CHURCHILL Sustainability Planning Framework

The Institute of
Urban Studies

University of Winnipeg

February 2011

Institute of Urban Studies (IUS)
at the University of Winnipeg

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URBAN STUDIES
UNIVERSITY OF WINNIPEG

Churchill Sustainability Planning Framework (CSPF)

February 2011

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Acknowledgement

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Vision for the Next 20 Years

The town of Churchill is a vibrant and resilient community that embraces our cultural and ethnic diversity, and cooperates to achieve shared goals. We maintain a friendly, small-town spirit while recognizing our role in the world as a gateway to the Arctic and a meeting of the boreal, marine and arctic eco-regions.

We recognize the interrelationships between people, community, local wildlife, and healthy ecosystems and take responsibility for actions that may impact the local and global environment. We have planned for and have adapted to changes in the environment.

We are proud to be a showcase for living green in a northern community. We facilitate an efficient cycle of resource use, minimizing waste and managing it responsibly. All residents take responsibility for maintaining a clean and aesthetically pleasing community.

Our community nurtures and promotes healthy families. A substantial proportion of our food is produced locally, contributing to a healthy and secure diet. Residents of all ages enjoy secure, safe, culturally appropriate and affordable housing. We understand the importance of elders and what they can contribute to the community, while cherishing our youth and recognizing that our future lies with them.

We have a thriving and diverse economy centered on our wealth of natural and cultural assets. Our local businesses promote economic opportunities for all citizens, and our community benefits from the wealth generated here. We have excellent education and training opportunities through which people of all ages and abilities can learn and achieve. We enjoy access to other communities through reliable, affordable and ecologically sustainable transportation.

The community's government and public officials contribute to a spirit of cooperation. The stewardship of diverse and significant interests involves considerations and actions that transcend traditional political boundaries.

Churchill is a place we are proud to call home and is the envy of visitors. Our children will benefit from growing up here and many of them will plan to make it their home for themselves and the next generations.

Executive Summary

The Sustainable Churchill Initiative was launched in August of 2008 as a collaboration between the Town of Churchill and the University of Winnipeg, with funding provided by Omnitrax Inc. It is overseen by a Steering Committee of Churchill residents and is managed by the staff of the Institute of Urban Studies, with the involvement of faculty and students at the University of Winnipeg.

The process has resulted in two previous publications: a Discussion Paper released in July of 2009 and an Interim Report that was submitted to the Steering Committee in December 2009.

The current report is the Churchill Sustainability Planning Framework (CSPF) which sets out the Vision, Values and Priorities for making Churchill a more sustainable community, and provides a "toolkit" for moving these priorities into action. It addresses the environmental, social and economic aspects of sustainability, and makes specific recommendations for the updated Community Plans and Urban Design. The report is geared towards answering the question,

> *how can Churchill be planned in such a way so as to provide the highest quality of life for all of its residents, over the long term while preserving the natural environment and maintaining social equity?*

In order to direct town of Churchill's resources toward achieving the community's vision, the current framework is oriented to six interrelated priority areas which may be summarized as:

Food Security
Defining and measuring "food security" is a complex matter, but being food secure is generally understood as a household having dependable access to affordable and nutritious food. In Churchill nourishing food is expensive to ship and purchase.

Economic Development
The local economy is reliant largely on tourism, public services and shipping. While the town needs to ensure that its status in tourism and shipping industries maintains, more opportunities are needed for new businesses and to retain local people.

Youth Education, Training and Recreation
Skills development is an integral part of economic development, particularly where youth are concerned. Education and training opportunities combined with a greater diversity of employment

and recreational activities would increase Churchill's appeal for young people. However, post-secondary educational attainment levels are comparatively low, except for Trades training.

Waste Management
Churchill's isolation, weather and polar bear population makes storing recyclables and compostables difficult. Furthermore, shipping trash for land filling in Thompson is expensive. While a new landfill will relieve pressure on present arrangements, a waste minimization strategy is needed, as are social marketing efforts to gain wider acceptance and cooperation on the part of local stakeholders and residents.

Housing
The housing market is imbalanced and distorted, with no private rental units and almost no new construction for 20 years, so the stock is aging and in need of upgrading and repair. There is a relatively high level of rentals as opposed to home ownership. There is a particular need for supportive housing for seniors. Additionally, the informal housing on "the Flats" represents a unique challenge in terms of governance, land titles and linkages to the rest of the town.

Built Environment
Churchill suffers from poor physical aesthetics. Overly wide streets make for a poor pedestrian environment and many properties are unkempt and filled with debris. Closer attention to the town's urban design could enhance the quality of life for residents and visitors alike.

The CSPF is geared towards exploring solutions for these key areas of concern, and in developing useful approaches for identifying practical measures for addressing them. The report outlines a "toolkit" that may be adapted for further planning purposes. The report concludes with recommendations for carrying these measures into implementation and beyond.

Broadly speaking the CSPF should not viewed as a sustainability policy per se, but rather should be considered to be a framework for the creation and implementation of a sustainability policy, one that can articulate a vision for the community, as well as underlying principles for achieving that vision. This framework should enable and encourage broad-based participation.

Churchill is a town that has tremendous assets: a globally strategic port, a strong tourism economy based on internationally renowned natural habitat, well-resourced research capacity and extensive

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public facilities that were originally built to serve a much larger population. At the same time, it is highly vulnerable to external circumstances, namely global climate change and the economics of international shipping. While Churchill is a popular international tourist destination this has not translated into broadly-shared wealth and well-being: there are sharp social and economic disparities. Those working for the major employers earn a higher median income than the province, but many of its residents live in aging public housing units. Its Aboriginal population is still recovering from a legacy of displacement, residential schools and isolation. In general the town has never recovered from the loss of the former military facility and rocket range, and its population is gradually declining. It is difficult to retain young people or attract new investment.

The town faces several pressing environmental issues. The most important contributor to its tourism economy – the polar bear population – stands to be severely threatened and even extirpated by climate change. The town needs a comprehensive strategy with which to deal with its new waste management regime. Finally, its built environment – most of it decades old – suffers from poor physical aesthetics.

What is needed is to address these many interrelated issues is to map out an approach that can articulate a vision for the town, identify strategies and take best advantage of the town's existing resources while identifying new ones. For this, a planning framework is needed.

The planning framework was used for the CSPF as an organized way to learn about and discuss Churchill's needs, to prioritize them, to set objectives and to identify specific projects that can work towards meeting those needs and achieving the community's vision. The goal of developing this framework was to provide an easy-to-use tool for stakeholders to plan collaboratively for their community and to promote informed community debate and decision-making.

The framework offers stakeholders the ability to consider various options and answer the following questions;

- Does it meet multiple human needs?
- Does it address multiple priorities?
- Is it consistent with our vision and values?
- Will it have significant impacts? How will these impacts be measured?
- Is it feasible?

Examining local issues in terms of meeting human needs gets closer to root causes and underlying conditions, and aids in devising holistic approaches to addressing these problems.

The first step in putting the "Framework to Action" was to give community members a chance to develop a vivid and collective image of where they want their community to be in 20 years. Setting out values helped the community identify ways to accomplish their vision in ways that are consistent with those values.

Community consultations took place in several stages and the results were published in the Discussion Paper and Interim Report. These findings were then used to identify areas of concern and to articulate community values. These criteria were then used to come up with a list of priorities which could be feasibly addressed.

Given limited resources, it was important to prioritize options and find ones that are not just feasible, but have the most impact. The impact of an option is evaluated based on its ability to meet multiple human needs and to have influence on several different priority areas. Each of these potential projects are then discussed in terms of the proposed "Toolkit", which evaluates them in terms of the following considerations:

- Is it consistent with the town's stated Vision and Values?

- How would this proposal address human needs?

- How would this proposal address community's priorities?

- Is It Feasible? How does its feasibility relate to its potential impact?

The next step is to act on these selected options/projects. For each project, attainable goals, objectives, and scope of the project should be clearly determined, as should be the time frame and the target group (who will benefit most). Any project would need to be undertaken within the available funding and resources.

The toolkit is then applied to a sample of these proposals to illustrate how it could be used. It should be noted therefore that the proposed options provided in the CSPF are considered potential options,

rather than as recommendations for action. They each require further study and consideration, and sources for further research are provided.

For each project, indicators of success should be clarified. What would success look like? How many people would ideally benefit? These indicators would help to evaluate the success and impact of the project, as well as enable the community to identify unforeseen challenges and adjust activities accordingly. Monitoring and evaluation would then, in turn, inform the whole framework for future planning purposes.

Following the review of options, the CSPF considers long-term planning as it relates to the built environment as well as broader strategic planning goals. After reviewing the Town's existing planning documents and Zoning Bylaw, the CSPF examines how Churchill could develop a high-quality physical environment that could help facilitate achieving many of the goals of sustainability and help promote a sense of community and civic pride, and as a result attract more tourists and new residents to the community.

The urban planning section considers Kelsey Boulevard, the Train Station Gateway and the Public Square in terms of principles of urban design, and makes a series of recommendations that are illustrated with computer-generated mock-ups of how the town could look in the future with these principles in mind.

Finally, the CSPF considers how the Town can mobilize itself so that these and other ideas may be realized – keeping in mind of course that all planning is iterative. Each change in the community initiates ripples that alter circumstances and needs, so that the planning context itself must be revisited regularly.

Given Churchill's small size, the likely actors all know one another and have histories of prior interaction that can either support the process or present a challenge. What is essential is that the players have assurance in the validity of the process itself, and that their commitment and efforts will be respected. Participants should be able to contribute to setting agendas and the establishment of the ground rules for their participation, which will go a long way to building trust and buy-in.

The CSPF, in addressing community issues, sets out potential goals and initiatives for ameliorating these conditions. To move forward, the community will need to determine an implementation

strategy that identifies available resources, existing initiatives, potential partners and commits local actors to taking responsibility for actionable items. These targets should be both short- and long term, with a set of indicators that may be used in the coming months and years to measure progress towards the goals of the CSPF.

The CSPF examines social, economic and ecological issues under the broad category of sustainability, and within contexts ranging from energy to personal fulfillment to governance to urban design. This holistic approach, combined with an iterative, adaptive process that encourages ongoing learning, should better enable the town of Churchill to identify its challenges and address them. The planning framework proposed in the CSPF is an adaptive tool, and ongoing results and project evaluations should inform each step, and the results should be monitored carefully to be able to modify the priority areas. While many of the issues facing the community are beyond the scope of what could be examined here, the approach proposed offers a pathway to sustainability.

CHAPTER ONE:

INTRODUCTION

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Chapter 1: Introduction
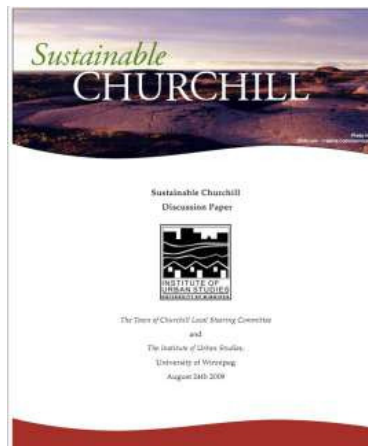
The Sustainable Churchill Initiative was launched in August of 2008 as a collaboration between the Town of Churchill and the University of Winnipeg, with funding provided by Omnitrax Inc. It is overseen by a steering committee of Churchill residents and is managed by the staff of the Institute of Urban Studies (IUS), with the involvement of faculty and students at the University of Winnipeg.

Initial consultations began in the fall of 2008, when IUS staff observed consultations already underway by Earthbound Environmental concerning the town's waste management options.

In March of 2009 several student researchers conducted key informant interviews and surveys as well as a youth engagement session at the Duke of Marlborough School. A brochure describing the project was mailed to residents and an online version of a survey was mounted in May of 2009. As well, a Facebook Page was launched.

In August 2009 IUS Director Jino Distasio returned for the Aspen Institute Tour and the Chamber of Commerce Meeting. Later that month, and in advance of more consultations, a *Discussion Paper* was released. It was mounted on the town's website, and a newsletter highlighting the report was distributed to every mailbox in the community.

At the end of August 2009 major consultations were held. Ten researchers from IUS and the University of Winnipeg – including several undergraduate students and Winnipeg Elder Thelma

Meade – travelled to Churchill to conduct interviews, hold public meetings and conduct planning exercises. The results of these consultations were analyzed and synthesized in a Draft *Interim Report* that was submitted to the Steering Committee in December 2009.

Over the Winter 2009-10, IUS staff worked on developing the Churchilll Sustainability Planning Framework (CSPF), as well as preparing further analysis, including a detailed demographic profile (see Appendix 1). Towards the end of March the Draft Interim report was returned for corrections and amendments.

In April 2010 a focus group session was held with the University of Winnipeg researchers who had been involved in the research and consultations in order to review and confirm the findings of the Interim Report. The findings from this session helped in refining and augmenting the report and process.

In July 2010, IUS researchers returned for meetings with the Sustainability Committee to report on progress and confirm approaches. The Interim Report was made public in November of 2010, highlighting the findings from the various consultations, and identifying issues, priorities and community assets. The fall of 2010 was spent finalizing the draft CSPF.
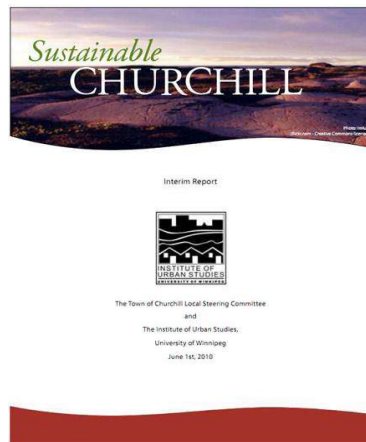
1.1   What is the Churchill Sustainability Planning Framework (CSPF)

The Churchill Sustainability Planning Framework (CSPF) is intended to map out how the town of Churchill could go about planning for its future, especially in terms of some of the particular issues and challenges that were identified in the consultation process.

The CSPF does not set out exactly what should be done, when and in what order. Because of this, it is not a Plan as such but is instead intended to be a framework for planning.

The CSPF sets out the Vision, Values and Priorities for making Churchill a more sustainable

community, and provides a "toolkit" for moving these priorities into action. It addresses the environmental, social and economic aspects of sustainability, and makes specific recommendations for the updated Community Plans and Urban Design. The report is geared towards answering the question:

"how can Churchill be planned in such a way so as to provide the highest quality of life for all of its residents, over the long term while preserving the natural environment and maintaining social equity?"

The intended outcome of the CSPF is to:

- enable the people of Churchill to make positive changes to the ecological, social, and economic aspects of their community;
- provide educational and capacity-building opportunities for both the residents of Churchill and the students and faculty of the University of Winnipeg;
- contribute to the long term goal of moving conceptual elements of the CSPF toward implementation; and
- result in a regular reporting mechanism that monitors progress with measurable indicators to demonstrate progress, engages the community and encourages accountability.

The researchers have strived to produce a sustainability planning framework that:

- represents the aspirations of Churchill residents;
- is based on sound policy and scientific research;
- is practical and feasible with fundable initiatives;
- will contribute substantially to the revision of the Town's official Development Plan; and
- can serve as a model for other northern communities.

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1.2 What is Sustainable Development?

Sustainable development is most often conceived – consistent with the Brundtland Commission report Our Common Future – as forms of development "that [meet] the needs of the present without compromising the ability of future generations to meet their own needs."

This simple statement underlies what are referred to as the three "pillars" of sustainability: the social, the economic and the ecological. A fourth, the cultural, is also considered important. To be sustainable over the long term, economic activities must not draw too many resources to be sustained, nor contaminate the environment with waste products to an extent that it becomes dangerous and uninhabitable. Activities must also not be detrimental to the well-being of people, but rather improve their quality of life – which would also encompass their culture, or way of understanding the world. The goal of sustainable development is known as the "triple bottom line:" economic prosperity, environmental quality and social equity.

Sustainable development should achieve a more equitable balance between human needs and those of nature, such that local economies are able to benefit diverse social groups and create a high quality of life while not drawing down natural capital.

The most commonly discussed dimensions of sustainable development include: minimized energy consumption and use of renewable energy; compact development minimizing the consumption of land; a reduced need for transportation; preserved agricultural lands and habitats; minimized waste streams and the use of wastes for other processes; the conservation of water and utilization of natural hydrologic cycles; and the preservation of biological diversity. These goals are key not just to the ecological viability of a sustainable community, but also to ensuring a high quality of life for its residents.

Of the three main components of sustainable development, perhaps the most difficult to realize is social sustainability. This dimension recognizes the importance of social equity in planning decisions, so that efforts to improve the sustainability of the physical and economic functioning of the community do not harm or diminish the quality of life of its most vulnerable populations. It emphasizes the creation of a high quality of life for all by ensuring that the benefits of development are shared equally by everyone. Socially sustainable development creates opportunities for citizens to fulfill their potential and to be more self-reliant, both as individuals and as a society.

Public Consultation
in Churchill

Source: David van Brink/flickr

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1.3   Why Plan?

We are living in a rapidly changing era of globalization, rapidly advancing information technology, and a wide range of social, environmental and financial crises. Despite its remoteness, Churchill is intimately connected with and affected by many of these issues; therefore, having a broadly-based, wide-ranging sustainability plan is more crucial now than ever. With a sound sustainability plan a community is better able to adapt to and resolve some of these challenges; without such a plan a community might fall victim to them.

With limited resources available in small communities and shrinking budgets and grants, it is important to prioritize a community's needs and find solutions which have most impact and less cost for the community. The framework produced in the CSPF is a commonsense tool to help officials and citizens to prioritize their needs and find systematic solutions based on their resources.

In order to direct Churchill's resources toward achieving the community's vision, the current framework is oriented to six interrelated priority areas, which were identified as a part of the ongoing consultation process outlined above.
These can be summarized as:

Food Security
Defining and measuring "food security" is a complex matter, but being food secure is generally understood as a household having dependable access to affordable and nutritious food. In Churchill nourishing food is expensive to ship and purchase. Sometimes scheduling and technical problems on the Hudson's Bay rail line can mean store shelves run empty. Alternative means are required to ensure that nutritious food is available, accessible and affordable. Such alternatives could involve more resident participation in growing and procuring food in cooperation with existing institutions and retailers.

Economic Development
The local economy is reliant largely on tourism, public services and shipping. While the town should ensure that its status in tourism and shipping industries is maintained, more opportunities are needed for new businesses and to retain local people. Improving access to economic opportunities is key to improving the quality of life and social equity.

Source: chinadialogue.net/flickr

Residential area in the Flats (Churchill)

Picture by Fereshteh Moradzadeh

Youth Education, Training and Recreation

Skills development is an integral part of economic development, particularly where youth are concerned. Education and training opportunities combined with a greater diversity of employment and recreational activities would increase Churchill's appeal for young people. Despite being a regional center for the university college of the North, post-secondary educational attainment levels are comparatively low, except for Trades training. Individuals without certified education have poorer economic prospects, and as a result are not fully able to participate in the local economy. Institutional capacity for furthering education needs to be developed locally. Stronger connections are needed between education and employment through mentoring and business incubation. While Churchill has recreational facilities in the Town Centre, young athletes must go elsewhere if they want to train and compete.

Waste Management

Churchill's isolation, weather and polar bear population makes storing recyclables and compostables difficult. Furthermore, shipping trash for land filling in Thompson is expensive. While a new landfill will relieve pressure on present arrangements, a waste minimization strategy is needed, as are social marketing efforts to gain wider acceptance of and cooperation on the part of local stakeholders and residents.

Housing

The housing market is imbalanced and distorted, with no private rental units and almost no new construction for 20 years, so the stock is aging and in need of upgrading and repair. There is relatively high level of rentals as opposed to home ownership. Although housing is affordable, there is a little demand for new housing. In the absence of new demand (such as a growing economy or major public investment) housing conditions are largely determined by provincial policies and practices. Additionally, the informal housing on "The Flats" represents a unique challenge in terms of governance, land titles and linkages to the rest of the town.

Built Environment

Churchill suffers from poor physical aesthetics. Overly wide streets make for a poor pedestrian environment and many properties are unkempt and filled with debris. Closer attention to the town's urban design could enhance the quality of life for residents and visitors alike.

The CSPF is geared towards exploring solutions for these key areas of concern, and in developing useful approaches for identifying practical measures for addressing them. The report outlines a "toolkit"

that may be adapted for further planning purposes. The report concludes with recommendations for carrying these measures into implementation and beyond.

It is important however to stress that, as the academic partner in this initiative, the Institute of Urban Studies and the University of Winnipeg cannot take ownership of the planning process or implement its recommended outcomes; these tasks will lie with stakeholders in the community, including the municipal government. The Plan's success will depend upon the extent to which stakeholders in Churchill can work together, so as to take ownership and leadership in carrying the CSPF forward into implementation, monitoring and evaluation.

1.4   What Will the CFSP DO?

The CFSP will set out what the issues are, how they might be approached, and the processes for addressing them most effectively. It explains these processes and suggests a number of strategies that might be adopted to improve social, economic and environmental well-being, including urban design ideas.

Chapter 2 explores and summarizes some of the major areas of community concern and needs. This will include a brief outline of local conditions based in part on the most recent community statistics but also those issues community members shared with the research team.

Chapter 3 explains the planning processes used to develop the CFSP and how these can be used by community residents for any future planning needs. Then this framework is put into action by identifying community needs and potential strategies for addressing them. The framework then demonstrates how these strategies can be assessed for their appropriateness and feasibility by focusing on two specific proposals. The intention here is not to draw actual conclusions about these proposals but rather to illustrate how the framework can be used for making such assessments in the future.

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Chapter 4 then turns to the built environment and considers Churchill's official planning documents, including its Zoning Bylaw, and how these might be amended. Then a series of urban design proposals are presented that illustrate how the built environment could be enhanced to improve the town's image and quality of life.

Chapter 5 then sets out some next steps for turning the CFSP into action. These include the development of additional strategies and guidelines for measuring future successes. The Framework also suggests official recognition for sustainability planning on the part of Town Council.

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CHAPTER TWO:

COMMUNITY PROFILE

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Chapter 2: Community Profile

The aim of this section is to provide background information on the community of Churchill and the range of issues identified during the consultation process. First we consider the context of northern communities before examining key social, economic and environmental issues.

2.1   Issues Facing Northern Communities

Canadian Northern communities are distinct and often face unique challenges which differ from those found in the south. Most northern communities were originally formed or founded for the conduct of a single economic activity, primarily trade-related (beginning with the fur trade) or resource extraction (minerals, timber etc.). If a community's primary economic activity is drastically reduced or discontinued (as has happened in many cases) a community may struggle to diversify its economy to maintain a good quality of life and prevent out-migration.

Reduction in Federal income tax transfers to municipalities in the 1990s (1) , unemployment and income disparity, along with little economic diversification all contribute to the challenges these communities face. Many northern communities have been subject to political neglect combined with

cultural isolation, a lack of infrastructure and material deprivation. As well, Aboriginal communities in the North struggle to preserve and enhance their cultural identity while planning for social and environmental sustainability. Value systems amongst northern communities and their citizens may differ as to the view of sustainable development and their approach to achieving sustainability. There is often a pronounced tension between economic development, ecological conservation and the need to maintain traditional ways of life.

The viability and sustainability of many northern communities can be dependent on (and vulnerable to) sources and forces outside the community such as commodities markets, policy decisions at other levels of government and the priorities of private investors. Difficulties in aligning the interests of these outside parties with interest groups within the community may exist. Local residents may feel that their desires, views, abilities and potential contributions are overlooked or disregarded by southern economic interests and government. The distance from northern communities to centres of power in the south can often result in a political and social isolation of the community. Long physical distances, high travel costs, and frequent harsh weather contribute to a community's actual and perceived isolation (2).

This isolation of northern communities can contribute to difficulties in accessing adequate infrastructure, sanitation, and diet, which can in turn lead to poor community health outcomes and low levels of social well-being. Remote communities can also suffer from an inability to attract and keep an appropriate number and quality of health professionals and services. Intergenerational medical issues and socioeconomic status can have a large impact on the health status of residents and health related issues including addiction and alcohol abuse may be prevalent (3).

These general observations are intended to situate Churchill's concerns within broader issues common to the North. What is unique about Churchill is that it not only shares some of these experiences, but has a great many significant attributes in terms of its location, habitat, infrastructure and economy.

2.2   Churchill Overview

Churchill has a distinct role in Manitoba's North in terms of tourism, scientific research, international shipping, and health services.

The Hudson Bay Lowland, of which Churchill is part, encompasses the tundra and wetlands surrounding the coast. The area serves as important habitat for polar bear, beluga whales, caribou, waterfowl, and a wide range of avian species. Churchill is often considered a "gateway" to the Arctic in Canada and is at a junction of the boreal forest, arctic tundra, and arctic marine ecosystems.

The town's location on the eastern side of the prairies and the western shore of Hudson Bay makes it geographically important for trade in Canada. Operating since 1931, and as Canada's principal seaport on the Arctic Ocean, the port facilitates the trade of grain between the Prairie Provinces, Europe and beyond (Fig. 1 and 2).

Following years of troubled and uncertain operations, in which authority for the single rail line into Churchill rested with CN and the port with Ports Canada, then-minister of western economic diversification Lloyd Axworthy commissioned a report that recommended these be put under one authority. In 1997 the rail line and port were transferred to Denver-based OmniTRAX Inc (4).

The global significance and usefulness of the port is now being promoted by the Churchill Gateway Development Corporation, a multi-stakeholder public-private partnership founded in 2003 consisting of the provincial and federal government as well as OmniTRAX.

In 2007, the provincial and federal governments committed $68 million to upgrade the rail line and port (5). A keystone of the port's importance is the burgeoning 20,000 acre CentrePort Canada planned for development adjacent to Winnipeg's James Armstrong Richardson International Airport. As Canada's first designated Foreign Trade Zone (FTZ), CentrePort will function as an "inland port", connecting manufacturers, shippers and investors to global markets through its geographic concentration of air, rail and shipping links – including Churchill's. A recent international summit held at the University of Winnipeg promoted Churchill's role as an "Arctic Gateway" to Asia (6).

Churchill's Grain Elavator
From Kelsy Blvd.
Picture by Fereshteh Moradzadeh

Figure 1: Port of Churchill and the Grain Elevator

Source: http://www.portofchurchill.ca/cms/index.php/cms/photos/13

Figure 2: Strategic Location of Churchill

Source: http://blog.markusgaertner.com/2010/04/26/die-wette-des-jahrhunderts

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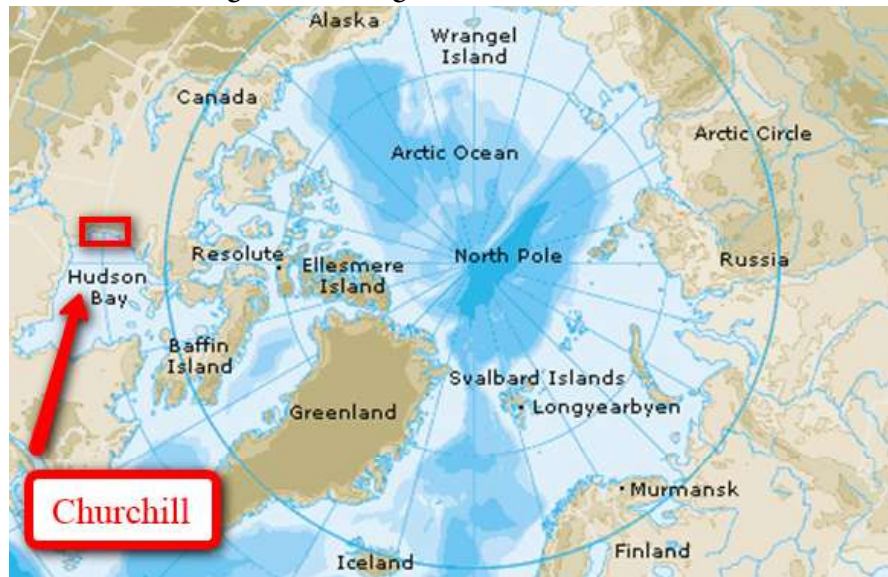
The later formation of sea ice in the fall on Hudson Bay and earlier spring break-up, both a result of climate change effects in the Arctic, may also allow a lengthening of the currently brief shipping season in the region. To support the expansion envisioned the Churchill Port would require upgrading in order to handle more than bulk grain and provide access to container ships carrying imported and exported consumer goods.

Churchill has long been strategically important. The military base of Fort Churchill was established in the summer of 1942 as one of the bases on the Crimson Air Staging Route to Europe. The town helped supply and feed nearly 2,000 American troops. While the end of the Second World War brought an end to the base's primary function, both Canadian and American forces used the air force base as a training centre.

Although military functions began winding down in the early 50s the base saw renewed use from the Churchill Rocket Research Range. Built to study the effects of Auroral activity on long distance communications in 1954, the range was expanded as part of Canada's participation in the International Geophysical Year in 1956 and again in 1959 when the U.S. began to test new solid fuel propellants in its upper atmospheric research rockets. The Churchill Rocket Research Range continued to host launches for research until closing in 1984.

The Churchill Northern Studies Centre, located 23 kilometres east of the town, utilizes the site of the now-closed rocket range. Founded in 1976, this independent not-for-profit research and education facility provides accommodations, meals, equipment rentals, and logistical support to students and researchers working on a diverse range of topics of interest to northern science. Thanks in part to funding provided by OmniTRAX, the Centre is at present completing a new green LEED accredited facility that is scheduled to open in June 2011.

The Churchill Regional Health Authority (CRHA) has a major role in northern health delivery, health policy innovation and northern health research. The CRHA, housed in the Town Centre complex, provides a broad range of modern health services to patients from Churchill and the region, including many communities of Nunavut. The CRHA facility provides 44 beds (about one for every 20 Churchill residents) and employs over 100 people, making it a significant contributor to the local economy.

Cannon at Prince of Wales Fort in Churchill
Source: Francesco Veronesi/Flickr

Churchill Rocket Research Range
Picture by Fereshteh Moradzadeh

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Tourism is a major economic driver in Churchill, not only because of polar bear activity but for beluga whales, migratory birds and northern lights. Due to the seasonal nature of tourism, as well as regional health care patients, Churchill's population fluctuates on a seasonal basis.

Like any community, Churchill also faces some challenges. Many of these are common to northern communities in Canada (discussed in the previous section); however some are particular to Churchill. Churchill's geographic isolation from the rest of the province (there is no road access and the town is 1,697 km by rail from Winnipeg) means that travelling to Churchill can be expensive and/or time consuming – particularly by rail – limiting mobility and hindering potential development.

Certain areas of the town fall under the jurisdiction of different levels of government and private sector authorities, making some planning decisions more complex. The map below (Fig. 3) shows different types of ownership within Churchill's urban district.

Figure 3: Churchill Ownership Map

Category 1: Private
Category 2: Municipally Owned
Category 3: Provincially Owned

Scale:

50 m
200 ft
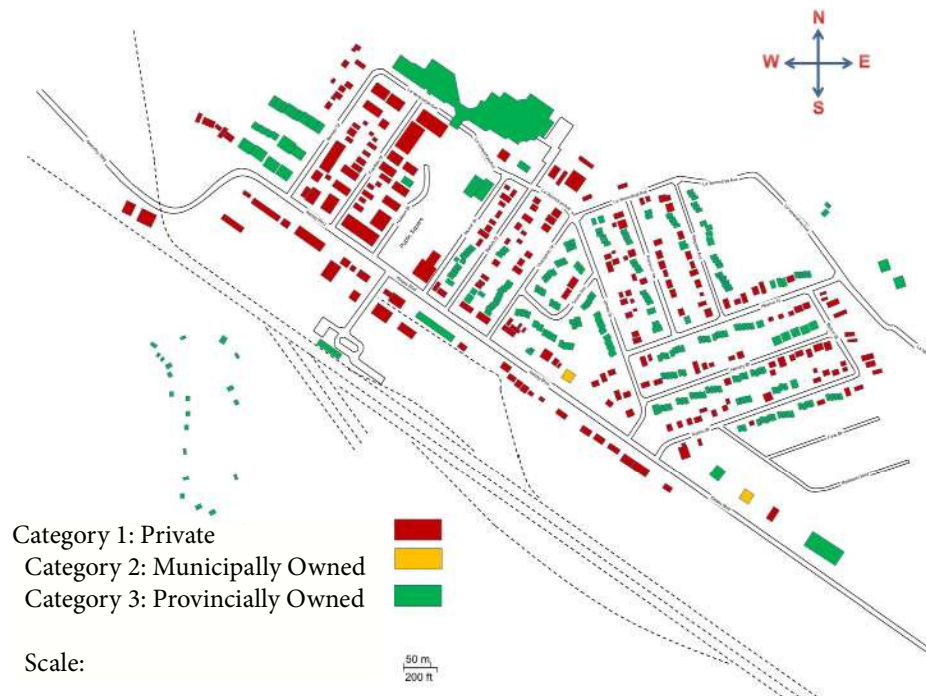
Map by Institute of Urban Studies

The Port of Churchill is owned and operated by the American-owned firm Omnitrax. Also, much of the housing stock is owned and operated by Manitoba Housing and therefore under provincial control. The map below shows (Fig. 4) Manitoba Housing and private housing distribution within the Churchill's urban district.

