# Winter Cities

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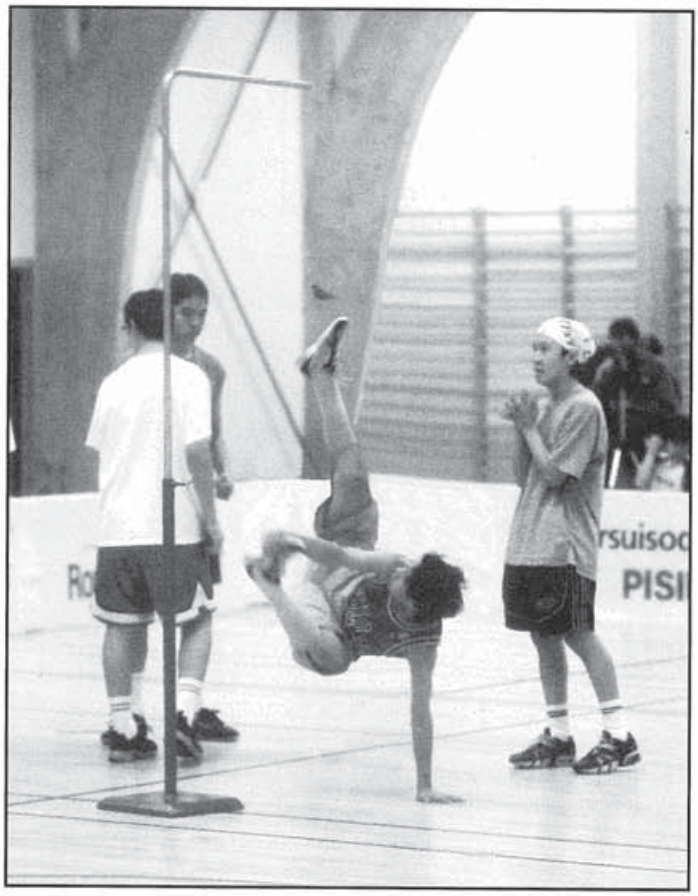

# ARCTIC WINTER GAMES

## 2002

# *President's Message*

A former President of the Liveable Winter Cities Association, the late Harold Hanen, maintained that new insights typically take twenty years to be accepted. They have to go through the stages of awareness, interest, evaluation, trial and then application.

Writing in the mid-nineties, at about the halfway mark for our Association, he felt that the Winter Cities movement had succeeded in introducing a top of the world perspective into the mainstream's consciousness and was embarking on the development, incorporation and evaluation of new northern solutions to northern problems.

When we celebrate the twentieth anniversary of the founding of the Liveable Winter Cities Association in Sault Ste. Marie next year, we will have an opportunity to review the Association's achievements, particularly as a vehicle for sharing information, ideas, research and community-based innovations. Such a review must be undertaken within a global perspective, taking into account the global socio-economic and environmental changes and challenges that are affecting us all but are perhaps felt more keenly in the north. Adversity is certainly helping us develop a shared northern identity.

The themes of recent Forums, both of our own Association and those of the International Association of Mayors of Northern Cities, have focussed on issues of sustainable development. In fact, the Winter Cities Forum 1991, hosted by Sault Ste. Marie, was the first to adopt this theme and to help us understand the dimensions of sustainability thinking.

Since then, we have come to appreciate that sustainable development is a journey, not a destination. This applies as much to an organization as it does to a community. When we meet again in Sault Ste. Marie, it will be interesting to look at some of the milestones on our Association's journey, to gain new insights and develop new pathways for the future. I hope many of you will be joining us. Please mark your calendars now! January 31 - February 3, 2003 for the Winter Cities Forum in Sault Ste Marie. Their web site can be found at: www.wintercities.com

Anne Martin, President

*Cover photo: The Alaskan High Kick starts with the competitor on the floor.*
*With one foot held by the opposite hand the athlete thrusts upward with the free foot while balancing on the free hand.*
*The player must rise from and land on the same side of the body.*

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The Winter Cities Association is dedicated to realizing the potential of all northern communities. Through publishing, networking, organizing conferences, facilitating research and other means, the Association seeks to make available northern solutions to northern problems and to promote awareness of opportunities associated with the winter season.



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# Winter Cities

Volume 21 • Number 3

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*SNOW SCENE--Early risers on Easter morning were treated to a vista freshly blanketed with snow, prompting many Saultites to get some fresh air and exercise. John and Cindy Studens brought their two children Hali and Kala out for a sled ride in Sault Ste. Marie's Bellevue Park, on the banks of the St. Mary's River.*
*(Sault This Week - Paul Norbo)*

# *Winter Cities to Visit "The Sault"*

## *North America's Meeting Place*

by SANDRA PAUL

SAULT STE. MARIE, ONTARIO, CANADA--Dr. Roberta Bondar, Canada's first female astronaut, has often spoken about seeing her home town from space. Picking out Sault Ste. Marie from the space shuttle was not difficult at all, because her winter city is situated at the Hub of the Great Lakes, in the Heart of the North American Continent. And indeed, history shows that for centuries, Sault Ste. Marie has been recognized as a natural meeting place. Aboriginal peoples, for example, gathered by the thousands at Bawating (the meeting place, as the Sault was then known) to negotiate treaties, to barter with one another, to fish for whitefish in the St. Mary's Rapids, hunt and trap game, and to tap the many maple trees for syrup.

