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NORTHWEST TERRITORIES  
7<sup>TH</sup> COUNCIL, 48<sup>TH</sup> SESSION

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TELEPHONE 873 4488  
AREA CODE 4031  
CABLE ADDRESS "NOMLAW"  
(ALSO AT INUVIK N.W.T.)

# SEARLE, FINALL & SIGLER

*Barristers and Solicitors*

DAVID H. SEARLE B.A. LL.B.  
MEMBER LEGISLATIVE COUNCIL N.W.T.

CLIFFE A. FINALL  
SOLICITOR SUPREME COURT OF JUDICATURE ENGLAND

P.O. BOX 3430

**YELLOWKNIFE**

NORTHWEST TERRITORIES

**CANADA**

XOE 1HO

MURRAY SIGLER B.A. LL.B.  
ALSO OF THE ALBERTA BAR

MALCOLM H. MCCONNELL B.A. LL.B.  
ALSO OF THE BRITISH COLUMBIA BAR

THOMAS G. DAVID, B. COMM. LL. B.

January 16, 1973

BY HAND

Mr. J. H. Parker  
Deputy Commissioner  
Government of the N.W.T.  
Yellowknife, N.W.T.

Dear John:

RE: Standing Committee on Finance  
Cost of School Construction Study

Enclosed herewith is my first draft of the report with  
appendices which, subject to your review and approval, I  
propose to table at the 48th Session.

May I please have your thoughts concerning the enclosed. If  
you approve of the draft then simply send it on to Binx for  
reproduction in sufficient copies for tabling, as well as  
copies for the following:

*Handwritten initials*

1. Yellowknife Public School District
2. Mr. J. J. Smart
3. Mr. G. A. Fraser

Yours faithfully,

*David*  
David H. Searle

*Appendix C*  
*G. A. Fraser*  
*Appendix D*  
*Date - 14 Jan 73*  
*Date on last 2*  
*Name on Bill*  
*Cost*

Page 6  
Billet

sjm  
Encl.

*S.S. This should have been on  
Council letterhead.*  
*D.H.*

REPORT OF THE STANDING  
COMMITTEE ON FINANCE TO THE  
48TH SESSION OF THE N.W.T. COUNCIL

DATE: 19 January, 1973

SUBJECT: Cost of School Construction

A. Preamble:

During a meeting of the Standing Committee on Finance of 28th October, 1971, as a result of a discussion respecting the cost of school construction, the Committee decided to undertake a study of school construction costs. To aid the Committee two independent non-government experts were appointed. An architect, one Mr. J. J. Smart, who is familiar with the standards of school construction in Alberta, was appointed to travel with the Committee to identify any "frills". As well Mr. G. A. Fraser, a man familiar with costing, was appointed to cost any frills identified by Mr. Smart.

At a Committee Meeting held on February 28th, 1972, it was decided that the Committee would visit only schools constructed by the Territorial Government since the transfer of the education responsibility from the Federal authorities. The schools decided upon were those at Hay River, Edzo, Fort Resolution, Fort Good Hope and Yellowknife. The Public School at Yellowknife was included for comparison purposes, it being appreciated that it is not a Territorial Government run school.

It was further decided that the study would take place between the 14th and 16th days of June, 1972, with the Committee and its advisors, plus representatives from the Departments of Public Works and Education, visiting those schools.

As a result, the schools at Hay River and Fort Resolution were visited and toured on the 14th day of June, 1972. The school at Edzo and the Public School in Yellowknife were visited and toured the 15th day of June and the school at Fort Good Hope was visited on the 16th day of June, 1972.

B. Reports:

Mr. G. A. Fraser tendered a Preliminary report, which is appended hereto as Appendix "A". Mr. Smart tendered his report which is appended hereto as Appendix "B". Mr. Fraser, after examining Mr. Smart's report, tendered a further report appended hereto as Appendix "C", which identifies the extra costs involved as a result of the items specified by Mr. Smart.

C. Costs:

As Appendix "D" hereto is a summary, in statement form, of the construction costs of the four (4) Territorial Schools above referred to.

D. Philosophy

The Committee commends the administration for the

philosophy of building schools as community centres for not only student use but for adult education and community recreation uses so that the school becomes an educational and cultural centre for the whole community. The Committee supports, as well, the consolidation around the school of other public service buildings such as adult education, public libraries, arenas and baseball fields to create a joint education community park use. To obtain this full utilization the Committee recommends to the Commissioner and Council that instructions go out to all school principals and teachers implementing this philosophy to overcome the natural human tendency to protect the facility from other than student use. The facilities being built can only be justified if a community centre approach with extensive adult and recreational use outside, as well as inside, school hours is the philosophy being employed.

E. Evaluation of the Schools Visited:

For detailed evaluation Appendix "B" hereto, being the report of Mr. J. J. Smart, requires careful reading, particularly the appendices to that report. The Committee offers the following comments:

(1) Hay River Senior High School

- (a) The expense in providing the foyer, music, art and stage areas and balcony can be justified only if there is integrated student and community use in accordance with the philosophy outlined in D. above, otherwise public funds will have been wasted.

- (b) The rounded isolated stairwells, music practise room pads and rounded corners added exterior wall perimeter, hence greater expense.
- (c) Extensive use of folding partitions added costs.
- (d) Armour plate glass at the main entrance is costly.
- (e) Glass classroom partitions are costly and hazardous to students.
- (f) Recessed fluorescent lighting is used whereas suspended fluorescent fixtures would have been more effective and less costly.
- (g) A higher than warranted cost has been paid as a result of this particular architect's artistic expression.
- (h) The science complex (Biology, chemistry and physics) could have been consolidated saving floor space, hence cost. As well they appear to be over equipped particularly in respect of the number of fume cabinets.

(2) Fort Resolution Elementary School

This is an excellent school facility complying with our recommended philosophy. There are no frills. The funds were well spent with the lowest per square foot cost obtained as can be seen from Appendix "D".

(3) Edzo School

Here again value for the rather reasonable cost has been obtained. The Committee has no adverse criticism except that excessive stripping of trees and vegetation seems to have occurred, thereby detracting from the appearance of the site. As well, from an

operational point of view, there was extremely low occupancy of the residence at the time of our visit on 15 June, 1972. Unless this has improved there may have been a serious and costly over building of residential facilities.