Figure 4: Churchill Ownership Map
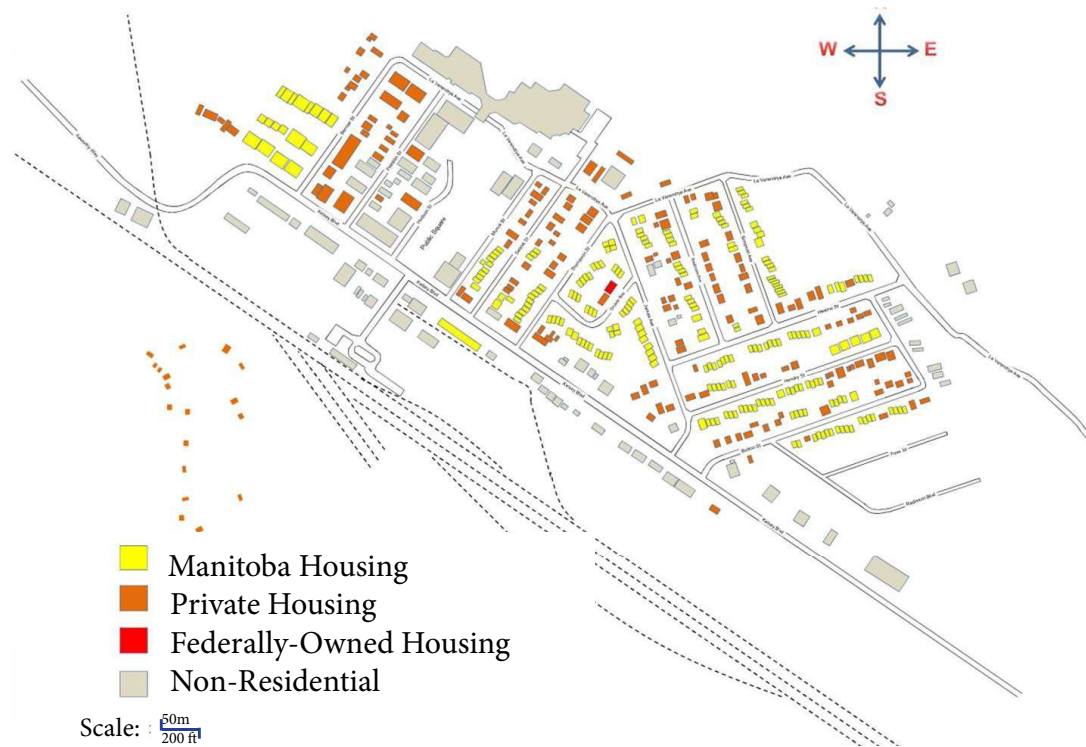
Map by Institute of Urban Studies

Churchill's majority Aboriginal population is a mix of Cree, Dene, Inuit, and Metis peoples. The Cree residents are largely from York Factory (or Landing). Unfortunately, the town's history includes a series of tragic federal policy decisions that had grave impacts on Aboriginal people. In 1956, the department of Indian Affairs decided that the Duck Lake Sayisi Dene needed to be moved from their traditional lands to prevent them from hunting Caribou, which conservation officials believed to be

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THE FLATS

The yellow highlight shows the location of the flats. Source: Google Map

A Typical House in the Flat
Picture by Fereshteh Moradzadeh

at risk. These displaced families – some 300 people – were left on the shores of Hudson's Bay with no resources, and then moved to "Camp-10" adjacent to the town's cemetery in 1959. For years they lived in terrible conditions and fell victim to alcoholism, violence and a loss of their traditional way of life. In the 1970s the survivors banded together and moved to Tadoule Lake, some 250 kilometres west of Churchill; but by then a generation of this Dene band (an estimated 100 people) had perished (7).

Unemployment, poor physical and mental health, alcoholism and inadequate housing were serious problems for displaced families, and the lack of physical infrastructure exacerbated the isolation between the community enclaves (Churchill, Fort Churchill, The Flats, Camp-10) which had developed since the 1950s. Camp-10 and the Flats had inadequate sewer, water or waste services, leaving many exposed to substandard hygienic conditions and diseases. The map below (Fig. 5) shows that most of the Flat is under provincial ownership.

Figure 5: Ownership of the Flats
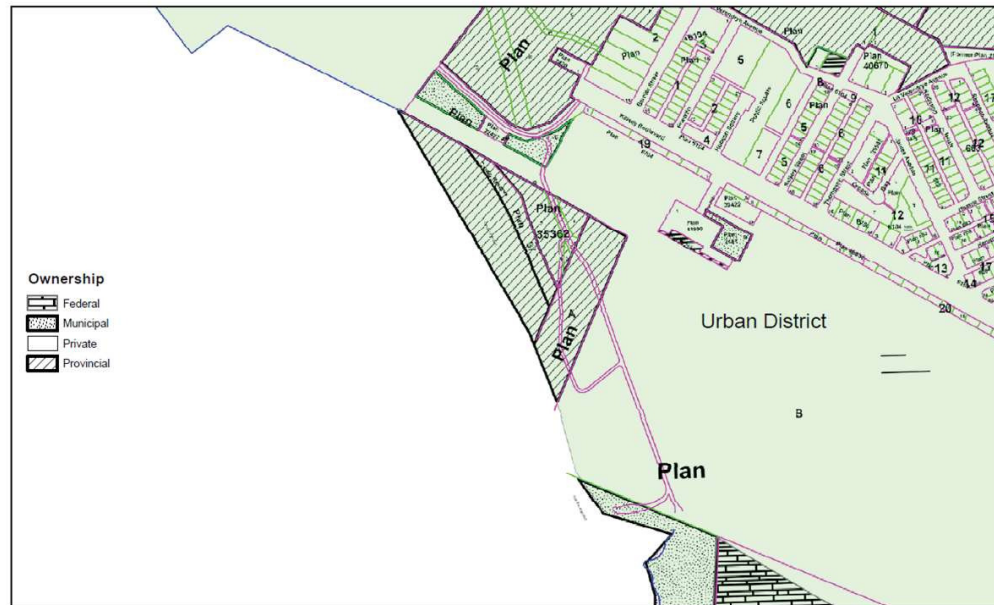
Source: Manitoba Local Government, Community and Regional Planning
Note: The map was created from available property assessment data and may not include ownership of properties not assessed

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Today Cree, Inuit, Dene and Metis people comprise the majority of the town's residents. The Flats remains settled, although is not formally a part of the townsite. Its history includes whaling, fishing and traditional economic activity. Housing in the Flats is informally settled on plots of federally and provincially owned land, meaning that the current residents have no formal tenure to their housing. The Flats is also included in the town's existing Development Plan (2000, p.7):

> *"Residents of the area southwest of the community, south of the railway line will be encouraged to redevelop their properties to municipal standards"*

Many of the issues related to the town's economic and social sustainability relate to the fact that in some ways it is no longer the hub that it once was: it is no longer a military base and its loss of population has occurred at the same time that other northern communities have developed larger populations and capacities of their own. At the same time, Churchill still remains an important shipping node and major tourist destination, and both of these major functions stand to be affected by climate change.

However, for all its potential, its challenges and its contradictions, the Town of Churchill as a jurisdiction has limited authority to respond effectively to many of these challenges. It will need to work with other levels of government and stakeholders within the business and third sector in order to address them.

2.3   Review of Social Conditions and Issues

2.3.1   Social Indicators

A review of major socio-demographic indicators reveals a number of pronounced social and economic characteristics and trends (for a more complete analysis with data tables, please see Appendix 1). Churchill's population is both aging and declining, with a diminishing population of

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employable young adults. Meeting the needs of an increasingly older population (housing, medical and social supports) will need to be a greater priority.

Aboriginal identity represents a tremendous cultural resource for the town. There is a significantly growing Aboriginal population (Appendix 1, Figure 4), pointing to the need to ensure more culturally-appropriate services, education, training and employment opportunities for Aboriginal residents, so as to facilitate capacity-building, and a greater degree of Aboriginal participation in the local economy. Ensuring political engagement of the majority population and to promote Aboriginal culture and history between generations is essential.

The town is also remarkably mono-lingual, (Appendix 1, Figure 6) with almost no non-English speaking residents which is something of a barrier for a town that is a hub of transportation and tourism – it would be beneficial to have residents who can speak languages other than English. Attracting newcomers from other countries to increase cultural and linguistic diversity would stimulate the local economy and tap into new sources of innovation.

The proportion of married families in Churchill is much less than the provincial average, while the proportion of common-law-couples is much higher. There is also a disproportionate number of single-parent families, almost half of which (unusually) are headed by men (Appendix 1, Figure 8).

More supports are needed for single-parent families, particularly female-led households which earn far less than their male counterparts. An examination of income levels (Appendix 1, Figures 12-13) shows Churchill has very low levels of social sustainability, in terms of disparities between income groups. According to the Churchill Regional Health Authority (CRHA Annual Report 2009):

> *"In communities where the discrepancy between the richest and poorest populations is the greatest, the health is the worst. In populations with the least discrepancy in incomes across the population, health status is the best, regardless of the overall income level".*

Measures are needed to improve the quality of life for its families by providing more economic and social supports.

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Educational attainment levels, including for high school diplomas (Appendix 1, Figure 9-10) are comparatively low, except in the case of Trades training. Barriers for school retention should be identified, and linkages between education and employment opportunities should be strengthened, potentially through mentoring and business incubation. Generally, individuals without certified education have poorer economic prospects, and as a result are not fully able to participate in the local economy. Institutional capacity for furthering education needs to be developed locally. An examination of fields of studied (Appendix 1, Figure 11) shows that most students enter education, public administration, architecture, engineering, social sciences, the physical sciences and training for service-oriented careers.

Young women appear to face challenges in obtaining certified education. Youth education and retention strategies will need to be a part of broader economic development strategies. Many of its residents have lower levels of educational achievement except for in the trades, and are underrepresented in the arts, math and computing.

Because of the great distances involved for shipping, Churchill residents must pay comparatively high costs of goods, especially food. Defining and measuring "food security" is a complex matter, but being food secure is generally understood as a household having dependable access to affordable and nutritious food. The Canadian food guide recommends consuming 5-10 fruits and vegetables a day. According to the Churchill Regional Health Authority (Fig. 6), those reporting consuming these amounts daily in Churchill (33.9%) are proportionately similar to the provincial statistics (34.5%).

Figure 6: Consumption of Recommended Fruits and Vegetables

	2003	2005	2007	2008
Manitoba	36.6%	34.5%	37.2%	34.5%
Burntwood/Churchill	29.1%	n/a	29.4%	33.9%

Source: Manitoba. Community Health Assessment 2009. Churchill Regional Health Authority. Web. 17 Feb. 2011, <http://www.churchillrha.com/pdfs/comhel09.pdf>

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However, when looked at national averages – and particularly if those are broken down by sex, we see that (Fig. 7), as of 2008, nearly 50% of Canadian females reported eating 5 servings per day of fruits and vegetables – significantly higher than Churchill's average of 33.9%.
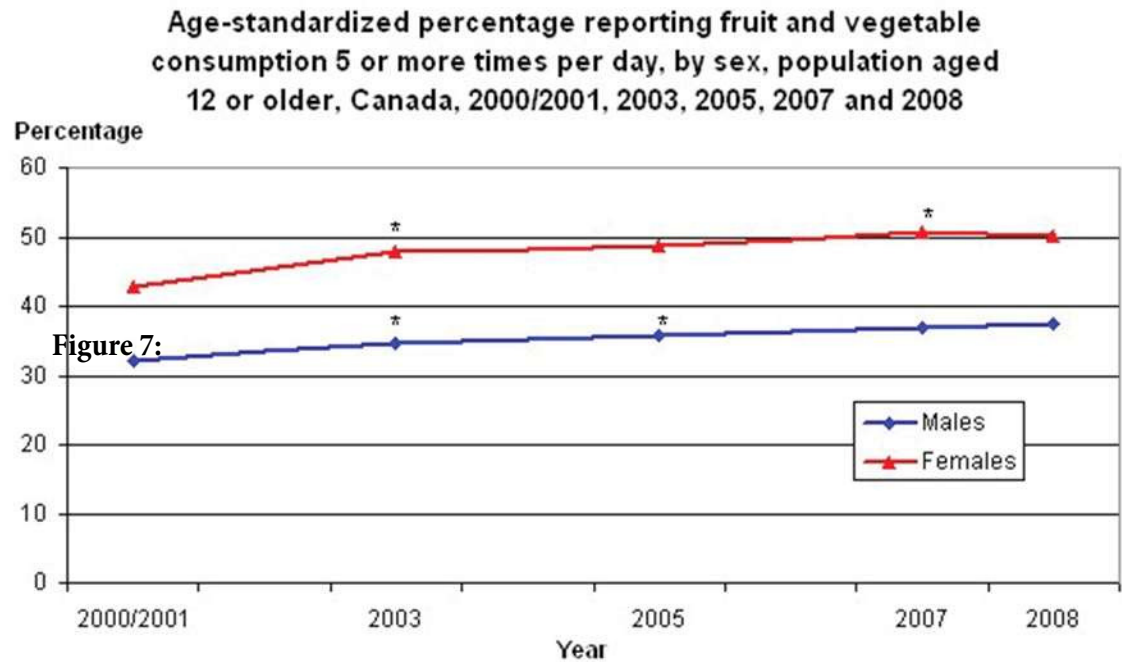
Figure 7:

Age-standardized percentage reporting fruit and vegetable consumption 5 or more times per day, by sex, population aged 12 or older, Canada, 2000/2001, 2003, 2005, 2007 and 2008

Source: Manitoba. Community Health Assessment 2009. Churchill Regional Health Authority. Web. 17 Feb. 2011, <http://www.churchillrha.com/pdfs/comhel09.pdf>

A major factor in the lower consumption of fresh fruits and vegetables is owed to the fact that these must all be delivered by train or plane. As a result, the cost of an nutritious food "basket" in Churchill is significantly higher than for other communities in Manitoba. As we can see in the following figure (Fig. 8), Churchill residents must deal with extremely high grocery costs.

A "nutritious food basket" can cost nearly $80 more than a comparable amount of goods in other Manitoba communities. These statistics confirm the considerable anecdotal evidence gathered for the Sustainable Churchill process, to the effect that food costs are a significant burden for local residents, and that this has a detrimental effect on food security.

Figure 8: Nutritious Food Basket Cost
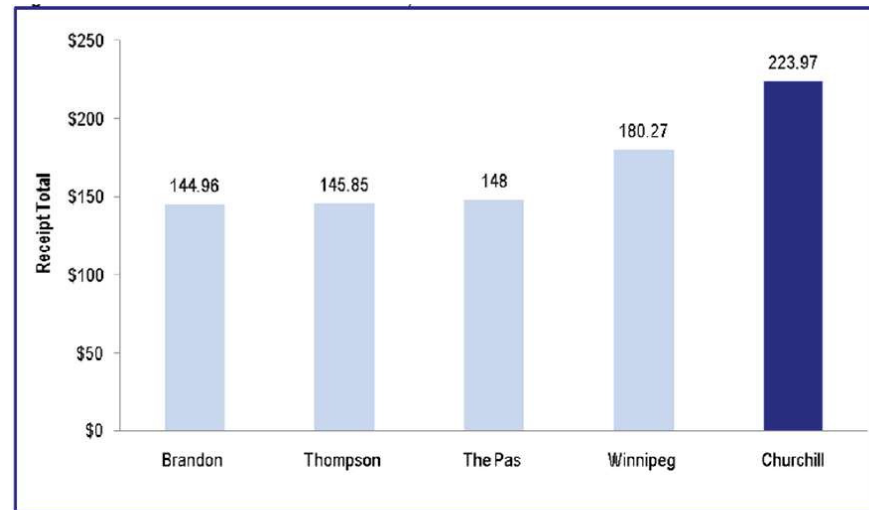
Source: Manitoba. Community Health Assessment 2009. Churchill Regional Health Authority. Web. 17 Feb. 2011, <http://www.churchillrha.com/pdfs/comhel09.pdf>

2.3.2   Economy

According to the Statistics Canada data analyzed by the Regional Health Authority, there are 4 major areas of economic activity: wholesale and retail employment - reflecting the tourism sector (19.3%), health and education - reflecting the presence of the Regional Health Authority (RHA)

and the school (23.7%); business services, also at 23.7%; and "other services" at 27.2%, indicative of shipping and transport activities. Manufacturing and construction (4.4%) and finance and real estate (2.2%) represent a very minor portion of the town's economic activities (Fig. 9 and 10).

Comparisons with the province as a whole are revealing. There is no resource-based activity in the town, and almost no manufacturing or construction, whereas these are both significant elements in the provincial economy. The economy of the town is driven primarily by retail, business and other services and health care.

These categories are reflected in data detailing the types of employment available to residents in Churchill, which are predominately sales and service occupations (hotels, restaurants and retail), consistent with its predominately tourism-driven economy.

The next largest area of occupation relates to transportation and the operation of equipment, in association with the Port of Churchill and the railway. Management occupations not surprisingly are also significant, given the major institutions that are present in the town – the Port, Parks Canada, Manitoba Housing and the Regional Health Authority. Next we see that education and government (the school and the Town Centre) employ some 9% of the residents, while health (the Regional Health Authority) employs 4%. Primary industry and manufacturing employ very few residents. Natural and applied sciences – largely through the Northern Studies Centre – employs 3% of the working population.

The town has a relatively high unemployment rate, highly seasonal employment (with a high rate of participation) and many eligible workers involved in unpaid caretaking work.

Reviewing the types of economic activity in the town shows that the local economy is rather unbalanced, depending largely on tourism, transportation and public services (Fig. 11). There is almost no manufacturing or resource development. Diversifying the economy to provide a wider range of stable (i.e., year-round) employment opportunities would be advised. Supporting such efforts however should be the development and funding of more daycare spaces to permit parents and caregivers (especially from one-parent households) to seek work.

Transportation and warehousing is the most significant component of the local economy, far outstripping the importance of this sector provincially. Health care and retail services are almost equally important – however the latter is largely seasonal.

Figure 9: Economic Activities
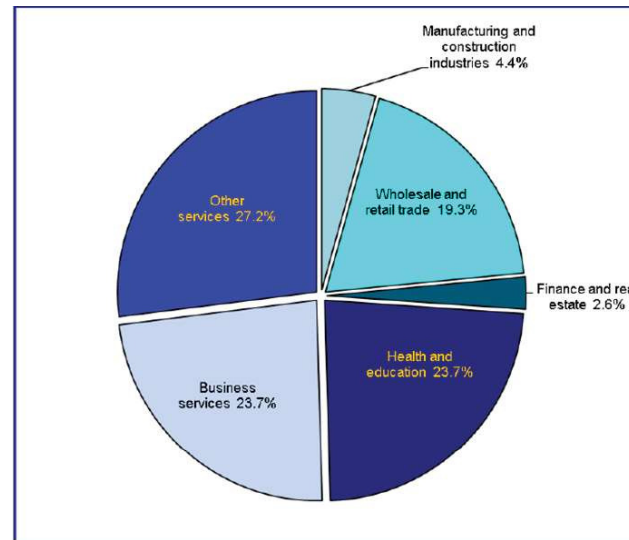
Figure 10: Employment in Churchill

Employment	Churchill			Manitoba		
	Total	Male	Female	Total	Male	Female
Agriculture and other resource-based industries	0.0%	0.0%	0.0%	7.9%	11.1%	4.3%
Manufacturing and construction industries	4.4%	3.3%	0.0%	15.8%	23.6%	7.1%
Wholesale and retail trade	19.3%	19.0%	16.1%	14.7%	14.9%	14.5%
Finance and real estate	2.6%	0.0%	7.1%	5.2%	3.9%	6.7%
Health and education	23.7%	10.3%	37.5%	20.5%	9.4%	32.8%
Business services	23.7%	34.5%	14.3%	15.8%	18.9%	12.4%
Other services	27.2%	32.8%	19.6%	20.1%	18.2%	22.2%

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Figure 11: Economic Activity by Sector
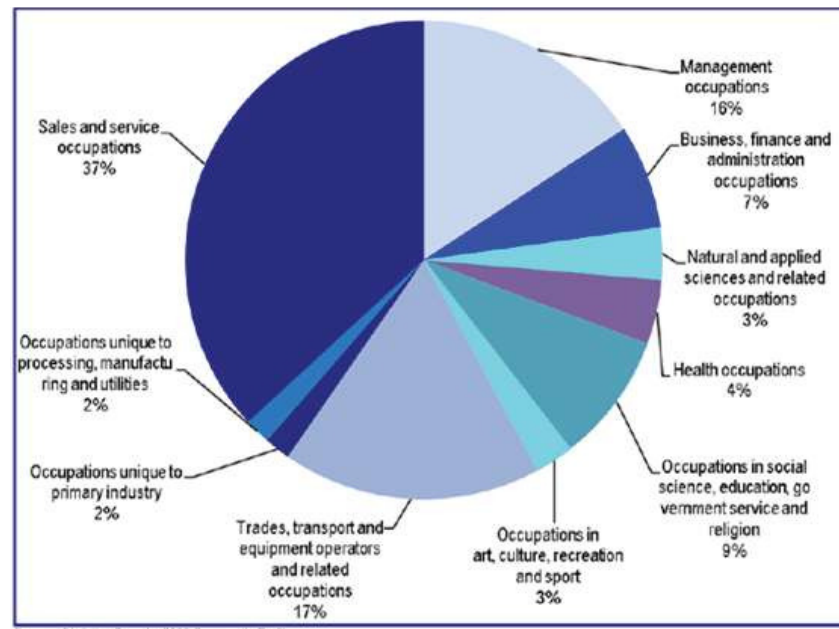
Source: Manitoba. Community Health Assessment 2009. Churchill Regional Health Authority. Web. 17 Feb. 2011, <http://www.churchillrha.com/pdfs/comhel09.pdf>

A significant issue for Churchill is its high unemployment rate of 14.5% which is nearly 9% higher than the provincial median. However the unemployment rate should be considered in light of the very high participation rate of over 80% which exceeds the provincial rate by more than 20%.

A significant portion of town residents receive their income on a seasonal basis and cause the unemployment rate to fluctuate greatly throughout the year (9). It should also be noted that the Town's participation and employment rates both declined, while the unemployment rate increased slightly from 2001 to 2006.

Tourism accounts for at least 40% of the local economy in Churchill, employing some 130 people directly, and 50 indirectly (2). Upwards of 12,000 visitors– many from the U.S.– come during the six-week prime polar bear viewing season from early October to mid-November (10).

Businesses catering to tourists are numerous in Churchill for a town of less than 1000 people. The town has nine hotels and five bed and breakfast establishments. There are six dining establishments in town as well as ten retail outlets catering to tourists. Some thirteen tour companies operate in the town, offering a variety of services including polar bear viewing via tundra buggies, as well as hiking, bird watching, dog sledding, kayaking, and snorkelling.

A concern raised during consultations is that presently the tourism infrastructure lacks a streamlined and consistent response to visitor inquiries to the Town of Churchill, Churchill Chamber of Commerce, Destination Churchill (member based only), Travel Manitoba or other related agencies. A position that could coordinate information between these would help address this, but would need to be up-to-date on accommodation availability, activity availability, etc.

2.3.3   Housing Conditions

Unlike the case in most Manitoba communities, the majority of Churchill's private residential structures are not owned by their occupants. According to the 2006 census, only 38% of Churchill's housing stock is owner-occupied while the rest (62%) is occupied by renters.

It appears that this unusual situation is a result of relatively low number of single detached houses (38% of the total housing stock) and the large stock of semi-detached and row houses in the town – which otherwise represents a small proportion of the housing stock in Manitoba.

Virtually 100% of the rental housing stock is owned and managed by the province (Manitoba Housing). The majority of this housing (93.6%) was also constructed prior to 1980, a major factor in the relatively high rate of housing needing major repair (16.8%), as compared to 10.3% provincially. There has been virtually no new housing constructed for the past two decades (Fig. 12).

However, because the rental stock is public, rents are geared to income, resulting in very affordable housing – averaging 8% of household income. Manitoba Housing has been engaging in cycles of repair and renewal on the housing stock, and making improvements to energy efficiency of the units at the same time.

Churchill's housing stock is therefore characterized by an aging rental stock and a relatively low rate of homeownership. Much of this housing in need of repair.

The continuing health of the community is dependent on the continued availability of affordable, comfortable and appropriate housing. Despite these issues, there is no shortage of housing, and waiting lists when they occur are very short. However, owing to the seasonal nature of employment, housing pressures can occur as residents move in for short-term employment.

In the absence of some new demand (such as a growing economy or major public investment) housing conditions are largely determined by provincial policies and practices. Strategic approaches to housing and transportation in partnership with other levels of government are essential.

Figure 12:Housing Condition and Affordability

Affordability (vs. Household income)	Churchill, T	MB
Non-farm, non-reserve private dwellings, occupied by usual residents		
Total number	395	426,070
Tenant Occupied	245	126,420
Average gross rent	$570	$591
>= 30% of hhld income	20%	35%
30~99% of hhld income	18%	31%
Owner Occupied	155	299,645
Average value	$112,357	$153,307
Average payments	$817	$768
>= 30% of hhld income	16%	11%
30~99% of hhld income	0%	10%
One family hhlds without additional persons in non-farm, non-reserve private dwellings		
Tenant households	125	50,055
Average gross rent	$568	$632
>= 30% of hhld income	8%	25%
Owner occupied	100	216,475
Average gross rent	$820	$820
>= 30% of hhld income	10%	9%

Dwellings	Churchill, T	MB
Occupied private dwellings	395	448,780
Ave. # of rooms	5.4	6.3
Ave. # of bedrooms	2.4	2.7
Persons in priv hhlds	975	1,119,530
Ave. # persons/hhld	2.5	2.5

% Dist., Dwellings by Structural Type

Tenure & Age of Housing	Churchill, T	MB
Occupied private dwellings	395	448,780
Owned	38%	69%
Rented	62%	28%
Band Housing	0%	3%

% Dist., Period of Construction

2.4   Environmental Issues

Source: beingmyself/flickr

With its small population and low rates of motor vehicle ownership and use, the town of Churchill on its own has a relatively minor impact on the environment. However, given its ecologically sensitive location, its outputs in terms of waste have a greater impact than would be the case if the town was much further south. Furthermore and most seriously, the fragile nature of its eco-region means that changes in that environment could have a significant impact on the community. This is particularly the case where climate change is concerned.

2.4.1   Climate Change

There is widespread recognition that the global climate is changing dramatically and rapidly. An October 2010 report (11) projects some 60 major effects of climate change, based on an assumed 2 degree rise in temperatures. These changes would include an ice-free Arctic during summer months, drought and wildfires on the prairies and a drop in water levels in the Great Lakes.

Source: Bill Liao/flickr

Many of the report's projections which are highlighted in the October 2010 issue of Canadian Geographic Magazine point to particularly apparent changes in Canada's north. Higher temperatures will cause ecological crisis, including animal and plant extinctions and extirpations. They will change precipitation and snowfall patterns, and cause some species of animals and plants to move north. However, climate change may also bring new economic opportunities for northern communities as access to natural resources is made easier.

Climate scientists and biologists are warning that the polar bear population in the western Hudson's Bay may disappear within 25-30 years. Not only will there be insufficient ice to support the bears' search for food, but poor ice conditions will make it more difficult for them to find mates to maintain a breeding population. Furthermore, increased sea traffic in ice-free water will bring further disruptions, as polar bears are highly vulnerable to spilled oil (12). Migratory birds, too, will have their routes and nesting patterns disrupted (13). In short, the three pillars of Churchill's tourism economy stand to be significantly harmed by increasing temperatures.

On the other hand, more ice-free months will expand economic opportunities for the Port of Churchill, which may be able to offer port services for a wider range of goods and for more of the

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year. This could translate into more jobs for local residents. However, increasing cargo traffic will bring with it increased risk to northern ecosystems from pollution and accidental discharges into the Hudson's Bay.

Even the prospects of increased port activity are uncertain, as they are dependent upon a reliable rail cargo link to Winnipeg, and from there to the rest of the Americas. This is the promise underpinning the Arctic Gateway initiative and railways upgrades discussed above.

However, thawing permafrost may present a more serious challenge to this scheme. Already the Hudson's Bay rail line has experienced heaving and sagging, with associated delays and travel disruptions. There are promising engineering solutions to this problem that have been utilized elsewhere in the world (14), but the scale, extent and duration of this problem may be a serious impediment to growth.

Industrial scale infrastructure aside, climate change also stands to adversely affect the local environment. Thawing permafrost will endanger civilian infrastructure, such as water pipes and the electrical grid. As well, the summer of 2010 was one of the wettest on record, and if projections hold, Churchill will face warmer, wetter summers with heavier rain events. Residential buildings may need to be adapted to withstand heavy rainfall, rather than simply extreme cold.

Taken together, these impacts point to the need for Churchill to have a climate change adaptation and mitigation strategy, and for such considerations to be integrated into planning at every level and for the long term.

Steps have been taken to integrate climate change considerations and information into the tourism economy. In November 2009, Marr Consulting Services and S. Dangerfield Interpretive Planning submitted to Destination Churchill a report on "Frequently Asked Questions" concerning climate change. Tagged with the subtitle, "Working Towards Environmental Stewardship" the report was intended to provide a primer to the local tourism industry on how to address commonly-asked questions related to climate change.

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2.4.2 Waste Management

The other important environmental issue facing the town relates to waste management. The town's former dump, originally built by the military, was in an inappropriate location near the coast and was drawing unwanted international attention to the town owing to its attraction of polar bears. Decommissioning of the main dump near the airport occurred in 2004 and its replacement was problematic. In the interim, the cost to send waste material to the Mystery Lake site in Thompson is prohibitive – tipping fees have been as high as $120 per metric ton plus the costs for sending the trailers to Thompson on the rail. The backloads of waste material stored in the L-5 building near town has been as much as two-years' worth.

A range of waste management options identified by Earthbound Environmental was presented to the public in the fall of 2008 that included food composting, a more developed transfer station, an incinerator, a gasifier, a large-scale composter, and a better landfill. Under various categories including capital cost, operating costs, technical expertise needed to operate and the extent to which the technology was proven, these options were considered and weighed. Ultimately, a combination of an improved transfer station with landfill combined with composting was the preferred recommendation. The incinerator option was ruled out for a variety of reasons: high operational costs, level of staff expertise required, and questionable proven technology on some models.

In terms of recycling, there will be focus on plastic and aluminum. The costs associated with transporting recyclables over great distances means there is no economic argument for shipping cardboard. The community has purchased a baler to shred the materials, which will then be shipped to the Thompson Recycling centre, but without provincial subsidy.

Bay 1 of the Waste Transfer Station is to be used for large-scale composting; to gather organic waste separately and compost it into useable soil. These efforts will focus on institutional customers (food and restaurant garbage, cardboard and paper products, grain dust from the port, etc.).

The landfill location has apparently not been chosen and as of the date of this report the discussions about a new landfill location are ongoing. The goal is to have this tie into the removal of material for use by the airport in resurfacing of the runway, as much as 180,000 tonnes of material. This process will leave behind a suitable excavated area for the Town to use for landfill. Landfill costs are projected at $30 per ton versus the Thompson landfill at $120 per ton plus shipping.