Today, Sault Ste. Marie continues its evolution as a meeting place, particularly in the area of transportation. Transportation logistics expert Jack Ross explains that "When Algoma Central Railway sold out to Wisconsin Central Railway, they in turn sold to Canadian National Railway, Sault Ste. Marie got two world-class railways--the Canadian National Railway and the Canadian Pacific. Now, what you have out of Sault Ste. Marie is a single line haul. You can put a railway car on the CN and you can ship it to Mexico City, or Chicago, or New Orleans, or anywhere, single line with a minimum of delay along the way. We've got the Canadian Pacific Railway going eastbound, called the "Huron Central."

Not only has rail transportation evolved, shipping continues as a valuable part of the economy. Algoma Central Corporation has

long been a fixture in the Sault Ste. Marie economy. "From a business point of view, transportation has never been better," Ross says. "I can load a vessel in Sault Ste. Marie and I can ship it to Beijing. You can't do that out of other Northern Ontario centres. The Sault's the only one with a deep water port. You have the requirements here for a salt water ship to come in. There are also tugs and vessel agents available."

Land transportation is also well used, as Sault Ste. Marie is located at the intersection of two of North America's longest, best maintained highways-the American I-75 and the TransCanada. Some of the biggest transport trucks made, ply these highways carrying products to and from the farthest reaches of the continent.

Sault Ste. Marie's current project is air transportation. The local passenger air service, in existence for decades was recently turned over by the federal government to the local authority, which is currently exploring the possibilities connected with air cargo flight, in particular transpolar air cargo. Sault Ste. Marie Mayor John Rowswell says it has been realized that a northern transpolar route would be more direct than traditional east-west flight paths and savings are estimated to be in the order of 10 to 30 per cent. What better place for the winter cities of the world to meet, renew friendships and create new ones? Rowswell, who has years of involvement with Winter Cities, points out that the revolution of electronic communications in recent decades has minimized the downside of being in the North and maximizes the positive aspects.

Economic, social and cultural currents of life can be carried on independent of local constraints, "so that we have the freedom to work and live in a winter city if we want to. Technology and electronic linkages have significantly reduced the importance of physical proximity and now allow companies to network electronically rather than in person. As such, investments in the telecommunications infrastructure of northern communities/winter cities clearly hold the key to transforming our location disadvantage to our advantage." Dr. Joseph Levy of York University in Toronto, Ontario, has been enthusiastic about the value of a northern lifestyle and environment, when he proposed that "people will choose to live in balance with the ecosystem with a lifestyle centered on quality of life." In a speech delivered to the Mayors Conference, International Winter Cities Forum, in Aomori, Japan this year, Rowswell explained, "The sustainability of current settlement patterns is questionable, given the degradation of the environment and quality of life, and the costs of congestion and urban sprawl. Communities like Sault Ste. Marie are more efficient and sustainable (less fuel consumed and less impact on the environment).

A modern communications infrastructure, together with our unique northern landscapes and lifestyles, can position winter cities as attractive and cost-effective alternatives for businesses and their employees seeking to escape congestion, stress and expense of locating in major urban growth areas. Winter cities like Sault Ste. Marie are very well positioned to accommodate further development in information and technology-based business. The unique lifestyle of winter cities translates into a high quality of life, and in turn, a more energetic and productive workforce.

In recent years, the provincial government has recognized how great the environment is in the north and how this beautiful place and its natural resources are treasures that need to be used for the benefit of our communities today, but also protected for future generations. Rowswell said, "One region in Northern Ontario is known as the Great Lakes Heritage Coast. It consists of 2,900 km of pristine coastline that contains 13 municipalities, 18 First Nations and 290,000 residents. The challenge ahead is to balance development and the protection of the wilderness. The communities have come together to develop ways of doing this." Rowswell recalled a meeting in June of 2001, when Sault Ste. Marie hosted a meeting of the International Association of Great Lakes and St. Lawrence River Mayors from both Canada and the United States. The mayors passed a resolution recognizing the value of the resources of the Great Lakes to its communities and called for the development of tourism opportunities through transportation linkages such as trails, waterways and highways. The participants encouraged and endorsed Circle Tours of the Great Lakes, including Lake Superior with all its natural beauty and international significance.

The Winter Cities Forum, to be held in Sault Ste. Marie Jan. 31 to Feb. 3, 2003, will be hosted by Mayor John Rowswell and Ontario Winter Carnival Mascot Mr. Bon Soo.

Themes for discussion will centre on the creation of economic partnerships, quality of life in winter cities, and tourism. Mayor John Rowswell and Mr. Bon Soo await, with eager anticipation, the arrival of the delegates who will be making their way to Sault Ste. Marie, the Meeting Place, this winter.

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*Sandra Paul is the Media Chair of the Planning Committee for Winter Cities Forum 2003. The Forum website is at: www.wintercities.com*

# *Winter Cities*

## *Development and Planning Urban Design Centered Upon Nuuk, Greenland*

by IRVING B. JENSEN, Architect, maa

In recent issues of Winter Cities Magazine there has been a review of the developments in the Winter Cities movement, and selected articles from the last conference in Aomori. The conditions for living in a winter city were described by Norman Pressman and Annie Lüttgen, who concluded that one should live with and accept the special conditions existing in the cold regions, and try to view the negative aspects in a more positive and forward looking way.

The different winter cities have basic differences - size, climatic and political conditions, planning prerequisites, etc., however, there is a common reference point and unifying element - the location on the Northern Cap.

Seen in an historical perspective, efforts have been made through various initiatives to improve life in the winter cities. These have primarily dealt with solving concrete problems such as snow removal, outdoor and indoor climate, etc., economical and environmental conditions. However, a common tool has been lacking for use in planning the towns, a mutual master plan to control city planning.

