

Figure 1. Nakasuk School, Iqaluit, NWT (1976), Fibreglass clad exterior.

Is There a Northern Architecture?

by Stephen Barr

Canadians are a northern people and despite the fact that the vast majority of our population lives within short distance of the American border, we perceive our national identity as more closely related to the great bulk of our country to the north. While architecture in southern Canada is derivative of a larger North American approach to design, Canada is indeed unique in having such a significant proportion of its land mass in true Arctic areas.

The question this article poses is whether there is in fact a concept of planning and design for northern architecture that can be discerned as unique.

My opinion is that there is indeed a distinctive approach to architectural design in the Canadian North that has developed primarily from the strict logistical, climatic and political constraints of our Arctic regions. As these constraints are unique to the northern situation so are the appropriate architectural solutions.

Prior to 1967, the federal government had controlled the Northwest Territories from the capital in Ottawa. Federal Public Works, who was the generator of the vast majority of public projects in the North during this time, had been approaching design in the Northwest Territories as a continuation of its work throughout rural and northern areas of the provinces. No distinctive philosophy had been developed for work in the sub-Arctic and Arctic areas.

Once the administration of the Northwest Territories transferred from Ottawa to a new capital in Yellowknife, the responsibility for the design of all government buildings (in effect the majority of the buildings in the north) fell from the federal government to the new Territorial Government Department of Public Works.

A new group of designers and builders were faced, in the early 1970s with the situation of a virtual blank slate upon which to begin an aggressive building program for native and non-native communities. These were exciting times and great efforts were made by government architects and private consultants to determine both a style and technology of construction that was at once unique and suitable to the Northwest Ter-

ritories. In developing these techniques there were few precedents to fall back upon. At that time, few of the other Arctic countries had conditions that were similar to those in Arctic Canada. The Americans virtually ignored Alaska as a distinct entity with respect to architecture and Scandinavians dealt primarily with a sub-Arctic environment. The area of the world with the most similar conditions, Siberia, had such a radically different political and logistical set of requirements that its applicability to Canada was very limited.

As with any radical program establishing the limits of design, there was an inevitable tendency towards polar extremes. Perhaps most interesting were the two distinct approaches to design that developed concurrently. These can be divided into two philosophical camps which I characterize as "high tech" and "grass roots."

High Tech

The "high tech" solutions relate predominately to the development of major public facilities. This scale of building would often allow the involvement of high profile architects from southern Canada and other countries. The philosophy behind these "high tech" solutions often seemed based upon the assumption that the Arctic is so unlike any other building situation and the requirements for construction are so unique that none of the physical solutions available in the south could be used. Design solutions had to be totally unique in planning, building form and physical construction.

The fibreglass clad schools in Iqaluit, the fibreglass clad mushroom in Igloolik and the prefabricated metal clad in Spence Bay school, are examples of the "high tech" solution.

While there was a certain clarity to this philosophy, the difficulty was that it presupposed radically different and costly technological solutions. It has become evident that the last place in the world one should carry out research on state of the art building technology is in the north. There was a presumption that technology which has not been successfully carried out in southern Canada where access to contractors, suppliers,

