



## ***SMART GROWTH AND WINTER CITY DESIGN***

### SUMMARY

“Northern communities, which occupy the top quarter of the globe, must be more competitive than their southerly counterparts. Winter is often perceived as a negative force-generating inconvenience and added costs- instead of a positive one which includes overcoming challenges in innovative ways, embracing healthy lifestyles and recreational opportunities.” (City of Boyne, 2007)

Despite winter weather conditions that can exist for a part of the year, the built environment of many northern cities does little to embrace the climate. Winter cities tend to focus on keeping people indoors, and removing them from the streets and civic spaces. However, through winter design, people can be encouraged to return outdoors. “Northern site planning and building techniques allow us to capitalize on these opportunities to stay outdoors, create lively streets and reinforce the vitality of the community.” (Ft. St. John, 2000).

Winter city design needs to address snow removal and storage, sunlight exposure, safety, wind, and darkness in the built environment. Elements of the built environment include:

- building layout, colour and design;
- density and uses of buildings;
- street layout, including roads, sidewalks and bike lanes, and lighting;
- civic space layout, vegetation and trees, and recreational uses;
- energy consumed by buildings and vehicles; and
- attitude

Smart Growth St. Albert proposes to build on these elements, by encouraging developments to consider winter design in terms of:

- year-round use of the public realm (streets and civic spaces);
- facilitate alternate modes of transportation (walking, cycling);
- maximize sun exposure and minimize wind; and
- facilitate snow removal.

*To Read: Don't hibernate, participate – get Winter Active.* A pamphlet from Ontario providing ideas of how and why people should get active in winter.

*Find it at:*

<http://www.hkpr.on.ca/uploadedFiles/winterActiveResource.pdf>

*To Watch : Winter Walking* with Jonathon E. Stewart

*Find it at:*

<http://video.about.com/walking/Prepare-for-Winter-Walking.htm>

*To Discuss:*

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*Places to see:*

Houghton, Michigan has developed a Pedestrian/Walkability Plan that addresses the needs of pedestrians in winter. They suggest a packed snow surface is the best for walking in winter. The street design is important as well. Newer suburban street designs with limited or no sidewalks leave little room to accommodate both pedestrians and snow storage.

*The articles and videos referenced in the Bulletins do not necessarily reflect the position of the City of St. Albert and are meant to encourage debate and discussion.*

## ***SMART GROWTH AND WINTER CITY DESIGN***

### INTRODUCTION

*“Northern communities, which occupy the top quarter of the globe, must be more competitive than their southerly counterparts. Winter is often perceived as a negative force- generating inconvenience and added costs- instead of a positive one which includes overcoming challenges in innovative ways, embracing healthy lifestyles and recreational opportunities.”*

*City of Boyne, 2007*

Strong community design that takes winter into account can be critical in mitigating some of the challenges of the season. Many winter cities have higher standards of living than their southern counterparts. Consistently, Norway and Iceland are ranked by the UN human development index as having the highest standard of living in the world (BBC news, 2009). Winter cities offer many positives, including:

- outdoor recreational opportunities, including downhill and cross-country skiing, skating;
- natural beauty of snow and ice;
- civic art opportunities with snow and ice
- innovation opportunities in services and building design; and
- winter tourism, events and festivals (City of Marquette, 2004).

Cities like Boyne and Marquette, both in Michigan, are embracing the fact that they are winter cities and entrenching that in their municipal plans. Fort St. John and Prince George in northern British Columbia are doing the same.

“The main principles to be incorporated in exemplary “winter city” designs should be contact with nature, year-round usability, user participation, cultural continuity, and the creation of comfortable micro-climatic conditions throughout much of the city’s open spaces.” (Pressman, 1996)

Granted there are challenges. People experience depression or Seasonal Affective Disorder (SAD) with the shorter days and this can be partly blamed on the difficulties getting out and about. There are physical challenges such as hypothermia, dangerous driving conditions, slips and falls, and lack of physical exercise (Crane, 2005). Municipalities need to consider snow management, heating costs and energy consumption. But people face similar challenges in hot climates. Energy costs of air conditioning, danger of heat stroke or protection in the public realm from the sun and the heat are all considerations for summer cities.