City planning contains all the elements in a city's development and is unfortunately an area that has not received sufficient attention. This is a general problem, and focus is now being directed on this area, which was evident at the last Winter Cities conferences, where city planning was discussed extensively.

In the following, an example of a comprehensive city planning strategy for Nuuk, Greenland is reviewed. The method was adapted to the special conditions in Nuuk, but can be used by adapting it to the local conditions in the country or regions for other winter cities.

### Development and planning

City development and urban design require a basic creative concept and a controlling geometry. As urban development is a long process and is subject to changing premises, this geometry must allow for changes. It should be general, open and flexible.

All city plans contain a layer of historical geometries, which can be read directly from the urban pattern or from the visions and plans that have influenced the city's development.

The classic geometry

The classic, static and closed geometry is clearly evident in city layouts from the Renaissance and up to the present.

. The modernistic geometry .

Rationalism and modernism's open and static net is characteristic of American planning and city development in Europe during the twentieth century.

The dynamic geometry

An example of a current, open and dynamic geometry could be attractor geometry.

## Urban design

Urban design must be applicable at the intermediate scale, the scale between the individual building and the city. The design of buildings, city quarters and cities takes place at a scale that is similar to that of the terrain and landscape.

A city and urban design cannot be produced one building at a time, or one urban space at a time, the scale is too large for this.

Therefore, Urban design must utilize large abstract volumes that represent building schemes, neighborhoods or entire cities, such as in the form of architectonics. At an intermediate scale, the building masses and terrain glide together as a total morphology. The city and the landscape can be folded together as a total cultural landscape. In areas where the landscape is weak, as in Denmark, the building masses become the dominant masses in the urban landscape. Where the landscape is strong, the terrain becomes the dominant urban landscape.

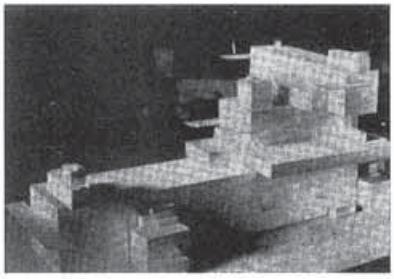
## Is it at all possible to adhere to one plan?

An answer to this question might be flexibility, in planning as well as in construction. However, it should be emphasized that total openness as well as total freedom is futile and unserviceable. A balance should be achieved, between freedom and order, openness and steerability, interpretation and comprehensibility, between process and expression. In other words: a balance between a general and a meaningful geometry.

The terms "general" and "generality" when used here refer to a simplified, yet defined shape, to be used in various ways, and one that will accept changes.

One method of city planning to answer to the need for generality is the manipulation of volumes, "architectonics," on a grand scale, as a first stage.

Architectonics may be defined as "non-function architecture" or "architectural volumina." Historically this is derived from the functionalism of the early twenties, when volumina were freely used as a sort of abstract architecture somewhere between geometrical forms and "real houses."



K. Malewitsch, Arkitekton Alpha, 1923

These architectonics were in no way random forms, but rather deliberate compositions.

Reversed, this method may be used analytically, as architectonics, the city's toy blocks as it were, may represent a structural picture of basic architectural differences and similarities.

Architectonics

Architectonics - Composition

To convert these architectonics into city architecture, they must be given a social, a cultural and an economic significance.

City planning problems in arctic surroundings often seem to be merely extreme variations of the general approach to these same problems. This implies that arctic city planning has many parallels to city planning in general.

## Greenland
## A modern arctic society

Greenland suffers from an extreme discrepancy between its actual reality and other nations' preconceived ideas. This is understandable as Greenland has changed from a closed, traditional fishing and hunting community, to a modern liberal nation open to visitors from the outside world. Greenland is the largest island in the world. Its length equals the distance from Stockholm to the Sahara, and the diversity of the landscape ranges from North Greenland mountain tundra to the lush hillsides of South Greenland.

The population totals a mere 56,000 yet the immense distances are spanned by a strong cultural fellowship and a very pronounced national awareness.

Though exposed to powerful influences from the surrounding world, the Greenlandic identity and the language, an Eskimo dialect related to other Circumpolar languages, are stronger today than ever before.

Introduced in 1979, the Greenland Home Rule Government is now almost fully developed as a well-functioning, independent unity within the Danish Realm. In very few years the political responsibility for development of Greenland has been transferred from Copenhagen to Nuuk and further out to the local communities.

Today Greenland is a modern democracy, but recent developments are still firmly rooted in ancient traditions. The residents of Greenland's sixty settlements live mainly by sustenance hunting and fishing in close communion with nature. The traditional Inuit harvest of whale meat, caribou, fowl and fish is sold in every Greenland town at "Brædtet," the open-air Market, where hunters and fishermen earn their living. Dogsleds and 29,000 sled dogs are still the most vital means of transportation for many people, and when traveling from their settlements to town or from one settlement to another, the locals often use dinghies or small motor boats.

To visitors from abroad, Greenland is more than just another holiday. It is a different kind of destination, offering the unique experience of magnificent Arctic nature and a modern society based on traditional values.

## Nuuk: A growing Arctic capital

In Nuuk, the capital of Greenland, the townscape reflects the rapid development of recent years. Many returning visitors are almost unable to recognize the town. Colorful modern dwellings have mushroomed on open hills and former plains with cotton-grass in bloom.

Architecturally, Nuuk presents a variety of styles including beautiful traditional wooden houses, sophisticated modern buildings, gaily colored row houses, bungalows, large apartment houses and densely built-up areas in the town center.