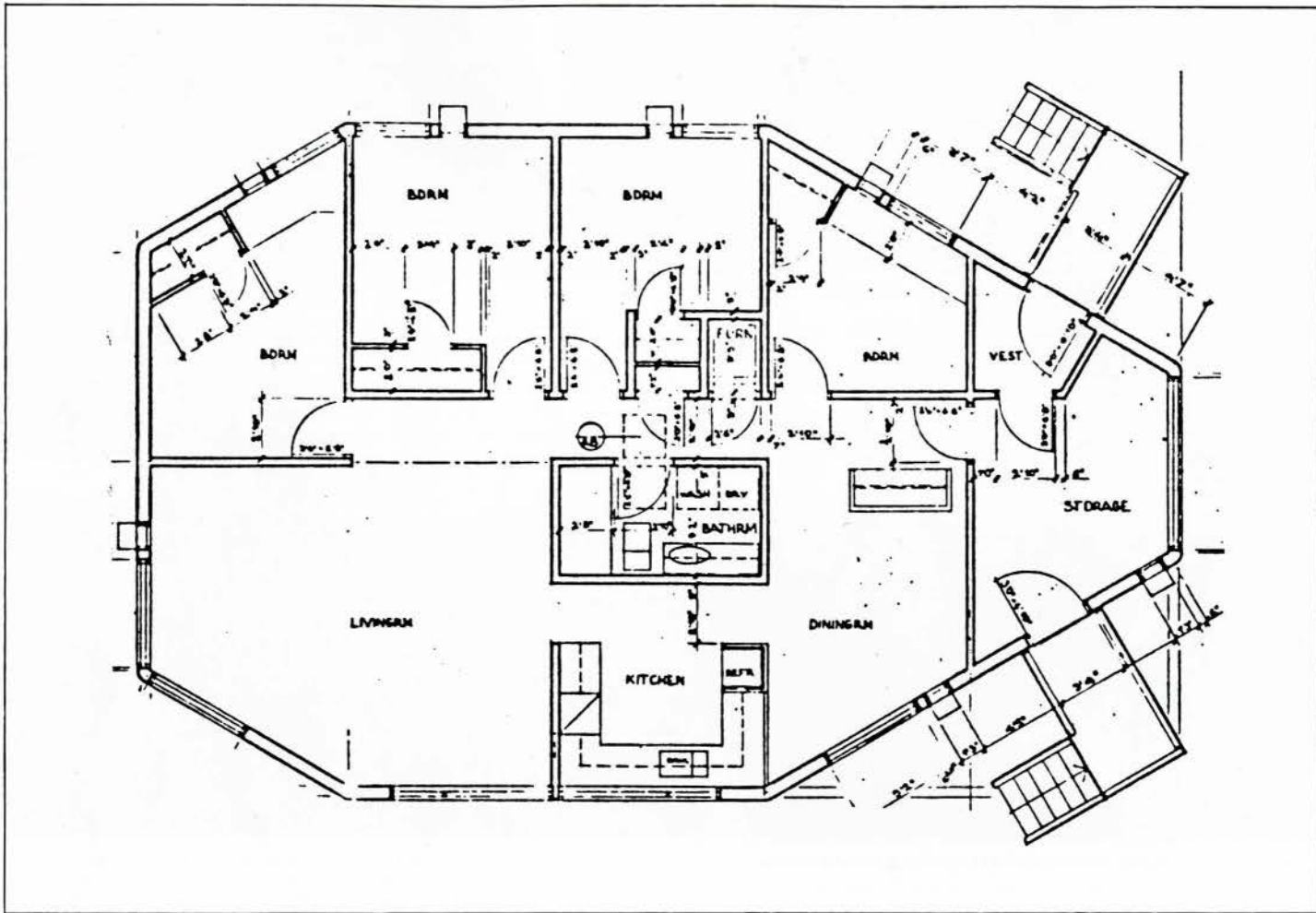


Figure 2. One Storey House, Resolute Bay, NWT (Unbuilt).

labourers, et al, is much greater, could somehow be developed in an environment where the logistical problems were magnified many times. This proved extraordinarily incorrect.

From a technical point of view, the buildings tended to fail because they do not take into account the difficulty of construction in the north. The ability to make on site revisions was decreased owing to the sophistication of the design. Results ranged from overly costly construction through to complete cancellation of entire projects.

The greater failure of the pristine "high tech" solutions related to the clash of cultures between these major public facilities and the populations they served. The sub-Arctic and Arctic areas of Canada are typified by native communities with small populations. Housing and other community facilities tended to be small scale wood frame buildings. The impact of a major public building such as a school or community hall, which was distinct from its environment, had a tremendous social impact on the community. The sophistication of the designs made them inaccessible to the native populations. Building materials and forms not of their place developed a very strong sense of disassociation, of "us" and "them." Little local labour was possible as the techniques of construction were alien to all but the most skilled workers from southern Canada.

Eventually the enthusiasm for this "airborne" form of architecture waned as the technical problems became more costly and the adverse political reaction from the local communities became more vocal.

Grass Roots

At the same time a group of designers were endeavouring to use the lessons to be learned from the indigenous populations as the basis for design. They derived form and function from anthropological data and assumptions based on early forms of buildings (primarily dwellings) built by the indigenous peoples. This philosophy presumed that since the natives lived in harmony with Arctic conditions, their buildings would also be optimal for Arctic living conditions.