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Based on the Earthbound Environmental study in 2008, proposed advantages of this option include:

• Managing all waste materials
• Minimizing polar bear/tourism issues by using L-5 during Polar bear season
• Transfering materials as part of the option (e.g. steel, household waste, recyclables)
• Compost material is value-added for community
• Manageable capital costs (subject to federal/provincial assistance)
• Lowest operating cost option
• Acceptable to the Province of Manitoba
• Transport Canada willing to consider Metal Dump Site
• The whole integrated system can be showcased to tourists

This new regime for waste management will require new procedures and a higher level of cooperation from local stakeholders and residents. Measures will need to be taken to limit the amount of material that is required to be placed in it. For example, restaurants and hotels could examine ways to serve condiments without the use of disposable or compostable containers, or at least avoid the use of plastic ones. The Northern Store could provide greater access to bulk foods, and customers could bring in their own containers and bags. And tour operators and event planners could deliver and serve food using reusable or compostable storage containers. Engaging the community on adopting these sorts of waste minimization strategies would require a well-planned social marketing campaign (see Appendix 4). The Solid Waste Alaska Network promotes the best sustainable practices for waste management and provides examples of systems that are used in their northern communities (15).

2.4.3 Water Management

Stantec Consulting Ltd. (Stantec) was retained by the Town to conduct a comprehensive study into various options for upgrading the existing water and wastewater systems. As the Stantec data shows, the summer flows are approximately 12% lower than the annual average flow and the peak tourist season flow is approximately only 5% higher than the annual average flows. Surprisingly, the water demand does not increase significantly during the peak.

In their draft report released in February 2010, Stantec established that Churchill's present water and wastewater treatment infrastructure is aging, and that some elements have reached the end of their

design life. The water treatment plant in particular no longer complies with the current Provincial Drinking Water Safety Act and is also extremely and unnecessarily energy-intensive. Churchill's water consumption from 2005 to 2009 is shown in the table below (Fig. 13).

Figure 13: Overall Summary of Water Consumption Data

Parameter	2005	2006	2007	2008	2009	Average
Annual Average Flow (m3/d)	1069	1120	761	1013	880	969
Population	923	923	923	923	923	923
Per Capital Water Demand (L/d)	1158	1214	824	1098	953	1040

Source: Stantec, Draft report of Churchill Water and Wastewater Systems Feasibility Study

The wastewater treatment system as well exceeds acceptable limits on fecal and coliform bacteria. The sludge lagoon is almost full and as a result sludge disposal also poses a problem.

The existing sewage collection system is comprised of asbestos cement (or AC) pipes which have been found to break easily, leading to leaking. The report identified sewers on Hendry Street and Kelsey Boulevard as being in particular need of upgrading. The AC piping is now at least 40 years old and is believed to be at the end of its design life. Watermains too have some issues, mainly owed to high groundwater and shifting, causing stress on the mains.

The Stantec report examined current water use and found little difference between regular and tourist season consumption patters, although this was based on a raw meter reading, as the town did not at the time have a flow measurement device at the point of distribution.

For the purposes of the report the authors utilized a base population of 923, with average per capita usage estimated at 1050 litres per person per day (by way of comparison, Winnipeg's usage is estimated

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at 400 l/d and a provincial average of 270-450 l/d). This significant difference was attributed not only to measurement error (i.e., no flow measurement device) but also to significant "bleeding" from leaking pipes. Absent more accurate measurements, the report proceeded on an assumption of 1040 l/d as a base rate, with a population base of 2,000 (to account for tourist season peaks).

The report was concerned with sourcing fresh water; treating the water for consumption; treating wastewater; and collecting and disposing of the resulting sludge.

After examining three sources for water (Churchill River, Hudson Bay and Isabelle Lake) the report concluded that staying with the current source (the river) was the best option, with Isabelle Lake as a secondary source. The draw of water should be accomplished by the installation of three new water supply vertical turbines augmented with an in-line booster station near the Lake Pumphouse, which would allow the water to be sent directly to the new water treatment plant.

The drinking water treatment plant option recommened is known as the "ballasted flocculation" process, a high-rate clarification process involving the use of micro-sand particles as well as a chemical coagulant and polymer in order to increase settling velocities. The resulting sludge/micro-sand mixture collected at the bottom of the tube settler is then pumped to a centrifuge after which the sand is recycled and the sludge discharged.

For wastewater treatment, Stantec recommended both an "Activated Sludge Process" (or ASP) as well as an "Integrated Fixed-film Activated Sludge" (or IFAS) treatments. According to the report, the ASP technology is a simple, well-established technology that is commonly used for small communities and with which existing municipal staff are already familiar.

The disadvantage of ASP is that it uses high rates of power for sludge aeration and heating and ventilation of the treatment plant units themselves. The IFAS is also used for smaller communities but produces lower amounts of sludge and requires less energy. On the other hand it is a newer technology utilizing maintenance-heavy chain drives and disk removal rather than aerators.

Finally, the report considered sludge treatment and disposal. Bearing in mind the potential for future sludge composting in Churchill, the report recommends that the sludge be stabilized through "aerobic digestion" and then "dewatered" in a trailer.

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2.4.4 Energy Planning in Churchill

The federal and provincial governments are moving in the direction of supporting community energy initiatives. The 2009 Standing Committee on Natural Resources Report (16), states that "integrated energy planning is an effective approach to supporting efficient and resilient patterns of energy supply and demand; diversifying economic opportunities; generating employment; reducing greenhouse gas emissions; and establishing more sustainable communities with an improved overall quality of life." Energy will play a significant role in shaping the future of Churchill, and should figure prominently in planning for the town's sustainability.

Energy security and climate change are the two most pressing challenges that need to be addressed in the town's official plans. Factors which determine the energy security of a jurisdiction include the on-going availability and affordability of required energy resources. Climate change planning addresses another element of energy use in focusing on the long term effects of increased carbon emissions from the burning of fossil fuels.

Combined, these two energy-related issues present significant challenges to the short- and long-term future of communities and need to be addressed through well-considered policy formation at all three levels of government as well as by individual households. Fortunately, a number of planning tools have been developed that facilitate the process of creating sound energy policy at the community level.

Energy security and climate change policies both share similar goals which can be incorporated into official town documents. In many cases, the sources of alternative energy that lead to an improvement in energy security are renewable and thereby also contribute to the reduction in carbon emissions. Hughes (2009) gives an outline for creating energy policy suitable for local governments and describes the process containing four stages.

First, conduct a review of current energy use and energy sources. Based on this review, reduce the amount of energy used through conservation and/or by increased efficiency; replace the least secure energy sources with those which are more secure; and lastly to restrict any new energy demand to the most secure sources. This process operates as the foundation for determining energy-related policy for the municipality and can be included in land use documents to help shape energy sustainability for the future of Churchill (17).

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Reviewing how energy is used in Churchill is the first step in developing a plan to improving energy security and reducing carbon emissions. The Churchill Strategic Plan of 2002 contains two goals related specifically to energy use at the Town Complex which included the requirement for a Manitoba Hydro energy audit as well as a mention that higher heating costs were becoming a concern.

The municipal government can do much to encourage changes in a community's relationship to energy by employing strategies to re-examine how municipal infrastructure is using energy. Energy audits of municipal structures, improvements to building envelopes, and analyzing the potential to include renewable sources of energy into the town's energy mix are all important steps towards engaging the challenges of climate change and energy security at the local level.

2.4.4.1 Electricity Consumption

In Churchill and other northern communities electricity is the primary source of energy for domestic, non-transport use. There is no natural gas service in northern Manitoba. The table Below (Fig. 14) shows the electricity consumption in Churchill. Institutional users such as schools and government buildings are included in the commercial category.

Figure 14: Electricity Consumption in Churchill

Sector	Electrical Customers	2009/10 (kwh)	Percentage of the Total
Residential	558	8,446,724	23.1
Industrial	6	2,606,079	7.1
Commercial	173	25,469,935	69.7
Total	737	36,522,737.8	100

Source: Manitoba Hydro

The commercial sector is responsible for using more than 2/3 of the electricity in Churchill. Residents in Churchill are using almost a quarter of the total electricity and there are only 6 industrial users in Churchill which spend almost 7% of the total electricity consumed in the town.

One reason for huge energy consumption by commercial sector could be justified by the fact that Churchill is a tourism town. However, even residential energy consumption seems too high.

On average, each residential customer in Churchill uses almost 15137.5 kwh per year. Although houses are relatively small in size, the age of the housing, the poor insulation, the design of the house, and consumers' behaviour play a role in the high energy consumption. Since more than 60 percent of the residences are rentals and they don't pay for their hydro, they have less incentives to save energy. Also, the small size of the households increases the energy consumption. Considering the fact that 923 residents live in 558 units, shows that on average 1.6 people live in each unit.

Figure 15: Manitoba Hydro- Current Interconnections and Potential Interconnections
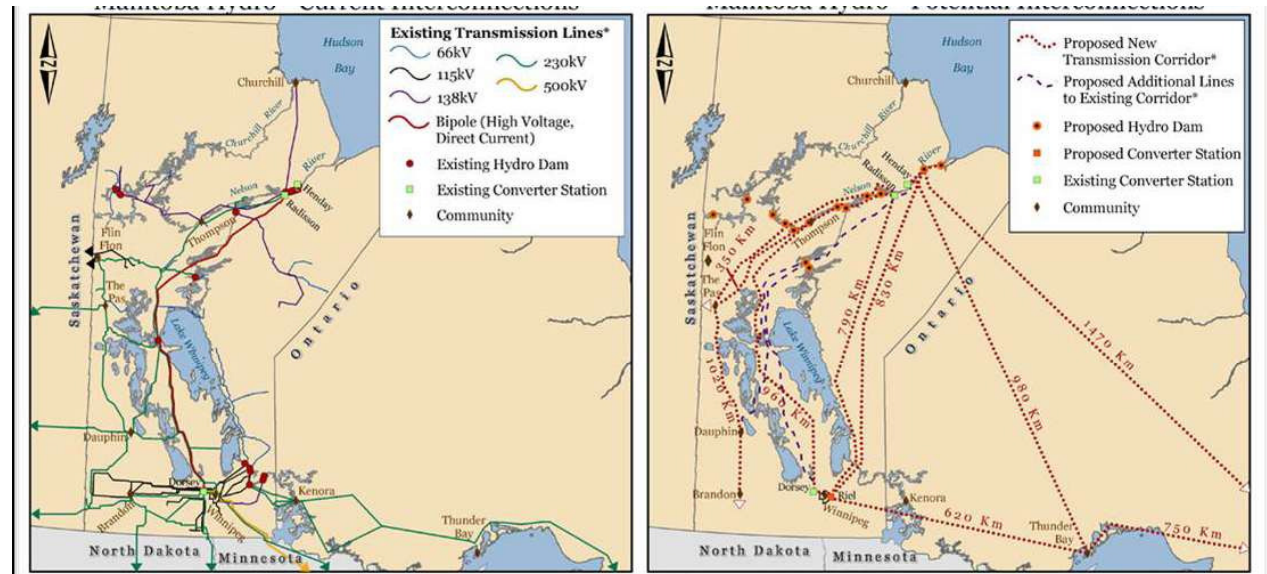
Source: Manitoba Wildlands, 2005

Electricity demand is currently met through a single transmission line stretching from the hydropower generated on the Nelson River (18). Having a single line to supply all of the town's needs for energy (Fig. 15) places the town in great risk should the line be damaged due to a storm or some other disturbance. Should a problem in the energy supply occur during the winter heating season, the situation would be dire for Churchill; therefore obtaining the means to provide diverse energy sources for the town should be a priority.

Assessing the potential for renewable energy generation is the second step in reviewing the current energy dynamic for Churchill. Appendix 2 is a compilation of resources for wind, solar, geothermal, and hydro energy generation in Churchill. The end result of analysis of energy generation capacity is the creation of a community energy plan.

2.4.4.2 District Energy

Strictly speaking, District Energy doesn't refer to the production of the energy itself, but rather to a thermal network and the way it is managed on a community level. Instead of piping gas into a housing unit from a central location to be combusted in a furnace, or electricity to be consumed by an air conditioner, a DE system uses a medium (usually water or steam but can include synthetic fluids) to carry and transport the heat (or coolant) from the point of origin to the user through a network of underground pipes. Heating and cooling needs are met in individual buildings, and the medium is then returned to the DE plant to be once again heated or cooled as needed.

Churchill with its large stock of public housing, would be particularly well-suited to a District Energy (DE) system. Common DE markets include municipalities, or clusters of buildings within a municipality. Campus settings such as hospitals, universities and industrial parks are ideal potential customers. As such, DE systems work well within and industrial ecology model, in which waste products from one industrial process may be used by another. In the case of DE, this is referred to as cogeneration or Combined Heat and Power (CHP), wherein the waste heat from one industrial process is used to heat the medium in a DE system and generate electricity, rather than being discharged into the environment. This flexible model extends to taking advantage of other natural and built assets. DE cooling systems can pump already chilled water from deep lakes to cool buildings, or draw warm water to heat nearby homes. Alternately, they can be teamed up with other green energy solutions, such as thermal solar energy collectors.

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The vulnerability of Churchill's present electricity delivery system could be offset with a DE system. District Energy has the potential to address issues related to network vulnerability in terms of disrepair, accidents and catastrophic weather. However, the particular value of this approach in terms of sustainability is that it allows communities to transition from less sustainable (or more expensive) fuel sources to "greener" alternatives.

DE systems are best suited for conditions where there is a large institutional energy consumer, (like Manitoba Housing or the Town Centre complex) so an essential consideration in DE systems is the nature of the urban form. They are not generally well-suited for low-density suburban neighbourhoods unless there is a significant institutional user nearby, as they require a certain level of building density. Large hospitals, businesses, universities or industries are desirable primary customers which can house the power plant, and then surrounding residential users may be incorporated into the system.

For the institutional customer, taking advantage of a DE system offers many benefits, as they can forego the expenses and maintenance responsibilities required for privately-owned on-site heating and cooling equipment. The only ongoing expense is for the heat or cooling actually delivered, instead of the capital and ongoing expenses involved in purchasing, maintaining and replacing furnaces, boilers and centralized air conditioning. This then frees up space which may be used for other – and potentially revenue-generating – uses.

Furthermore, the underlying flexibility of DE systems allows them to take advantage of fuel-switching strategies: when certain sources become too expensive, the utility can heat the DE medium with another, less expensive source. Heating and cooling costs are thus stabilized for the entire community, including institutional users.

For the purposes of environmental sustainability, the attraction of DE systems is this ability to "fuel switch" which allows for the utilization of a wide range of fuel sources, which can include municipal waste or otherwise valueless industrial by-products, such as wood chips. The real benefits accrue when a DE system is used as a platform for transitioning from fossil fuels to renewable sources such as biomass.

Because of the diversity of energy consumers in a given community, each with different energy needs, energy conservation measures are highly dependent on social marketing approaches geared towards obtaining buy-in and cooperation from each individual energy user.

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By contrast, DE systems connect all these potential users together and control the consumption of energy at a central source. This offers utilities a greatly enhanced ability to manage energy consumption and promote wider sustainability goals in the community. Unlike standard systems in which it is up to the resident or owner of each building to regulate fuel flows, these are centrally managed and can even take the form of thermal storage during off-peak hours. The levels of efficiency possible with DE are such that emissions can be significantly reduced when compared to standard systems, even if the fuel source (e.g., natural gas) is the same.

In its ability to make use of available waste heat; to regulate output according to community demands; to manage energy consumption; and to switch to more sustainable fuel sources, DE is becoming increasingly popular choice for community energy planning initiatives, and for emerging "green" urban developments. (For further reading, see notes 19-21)

2.4.4.3 Moving Forward With Energy

Developing the means of making the required shifts in behaviour and design to address the challenges of energy for both global warming and energy security is an essential element in moving forward on the town's sustainability plan. Programs and incentives are available for individual households, businesses and industry, as well as the municipality.

Manitoba Hydro has compiled a list of resources to address financing for residential, commercial, and industrial users. Financing in the form of loans and grants is available for programs which to help increase energy efficiency as well as programs which encourage the development of renewable energy generation. Efficiency programs target improvements to the building envelope or upgrading the heating, hot water or lighting of a building. Incentives are also available for geothermal and solar hot water heating systems (22).

At the municipal level, the Federation of Canadian Municipalities offers its Green Municipal Fund to help municipalities make improvements in five areas; brownfields, energy, transportation, waste, and water.

This fund can be used to help pay for community sustainability plans (including energy plans), feasibility studies, and/or capital projects. There are many excellent case studies provided of

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how municipalities have taken advantage of this funding to make improvements to municipal infrastructure and set a good example for the community by being a leader in the area of energy sustainability (23).

By engaging in the process of a community energy plan, municipalities will benefit in the short term through the reduction of municipal expenses while simultaneously working towards creating a more resilient community by creating land use provisions which accommodate and facilitate renewable energy generation and policies which reward energy conservation and reduction practices.

2.4.5 Transportation

Churchill demonstrates relatively low rates of automobile use for commuting purposes. However, many residents do make extensive use of All-Terrain Vehicles (ATVs) for local travel. Research has shown that two-stroke engine vehicles such as ATVs can produce more pollution than thirty automobiles over the same time period, with significant implications for local air quality (24).

The most important transportation issues facing Churchill is not so much related to local mobility, but to the town's isolation and reliance on train and air travel for the transport of all goods and for reaching other destinations. Derailments and other delays in recent years have left store shelves empty and wary residents tempted to hoard when shipments are unreliable (25). At present the rail connection is undergoing extensive upgrading thanks to $40 million in federal investments announced in 2007, and further investments are being considered as a part of a larger "Arctic Gateway" concept that would strengthen linkages between Churchill and Winnipeg's CentrePort development. According to the Hudson's Bay Route Association, refurbishments to the line to the end of 2009 had "resulted in 33% improvements in running times" (26).

There are no nearby towns and no regional First Nations communities which residents can easily visit. Tadoule Lake is 248 kilometres away, Gillam 271. Winnipeg is over 1000 kilometres away. The consultations in 2009 demonstrated that, to some, this isolation is essential to the Town's character and distinctiveness; to others, it is a barrier to the development of the town and the ability of its residents to fulfill their aspirations. The alternative most frequently discussed is an all-season road connecting the town to Gillam, but the idea is controversial and, as some pointed out, would be impossible to keep clear during the winter and hence dangerous for travellers.

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The lack of road access has resulted in significantly higher outcomes in terms of local active transportation, but poorer food security outcomes. More secure, reliable, accessible, affordable and environmentally sustainable transportation options to other communities are needed. And because high food prices contribute to poorer food security outcomes, local alternatives to food supply are required.

A compelling argument against more northern roads is offered by University of Manitoba professor Barry Prentice, who points out that connecting all of Manitoba's isolated northern communities with roads would be impossibly expensive. A far more reliable alternative, he argues, would be advanced hybrid airships which could serve the north for a fraction of the cost and, not incidentally, boost Churchill's fortunes as a port (27).

2.4.6 Built Environment

While Churchill is renowned for its natural assets and has significant facilities, such as the town centre, its urban environment suffers from poor aesthetic qualities. Overly wide streets make for a poor pedestrian environment and many properties are unkempt and filled with debris. Closer attention to the town's urban design could enhance the quality of life for residents and visitors alike.

Developing high quality physical environments could also contribute to achieving many of the goals of sustainability. It would help promote a sense of community and civic pride and attract tourists and new residents to the community which, in turn, would affect the community's economic development. Furthermore, it could make the town safer for pedestrians and would attract residents to walk more. Providing attractive public gathering spaces would promote neighbourliness and community-building, as well as communication between residents and visitors.

The issues related to the urban environment and strategies to addressing them will be taken up more fully in Chapter 4.

2.5   Summary of Community Needs and Assets

Churchill is a town that has tremendous assets: a globally strategic port, a strong tourism economy based on internationally renowned natural habitat, well-resourced research capacity and extensive public facilities that were originally built to serve a much larger population.

At the same time, it is highly vulnerable to external circumstances, namely global climate change and the economics of international shipping. While Churchill is a popular international tourist destination this has not translated into broadly-shared wealth and well-being: there are sharp social and economic disparities. Those working for the major employers earn a higher median income than the province, but many of its residents live in aging public housing units. Its Aboriginal population is still recovering from a legacy of displacement, residential schools and isolation. In general the town has never recovered from the loss of the former military facility and rocket range, and its population is gradually declining. It is difficult to retain young people or attract new investment.

The town faces several pressing environmental issues. The most important contributor to its tourism economy – the polar bear population – stands to be severely threatened and even extirpated by climate change. The town needs a comprehensive strategy with which to deal with its new solid waste management regime. Not connected to the provincial energy grid, it must derive its electricity from a single transmission line stretching from hydropower generated on the Nelson River. Finally, its built environment – most of it decades old – suffers from poor physical aesthetics.

In summary, there were 10 needs identified in this Chapter. They include:

1. Food security: making healthy and notorious food more accessible and affordable.

2. Addressing housing needs including: supportive/supported housing for seniors; the need for repair and retrofitting; identifying opportunities for more market rentals and home ownership; and adapting residential buildings for a changing climate.

3. Diversifying the economy and providing a wider range of year-round employment opportunities.

4. Enhancing educational attainment levels. Youth education and retention strategies will need to be a part of broader economic development strategies.

5. Waste and water management: Develop social marketing strategies to minimize solid waste and conserve water.

6. Ensuring more culturally-appropriate services, education, training and employment opportunities for Aboriginal residents. Ensuring political engagement of the Aboriginal population and promoting Aboriginal culture and history between generations.

7. Energy Security: Energy conservation and reduction practices as well as provisions and policies which accommodate and facilitate renewable energy generation.

8. Sustainable Transportation: Using social marketing approaches to encourage walking and cycling discourage unnecessary vehicle idling and use of cleaner four stroke engines rather than two engines in ATVs and snow mobiles. Exploring the feasibility and desireability of road connection to other communities

9. Improving Built Environment: Improving the urban design and aesthetics of the town.

10. Attracting newcomers to increase population and also enhance cultural and linguistic diversity to stimulate the local economy.

What is needed is to address these many interrelated issues is to map out an approach that can articulate a vision for the town, identify strategies and take best advantage of the town's existing resources while identifying new ones. For this, we need a planning framework.

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Chapter Two notes

CHAPTER THREE:

DEVELOPING A PLANNING FRAMEWORK

CONTENTS:

Chapter 3: Developing a Planning Framework

In order to address the issues identified in Section Two, a framework for identifying priorities and implementation is necessary. The Churchill Sustainability Framework outlined in this section demonstrates a means by which to integrate environmental, social, and economic sustainability.

3.1   What is a Planning Framework?

The planning framework which will be introduced here is an organized way to learn about and discuss Churchill's needs, to prioritize them, to set objectives and to identify specific projects that can work towards meeting those needs and achieving the community's vision. The goal of developing this framework was to provide an easy-to-use tool for stakeholders to collaboratively plan for their community and to promote informed community debate and decision-making.

The framework is adaptive to changing needs and circumstances, and does not dictate a specific objective or goal for the community. It is built on a very basic primary principle: that of meeting human social, environmental and economic needs.

The framework offers stakeholders the ability to consider various options and answer the following questions:
• Does it meet multiple human needs?
• Does it address multiple priorities? (cross cutting?)
• Is it consistent with our vision and values?
• Will it have significant impacts? How will these impacts be measured?
• Is it feasible?

3.2   Sustainability and Meeting Human Needs

Among the concepts of sustainability discussed in Chapter 1, the most significant for this framework is addressing human needs. At its core, sustainable development is not possible unless human needs are met in an ecologically sound way. Fundamental human needs are understood as:

• Subsistence- e.g. food and shelter
• Protection- e.g. public safety, social supports, health care
• Affection- e.g. friendship, Relationship with Nature
• Understanding- e.g. education, communication
• Participation – e.g. responsibilities and rights
• Leisure- e.g. amusement and recreation
• Creation- e.g. opportunities to contribute, invent and improvise
• Identity- e.g. self-concept, self-fulfillment
• Freedom- e.g. autonomy to choose or dissent (1)

These nine fundamental human needs are each best considered in terms of the four categories of Being, Having, Doing and Interacting. For example, the production, preparation and sharing of food (subsistence) ideally involves the development of culinary talents and skills (being); acquiring of the necessary equipment and ingredients (having); the act of growing, harvesting and preparing food (doing); and interacting (sharing meals with family and friends).

Similarly, meeting the basic need for protection would involve: feeling secure in one's environment (being); access to adequate resources to provide for one's health and well-being (having); being involved in providing for oneself and assisting one's neighbours (doing); and working cooperatively with others (family, friends, institutions etc.) to ensure that protective needs are being met.

Examining local issues in terms of meeting all of these human needs, and doing so within the realms of being, having, doing and interacting, more effectively ensures that a planning process isn't just addressing symptoms, but actually gets at root causes and underlying conditions, and aids in devising holistic approaches to addressing these problems.

3.3   The Framework at a Glance

The Sustainability Plannig Framework for the town of Churchill has been developed by considering the human needs theory (1) and other select planning and sustainability concepts and theories. This framework has 6 stages including:

Step 1: Identify Vision and Values

Step 2: Identify Needs
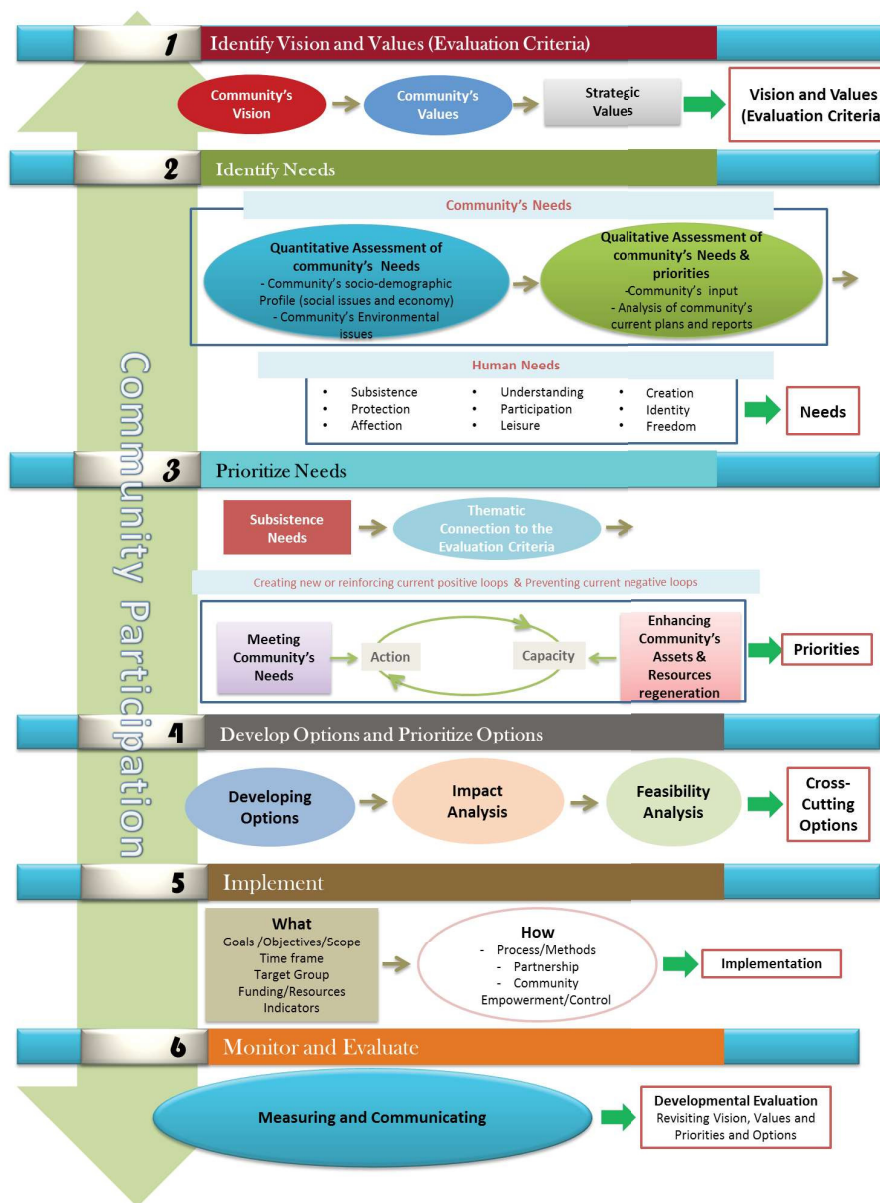
Step 3: Prioritize Needs

Step 4: Develop Options for each Priority and Prioritize Options

Step 5: Implement

Step 6: Monitor and Evaluate

The diagram below (Fig. 16) shows these 6 stages of the framework.

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Figure 16: Framework for developing the Churchill's Sustainability Plan

Framework by Institute of Urban Studies

Although the stages are presented in an order, users may go back and forth between different stages. For example, identifying needs at stage 2 may affect the community's vision, which is presented in stage one. All the stages are interrelated and inform each other, as seen by the large green arrow on left side. This represents the adaptive nature of the process – each step can inform the other and lead the players to reconsider their assumptions. Also, since the community needs to be the main player of this decision making process, community participation has been included on the green arrow (Figure 16).

After going through all the stages, the community should have a better understanding of its needs, capacity, assets and goals. In short, a community can better understand its complex social, economic, and environmental systems. Therefore, each time that the community goes through this practice it will build a capacity to use and adapt the framework more effectively.

3.4 The Framework in Action

Step 1: Identify Vision and Values (Evaluation Criteria)

The first step is to give community members a chance to develop a vivid and collective image of where they want their community to be in 20 years. Setting out values can help the community identify ways to accomplish their vision in ways that are consistent with those values.

In Churchill, community consultation took place in several stages and the results were published in two different documents, the Discussion Paper and Interim Report (See Introduction, page 2-3). These two reports were then analyzed to determine community vision and values. Any statement which included interviewers' values or vision was highlighted. The researchers then examined all of these statements and integrated them into a single vision statement and set of values.

Page 53
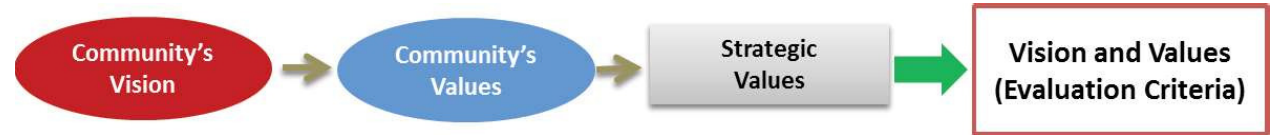
Also, the researchers reviewed the literature as well as the sustainability values from communities similar to Churchill to find applicable and recommended sustainability values. We are referring to this as strategic values (Fig. 17).

Establishing the vision and values is the first step which then allows us to set evaluation criteria for prioritizing the needs which the community is going to address. Based on the findings and conclusions from the Interim Report, the vision and values for Churchill are as follows:

VISION:

In Twenty Years...

The town of Churchill is a vibrant and resilient community that embraces our cultural and ethnic diversity, and cooperates to achieve shared goals. We maintain a friendly, small-town spirit while recognizing our role in the world as a gateway to the Arctic and a meeting of the boreal, marine and arctic eco-regions.

We recognize the interrelationships between people, community, local wildlife, and healthy ecosystems and take responsibility for actions that may impact the local and global environment. We have planned for and have adapted to changes in the environment.

We are proud to be a showcase for living green in a northern community. We facilitate an efficient cycle of resource use, minimizing waste and managing it responsibly. All residents take responsibility for maintaining a clean and aesthetically pleasing community.

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Our community nurtures and promotes healthy families. A substantial proportion of our food is produced locally, contributing to a healthy and secure diet. Residents of all ages enjoy secure, safe, culturally appropriate and affordable housing. We understand the importance of elders and what they can contribute to the community, while cherishing our youth and recognizing that our future lies with them.

We have a thriving and diverse economy centered on our wealth of natural and cultural assets. Our local businesses promote economic opportunities for all citizens, and our community benefits from the wealth generated here. We have excellent education and training opportunities through which people of all ages and abilities can learn and achieve. We enjoy access to other communities through reliable, affordable and ecologically sustainable transportation.

The community's government and public officials contribute to a spirit of cooperation. The stewardship of diverse and significant interests involves considerations and actions that transcend traditional political boundaries.

Churchill is a place we are proud to call home and is the envy of visitors. Our children will benefit from growing up here and many of them will plan to make it their home for themselves and the next generations.