Nuuk means "the promontory," and the town is located on a peninsula intersected by several low mountain ridges. When missionary Hans Egede founded the "Godthaab Colony" in 1728, all buildings, including Our Savior's Church, Hans Egede's House and what is now the Greenland National Museum, were clustered round the Colonial harbor.

Protected by preservation regulations issued by the Greenland Parliament and the Municipality of Nuuk, this part of town still retains the quaint atmosphere of a bygone era.

Since the 1960's, when modern development gained momentum, the entire promontory has gradually been built over. Development soon created the need for a modern traffic and fishing port. Nuuk established a wharf for the big transatlantic vessels, on the other side of the promontory and a direct road from the old Colonial Harbor to the new industrial harbor. "Skibshavnsvej," as the new road was named, makes an oblique intersection through Nuuk's street pattern just as Broadway cuts diagonally through New York's rectangular grid system. Today Skibshavnsvej is Nuuk's main street and partly reserved for pedestrians.

Nuuk has had to come to terms with growing pains in the wake of the introduction of Home Rule. Today many government services and institutions such as the Landsting (Parliament), the Greenland High Court of Justice, the Central Hospital, the National Library and the National Museum are located in Nuuk. A number of educational establishments make it the prime educational town in Greenland, host to large numbers of young people coming in from all parts of the country to pursue their studies.

Nuuk is Greenland's administrative and political center, and the location of the bank headquarters, travel agencies and industrial companies along with restaurants and a variety of shops and department stores.

All these activities attract a great many people, and today the city has spread far beyond the old town center. Nuuk is now Greenland's largest town, home to some 14,000 people, one fourth of Greenland's total population.

In Nuuk, one is close to nature. The azure fiord - with occasional icebergs and whales at play - and the huge massifs with luring snow-capped summits are visible from all parts of town. A few minutes' walk will take you away from the busy town hub, out into the wide-open spaces of the grand nature surrounding Nuuk.

## Development and planning

Urban building and planning in arctic regions are based on the following main elements:

- The location of the country or region in the north cap, economic and political conditions,

- The town's urban character and climatic conditions, development trends, landscape, building orientation.

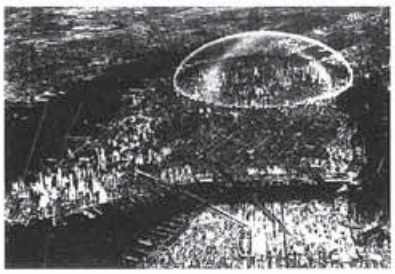
Nuuk - Development geometry

Nuuk is located in an area with an annual snowfall of 4.5 meters, an average temperature of 7 degrees C

in July and -8 degrees C in January. Nuuk Municipality covers an area twice that of Denmark.

After the second world war, development projects were carried out in Greenland to bring it into the modern era. Concrete apartment houses were built in the 1960's and 1970's, followed by dense/low-rise housing in the next two decades. Nuuk will now incorporate new land for future urban development.

During the 1980's, the planners in Nuuk carried out a survey among the local population with one basic question: How did they feel about a covered city? The answer was, that this was something they could not imagine. When one lives in a winter city, one must adapt to the conditions - if it is cold and windy, one should dress for these conditions - live with nature and not in opposition to it.



Fuller - Manhattan

A strategy that emphasizes the following conditions will be employed:

- Folding town into terrain as a comprehensive urban morphology,
- Using different types of volumes as elements in shaping the urban space,
- Expanding in less concentrated, delimited, and folded units in close contact with Nuuk center,
- Folding the city, water and harbor together,
- Local history and mythology,
- Climate, wind and sun.

When the comprehensive city plan is determined, the following question arises: How does one continue and create "the ideal city"?

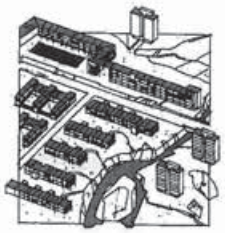
Just as mentioned earlier where architectonics were employed, design manuals had to be produced that addressed the following conditions:

- Local knowledge
- Test models
- Examination and analysis of the landscape, vegetation and buildings
- Climatic data
- Sun, cloud covering, precipitation, temperatures
- Wind flows combined with sun, precipitation and temperatures
- Seasonal and 24-hour variations
- The plan's limiting traffic conditions, parking, walks and bicycle paths, public and private playgrounds and recreational areas
- Sun and shadow
- Snow depots, snow removal plans, drainage plans, turbulence, etc.
- Areas with snow drift problems
- Visibility conditions
- Preserving or supplementing the landscaping
- New landscaping/shelter
- Interplay with the landscape, vegetation and buildings to improve climatic conditions
- Outdoor conditions, life between the buildings.