(4) Yellowknife Public School

The committee has only one comment respecting construction costs and that is with regard only to the Kindergarten Teepee. This has obviously cost a substantial amount of money greatly out of proportion to what could have been obtained by producing the same space by conventional standards. Though architecturally attractive, we do not recommend this form of school construction for the Government of the N.W.T.

(5) Fort Good Hope School

This School was much like the school at Fort Resolution. It complies with the Committee's recommended philosophy. Except for rather minor criticisms made by Mr. Smart, the Committee has no adverse comments.

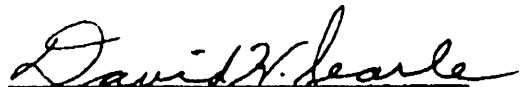
F. General Recommendations:

- (1) For emphasis, the Committee re-affirms the philosophy recommended in D. above, otherwise there is serious over spending in the provision of educational facilities. The implementation of this philosophy in every school and every community is essential in order to obtain maximum utilization and value from the facilities being provided.
- (2) Because the selection of the architect is all important, great care must be taken to first determine what we want and then choose the architect who has demonstrated from previously designed projects that he will produce it.
- (3) A Section within D.P.W. should be established for the exclusive purpose of maintaining school facilities. Criticism respecting

maintenance was expressed everywhere.

- (4) There should be a standardization of equipment, materials and fitments to simplify maintenance and reduce inventories.
- (5) Mechanical controls should be reduced and simplified.
- (6) The Committee supports the use of quality materials. They should be selected with care so as to be easily repaired, replaced or substituted.
- (7) Respecting site preparation and landscaping, the amount of site stripped should be as limited as possible and this should be insisted upon.
- (8) The matter of labour and trade costs are increased in the Northwest Territories by virtue of increased transportation, billeting and other overheads. A voice in labour negotiations is becoming essential to keep these costs within reasonable limits. This government should consider certification of labour unions plus the need for compulsory arbitration by way of Territorial legislation.

All of which is respectfully submitted.



Chairman



ACTIVITY SCHEDULE

Study by

STANDING COMMITTEE ON FINANCE  
NORTHWEST TERRITORIES COUNCIL

Into

CAPITAL COST OF SCHOOL CONSTRUCTION

June 14-15-16, 1972

A General Contractors Point of View

When determining the amount of money to be spent on a school in any particular location the first thing that must be considered is the amount which will have to be spent to satisfy the local people. In Fort Resolution the people are used to very little and therefore for a relatively speaking small amount of money enough extras and special conveniences can be added to make the people more than happy with the results. In May River however because the local people are used to better things they also want better schools, not only as far as equipment is concerned but also appearance. To achieve this it is natural to assume that more money must be spent to build this type of school. This additional cost can be due to a number of different things such as materials used, appearance, added features, not necessarily required but suggested in order to achieve a school just a little different from all others.

This is where the selection of the architect is all important. Do not select the architect first and then try to incorporate your ideas into his plans because this does not work. Decide first, what you would like, to make this school different, and then select the Architect, whose designs are closest to what you would like to have. This can be done by studying other projects which he has completed. Most Architects have their own ideas on how to make a building different and they incorporate these ideas into their designs whether it be a school, church, office building or any other structure.

The budget has been set and the Architect whose ideas are best suited to the situation has been selected and now the Architect designs the building giving the owner the required space and at the same time adding in the special features to make this structure different. However to achieve this and stay within budget he must delete other possibly essential features to reduce costs in other areas. Most architects try to design a building very close to budget or just over because their design fee is a percentage of contract. This also includes their design Engineers who are also on a percentage fee. When a building comes in over budget, too often items are deleted to reduce costs which are essential to the functional qualities of the building and the features which the Architect is noted for, to make this building different, and are usually the largest contributors to the high cost, go untouched.

It is too late after the building is built to say that this item or that item could have been done cheaper because there is no doubt that it probably could have, but the money saved would have been spent somewhere else, as the Architect attempted to come as close to the budget as possible. This is why it must be impressed on all concerned that what you wish to get for your money must be determined from the very beginning if you hope to be satisfied with the end result.

Now the question comes up as to why a school or any building should cost more in one area than another besides increased material, labor and equipment costs which have already been taken into consideration. There are many reasons for this. Some contractors in desperation to get a job bid the competition. This means that if a similar school is tendered in different localities a few weeks apart the prices tend to go down as contractors attempt to beat the bid submitted on the first school tendered. However in many cases the reverse happens and again the question is asked, why? The percentage of jobs obtained by the low bidders having made a mistake is greater than most people are led to believe and this is usually a sure indication. This particular project should not be used when determining costs of future schools.

It should be remembered that schools are not just schools anymore, but can now be purchased over any price range just like any other structure because of the wide variation in available materials, equipment, designs, etc.

Except when unusual ground conditions exist, resulting in higher foundation costs, it is very seldom that you will find that the basic foundation, structure or standard wall cladding materials vary that much from one school to the next within the same locality. The fluctuation in costs is a result of the type or quality of materials, equipment etc. specified or the unusual design features incorporated, and this can be controlled.

A school such as the one in Edzo can become quite costly, not because of the school itself but because of the living quarters attached and the other facilities required because of this. A project like this should not be classified with standard schools. Also any school which is to be used by the community as well will probably cost a little more because the quality and durability of the materials and equipment used will have to be higher to withstand the rougher abuse which the students alone would not give them.

In determining school cost budgets, a yearly percentage increase must be allowed to cover the higher costs of labor and materials. Recently the true extent of these increased costs have been difficult to determine because the new system of wide open teaching has reduced the number of partitions required which theoretically should have reduced the costs but have been more than covered by the more recent increases in material and labor. In this area we

have gone about as far as we can go since there is not too much more that can be eliminated so everybody should be prepared for a more rapid increase in costs in the future.

The Fort Good Hope School is a good indication of what can be done with standard frame building materials both as far as appearance, economy and speed of construction. In many cases special structural components or prefabricated panels are chosen to reduce on site labor costs and to improve completion dates but this is not always the end result.

A review of all the projects would indicate that the materials best suited to each location have been used to achieve durability, appearance and economy. There are some instances where materials, equipment or finishes have been selected which are more costly, to achieve something special for that school, but is this so bad? Everyone wishes to have something a little different or a little better, that's what progress is all about.