At its best, this approach was sensitive to local conditions and produced buildings of a scale and material that were consistent with the existing community. At its most radical extreme, there were misassump-

tions with respect to the principles of indigenous design as opposed to the built forms themselves. The early 1970s were littered with housing and other small buildings where dome shapes (mirroring the igloo), and conical shapes (the tent) were used repetitively. The obvious premise was that if it worked for the indigenous population it must have essential merit in new situations.

This philosophy incorrectly assumed that the original forms were derived as a matter of choice. On the contrary, the native populations were pragmatic users of the only materials that were available to them and the circumstances under which they would be built. The lack of building materials and a nomadic life style led to a desire for low weight materials and easily constructed dwellings. For example, the snowhouse is a dome shape, not because domes have any greater inherent value as a building form, but because this is the most efficient way that snow can be made to stand up.

The difficulty with trying to take indigenous forms without their pragmatic philosophy, is a tendency to build structures reflecting such forms out of different materials to fit different circumstances. The classic example is building a domed form out of wood framing. The inability to properly enclose a space and keep the environment out led to a number of notable building failures.

Towards a Unique Northern Approach

While the extreme positions of both "high tech" and "grass roots" design led to disappointment, these experiments in architecture acted as catalysts for the development of a body of work that remains unique to the Canadian North. Perhaps the most important factor in establishing the distinctive northern approach to architecture is the political and professional maturity of this region. There is now a body of professional designers who are comfortable with their environment and understand the Arctic conditions as the successful basis for design.

What is it then that distinguishes an approach to architecture that is appropriate to the Canadian North? Perhaps this approach would best be described by the word pragmatism. Tight and well constructed buildings strive to work in harmony with the local climate and circumstances.



Figure 3. Homan School, Holman, NWT (1984). Exterior showing streamlined roof form and articulation of insulation of eave structure and snow control covers on ventilation panels.



Figure 4. Holman School, Holman, NWT (1984). Interior of main communal area leading to program spaces.

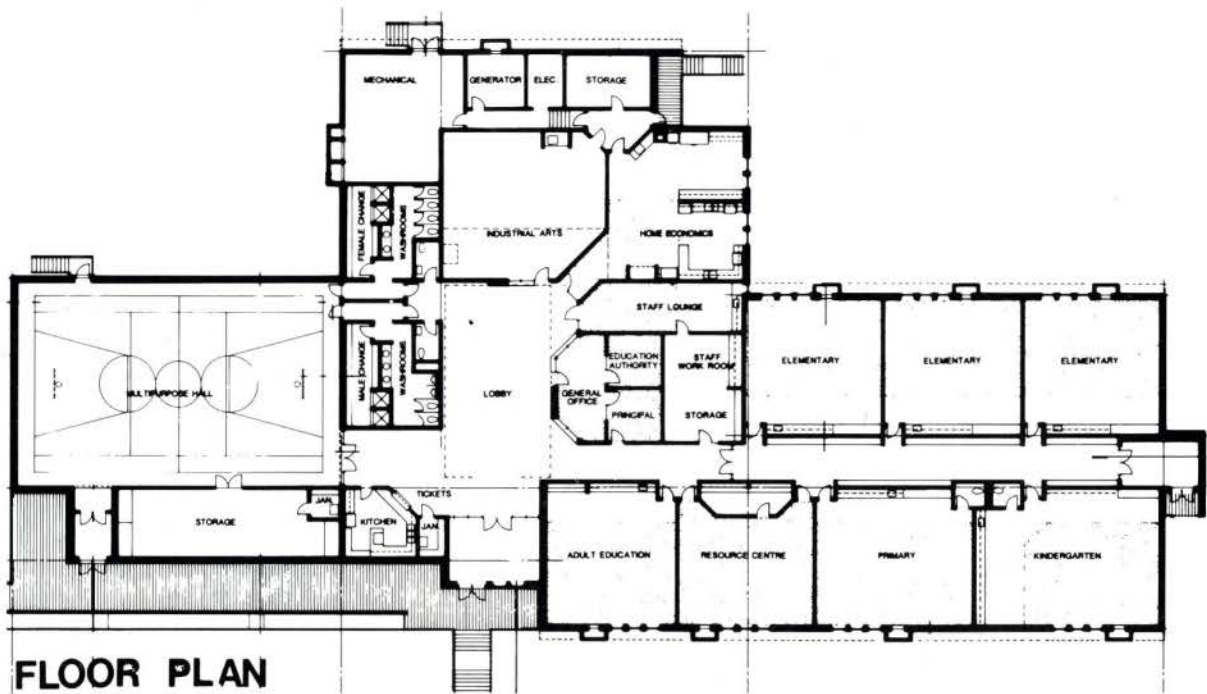


Figure 5. Holman School, Holman, NWT (1984). Floor plan.