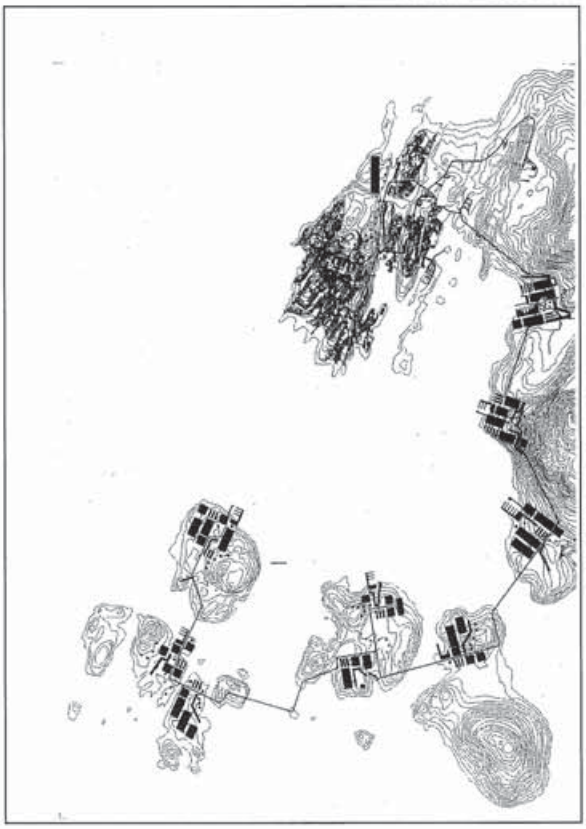
## Network

It is of utmost importance to establish a survey of arctic city planning around the Northern Hemisphere, and of interrelated problems. On this level, a network and a forum as a planning instrument should be created.

Perspective



Nuuk - Site Plan



Nuuk - Qinngorput
Morphology
Architectonics and landscape

*Irving B. Jensen is an architect in Copenhagen, Denmark. His research project "Arctic Urban Design" is financed by the Danish Research Council.*

## Greenland

| | |
|---|---|
| Total | 2,166,860 km2 |
| Ice-free | 410,449 km2 |
| North-south | 2,670 km |
| East-west | 1,050 km |
| Coastline | 39,000 km |
| Gunnbjørn mountain | 3,733 m |
| Population (2002) | 56,542 |

## Nuuk

| | |
|---|---|
| Latitude | 64° 10'N, 51° 44'W |
| Total | 87,000 km2 |
| Ice-free | 17,400 km2 |
| Population (2002) | 14,259 |

# *Visit to Evenkiya in the* *Siberian Federal District*

by GEORGE PAUL

Representatives of the University of Northern British Columbia, the Canadian Institute of Resources Law, and the City of Prince George traveled to Central Siberia in March of this year as part of a Canadian mission to explore possible directions in encouraging and coordinating Canadian technical assistance to the Siberian Federal District. The type of assistance desired involved advancing the economic interests of people in the District while balancing the need to protect both the physical environment and the traditional ways of life of the aboriginal people living in the region.

*Gary Wilson, Greg Poelzer of UNBC and George Paul representing the City of Prince George adjacent to the Cultural Centre in Tura.*

One of the main components for this initiative involved training of officials on appropriate local government practices. Participants in the mission were Owen Saunders and Janet Keeping of the Canadian Institute of Resources Law, which is based at the University of Calgary, and Jonathan Murphy, Senior Lecturer in Public Administration at the Kazakhstan Institute of Management in Kazakhstan who is a consultant on the development of civil society. The British Columbia participants included Prince George City Manager George Paul and Political Science Professors Greg Poelzer and Gary Wilson from the University of Northern British Columbia. The UNBC and City representatives were invited because of their expertise in local government, northern governance, and relevant educational programming.

The group visited Evenkiya, a region that is approximately three-quarters of a million square kilometres. Evenkiya is an Autonomous Okrug (District) within the Krasnoyarsk Territory of Siberia. There are currently about 26,000 inhabitants in the District. This vast but sparsely populated territory was established in 1930. The majority of the inhabitants are Russian settlers, the first nation Evenki are the minority. The capital city is Tura, a community of 6,000 people. Evenkiya is currently one of the poorest regions in the Russian north, although it sits on oil and natural gas reserves that one day might bring prosperity to the area. Evenkiya is undergoing local government reforms as part of an effort to restructure the regional and local political institutions and kick start a stagnating economy. Undertaking these reforms requires the assistance of specialists from outside of the country, and Canadian expertise is especially helpful, given our similarities in economic, cultural and climatic conditions. The representatives were invited by Governor Boris Zolotarev and financially supported by the Circumpolar Liaison Directorate of the Canadian Department of Indian and Northern Development. The potential for oil and gas development in the next 5-10 years and its effect on the economy, social structure, and environment is substantial. As a result, the Russian local government leaders need administrative and political tools to deal with the opportunities and challenges.

Since perestroika, the reforms initiated by Mikhail Gorbachev, the economic and political challenges have been overwhelming. The post-war decades have left behind a whole generation of people who do not possess the knowledge needed for key economic activities such as reindeer herding. As a result, during the 1990s, the domestic reindeer herds fell to ten percent of their previous numbers, after subsidization and state operation of this

activity was discontinued.

The participants viewed this first mission to Evenkiya as an opportunity to build partnerships for future activities and to carefully examine the possible fit between the expertise of the Canadian group and the needs of people in the Evenkiya Autonomous Okrug. The Canadian delegation met with representatives of a broad range of Federal, District and Local Officials from various organizations ranging from the Federal Ministry of Natural Resources, Aboriginal representatives, College officials, and Local Government, to name only a few.

With respect to the British Columbia representatives on this mission, the particular area of interest involves joint cooperation with local government officials that will lead to education in political leadership, organization and economic development skills. UNBC has developed expertise in local government that is a combination of academic knowledge and practical experience. The coursework developed for Russian government officials will be similar to UNBC's certification program for municipal officers, which has been developed over the last few years and has been well received by practitioners in northern British Columbia.

Overall, the mission was successful in that much information and many opinions on the current problems and challenges facing the Okrug were obtained. The challenges facing the Okrug and the potential for future development are significant. While the investigation and identification of the needs of Evenkiya are not entirely complete, the potential for assistance to, and exchange of information with Evenkiya are substantial.