VALUES:

• Recognizing and striving to meet the varying needs of residents;
• Promoting personal development and capacity building;
• Considering immediate and cumulative long-term effects to the environment during decision-making;
• Being as efficient as possible in the consumption of resources;
• Taking advantage of existing infrastructure and resources; and
• Acknowledging and building on recent and concurrent initiatives and activities.

Page 55
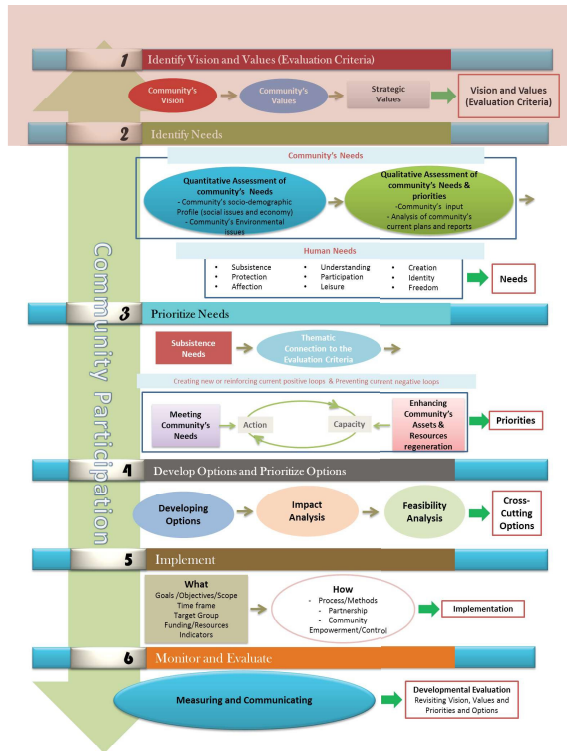
Step 2: Identify Needs

Community needs can be identified by gathering quantitative and qualitative information and using the categories of human needs referred to in section 3.2. Quantitative assessment can be achieved by analyzing a community's socio-demographic profile (see chapter 2), while qualitative assessment can be done through community consultation and on analysis of a community's current plans and reports. The Interim Report provided a review of the comprehensive community consultation in Churchill.

The human needs approach (see section 3.2) has two applications. First, it can be used as a guide for community consultation (qualitative assessment). Questions can be directed to identify gaps in the community in order to address the nine fundamental human needs. Second, after identifying needs in the community through qualitative and quantitative assessment, the findings can be compared to the nine fundamental human needs to make sure all of those needs are met in the community. The process of examining local issues in terms of meeting all of these human needs, and doing so within the realms of Being, Having, Doing and Interacting, more effectively ensures that a planning process isn't just addressing symptoms, but actually gets at root causes and underlying conditions, and aids in devising holistic approaches to addressing these problems.

Figure 18: Second Step in the Framework: Identify Needs
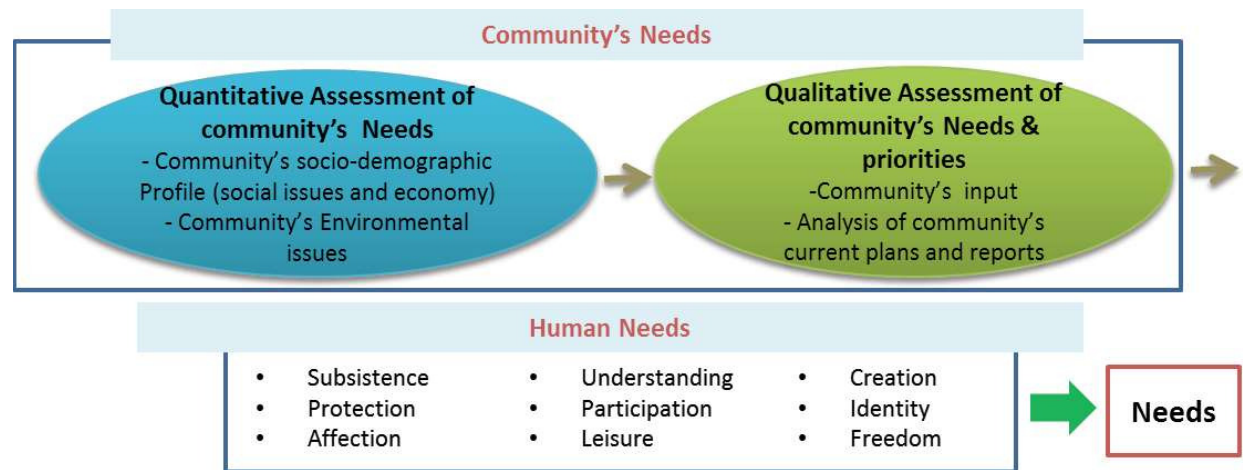
It is important to mention that since conditions are always evolving identifying a community's need is an ongoing process and information gathering will need to be continual.

Needs:

The needs identified in Chapter 2 are as follows:

1. Food security;
2. Addressing housing needs;
3. Diversifying the economy;
4. Enhancing educational attainment levels;
5. Waste and water management;
6. Ensuring more culturally-appropriate services, education, training and employment opportunities for Aboriginal residents;
7. Energy Security;
8. Sustainable transportation;
9. Improving Built Environment;
10. Attracting newcomers.

The needs identified in the Interim Report are as follows:

1. Social equity planning;
2. Food security;
3. Waste management;
4. Housing: quality, diversity, affordability and tenure of housing including housing for elders;
5. Education and training;
6. Economic diversification;
7. Placemaking: improving quality of built environment.

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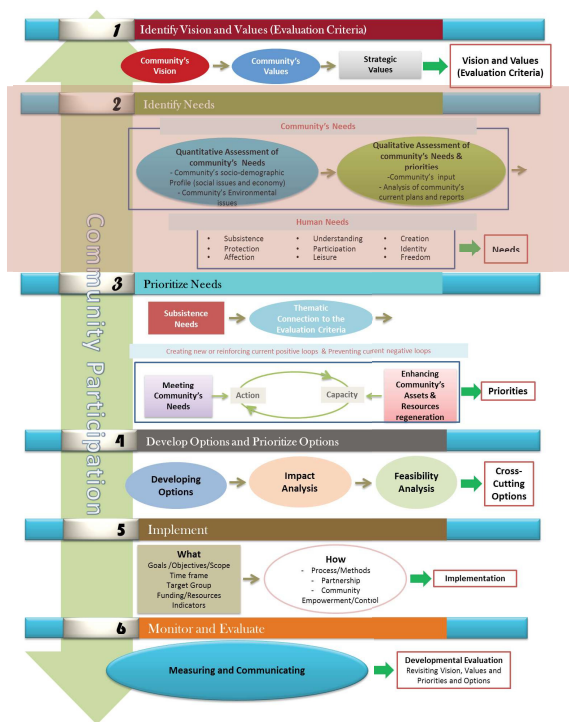
Step 3: Prioritize Needs

In any planning process, it is important to prioritize a community's needs (Fig. 19). This way limited resources can be used more effectively and issues can be addressed strategically over time.

The framework suggests three ways to prioritize needs identified in the second step.

First, based on the human need theory (See section 2.5) in the hierarchy of nine fundamental human needs only subsistence needs are the most urgent needs, the other eight needs have the same priority. Therefore, if some of the needs are subsistence they would be considered at a higher level of priority than those which are not subsistence-related.

Second, needs should be prioritized based on the community's vision and values (see section 3.3.1). If perceived needs are not in line with community's vision and values, then they would not be considered as a priority. On the other hand those needs which have the most thematic connection to the community's vision and values (evaluation criteria) would be considered as priority.

Third, those needs that can be met in a way that enhances community capacity should be given a higher priority. In other words, if an action to meet the need and capacity can create a positive loop, that action would be considered as a priority.

For example, in Churchill transportation is expensive and therefore the cost of food is high. Here there are two needs, reducing the cost of transportation and making affordable food more available.

Looking at Churchill's assets and resources, options such as developing a greenhouse would make fresh food more available and affordable and at the same time it can enhance the community's capacity to produce more food through greenhouses and be self-reliant. In comparison, requesting subsidies for transportation would not add to the community's capacity. Therefore, food security through capacity-building would be a priority.

Page 58
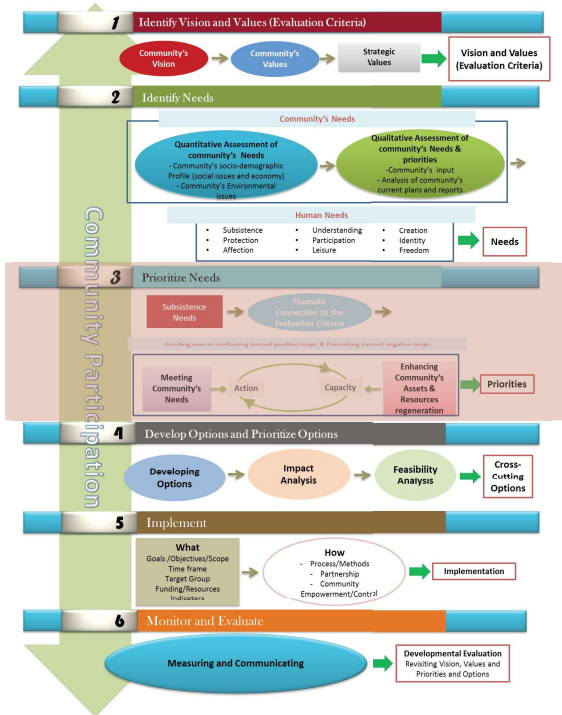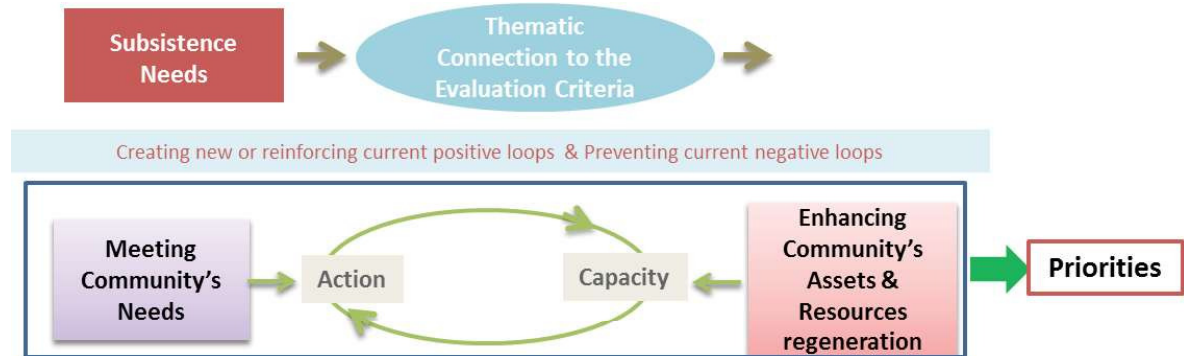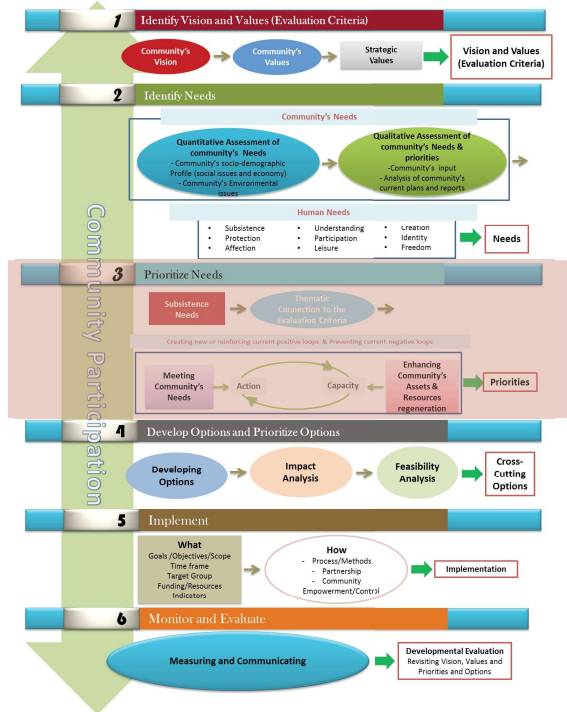
Using this framework, the following needs have been prioritized:

• Food security: Nourishing food is neither affordable nor easily available. Community has almost no control on the cost and availability of the food.

• Waste management: Churchill's isolation, weather and polar bear population makes storing recyclables and compostables difficult and expensive. While a new landfill will relieve pressure on present arrangements, a waste minimization strategy is needed.

• Economic development: The local economy is reliant largely on tourism and shipping. Diversifying the economy would provide more stable year long employment and attracts new residents.

• Youth education, training and recreation: Educational attainment levels are low. Youth education and retention strategies will need to be a part of broader economic development strategies. More opportunities are needed to retain young people.

• Housing: Almost all rental housing is aging and in public hands. Improvements are needed to the town's public realm and aesthetics. The "Flats" represents a unique challenge in terms of governance, land titles and linkages to the rest of the town.

• Built Environment: Churchill suffers from poor physical aesthetics. Overly wide streets make for a poor pedestrian environment and many properties are unkempt and filled with debris. Closer attention to the town's urban design could enhance the quality of life for residents and visitors alike.

As these areas are in many ways interrelated and are geared to promoting a greater quality of life, it will be important to identify "cross cutting" options that can significantly improve conditions across several or many priority areas.

Step 4: Develop Options and Prioritize Options

After identifying priorities, the next step is to translate those priorities to options or projects to meet those needs (Fig. 20). Each priority may be addressed in several ways, and these will be referred to as options. Similar to identifying needs, the greater community should be part of developing options for each of those priorities.

During the process of community consultation, Churchillians identified some of the options required to address needs. In addition to those identified options, researchers studied other communities to see how they addressed similar needs. The combination of these two methods was used for developing suggested options.

Given limited resources, it is important to prioritize options and find ones that are not just feasible, but have the most impact. The impact of an option is evaluated based on its ability to meet multiple human needs and to have influence on several different priority areas. These will be referred to as "cross-cutting" options or projects (See examples of finding cross-cutting options under section 3.4.4.2). To qualify as a cross-cutting option, not only should the option have multiple impacts on addressing human needs and community's priority areas, but it should also be consistent with the town's stated vision and values.

After identifying options with multiple impacts, there is a need to analyze their feasibility. To do a feasibility analysis, the required resources (financial, physical, cultural, and human) from different sectors such as local, provincial, federal, private and NGO should be identified (Fig. 21).

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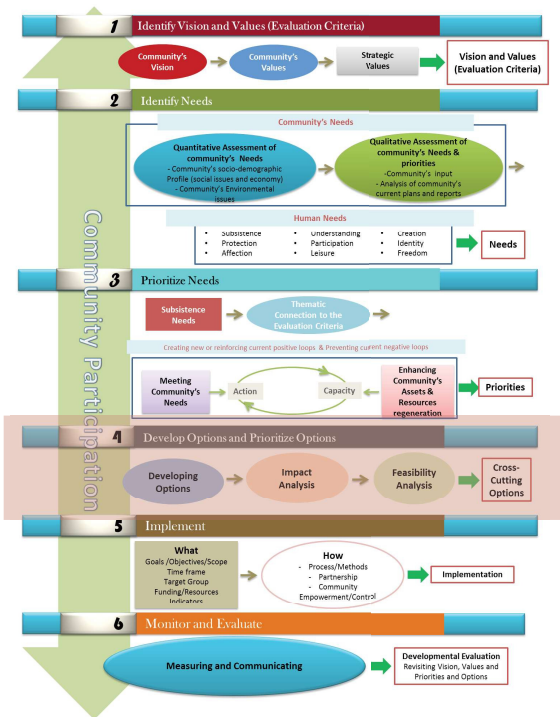
Figure 20: Forth Step in the Framework: Develop Options and Prioritize Options
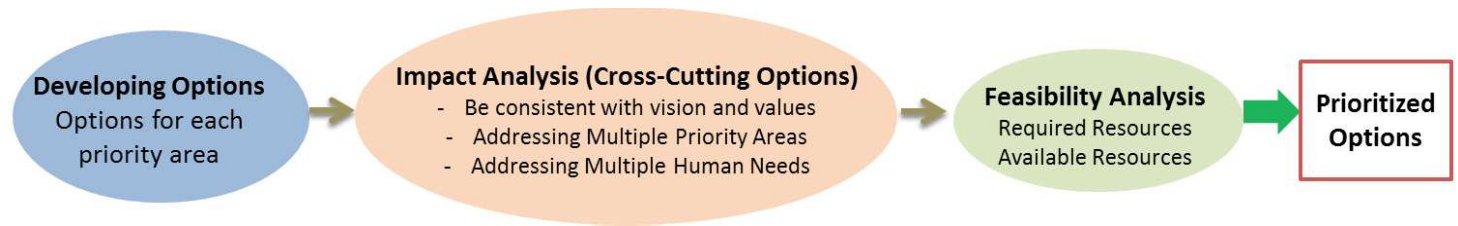
Figure 21: Feasibility Analysis Tables

Identifying Resources

	Local	Provincial	Federal	Private	NGOs
Financial					
Physical					
Cultural					
Human					
Information					

Tables by Institute of Urban Studies

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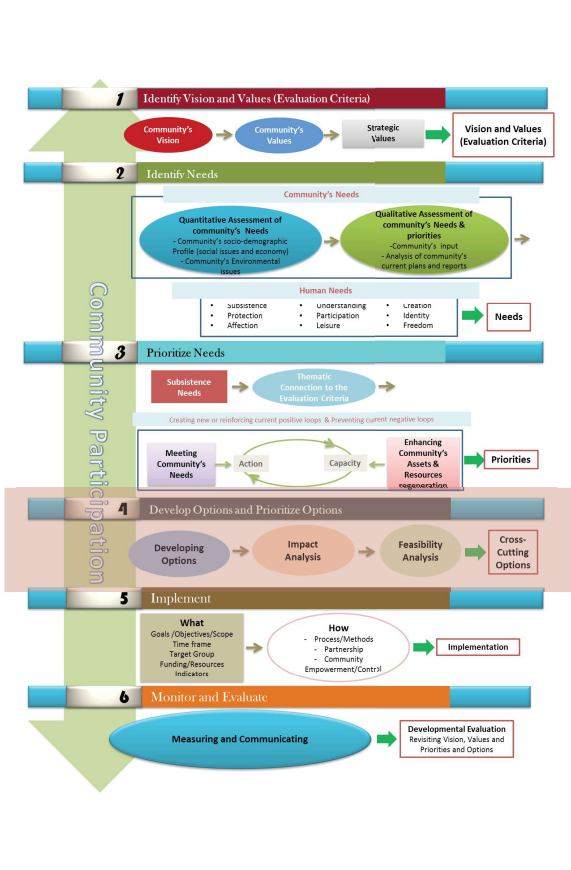
Cross-cutting options are those with the most impact and feasibility. However, to generate interest in the community the town may choose to prioritize options based on the highest feasibility in order to realize shorter term goals and then, secondarily, focus on options with the most impact.

The following section will illustrate this fourth step of the framework in action. First, for each of the priority areas in Churchill, a set of options has been developed. The impact and feasibility of two of the options have been analyzed to demonstrate the process of impact and feasibility analysis.

Develop Options

Below are listed Churchill's priority areas as identified in the third step of the framework (See section 3.3.3). Under each of those priorities a set of suggested options have been developed. It should be noted that by no means are these the only existing options, but rather examples to help illustrate this step.

Sample Options for the Priority of "Food Security":

A. Community Greenhouses

Other northern communities have had a great deal of success in growing more food locally through the use of greenhouses. These greenhouses can be large and centralized, or small and distributed through the community. There are a number of prefabricated greenhouse kits available, so only a minimum of construction expertise is required.

The researchers have also consulted with Manitoba Housing, who have indicated their interest in cooperating with such a scheme, and have identified two plots of land where greenhouse placement might be appropriate: the sites respectively of a demolished housing unit and one that is slated for demolition. The map below (Fig. 22) highlights the potential locations.

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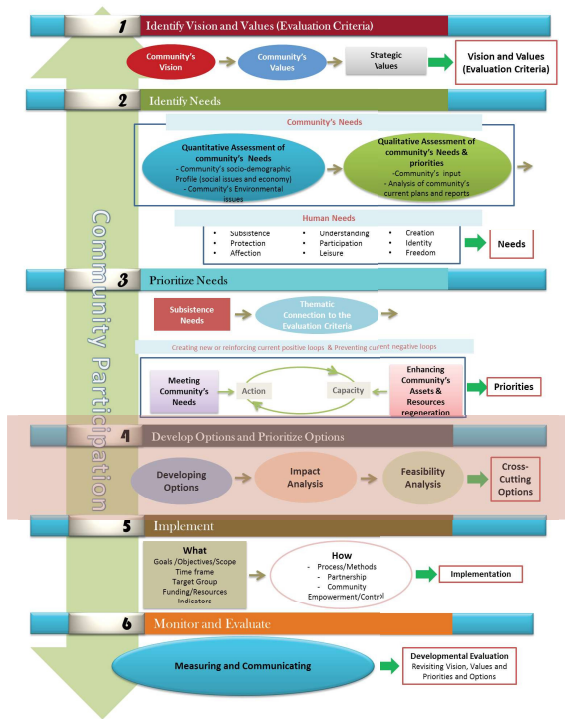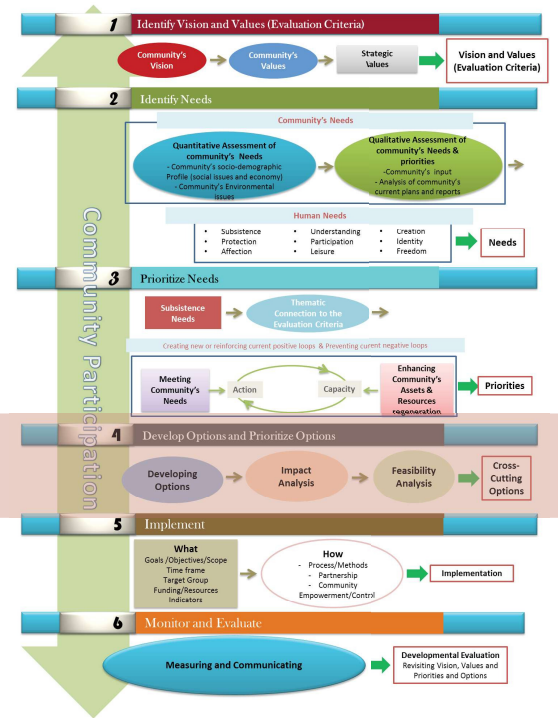
Map by Institute of Urban Studies

Community greenhouses have the potential to not just augment diets with locally-grown food, but can engage residents of all ages in learning new skills and in forming new cooperative relationships. They could also be a boon to the local economy through supplying local restaurants with fresh ingredients. To find out more about this option see notes 2-5.

B. Community Freezer

Procuring meat for a household by hunting is made more difficult by the inadequate sizes of most commercially-available freezers. Even a large deep freeze may not be large enough for caribou and other large game. They can also be expensive for a single household to maintain. A community freezer – which can be built underground or of insulated building materials and make use of natural cooling – can be shared by the community.

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Community freezers should ideally be part of a broader strategy to encourage and facilitate the gathering, preparation and economic integration of traditional food. This strategy would need to include (6):

• a harvester's support Program – Increased level of individual support for hunting equipment/supplies (including camping equipment, ammunition)
• community hunts
• linkage with food bank
• implementation and/or expansion of youth hunting
skills programs, traditional food preparation classes
• salary for hunters
• non-profit/cooperative traditional food processing plant and sales (see note 7).

C. Community Kitchen

A community kitchen isn't so much a place as it is a program, one that offers residents the opportunity to prepare meals together. Food being such an important part of community building – breaking bread with one's neighbours and family – the community kitchen can help build a sense of community, increase capacity-building by teaching new skills, address food security issues and be a major driver behind regular community feasts. Members' families can enjoy healthy, low-cost meals and learn to enjoy a wider range of more nutritious foods (see notes 8-10).

D. Related Initiatives

Once a local food economy (with sufficient greenhouses, preserving, a community freezer and a community kitchen) has been sufficiently developed, then things like regular community "harvest" feasts and a farmer's market could be developed. There may even be the opportunity to provide produce to the Northern Store.

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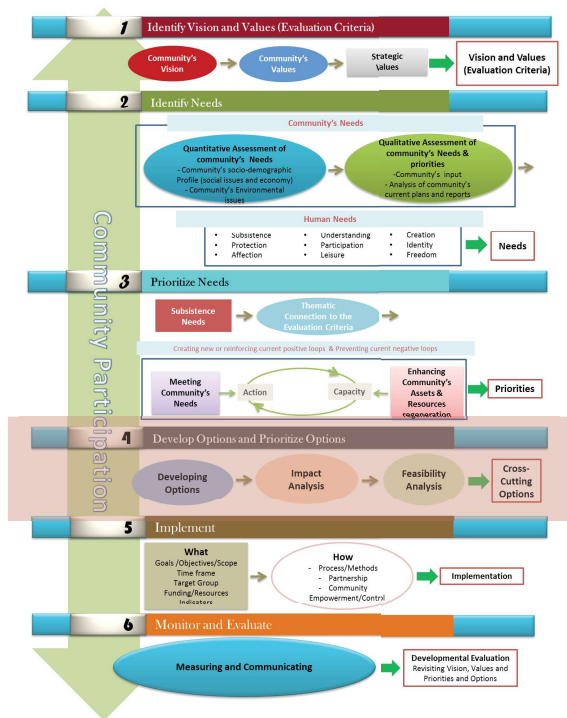
Sample Options for the Priority of "Economic Development":

Initiatives under this heading are intended not only to support existing economic activity in the town, but to develop new opportunities, all while strengthening the capacity of local community members to participate in and benefit from those activities.

A. Community Economic Development (CED) Organization

A community-based CED organization is a way of building local capacity to plan for economic development with local stakeholders. It affords members of the community the means to take greater leadership in articulating the direction of the community. It enables the community to identify where "leaks" in the local economy are allowing economic resources to flow out of the community, and seek to "plug" them; to ensure that the greatest return is being obtained for local economic activity; provide support for existing businesses to ensure that they have the resources they need to succeed; and identify and develop previously un-tapped local resources (see note 11-13).

B. Small Business Incubator

A small business incubator can be a key element of an economic development strategy, and a way of harnessing local resources. They provide support to local entrepreneurs by providing low-cost access to office space, computers and networking, capital, meeting rooms, guidance and assistance. Set up in an existing facility, this shared space would allow overhead costs to be kept to a minimum and could offer ancillary services such as secretarial, accounting and legal support. The incubator is itself a business, and would need to have strong connections with the existing business community and the Chamber of Commerce (see note 14-16).

C. Integrated Tourism Information

One of the issues raised in consultation is the lack of coordinated information-sharing between the tourism-related entities in the community. Destination Churchill's website currently offers recommended visiting times and types of holidays to plan depending on one's interests. But there

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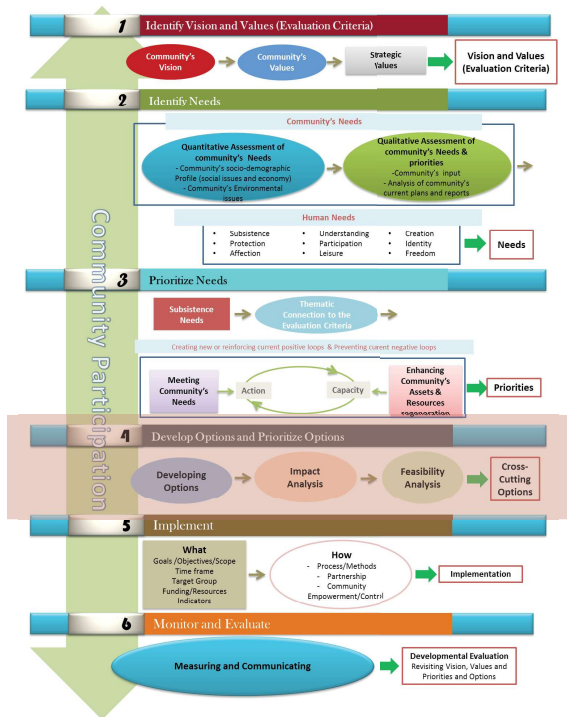
is no "one-stop shop" for potential visitors to go to in order to determine the range of services on offer and their availability, such as room vacancies and menus. What may help here is Community Tourism Planning, which is a community-based and participatory process for more systematically and holistically planning the tourism infrastructure in a given community, rather than leaving this entirely in the hands of local entrepreneurs and interest groups. This allows for more proactive approaches to developing the industry, and may contribute to the economic and social benefits of the industry being more widely shared (see note 17).

D. Airport / Train station Visitor Centre with Ambassador

A part of promoting "community tourism" would be to raise the profile of the community where visitors first encounter the town: at the airport and the train station. The town has no presence as such at the airport. Unlike major metropolitan airports which provide direct phone lines to hotels and other attractions, the Churchill airport leaves the visitor to their own devices to learn about the community and region on their own. An "ambassador" program including a welcome desk at both the airport and train station could help address this. Local residents would be trained and employed to greet arriving tourists, answer questions and direct them to local services.

Ambassadors should be familiar with the history of the town, local wildlife and climate, local attractions, guidelines for visitors to keep the community and area intact (littering, interfering with wildlife, etc.) and safety, as well as local issues such as food security and climate change. Community elders/long-time residents could be paired with youth to train as ambassadors. Employees of the visitor centres could become accredited as a Certified Tourism Ambassador with the Tourism Ambassador Institute (see note 18).

E. Tool/Appliance/Equipment Sharing Network

Not every household needs – nor can afford – to purchase the full range of tools and equipment that might be needed over the years. A tool/appliance sharing network would allow people to locate, retrieve and use a needed item, and then make it available. Easier to organize than a tool "library" (which would require a set location and operating budget) a sharing network would make use of existing resources in the town. As it would mean another reason for residents to get in touch with one another, it can also contribute to community-building (see note 19).

Diagram: Community Participation framework

Community Participation

1. **Identify Vision and Values (Evaluation Criteria)**
   - Community's Vision → Community's Values → Strategic Values → Vision and Values (Evaluation Criteria)

2. **Identify Needs**
   - Community's Needs
     - Quantitative Assessment of community's Needs – Community's socio-demographic Profile (social issues and economy) – Community's Environmental issues
     - Qualitative Assessment of community's Needs & priorities – Community's input – Analysis of community's current plans and reports
   - Human Needs
     - Subsistence, Protection, Affection
     - Understanding, Participation, Leisure
     - Creation, Identity, Freedom
     → Needs

3. **Prioritize Needs**
   - Subsistence Needs → Thematic Connection to the Evaluation Criteria
   - Creating new or reinforcing current positive loops & Preventing current negative loops
   - Meeting Community's Needs → Action → Capacity → Enhancing Community's Assets & Resources regeneration → Priorities

4. **Develop Options and Prioritize Options**
   - Developing Options → Impact Analysis → Feasibility Analysis → Cross-Cutting Options

5. **Implement**
   - What: Goals /Objectives/Scope, Time frame, Target Group, Funding/Resources, Indicators
   - How: Process/Methods, Partnership, Community Empowerment/Control
   → Implementation

6. **Monitor and Evaluate**
   - Measuring and Communicating → Developmental Evaluation Revisiting Vision, Values and Priorities and Options

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F. Cultural Festivals

With the success of the Aurora Winter Fest, perhaps there is the potential to explore another annual festival, but one geared more towards the arts. Fine and traditional arts, music, film, theatre – all these have the potential to develop local talent, attract artists and audiences and boost the local economy. Ideally scheduled around existing peaks, an annual arts-related festival would help maintain more regular business for the town's hospitality businesses (see notes 20-21).

Sample Options for the Priority of "Youth, Education, Training, and Recreation":

A. Youth Apprenticeship Employment Program

An apprenticeship program could see youth can be recruited to work with a local business or tourist operator for a season. The youth gain skills working with that business and with the public while earning money. Wages can be funded in part through provincial and federal programs for example, the Urban/Home Town Green Team program, or employment programs for Canada from Service Canada. The program should be coordinated as a school-to-work program with the Duke of Marlborough School to facilitate the recruitment process and possibly provide a high school credit for successful participation. A coordinator would be required to review applicant resumes and match youth with businesses. Incentives for participating businesses should be considered (see notes 22-25).