Glenn A. Fraser,  
Chief Estimator,  
POOLE CONSTRUCTION LIMITED

REPORT TO

THE STANDING COMMITTEE ON FINANCE OF THE

COUNCIL OF THE NORTHWEST TERRITORIES

RE:

EVALUATION OF SCHOOL FACILITIES AT  
HAY RIVER, FORT RESOLUTION, EDZO-RAE,  
YELLOWKNIFE, AND FORT GOOD HOPE,  
DURING JUNE 14 - 16, 1972

SUBMITTED BY

  
J. J. SMART

FORWARD

In opening my report, I wish to express at this time my appreciation for the invitation and the privilege of working with the various members of the Committee on the task of evaluating the above listed schools. It has been a tremendous and satisfying experience, to myself, to discover that these facilities match equally, and in some cases even exceed the facilities provided in the Southern Canadian city centres.

The educational staff, together with their back-up staff, should be congratulated for their efforts and skills in implementing group and individual instruction methods as well as their extensive use of the open area facilities provided for them.

The basic policies established, in all centres that we visited of using schools as community centres for student and adult educational and recreational facilities should be commended. This combined use, which is being developed, not only provides for formalized activities but becomes a catalyst for the natives and various other societies to understand one another and to encourage them in working towards building a better community for their common need. (This is quite noticeable to an outsider of the community, like myself.)

I trust that my report assists in a small way to contribute towards the further development of your educational endeavours.

Sincerely,



J. J. SMART

Chief Architect and Director of Plant  
Calgary Public School Board

## SUMMARY OF THE EVALUATION

As mentioned in the Forward, the program being presently presented in all schools visited allowing for local adaptations and variations, appears to have been very successful. This success can be attributed to the genuine interest of the people involved to provide as good an education as is provided outside the territories. I shall follow up with a number of observations which in my opinion makes the combination of facilities and instructional approach a success. I shall also present a number of suggestions which I believe could be of assistance to the Committee and staff in developing future programs and accommodations.

All of these comments will be based on my evaluation of the facilities visited, and how they were being used or intended to be used. The assessment of the various projects should in no way be construed as the ultimate, as the time spent on the survey was too limited to provide a detailed constructive, critical evaluation. However, the points which are being presented have been weighed against my personal experience in research, design and construction of a large number of schools, through a large variety of architects, engineers, contractors and suppliers.

The comments are a consolidation of observation of all five projects and do not relate specifically to any one. The detailed individual school evaluations are attached to this report in the form of appendices (one to five inclusive).

### POINTS OBSERVED IN EXISTING OPERATIONS AND FACILITIES WHICH CONTRIBUTE TO THE SUCCESS OF THE PRESENT FACILITIES

The first and prime contributor is the central administration who have a genuine interest in the development of a total educational program and appropriate facilities. The executive staff, Mr. Parker and Mr. Blewett, in my opinion, have no tendencies towards frills, but do support good quality programming, materials and workmanship. They have also briefed and imparted to me a better understanding of the total social environment.

In considering education in the Northwest Territories, my comments will be based very heavily on brief observations and short discussions. It comes through clearly that education in this area has to and is encouraged to extend beyond the students in the classrooms, into the surrounding adult community as a whole. The adults want to be involved and the program being provided encourages this involvement. Inevitably, all educational philosophies and policies are affected by the local economy, and sponsoring governments. The latter was borne to the forefront when a statement was made that very frequently the native children living in residence are withdrawn from school and taken home to keep the family qualified for family allowance. Although the legality of this action can be questioned, the action still becomes a serious factor to the educational program and equally serious to the parents, where the family allowance in many cases is the only source of parent income and therefore forces them into adverse methods.

In regards to use of facilities by the adults, I was pleasantly surprised by verbal reports in all areas that there is a great interest by the adults in the use of the industrial arts and gymnasium facilities. My initial reaction to the spaces provided was that these areas were much more extensive than those provided and required for normal school programs. After traveling through the four locations other than Yellowknife, there is no hesitation on my part to state that the space provided is not out of line because of the extended use of these facilities to the adults.

This practice, for example in the case of the gymnasium, should be encouraged. Undoubtedly, there will be conflicts of interest for use by the school and community and an increase in operational costs, but, in communities of relatively small populations and limited sources of funds, it does not make sense to duplicate the facilities when there is an opportunity, by joint planning, to provide space that would meet the demands of both users. Extra effort should be made in the Northwest Territories to foster this approach. Following this concept through, in the case of the gymnasia, the area would have to be built to the adult competitive standards. The increased, construction cost, because of the larger area, is more than compensated for by the greater use of the facilities and the reduced, combined capital costs as compared to the total cost of two individual capital projects. Besides the economic factor, the school then becomes an educational and cultural centre for the area.

It appears that the preceding philosophy is being fostered in the areas visited and I would recommend that additional study should be given to the feasibility and practicality for expanding and applying this approach, not only in the areas visited, but throughout the Territories. Consideration should be given to the feasibility of consolidating around the school, which generally is the largest public building in the town, of other public service buildings such as adult education -- trained and industrial arts shops, public libraries, medical centres and other recreational facilities, such as arenas and baseball fields, to create a joint education, community park. This consolidation would require a larger site and increase the initial cost, but would in the long run, reduce the total development and maintenance cost.

With regard to the standard of accommodations, the facilities provided compare very favorably to the average accommodations provided across North America. I am pleased to state that at no time during my discussions were there any indications of the attitude that the facilities were too elaborate for the districts. The children from these districts will migrate to the outside and the outside pupils will immigrate into the Territories and it becomes essential that there is continuity in the quality and standards within the Territories being equal to those throughout the continent, to make the transition and continuity of the students' education more fluid and variable. The cultural area differences will be brought out and accommodated by the community social activities and attitudes.