For me, what is most exciting about this initiative is that a northern land mass, which covers more than 150 degrees of the globe is now much more accessible to the Western world. The Russian Government is reaching out to develop strong relationships and share information and expertise with Europe and North America. This can only be a positive development for winter cities and northern communities in general.

I hope to be able to provide readers with a more comprehensive report on our mission's ultimate success once our work with the Siberian Federal District is complete.

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*George Paul is the City Manager, City of Prince George. He is also the treasurer of The Winter Cities Association.*

*The government centre in Tura, the capital of Evenkiya.*

# *Planning for Climate-Related Adaptations in Northern Building Complexes*

by MICHAEL L. BARTON, Dipl. Arch., M.A.

In the January 2001 issue of Canadian Architect, right next to the "Masthead", was an editorial piece on the Intergovernmental Panel on Climate Change (IPCC). The editorial mentioned some of the things that we are all now becoming familiar with. These are, for example, the gradual increase in global temperatures, ice caps melting, C02 emissions, and so on. Certainly, the most disturbing aspect was the fact that Canada is more interested in negotiating itself out of meeting reduction commitments, rather than being a leader in this kind of strategy.

The editorial finished by suggesting that it was the Architect's responsibility to convince building owners of the need for sustainable design. Since this term came into popular usage, it has been mostly to do with the use of appropriate (or "green") materials. This means non-toxic, indigenous, user-friendly and recyclable.

But the other aspect of this equation is planning and designing for micro-climate conditions.

## Northern Design Background

Briefly, it is possible to talk about

*Energy building - Whitehorse. Received National award for energy efficiency.*

"ethnographic" forms that have almost become icons. These are indigenous shelters such as the Tepee, the Thule shelter and, of course, the Igloo. The entrances to these structures were all weather-protective. The Thule shelters had openings facing the sun with their backs against the winter winds. Two or three thousand years later, this elementary design principle is missing in many recently built sub-divisions.

More recently, the Klondike style appeared, an Edwardian genre imported into North America about 150 years ago that is completely inappropriate for the North. Then various military type buildings appeared, especially in the Yukon during WW2 and the 1950's. Finally, during the last few years, we have turned our attention to energy-efficient buildings. Some of these forms are appropriate in the North.

## Shapes and Forms

In terms of surface to volume ratio, the sphere is the best form. It has the greatest volume for the least amount of surface area. The hemisphere is next best. Both of these forms have been developed as prototype structures in the North by architects and engineers. So, the military style Quonset building, mentioned above, is a good runner up!

A curved form is also very good at deflecting winds and blowing snow. Some examples of this can be seen in the North and the far North, in Nanisivik on Baffin Island, for example. The shape of the building, as well as the clustering of separate forms, can be deterministic in dealing with weather conditions. This has been termed air and snow transfer dynamics. The study of microclimate conditions is used to determine the best form and orientation of the building or complex.

The study of sun paths is another critical factor in the North. Heliomorphic form generation is the utilization of diurnal and annual sun path criteria for a given latitude. If a building is located at the base of a

hill at 60 degrees north, the sun's winter arc behind the hill will keep it in shadow for two or three months. This has a direct effect on the heating bill.

## Architectural and Planning Design Guidelines

In recent years, various types of these guidelines have appeared. In the Yukon, the writer was responsible for putting such guidelines together. Other jurisdictions and organizations have produced similar publications. They are viewed as being Climate sensitive or adaptive.

As mentioned earlier, many buildings in the North are essentially southern type designs that have been erected with little or no attention to location or site specifics. All of us have seen entire complexes and residential sub-divisions like this throughout the North. There almost seems to have to be about a ten year gap between the production of this kind of document (that is, Design Guidelines) and really decisive action. Well, the ten years are nearly up!

When Architects and Planners are able to take the time, they collect "Design-Relevant Information" during the design incubation period for any given project. If it is a Children's Hospital, for example, they should be studying sick children, behavioural characteristics, ergonomics, and anthropometrics, as well as all the technical criteria. If we are planning a public building in Dawson City in the Yukon, what site specific criteria is there to note? Let's see:

A huge annual temperature range for a start (it could be as much as 85 degrees Celsius).

A diurnal temperature range that might be as much as 30 degrees.

The winter sun arc is almost non-existent and is behind the hills, even in March.

Conversely, during the summer months, the sun is high and barely sets, causing many buildings to overheat.

There can be sudden summer thunderstorms, with a large amount of rain falling in a few hours causing flash floods.

Added to all this is the fact that Dawson is on an alluvial flood plain.

But don't go looking for state of the art solutions in Dawson as it is a town of architectural heritage, what we call the "Klondike" vernacular. It is a style that has its roots in the more southern climes of Europe and the USA.

## Adaptive Planning and Design

It is interesting to note that the Romans, when they extended their Empire to the British Isles, adapted their architecture and infrastructure. The roads they built across the land are still there, and they still drain better than a lot of the modern ones. There are aqueducts that are still being used by boats on the inland canals; the heating and plumbing systems they utilized for their building complexes are still functioning; but most importantly, the Romans studied local climate conditions and adapted accordingly. Large outer walls gave protection from the winter winds and open courtyards allowed the sun to enter during the spring and early summer. Their building sites were always superbly drained. Much of the British fastidiousness with site criteria was learned from the Romans!