B. After School Programs

The town and its young people would benefit from an extension of the successful existing Youth drop-in Centre run by the Churchill Youth Drop-in Committee. A daily program immediately following school for young children can provide a safe and nurturing place where they can have fun, be active and creative, and build skills and confidence. Following this, a nightly drop-in program with a variety of age-appropriate activities would provide avenue for youth to engage in positive, adult-supervised activities. Through these means children and youth can build positive relationships and will help keep them from engaging in counter-productive or high-risk activities.

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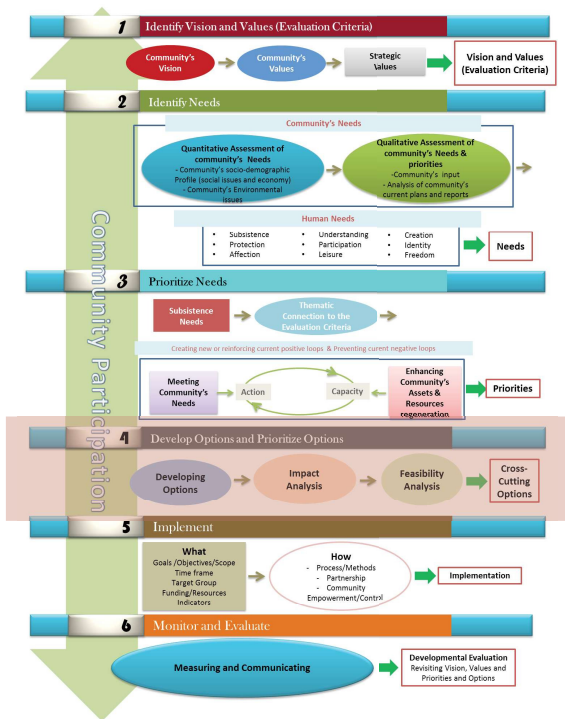
Sample Options for the Priority of "Housing":

A. Mixed-use Housing

Future development in the town should promote live-work arrangements, in which business owners can operate out of their homes, or storefronts attached to their houses. This would encourage economic development efforts, as well as make both homeownership and business management more affordable. It also promotes transportation demand management by reducing the amount of travel needed. This recommendation is reflected in the discussion of revisions to the Zoning Bylaw (see Section 4.1.2 below).

B. Senior's Housing

One of the needs identified in the consultation was dedicated housing for Elders, in facilities where they could have access to appropriate health care supports. A continuum of housing and supports would allow residents to live in a range of circumstances – independently, communally and in extended care. Retrofits of existing housing stock – adjacent townhouses for example – might be utilized to create multiple units built around common facilities.

Sample Options for the Priority of "Waste Management":

A. Used Goods Sale and Trade

This would be a location where residents can have a table for low or no cost to sell and trade used items, homemade foodstuffs and handicrafts. An event could be held monthly or depending on demand. People could also meet here to trade skills (sewing, carpentry, small engine repair, canning, music, etc.). It could also be the start of a place to sell homemade goods during tourist season. Vendors could sell local foods and provide opportunities for local food production. This is a good economic development strategy that also helps build a sense of community (see note. 26).

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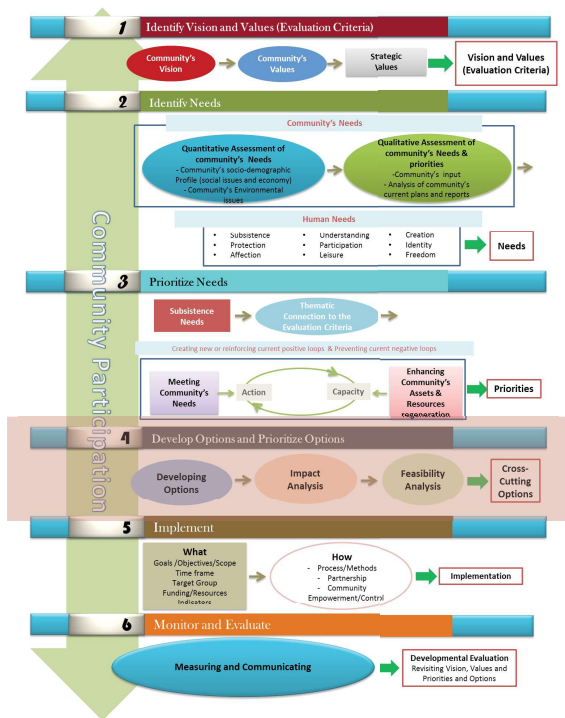
B. Fee for Tourists to Support Waste Management

Given the extraordinary impact of visitors on Churchill's solid waste management challenges, it has been suggested in the past the visitors be charged a fee to help offset these costs. There was concern expressed during consultations that this could be received badly by tourists and thus hurt the tourism sector. However, while the tourism in Churchill isn't billed strictly speaking as "eco-tourism", most tourists are motivated to travel to Churchill to experience its natural habitats and wildlife, and would therefore presumably be more motivated to pay a premium on their hotel and restaurant bills to keep that environment clean. As civil engineer Sandra Cointreau argues (27):

> *"Willingness to pay is greatly enhanced when local residents [and visitors – Ed.] perceive accountability and transparency in the management of the fees charged for solid waste management services, thus collecting money in a segregated account for the sole use of the solid waste sector is a useful tool for financial management."*

Willingness to Pay (WTP) studies undertaken in other jurisdictions show a significant willingness on the part of visitors to pay a "green" premium as long there is certainty and transparency as to where these monies are going and how they can support proenvironmental goals. As one tour operator told Colby (28):

> *"Clients don't object to paying fees as much as they criticize that this fee does not show up in improved environmental management services…Rather than driving tourists away, fair user fees to fund such investment are vital to attracting the most valuable tourists".*

If this was to be pursued, the key is determining the most efficient, transparent and fair way to charge such a fee. Would it be an airport/railway departure tax for non-residents, for example, or a surcharge on all meals? This would need to be explored, as would ways to transparently ensure that the fees collected were directly applied to solid waste management (see note 27-30).
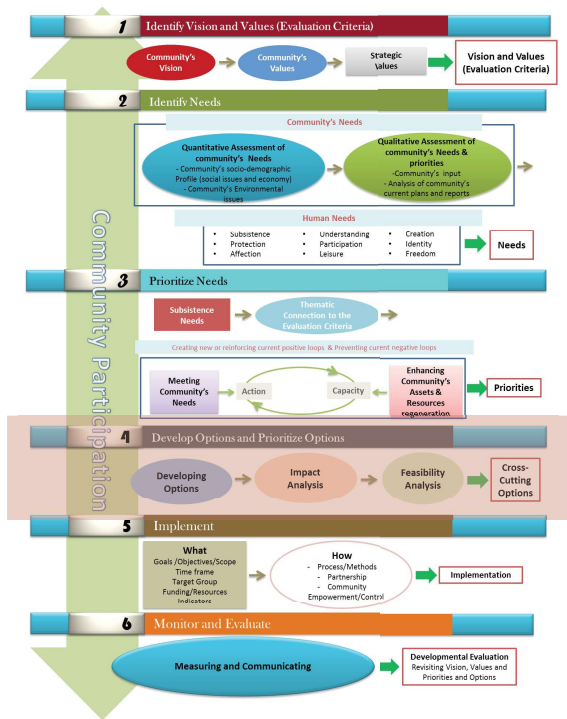
C. Bike Dump

Bicycles are common form of transportation in Churchill, especially for young people. The consultation revealed that some young people are obtaining spare bike parts from L5. A safer, more

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convenient and legitimate way to promote do-it-yourself bicycle repair would be an in-town "bike dump" -- a location where adults and youth can learn how to repair bicycles and can find spare parts to fix their bikes, as well as receive technical assistance.

The Dump would take donations of used bikes with usable parts and be staffed by volunteers or with a few paid positions. Young people volunteering at the Dump can learn useful mechanical skills, and receive a free reconditioned bicycle in exchange for their labour (see notes 31-32).

D. Community-Based Social marketing

Designed by Dr. Doug McKenzie-Mohr, Community-Based Social Marketing (CBSM) responds to the ineffective but prevalent methods of promoting environmentally friendly behaviour (33). Combining behavioural psychology with social marketing techniques, CBSM verifies the day-to-day barriers and motivations for specific behaviours. Once the real barriers and benefits are confirmed, various tools, such as personal commitments, community norms, tailored prompts and vivid communications can be used as part of a comprehensive strategy. The use of small scale pilot programs significantly inform the final strategy, which in turn is measured for successful impacts.

CBSM can be used for everything from reducing waste entering the landfill, to reducing energy consumption, to using water more wisely.

In the case of solid waste, recycling and composting, a CBSM program would need to identify barriers preventing people from participating fully in sustainable solid waste practices, and then develop a suite of tools for overcoming these barriers. Social marketing could also be highly effective in addressing the aesthetics of the town, in getting people to maintain their own properties, and properly dispose of garbage and other bulk items (For more on CBSM please see Appendix 4).

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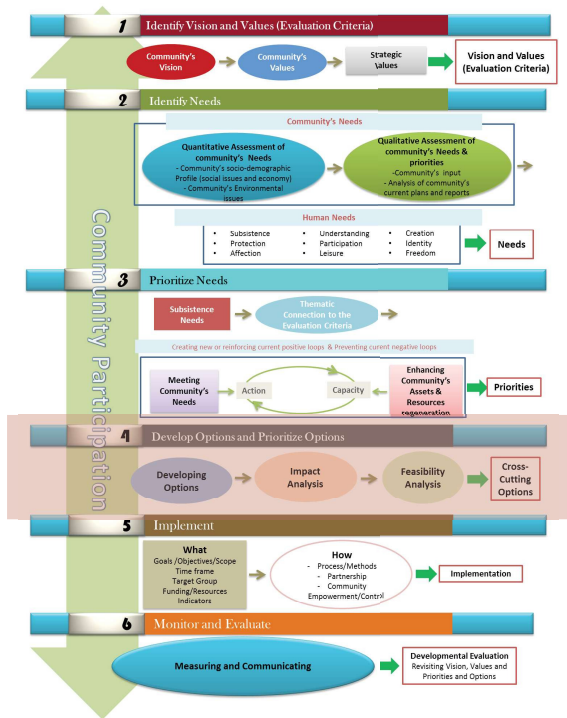
Impact and Feasibility Assessment

To demonstrate the "toolkit" in action, the two following potential projects are analyzed:

- a small business incubator, and
- a community greenhouse.

These projects will be analyzed in terms of their potential impacts and feasibility. Looking at potential impacts and feasibility further requires, based on the other criteria, that community stakeholders determine if it is more important to have a higher impact or higher feasibility. Ideally both impact and feasibility are desirable but it may not be possible to have both.

Impact Analysis

By examining each project in terms of the Vision and Value statements, we begin to assess its potential impacts. Also, the impact would be examined based on determining how each project would address the community's needs and support the human aspirations for Being, Having, Doing, and Interacting (see section 3.2) and more importantly, how each project would address the community's priorities.

Is it Feasible?

A feasibility assessment requires looking at practical considerations related to financial resources, physical space requirements, management, staffing, maintenance, promotion, timeframes and long-term sustainability. The table below (Figs. 23) is intended to assist in the planning process by identifying what resources would be available to make a project successful— locally, provincially and federally.

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	Local	Provincial	Federal	Private	NGOs/ Community
Financial	Is there local capital available? Would investment from elsewhere be needed?	Are there provincial grants or other assistance?	Are there federal grants or other assistance?	Are there investors/owners to start up the project?	Is there a Community-based CED organization?
Physical	Is there underutilized space in existing building? Surplus furniture and equipment?	Is there provincially-owned land or property that could be used/ adapted/ shared?	Is there federally-owned land or property that could be used/ adapted/ shared?	Is there a privately-owned property that could be used/ adapted/ shared?	
Cultural	What can make this a unique, "made in Churchill" business?				
Human	Are there interested residents to work or volunteer?			Is there specific skill set, background available to own and manage	Is there a Community-based CED organization?
Informational	Is there some local expertise?	Are there other examples in Manitoba?	Are there other examples in Canada?		What is the level of support in the community?

Table by Institute of Urban Studies

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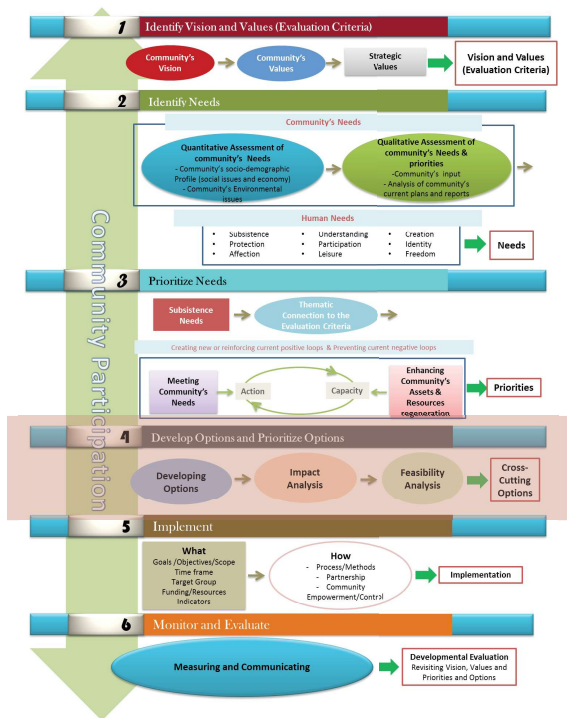
Example #1: Small Business Incubator

Impact Analysis

Is it consistent with the town's stated Vision and Values?

It would:
• Recognize and strive to meet the varying needs of residents *by providing flexible, affordable and creative ways to fulfill their potential;*
• Promote personal development and capacity building *by giving people access to the tools they need to succeed;*
• Consider immediate and cumulative long-term effects to the environment during decision making *by emphasizing the need for ecologically sustainable economic activity;*
• Be as efficient as possible in the consumption of resources *by sharing workspaces, tools, resources and utilities;*
• Take advantage of existing infrastructure and resources *by being housed in an under-utilized space;* and
• Acknowledge and build on recent and concurrent initiatives and activities *by contributing to and enhancing the community's existing economic base and taking advantage of and supporting ongoing community-building efforts.*

How would this proposal address the community's needs?

Subsistence: Providing support for meaningful livelihoods
Protection: Reduces the risk of entrepreneurship
Affection: Creates and supports a community of businesspeople
Understanding: Provides framework for economic development and facilitates communication between aspiring businesspeople, investors and customers
Participation: Engages multiple stakeholders within and without the town
Leisure: Participants may be able to work flexible hours, leaving more time for leisure activities
Creation: Encourages economic creativity
Identity: Assists people in developing their potential, and in terms of whatever "identity" they choose.
Freedom: Affords people opportunities not possible working for other employers.
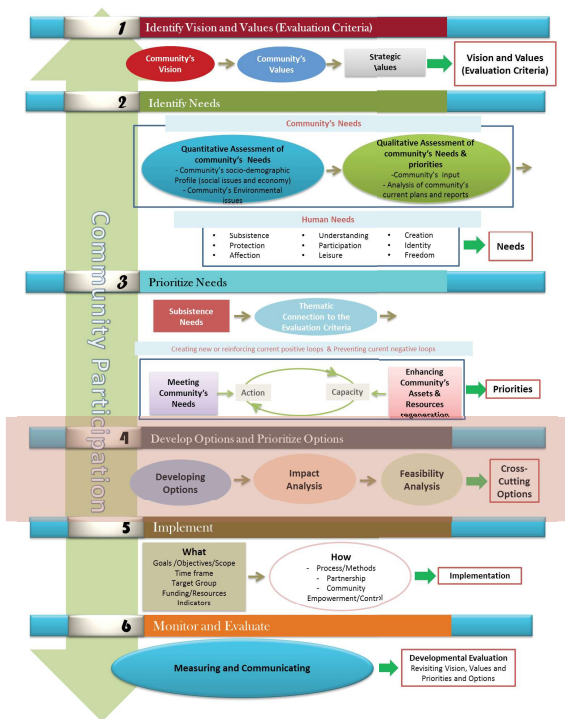
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Would it support the human aspirations for Being, Having, Doing, and Interacting?

Being: Acquiring new skills
Having: Gaining access to tools, facilities, raw materials.
Doing: Carrying out business activities
Interacting: Working with other entrepreneurs in the Incubator, investors, customers.

Is it Cross Cutting? How would this proposal address community's priorities?

• Could address **Food security** if one of the incubator businesses was oriented this way; otherwise not related
• Would address **Waste management** through shared space, meaning fewer resources used. Could also adopt a waste minimization strategy, e.g., paperless office
• Primarily concerned with **Economic development**
• Could have a **Youth education and training** component by offering young people an opportunity to intern and learn business skills
• Not related to **Housing**.

Strongly related to one priority (economic development); somewhat related to two others (waste management, youth education and training), not related to two others (food security and housing). These steps show that, in the case of the small business incubator, potential impacts would include contributing to the local economy by creating new business enterprises, training members of the local workforce and attracting new investment to Churchill. It would promote economic and social sustainability, and, if oriented to "green" business would also support environmental objectives. *It is not, however a strongly "cross cutting" option.*

Is it Feasible?

Below some of the available resources for this option have been identified. However, note in an actual planning process good deal of local information would be needed to identify resources. These are presented for demonstration only.

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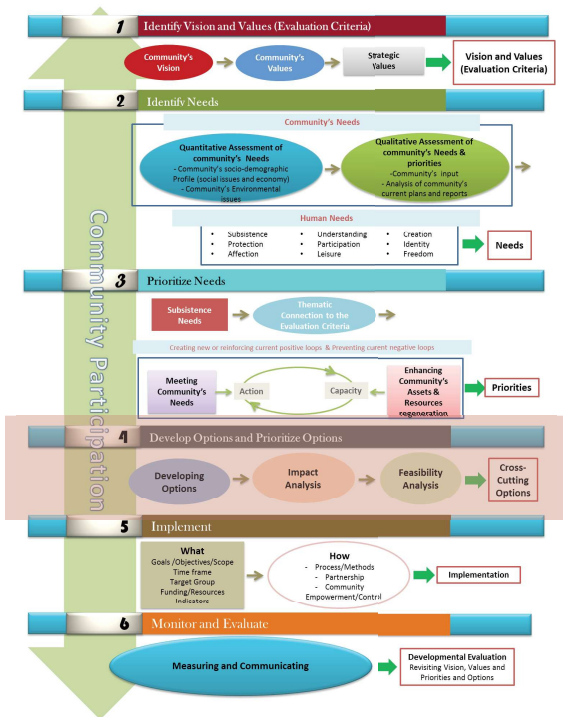
Identifying Resources for the option of small business incubator:

- Local Resources (Physical): e.g. Town Centre?
- Provincial Resources (Financial): The Business Start Program (34)
- Provincial Resources (Informational): Profiles of Capital Providers (35)
- Federal Resources (Informational): Business Services Centre (36)
- Private and Community Resources: To be identified

Comparing Impact and Feasibility

Initial review of needs and resources would seem to show that the idea is very feasible, with few potential barriers. It has the potential for considerable impact. The feasibility would need to be further fleshed out with local expertise, and impacts would ultimately depend on the types of entrepreneurs attracted to the Incubator and the types of businesses they might develop.

Small Business Incubator Option:
IMPACT: Moderate
FEASIBILITY: High

Example #2: Community Greenhouse

Is it consistent with the town's stated Vision and Values?

It would:
- Recognize and strive to meet the varying needs of residents *by providing supplementary produce;*
- Promote personal development and capacity building *by giving people the opportunity to participate in the creation and management of one or more greenhouses*;
- Consider immediate and cumulative long-term effects to the environment during decision making *by emphasizing the need for ecologically sustainable local food production;*

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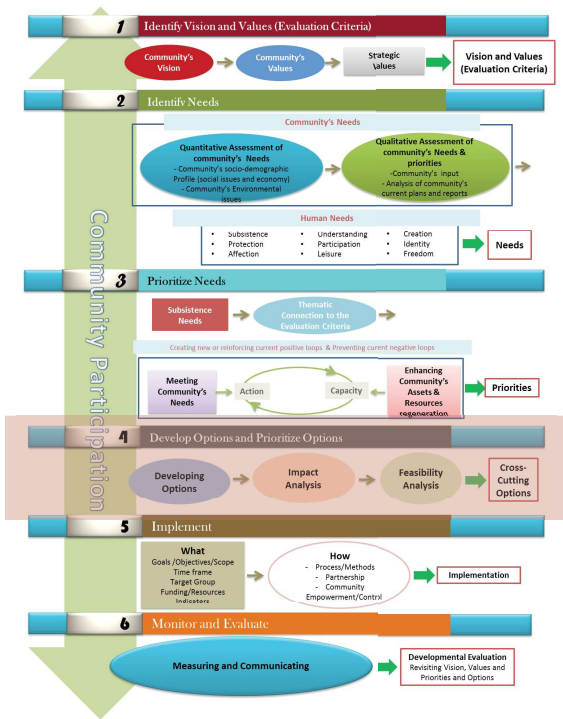
• Be as efficient as possible in the consumption of resources by *drastically minimizing energy inputs into the local food supply;*

• Take advantage of existing infrastructure and resources *by being located in presently vacant properties*; and

• Acknowledge and build on recent and concurrent initiatives and activities *by contributing to and enhancing the community's existing economic base and taking advantage of and supporting ongoing community-building efforts.*

How would this proposal address human needs?

Subsistence: Providing nourishing foodstuffs
Protection: Reduces risk of food insecurity
Affection: Creates and supports a network of community gardeners, suppliers and customers
Understanding: Provides opportunity for learning new skills
Participation: Engages multiple stakeholders within and without the town
Leisure: Gardening is an excellent and popular hobby
Creation: Encourages the development of continually renewable economic and social activity
Identity: Assists people in developing their potential, and
Freedom: Liberates people from relying entirely on food delivery chain from the south.

Would it support the human aspirations for Being, Having, Doing, and Interacting?

Being: Acquiring new skills
Having: Gaining access to tools, produce, recipes, nourishing food
Doing: Carrying out planting, care, harvesting, food preparation
Interacting: Working with other community members as fellow gardeners and customers.

Is it Cross-Cutting? How would this proposal address community's priorities?

• Primarily concerned with **Food Security**
• Related strongly to **Waste Management** by reducing dependence on prepackaged foods.
• Related to **Economic Development** by providing participants the opportunity to add value and sell food products locally, for example at a farmer's market.
• Would relate to **Youth Education, Training and Recreation** by engaging young people
• Could be associated to **Housing** by being located on Manitoba Housing land.

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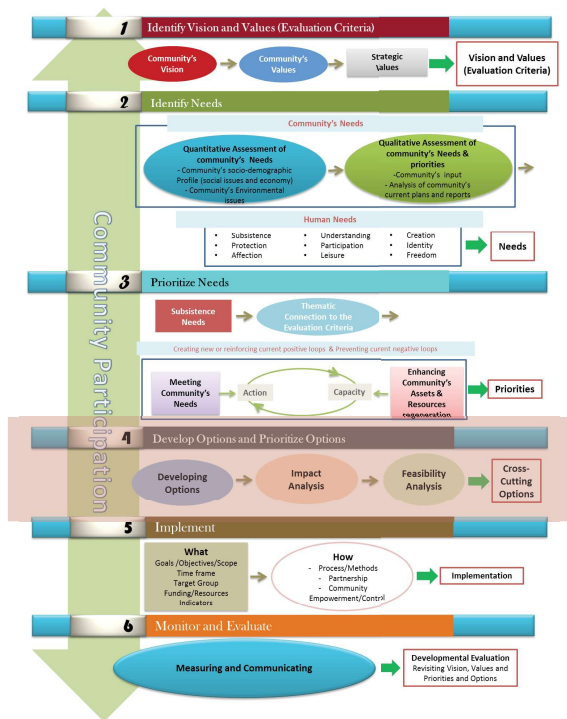
These steps show that, in the case of Community Greenhouses, potential impacts would include contributing to the health and well-being of residents, contributing to the local economy by reducing household expenses, creating new business enterprises, training residents with new skills, and facilitating new social relationships. They would promote economic, ecological and social sustainability. *This option is strongly cross-cutting.*

Is It Feasible?

Below some of the available resources for this option have been identified. However, as mentioned before a good deal of local information would be needed to identify available resources and these are presented for demonstration only.

Identifying Resources for the option of Community Greenhouse:

• Local Resources (Physical): Building supplies and equipment, Range of fruits and vegetables
• Local Resources (Human): Bill and Diane Erickson of Boreal Gardens (local people with valuable skills and experiences)
• Local Resources (Cultural): ethnic staples, varieties
• Provincial Resources (Financial): Northern Healthy Foods Initiative (37)
• Provincial Resources (Physical): Vacant properties managed by Manitoba Housing
• Provincial Resources (Informational): Manitoba Agriculture, Food and Rural Initiatives (38) and Food Matters Manitoba (39)
• Federal Resources (Physical): Federally-owned plots
• Private Resources (Physical): Privately-owned plots
• NGO/Community Resources (Financial): Manitoba Alternative Food Research Alliance (40)

Comparing Impact and Feasibility

Initial review of needs and resources would seem to show that the idea is feasible, and has a strong local precedent in Boreal Gardens. It has the potential for considerable impact, in terms of addressing local food security issues and in building local capacity. The feasibility would need to be further fleshed out with local expertise, and impacts would ultimately depend on the extent to which local participants could be attracted to the project, and how it was carried out.

Page 77
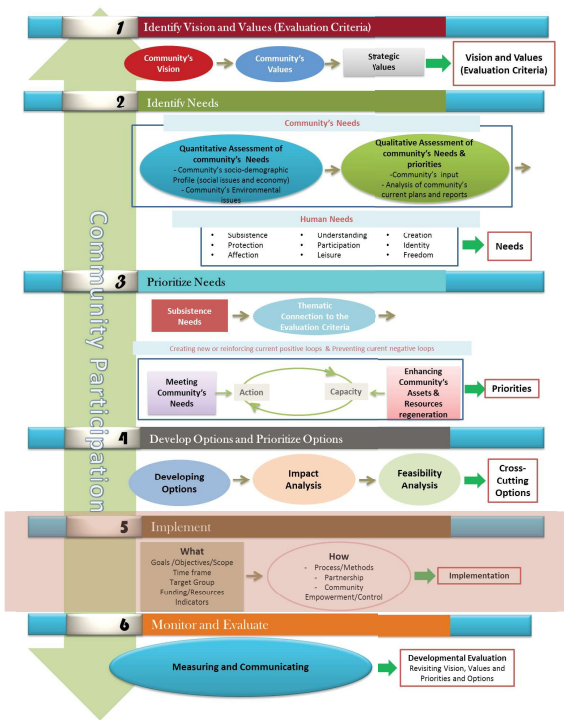
Community Greenhouse Option:
IMPACTS: High
FEASIBILITY: Moderate

As mentioned before, ideally both a significant impact and a high level of feasibility are desirable when implementing change, but it may not be possible to have both. Depending to the circumstances and criteria being used in decision-making, the town may decide go with the more feasible option and take a small but certain step toward meeting a larger priority -- which could boost public perception of the changes under consideration. However, if the town needs to have a significant result in terms of meeting an urgent need, the town may choose to pursue an option with the greatest potential for a positive impact, even though there may be more uncertainties involved with it.

These options should, of course, only be considered potential options, rather than recommendations for action. They each require further study and consideration; such research could perhaps be undertaken by a qualified consultant, or in association with an interested University of Winnipeg student, or the Northern Studies Centre.

Step 5: Implement

The next step (Fig. 26) is to act on these selected options/projects. For each project, attainable goals, objectives, and scope of the project should be clearly determined, as should be the time frame and the target group (who will benefit most). Each project will need to be undertaken within the available funding and resources.

Page 78
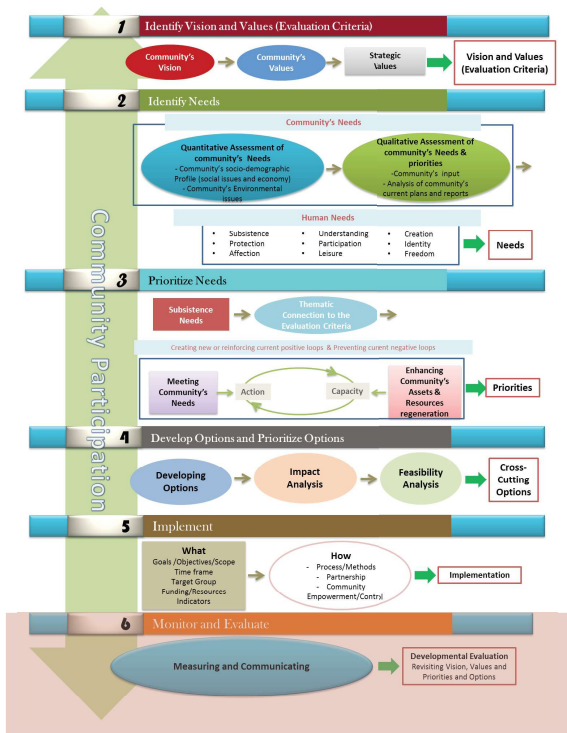
Figure 26: Fifth Step in the Framework: Implement

Step 6: Monitor and Evaluate

For each project, indicators of success should be clarified. What would success look like? How many people would ideally benefit? These indicators would help to evaluate the success and impact of the project, as well as enable the community to identify unforeseen challenges and adjust activities accordingly. Monitoring and evaluation (Fig. 27) would then, in turn, inform the whole framework for future planning purposes.

Figure 27: Sixth Step in the Framework: Monitor and Communicate

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3.5   Conclusion

This section has demonstrated the CSPF in action, offered a range of potentially cross-cutting options to address identified needs, and illustrated how these needs can be tested for their appropriateness through the use of a toolkit for community development. The full potential of this toolkit would require its use by those with the appropriate level of local knowledge – of resources, of expertise, and of place.

It is to this last consideration – that of place – that the CSPF now turns, in an examination of land use and urban design.

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CHAPTER FOUR:

IMPLICATIONS FOR INTEGRATING THE CSPF INTO PLANNING & URBAN DESIGN

CONTENTS:

Chapter 4: Implications for Integrating the CSPF into Planning & Urban Design

In this section we consider long term planning as it relates to the built environment as well as broader strategic planning goals. Three of the town's official plans including the Development Plan, the Zoning By-law and the Strategic Plan will be discussed. With respect to urban design, Kelsey Boulevard, the train station, and the Public Square will be examined.

4.1 Implications for Official Plans

4.1.1 Development Plan

The purpose of a municipal development plan is to provide the town with direction for future development (both short and long term), as well as to identify "issues of government concern" which may affect development within the community, and to align the policies within the plan with the provincial land use policies. Additionally, a plan identifies policies that are to be enforced by the zoning by-law. Churchill's most recent development plan was adopted in 2000. While the province of Manitoba typically calls for development plans to be reviewed every five years (1), this may not

always happen. The recommendations in the CSPF are intended to inform the revision of this official development plan.

Churchill's 2000 Development Plan provides direction mostly on land use regulation and land development. The development areas are divided into residential, commercial, industrial, and limited development. The plan also provides some guidelines and policies for regional development, environmental conservation, and education.

Residential development policies emphasize the importance of attracting new residents, and the logical development of new residential space. Policies state that residential development shall include permanent, seasonal, and mobile home development, and that owners of underdeveloped lots will be encouraged to make them available to those wishing to build. Residents of the area "southwest of the community, south of the railway line" (Flats) will be encouraged to redevelop their properties to municipal standards (2). There is also a policy encouraging council to meet with Manitoba Housing in order to establish ways of selling housing to private owners.

The section on commercial development emphasizes the maintenance and enhancement of existing commercial development as well as the "beautification" of the downtown area. Policies also encourage new development to locate in the downtown area, to minimize servicing costs.

Policies relating to industrial development state that industrial uses must remain within the designated industrial areas, that future industrial developments have access to major roads while minimizing effects on residents, and that buffers be provided between industrial areas and other areas that may be adversely affected by noise, dust, etc. Additionally, those industrial uses currently not located in industrial areas will be encouraged to relocate.

The limited development section states that predominant uses shall be recreation and tourism, and that natural areas should be maintained for the use of the public whenever possible. Further study of resources for the tourism industry will be encouraged, and crown agencies will be encouraged to consult with the residents in all decisions.

