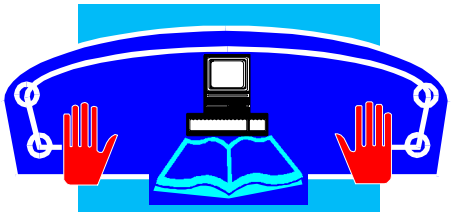

1986 Monitoringof Cmhc's Rural And Native Housing Demonstration Program - Volume I: Program

Type of Study: Analysis/review

Date of Report: 1987

Author: Canada Mortgage And Housing

Catalogue Number: 9-5-298

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1986 MONITORING OF CMHC'S RURAL AND NATIVE HOUSING DEMONSTRATION PROGRAM

VOLUME 1: PROGRAM

VOLUME 1

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ACKNOWLEDGEMENTS

This study was carried out by Larsson Consulting Ltd. of Ottawa on behalf of the Project Implementation Division of the Canada Mortgage and Housing Corporation (CMHC).

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We would like to express our appreciation for the very valuable cooperation extended to us by all CMHC field offices and by the governments of Alberta and the Northwest Territories. We would also like to thank the project construction managers who often accompanied our field staff and Local Office CMHC staff on site visits. Sincere thanks are also due to the homeowners who allowed us access to their houses and answered our questions with great patience. Finally, we wish to thank Norbert Koeck and Dan O'Leary who not only cooperated superbly at all times, but also provided welcome encouragement at critical moments.

FOREWORD

This report presents the results of an assessment of 19 projects funded under the Rural and Native Housing Demonstration Program (RNH), and four projects funded under either the Alberta Rural Homeownership Assistance Program (RHAP) or the Northwest Territories Homeownership Assistance Program (HAP).

The Demonstration Program provides building materials and technical assistance to selected participants to help them build their own houses. The Program is a development of ideas first tested in the HAP and RHAP Programs and subsequently endorsed by the Nielsen Task Force. It is generally impossible for low-income people living in rural and remote areas to construct their own houses; the objective of this Program is, by providing appropriate assistance, to develop and test their capacity to do so. The Program is also expected to produce housing at much lower capital cost than other types of CMHC housing in remote areas, and with lower operating costs.

Analysis of project data has been made on a national basis, and comparisons have been made of the RNH Demonstration Program and two similar programs (Alberta's RHAP and NWT's HAP) . It should be noted that the Demonstration Program is at an early stage in its development, and that projects were incomplete at the time that field work was carried out. Data analysis and program comparisons are therefore limited in scope and preliminary in nature.

SECTION 1

EXECUTIVE SUMMARY

1. EXECUTIVE SUMMARY

Field assessments of the RNH Demonstration Program indicate that most projects are proceeding at a satisfactory rate, within budget and with good quality products. The late start of the 1986 Program meant that construction had to be carried out over the winter, and as a result subtrades have been used much more than was anticipated. Nevertheless, homeowners have also been deeply and admirably involved in the construction process.

Communities chosen have populations of less than 2,500, although many of them tend to be rural, rather than remote, in character.

All but one project followed guideline requirements in terms of the number of units per project (three to seven). However, seven projects, instead of adhering to the tightly clustered arrangement anticipated in the guidelines, consisted of widely scattered houses. This had a negative effect on the delivery of these projects.

The role of the construction manager was, as anticipated, crucial to the success of the Program. Homeowners were unanimous in commenting on the important contribution that managers had made in providing management, guidance and on-the-job training. In several of the larger projects (with five or more houses), construction managers were assisted by carpenters who took the lead role on each site. Despite the increased cost involved, this division of responsibility was found to be useful and effective.

Notwithstanding the limited budget available for Demo houses, it was decided in certain cases to modify the design by replacing the recommended crawl space with a full basement. Although the added space provided by basements appears to be worth the marginal cost in some cases, the impact of the increased operating costs have not yet been assessed. In addition, basements are not appropriate in the many areas where groundwater problems occur.

A comparison of the net construction cost[1] of Demo units and the net construction cost of comparative units (taken as the lesser of costs for local RNH Homeownership units or local builder's units) indicates that Demo units are about 43% less

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[1] Costs throughout the report are quoted on a per-unit basis, that is, the project cost divided by the number of units. "Net construction cost" has been defined as the total construction cost minus any expenditures for land and site services. This approach has been taken to provide greater comparability, since some land and services were provided by owners.

expensive. Most of this saving can be attributed to the use of volunteer labour. Data obtained from the NWT (see pg.39) indicate an even larger capital cost saving and also show massive savings in on-going subsidy costs.

The typical unit costs of units built under the Demonstration Program compare favorably with those of the Alberta Residential Home Assistance Program (RHAP) and NWT's Homeownership Assistance Program (HAP), taking into account differences in the type of housing delivered.

Interviews reveal that the Demonstration Program is very popular with delivery personnel and homeowners.

Despite its virtues, the Demo Program has aroused some overt opposition. The 100 Mile House and Carmacks projects have been especially controversial, but field work also uncovered less vocal, but equally negative, opinion in other areas. There tended to be a sharp decline in the number of volunteers to help with construction during the life of those projects where there was local opposition. Although the controversy in Carmacks was partially fuelled by a local by-election, the Program is perceived as a give-away in many areas, and the recipients (many of whom are unemployed, or partially employed, and on some form of assistance) are seen as undeserving.

The public is generally unaware of the enormous expense involved in housing programs; at the same time, the public does not realize that the Demo Program is far less expensive to the government than RNH Homeownership housing. At the time of the field work, CMHC was attempting to address this problem by extending the forgiveness period to 25 years; but the effects of this measure are not reflected in this report.

SECTION 2

METHODS AND PROCEDURES

2. STUDY METHODS AND PROCEDURES

This study has been based on file data collected from the National and Local Offices of CMHC and data gathered in the field.