### CLIMATE AND COMMUNITY DESIGN

“Even though most cities in the northern United States and Canada have winter conditions- snowfall, ice, freezing temperatures, and long nights for substantial portions of the year, their built environments do little to embrace their climate.” (Crane, 2005). North American winter cities have tended to focus on keeping people indoors, designing mega-malls and networks of indoor stores connected by tunnels and skywalks. People are removed from the streets and civic spaces.

However, through winter design, people can be encouraged to return outdoors. “Northern site planning and building techniques allow us to capitalize on these opportunities to stay outdoors, create lively streets and reinforce the vitality of the community.” (Fort St. John, 2000). Elements of community design that should be considered for a winter climate include:

- building layout, colour and design;
- density and uses of buildings;
- street layout, including roads, sidewalks and bike lanes, and lighting;
- civic space layout, vegetation and trees, and recreational uses; and

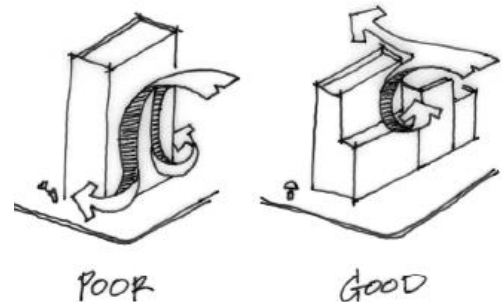
- energy consumed by buildings and vehicles; and
- attitude.

### Buildings

Mass fabrication of buildings means that, despite climate differences, shopping centres, hospitals and other buildings have the same layout from Edmonton to Houston. However, a variety of techniques can be incorporated into building design to reduce energy costs, and create a more comfortable experience for people accessing or adjacent to the building. These techniques include:

- Sunlight – orient buildings and open spaces to maximize sunlight exposure and minimize development on north facing slopes. Buildings sited on the north slope cast long shadows, reducing solar exposure (City of Marquette, 2004).
- Wind – incorporate balconies, stepped facades and irregularities in the building’s exterior to reduce wind speeds (See Figure 1). Continuous building facades and awnings protect pedestrians from the elements (City of Marquette, 2004).
- Snow – Design roofs to accommodate snow and ice accumulation and prevent it from shedding into walkways and parking lots. To prevent snow from drifting into building entrances use vegetation and berms and swirl chambers, and provide transition areas at building entrances for patrons to shed snow (City of Marquette, 2004).
- Safety – cover ramps and stairs to prevent snow and ice accumulation (heat particularly hazardous ones).
- Darkness – use warm colours, lighting and landscaping treatment to offset the darkness and monotony of winter (Coleman, 2008).

Figure 1



Source: City of Fort St. John

*Stepping back upper storeys of a building creates a swirl chamber that reduces the impact of the wind at street level*

### Density

Compact, mixed-use neighbourhoods reduce distances to stores and services, making walking more of an appealing mode of transportation in the winter. “A compact city uses space efficiently, allows people to walk between places, and ensures that streets and public open spaces are sheltered from the wind.” (Fort St. John, 2000) Providing housing, retail and offices within the same building or neighbourhood also reduces travelling distances for daily activities, making walking or cycling in the winter more feasible.

### Streets

Winter can provide many challenges for drivers and pedestrians. “Cold, snow, and the decreased light levels in the north all influence not only the ability of people to walk in winter, but also the desire to walk.” (City of Boyne, 2007). With the aging population, providing a safe pedestrian experience in the winter will become critical.<sup>1</sup>

To improve the winter experience of the pedestrian and driver, the following techniques should be incorporated:

- Sunlight – Pathways should be provided on the sunny side of buildings, and building should not shade pedestrian walkways (Fort St. John, 2000).
- Snow removal – include snow storage areas adjacent to roads to prevent it from going onto sidewalks (i.e. boulevards and bike lanes), and through landscaping in parking lots. Walkways

<sup>1</sup> See Bulletin #4- Demographics

should receive priority for snow clearing. Curb extensions should have gentle curves to accommodate ploughs (City of Marquette, 2004).