Regional development policies emphasize that the federal and provincial governments not undertake any initiatives without consultation with the Town of Churchill. The town shall continue to be represented on the Management Board of Wapusk National Park, and shall remain close

with representatives of the Kivalliq Region in terms of initiatives that could be beneficial to both communities. The province will be requested to prepare an official land use plan for the crown lands in Churchill and region. In addition, the policies call for council approval of any extraction projects, and for Manitoba Conservation to "aggressively monitor" the area to ensure these objectives are met (3).

Section Eight, which deals with the environment, says that environmental consideration shall be part of the review process for all development, and that council shall consult with Manitoba Environment on those proposals that may compromise the environment. Recycling shall continue to be supported, as will other environmental initiatives that may be brought forward.

Among the differences between the Development Plan and the present CSPF is that the former does not include a defined collective vision for Churchill's future, nor does it set out broad priority areas as has been done in the CSPF. Finally, there is a lack of monitoring and evaluation mechanisms of the sort discussed below in Chapter 5.

As well, policies and objectives are very broad and insufficiently descriptive. For example, under the environment section (Section Eight), there are only three policy statements, including:

> *"a) Environmental considerations shall be a part of the review process for development and land use proposals.*
> *b) Council shall consult with Manitoba Environment on proposals that may compromise the environment.*
> *c) Council shall continue to support the recycling efforts in Churchill and any other environmental initiatives that may be proposed from time to time."*

Because the Development Plan is concerned primarily with land use, important environmental issues such as energy efficiency and water conservation receive no attention. Also, waste management, which is one of the critical issues in Churchill is considered only under recycling efforts.

For these and other reasons, the CSPF has sought to address broader issues, and to consider the built environment as being interconnected with the social, economic and ecological sustainability of the community.

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The Development Plan includes a land use map for the Churchill region which identifies the town's developed area as an urban district. However, there is no specific map for the current land uses in the urban district to identify residential, commercial, schools and open spaces. The Urban District area as is shown in green if Fig. 28 below.

Figure 28: Churchill's Land Use Map
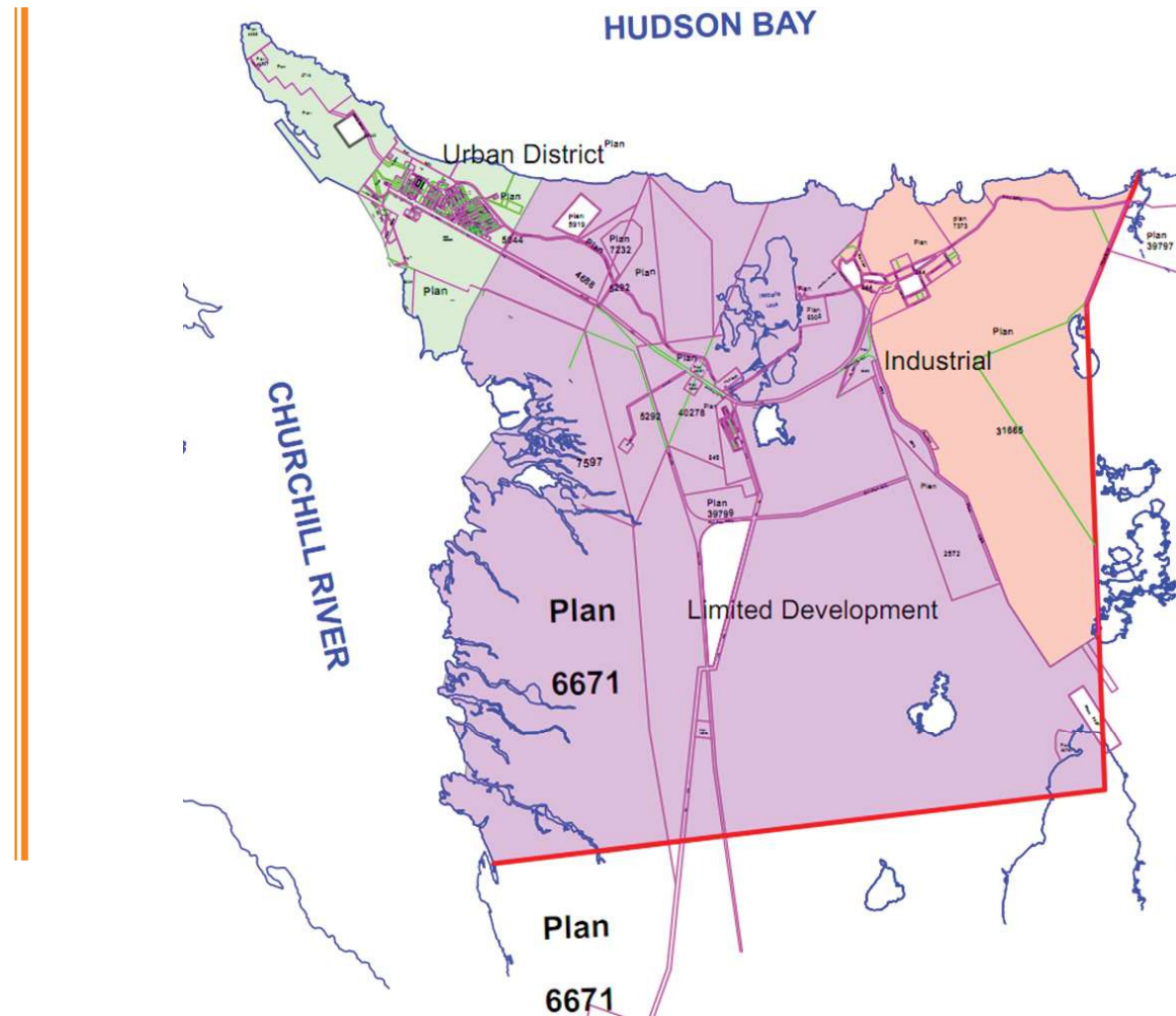
Reference: Town of Churchill Development Plan

Using Geographic Information System (GIS) databases, a land use map can be used to identify existing problems and conditions (4). For example it can be used to record land conflicts, areas with poor sewer and water service, important open spaces, historical buildings and sites and lands ready for commercial, industrial or residential developments (4). Also, current and accurate land-use maps for Churchill will provide both residents the ability to see how the vision for Churchill is being represented in a graphic fashion.

The residential land-use map and ownership map (shown on page 15 and 16) have been developed to show how land-use maps can help to communicate the town's issues more effectively. For example, the residential land-use map shows the distribution of the social and private housing in the town and it helps to identify opportunities for infill developments. The ownership map shows which areas would be affected if changes in land use occur. Since different levels of government each have a stake in Churchill's urban district, there is a need for collaboration between the different levels of government as well as private owners to make changes to land-use and zoning in Churchill.

4.1.2 Zoning by-law

Zoning is an important planning tool that helps to shape the built environment of a community. It is used to prescribe and facilitate certain types of land uses and separating incompatible uses, thereby protecting residential areas from potentially harmful or undesirable development. By facilitating sound land use policy decision-making, zoning can also provide a means of supporting the social, economic, and environmental sustainability of Churchill.

The zoning by-law enables a board or council to adopt specific regulations for the use and development of land. Where the development plan is a statement of the board or council's intent respecting future development, the zoning by-law provides an essential mechanism for implementing the policies set out in the development plan.

The Zoning by-law should take into account the collective vision for a sustainable Churchill and translate these principles into a set of regulations which are then are applied to all future development in the town.

On the broadest scale of zoning in Churchill there are three districts: urban, industrial, and limited development. These districts give a general scope for future development in the area. As defined in the 2002 Zoning By-law, the urban district zones are divided into three principal categories; residential (including zones for low and high density as well as mobile homes); commercial and industrial; and lastly public, recreational, and limited development.

Most planners working in the area of sustainable urban development now advocate mixing uses, rather than depending on strict separation. For example, the Zoning By-Law for the town of Fort Nelson, British Columbia uses a varied set of specific zoning regulations to define their community is in their 'Downtown Mixed Use' zone. The need for such a zone is first clearly delineated in their Official Community Plan (similar to the Development Plan in Manitoba).

> *The intent of the Downtown Mixed Use area is to promote a compact, active commercial spine for the Town and surrounding district – a special place which is friendly to pedestrians, with retail, office, entertainment and tourist uses predominant on the ground level, but welcoming to residential, institutional or office uses on upper floors (5).*

Following this example, Churchill could review the zoning categories within the urban district and consider including a mixed-used designation for the central core of town that would encourage both commercial and residential uses within the same property. At present, Part 5.6 of the zoning does permit Accessory Dwelling Units to the rear or above a commercial building, but a Mixed Use designation for the central area would encourage residential development adjacent to businesses.

As well, the By Law could include a provision for secondary or "granny" suites in the low-density residential zone. These could be accommodated in Part 4.2, Accessory Building Structures and Uses. Together, these two recommendations create a greater range of diversity in the type of accommodations available within the town and would be a step towards recognizing the residential development objectives as outlined in the Development Plan (page 5-6).

The third recommendation is to develop a zoning category that would protect areas with historical or cultural significance. In conjunction with other promotional efforts to showcase the cultural assets of the town, this new zone would be a step towards communicating the places valued by the community. This new zone would also realize the objectives laid out in the Development Plan (page 4-5, General Development Objectives).

The last recommendation is to establish a regular evaluation and review mechanism of the goals and objectives to create regulations that will lead to the desired outcome. An updated strategic plan is one means of accomplishing this end goal.

4.1.3 Town Strategic Plan 2002

In 2002, the town of Churchill created a strategic plan which lays out an agenda for local government, broken down by department (i.e. administration, public works & utilities, complex facility, culture & recreation). The plan also reviews goals the town achieved in previous years and sets an agenda for the upcoming year. The town's vision statement cites the town's intention to provide responsible governance to the people of Churchill while incorporating the unique traditions and values of the area. The vision also strives to maintain a safe community and implement guidelines that benefit all citizens.

The Churchill Strategic Plan of 2002 was created as a means for the four Town departments (Administration, Public Works and Utilities, Complex Facility, and Culture Recreation and Heritage) to review and identify recent goals achieved as well as to plan for future short-term goals. The purpose of the Strategic Plan is to track progress within the four departments with respect to goals produced and achieved on an annual basis. There were several primary themes related to sustainability that are covered in this document:

• The importance of improving the overall aesthetics of the town was noted on numerous occasions spanning such topics as paving projects at the Via Rail station and Northern Store, to new street signs and lights. This reflects the objective stated in the town's Development Plan to "aggressively initiate a program of aesthetic rehabilitation" (p. 2).

• The development and maintenance of parks and green spaces was also highlighted as important goal for the town.

• Energy issues also received mention including efforts to asses the potential for developing a capacity for harnessing wind energy and an energy audit of the town centre complex (for more information on energy planning please see Appendix 2).

The primary relationship between the Strategic Plan of 2002 and the development plan is that the Strategic Plan offers a means of implementing and tracking progress towards achieving the goals set forth in the Development Plan on an annual basis. One of the outcomes of the present CSPF should be to revise the Strategic Plan in light of its recommendations.

4.2 Implications for Urban Design

As discussed in section 2.4.6 the built environment in Churchill requires attention and improvement. While some of these improvements would be responsibility of residents in terms of maintaining their own properties, larger scale changes to the public realm and private and public buildings would require an urban design strategy.

Ewing (2006) identifies eight urban design qualities which can enhance walkability in the community and make them more attractive. In his paper "Identifying and Measuring Urban Design Qualities Related to Walkability" (6), he explained them as follows:

Imageability
Imageability is the quality of a place that makes it distinct, recognizable, and memorable. A place has high imageability when specific physical elements and their arrangement capture attention, evoke feelings, and create a lasting impression.

Legibility
Legibility refers to the ease with which the spatial structure of a place can be understood and navigated as a whole. The legibility of a place is improved by a street or pedestrian network that provides travellers with a sense of orientation and relative location and by physical elements that serve as reference points.

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Enclosure

Enclosure refers to the degree to which streets and other public spaces are visually defined by buildings, walls, trees, and other elements. Spaces where the height of vertical elements is proportionally related to the width of the space between them have a room-like quality.

Human Scale

Human scale refers to a size, texture, and articulation of physical elements that match the size and proportions of humans and, equally important, correspond to the speed at which humans walk. Building details, pavement texture, street trees, and street furniture are all physical elements contributing to human scale.

Transparency

Transparency refers to the degree to which people can see or perceive what lies beyond the edge of a street or other public space and, more specifically, the degree to which people can see or perceive human activity beyond the edge. Physical elements that influence transparency include walls, windows, doors, fences, landscaping, and openings into mid-block spaces.

Linkage

Linkage refers to physical and visual connections from building to street, building to building, space to space, or one side of the street to the other which tend to unify disparate elements. Tree lines, building projections, marked crossings all create linkage. Linkage can occur longitudinally along a street or laterally across a street.

Complexity

Complexity refers to the visual richness of a place. The complexity of a place depends on the variety of the physical environment, specifically the numbers and kinds of buildings, architectural diversity and ornamentation, landscape elements, street furniture, signage, and human activity.

Coherence

Coherence refers to a sense of visual order. The degree of coherence is influenced by consistency and complementarity in the scale, character, and arrangement of buildings, landscaping, street furniture, paving materials, and other physical elements.

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Tidiness

Tidiness refers to the condition and cleanliness of a place. A place that is untidy has visible signs of decay and disorder; it is in obvious need of cleaning and repair. A place that is tidy is well maintained and shows little sign of wear and tear.

The quality of urban design in Churchill can be improved using these eight measures. Here, specifically three major urban spaces in Churchill including Kelsey Blvd., Train Station Gateway and Public Square will be examined.

4.2.1 Kelsey Boulevard

Kelsey Boulevard is the main route in the town. Most of the buildings along Kelsey are commercial with only a few residential buildings. Improving urban design qualities here would directly affect the economy of the Churchill for two reasons. First, Kelsey Boulevard is a route that all tourists use for shopping, accommodations and dining. Therefore, it would affect the tourists' impression of the town and their willingness to walk along this route and shop or visit important buildings along this route. Second, Kelsey Boulevard is one of the most travelled routes for local residents, for whom the Northern Store is the only local grocery store. Making this route more aesthetically appealing and safe for pedestrians would improve the quality of life for both residents and tourists.

Urban Design Challenges

• Human Scale/Width of Boulevard - Kelsey Boulevard is extremely wide, acting as a deterrent to pedestrian exploration. The average width between buildings on opposite sides of the street is 49 m. We propose that a combination of several factors contributes to the impression of being out of proper human scale.

It appears that the carriageway was originally designed to be four lanes wide, in the manner of a boulevard, but only the north-eastern pair of these four lanes were maintained. This unused section of carriageway is one of the factors which leads to creating distances between buildings of up to 49 m. This width in combination with buildings of only one or two stories in height combine to make Kelsey Boulevard feel out of scale for pedestrians and encourages motorized transportation to bridge the spaces in between destinations.

• Human Scale/Buildings - Relationship with the Road - The buildings located on the boulevard do not maintain a close relationship with the road. Even though these structures have the functioning half of the boulevard to work with, they still maintain wide setbacks of approximately 18 m often with parking adding to the distances. An exception can be found in the two blocks between Hudson Street and Bernier Street which average approximately 11 m in setback. In these blocks, it appears that a transition is made from an area zoned for highway commercial, with wider setbacks, to that for core commercial, with buildings and streets maintaining a more intimate relationship and thus being more walkable. For a small town, there should be a better sense of continuity on what is essentially the main commercial avenue.

• Enclosure/Gaps in the Streetscape - The wide gaps presented by lots which are either unfilled or under-utilized exacerbates the problem of scale on Kelsey Boulevard. The additional sense of vastness created by these "missing teeth" further discourages foot travel in the direction which they are located.

• Linkage, Transparency/Parking Lots – Parking lots are located in front of buildings. Although it makes access to the buildings for drivers much easier, it has an adverse effect on aesthetic of the Kelsey Boulevard. More importantly, it decreases the sense of safety for the pedestrians. This is particularly true because these parking lots form a continuous band of open space that is often used as an unofficial secondary roadway by both passenger vehicles and ATVs.

Also, front parking lots affect the urban quality of linkage. Since parking lots require an extended space in front of buildings, this makes buildings visually and physically disconnected to Kelsey Boulevard itself. Furthermore, it affects the urban quality of transparency. The parking space in front of buildings acts as an urban edge for pedestrians and decreases the degree to which people can see or perceive human activities.

• Safety - According to the 2006 Census, more than 48% of Churchill's residents identified that their primary mode of transportation to work was by either bicycling or walking. While fewer males walked, biked or rode as a passenger to work in 2006, the number of females walking or bicycling to work increased dramatically by 18% during the period.

The lack of differentiation between vehicle space and pedestrian space creates a situation that discourages walking. Designing a space in which pedestrians feel that they can safely walk to their

destination of choice means creating the kind of conditions in which they can feel that they are protected from areas of vehicular transit and that are designed to suit the pedestrian experience. On Kelsey Boulevard where sidewalks exist, they are on the same grade as the carriageway and there are no physical buffers in between the two.

Solutions

• Zoning By-law - A maximum setback should be introduced to maintain a 9m setback for commercial properties on the entire length of Kelsey Boulevard. This may be difficult if properties do not extend to the present edge of the boulevard and if infrastructure is located according to the original boulevard width (will require a review of current property maps and infrastructure map).

• Infill - Effort should be made to encourage infill of vacant spaces on Kelsey Boulevard.

• Parking - Ideally, new and renovated businesses should be built closer to the street with parking lots in behind them; more practically and in the short term, creating landscaping between the property lines will serve to distinguish lots from one another and create a barrier to their use as a roadway.

• Separating Walkways and Vehicular Pathways - To enhance the walkability of Kelsey Boulevard, alterations are required which would differentiate walkways and vehicular pathways. Changes should also be made which would incorporate designs to enhance activities for all seasons along the boulevard. This includes designing windbreaks and features that facilitate snow removal.

What follows is a series of proposed concepts aimed at demonstrating the qualitative enhancements that could be achieved if the above urban design suggestions were carried out. We will examine the potential effects for Kelsey Boulevard, the Train Station Gateway, and the Public Square.

The first set of images (Fig. 29, and 31) is based on the current situation in Churchill. The vantage points are at eye level as well as at 15 m elevation and the images are based on a southeastern view down Kelsey Boulevard from a position slightly northwest of the street leading to the train station. The proposed design/zoning changes then follow (Fig. 30, and 32), taken from the same camera angles and vantage point. Figure 33, shows a close up image from the proposed changes on Kelsey. Figure 34 demonstrates benefits of "pocket parks" in winter cities.

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Figure 29: Kelsey Boulevard, Current Situation

Maps by Institute of Urban Studies. Base map: Google Map

Using a Google Map base, the buildings along Kelsey Boulevard are highlighted. The relationship between buildings and street are depicted, including the gaps existing between buildings and vast distances between the buildings on opposite sides of Kelsey Boulevard.

Maps by Institute of Urban Studies. Base map: Google Map

Proposed infill buildings are highlighted in red. These buildings are closer to Kelsey Boulevard than the existing buildings and they fill the gap between buildings.

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Drawings by Institute of Urban Studies.

This sketch shows the three dimensional perspective of Kelsey Boulevard (eye-level and bird's-eye view or 15 m elevation). The gaps between buildings and the width of the boulevard demonstrate that the design of this area is out of human scale.

Figure 32: Kelsey Boulevard, Proposed Changes

Drawings by Institute of Urban Studies.

Proposed infill buildings are highlighted in yellow. These buildings are closer to the boulevard and fill the gaps between existing buildings. Most of the buildings on the right hand side are existing buildings. The landscape features have been used to divide the parking lots and discourage vehicles from using the parking lots as a route to go along the boulevard. The proposed newer buildings are designed to have the parking lots behind them. Also, the design elements such as sitting areas and bicycle racks encourage people to walk or bike.

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Figure 33: Kelsey Boulevard, Proposed Changes (Details)

Drawing by Institute of Urban Studies.

This image shows the detail of the proposed changes on Kelsey. Planter boxes and green spaces help to define the space. The occasional set back of buildings can provide meeting places for pedestrians and protect them from the cold wind in the winter time.

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Figure 34: Pocket Parks in Winter Cities

Pocket parks can provide year-round meeting places in south-facing setbacks.

Awnings help provide protection from precipitation as well as reducing the effect of wind.
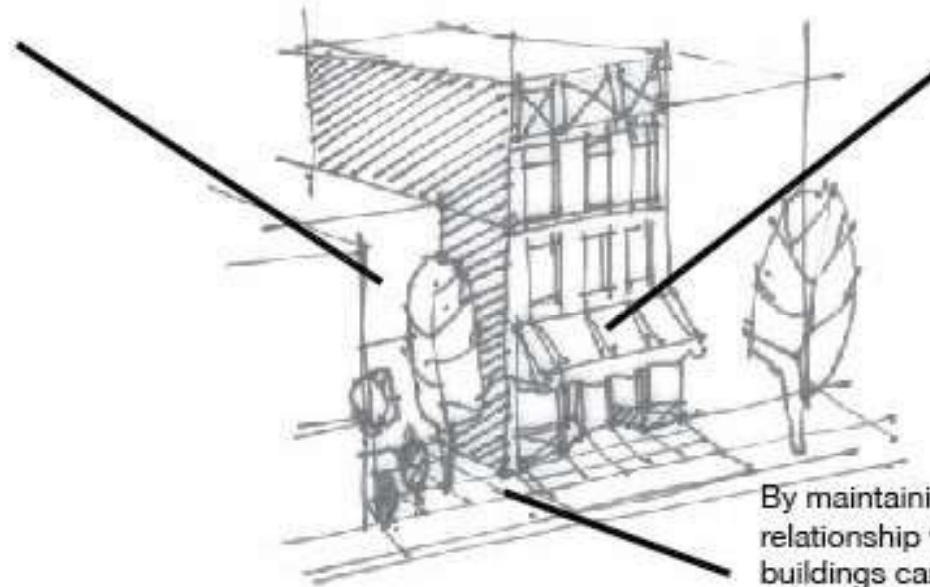
By maintaining a close relationship with the street, buildings can help protect outdoor public spaces from wind.

Reference: Fort St. John, Winter City Design Guideline (2000), p. 8.

This image from Fort St. John, Winter City Design Guideline shows the details of pocket parks in winter cities. Adding similar pocket parks along Kelsey Blvd. could enhance its walkability.

4.2.2 Train Station Gateway

For newcomers to Churchill who arrive by train, their arrival at the train station (Fig. 35) offers the first glimpse of what they can expect during their stay in town. First impressions are important to creating the desire to explore a place. Improving urban design qualities along this gateway corridor would help to create welcoming and inviting streetscapes for visitors to explore the town's cultural and commercial assets that otherwise may be missed.

Figure 35: Train Station Gateway

Picture by Fereshteh Moradzadeh

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Urban Design Challenges

• Human Scale - The streetscape around the train station is out of human scale and the distance between buildings across the street is approximately 32 - 36 m. This is similar to the scale experienced on Kelsey Boulevard.

• Enclosure – The wide gaps between buildings decreases the degree to which the area around the train station is visually defined.

• Linkage, Transparency - The existence of parking lots in front of buildings prevents visual and physical connection between pedestrians and buildings.

• Complexity, Imageability – Because of lack of complexity and visual richness of the place, the train station gateway is not distinct or memorable. Also, it does not encourage visitors to Churchill to explore the cultural and commercial assets.

Solutions

• Zoning By-law – Churchill's zoning by-law should require a maximum setback of 9 m for the street connecting the train station to Kelsey Boulevard.

• Infill – Efforts should be made to encourage infill of vacant spaces along the train station road.

• Parking - Parking lots should be moved to the back of the buildings.
• Commercial Kiosks- Adding commercial kiosks around the train station would add to the urban quality of complexity and imageability. Furthermore, it will provide opportunities for small and local businesses to grow.

• Landscape, sculptures, inukshuks – Landscape elements, sculptures and specifically inukshuks would help to enrich the visual and cultural capital of the train station gateway.

• Sitting area – In addition to lobby and the sitting area inside the station, seats outside the station

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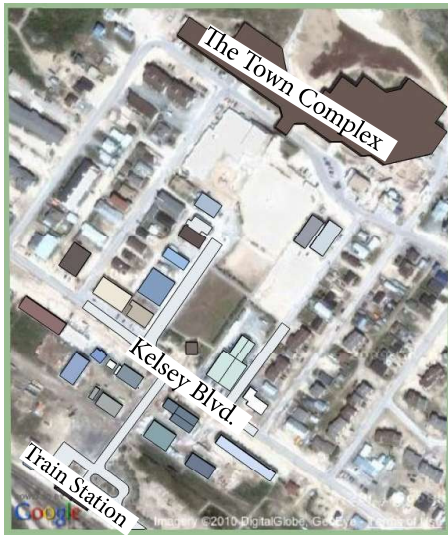
would enhance the experience for those waiting for the train or travellers. The existence of cultural and business attractions outside of the station would provide some activities for users of this area.

What follows is a series of proposed concepts aimed at demonstrating the qualitative enhancements that could be achieved if the above urban design suggestions for the train station gateway were carried out.

The first set of images (Fig. 36) is based on the current situation. The vantage points are at eye level as well as at 15 m elevation and the images are based on a view from the train station toward Kelsey Blvd. The proposed design/zoning changes then follow (Fig. 37), taken from the same camera angles and vantage point. The last image (Fig. 38) shows the detail of the proposed changes around the train station.

Figure 36: Train Station Gateway, Current Situation
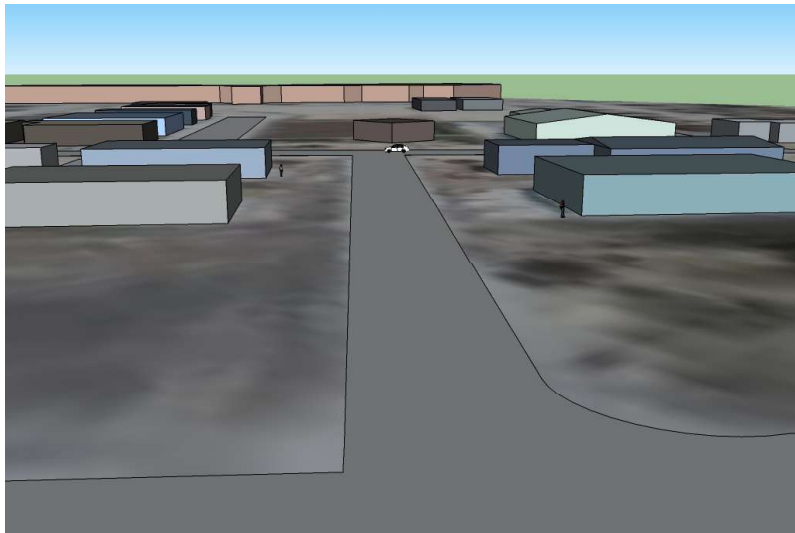
Top Left Figure: Using a Google map the buildings around the train station gateway have been highlighted.
Bottom Right Figure: The eye-level perspective from train station road toward the town complex.
Bottom Left Figure: The bird's-eye view (15 m elevation) from train station road toward the town complex.

Figure 37: Train Station Gateway, Proposed Changes

The Town Complex

Kelsey Blvd.

Train Station Road

Train Station
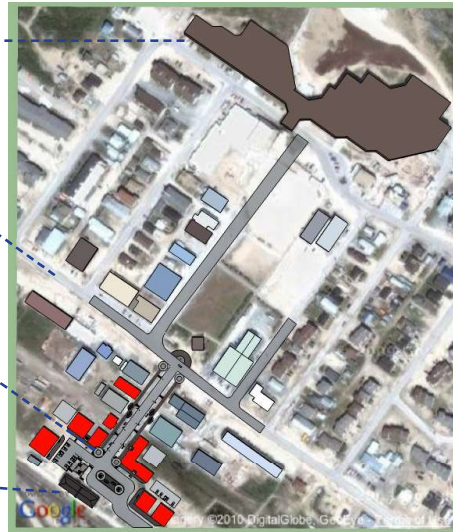
Top Left Figure: Proposed infill buildings are highlighted in red. These buildings are closer to train station road than the existing buildings and they fill the gap between buildings.

Top Right and Bottom Figures: Proposed infill buildings are highlighted in yellow.

Drawings by Institute of Urban Studies.

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Figure 38: Kelsey Boulevard, Proposed Changes (Details)

Drawing by Institute of Urban Studies.

This image shows the detail of the proposed changes around the train station. Planter boxes and green spaces help to define the space. The occasional set back of buildings can provide small spaces for cultural and business activities.

4.2.3 Public Square

Public spaces are important for creating sustainable communities. Such spaces that successfully attract social activities are inclusive and provide opportunities for social interaction for community members as well as visitors.

Dempsey and others (7) have identified five dimensions of a community's social sustainability. Those are:

• social interaction/social networks in the community
• participation in collective groups and networks in the community
• community stability
• pride/sense of place
• safety and security

The Public Square in Churchill has the potential to provide opportunities to contribute to these social dimensions of sustainability. However the current design of the Public Square poses some challenges which need to be addressed.

Urban Design Challenges

• Legibility – Hudson Street, which connects the Public Square to Kelsey Boulevard and the rest of the town, is a dead end street and therefore, has an adverse effect on the legibility of the Public Square. Although the town complex is very close to the Public Square, there is no defined route to connect these two important public spaces.

Furthermore, Hudson Street is the closest route for tourists who pass the train station gateway to take to get to the town complex. However, since this route is dead end, it decreases the sense of readability for tourists.

• Complexity, Imageability – Because of the lack of complexity and visual richness of the place, the Public Square is not distinct or memorable. Also, it does not provide opportunities for activities to encourage Churchillians and visitors to stopover and interact with each other.

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• Enclosure – The Public Square is not visually defined. There is no building on the north east of the public square, and there is only one small building on the south west of the Public Square.

• Security- Since there is no building on the north east of the building, and also there is no residential building around the public square, the sense of security is low. Since residential buildings are occupied 24 hours a day they help to increase the sense of security in an area.

Solutions

• Connecting Kelsey Boulevard to LaVerendrye Avenue through Hudson Street - Continuing Hudson Street to connect two main routes in the town (Kelsey and LaVerendrye) and two main public spaces (Public Square and the Complex) can increase the level of legibility in the town.

• Park Pond and Coffee Shop Kiosk– Providing a park pond in the middle of Public Square which can act as ice skating rink in the winter time would provide opportunities for outdoor activities. An outdoor coffee shop would be an appropriate addition to the park pond and would add to the complexity and imageability of the square.

• Infill – Efforts should be made to encourage infill of vacant spaces around the Public Square to add to the quality of enclosure. Since there are no residential buildings around the Public Square, it is recommended that the infill be used for residential purposes. Having a mix of commercial and residential properties around the Public Square provides for a more lively and safer area.

• Transparency- Although it is recommended to fill the vacant spaces around the public square, the southwest of the square should not be blocked completely. Providing an open space on the south-west edge of the square adds to the transparency of the space. People coming from the train station gateway or walking on Kelsey Boulevard would be able to see the activates in the public square.

• Protection from the Cold - A heated building with washroom facilities provides a place to warm up during winter activities and trees help to create a buffer from the cold winter winds.

• Seating areas - Seats around the park pond would provide opportunities for people to sit and watch the activities. It also would add to complexity of the space.

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What follows (Fig. 39 and 40) is a series of proposed concepts aimed at demonstrating the qualitative enhancements that could be achieved if the above urban design suggestions for the Public Square were carried out.

On the map (Fig. 39) proposed infill buildings are highlighted in red. However, on the 3-D image (Fig. 40) proposed infill buildings are highlighted in yellow.

Figure 39: Public Square, Proposed Changes

Map by Institute of Urban Studies. Base map: Google Map

A park pond has been added to the Public Square. Kelsey Boulevard has been connected to LaVerendrye Avenue through Hudson Street.