Information was gathered in the field by means of semi-structured questionnaires designed for application at a number of levels, beginning with the Regional and Branch/Local Offices of CMHC, and continuing down to the project and house/homeowner level. Field experience indicates that the questionnaires became more relevant and useful as we descended downwards in scale, towards the house/homeowner level. Demo houses were photographed, as well as comparable housing in the area. At least one of each house type was inspected for quality and code violations, and the homeowner interviewed. In these houses, changes made to the original design were noted.

Reality always differs from theory. In some cases, we found that neither construction managers, CMHC staff nor clients could remember certain details that were of interest to us -- for example, how many and what kind of meetings were held. In other cases, we obtained directly conflicting information from two equally well informed people. Despite these difficulties, the usual ones besetting a project that involves the collection of primarily "soft" data, we believe that this report fairly depicts what has taken place in the field.

Readers should note that the data on project costs is based on preliminary budget estimates, and that final data on project costs will have to await the closing out of projects.

SECTION 3

BACKGROUND OF THE PROGRAM

3. BACKGROUND OF THE PROGRAM

3.1 ORIGINS OF THE RNH DEMONSTRATION PROGRAM

CMHC's Rural and Native Housing Demonstration Program, established in 1985, was partially based on similar programs already being operated by the governments of Alberta and the Northwest Territories.

The Government of the Northwest Territories introduced the Small Settlement Home Assistance Grant Program (SSHAG) in the early 1970's in order to reduce the pressure on public housing rentals. Under this program, clients able to construct their own houses from locally available materials -- usually logs -- were eligible for a grant of $10,000 (raised to $18,000 in 1981) for the purchase of manufactured goods and specialized services. In 1980, a NWT Housing Corporation (NWTHC) staff report on the program's implementation at Snowdrift, NWT, suggested that if all costs were counted, including administrative costs and federal manpower grants for skilled trainers, the real cost to the territorial and federal purse for each grant was close to $30,000.

In 1982, the NWTHC replaced SSHAG with a new program, called the Homeownership Assistance Program (HAP), the intention being to extend the program to larger centres and to introduce more flexible rules. The objective of HAP was essentially the same as that of SSHAG, but dropping the requirement for locally harvested material meant that it could be used in all areas of the NWT, and not only where good building logs were available. Thus, it became a significant component of the overall set of housing programs supplied by the NWTHC.

The success of SSHAG encouraged the Alberta Department of Housing to introduce a similar program in that province in 1978. In both programs, the use of labour contributed by the homeowner meant greatly reduced costs. This aspect is discussed in greater detail in following sections of this report.

In 1984, the Nielsen Special Working Group on Housing noted the success of these programs, referring in particular to the savings achievable by trading the ongoing subsidy and administration costs of conventional public housing for a one-time grant.

The Working Group went on to comment on the deplorable housing conditions in remote and rural areas where this type of self-help housing could be most effectively introduced. It was also noted that the very low incomes typical of remote populations had resulted in a 30 per cent rate of arrears in current Rural and Native Housing programs. The Working Group

concluded that a demonstration program should be undertaken to test the feasibility of a federal program similar to those in the NWT and Alberta.

An earlier Cabinet decision, which had approved in principle a new RNH Demonstration Program, was re-confirmed in November, 1985, as part of a whole set of new housing initiatives, and the new program was announced by the Minister responsible for CMHC in early 1986. Work on the development of the Demonstration Program began in early 1986 with the consideration of a number of alternative ways of delivering the program.

At first, it was thought that the fastest and most effective method of project delivery would be a highly centralized operation involving the shipping of components or semi-prefabricated units to sites. However, in a program where local involvement was considered essential in encouraging homeowners to take pride in their houses, this approach had the disadvantage of shutting out local associations and regional staff. It was also considered important that local people, by being intimately involved in the program, should develop a good understanding of the advantages, costs and responsibilities inherent in this form of tenure.

Consultation with CMHC regional staff, Provincial and Territorial authorities and with native groups suggested that regional administration of the program would be both workable and desirable.

By mid-March, 1986, draft guidelines and procedures had been developed at CMHC National Office and distributed to Regional Offices for comment.

A submission was made to CMHC Management on May 27, 1986, requesting approval of an off-reserve Rural and Native Demonstration Program that would be administered by CMHC Regional Offices, perhaps in cooperation with those Territorial and Provincial agencies that had comparable programs in place. As the program was to be distinct from line programs and was intended merely to assess the potential of this method of delivering low-cost housing, management was also asked to obtain an order-in-council for the necessary funding as required by Section 37.1i of the Northern Housing Act (NHA) for demonstration work.

The submission was approved by CMHC Management, and an order-in-council approving the required funding for 1986 was obtained on July 23, 1986.

3.2 OUTLINE OF THE RNH DEMONSTRATION PROGRAM

The current RNH Program is based on a payment-to-income (or mortgage payment) formula developed to distribute the capital, operating and maintenance costs of a dwelling equitably between low-income families and the federal-provincial housing partnerships . This arrangement places the responsibility for funding the project and for monthly operating on the federal/provincial partnership, which then has to recover a portion of the monthly costs from the occupant. This process not only involves a subsidy for up to the 25-year life of the mortgage, but also requires a widespread and costly administrative organization. There is little in this arrangement to encourage the occupant to become self-reliant or to use family labour to maintain the dwelling.

A 1980 study of on-reserve family life[2] suggested that wage income (that is, cash) made up only half of a family's real income; the balance was made up through farming, hunting and fishing for food, and through barter and the exchange of services. The low proportion of cash to non-cash income is a significant factor in most rural and remote areas.

The existing RNH Horneownership Program concentrates on the family's cash income and, by requiring monthly cash payments, tends to deplete an already scarce resource. The Demonstration Program, on the other hand, utilizes the non-cash resources of a family to provide construction labour, leaving the family's cash income intact. Under the new program, the homeowner undertakes the usual homeowner's responsibility for operating and maintaining the dwelling, thus relieving the federal/provincial partnership of the cost of subsidy and administration.