Figure 6. Tuktoyaktuk Community Centre, Tuktoyaktuk, NWT (1983). Exterior showing roof and door form for clearing snow.

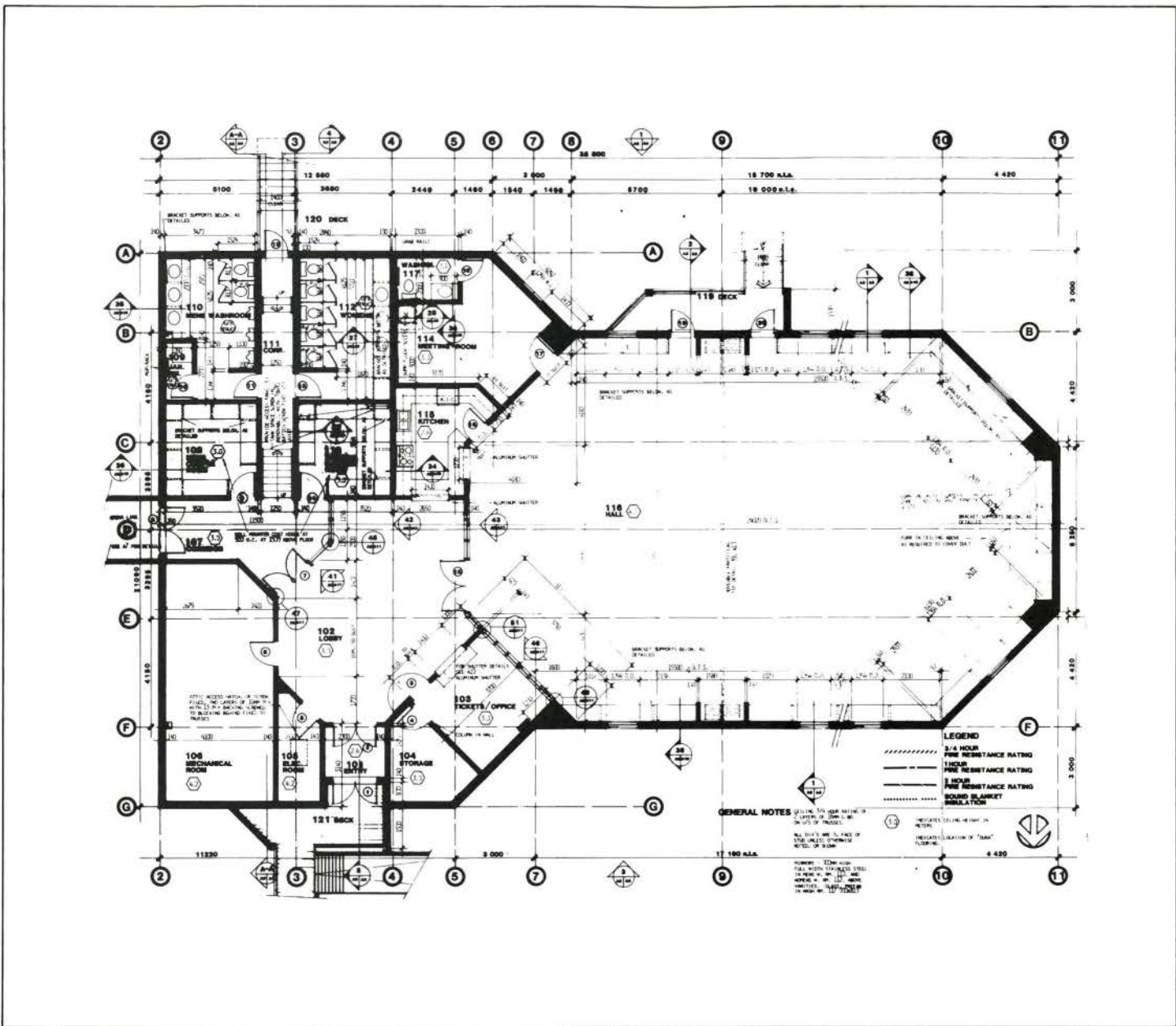


Figure 7. Tuktoyaktuk Community Centre, Tuktoyaktuk, NWT (1983). Floor plan.