Throughout the survey, I noted a number of practical, down to earth, and economical materials, methods and design techniques applied on the various projects. The following highlight some that should be continued and encouraged:



1. The type of construction and materials used in Fort Resolution, Edzo, Fort Good Hope and the addition to the Yellowknife Elementary School (excluding the teepee) is very appropriate for the area and should be encouraged.
2. The use of standardized components (by this I mean not catalogued or stocked items only but a repetition where possible of costume items).
3. The use of prefabricated and prefinished items, e.g. metal prefinished siding, prebuilt furnishings. (This saves import of extra trades and saves transportation cost of materials.)
4. The use of good quality materials and equipment. (This is a must in the area. Unfortunately, each individually, and many times both, are interpreted by the public as frills.)
5. The contract management approach does provide many benefits even on the small jobs. C.M. permits staging of construction economically and in accord with needs, e.g. piling the foundations prior to the building materials for the main structure being delivered. Bulk buying, or pre-buying of materials and many others.
6. The adaption of foundation of sites has been very well handled and methods used should be continued.
7. Intense interest of architects and response to the challenge.
8. Many other small items that in total produced good savings.

In conclusion, I do not believe that Mr. Fraser and myself were expected to present to the Committee an economic solution for all times, but rather that after studying what has been done and is being done, we present to you our observations and comments, which could be of assistance in helping the Committee and administration formulate guidelines for future school developments within your basic terms of reference, of reducing educational frills to a minimum and keeping Construction Costs at an equitable level for the educational facilities required in the area. I have drawn some of these to your attention in the Appendices and others in analytical comments. I am certain that you recognize that time did not permit a detailed study, and that out of necessity, many comments had to be generalized.

I trust that the preceding are of assistance to the Committee and administration. Again, thank you for the opportunity of serving you, it was very interesting and a pleasure.

Summarizing the good, and the questionable, it becomes incumbent on myself to express an opinion of the total, together with some sage recommendations.

First, the projects observed have been handled with a good understanding of the educational, as well as physical needs, both administratively and by the architects. This statement is conditioned by the Appendices.

Secondly, the sage recommendations are as follows:

1. The new facilities provided are as good, and in some instances, better than those provided in southern areas. It now becomes a necessity to maintain these in good shape so that the total value of the investment can be realized. I am therefore recommending that the Committee consider the setting up of a preventive maintenance program for all educational buildings. After serious consideration, I believe a department should be set up within the D.P.W. for the exclusive purpose of maintaining school facilities. By proper planning, the services can be coordinated with D.P.W. to establish mutual advantages in cost saving of transportation and material.
2. A concerted effort should be made in the design and fitting of new and old buildings to establish a standardized use of equipment, materials and fitments so that maintenance can be simplified, inventories reduced, and delays for specialized parts and tradesmen reduced.
3. The variety of trades and specialized equipment and materials be reduced and limited to a minimum in the design stages.
4. Reduction of mechanical controls -- the simpler the operation, the more assured you are of continued operation and a more economic maintenance. Finite controls on the majority of school equipment is not essential. They only add to the shut-down, to a lack of specialized tradesmen.
5. Care in selection of materials. Use materials that can be easily repaired, replaced or substituted. Stay away from the exotics.
6. There was a concern raised as to the use of a number of hot air heating units at Fort Good Hope. The questioning of operating costs of the large number of units used and their maintenance is legitimate, and I personally have discouraged it in our system. However, in the above case, I must admit that it has merit, not only from the cost per square foot basis, but on the shut-down of facilities. It would be a very unusual situation when all units would go out of operation. Therefore, even if half of them went out of operation, the balance still could maintain sufficient heat to keep the plant from freeze-up. The use of smaller units has much to commend them.
7. Costume method of construction and status buildings should be discouraged and avoided. Good buildings can be produced without the first, and the second can be obtained by simple design.
8. Site preparation and landscaping -- I would recommend that in future, because of the difficulty in re-establishing grass and other growth, serious consideration be given, and insisted upon, to limit the amount of site that is stripped in the immediate area of the building site. This could have been done at Rae-Edzo and saved the district a lot of inconvenience and money. I would, in this case, suggest re-establishing the native plants mosses, etc. in the ornamental areas of the schools. These could be obtained from the areas over which the houses are being placed. I would also, in this case, require the developers to do the same with the residential area. I believe in local fauna and if treated properly, it can be more effective than poorly maintained turf. Edzo is just an example, another approach may have to be used on another site.

Acting in a just position to the preceding are the following cost escalating factors that have to be accepted:

1. The Northwest Territories communities do not have the same access to the varied competitive construction methods and market (example: precast concrete, steel, timber, versus cast-in-place, etc.), and are confined to those methods which transportation and local environmental conditions permit economically.
2. The area cannot take advantage, as readily, of shopping for a variety of substitute materials.
3. Quality, proven materials and methods must be given preference to lessen the risks of shut-downs. This narrows the competitive area of bidding, normally to a fewer established suppliers with the resulting escalation of material costs. However, irregardless of reducing the competitive advantages, I would strongly suggest that a policy of providing quality, proved materials be a must. The additional premium in cost for this factor is a sound investment. (The cost of transportation and the cost of labour are the same for good material as something just about as good, but your future maintenance expenditure can be significant.)
4. All areas in the Northwest Territories are or can be considered as isolated and anyone bidding into the area has to face the facts of expensive transportation, short building season and sound financial backing. The result of the latter factors is that competition from marginal profit construction firms and local builders, if any, is non-existent. It is this segment of the construction industry that enables the construction costs in southern areas of Canada, especially in the larger centres, to be held down at a good level. I cannot foresee this factor being alleviated in the near future because the developments are scattered, isolated and have too low a rate of building growth to encourage the establishment of local construction businesses and thus create a variable competition to the import firms.

In analyzing the other more direct factors that raise the comparative costs on a per square foot basis, of the schools visited, opposed to similar schools in the South, the following are essential items that should be a must and have a major escalating effect:

1. Stand-by equipment - e.g. heating boilers, auxiliary power units, etc.
2. Water supply and water filtration.
3. Sewer disposal.
4. Frost protection.
5. Fire sprinkling system - (this is good insurance for Northwest Territories, but provided otherwise in the South, and generally not included in schools.)
6. Insufficient supply and/or lack of fully trained trades personnel in the area results in the necessity of having to import and billet the required tradesman.

7. Longer hours of work -- in order to import tradesmen and to make this economically feasible, the contractors have to provide longer work days and overtime pay. Although it is claimed that there is some offset for the overtime because of increased productivity, (I would hazard a guess of 10% maximum) cold logic indicates an increase in cost.
8. Provision of foundations or substructures.
9. Climatic conditions -- or winter construction.
10. (By no means the last). The Southern Unit Labour Agreements which demand no jurisdiction or overlap of the trades, as a resultant that some trade costs are further disproportionately increased through transportation, billeting and other overheads.