In the NWT and Alberta, where similar programs were introduced in the late 1970s, the capital cost of constructing a dwelling equal in size and quality to others in the neighbourhood has been reduced by about 50 per cent. Therefore, the homeowner and his family have contributed 50 per cent of the value of the dwelling. This is a very significant saving to the federal/provincial partnership; furthermore, the homeowner's substantial equity, to say nothing of the pride of ownership, is likely to provide the incentive for proper operation and maintenance of the dwelling.

The RNH Demonstration Program is scheduled to deliver a total of 500 housing units to rural areas of Canada over five years commencing in 1986.

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2 Indian Conditions: A Survey, DIAND, 1980

Households of all ethnic backgrounds are eligible for inclusion in the program, but in fact needy households in remote and rural areas tend to belong to Native and Metis communities. Though the program is designed to serve the low-income population, income limitations are applied to exclude families too poor to maintain a dwelling without an on-going subsidy.

Since it is mandatory that each participating family take an active part in the construction of its dwelling, selected households must be able to commit a considerable amount of their own or volunteer time to the project.

Participating families are provided with a materials package delivered to the site and the services of a construction manager to manage the project and to provide some training. The Program also covers the acquisition of land, the provision of skilled sub-trades, utilities and the payment of design fees and other professional charges. No payment is offered for the household's labour, nor for other volunteer labour, and the household must supply appliances and furnishings.

All these costs are acknowledged by the homeowner in the form of a signed mortgage document or promissory note. This indebtedness is forgiven at the rate of 20 per cent annually, so that in five years the dwelling is owned outright by the homeowner. This security is intended to discourage early profit-taking and to ensure that CMHC can recover the unit if it is abandoned within the first five years.

In order to qualify for the annual forgiveness, the homeowner has to occupy the dwelling and demonstrate that it is adequately maintained. Otherwise, the homeowner has all the usual rights associated with ownership and if the dwelling is sold within the five-year period, the owner can take the profit from the transaction after paying off the residual debt to CMHC.

Rural and remote areas have no lack of land for the erection of dwellings; however, it is not always possible to acquire sites where the land title allows for a mortgage to be placed on the dwelling.

By September 1986, the regions were calling for a clarification of acceptable ways of dealing with land title, and it was resolved that during the five-year forgiveness period CMHC would retain the right to take back and re-assign a dwelling of a client who did not maintain or live in the dwelling. The policy was intended as a deterrent against premature sale of a dwelling where the homeowner could make a windfall profit. This was a particularly important consideration in areas where there was an established real estate market.

This problem was discussed in a memorandum from Project Implementation Division (PID) desk officers to the regional managers of operations (September 12, 1986). The following provisions outline the policy with respect to land title and mortgage requirements for the RNH Demonstration Program during the 1986/87 operations.3

A. **Where the client has no land:**
If necessary, CMHC may purchase or provide a lot on behalf of an eligible client. The title to the property should be registered in the client's name at the time of purchase. CMHC will take a mortgage on the property with the forecasted interest adjustment date being the estimated date of substantial completion. Where freehold title exists, a form of freehold mortgage should be used where the total amount of unit construction plus land cost is forgiven at a rate of 20 per cent per year over a five-yea-r period.

B. **Where the client has land:**
Title to the property will remain in the client's name and CMHC will take a mortgage on the property with the forecasted interest adjustment date being the estimated date of substantial completion. Again, a form of freehold mortgage should be used where the total amount of unit construction cost is forgiven at a rate of 20 per cent per year over a five-year period. If any liens are registered against the client's property, these should be looked into and, if necessary, the regional solicitor's opinion could be obtained before deciding whether to proceed. It is not recommended that personal debts against the client's property be cleared by CMHC.

C. **Where the client has leasehold property (in a registered planned** *vision):
The lease will remain in the client's name and the regional solicitor will be asked to review the lease and advise whether house construction could proceed and if a leasehold mortgage can be registered against the property. CMHC will take a leasehold mortgage on the property with the total amount of unit construction cost forgiven at a rate of 20 per cent per year over a five-year period.

D. **Where the client is occupying crown land:**
If possible, the client should have an occupancy or use permit orwe should attempt to get a letter of comfort from the province or territory indicating that we may proceed to construct the demo units. The client will sign a promissory note, similar to the RRAP Agreement, which again will forgive the total amount of unit construction cost at a rate

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3 E-roil to Regions from Program managers, July, 1986

of 20 per cent per year over a five-year period.

The RNH Demonstration Program does not deliver a normal "builder's house", and the insurance safeguards available to a builder are not always available to government or unpaid labour. The following memorandum discusses the policy, and problems that are being encountered in its implementation.

> Please be advised that we have obtained comprehensive general liability insurance against third-party claims through our Rural and Native Housing Demonstration projects. Present coverage under Policy NO. CGL023281 extends from June 15, 1986, to December 1, 1986, and will be extended at that time. Any claims should be filed in accordance with procedures in Manual 21-2, Section 21-2.2 11/1 .
>
> Althoughwe have looked into comprehensive job site insurance against fire, theft, etc., we have found that the cost, deductibles and administrative requirements are prohibitive. Unless you feel it is necessary to explore this further on a regional level, we are recommending that you proceed with a "self-insured" policy and reserve some funds to enable some re-supply if necessary.
>
> We have made some inquiries regarding the payment of Workman's Compensation fees for the client and any volunteer labourers but are told this is not possible if there are no earnings to insure. You may wish to pursue this further on a provincial basis, otherwise clients and volunteer helpers should be advised that they are not covered through the program. As indicated in the Construction Manager Contract, Item 9, the Construction Manager must pay his/her own Workman's Compensation fees.