- Safety – raised crosswalks prevent snow accumulation and increase pedestrian safety. Ensure transition areas between the street and sidewalks, such as curb cuts and bus stop platforms, are properly ploughed. Separate sidewalks from roadways to protect pedestrians from the spray of slush and water from passing cars (City of Marquette, 2004).
- Wind – consider using landscaping to protect roadways from drifting snow (Coleman, 2008). “Screens, buffers, and buildings can reduce wind speed by 50% on a distance equal to 4 to 10 times their height.” (Fort St. John, 2000)
- Lighting – illumination should be low level and non-glare. (City of Boyne, 2007). Seasonal light features can create a warm winter atmosphere.

### *Civic spaces*

Inactivity during the winter months is a major issue for both adults and children. Civic spaces should be designed for a variety of uses in both the summer and winter. Ponds or water features can be transformed into skating rinks, and amphitheatres into sheltered fire pits. Heated shelters should also be provided.

Play is critical for child development, and the outside environment provides opportunities for physical development and activity (see Figure 2). Many cities in Northern Europe, particularly Sweden and Norway are looking carefully at how to encourage children to play outside in the winter. According to Steinsvik (2004), playgrounds need to incorporate places for mystery and adventure, role-playing and interaction, learning, activity and meeting places.

To encourage both adults and children to participate in outdoor recreational activities, the following techniques can be incorporated:

- Wind – use buildings and landscaping to protect parks and outdoor spaces from wind. A three meter high planting can for instance reduce a near gale to a moderate breeze from the windshield (the planting) and to a distance of 60 meters, at the same time as the measured temperature will increase with 1-5 degrees Celsius. (Steinsvik, 2004).
- Sunlight – the use of dense coniferous vegetation on the parks north-west side help block wind, while the spaces southern exposure will maximize heat from solar radiation.
- Darkness – incorporate public art to reduce muted tones of winter (Coleman, 2008).
- Activities – festivals and winter activities can encourage people to get out in the winter weather. Park City’s most successful festival (Sundance Film Festival) occurs in winter, and there are many elements of Smart Growth in the municipality’s design.

### *Energy*

Winter cities use a large amount of energy heating buildings, and fuelling vehicles. Winter city design provides an opportunity to address the approaching energy crisis. A 2004 study released by the National Climatic Data Centre on seasonal energy demands, found energy consumption in the winter was double that of the summer (Crane, 2005). To reduce energy consumption, neighbourhoods should incorporate:

- more multi-family housing. In Canada, the single-detached homes are one of the biggest consumers of energy;
- smaller scale retail. Conventional suburban developments and large shopping centres consume large amounts of energy. West Edmonton Mall uses the same amount of energy as a city with a population of 50,000, spans 48 city blocks and has the world’s largest parking lot (Crane, 2005).

**Figure 2**



*Kicksledding in Finland gets all ages out enjoying winter weather*

- modified grid street system to reduce travel distances for vehicles and pedestrians. Driving distances are 24 - 50% less in neighbourhoods with a grid layout for streets and mixed uses than in residential neighbourhoods with large blocks and cul-de-sacs (BC Climate Action Toolkit, 2009); and
- facilities for pedestrians and cyclists (sidewalks and bike lanes).

#### Attitude

Often a first response to Smart Growth concepts is that it cannot work in winter climates. But then, the first response in sunny climates is that they're too hot, people won't walk there so Smart Growth won't work there.

Climate and weather are used as an excuse in many places to accept poor urban design and development. People will walk across an expansive wind-swept parking lot to go to one store, walk back across the parking lot, drive to the next store and do it again. Wouldn't it make more sense to park and walk down a block, the same distance as one walk across a parking lot, being able to duck into a variety of stores that are close together, never being outside for very long at a time?