Figure 8. Thebacha College Trades Complex, Fort Smith, NWT (1984). Exterior showing classroom wing and entry to main atrium.

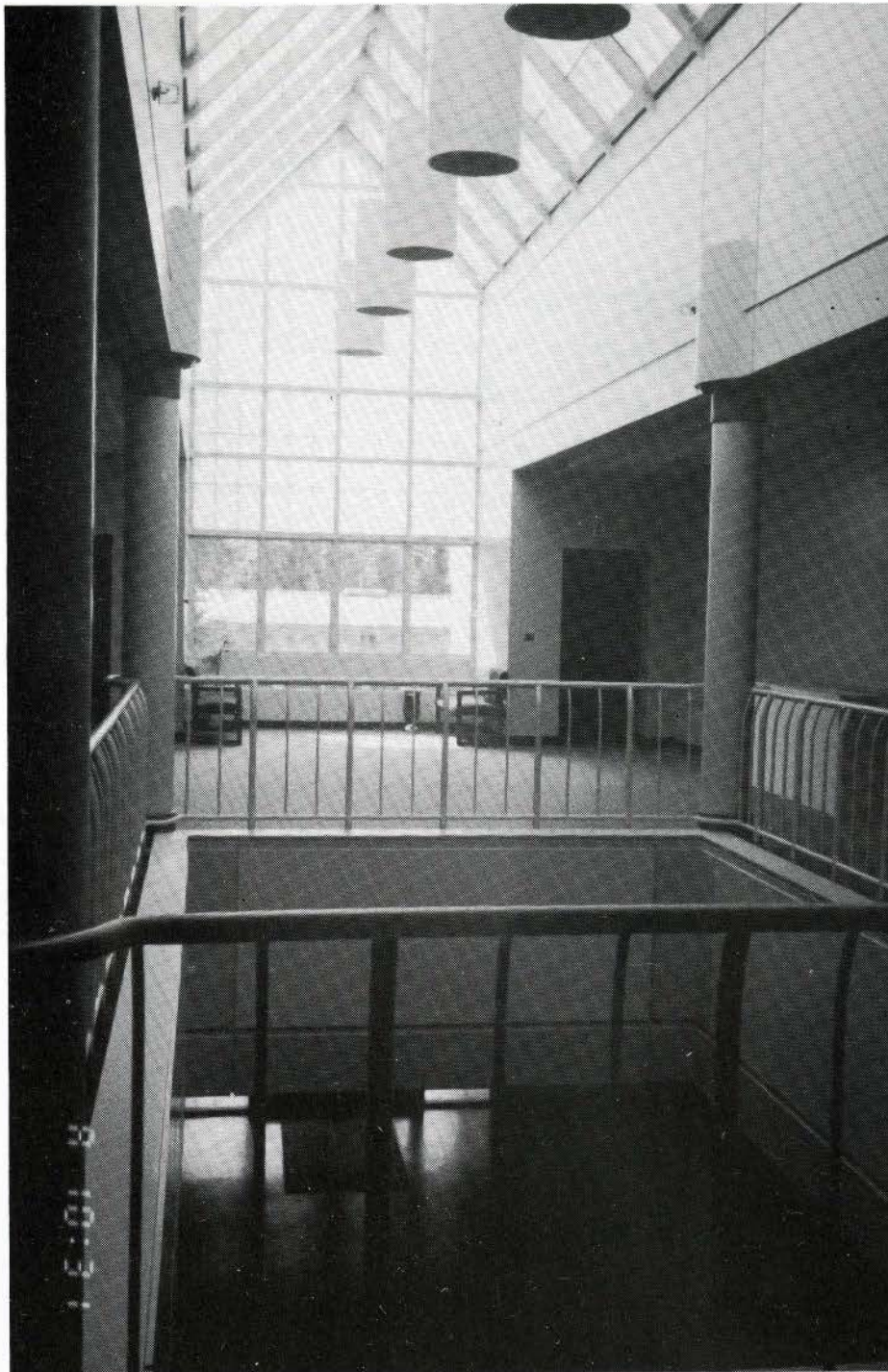


Figure 9. Thebacha College Trades Complex, Fort Smith, NWT (1984). Interior of entry atrium from second level classrooms showing opening to instructor and administration areas below.