3.3 PROVISIONS FOR FUTURE MONITORING AND EVALUATION

When CMHC management approved the RNH Demonstration Program, the President outlined a number of required controls, including several that would tend to keep management fully informed of progress.

It was suggested that a regional average of $40,000 per unit be allocated for the first year of operation, thus giving the General Manager in each Region the authority to spend relatively more or less, depending on the local circumstances. This figure was to be modified annually both to account for inflation, and to adjust it according to the first year's experiences.

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4 Memorandum, R.S. Stapledon to J.S Morris, August, 1986

In order to ensure that all houses will be completed, the Regions are to dispose of enough funds to cover contingencies in the field. The Program is designed so that the Corporation has some claim on a house being built, or already occupied, if the homeowner abandons the house for any reason.

Each homeowner will enter into a mortgage, or some similarly binding agreement, with CMHC for the full cost of acquiring and developing the site, the materials package, and associated capital costs. The mortgage will not be discharged until the end of the five-year forgiveness period, permitting CMHC to repossess the dwelling during this time if it is abandoned by the homeowner.

In implementing the program, a standardized reporting system has been adopted by the PID, starting with a "Commitment Authority" form that is completed at three stages: at the "soft" stage, where the selected clients are named and estimated cost of the project is determined; at the "hard" stage, where actual costs are available; and at the "close-out" stage, after completion of the project. Monthly reports to the President have been made and are available for reference.

A general ledger account has been established to encourage reporting in a way that will facilitate future monitoring and evaluation. Capital expenditures are reported from the field under General Ledger Account Code 120-11 within the following descriptive fields:

1.	Pre-development expenses	01
2.	Land	02
3.	Fees and permits	03
4.	Construction manager -- Contract	04
5.	Construction manager -- Expenses	05
6.	Tools	06
7.	Materials package	07
8.	Extra freight costs	08
9.	Equipment rentals	09
10.	Specialized labour contracts	10
11.	Miscellaneous	11

The program is to be monitored annually, with this report focussing on year-one activity. The basis for a full evaluation of the Demonstration Program at its termination in 1990 will be the "Rural and Native Housing Demonstration Program, Evaluation Framework" (Draft: May 21, 1986) prepared by the Program Evaluation Division, CMHC.

The purpose of the on-going monitoring, and of the final evaluation, is to measure:

the quality of housing produced;

the nature of the client group;
clinet's ability to afford maintenance and operation costs;
the degree of community acceptance;
delivery requirements, including the need for training, on-site supervision and inspections; and,
a comparison of program costs with the subsidy and administrative costs of conventional mortgage repayment programs.

The cost of the annual monitoring of the program, along with evaluation of the program, is carried by National Office (PID) and does not form part of the global regional budgets.

SECTION 4

NATIONAL FINDINGS

4. NATIONAL REPORT ON PROGRAM MANAGEMENT AND DELIVERY

4.1 ALLOCATION TO REGIONS

Approval was obtained in the amount of $4,150,000 for the 1986-87 construction year. The total number of units to be constructed in 1986-87 was limited to 100, with an average cost of $40,000 per housing unit. Funds were allocated to the CMHC Regions as indicated in Table 1.

TABLE 1 PROGRAM ALLOCATIONS BY REGION

	Original Allocation		Final Allocation	
	units	$	units	$
Newfoundland	5		5	
PEI	3		3	
NB	5		5	
Nova Scotia	12		16	
ATLANTIC	25	1000000	29	1160000
QUEBEC	15	600000	16	64000
ONTARIO	15	600000	8	32000
Manitoba	10		11	
Saskatchewan	10		6	
Alberta	9		9*	
PRAIRIE	29	1160000	26	1040000
B.C.	10		5	
Yukon	6		13	
B.C REGION	16	640000	18	720000
CANADA	100	4000000	97	3880000

Allocations were subsequently altered because of the finding of some Regions that they would not be able to complete the full program within the initial allocation. The Alberta allocation is a special case, since it was decided to dedicate CMHC funds to the production of units under Alberta's very RHAP. Because of the lower funding levels under RHAP, about $20,000 per unit, and

* Funds are expected to produce 33 units, because of lower costs and cost sharing with Alberta.

because of the CMHC/Alberta decision to undertake this on a 50/50 basis, the CMHC allocation is expected to produce 33 RHAP units in that province.

The delivery of the houses was the direct responsibility of the CMHC Regional General Managers, under the general direction of PID at the CMHC National Office.

Each General Manager was authorized to decide exactly how much more or less than the $40,000 average would be spent on each house, as long as the overall budget allocation was not exceeded and as long as the specified number of houses was built.

The Operational Guidelines were developed in conjunction with the Local Offices; however, some clarification was required before the program could be implemented.

4.2 PROGRAM DELIVERY STAFFING AND ROLES

The Operational Guidelines outlined the responsibilities of the various participants in the process. Broadly speaking, the allocation of responsibilities was expected to conform to the pattern outlined in the following table.

TABLE 2. INTENDED DELIVERY ROLES

TASK	Region	Branch	NGO*	ConSt. Mngr.	Client
Macro program management	L				
Local program management		L			
Regional/LO budgets	L				
Project budgets	A	L			
Public/NGO relations		L			
Macro project alloc.	L				
Project selection	A	L	s		
Client selection		S/L	L/S		
Selection of CM		L	s		
Project administration	A	L		s	
Site selection/pre-dev.	A	L			
Construction management		A		L	
House design		L		s	s
Tendering		L			
Construction training				L	
Construction				A	L
House inspections		L		s	

(L = lead role)
(s = Support)
(A = Approval)

* NGO - Non-governmental organization, such as a Native association or a non-profit community association

At the program, as compared to the project, level, this model was generally adhered to, with some significant exceptions. The Prairie Region took an exceptionally active role in the delivery of the Manitoba projects, although it played a more conventional role in Saskatchewan. In the Atlantic, Quebec and Ontario Regions, Local Offices tended to take on main delivery repsonsibilities . In the BC/Yukon Region, the Prince George Office took the lead in the delivery of its project. In the Yukon, the Yukon Housing Corporation (YHC) was responsible for delivery, while a tripartite committee recommended communities and actual delivery was handed over to a contracted individual.