It is suggested that if the territorial government has any voice in labour negotiations for the North area, an overlap of trade jurisdiction be provided within the trade agreements.

## APPENDIX I

### HAY RIVER SENIOR HIGH SCHOOL

This is the first school we visited in the survey. It is located in the relocated townsite of Hay River and becomes a topic of discussion immediately its purple exterior meets the eye. The school has not been occupied by the students to date but will be put into use in September 1972. In evaluating it, much consideration was given as to how it fits into the community. After the initial reaction to the unexpected exterior color and after relating it to the other new structures within the town, and augmented by public comments, the building is not out of place in the growing new community. When the grounds are completed, leaving the standing trees on the grounds until that space is needed, the fully developed school contributes extensively to the community.

The school has the potential of becoming the cultural centre of Hay River, with proper acceptance, planning and development of student and adult activities.

### FACILITIES

The unusual exterior colour is followed up with an exposure to an unorthodox approach in developing the school's interior facilities. My first reaction to the interior was "Halleluiah, frills galore!" I am pleased to report that my subconscious reaction was changed considerably by the time we completed inspecting the building.

The evaluation of this facility has to be based on its broader integrated educational and community purpose, and not solely on the generally accepted educational functional concept. It is the architect's definite approach in resolving the former that arouses the first reaction to an unorthodox deviation from the standard school plan. I refer to the expansive space at the main entrance, a second floor balcony opening on to it, and a small circular group area under the stair. The latter, although provided at an extra cost, adds to the different character of the foyer.

The concept of combining the student auxiliary room, (the foyer) with the music, art and stage area is a novel approach and can become a very useful space, but it will require an exceptional effort by the school and community to make effective use of the facilities provided. This combination could be the forerunner in the Northwest Territories of providing one public facility which would meld the school and the community. At the expense of repeating myself, in order for this concept to be a success, considered promotion, programming, scheduling and cooperation by both the school and adult community is required.

Otherwise, the space provided, could have been treated more conventionally in accord with proven school design approaches at a lesser cost.

Continuing with spaces that contribute to the preceding, the music room, if closed off with the high quality folding or moveable partition, becomes a standard music room, except for the music practice rooms which are enclosed in circular cul-de-sacs (for exterior architectural effect), then rectangular-

ized inside to conform to standard music practice rooms. In my opinion, the practice rooms could have been provided at a lesser cost.

The art which forms part and parcel of the total foyer space is separated from the music room and from the base foyer by folding partitions. When these partitions are in place, the room is a standard box art room. The space could have been produced cheaper but the philosophy was that this entire combined area forms the auditorium for the community and that the purpose of the folding door between the art room and the music room is for the purpose of extending the music or art instructional space, while at the same time, it isolates it from the rest of the school activities. This concept of folding partitions also enables the music room to be combined into a stage, which explains the pine floor. (The pine floor is normally used on stages to assist in setting up stage sets as the floor can be nailed into without splintering the finish.)

In summary, my conclusion on this section is that the extra cost of providing the high quality acoustical folding partitions and the large open foyer can be justified if the area is used for both educational and extensive community functions.

Further consideration should be given as to whether luncheon facilities should be provided in this school. I venture to state that these would be an asset to the school and/or combined use. A very modest kitchen serving limited menus would suffice. A kitchen could be provided for \$20,000.

The Industrial Arts and Home Economics section are slightly above the average facilities provided in Southern Canadian cities. The equipment is current and of good quality -- thus, might be interpreted as a frill but it has to be accepted as a wise investment provided that its operation is simple enough that an average inexperienced student can learn to use it effectively. The home economics equipment may seem to be too advanced for the area, but then it has to be accepted that the students will require higher home standards. It is my opinion that this area is not out of line when compared to facilities provided in other districts.

The administrative suite is standard when compared to suites in other districts. The P.A. system provides an extensive communication media. Good quality P.A. equipment in this area, in my opinion, is a must. The maintenance of poor equipment could be very costly. It is not advisable for me to comment, not knowing the school communication requirements, as to whether it is too extensive for the school.

Reviewing the two floors of classrooms and two-storey resource centre, I can only classify it as a standard classroom approach for providing instructional space, the only difference being that the classrooms are separated from the hallways and the resource centre by glass partitions. This whole concept of "see through" space appears to be a reflection of an indecision in the secondary schools of the acceptance and need of flexibility or open space to provide flexibility in instructions. The cost of providing this feature would be higher than a standard partition. (This cost difference could be determined and might be set off to some degree if maintenance is considered.) My major concern would be the possibility of breakage and safety of students.

The extensive use of folding partitions indicates a very flexible program and unless there is a need for frequent changes of unitized classroom space sizes, the folding partitions are an expensive method of providing limited combination of spaces.

The science complex of biology, chemistry and physics is very ample for a program that is required for a 400-student senior high school. In my opinion, the specialized science sections could have been consolidated into a tri-lab complex with a resultant saving in floor space. (Again, in this instance, it is hard to evaluate if the action taken was a requirement of the curriculum, programming, size of classes, lab utilization and when the school will be expanded.) The area can be used as home rooms, because of class mobility, and provide additional classrooms prior to adding on to the school. The labs are well equipped. I do question the need of four fume cabinets. In my opinion, two would have been sufficient. However, this requires the acceptance of fluidity of staff and students in adapting to the facilities and equipment provided.

In summary, the labs have been set up to the sciences instructional ideals.

In reference to the second floor balcony, this forms an interior circulation space. Its effectiveness as an audience balcony is limited by a high solid railing to the extent that it provides only spectator standing room. To provide a raised floor for seating is expensive for the number of times this space would be required for overflow audiences. It is much more economical to repeat a program. The effect, however, on the total concept is quite pleasing and its worth has to be evaluated within the perimeters of the total concept of use.

The gymnasium is developed without the traditional stage; the drama facilities being provided in the main foyer. The gym floor area is larger than would normally be provided in southern high schools. However, consideration has to be given in the Northwest Territories to the fact that the gym serves a dual purpose, that is, the requirements of education and competitive adult needs. Evaluating these two, the space is not out of line. The floating maple floor is recommended and the equipment provided will meet the demands of both the school and major competitions. The only section of this facility that can be criticized adversely is that the dressing rooms are too small.