It is a matter of attitude. Too often winter is referred to in negative terms. What weather forecast recognizes a beautiful sunny day at -20 without some negative comment? Communities are starting to accept what they are and embrace winter. Marquette, Michigan proudly proclaims on the front cover of its municipal plan – “A premier livable, walkable winter city.” And this focus came from its residents through the public consultation.

The cities of northern Europe, Japan, Iceland and even our own northern territories are far ahead of many of their southern winter cities in accepting and maximizing the climate and weather. Outdoor cafes, markets, festivals and opportunities for outdoor activities abound, like this Swedish café that gives its customers 'warm' service (see Figure 3). Whitehorse, in the Yukon Territories, is full of pedestrians throughout the year. People accept winter, dress appropriately and go about their everyday lives. Municipalities accept winter and plan and design the built environment to enable residents to do just that.

**Figure 3**



*An outdoor café in Sweden provides a 'warm' touch for customers*

#### WINTER CITY DESIGN AND ST. ALBERT

Contrary to our exaggerations, winter does not last six months of the year in St. Albert, although, granted, it does sometimes feel like it. Between 1971 and 2000, St. Albert saw an average of only 40 days annually with temperatures below -20, which accounts for only 11% of the year. Temperatures between -10 and -20 are experienced for about a quarter of the year. The average temperature in January is only -12 and the City's annual snowfall is 132 cm, less than Grande Prairie's 180 cm, Whitehorse's 145 cm or Ottawa's 235 cm. The Michigan cities cited earlier get 123 cm in Marquette and over 300 cm in Boyne.

While St. Albert currently has no provisions in the Municipal Development Plan or Land Use Bylaw that specifically incorporate winter design principles, the City does incorporate some features that support winter city design such as:

- landscaping requirements in parking lots to provide snow storage;
- boulevards along neighbourhood streets that provide snow storage and protect pedestrians; and
- parks with winter outdoor recreational activities, including skating rinks, Nordic ski trails, and tobogganing hills.

### SMART GROWTH ST. ALBERT

Smart Growth St. Albert recognizes that design plays an important role in making a city more effective in winter, to encourage year-round use of the public realm (streets and civic spaces); facilitate alternate modes of transportation (walking, cycling); maximize sun exposure and minimize wind; and facilitate snow removal. Additional winter design elements are incorporated throughout the Smart Growth regulations, and include:

- boulevards along sidewalks for snow removal, and to protect pedestrians from vehicles and spray;
- multi-use sidewalks to enable people to cycle safely in the winter;
- projections and recesses in building facades are required for facades longer than 30m, to reduce wind at street level;
- landscaping requirements in parking lots provide room for snow storage;
- covered building entrances required on low/mid rise and high-rise buildings;
- clustered buildings in the Large Format Commercial District, which will provide shorter walking distances to stores and services;
- buildings stepped back above the third storey on key streets, for wind minimization;
- multi-use civic spaces to incorporate activities for all seasons and surrounding buildings create weather protection;
- more multi-family housing than the city currently has, which will reduce energy consumption;
- modified grid system, which has lower snow clearing costs than conventional curvilinear street patterns with cul-de-sacs. On average it takes 10-15 minutes to clear a cul-de-sac of snow, eight times longer than it takes to plough a through street of the same size (City of Westfield, ND). Modified grid system also ensures shorter travelling distances for pedestrians, through improved street connectivity and shorter block lengths;
- compact, mixed use neighbourhoods, to enable shorter travel distances to stores and services, and reduced vehicle trips; and
- alleys along certain key streets to provide a continuous street front, creating a safer, more sheltered pedestrian environment.