Native associations were generally very active in the selection of communities, projects and clients, although Ontario and Saskatchewan had little or no involvement of this kind, depending instead on the involvement of municipal or local councils.

4.3 COMMUNITY AND PROJECT SELECTION

The Operating Guidelines clearly define the type of communities and projects to be selected. Specific criteria include the following three official requirements.

a) Communities should be off-reserve, and remote or isolated, with populations of less than 2,500.

b) Preference should be given to communities where existing RNH Homeownership or rental programs are not being developed.

c) A typical project shall be considered to consist of a cluster of three to seven units in one community.

Although most of these criteria have been respected in most areas, there are significant exceptions, as indicated in Table 3. Analysis indicates that rural, rather than remote, communities were often selected, though the distinction between rural and remote communities does not appear to be a crucial one. There are, for example, very few truly remote communities in the Maritimes.

It was also interesting to find that seven projects were spread out over scattered communities or sites and that one project consisted of a single house. The scattered projects, most numerous in the Atlantic provinces, led to inefficiencies in project management, since construction managers had to spread their efforts over a wide area and wasted a great deal of time traveling. Also, in these projects, it was difficult to form homeowners into work teams, and much of the advantage of group work was lost. The single house project, albeit experimental,

led to a very high proportion of project funds being spent on management.

TABLE 3. COMMUNITY SELECTION CRITERIA SATISFIED

	remote/isolated under 2500 pop.	No existing RNH Homeown.	3 to 7 units in one community
Nain	OK	OK	OK
PEI	rural	Homeownership	3 units, 2 cm.
NB	rural	Homeownership	5 units, 4 cm.
Preston	semi-urban	Homeownership	7 units, 3 comm.
Annapolis	rural	Homeownership	5 units, 3 cm.
Chutes	rural	OK	OK
Mistassini	rural	OK	5 units, 2 cm.
Rupert	rural	OK	1 unit
Campb. Bay	OK	OK	OK
Rutherglen	Sal-urban	Homeownership	OK
Hornepayne	OK	Homeownership	OK
Longbody	OK	OK	OK
Baden	OK	OK	OK
Red Deer	OK	OK	OK
Livelong	rural	OK	OK
100 Mile	OK	OK	scattered units
Carmacks	OK	OK	7 units, 2 areas
Carcross	OK	OK	OK
Old Crow	OK	OK	OK

4.4 CLIENT SELECTION PROCESS AND CLIENT CHARACTERISTICS

Client selection criteria, which were outlined in the Operational Guidelines, are presented in abridged form below.

a) Applicants must have an observable need for improved housing.

b) Household income must fall within local or regional definition of core need.

c) Applicants must have the ability to operate and maintain their homes and to pay for all utilities and taxes, etc.

d) Applicants must demonstrate their willingness and capability to participate in construction through the provision of

la.hour .

e) Preference shall be given to those not currently occupying subsidized housing and not currently in housing arrears with any housing authority.

Other requirements were mainly of an administrative character, including the performance of a credit check, and signature of a Homeowner agreement.

Criteria a, b and e were adhered in virtually all cases, while criterion c was applied mainly by an assessment of income: that is, while income had to be within core need, the very lowest income families tended to be eliminated on the basis that they would lack the necessary funds for proper maintenance and operation of the house. As far as is known, no specific techniques were used to ascertain whether applicants satisfied criterion d, and this has created problems in some instances.

Table 4, which summarizes household characteristics, shows a tendency to very modest incomes, considering household size. Nain is an exception, but the high cost of living there provides an acceptable context for these relatively high incomes. The very low average incomes in several projects (Campbell's Bay, Hornepayne and Longbody Creek) may mean that these families will experience difficulties in the operation and maintenance of their houses . Even in cases where the average income is relatively high, households often depend on seasonal jobs, with poor security. There is a clear need for further monitoring of the way in which homeowners' cope with the responsibilities and expense of home ownership.

4.5 PROJECT ORGANIZATION

Not surprisingly, the constraints of a tight schedule and varying local conditions made for frequent minor departures from the standard model of project delivery (see 4.2).

The New Brunswick, Preston, Longbody, Baden, Red Deer and Livelong projects were all delivered by CMHC inspectors in the role of construction manager. In Manitoba, where the Longbody project was not only plagued by difficult site conditions, but was also hindered by the failure of the first construction manager to mobilize the homeowners, the Regional Architect was instrumental in managing the early stages of the project. The Local Office Manager in North Bay provided active leadership in the Rutherglen project, greatly assisted by one homeowner, so that the construction manager played a less vital role.

Other projects depart totally from the standard model. The Hornepayne project in Ontario was carried out essentially as a

TABLE 4. SELECTED CHARACTERISTICS OF HOUSEHOLDS

	No.of house holds	size of avg hshld	household income		
			lowest	average	highest
Nain	5	6.4	17700	22900	35600
PEI	3	2.7	NA	NA	NA
NB	5	3.6	9400	12500	16000
Preston	7	5.7	7700	13400	24400
Annapolis	4	3.3	7200	12450	18000
Chutes	5	3.0	7450	11100	15350
Mistassini	5	4.6	12000	15400	18000
Rupert	1	4	13000	13000	13000
Campb. Bay	5	4.0	8100	9550	10750
Rutherglen	5	4.0	8550	12350	17400
Hornepayne	3	3.7	4850	6650	7600
Longbody	5	8.3	0	6750	12000
Baden	3	4+	9000	10450	11900
Red Deer	3	5+	7450	11050	15150
Livelong	6	4.7	9500	12550	17250
100 Mile	5	5.0	11000	14750	17100
Carmacks	4	3.3	7200	12450	18000
Carcross	3	4.0	NA	NA	NA
Old Crow	3	4.0	7200	10000	16800

normal builder's contract for three separate units, with the homeowners participating very little. In the Yukon, a construction coordinator provided custom design services and overall project coordination, assisted by construction managers in each project.