For communities in the circumpolar north, the following local climatic considerations should be factored in at the design stage:

- Air temperature and movement (and relative humidity)
- Diurnal and annual sun-path criteria
- Heating/cooling degree days
- Precipitation characteristics
- Soil temperature (including permafrost presence)
- Winter prevailing winds
- Snow loading information and freeze-thaw cycles
- Potential for material corrosion or breakdown
- Frequency of environmental hazards

It is the last named that is now focussing our attention. Wind storms, rain and flooding, melting and un-seasonal warming. All of this has been happening recently. Some of the design adaptability we have been used to providing in the north will definitely help.

We can include Heliomorphic design. This is the use of sun-path and altitude knowledge, at any given latitude, as a design determinant.

Also, for site adaptation, the use of berms or planting (in lower latitudes) can be used to deflect wind and snow drifting. The proper orientation of the building or complex not only affects heating and cooling characteristics, it may also determine where the most snow is dumped. There may have to be a choice made as to which one is the most important. In places like Baker Lake and Iqaluit, prevailing wind is

the one to choose.

We are used to the idea of elevated buildings on piles in the far north. This is done in permafrost conditions. It is also a strategy where wind is a big factor, in conjunction with careful use of materials and detailing on the windward side. This may well prove to be a strategy for flooding as well. A proposed new Air Terminal Building in Old Crow is being designed in this manner, not only for reasons of permafrost but also for the fifty year flooding potential. (Perhaps in the year 2050 this will have become a ten year phenomenon)

## Summary and Recommendations

There is much more that could be said but this is a short paper. There are plenty of architectural and engineering details that definitely help us in the quest to provide good, long lasting buildings, but this is not the place to delve into these. The most important thing is to be receptive and to pay attention.

The main topic at the Winter Cities Forum 2001 in Quebec City was Climate Change. It is happening and faster than we had previously thought. It is happening because of Human Interference. The leading climate scientists in the world have told us this. Other people at the Winter Cities Forum told us the same thing and provided the latest statistics. It is scary stuff! But each one of us can help in some fashion.

Those of us in my profession should be doing what we can to get the word out. Plan for flexible, adaptive buildings that reflect the local environmental situation. Network with other specialists. Check the long- range forecasts. Listen to what local people say about a site location. Fifty years ago Frank Lloyd Wright said, "The site determines the form". This was before we knew anything about climate change. Today, this message is more important than ever.

*Michael Barton is Consultant Architect, Energy Solutions Centre, Yukon Development Corporation. This article is based on the paper he presented at the International Conference on Climate Change in the Circumpolar North held at Yukon College, Whitehorse, Yukon in March 2001. Michael is the vice-President of the Liveable Winter Cities Association.*

*Beringia Centre, Whitehorse. Energy efficient building and winner of the Governor General's Award for Architecture in 1997.*

*Klondike Style*

# *International Snow Management Initiative*

by GEORGE PAUL

*One of hundreds of in-ground snow melting systems in Sapporo Japan.*

The International Association of Mayors of Northern Cities (IAMNC) is an organization that circles the globe. While the Association's secretariat is located in Sapporo Japan, every two years the Association meets in a different location around the world. The purpose of the Mayors' Conference is to provide a forum in which urban leaders can meet to share ideas and experiences concerning winter cities.

From time to time the IAMNC incorporates subcommittees to analyze in detail a specific subject of interest to winter cities. During the Year 2000 conference, held in Lulea and Kiruna Sweden, Prince George was designated as the City to host the "Snow Management Subcommittee". The normal practice for subcommittees is to undertake research during a four-year period and reports back to the IAMNC on an interim basis two years after formation before the final report. The Snow Management Subcommittee will be reporting to the Mayor's conference in Anchorage Alaska in 2004.

The mandate of this particular subcommittee is to establish a 'best practices' manual of snow and ice management options that may be utilized and implemented by IAMNC member Cities. It would be expected that the options to be used by individual communities would depend on the services to be delivered, the conditions anticipated or encountered, and the resources available to each community.

It is the goal of the subcommittee to recommend 'best practices' or policies that are sustainable; optimize use of resources; and ultimately contribute to improving the quality of life for residents. In developing these 'best practices' the subcommittee intends to also provide information that will give snow management decision makers access to resources such as publications and particular expertise that may be resident with the staff in some of our member Cities. We hope to be able to develop a library of information that can be shared through the IAMNC Web Page. We also intend to encourage exchange of staff between Cities so that both our managers and operators can develop some first hand familiarity with the snow management practices in other cities. Some side benefits to these types of exchanges will include an appreciation for the cultural differences between our cities as well as the different ways of approaching operational challenges. I have personally benefited from the relationships I have developed with local government officials from around the world. While the challenges vary, and our ways of meeting those challenges can be different, the hospitality and kindness extended to me has been, without exception, overwhelming.

Some of the issues that the subcommittee will be analyzing include the degree to which partnerships with individuals, community groups, business, contractors and consultants are sought by different jurisdictions. Technology is a large issue in snow and ice management. The subcommittee will be documenting the awareness of technological resources, the degree to which cities are optimizing existing technology and how cities and private firms are developing new technology.

Training will be another impor-

tant issue for the study. Which staff is trained, what instruction they are provided and how they are trained needs to be analyzed. Another important issue concerns the environment. How sensitive our snow and ice management policies are to sustaining and improving upon the condition of the environment and how aware we are of the ramifications of our activities on our natural environment will be reviewed by the subcommittee.

The needs of special sectors of our population will be reviewed. Winter challenges to the disabled community must be considered if we are to improve their quality of winter life. Because of dramatic shifts in demographic trends, we must give greater consideration to the needs of the elderly as well as the needs of children and students.