There is also a realization that the solution to technically complex problems as encountered here is not necessarily to be found in equally complex solutions. The north has simple construction support systems and the cutting edge syndrome of design offers far greater opportunities for outstanding failures than a more conservative but realistic approach to technology.

Although this article is not intended to be a technical summary of Northern construction, the use of building materials and the way they enclose function is an integral part of a solution which meets optimal needs. We are now finding that a design which makes use of commonly available technologies and adapts them to local needs leads to the greatest success. There is a greater use of wood or light steel frame construction where each detail is made even more straight forward and durable than in the south. Materials and construction techniques are selected not only for lower cost of shipping but also for ease of site revision and repair. These technical issues provide only the tools from which a northern approach to building form is developed. Northern designs also exhibit a

sophisticated understanding of the natural forces that have such a significant impact on life in the north.

The design environment is typified by a number of common factors;

1. Difficult siting conditions often involving permafrost.
2. Lighting conditions ranging from near total darkness in winter to virtually continuous daylight through summer.
3. Snow drifting is a physical presence that must be dealt with as part of the overall building design.
4. Extreme ranges of temperature. Not only does the north have significantly lower average temperatures during winter but in spring and fall the ranges of temperature can be damaging to buildings.
5. The majority of buildings are constructed in small native communities. Surrounding buildings are typically small in scale and predominantly wood frame.

All of these factors have led to a building approach which is typified by a certain leanness. The cost of space is so phenomenal that it is too