The primary involvement of non-governmental organizations (NGOs), especially of native groups, was expected to be advisory in nature, with the main contribution being made under the leadership of the Region in the community/project selection process. Although this was the case in most provinces, the NGOS have occasionally been active in other aspects of delivery. In the Annapolis project, for example, the Kings County Housing Society took the lead role in client selection, construction management and post-occupancy counseling. In the Yukon, program management for the Region (including the Carmacks, Carcross and Old Crow projects) was the responsibility of a tripartite committee made up of representatives from the Council of Yukon Indians, YHC and CMHC, with actual project coordination being

left in the hands of a contracted individual.

It was recognized from the outset that the role of the construction manager would be crucial to the Program's success, and this has been borne out in the field. Those projects directed by construction managers with good technical skills, organizational ability and leadership qualities tended to do well; those with weak and unskilled construction managers fared poorly. Examples drawn from specific projects illustrate this phenomenon.

Nain	The construction manager (CM) was a local man with excellent qualifications. His success, and that of the projects he directed, was partly due to his familiarity with the local people.
PEI	The CM was an employee of the firm that designed and supplied materials for the houses and his experience in working with inexperienced homeowners contributed to the project's success.
NB	The CM, who lived in the area where this scattered project was implemented, had previously had his own construction business, had taught in trade schools and was currently working for CMHC as an inspector. He designed the houses and provided training and assistance in excess of contract requirements.
Preston	The CM was a CMHC inspector who devoted 85 per cent of his time to the project. Relatively slow progress in this case was largely due to the clients' lack of construction experience, and also to their lack of commitment to the project.
Annapolis	The local NGO provided a CM and lead carpenters for each unit. The CM was an experienced local contractor, and good leadership was provided by the organization as a whole.
Chutes aux Outardes	A CM with good technical and leadership skills was contracted for the job and was instrumental in motivating the clients and ensuring a successful project.
Mistassini	The CM was hired in a competitive process. He was experienced in construction and was praised by the clients, but his diminished input towards the end of the project created sane problems in motivating the homeowners.

Rupert	A unique project, consisting of one house, made use of an experimental construction system developed by the CM, who also did much of the construction. In a single project such as this, the role intended for the CM is largely irrelevant.
Campbell's Bay	The CM, one of five interviewed, was credited by the homeowners with the success of this project, which was completed in a very short time.
Rutherglen	The CM was a heating and plumbing contractor. Although initially favoured by the clients, he was subsequently perceived as not being sufficiently involved in the process. His management deficiencies were compensated for by the very active involvement of the CMHC Office Manager and one of the clients, and the result was a good project.
Hornepayne	The CM project was the winning bidder in a tender that called for materials and most labour. He acted essentially as a contractor in building three houses for clients who took little part in the process. A stronger CM may have been able to involve the clients more, but this would in any case have been limited by the clients' lack of skills and available time.
Longbody	The Regional Architect was heavily involved in the initial stages of this project, mainly because the CM, an experienced contractor, had few management skills. At one point, CMHC actively intervened by sending in a work crew for a short period, after which a new CM, a contract CMHC inspector, was appointed. His management, technical and personal skills were responsible for improving the motivation of the clients and bringing the project to a successful conclusion.
Baden	An experienced contractor was hired as CM (but paid directly by the CMHC Winnipeg Office). The proximity of the Baden and Red Deer projects led to confusion between his duties and those of the CMHC inspector who acted as CM for Red Deer. There was friction between these two individuals until their responsibilities were clearly divided in early January, 1987. At the end of February, when two units had been completed, the original CM's contract expired and the CMHC inspector took over the supervision of the third unit in Baden.

Red Deer Lake	The CM was the contract CMHC inspector who was also involved in the Longbody and Baden project. Good motivational efforts by the CM helped stimulate client participation. The CM was assisted by two carpenters who provided much on-site direction, especially at early stages of the project.
Livelong	This project involved a CMHC inspector who handled most of the project management duties and two CMs who shared on-site supervision and training of clients. This approach was generally successful.
100 Mile House	The CM was a journeyman carpenter with 45 years' experience. Although technically skilled, he lacked management expertise, and this had a negative effect on the project.
Carmacks	All Yukon projects were delivered by a project coordinator who supervised a CM in each project. In Carmacks, the CM, who was the owner of a construction firm, was assisted by two skilled carpenters.
Carcross	The clients in this project stated that they would have found it impossible to build their houses without the leadership of the CM, who was a local builder with considerable experience.
Old Crow	The CM, working under the general supervision of the pro ject coordinator, was experienced in construction and provided satisfactory leadership during the construction process. The local Band was active in providing support to the project.

4.6 TRAINING AND INFORMATION DISSEMINATION

The participation of Demo clients in aspects of the program other than construction varied across the country.

One frequent type of involvement consisted of participation in one or more general information sessions where the Program was discussed, with particular reference to the obligations and responsibilities of homowners. In some cases, such sessions involved a large group of potentially eligible clients and took place during the spring and summer, even before the Program had been authorized; however, in most cases, the tight schedule after project commitment left time for only one quick session with the selected clients.

It is clear that some of the projects suffered from the clients' lack of construction experience and skills. In this context, it should be noted that no formal assessment was made of the clients' experience, and no training was provided for clients before construction began. Even if resources had been available, the late start of the 1986 would probably have interfered with any such assessment or training. In the Yukon, the project coordinator did at least make an explicit statement of the experience and voluntary resources available to each client. Despite the lack of a formal training or assessment approach, most projects featured on-the-job training to various degrees.

