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TERRITORIAL HOUSING CONSTRUCTION STUDY

June, 1969

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Background

At the 38th Session, Council requested a study of the feasibility of building all houses at the proposed new townsite near Rae from local logs. This paper is an interim progress report on the study arising from that request.

Council's continuing interest in promoting the use of local labour and materials for house construction throughout the Territories is recognized. The terms of reference were therefore broadened, and the study is now intended to include:

- Log construction both for the Rae area and for all off-highway settlements below the tree line.
- Frame construction with an increasing input of local labour and materials.

Purpose of Study

To investigate the feasibility of using more local labour and materials in housing constructed by the Government of the Northwest Territories.

Factors to be Considered

The factors to be considered in this study include:

1. The availability of logs to settlements below the tree line.
2. The availability of small sawmills in a number of the settlements. These mills can be used both to square logs, if squared log construction is desired, and to cut rough lumber.

3. The general availability of local labour in settlements for the construction of both log and frame houses.
4. The varying requirements for supervision and skilled labour from outside the settlement, depending on the skills available locally.
5. The varying degree of acceptance of log housing. A preliminary investigation on this subject indicates that log houses are accepted, and in some cases even preferred, in many of the remote settlements with a predominantly indigenous population. In settlements with a more mixed population, or with a large number of existing frame houses, there is often less acceptance of log housing; living in a frame house appears to give a higher status.
6. The lack of historical cost data, on a comparable basis, for different methods of construction. These data are needed for accurate estimates of true construction costs and of the impact on the local economy.

Conduct of Study

The study is being carried out jointly by the Department of Public Works and the Department of Industry and Development. It consists of two phases.

Phase 1 involves a preliminary cost estimate for five methods of constructing a typical house. The estimates consider both overall costs, and the dollar input to the economy of the settlement through the use of local construction labour and locally-produced materials. This phase is now complete and the results are summarized in this paper. The five methods covered are:

1. Log construction, local labour for procuring and squaring logs, and local labour for erection except where specialized skills are involved.
2. Log construction, local labour for procuring and squaring logs, and erection by an outside contractor using outside labour. This method is unlikely to be considered but is included to complete the analysis.
3. Frame construction, locally-cut lumber, and local labour for erection except where specialized skills are involved.
4. Frame construction, imported lumber, and local labour as above.
5. Frame construction, imported lumber, and erection by outside contractor using outside labour.

Phase II will involve building both log and frame houses under strictly comparable conditions. This is expected to give accurate information on cost and feasibility. Also, it should provide a more objective evaluation in terms of comfort, warmth, heating economy, and general acceptability than is presently available. Five log houses will be built under the Territorial housing program and eight frame houses under the Federal housing program, all at the same location. The houses will be built in the summer of 1969, and it is planned that a final study report and a Recommendation to Council will be presented at the first session of Council in 1970.

Description of Houses Used in the Comparison

To obtain a valid comparison it was necessary to select one specific size and style of house in one location, and also to select one of the several possible types of log construction. However, the information obtained should be generally applicable to all government houses, including staff housing, in the appropriate settlements.

The comparison, for both Phase I and Phase II, is based on a standard three-bedroom low cost house erected on a gravel pad. The cost figures assume a location at Fort McPherson and the test houses will be built there. Fort McPherson meets all the requirements for this study, and in addition happens to have a supply of seasoned logs available for immediate use.

The type of log construction selected uses logs squared on three sides, with the round side out. Slabs one inch thick are cut from the two opposite sides, and the rounded part remaining on the third side is then cut off. On erection the logs are held tightly together with 10-inch dowels spaced every 4 feet. The inside is strapped, covered with 2-inch fibreglass batt insulation, and lined with ½-inch plywood. Squared logs are favoured over any of the round log alternatives, because of the limitations in construction skill, degree of supervision, and log quality faced by most of the settlements. Under these conditions a squared log house is likely to be tighter, warmer, and more attractive than a round log house. The intention in this study is to consider a log house which in all respects is as desirable as a frame house. Part of the higher cost of the squared logs will be offset by the lower erection cost.

The frame houses use maximum local labour, with no factory pre-cutting or pre-fabrication. They are insulated with 4-inch fibreglass batts, providing an overall insulation value comparable to that of the logs and 2-inches of fibreglass.

Preliminary Results and Conclusions

The results of Phase I are summarized in the accompanying table. Because firm data will not be available until the test houses are constructed, the tabulated figures should be considered preliminary and approximate.

It will be noted that, even with maximum local labour, the figure for outside labour is given as \$1,600 to \$2,150. This covers supervision and those skilled trades, e.g. electrical, which are not generally available in the settlements at the present time. As the level of technical skill available in the settlements increases, this figure will reduce.

The main conclusions, which must be considered highly tentative until Phase II is completed, are:

1. Log houses are slightly cheaper than comparable frame houses.
2. The overall cost of a house tends to decrease as the local input increases.
3. Redirection of the current governmental housing programmes in the Northwest Territories to include a significant increase in the use of local labour and materials appears feasible.

PRELIMINARY ESTIMATE OF CONSTRUCTION COSTS

3 BEDROOM LOW COST HOUSE AND GRAVEL PAD

FORT McPHERSON 1969

Elements of Cost

Log Construction

Frame Construction

| | <u>Log Construction</u> | | | | <u>Frame Construction</u> | | | | |
|---------------------|----------------------------|-----------------|----------------------------|-----------------|---------------------------|---------------------|------------------------|---------------------|-----------------|
| | <u>Locally Constructed</u> | | <u>Outside Constructed</u> | | <u>Local Lumber</u> | | <u>Imported Lumber</u> | | <u>Outside</u> |
| | <u>Local</u> | <u>Outside</u> | <u>Local</u> | <u>Outside</u> | <u>Max. Local</u> | <u>Local Labour</u> | <u>Max. Local</u> | <u>Local Labour</u> | <u>Contract</u> |
| | <u>Expenses</u> | <u>Expenses</u> | <u>Expenses</u> | <u>Expenses</u> | <u>Expenses</u> | <u>Expenses</u> | <u>Expenses</u> | <u>Expenses</u> | <u>Expenses</u> |
| Construction Labour | \$1,800 | \$1,600 | | \$4,200 | \$1,400 | \$2,150 | \$1,400 | \$2,150 | \$4,200 |
| Materials | 1,600 | 5,800 | 1,600 | 5,800 | 1,550 | 7,000 | | 8,350 | 8,400 |
| Freight | | 1,200 | | 2,100 | | 1,000 | | 1,400 | 2,400 |
| | <u>\$3,400</u> | <u>\$8,600</u> | <u>\$1,600</u> | <u>\$12,100</u> | <u>\$2,950</u> | <u>\$10,150</u> | <u>\$1,400</u> | <u>\$11,900</u> | <u>\$15,000</u> |
| | | <u>\$12,000</u> | | <u>\$13,700</u> | | <u>\$13,100</u> | | <u>\$13,300</u> | <u>\$15,000</u> |