In considering the total building, the structural system of enclosing the building with pre-painted, corrugated, standardized steel panelling is commended for the area. It reduces the waste of materials and the cost of transportation. It also reduces the number of field trades if not in total, because of interior painting, it does reduce the field time spent by painters.

In summary, because the school was designed for the joint use of education and the community, it is a tremendous addition to the community as a whole. It can form the nucleus of the community services. If it does this then the extra cost of promoting this philosophy has to be recognized. Although it can be argued that some of the expenditure is made on providing facilities other than those required by students, it has to be accepted that duplications can be eliminated with a saving in total to the taxpayer.

Some of the items which I feel contributed to a higher cost in this particular project and should be considered in future planning are:

- (a) The purple colour - (not that I do not like purple) but it is a specialized colour and in all likelihood had to be obtained at a higher cost than other colours. (I stand to be corrected.)
- (b) The rounded isolated stairwells, and music practice room pods and rounded corners not only add additional exterior wall perimeter, in this case, but also consume more time and labour than a consolidated rectangular approach.
- (c) Extensive use of folding partitions in future projects should be analyzed very closely as to their frequency of use and purpose as a space divider.
- (d) The use of armour plate glass at the main entrance and in the administrative hall, although very effective architecturally, is costly.
- (e) Glass classroom partitions are architecturally effective for creating spaciousness but costly and a potential hazard.
- (f) Architecturally, the project was a success, there is no doubt in my mind that the accommodations will serve the educational purpose well. There is a built-in flexibility within the structure which makes it possible for the instructional areas to be converted into total or limited open area as well as individual study areas.
- (g) The recessed fluorescent lighting, although effective, will lose its effectiveness very rapidly and will demand additional maintenance cost. A more effective and recommended method of lighting is suspended fluorescent fixtures.
- (h) My feeling is that the cost of the architectural expression does not reflect the intent of Clause 15 -- "Art or Sculpture for School Buildings as stated in the Northwest Territories" Proposed School Accommodation Standards April 1972.
- (i) The architect undoubtedly expends considerable effort in research and interest in developing the joint use concept and should be commended for this.



## APPENDIX II

### FORT RESOLUTION ELEMENTARY SCHOOL

General Observation - The village is an old Indian settlement, in fact one of the first in the Northwest Territories. No major reorganization of the village was carried out until recently, where a limited section of the town is being developed in an organized manner. The school is located in the latter section. The village school counsellor was present at the inspection. He is a young native and showed keen interest in the new facilities and acceptance of education. As he was in charge of the school facilities, he expressed his reluctance in making the facilities available to the community for dancing because the building could be damaged, but encouraged the use of facilities for basketball and other sports activities. Under this type of attitude, there is a definite feeling that the school could become the community centre of the village.

The school, K-8, is a single storey building built for 250 students in a village of 600 population. The plan is well conserved and is not unlike any elementary school throughout settled Canada. The unusual aspect of the plan is that both industrial arts and home economics facilities are provided in the school. The school was opened in the fall with the result that the outside grounds are still being developed.

The school is divided into two basic educational activities:

1. The academics - K-8 consisting of three individual classrooms, and a six-classroom open area, a kindergarten room and the resource centre.
2. The active area - consisting of the gym, home economics and industrial arts.

These two areas are connected by a central corridor or foyer which doubles as a display area. This hall contains a kiosk with a record of the local history. The materials for this display were contributed voluntarily or obtained only through perseverance of the architect. Now that it is established, it forms a common link for the villagers. The school is also used for adult education. In fact, this forms the major reason for providing the industrial arts and home economics spaces.

The open classroom area is well used and in my opinion lends great flexibility for developing instructional space for varying class sizes as well as individual and group instructions. I had some reservation as to the small size of the resource centre and its method of use, but after discussing it with the principal, he indicated that they were not yet ready to totally integrate the open instructional program with the resource centre. However, he is pleased with the progress he is making with the students and adults in their acceptance of the need for education.

The use of native adult school aids was an unexpected surprise to me, but after discussing its purpose with the various Northwest Territories administrative personnel, and with the principals of the various schools visited, the policy is paying dividends, not only to the students, but also to the adults within the community and outside.

The industrial arts centres and home economics instructional areas, with programs for adults, contributes further to the acceptance by the villagers that the school is their facility. The exterior finish of prepainted metal siding of the building for this area is ideal and should present a minimum of maintenance problems.

The floor structural system uses a standardized open web joist (without having an opportunity to check the design criteria, it appears that these may be over-designed). I also have some concern as to whether the wooden top and bottom chords of these joists could be affected by the moisture in the crawl space. (It should be noted that these are general observations and concerns, and should not be misconstrued that they are not properly designed or used. All I am saying, is that due consideration has to be given to the type of material used and in what area.)

In summarizing the evaluation of the Fort Resolution Elementary School facilities, it is my opinion that the facilities provided meet the educational program space requirements very adequately. The staff is making very effective use of it. The students and the adults appear to be very pleased with the school.

The materials and workmanship, together with furnishing and equipment, are of good average quality and are suitable for the area. The method of construction lends itself to a rapid economic means of fabricating a good building.

There are no major changes that I can recommend for this project.

### APPENDIX III

#### EDZO-RAE

Visited June 15, 1972, by car, located approximately 90 miles northwest of Yellowknife -- after the dust cleared out of the way.

The school is a K-8 residential school designed for 500 students to serve the residents of Edzo and Rae as well as 100 resident students.

Generally, the school is of post and beam construction and clad with wood. It is nicely located and situated in the new townsite. The total complex consists of three units:

1. An open area academic school with a home economics and industrial arts being provided as an essential facet of education required by the natives.
2. The kitchen, dining hall and staff visitors residence.
3. Student residence blocks.

The planning and construction is basic and conceived on the standardization and repetitive principles. In total, except for the exterior which is of wood and will have to be repainted more frequently than the prepainted metal panels on the other schools visited, the finish and workmanship is to be complimented.

The facilities are finished very economically and in a manner recommended for an isolated area. The open area instructional approach with the use of native school aides provides a sound method of instructing classes of various sizes and competence.