One of the concerns of those delivering the Program is that clients may not have the skills, experience or financial resources for proper operation and maintenance of the houses. This issue was addressed by the non-profit delivery group in Annapolis, which organized workshops for all participants in the program. These workshops, originally developed for other social housing programs, have a good record. The CMHC Halifax Office plans to hire a social development officer to initiate a similar program. The concept is sound, but does require human and financial resources not currently provided in the context of the Demonstration Program.

4.7 HOUSE DESIGNS

Surprisingly, in view of the short time available for the design process, client participation was considerable. As with other facets of the Program, there were considerable variations. The various approaches can be categorized as follows:

a) Use of one standard plan
This approach was recommended in the Program Guidelines and was used in many projects. In some cases -- in PEI, for example, and in Livelong and Hornepayne -- a local building materials supplier provided both plans and materials, while in Preston a stock RNH plan was selected.

b) Preparation of a single design for the project
Specific designs, mostly adaptations of existing plans, were developed for many projects. In Annapolis, for example, the non-profit delivery group adapted a small "hearth" design that had been developed for another program. Two new designs were developed for the Manitoba projects, and in Chutes-aux-Outardes and Mistassini, an older design was adapted, In most projects, a surprising amount of minor modification was accepted by CMHC and the construction managers despite the tight deadlines.

c) Development of individual designs
Individual designs were developed for all clients in the three Yukon projects. This costly and time-consuming approach was feasible in the Yukon context only because the project coordinator and designer provided what was, in effect, a subsidy.

The designs of the 82 houses that had been built as of the date of the field survey, were generally modest, as called for in the Program Guidelines, and they consisted of 36 different unit types . Some selected characteristics are shown in Table 5. Note that the "Gross Area" in this table refers to the ground floor only, except for those hi-level units which have been grossed up by 50 per cent of the lower floor area. "Equivalent Area" includes a grossing up for basement types as well.

The Guidelines strongly recommended the construction of crawl spaces instead of basements. The 36 unit types actually built include two slab-on-grade, nineteen models with crawl spaces, six hi-levels and nine basement units. The hi-level and basement unit types account for 44 of the 82 units actually built at the time of the survey. The relatively large proportion of these unit types reflects a typically common desire on the part of clients and those delivering the Program to build basements where possible. As explained by many of those interviewed, a basement provides valuable expansion space for bedrooms or storage at a minimal marginal cost. Soil conditions or by the difficulty of providing concrete to some locations can make basements impractical, but they are clearly desirable where conditions and budgets permit.

The data displayed in Table 5 have been rearranged in Table 6 to illustrate differences between units types at the national level. The data indicate that the hi-level and basement types are not only larger on an equivalent area basis (50 per cent of basements included), but are also larger on an above-grade floor area basis (including a gross-up of 50 per cent for hi-level units only). The number of potential bedrooms available in bi-level and basement units should also be noted.

As indicated in Section 4.12, a comparison of the cost of hi-level and basement units with crawl space units favours the former even if basement areas are ignored, and only 50% of the lower floor the hi-level unit is included.

The Program anticipated the use of prefabricated and standardized designs in order to simplify and speed up construction for inexperienced homeowners. This goal was not really achieved in any project.

TABLE 5 HOUSE TYPES USED IN THE PROGRAM, BY PROJECT

	No. of units	Bedrooms		Unit area, sq.m		Foundation Type
		xist	pot.	Gross	Equiv.	
Nain	2	3	0	84.7	84.7	crawl space
	2	3	0	88.3	84.7	crawl space
	1	5	0	122.6	122.6	crawl space
PEI	2	3	0	89.1	89.1	crawl space
	1	2	0	80.0	80.0	crawl space
NB	3	2	0	71.4	71.4	crawl space
	1	3	2	80.3	120.5	basement
	1	3	0	80.3	80.3	crawl space
Preston	2	4	2	108.2	108.2	hi-level
	5	3	2	85.7	128.6	basement
Annapolis	1	2	0	59.1	59.1	crawl space
	1	3	0	69.5	69.5	crawl space
	2	3	2	69.5	104.3	basement
Chutes	5	2	2	113.7	113.7	hi-level
Mistassini	5	2	2	80.3	120.5	basement
Rupert	1	3	0	104.5	104.5	slab on grade
Campb. Bay	5	3	2	88.2	132.3	basement
Rutherglen	5	3	2	88.2	132.3	basement
Hornepayne	3	3	0	84.7	84.7	slab on grade
Longbody	1	3	0	80.7	80.7	crawl space
	4	4	0	93.6	93.6	crawl space
Baden	1	3	0	80.7	80.7	crawl space
	2	4	0	93.6	93.6	crawl space
Red Deer	1	4	0	93.6	93.6	crawl space
	2	3	0	80.7	80.7	crawl space
Livelong	6	3	2	80.3	120.5	basement
100 Mile	4	3	0	84.7	84.7	crawl space
	1	3	2	84.7	127.1	basement
Carmacks	1	3	2	96.6	144.9	basement
	1	2	1	96.6	144.9	basement
	1	2	2	144.9	144.9	hi-level
	2	3	2	115.2	115.2	hi-level
	1	3	0	130.1	130.1	crawl space
Carcross	2	3	2	115.2	115.2	hi-level
	1	3	2	137.7	137.7	basement
Old Crow	1	3	0	89.2	89.2	crawl space
	2	4	0	89.2	89.2	crawl space

Notes:
1. Bedrooms include "existing" and "potential" types.
2. Equivalent area includes 50% of basement area; bi-levels include 50% increase in gross area.