The challenges facing the subcommittee are significant. The twelve-subcommittee member cities circle the globe. They are located in Canada, Japan, China, Denmark, Korea, Mongolia and Sweden. The language barrier alone is a formidable challenge. To date the subcommittee has met in Prince George and Quebec City, Canada, and in Aomori and Sapporo, Japan. As well, considerable electronic communication has occurred. During the winter of 2001-2, representatives from Lulea and Kiruna Sweden traveled to Marquette Michigan, USA and then to Prince George to experience first hand, the snow management practices of these two Cities. The subcommittee is currently surveying many cities around the globe to gather information on their snow and ice management practices. As well, cities are being asked whether they wish to participate in an exchange of staff resources. During the winter of 2002-3 it is expected that a number of exchanges will take place. The reports resulting from these exchanges will be further grist for our information mill.

There is a great deal to learn from each other. Snow and ice management practices vary greatly from city to city and especially from country to country. We hope that the work done by the subcommittee will greatly assist the IAMNC in providing value to its membership. Once the final report of the subcommittee has been tabled with the IAMNC, I would like to share the subcommittee's findings and recommendations with the Winter Cities Association. I hope that this process will add value to our efforts to improve the quality of life in winter communities while bringing international winter communities closer together in friendship.

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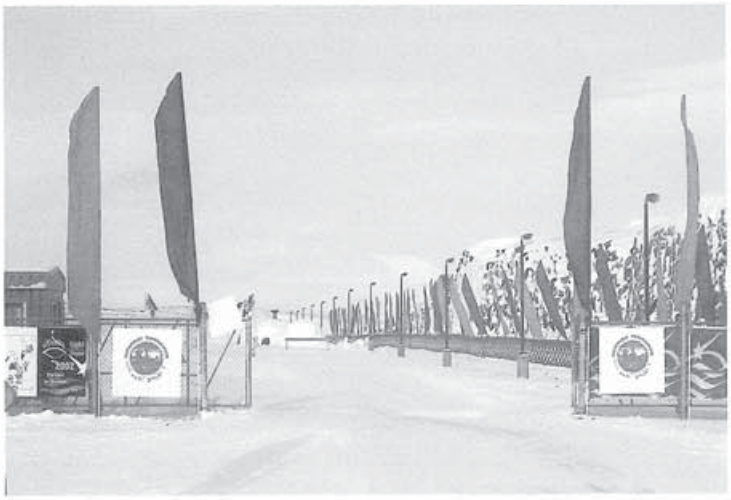
*George Paul is the City Manager, City of Prince George, British Columbia. He is also the Treasurer of The Winter Cities Association and Chair, Snow Management Sub-Committee IAMNC.*

*Sapporo Japan introduces snow into treated wastewater, which because of its heat, rapidly melts the snow.*

# *Arctic Winter Games*

by ANNE MARTIN

For the seventeenth time in the past thirty-two years, the 2002 Arctic Winter Games were held last March. The Games were co-hosted by Iqaluit, the capital of Nunavut, and Nuuk, Greenland. Although the games were jointly hosted by Hay River/Pine Point in 1978, this year's games were the first to be shared internationally.



*Entrance Gate - Arctic Winter Games 2002 (Cheri Kemp-Kinnear, Iqaluit)*

The idea of bringing together athletes from across the circumpolar north on a regular basis is attributed to Yukon Commissioner James Smith and Northwest Territories Commissioner Stuart Hodgson. They had watched athletes from their two jurisdictions compete, with little success, in the 1967 Canada Winter Games. The two commissioners felt something must be done to help northern athletes overcome the challenges of limited sports facilities and opportunities. They asked Governor Walter Hickel of Alaska for his support and the Arctic Winter Games were launched in 1970, hosted by Yellowknife.

The 1970 games were a great success. The event was opened by the Canadian Prime Minister of the day, Pierre Elliott Trudeau and over five hundred athletes, from the Yukon, the Northwest Territories and Alaska, came together to compete. Since then, the Games have more than doubled in size and this year included contestants from two Russian Provinces, Chukotka and Magadan, Alaska, Greenland, Northern Alberta, Northwest territories, Nunavik (Arctic Quebec), Nunavut and the Yukon.

The Arctic Winter Games are defined not only by medal counts and individual successes but also by the ideals of teamwork and sportsmanship. The Hodgson Trophy, donated by Stuart Hodgson in 1978, is awarded to the contingent showing the best overall sportsmanship during the event. The Trophy, a piece of Inuit art, was won this year by Team Greenland. Individual winning athletes receive medals designed in the shape of an ulu. This is the Woman's Knife, indigenous to the Arctic, with a handle and semicircular blade. The medals are made from a copper/nickel alloy coloured gold, silver and bronze.

The sports events this year included basketball, curling, dog sledding, gymnastics, hockey, wrestling, alpine and cross-country skiing. Also included were the premier Arctic sports, the Inuit Games and the Dene Games, such as the kneel jump, the head pull and the knuckle jump. A cultural program brought together musicians, artists, dancers and throat singers from circumpolar areas, displays of arts and crafts and a fashion show that demonstrated the skills of Arctic designers.

The success of the Arctic Games depends on volunteer effort, from the International Arctic Winter Games Committee that selects the host community and provides it with support, to the local organizing committee and the people helping out during the actual week of the Games. Government and corporate donations help finance the Games.

The next Arctic Winter Games will be hosted by the Municipality of Wood Buffalo (Fort McMurray) in Northern Alberta, February 29 - March 6, 2004.

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*Anne Martin is the President of The Winter Cities Association and lives in Prince George, British Columbia, Canada.*