### CONCLUSION

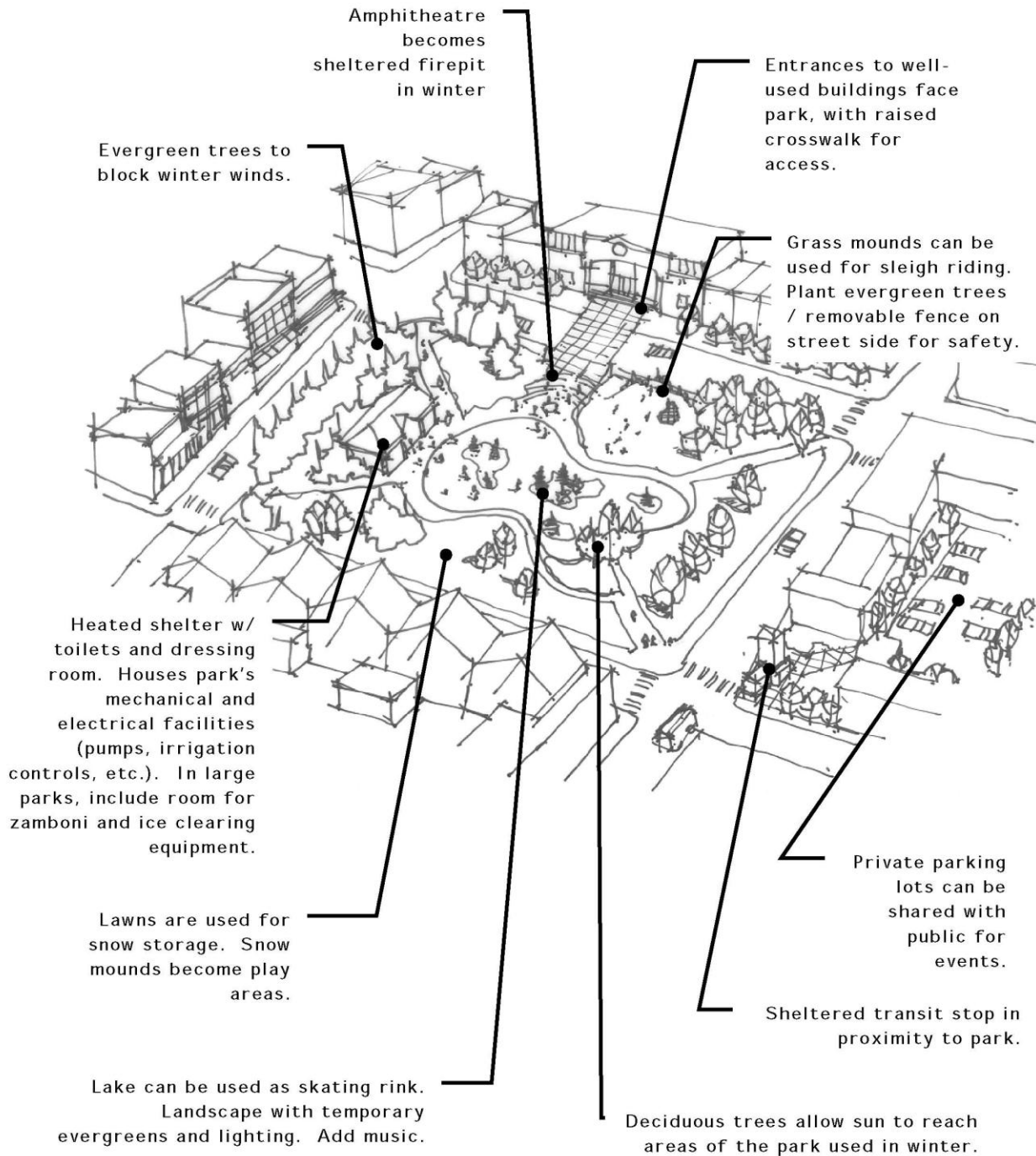
With most cities experiencing a number of months of winter weather in Canada, the built environment should embrace the climate, and streets and public spaces should continue to be vibrant and active throughout the year. Smart Growth has much to offer in creating livable winter cities.

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APPENDIX 1 :

The City of Fort St. John in British Columbia has developed guidelines for designing city areas that are suitable for all seasons. This diagram shows some design ideas that could be considered to ensure a Square can incorporate a variety of uses and amenities for winter use.



Source: City of Fort St. John Winter City Design Guidelines