Figure 40: Public Square, Proposed Changes
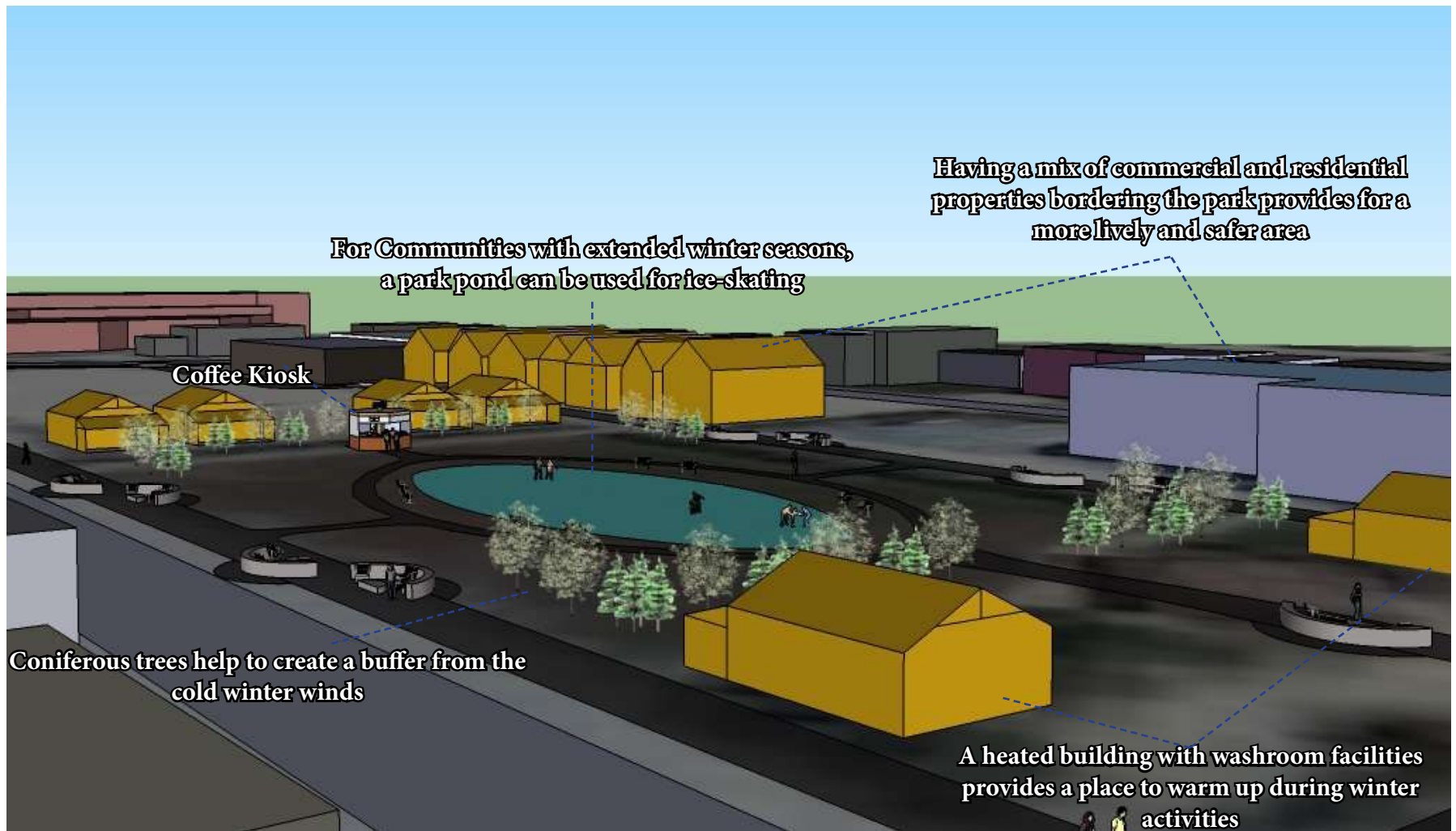
Having a mix of commercial and residential properties bordering the park provides for a more lively and safer area

For Communities with extended winter seasons, a park pond can be used for ice-skating

Coffee Kiosk

Coniferous trees help to create a buffer from the cold winter winds

A heated building with washroom facilities provides a place to warm up during winter activities

Drawing by Institute of Urban Studies

Proposed infill buildings are highlighted in yellow. In addition to landscaping, a park pond, a coffee kiosk, heated buildings with washroom facilities, and a mix of commercial and residential properties are proposed.

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4.3 Conclusion

Environmental, social, and economic sustainability are interconnected and cannot be achieved unless they are considered in every aspect of a community from official plans and policy making to urban design and built environment.

Development plans must be reviewed on a regular basis and have all the necessary supporting documents such as land use maps to effectively communicate both the current state and the future vision of the community. Revisions to town plans should reflect the most salient long-terms considerations such as water, waste, and energy.

The town's land-use by-laws can also reflect long term priorities of the community. By moving away from single-use zoning to embrace multiple uses such as residential and commercial, zoning can help to activate underused areas of town while simultaneously contributing to the range of housing options available. Land-use by-laws can also be utilized to recognize and protect areas of cultural or environmental significance.

Strategic plans can operate as a means of reviewing and acting on changing priorities over a medium timeframe. Periodic review is required to determine if the goals are being advanced and if the actions taken are effective. This is especially important in light of the recommendations contained in the Sustainabilty Plan.

Urban design also can aid in creating a sustainable community through a process of creating public spaces which are conducive to residents and visitors across all seasons. Integrating the important landmarks in a larger plan that values and recognizes the natural and cultural heritage of the town and region will reflect and promote the kind of community cohesion that is basic to being a stable longterm entity.

In summary, through the process of review and revision of town land-use by-laws, development plans and strategic plans, and urban design strategies, the shape of the built environment in Churchill can be adapted to enhance the social, economic and environmental dimensions of sustainability.

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Chapter Four notes

1. Manitoba. Intergovernmental Affairs. The Planning Act Handbook: A Guide for Municipalities and Planning Districts, section 26, p. 15.

2. Town of Churchill Development Plan, 20 Mar. 2000, p. 7.

3. Town of Churchill Development Plan, 20 Mar. 2000, p.12.

4. Daniels, Thomas L., John W. Keller and Mark B. Lapping. The Small Town Planning Handbook, Third Edition Chicago: APA Planners Press, 2007, 154-155.

5. Fort Nelson/Northern Rockies Official Community Plan 2006. Web. 8 Feb. 2011. http://www.northernrockies.ca/EN/main/business/planning-development/NRRM-OCP.html

6. Reid Ewing, Susan Handy, Ross C. Brownson, Otto Clemente, and Emily Winston. Identifying and Measuring Urban Design Qualities Related to Walkability, Journal of Physical Activity and Health 3, Suppl.1, 2006, S223-S240. Web. 8 Feb. 2011. < http://www.activelivingresearch.org/files/JPAH_15a_Ewing_0.pdf>

7. Dempsey, Nicola, Glen Bramley, Sinéad Power and Caroline Brown. "The Social Dimension of Sustainable Development: Defining Urban Social Sustainability" Journal of Sustainable Development 26 May 2009. Web. 8 Feb. 2011. <http://onlinelibrary.wiley.com/doi/10.1002/sd.417/pdf>

CHAPTER FIVE:

MOVING THE CSPF TO ACTION

CONTENTS:

Chapter 5: Moving the CSPF to Action

To this point the CSPF has been concerned with identifying key local issues and establishing a process with which to both understand and address them. Now that some potential courses of action have been proposed, it is equally important that the community considers how it can mobilize itself so that these and other ideas may be realized – keeping in mind of course that all planning is iterative.

Each change in the community initiates ripples that alter circumstances and needs, so that the planning context itself must be revisited regularly. In the words of planning authors Rittel and Webber, there is a "no stopping rule" – i.e., one can never consider planning to be completed - for instance, sustainability has been achieved (1).

This observation is very consistent with the Aboriginal World View. As Leroy Little Bear (2000) describes, the world as seen by Aboriginal peoples consists of energy, rather than objects, and so each and every thing in the world is therefore in a constant state of change. He writes (2):

> "The Earth is where the continuous and/or repetitive process of creation occurs. It is on the Earth and from the Earth that cycles, phases, patterns – in other words the constant motion or flux – can be observed. Creation is a continuity.,..[this] leads [to] Aboriginal philosophy as being holistic and cyclical or repetitive, generalist, process-oriented and firmly grounded in a particular place."

This continual state of change therefore requires ongoing attention in the form of monitoring, measuring, dialogue and communication. In this section the CSPF considers these functions in terms of governance, or the processes involved in managing, guiding and decision-making.

5.1   The Need for Change

In Section two we learned of the many challenges facing Churchill, some of which are beyond local control. To remain a viable and vibrant community over the long term, these changes will need to be anticipated and adaptations made. Some of these adaptations will need to be significant. For example, the current projections from the climate scientists and biologists regarding the future of the polar bear populations on Hudson's Bay are very grim indeed – the loss of sea ice will bring a dramatic decline to the polar bear population (3). While tragic for the biosphere, this will also bring difficult times for the town, as Churchill's status as "polar bear capital of the world" is unfortunately unlikely to endure for more than two decades, as will the present high degree of dependence of the local economy on the tourism trade. Whether adaptation to this threat takes the form of a diversified economy, different types of tourist attractions or a combination of these will be up to the community to decide.

In any case, the economy in its present state is already insufficient to attract and retain residents, and the population is declining. New opportunities, new forms of sustainable development and greater efforts at improving the quality of life for Churchill residents, are needed.

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5.2   Promoting Change

Whenever any kind of community change is contemplated, governments have a few broad tools that they can use. They can own and operate some form of public service (such as public housing). They can regulate by setting laws and establishing rules by which businesses and individuals must comply. Related to these changes would be the institutions of incentives and disincentives – to promote desirable behaviours through rebates or tax relief, and discouraging other behaviours through fines and higher taxes. Finally, governments can seek to inform the public to make desired behaviour changes. Changes and investments sponsored by governments can take the form of physical infrastructure (new sewer pipes) or the facilitation of social and cultural change – for example, the gradual phasing out of public smoking.

Governmental services such as schools, libraries, community centres and health care providers can be a part of all these efforts. However, each or all may also seek to promote their own initiatives to address the needs of their user groups. Community institutions such as Churches and service organizations can champion other forms of programming aimed at their user groups, and use their existing networks and means of communication to apply for funding and lobby for change. Finally, at the community level, groups of citizens can come together on their own to organize community based initiatives such as cooperatives, community markets and citizens' committees.

At each level however, proposed options for community change should in this framework should be evaluated in terms of their desirability (re: community vision and values and ability to meet human needs) and their feasibility (they can be undertaken within constraints of resources, community capacity and time).

With these principles and steps now identified and explained, we turn to showing how these steps have been and can be carried out in the planning process for a sustainable Churchill.

5.3 Organizing for Change

Broadly speaking the CSPF is not sustainability policy per se, but rather should be considered to be a *framework* for the creation and implementation of sustainability policy, one that can articulate a *vision* for the community, as well as underlying *principles* for achieving that vision. This framework should enable and encourage broad-based participation.

As has been established in Chapter 3, key to accomplishing these roles for the CSPF is the establishment of a process appropriate to the challenges it identifies. It should adopt an integrated planning approach that links it to other planning processes in the town and region, so that it is consistent with existing institutional structures and engages relevant local actors. The necessary processes to achieving this holistic approach would include ongoing research, including data gathering and analysis; a regular and multi-platform community consultation process; the identification of key target groups; and ongoing communication with multiple governmental departments and agencies so that they are apprised of the goals, objectives and elements of the CSPF.

In the past, public planning processes have been characterized by "decide, educate, announce, defend", or the acronym DEAD. In other words, local governments make decisions in advance, then convince the public that it was the correct decision (4). The new planning model is that of meaningful participation, of governments planning with communities, and not just for them. To make participatory planning processes meaningful (and not just exercises in lip service), the National Roundtable on the Environment and the Economy has identified what they call "guiding principles" on participation (5):

Principle 1 - Purpose Driven: People need a reason to participate in the process.

Principle 2 - Inclusive not exclusive: All parties with a significant interest in the issue should be involved in the consensus process.

Principle 3 - Voluntary Participation: The parties who are affected or interested participate voluntarily.

Principle 4 - Self Design: The parties design the consensus process.

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Principle 5 - Flexibility: Flexibility should be designed into the process.

Principle 6 - Equal Opportunity: All parties must have equal access to relevant information and the opportunity to participate effectively throughout the process.

Principle 7 - Respect for Diverse Interests: Acceptance of the diverse values, interests, and knowledge of the parties involved in the consensus process is essential.

Principle 8 - Accountability: The parties are accountable both to their constituencies, and to the process that they have agreed to establish.

Principle 9 - Time Limits: Realistic deadlines are necessary throughout the process.

Principle 10 - Implementation: Commitment to implementation and effective monitoring are essential parts of any agreement.

It is inevitable that the act of bringing together a range of actors will bring with it the potential – indeed the certainty – of conflict. There will be disagreements over approaches, tactics and even fundamental values. What is essential is that the community planning process – whether in the form of a community development corporation or an informal committee – has a process in place to work towards consensus building.

Given Churchill's small size, the likely actors all know one another and have histories of prior interaction that can either support the process or present a challenge. What is essential is that the players have assurance in the validity of the process itself, and that their commitment and efforts will be respected. Participants should be able to contribute to setting agendas and the establishment of the ground rules for their participation, which will go a long way to building trust and buy-in.

Planners Linda Schneekloth and Robert Shibley have done a great deal of work in communities in which planning decisions were controversial. In their book *Placemaking* they set out their strategy for ensuring that public engagements are conversations, not arguments. They view Placemaking in terms of how making places changes the world; it is also the way in which we connect with other people, about the relationship of people to their places, and also the relationships among people in places. They propose a two-stage process of "creating a "dialogic space" and "framing the action."

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In the first stage, setting the "dialogic space" involves giving legitimacy to all forms of knowledge, while attending to relationships between people, and people and place. The dialogic space as they describe it is not so much a place as it is a process, one that acknowledges that conflict is likely, and also that acknowledges different forms of knowledge. It requires that those at the table are committed to a process of both confirming the issues (from their perspectives) but also interrogating them. That is, questioning assumptions, seeking to identify the root of the issues, rather than mistaking a symptom of the problem for the problem itself. This process of listening and dialogue is empowering and affirming of peoples' experiences.

Following the process of confirmation and interrogation, the group then engages in framing the action – naming the players, setting the rules, and determining the boundaries for action. After all, a group can't accomplish everything nor involve everyone at every step of the way. Delegation and selection are necessary (6). With such a process in place, a community is better able to overcome resistance to change.

5.4   Strategies for Change

While a number of proposed actions were set out in Chapter 4, there is clearly scope for a more thorough approach to a addressing the town's priorities. It will likely not be enough in some cases to implement a project or two; what will be required is a set of broader strategies. Some of these could be:

• **Waste reduction strategy:** Engaging businesses and residents on a comprehensive plan to reduce outputs of waste through bulk foods, reusing and sharing household items and phasing out single-use containers where reusable ones are practical and sanitary. For example, restaurants could serve salad dressings and syrup in small washable bowls rather than disposable plastic dispensers. This will require a community-based social marketing (CBSM) approach (see Appendix 4).

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- **Youth strategy:** Engaging community stakeholders including the school, businesses, library, churches, the Regional Health Authority and youth themselves on creating a Youth-Friendly Churchill.

- **Food security strategy:** Engaging with residents, businesses and the Regional Health Authority on seeking ways to make nutritious food and its preparation accessible and affordable.

- **Energy strategy:** Engaging with residents, businesses and Manitoba Hydro on energy reduction and the retrofitting of buildings with energy-efficient and renewable energy technologies. Explore potential for District Energy solutions.

- **Economic development strategy:** Engaging with businesses and government on diversifying and supporting the local economy.

5.5   Monitoring and Evaluation for Change

It is not enough to produce a sustainability planning framework that sets out issues and desired outcomes; the community should be able to determine in the future that progress is being made towards reaching desired outcomes. Therefore indicators must be identified during the planning process, benchmarks of progress established, and progress then monitored afterwards. A regular "report card" might be produced. The body responsible for overseeing the sustainability planning process could supply the city with semiannual reports. Finally, as a living document, the CSPF will need to be revisited and revised in subsequent years on a schedule to be determined. Key to the ability to monitor the CSPF's progress is the development of relevant and robust indicators.

The CSPF, in addressing community issues, has set out potential goals and initiatives for ameliorating these conditions. To move forward, the community will need to determine an implementation strategy that identifies available resources, existing initiatives, potential partners and commits local actors to taking responsibility for actionable items. These targets should be both short and long term, with a set of indicators that may be used in the coming months and years to measure progress towards the goals of the CSPF.

The planning framework is an adaptive tool, and ongoing results and project evaluations should inform the first step, and the results should be monitored carefully in order to be able to modify the priority areas if necessary. Consistent with the principles outlined above concerning meaningful participation, members of the community should be part of the evaluation process. When monitoring, it is important to distinguish between outputs and outcomes. The former refers to those things that were funded, and were intended to be produced with that funding, e.g., housing units, new businesses etc. An outcome is some estimate of the real-world consequences of that intervention.

To gain a sense of both outputs and outcomes, a robust set of community indicators is needed. Indicators provide evidence of success or problems and they may be qualitative or quantitative. In a community context, they can help evaluate whether local actions are having the desired effects. A community can use indicators to assist in determining what conditions exist and whether the direction the neighbourhood is headed is consistent with community goals. Indicators of sustainability are often statistics which measure the various contributing factors to well-being; these can be compared against one another or combined into a single index of sustainability.

Indicators are necessary and useful in reaching a number of aims. These include (7):

• generating statistics that measure meaningful change in the town;
• building capacity to collect and disseminate indicators that inform and support local initiatives;
• developing dynamic models of municipal change;
• setting goals for local improvement;
• evaluating the likely impact of existing and/or proposed policies on the town and/or residents;
• developing surrogate census-like measures between Census years; and
• making municipal concerns more visible at a national level.

There are various criteria for assessing the usefulness of an indicator to a community. These include (8):

• Does it measure progress/ is relevant towards a goal?
• Does it compel, interest, and excite?
• Does it focus on resources and assets in a positive way? (focus on causes and not symptoms)
• Does it make linkages between various community relationships?
• Does it relate to the whole community?
• Is it understandable to all?

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- Is it accessible and affordable?
- Is to comparable (standardized) to other indicators?
- Is it credible, consistent and reliable?
- Is it measureable? (is it truly measuring what it is intended to measure?

Essentially, indicators need to be viewed as a form of communication between organizations and their community. Already, the Sustainable Churchill planning process resulted in a set of proposed sustainability indicators, which were integrated into the Discussion Paper (see the Appendix 3). In addition, the Churchill Regional Health Authority has established a very thorough set of indicators of social well-being as a part of their 2009 Community Health Assessment (9).

For all of these indicators, data gathering will present challenges – even in the case of the Census, which in subsequent periods are not likely to be as complete or reliable as those in the past. They will require the community stakeholders to work closely with other levels of government and local actors. The gathering of data is also a matter of governance: who will take responsibility for gathering and archiving this data? If not a Community Development Corporation, then whom?

But gathering the data is only a part of the challenge: these must be communicated. As indicators are a form of public communication and engagement, a venue is needed. While some communities produce "state of the town" reports, others are also turning to new digital technologies. An example of this option is Citizen Dan (10), a

> "free, open source system available to any community and its citizens to measure and track indicators of local well being. It can be branded and themed for local needs. Citizen Dan's information sources may include Census data, the Web, real-time feeds, government datasets, municipal government information systems, or crowdsourced data. Information can range from standard structured data to local narratives, including from minutes and reports, contributed stories, blogs or news outlets. The 'raw' input data can come in essentially any format, which is then converted to a standard form with consistent semantics. Text and narratives and the concepts and entities they describe are integrally linked into the system via information extraction and tagging. All ingested information, whether structured or text sources, with their semantics, can be exported in multiple formats."

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Using a platform like Citizen Dan, Churchill could monitor selected indicators and engage and collaborate with the community at the same time.

5.6   Next Steps

The processes described above will not be able to be carried out successfully in an ad-hoc manner, without sufficient capacity and institutionalization. Although the involvement of residents and volunteer groups will be required, citizens working without official support and without financial resources will not be able to implement the recommended planning framework.

The Town Council should take the necessary lead and formalize and mandate the sustainability planning function in a body equipped for this purpose, such as a community development corporation (CDC), and ensure that its work is sufficiently financed and staffed. This institutionalization will need to extend beyond a particular body, however, and reach into the municipality and key provincial departments and agencies. To be successful, sustainability plans need to be integrated with the other major operations and governance structures in the community.

The first step should be the formalization of planning authority, most likely through the formation of a Churchill CDC, with a mandate from Town Council. For example, in Thompson, the Thompson Neighbourhood Renewal Corporation (TNRC) (11) acts as a catalyst for community development initiatives in the areas of housing and community safety, with funding from Manitoba's Neighbourhoods Alive! (NA!) Initiative.

Like TNRC, a Churchill CDC would also then be in a position to apply for core and project funding through NA!, which would allow it to direct funding to local projects. Manitoba's NA! Initiative offers three funding streams: The Neighbourhood Renewal Fund, Neighbourhood Development Assistance and Neighbourhood Housing Assistance. Churchill is not, as yet, a NA! community, but could conceivably become one. In order to do so, project proposals should show that they have the support of the community – most easily demonstrated if they are put forth by an entity such as a CDC (For more information, see Note. 12).

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With or without an actual CDC the task remains; for any successful project implementation, it is necessary to engage the necessary individuals, organizations and businesses. The Toolkit in Chapter 3 offers an initial way to think about this process; but once these are identified their involvement must be nurtured, developed and sustained.

5.7   Conclusion

In this CSPF social, economic and ecological issues have been considered under the broad category of sustainability, and within contexts ranging from energy to personal fulfillment to governance to urban design. This holistic approach, combined with an iterative, adaptive process that encourages ongoing learning, should better enable the town of Churchill to identify its challenges and address them. While many of the issues facing the community – and some of the actors -- are beyond the scope of what could be examined here, the approach proposed here offers a pathway to community resilience. Whatever the future may bring, a strong and resilient community that understands its needs and resources, and whose members know how they can work together, is in a better position to deal with threats and gain benefits from opportunities (13).

Chapter Five notes

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13. For more general resources about community planning work, an excellent resource is CommunityPlanning.net (http://www.communityplanning.net/index.php) which has a wide range of resources to support communities of any size in their planning processes.

Chapter Five NOTES

Contents:

Appendices

Appendix 1: Socio-Demographic Profile

In the Churchill Discussion Paper (August 2009) a basic demographic overview was offered for the Town of Churchill. Now a more thorough and comparative analysis of major socio-economic indicators is presented as an integral part of the CSPF. These indicators may be used to develop the necessary "baseline" from which future progress may be determined.

These data are derived from the 2006 Census, and include trends over several census periods. The analysis also uses data tables from the Churchill Regional Health Authority's 2009 Community Health Assessment, as well as tables produced in 2008 by the Manitoba Bureau of Statistics. These data are presented with the caveat that since the absolute numbers of individuals being described are small, it is important to interpret these results with caution.

Population/Age

Between 1996 and 2006 the town lost 15% of its population, many of whom were working age. While the rate of loss slowed between 2001 and 2006, in the same period it saw its 45-64 cohort increase by 9% and its seniors cohort by 55%. While this latter cohort now represents 7.5% of the total population, present trends suggest that this proportion will continue to grow while younger cohorts will shrink.

The majority of the population (64.2%) is below the age of 45, and the median age is below the provincial average. While over 24% of the town is below the age of 14, the largest cohort (at 43%) is between the ages of 15 and 44.

However, the Town has been seeing this cohort diminish: there was a 30% decline of 15-44 year olds between 1996 and 2006, and a 21% drop in children 0-14, which alsoportends a small young adult cohort in years to come. The loss is particularly pronounced in terms of working-age men aged 15-34, suggesting economic migration. As we see below on this table from the CHRA, the balance of the population is clearly shifting from a youthful cohort to an older one.

Population/Age

	1996	2001	2006
Total Population	1,089	963	923
Percentage Change	-4.7	-11.6	-4.2
Age Characteristics (#)	1996	2001	2006
Children (0-14)	285	245	225
Young Adults (15-44)	575	445	400
Mid Adults (45-64)	175	215	235
Old Adults (65-85+)	50	45	70
Median Age	29	32.7	33.8
Age Characteristic (%)	1996	2001	2006
Children (0-14)	26.6%	25.8%	24.2%
Young Adults (15-44)	53.0%	46.8%	43.0%
Mid Adults (45-64)	16.1%	22.6%	25.3%
Old Adults (65-85+)	4.6%	4.7%	7.5%

Table by Institute of Urban Studies

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Population Structure
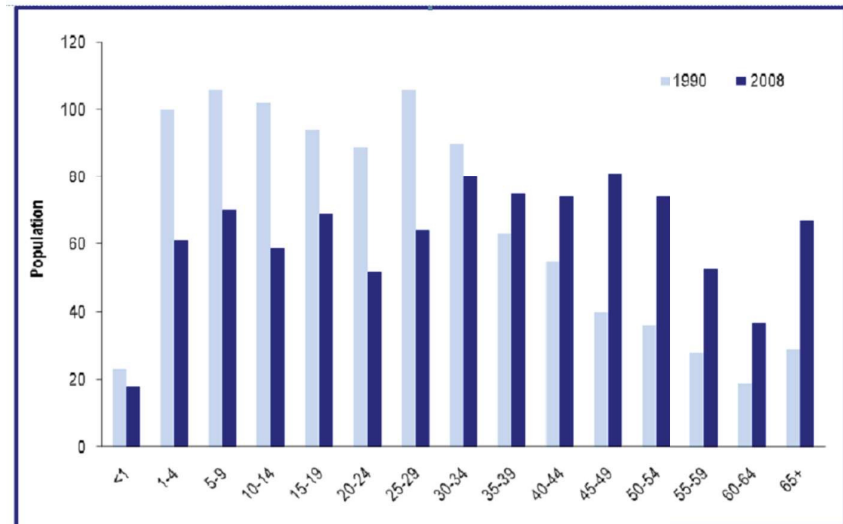
Source: Churchill Regional Health Authority Annual Report 2009

2006 Population Pyramid

Population, Chuchill (2006)
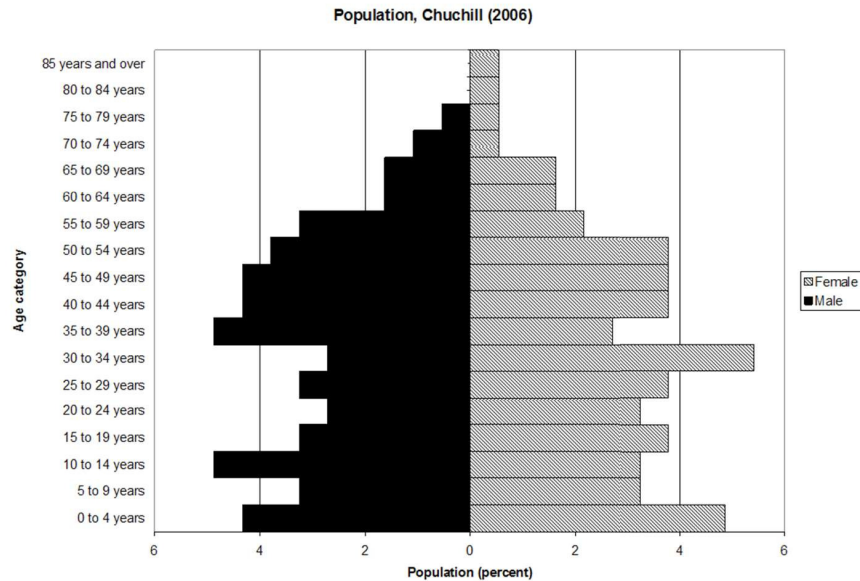
Source: Statistics Canada, 2008

Ancestry

The makeup of the population in the Town of Churchill is almost evenly distributed between Aboriginal and non-Aboriginal persons, with few visible minorities.

Aboriginal Population

Aboriginal Population	Churchill		Manitoba	
	Total		Total	
Total - All persons	975		1,133,515	
Aboriginal identity population	550	56.4%	175,395	15.5%
Non-Aboriginal population	425	43.6%	958,120	84.5%

Source: Churchill Regional Health Authority Annual Report 2009

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Compared to other municipalities in the province, Churchill has a large Aboriginal population. While only 15.5% of the general population in Manitoba is Aboriginal, over 56% of the population is First Nation, Inuit, Dene, Aboriginal or Metis. In 1996, Churchill's Aboriginal persons represented over 48% of the town's population. Ten years later the overall number and proportion of Aboriginals within Churchill increased to 550 or nearly 60% of the population. This trend of majority or near-majority Aboriginal population composition is one found throughout Manitoba's north, with Gillam (46%), Lynn Lake (56%) and Leaf Rapids (70%) all having comparatively large Aboriginal populations.

This trend is all the more significant because, while the overall population of Churchill is shrinking, the absolute number and proportion of Aboriginal people in town is growing. This demographic reality has important implications for social planning and clearly points to the need for robust representation of the majority of the town's population in any planning initiatives.

Visible Minorities

	2001	2006
Visible Minority Population	20	45
Chinese	20	25
Black	0	20

Table by Institute of Urban Studies

No Asian or Black residents were recorded in 1996, but by 2006 there were 20 and 25 individuals from these groups respectively – a large percentage increase but a minor demographic change.

Languages Spoken and Immigration
English is by far the dominant language spoken in Churchill, with no measurable French households and only a handful of households using a non-official language, likely Aboriginal in character. This is also reflected in terms of the diversity of the population; almost the entire population is Canadian-born.

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Language Spoken

Language spoken most often at home	Churchill	Manitoba	Canada
Total - All persons	975	1,133,510	31,241,030
English only	960 (98.5%)	989,215 (87.3%)	20,584,775 (65.9%)
French only	0 (0%)	19,515 (1.7%)	6,608,120 (21.2%)
Non-official language	10 (1%)	107,875 (9.5%)	3,472,130 (11.1%)
Both English and French	0 (0%)	1,820 (0.2%)	94,060 (0.3%)
English and non-official language	0 (0%)	14,875 (1.3%)	406,455 (1.3%)
French and non-official language	0 (0%)	0 (0%)	58,885 (0.2%)
English, French and non-official language	0 (0%)	0 (0%)	16,600 (0.1%)

Source: Churchill Regional Health Authority Annual Report 2009

What is striking about Churchill's immigrant population is not just that it is comparatively small compared to the provincial average, but that it is almost precisely divided between those who arrived prior to 1991, and those that arrived after 2001. The ten-year period between those two Censuses recorded no immigrant residents.

Immigrant Characteristics

Immigration Characteristics	Churchill Total		Manitoba Total	
Total - All persons	975		1,133,515	
Canadian-born population	935	95.9%	974,735	86.0%
Foreign-born population	40	4.1%	151,230	13.3%
Immigrated before 1991	20	50.0%	92,535	61.2%
Immigrated between 1991 and 2001	0	0.0%	27,505	18.2%
Immigrated between 2001 and 2006	20	50.0%	31,190	20.6%
Non-permanent residents	0	0.0%	7,545	0.7%

Source: Churchill Regional Health Authority Annual Report 2009

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It is noteworthy that there are almost as many common-law couples as those that are married. Only 40% of couples in Churchill are married, as compared to the provincial average of 72%. Just over 36% of couples are common law, while the provincial average is under 11%. While there isn't a significantly larger proportion of lone-parent families than the provincial average (22.4% as opposed to 17%), what is remarkable is the gender difference: whereas just over 80% of Manitoban single-parent families are led by women, in Churchill only 54.5% are, with 45.5% of the lone parents being male. The provincial average is only 19.3% male-headed families.

Family Structure

Family Structure	Churchill		Manitoba	
	Total		Total	
Total number of census families	245		312,805	
Number of married-couple families	100	40.8%	225,875	72.2%
Number of common-law-couple families	90	36.7%	33,720	10.8%
Number of lone-parent families	55	22.4%	53,210	17.0%
Number of female lone-parent families	30	54.5%	42,930	80.7%
Number of male lone-parent families	25	45.5%	10,280	19.3%
Median income in 2005 - All census families	$76,897		$58,816	
Median income in 2005 - Married-couple families	$86,691		$67,013	
Median income in 2005 - Lone-parent families	$23,619		$31,518	

Source: Churchill Regional Health Authority Annual Report 2009

There are some important implications of this trend. Households led by single fathers tend to be more financially secure than those led by women but in Churchill the differences are extremely stark: the median income for male-headed households is $63,122, but only $3,423 for female-headed households – nearly 20 times lower.