The industrial arts and home economics programs, together with the native school aides, is to be commended. The space provided appears to be small and could be increased by approximately 50%. If instructions for adults in this area is to be further enlarged in the community, additional instructional space could be provided for this settlement by setting up a workshop for the adults on the school site and arranging its use by students.

In summary, considerable thought must have been given to the design of the total project, because it was constructed at a low cost for the Northwest Territories. This should be appreciated even more when consideration is given to the fact that a fire sprinkling system, an auxiliary power unit, as well as a stand by heating boiler to reduce the probability of plant failures had to be installed. Due attention should be paid to the type of lighting fixtures used in the school when compared to the recessed units used at Hay River. The units used at Edzo are an economic, easily serviced unit. These units can be readily moved in case of space reallocation which requires a change in lighting. (I would advise that safety chains be provided on the plastic light shades to eliminate the danger of these shades falling on the students.)

Generally, the project in total is a success. It is unfortunate that the ornamental areas around the school and residences were stripped of their native vegetation, because it would have added greatly to the total project and at the same time provide a minimum of maintenance care. I would highly recommend that if at all economically possible, the natural fauna be restored.

Finally, the road was just as dirty on the way back to Yellowknife.

## APPENDIX IV

### YELLOWKNIFE ELEMENTARY SCHOOL

The new addition was built in 1971, for the purpose of extending the existing facilities to accommodate an enrolment of 620 students in the K-6 grouping, and the 335 pupils in the (7-9) grouping.

Extensive use is made of open space, although grouped into class units, it was noted that flexibility occurred within this unit, together with groupings within the unit. Emphasis seems to be on flexibility in staff thinking and action, as well as the adaptability of programming to space and activity. What I have seen of the operation, the principal and his staff should be congratulated.

In reference to the accommodations provided, the spaces are generous. This should not be interpreted as indicating too much space, but rather comfortable space is adequate to do the job without overcrowding. The provision of lockers for elementary students in schools is out of the ordinary but can be justified in this case because of the open area concept and the size of the environment in the school. These lockers should reduce the percentage of misplaced personal belongings, misuse and pilfering of others belongings.

The open area resource centre and common areas were developed on a split level basis, because of the site contours. This provided an interesting facility at a more economic cost than trying to place all of these on one level.

The Industrial Arts Department was very active and if anything, tight for space, but this could have been one of those rare occasions when a special project is being pushed through. Again, as in the other two preceding schools, there appears to be an extensive interest in both industrial arts and home economics, not only by the natives, but by the Caucasian students.

In the kindergarten annex, the teepee structure has been built primarily for architectural effect, both from the outside and the inside. Internally adequate floor spaces provided for two classes, but unless the community was prepared to accept a substantial layout of money for architectural effect, the actual cost of the structure, as related to the instructional space produced, is greatly out of proportion of producing the same space by conventional standards. I would suggest one or two mezzanines be provided within the town to get better utilization of the space for the investment.

The balance of the project was designed and built within accepted standards of construction for Yellowknife. The structural system is economic. The materials and workmanship are of good quality. The architectural concept is appropriate for the community, including the teepee. The teepee provides a landmark to the city. The total unit is a worthy contribution to the educational program as well as the community.

YELLOWKNIFE ELEMENTARY SCHOOL - OLD SECTION ON YELLOWKNIFE HIGH SCHOOL

These two projects were included in our visitation at Yellowknife, at my request, primarily for establishing a comparative base to which the new accommodation would be related by the local communities (what is new in accommodation today, compared to the accommodations, Joe and Jane citizen attended 20 years ago?)

The old section of the elementary school was built to the old standards of the southern schools — wood floors, wide corridors, many windows, plaster or donna conna walls, etc. The design of the new addition took into consideration the undesirable factors, and eliminated the windows, carpeted the floors for acoustical purposes, and consolidated the egg crate classrooms into open space. The necessary adoptions were made to stay with the changing curriculum and the changing social times.

The senior high school is a residential combined academic vocational high school. As in the case of the elementary schools, and as in the case of the new Hay River High School each was built on the educational concept of the time as well as the architectural status of the type of institution. If one looks for frills, the old high school has some of today's standards, example, ceramic tiles in the corridors. Yet when the school was built, at that time, this was not classified as a frill in a high school. This could be related very easily to today's evaluation of carpeting in the music room at Hay River.

As stated at the beginning of this section, the purpose of looking at the older schools in the study was to establish in the evaluation of the schools if there were any radical deviations beyond the requirements of the educational process and curriculum, as well as the community's expectations of services to be rendered by the schools.

## APPENDIX V

### FORT GOOD HOPE ELEMENTARY SCHOOL

Visited January 16, 1972 -- weather perfect.

#### General Observation

The village is very neat and there appears to be a genuine interest in its appearance. Native residences are relatively new, standardized log style buildings. Yards are clean and extensive provision of wooden sidewalks further indicates native interest in their community. In my conversation with the principal, he indicated that this interest is carried into the school and the adult communities use of school facilities.

The school is a K-8 elementary school located on a hill, giving limited playground area, but the community playground is only about 500 yards away. The grounds are stripped but have a clay topping and could be seeded to grass. It is my opinion that with river water being easily available, the grounds could be seeded and maintained as a good contribution to the community.

The school building was well conceived and planned, and construction work is to be complimented. The approach used of placing the building on piles enabled the school to be erected in stages and the contractor to move very rapidly in the very short construction period.

The design of the school itself was such that enabled it to be assembled rapidly and effectively.

The materials, both interior and exterior, were well selected, economical and of good quality. There should be a minimum need of long term maintenance.

Again, the use of carpeting is very good. The materials used are of good quality and relatively cheap. Besides the good wearing surfaces, the carpet provides acoustics and additional insulation on the floors.

The painting of the interior and exterior was well selected and tastefully applied, which I believe, encourages further interest in the school by the adults.

Educational spaces -- the gymnasium again is large to the Alberta standards, but not too large for the purpose it is being used -- it is to be used for adult purposes.

As I expressed on the visit, there is some concern as to whether the vinyl asbestos tile finish of the gym floor will give you long service. For gym activities, it has a tendency to become too slippery. If it is not properly maintained it may lift or curl which can develop into a serious problem.