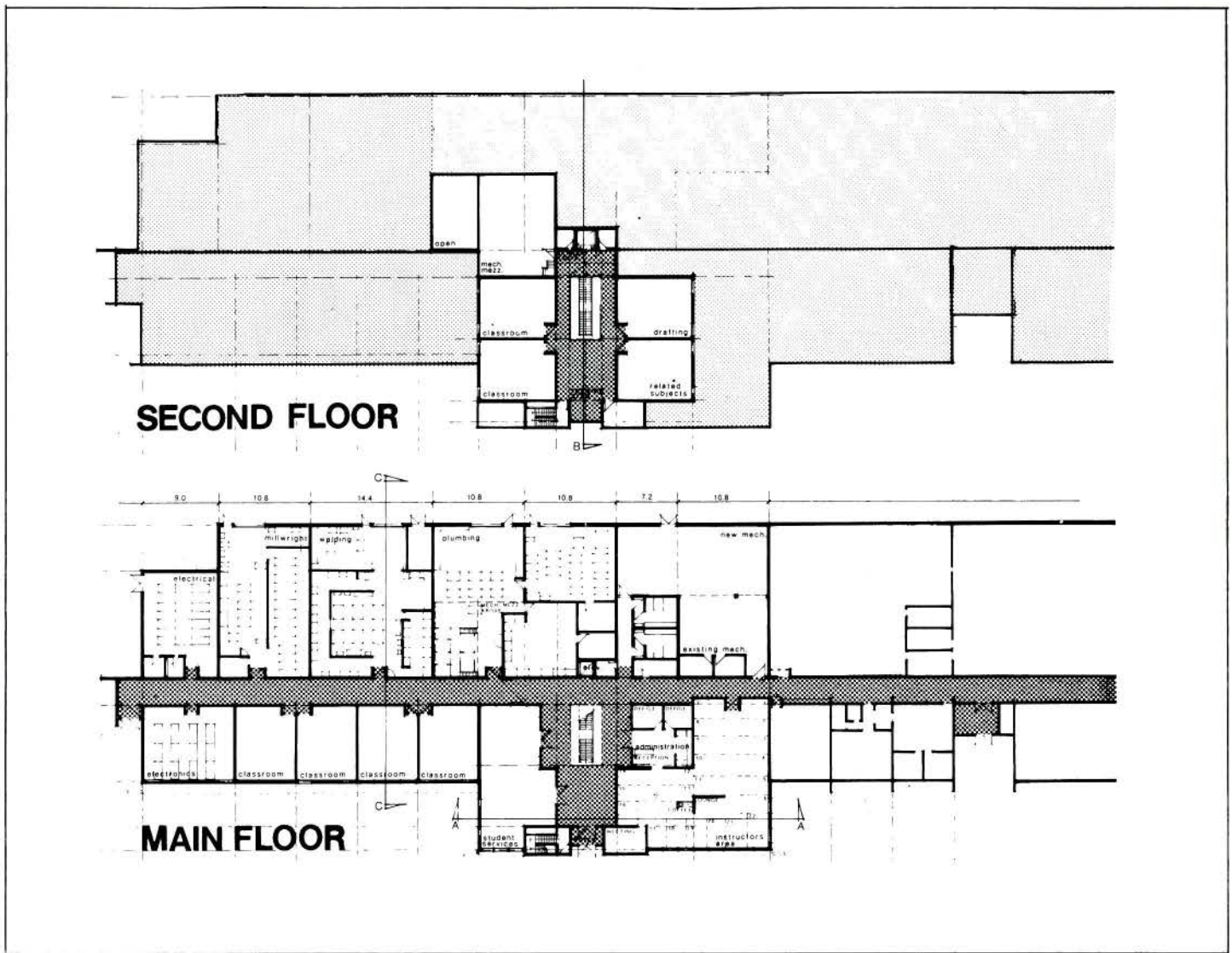


Figure 10. Thebacha College Trades Complex, Fort Smith, NWT (1984). Floor plan.

valuable to waste. Maximizing the interior volume to exterior skin ratio and the necessity of streamlining buildings to reduce the impact of snow accumulation and minimize heat loss trims unnecessary articulation from the exterior.

This is not to say that the external building form lacks in design consideration. There is an uncommon beauty in a building which so clearly illustrates the manner in which it accepts the natural environment. Nor is there an avoidance of colour and lighting and their impact. As with all things in the north, they are used in bright intense bursts so as not to waste their impact. The detailing of the building exterior seeks a balance between the need to contain and protect and the need for connection to the exterior environment. Well gone are the days when we could consider buildings with little or no glazing under the mistaken premise that there wasn't much to miss. The need for personal connection to the environment is critical even if no more than a breath of fresh air and a glimpse of a dull red horizon at a winter's noon.

The general approach then to exterior form is one of low scale and streamlined form with bright punctuations of colour and connection between inside and outside.

Such buildings of necessity become more introverted with a greater attention paid to the development of interior spaces. This emphasis on interior spaces is enhanced by the fact that many northern buildings are multi-functional and have more communal spaces. A greater range of activities are carried out within and hence the possibilities for a more interesting interior environment are greater. This offers an opportunity for more individual expression and liveliness in northern architecture. This is the area where the use of light, both natural and artificial, and colour have reached their greatest development. A more significant portion of time is spent in the interior of these buildings as opposed to viewing them from the outside. The architectural impact of vibrant interior spaces is therefore greater.

Of the examples shown, the Holman School best illustrates this approach. The exterior form tightly surrounds its function with a minimal amount of articulation that does not fulfill a specific purpose. At the same time careful use of colour (to enliven a winter environment), lighting on the exterior (as these buildings are perceived in artificial light for a significant portion of time) and a reasonable use of glazing allows for a balance between tightness of construction and connection between the interior and exterior. The central areas are brightly coloured with direct connection to many of the program areas.

The Tuktoyaktuk Community Centre is an example of a streamlined form. Concerns for snow control are the predominate generator of building form. The building has a very tight and low scale architecture which contains within it the large communal areas needed.

Even buildings in sub-Arctic conditions such as the Thebacha College Trades Complex, in Fort Smith, although not having to deal with the extremes of climate and snow, still maintain a very tight exterior with an emphasis on the quality of interior spaces.

Although these examples look radically different in style of design, the approach has remained reasonably consistent. They are all characterized by a leanness of form and an intense development of the interior space.

What makes northern design unique is this rigorous adherence to the constraints of logistics and climate matched with interior spaces designed to enhance the human condition. It is this rigour that distinguishes work in the north from that in southern areas where opportunities for greater swings in design trends can occur. Design trends become less important compared to the severe and consistent realities in the north.

The fact that successful buildings are so hard won makes work in the north all the more challenging and rewarding.