At the same time, most communities generally lack social service support specifically for single fathers, and this is also the case in Churchill. What is generally understood is that for all lone parent families there is a much greater likelihood that the household will be economically disadvantaged: the median household income of a single parent family is a fraction of the median for a married couple family. Lone parent families in Churchill experience substantially lower income compared to couple families (median family income of $23,619 versus $86,691).

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Whether so many families in Churchill are living in poverty because they are led by a single parent, or whether troubled relationships and breakups in these households have occurred as a result of the difficulties associated with living in poverty, these indicators point to a significant array of stressors on Churchill's families. Low incomes are particularly difficult to live with when basic goods are as expensive as they are in Churchill. More supports of all kinds are clearly needed for Churchill's families.

Education

One of Churchill's major assets is its public school, which is housed in its well-equipped Town Centre, complete with library, theatre and recreational opportunities. Churchill is also a regional centre for university college of the North. However, relatively few residents hold post-secondary educational certificates or diplomas. Compared to the provincial average, education indicators in Churchill compare rather unfavourably. Over 40% of residents hold no certified education, where this figure is just under 30% for Manitoba; furthermore, this lack of educational achievement is concentrated disproportionately among women, 48% of whom have no certificate, diploma or degree compared to 37% of male population. In Manitoba, 66% of the adult population has attained high school education or higher, while in Churchill the figure is lower at 57%.

The one indicator in Churchill's favour is in the Trades, where the town has a 6% advantage over the provincial average, and women in this case have higher rates of achievement than for women in the province as a whole. Where university education is concerned, too, women in Churchill share an equivalent rate of accomplishment as their counterparts in the rest of the province, while very few of Churchill's men hold university degrees.

The population without certified education is also concentrated in the youngest cohort. Over 72% of residents between 15 and 24 have not graduated from high school (as opposed to only 47% province-wide), although the statistics are more comparable for the next cohort. These numbers are especially troubling for young women: over 84% of those between 15-24 have not graduated from high school – almost twice as many as provincially.

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Education

Education	Churchill			Manitoba		
	Total	Male	Female	Total	Male	Female
No certificate, diploma or degree	43%	37%	48%	29%	31%	28%
High school certificate or equivalent	18%	22%	14%	27%	26%	28%
Apprenticeship or trades certificate or diploma	16%	22%	11%	10%	12%	7%
College, CEGEP or other non-university certificate or diploma	10%	12%	7%	15%	13%	17%
University certificate or diploma below the bachelor level	3%	3%	4%	4%	4%	5%
University certificate, diploma or degree	10%	4%	15%	15%	15%	15%

Source: Churchill Regional Health Authority Annual Report 2009

Population 15+ without High School Certificate

Age Group	Churchill			Manitoba		
	Total	Male	Female	Total	Male	Female
15-24	72.4%	52.9%	84.6%	47.6%	50.0%	45.0%
25-34	17.9%	20.0%	22.0%	16.4%	18.6%	14.3%
35-64	33.3%	30.2%	35.3%	21.6%	23.5%	19.6%
All residents age 15+	43.1%	36.9%	47.9%	29.5%	30.8%	28.3%

Source: Churchill Regional Health Authority Annual Report 2009

It is also interesting to note in which disciplines post-secondary education is concentrated. Similar to Manitoba as a whole, students in Churchill have emphasized education, public administration, architecture, engineering, social sciences and the humanities. Churchill residents appear to be more likely than most Manitobans to study the physical sciences and for service-oriented careers. What are notably lacking are certified graduates in programs related to the visual arts, communications, math and computer sciences.

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Education: Field of Study

% Distribution for Population 25 to 64, with post-secondary qualifications
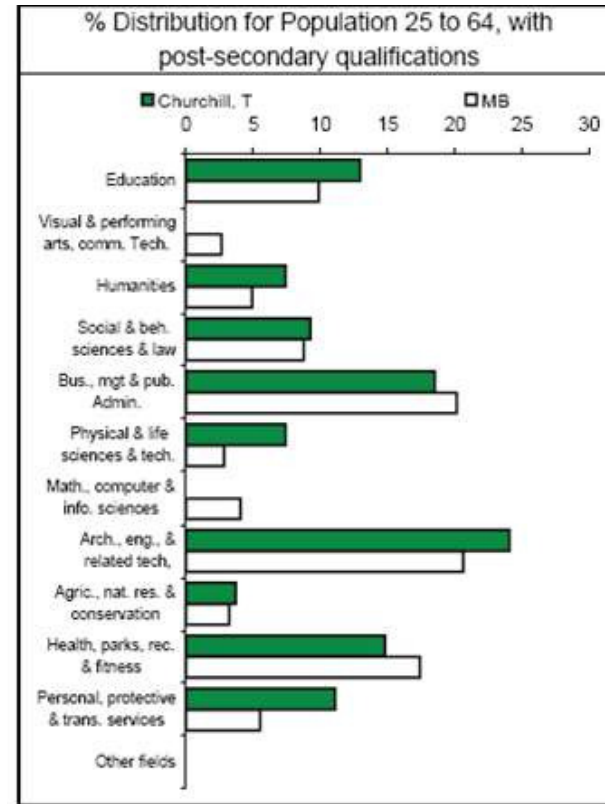
Source: Manitoba Bureau of Statistics

Income
According to the 2006 Census, in 2005 the median income for all persons 15 years of age and over in Churchill was $30,458, an increase of 6.5% from the 2001 Census. The median income for all economic families in Churchill was $77,145. This actually exceeds the Manitoban median of $60,754. This difference is shown in the table below which shows that once salaries reach the $70,000 threshold, proportionately more Churchillians earn higher wages than do Manitobans in general, while the portion of Churchillians who earn under $50,000 per year is much higher than Manitoba as a whole.

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Family Income in 2005

	Churchill, T	MB
Economic Family Median Income		
All economic families	$77,145	$60,754
Couple economic fam	$84,481	$66,686
Male lone-parent e-fam	$63,122	$44,642
Fem. lone-parent e-fam	$3,423	$32,883

2005 Family income groups, all economic families
% Distribution
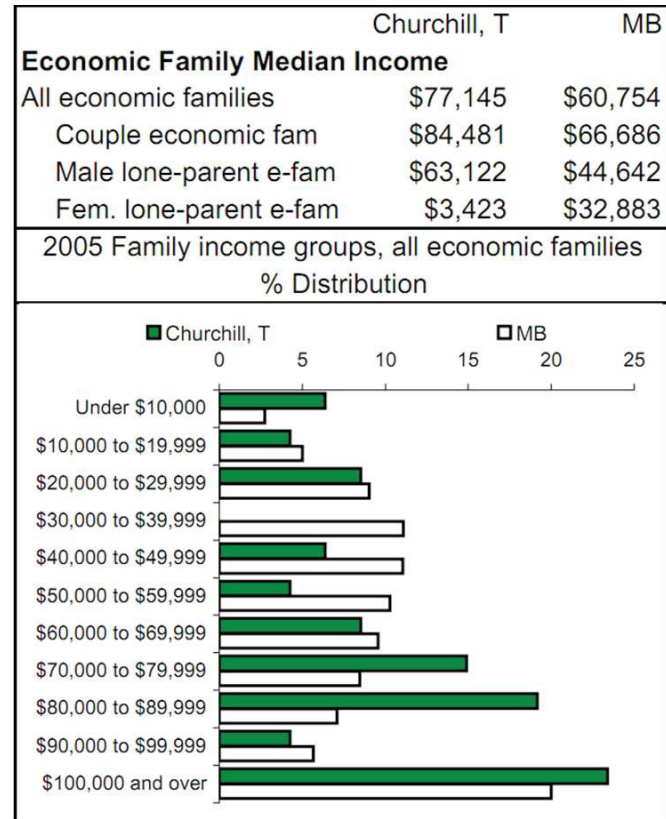
Source: Manitoba Bureau of Statistics

The majority of personal income in Churchill (85.6%) is generated through earnings associated with employment while 11.3% of residents receive their income via government assistance. The remaining 3% receive their income through other forms. Again, the differences are most pronounced between male- and female-headed households. Virtually all households headed by a female live in poverty, while no male-headed households do. As mentioned earlier, single fathersearn more than twenty times what is earned by single mothers.

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Prevalence of Low Income in 2005

	Churchill, T	MB
All economic families	240	298,305
Before-tax low inc.	11%	12%
After-tax low inc.	8%	9%
Couple economic fam.	185	247,850
Before-tax low inc.	0%	8%
After-tax low inc.	0%	5%
Male lone parent e-fam	25	7,680
Before-tax low inc.	0%	20%
After-tax low inc.	0%	15%
Fem. lone parent e-fam	30	35,925
Before-tax low inc.	100%	40%
After-tax low inc.	80%	31%
Persons 15+ not in e-fam	160	154,745
Before-tax low inc.	22%	38%
After-tax low inc.	12%	29%
Persons <6 years old	85	72,220
Before-tax low inc.	0%	26%
After-tax low inc.	0%	20%
Persons 65+	55	147,875
Before-tax low inc.	0%	16%
After-tax low inc.	0%	7%

Source: Manitoba Bureau of Statistics

Transportation Modes to Work

According to the 2006 Census, more than 48% of Churchill's residents identified that their primary mode of transportation to work was by either bicycling or walking. Accordingly, the second most popular mode of transportation was the private vehicle (38%) while 10% of residents indicated that they were passengers in these vehicles. The remaining 2% of respondents stated that they used

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'Other Methods' to reach work. It is interesting to note that since 2001, the number of people using private vehicles to commute in Churchill has decreased while bicycle use or walking has increased. Additionally, it should also be noted that choice in transportation is in part determined by gender. While 57% of males chose private vehicles to commute to work (an increase of 11% from 2001) only 19.1% of females used private vehicles (a decrease of 9% from 2001). As a result, while fewer males walked, biked or rode as a passenger to work in 2006, the number of females walking or bicycling to work increased dramatically by 18% during the period.

Mode of Transportation to Work

	2001	2006	Prop. of total pop 2001	Prop. of total pop 2006
Total Population	1,089	963	923	Total Population
Total - All Modes	490	485	100%	100%
Car, truck, van, as driver	180	185	36.7%	38.2%
Car, truck, van, as passenger	70	50	14.3%	10.3%
Public Transit	0	0	0.0%	0.0%
Walked or bicycled	220	235	44.9%	48.5%
Other method	20	10	4.1%	2.0%

Table by Institute of Urban Studies

Despite a slight increase in private vehicle use from 2001 to 2006, Churchill still has one of the lowest rates of auto for commuting purposes use for any northern settlement. This is surely owed to the town's inaccessibility by road. Motor vehicles must be delivered by rail. On a provincial scale however, the differences become much more drastic. In 2006 more than 77% of Manitobans indicated that they drove their car to work on a daily basis, a difference of 39% from Churchill's stats. In addition, more than 48% of Churchill's residents walked or bicycled to work, only 9% of Manitobans used the same form of transportation.

Appendix 2: Wind, Solar, Hydro, and Geothermal Power in Churchill

Wind Power

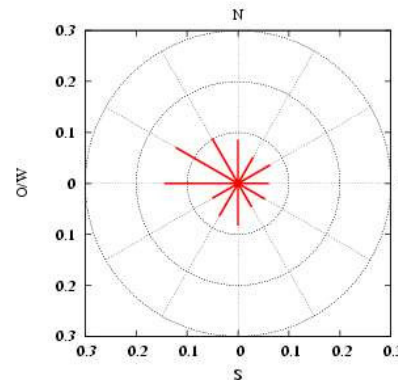Wind power utilizes turbines to convert wind energy into electricity. Wind energy is intermittent and thus requires a back-up system to ensure constant supply and/or battery storage.

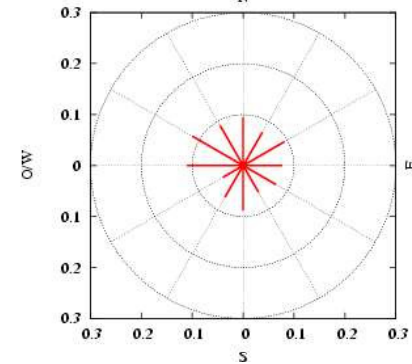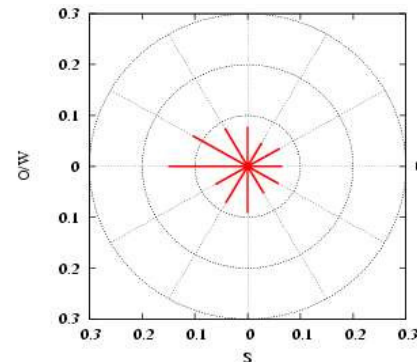**Churchill's Annual Wind Rose**
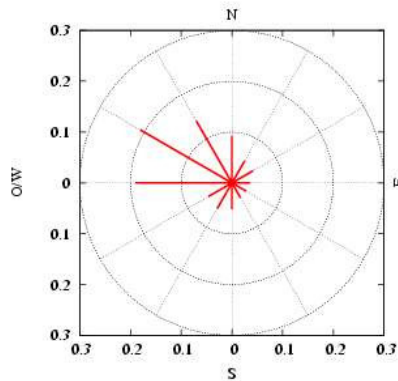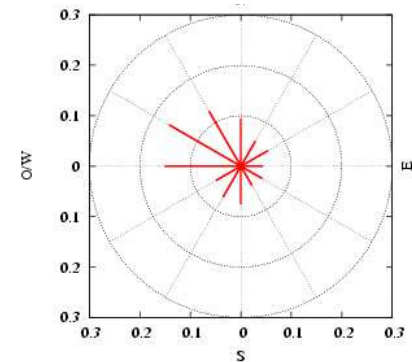

Churchill's Wind Roses

Winter Wind Rose

Spring Wind Rose

Summer Wind Rose

Fall Wind Rose

Source: Natural Resources Canada (2007) Photovoltaic potential and solar resource map

Wind turbines have been criticized based on their noise, environmental impacts on birds and bats, effects on property values, impacts on agricultural and forestry practices, visual effects (visual landscape and lighting), frontage distances, interference with telecommunications, shadow flicker, and ice throw (1).

The Canadian Wind Energy Atlas indicated that the town area has a mean annual wind speed of 7.10 m/s and 8.01 m/s during the winter when energy demand is at its peak. This wind rate is above the 7 m/s threshold for an economically viable commercial wind-source. Thus, these wind speeds indicate that there is potential for wind generation in Churchill and further analysis is warranted.

Mean Wind Speeds in Churchill at 50m   Latitude = 58.713, longitude = -94.181

Period	Annual	Winter (DJF)	Spring	Summer	Fall
Mean Wind Speed	7.10 m/s	8.01 m/s	6.70 m/s	6.32 m/s	8.11 m/s

Source: Canadian Wind Energy Atlas, Environment Canada (2008) .
http://www.windatlas.ca/en/nav.php?field=E1&height=50&season=ANU&no=33

The prevailing wind direction for Churchill is from the northwest (see Wind Roses). Wind roses indicate how often the wind blows in a particular direction. Thus the longer the spoke, the more often the wind blows from this direction. Building and community design practices for northern communities factor in wind direction as a part of their parameters effecting planning projects (2).

Advantages of Wind Power

- System would be greatly enhanced with the addition of a storage capacity or if energy could be sold to the existing grid; and

- Availability of expanses of unoccupied land could lessen the nuisance of wind facilities on residential or wildlife areas. Possible to site facilities in Hudson's Bay.

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Disadvantages of Wind Power

. Complaints from neighbours based on concerns of noise, aesthetics, and decreased property values may complicate implementation;

.As wind supply is intermittent, there would be a need to develop a storage capacity if the town wished to have a back-up supply connected to the current hydro lines. Otherwise arrangements with Manitoba Hydro would need to be made to sell energy generated directly to the existing grid.

Solar Power

Solar energy offers a variety of design opportunities, as solar panels can deliver either electrical or thermal energy. Non-commercial applications are most often employed on a single building for the provision of hot water, space heating, or electricity. Larger systems have been developed that work in conjunction with geothermal storage for district heating, and will be discussed in the section on geothermal energy. Passive solar design considerations include building orientation and composition.

To maximize solar gain, buildings are typically arranged on roads that run east-west. Streets in the southeast portion of town run approximately east to west while the streets in the remainder of town run roughly north to south. The Natural Resources Canada's (2007) Photovoltaic Potential and Solar Resource Maps of Canada indicate a solar generation potential (photovoltaic and thermal) of 945 – 1120 kWh/kW/year for the Churchill area (See table below).

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PV potential and Mean daily global insolation for Churchill, Manitoba

Geographic location -> -94.17E,58.77N

	South-facing vertical (tilt=90°)	South-facing, tilt=latitude	South-facing, tilt=latitude+15°	South-facing, tilt=latitude-15°
January	62	58	62	51
February	96	94	99	85
March	144	153	153	144
April	129	153	145	154
May	96	128	115	136
June	77	116	99	128
July	79	116	100	127
August	76	103	92	109
September	55	68	64	69
October	45	49	48	46
November	45	43	46	39
December	40	37	39	32
Annual	945	1118	1063	1120

Reference: https://glfc.cfsnet.nfis.org/mapserver/pv/municip.php?n=468&NEK=e

This means that for each solar panel rated at 1 kW installed, one can expect to generate between 945 and 1120 kWh each year depending on the orientation and angle of the panel (See table below).

Mean daily global insolation (kWh/m2)

	South-facing vertical (tilt=90°)	South-facing tilt=latitude	South-facing tilt = lat+15°	South-facing, tilt= lat-15°	Two-axis sun-tracking	Horizontal (tilt=0°)
January	2.7	2.5	2.7	2.2	2.9	0.6
February	4.6	4.5	4.7	4.1	5.4	1.5
March	6.2	6.6	6.6	6.2	8.5	3.3
April	5.7	6.8	6.5	6.8	9.7	5.0
May	4.1	5.5	5.0	5.9	8.4	5.9
June	3.4	5.1	4.4	5.7	8.6	6.0
July	3.4	5.0	4.3	5.5	8.4	5.6
August	3.3	4.4	4.0	4.7	6.7	4.3
September	2.5	3.1	2.9	3.1	4.0	2.6
October	1.9	2.1	2.1	2.0	2.5	1.3
November	2.0	1.9	2.0	1.7	2.2	0.6
December	1.7	1.6	1.7	1.4	1.8	0.4
Annual	3.5	4.1	3.9	4.1	5.8	3.1

Reference: https://glfc.cfsnet.nfis.org/mapserver/pv/municip.php?n=468&NEK=e

The mean daily global insolation or irradiance in the Churchill area is 3.1-5.8 kWh/m². This represents the average amount of solar energy per day that falls on each square meter of a solar panel array. For northern communities, the reduced potential for solar energy in the winter months, reflected in the lowest levels of solar insolation, means that solar power cannot carry the full demand load during this period and can therefore be a supplementary energy source.

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Photovoltaic Solar Power

Photovoltaic cells (PVs) are designed to convert sunlight into electrical energy. This electricity can be stored for future use, utilized immediately to meet an energy demand, or supplied to Manitoba Hydro's grid. The size of the solar array, battery bank, and AC inverter required for a typical solar PV application depends on a number of factors. These factors include electricity usage, the amount of sunlight at the site, the number of days without backup required, and the peak electricity demand at any given time (3). The amount of solar energy available varies seasonally, thus connection to Manitoba Hydro's existing electrical grid is necessary.

Advantages of Photovoltaic Solar Power

. Micro-level generation can provide a significant portion of the electricity needs of a building;

. On-site electricity generation and storage gives an added degree of security to provide power to heating systems in the case of a power outage; and

. Noise and visual impacts will not be an issue.

Disadvantages of Photovoltaic Solar Power

. Initial costs are relatively high;

. Macro-level generation requires more extensive permitting and financial and community buy-in.

Solar Water Heating

Solar water heating involves circulating a water-glycol mixture through a series of tubes. After being heated in the solar panels, the mixture is then sent to a heat exchanger where it pre-heats the domestic hot water supply. This system can meet approximately 43% of annual hot water needs (4). The number of collectors required for a site depends on a number of factors, such as the size of the load (amount of water to be heated), the efficiency of the unit, the amount of solar radiation at the site, and the amount of storage available (4). As a rule of thumb, one square meter of flat plate solar collector is required for every forty liters of daily hot water demand.

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Advantages of Solar Water Heating

- Low-to-mid range costs for individual systems;

- Significant amount of domestic hot water needs can be met;

- Macro-level systems can be combined with geothermal storage.

Disadvantages of Solar Water Heating

- Solar water heating panels that use pumps to move liquid require electricity, therefore are not able to be used as a stand-alone system.

Hydro Power

The proximity of Churchill River presents an opportunity to examine the potential of micro or small hydro energy production for the town. The site potential (power output in kiloWatts) of a watercourse is determined by measuring the flow rate (the amount of water flow per second), the head (the height from which the water is falling), and the efficiency of the generation system (energy lost in the turbine and generator). Small hydropower systems have an installed power generation capacity of between 1-50 megawatts (MW), which is sufficient to supply the electricity needs for a small community (5). Natural Resources Canada (6) states "micro-hydropower systems have an installed power generation capacity of less than 100 kilowatts (kW). Many micro-hydropower systems operate "run of river," which means that no large dams or water storage reservoirs are built and no land is flooded." The Water Power Act and the Water Power Licensing documents provide the initial framework for any further examination of the feasibility of future hydropower consideration for Churchill (7). For guidelines for small hydro see Note 8.

Advantages of Hydropower

- Energy output is constant; and

- Noise and visual impacts will not be an issue.

Disadvantages of Hydropower

•Supply of micro hydro power will only meet a small percentage of community electrical needs;

•Larger-scale generation requires more extensive permitting and financial and community buy-in;

•A small hydro facility may create a significant portion of the energy required in the town.

Geothermal Power

Many communities are making use of the earth's energy to provide heat for their municipal and residential buildings. Geothermal heat pump systems use the difference between air and ground temperatures to help moderate the temperature of a building. The ambient earth temperature is used to preheat water that can then be brought up to the required temperature using less energy.

The earth can also act as a heat store by pumping additional heat into the ground, potentially from thermal solar panels during the summer months. This heat is then redistributed in the home during the winter season. The combination of solar heating and ground storage is known as a GeoExchange system.

There are currently two Canadian examples of residential district heating systems that combine geothermal storage and solar thermal heat generation; Drake Landing in Okotoks, Alberta and a proposed system in Whistle Bend (Whitehorse), Northwest Territories (9). Initial capital costs were significant for both projects, requiring public-private investment schemes to make them feasible. To determine the economic and physical feasibility of such complex systems, a detailed study of the subsurface conditions in Churchill will be required.

Advantages of Geothermal Power

• Moderate initial costs for individual systems;

• Can provide the majority of domestic space heating needs, depending on subsurface characteristics.

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Disadvantages of Geothermal Power

. Systems may require a high amount of electricity to run the pump, depending on site conditions.

. Macro-level systems require substantial initial costs.

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Notes:

1. New Brunswick Department of Energy. Model Wind Turbine Provisions and Best Practices for New Brunswick Municipalities, Rural Communities and Unincorporated Areas, 25 Nov. 2008. Web. 8 Feb. 2011. <http://www.gnb.ca/0085/pdf/nbwindenergy.pdf>

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7. Manitoba Water Stewardship. Water Power Licensing n.d. Web. Feb. 2011. <http://www.gov.mb.ca/waterstewardship/licensing/water_power_licensing.html>

8. International Small-Hydro Atlas. Planning, Developing and Operating Small Hydro, 2010. Web. 8 Feb. 2011. <http://www.small-hydro.com/index.cfm?fuseaction=planning.home>

9. City of Whitehorse. District Heating and Waste Heat Recovery Feasibility Study, n.d. Web. 8 Feb. 2011. <http://tinyurl.com/4lstz4x>

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Appendix 3: Indicators for Measuring Progress (From Discussion Paper)

Employment and Income

Key Indicators: percentage of households with incomes below the Low Income Cut-off; annual average (or median) household or individual income; percentage of Employment Insurance beneficiaries as a percentage of the total population; middle income earners as a percentage of total population; real average weekly earnings; number of people requiring food bank services or Christmas Cheer Board hampers.

Energy Use

Key Indicators: energy consumption per household; energy consumption by sector; municipal water consumption per capita (total, residential commercial, other); percentage of households serviced by sewage treatment (e.g., by level: none, primary, secondary, tertiary) Town, The Flats, Goose Creek, Churchill Northern Studies Centre, remote residences; urban air quality (e.g. bear season / winter idling of vehicles, local citizens see occasional emissions from the operation of RHA incinerator); ambient levels and accidences for ground-level ozone, PM10, CO, NO, SO2, benzene.

Waste Management and Minimization: [Topic of high interest]

Current practices and Waste Disposal Alternatives
Solid Waste
Recyclables – Reduce, Re-use, Recycle
Hazardous Material

Key Indicators: Waste generation and disposal (total and per capita); recycling and composting participation rates; the meeting of high standards rather than minimum compliance; implement

waste prevention and management plan; increase diversion of waste for reuse or recycling; reduce waste production

Conservation and Biodiversity

Key Indicators: Green space as a percentage of total land area in town; total area of environmentally sensitive habitat and percentage of area protected from development (i.e. protected area or covenanted land); number of species at risk; population trends of species at risk; population trends of keystone species.

Education for a Sustainable Future

Key Indicators: Education levels (as a percent of population over 15 years of age; < grade 9, grades 9–13, post-secondary); Percentage of youths aged 15–18 attending school; literacy rate.

Housing

Key Indicators: average waiting time for those in need of subsidized housing; affordability (percent of households spending 30% or more of income on housing); adequacy (percent of housing stock below adequacy standard); suitability (percent of households below national occupancy standard for number of people per bedroom; average price of serviced residential lots (total and as a percent of average price of house); % of total housing stock made up of social housing units; vacancy rates, by price and housing type; supply of serviced residential land coming on stream to meet future demand.

Public and Legal Services
Key Indicators: accident rates (by type); crimes against persons (offences per 1 000 population); crimes against property (offences per 1 000 population); number of charges laid (by victim and by police) in domestic violence incidents reported to police (also as percentage of all incidents.

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Appendix 4: Community-Based Social Marketing for Environmental Behavior

Community-Based Social Marketing (CBSM) is an approach designed to promote environmentally friendly behaviours by combining behavioral psychology with social marketing techniques. CBSM verifies the day-to-day barriers to such behaviours and identifies motivations for desirable behaviors. Once the real barriers and benefits are confirmed, various tools, such as personal commitments, community norms, tailored prompts and vivid communications can be used as part of a comprehensive CBSM strategy. CBSM can be used for everything from reducing waste entering the landfill, to reducing energy consumption, to using water more wisely.

Most programs for changing environmental behavior focus on two different information-intensive approaches, neither of which are very effective. The first method assumes that if people are more knowledgeable and their attitudes change that it will change their behavior. The second relies on the assumption that the economic self-interest of an individual will motivate them to change their patterns if a cost savings can be achieved. Neither of these approaches are effective in creating long term change.

The term Community-based Social Marketing merges environmental psychology with social marketing. Social networks are known to play a significant role in day-to-day behavior; changes in behavior result as an extension of what friends do or recommend. Uncovering what can be done to make behavior changes as easy as possible is also essential to the CBSM process.

There are several categorical ways of changing behaviors. These include policy changes; voluntary actions shifting to policy; voluntary compliance; and regulation. As well, there are strictly voluntary measures where policies do not exist, or change is possible without directing policies. However, invoking policies to promote a particular behavior do not lead to change alone.

There are several steps required within the CBSM model, beginning with selecting a behavior to change, followed by uncovering the barriers and benefits of the population changing that behavior. Once the barriers and benefits have been identified a strategy can be developed, which is preceded by a pilot of that strategy, and concluded with full implementation and assessment.

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Selecting Behaviors

The starting point is to identify the single behavior which would have the most significant impacts for one's community, as well as having a high probability of success. Behaviors that are targeted can be either repetitive, or one time actions. Repetitive behaviors can include things like composting and recycling, or walking in lieu of driving. One time actions can include using a programmable thermostat, or reducing the temperature on a hot water tank.

Any behaviors that are targeted must be an "end state" behaviour, meaning that the behavior is a final goal. For example, purchasing a low flow showerhead does not reduce water consumption, but having a low flow showerhead installed does. Except…

One thing to consider when targeting behaviors is the possibility of a rebound effect. Sometimes, for example, low-flow showerheads may lead to people taking longer showers because they believed they were using less water. Rebound effects do not always occur. It is important to consider that increased technological efficiency doesn't necessarily lead to more environmentally sensitive behavior, and can sometimes lead to less environmentally conscious behavior. The most successful long term programs are ones that change repetitive behaviors, rather than one time technological 'fixes'.

Barriers and Benefits

Identifying the individual barriers to an environmental behavior goes hand-in-hand with uncovering the personal benefits of engaging in the barrier. Removing barriers and providing motivations work best when they are in chorus with each other.
There are four steps and methods for uncovering barriers; these include literature searches, observation, focus groups, and surveys.

Observation

Direct observation of people engaging in the behavior (doers), or not engaging in the behavior (non-doers) can provide substantial insights. Observation can provide greater context for a behavior in a local community, and can illustrate the differences between those engaged and those who are not.

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The trick with conducting observations is to ensure that they are unobtrusive. Individuals who are aware their behavior is being observed are highly likely to modify their actions, and behave in unauthentic ways. Gaining insight into waste and recycling habits, for example, can be through conducting waste audits. This form of observation is unobtrusive, and clearly illustrates business and residential waste practices.

Focus Groups

The focus groups that provide the most information are conducted prior to the administering of a survey, as focus groups can inform and define survey questions.
Structurally, focus groups should be no longer than 1 or 2 hours, and should address 2 or 3 potential behaviors. Each focus group should have no more than 6 to 8 participants, and groups should be split by 'doer' and 'non-doer' as well as by gender. Other tricks for running focus groups include having participants write their responses down prior to discussion. This reduces 'group-think' behavior, improves the quality of the information and provides the researchers with actual response wording for comparison.

Develop Strategy

Once the barriers and benefits have been identified, a strategy can be developed. A strong strategy will reduce the barriers and increase the benefits of a desired behavior. In addition to this, the strategy will increase barriers and reduce benefits for the undesired behavior. There are a variety of strategy tools that can be used, but these tools must be appropriate for the specific barriers and benefits, otherwise they will have little impact. CBSM tools are designed to address common barriers and include personal commitments, prompts, social norms, communication and structural change.

Barriers	Tools
Lack Motivation	Commitment, Norms, Incentives
Forgetting	Prompts
Lack of Social Pressure	Norms
Lack of Knowledge	Communication

Commitments

Personal commitments work because they are voluntary. Start with small commitments, followed by larger ones. This often takes the form of verbal commitments, followed by signed ones, then public commitments, and finally a group commitment.

Prompts

Changing attitudes is not the goal of prompts; instead they remind and prevent forgetting. Prompts must be located directly at the location of a behavior action. This can be right at the light switch, water tap, or recycling bin. They must be noticeable, self-explanatory and encourage the desired behavior.

Norms

These socially accepted behavioral cues are very powerful, and are at their strongest when the public believes that participation is high. Normative behavior and indicators must be visible to others, and close to the activity. These are often combined with prompts, where a sign or label highlights that a person is participating in a behavior. These are most common in automobile anti-idling stickers, composting and recycling labels, where the prompt for the participant also acts as a normative display for others.

Communication

Persuasive, vivid messages will capture one's attention, increase long term memory, and enhance recall. The type of message medium is also key, as print, radio and TV communications are highly ineffective when compared to face-to-face and personal contact. Other tricks to successful communication include avoiding fearful messages, as they rarely work. As well, people are much more likely to respond to a loss of money, rather than a gain of money, especially if the loss is from inaction. Individuals only buy into a messages if it within their range of values and acceptance. Many

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environmental messages do not work because the audience does not share the same environmental values as the group presenting the communications. Messages that are the most persuasive come from 'people like us' and credible public figures. Allowing for feedback with communication reinforces repetitive behaviors, builds public support and helps develop community norms.

The use of CBSM strategies can be a very effective means of changing undesirable public behavior towards something more environmentally preferable. It does require a lot of work to research and develop, but when the barriers and benefits have been verified for the population a strong strategy can be developed. Only when the actual roadblocks and the real motivations to a behavior change are uncovered can effective programs be created.

Adapted From:

McKenzie-Mohr, Doug and William Smith. Fostering Sustainable Behavior: An Introduction to Community-Based Social Marketing. Gabriola Island, BC: New Society Publishers, 1999.

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