The maple flooring is highly desirable, but it is expensive. Another material that has been effectively used on gym floors is krommenie cork carpet. It is a cork based sheet material and would provide a finish with properties between the maple floor and vinyl asbestos tile. The cost is slightly more than the tile. The folding stage is economical and a good solution for providing stage facilities where, I assume, there is a low demand for dramatic production.

Side panels and stage flats can be easily produced for this type of stage, and we would be pleased to provide sketches if desired.

Classrooms and supporting facilities are equivalent to accepted standards in schools throughout North America. I noted that classroom instructional space on this school is more formalized to individual classrooms. However, I presume that these were adopted to the needs of this school, and it would be difficult because of the structural system used to convert the entire classroom area into one open area.

The only instructional spaces that were undersized or not provided with the active instructional courses were the industrial arts and home economics. It is my understanding that there is extensive interest by the adults in these activities. If so, I would suggest that a portable or permanent shop unit be located on the same site which could then be used by the adults and at the same time be made available to the school student needs through scheduling.

Residence -- the breaking down of residence into smaller units makes a lot of sense. I was also impressed with the approach that an attempt is made to keep the family students in one unit. This, I believe, softens the institutionalization effects on the young students. The hiring of native "house-parents" not only creates employment for the natives, but also enables the students to adapt to a new way of living.

It is unfortunate that the coloring and "life" of the school was not extended to the residences, but I am of the opinion that this can be overcome by encouraging the residents to decorate their units and the children to decorate their rooms. Some curtains and paint (colors to be selected by the students) would be a very small investment towards extending the total education program and towards the establishment of morale. In fact, this could reduce, to some degree, the annual early summer student immigration out of the schools to the open spaces. At least, it would encourage the return to the school. In regards to the Lennox hot air furnaces, a regularly scheduled preventative maintenance service (twice a year) should be provided. This would give you good returns. The advantages of these units are that heat and air circulation can be maintained within the building even with a breakdown of two or three units and there is no need for expensive standby units. The installation is very economical when compared to the heating plant installed at Edzo.

In summary, the facilities, except for a couple of minor things mentioned earlier, can be praised in all facets and the basic principles used in producing these facilities should be given due consideration and applied in future school planning in the Northwest Territories.



In conjunction with our previous report and to clarify the reference to costs in the report as prepared by Mr. J. J. Smart, we provide the following comments for your information:-

1. With reference to the cost of the Music Practice Rooms and the Stairwells in the Hay River School and probably in other areas as well, the suggested increased costs are due to the same thing, the excessive use of exterior walls to enclose these areas as compared to the average similar type building. In this structure, exterior walls cost approximately \$4.35/Sq. Ft. while the interior partitions cost approximately \$1.20/Sq. Ft. In some areas the ratio of exterior wall to interior partitions is as much as 3 to 1 whereas in the average building it could be 1 to 3.
2. Folding partitions were mentioned as adding to the cost of the Hay River School, so for comparison purposes the following costs apply -
  - A. Classroom Type Folding Partitions - \$13.00/Sq. Ft.
  - B. Accordion Type Folding Partitions - \$9.00/Sq. Ft.
  - C. Standard Drywall Interior Partitions \$1.20/Sq. Ft.
3. Providing glazed partitions in lieu of drywall partitions as was the case in the Hay River School increased the partition costs from \$1.20/Sq. Ft. to \$3.90/Sq. Ft.  
 If in some areas safety glass was used, this could increase the partition cost from \$3.90/Sq. Ft. to \$6.90/Sq. Ft.
4. Laboratory fixtures are expensive and if too many are provided as suggested in the Hay River School then the cost for the additional furnishings can be determined as follows -
  - A. Lab Counters & Tops \$79.00/Lin. Ft.
  - B. Lab Stools \$30.00/each
  - C. Fume Hoods \$850.00 to \$1,000.00/each
5. The additional cost suggested to provide the Teepee Structure for the Yellowknife School is quite evident as compared to a standard structure, however, before this structure was built, a separate price was provided and although it was nearly deleted from the contract it was decided after lengthy consideration that this architectural feature should not be eliminated.
6. To compare costs of various gymnasium floors as suggested under the report on the Fort Good Hope School, the following information is provided -
  - A. Vinyl Tile \$ .40/Sq. Ft.
  - B. Maple Flooring \$ .90/Sq. Ft.
  - C. Hardwood Gymnasium Flooring \$2.20/Sq. Ft.

The cost escalating factors which, according to Mr. Smart, have to be accepted, as outlined in his report on Page 5, are not actually occurring as he has indicated.

1. The Northwest Territories does have access to the varied competitive construction methods and materials and has successfully and economically used various materials in school construction.  
Examples - Lumber for the majority of schools, Steel for Hay River, Coppermine and Cambridge Bay, Prefabricated Fibreglas exterior panels in Frobisher Bay.
2. The firm price bidding in Northern Areas is no less competitive than in any other areas.  
Examples - Hay River High School - 7 Bidders, Ft. Resolution - 9 Bidders, Edzo School & Residence - 12 Bidders, Ft. Good Hope School - 3 Bidders.  
Competition from marginal profit construction firms is non-existent.  
We compete successfully against local contractors in any area in Canada.

"G.A. Fraser"

SUMMARY - SCHOOL COSTS

<u>HAY RIVER HIGH SCHOOL</u>		65,000 sq. ft.
Construction cost	\$2,103,148.82	32.31
Consultants	164,260.13	2.53
TOTAL	<hr/>	<hr/>
	\$2,267,408.95	\$34.84 per sq. ft.
 <u>EDZO SCHOOL &amp; RESIDENCE</u>		85,000 sq. ft.
Construction cost	\$2,359,356.27	27.76
Consultants	116,152.99	1.37
TOTAL	<hr/>	<hr/>
	\$2,475,509.26	\$29.13 per sq. ft.
 <u>FORT GOOD HOPE</u>		14,800 sq. ft.
Construction cost	\$ 474,876.01	32.08
Consultants	51,431.09	3.48
TOTAL	<hr/>	<hr/>
	\$ 526,307.10	\$35.56 per sq. ft.
 <u>FORT RESOLUTION</u>		25,000 sq. ft.
Construction cost	\$ 615,812.01	24.63
Consultants	71,017.84	2.84
TOTAL	<hr/>	<hr/>
	\$ 686,829.85	\$27.57 per sq. ft.