TABLE 6 HOUSE TYPES USED IN THE PROGRAM, CANADA

	No. of units	Bdrm/unit		Unit Area, sq.m		Foundation Type
		exist	pot.	Gross	Equiv.	
Canada	33	3.2	0.0	86.8	86.8	crawl space
Canada	45	2.8	2.8	93.8	123.7	bi-level/bas.
Canada	82	3.0	NA	90.8	107.2	all types

In the PEI and Hornepayne projects, plans and materials were tendered from a single supplier, while in the Preston and Livelong projects there was some prefabrication of wall panels. In most projects, however, prefabrication was limited to roof trusses. CMHC did obtain prices for a completely prefabricated unit for the Preston project but found that the resulting bids were higher than for stick-built units.

The desirability of prefabrication was challenged by spokesmen of the Kings County Housing Society, the organization delivering the Annapolis project, on the basis that prefabrication would tend to reduce the need for unskilled labour and would thus not contribute to solving the local unemployment problem. However, since on-site labour for the Program, except for specialized subtrades, is mainly provided by volunteers, this challenge seemed irrelevant.

The houses had not yet been completed, or had been occupied for only a short time, at the time of the interviews, and most families were too surprised and happy to be in their own houses to be critical. Most homeowners had been involved in the selection of their house plan from a number of possibilities or, where no options had been offered, they had liked the plan. Changes at the design stage consisted mainly of the relocation of bathrooms, the adding or enlarging of porches and the addition of storage facilities. No problems in the design process were reported.

Changes requested by owners had mainly to do with an increase in the kitchen size and the addition of storage space. Most families would have liked full basements instead of half or none. Some families made minor changes on-site: interior walls were modified to suit the family; walls between living rooms and kitchens were frequently eliminated; some clients wanted low walls between the kitchen and living room, particularly where the kitchen was exceptionally well finished and equipped by the family for constant and varied use; one family with two teenage girls sacrificed a third bedroom to provide more space in the

living room and a small sewing room for the mother.

Where basements were provided by design (or by accident -- for example, where the excavation went deeper than intended) , families planned to add recreation space and extra bedrooms as time and money permitted.

House plans very often located the coat closet close to the front door, rather than the more frequently used side door (usually leading out of the kitchen). The front door usually leads into the living room and, although families like the idea of two doors, the use of the front entrance appears to be limited to formal occasions or to the summer.

Three houses were occupied by families with a handicapped member; two were suitable and one was not. It would be desirable to have the house plans for families with handicapped members vetted by someone familiar with their particular housing needs . Also, ramps and other essential features should be designed before construction begins, at which time they can be added at little or no extra cost.

4.8 TENDERING AND MATERIALS PACKAGES

Given the trend in most projects to the conventional stick-built approach, the tendering for materials in most projects was very straightforward. In most cases, bids were received for the main materials package, including delivery. Three bidders were usually invited, as is normal in rural areas where there are usually few suppliers large enough to bid on integrated materials packages. In some cases, CMHC invited bids for specific items, much as a general contractor would do: in the case of Rutherglen -- a project situated in a semi-urban area where there were many suppliers to choose from -- 69 suppliers were contacted, bids were received from 57, and contracts were awarded to 13.

Delivery costs were very high in Old Crow, Longbody and Nain, but were minor for other projects. Where there was good road access, phased delivery was preferred, with an initial delivery of all materials necessary to complete the lock-up stage, followed by at least one more delivery of secondary components .

Tendering for subtrades was usually done on the basis of invitation. In areas with few subcontractors, contracts were negotiated. Homeowners often suggested local subcontractors, who were then vetted by the construction manager.

4.9 THE CONSTRUCTION PROCESS

The Program design is centered around the need and desirability of homeowners, or their friends and relatives, performing most of the construction. It was recognized, however, that some specialized work would have to be done by professionals, especially electrical work and the roughing-in of plumbing.

In each project, an attempt has been made to specify the proportion of work done by the main actors involved in the process, but these estimates (necessarily based on the retrospective calculations of construction managers) are very rough. This is especially true in that some projects had not been completed at the time of the field survey, and volunteer labour was often promised, but less often delivered. Nevertheless, the percentage breakdowns provided in Table 7 provide a useful approximation of the effort put into the process by those involved. Since the amount of effort contributed by subtrades and paid labour was of special concern, this data has also been provided. Note that the amount of contract labour funding has been related to the Total Project Cost, not to the Program Cost (see pg. 26 for definitions), since the latter is not a good measure of the actual value of the projects.

Table 7 indicates that the percentage of funds provided for subtrades and labour varies from 5 to 62 per cent, with an average value of 28 per cent. Note that the Demo values are skewed by the figure for Hornepayne, which is at best a guess, since this project had a package price for materials and labour. If Hornepayne is excluded, the range is from 5 to 45 per cent, with an average of about 26%.

In any case, the proportion of funds expended for subtrades and labour is higher than expected. The estimated input for subtrades and labour (column 2 in Table 7) accords roughly with the proportion of funds expended for this purpose, as shown in the same table -- a fact that gives some credence to estimated labour in Hornepayne.

This fairly high reliance on subtrades was due in part to the late start of the 1986 program, which precluded adequate assessment of homeowner construction skills and left no time for training. In addition, the cold and dark of winter made it imperative to close in the houses quickly by using subtrading for, for example, the building of foundations.

Rough estimates of homeowner participation in the construction process indicate a considerable diversity of effort. In some of the projects where participation was low (Preston and Hornepayne), clients were mainly mother-led families, or where the clients lacked time, or had no previous construction training. Also, clients with regular jobs had difficulty finding

time to do the work; fortunately for the Program, most clients had only seasonal jobs.

TABLE 7 SUBTRADE AND LABOUR INPUTS, DEMO PROGRAM

	Percent labour inputs				Total Project Cost, $ /unit	subs & labour cost, * $/unit	subs & labour as % of total
	const mgr.	subs, labor	bane owner	volun teers			
Nain	10	10	80	0	42000	2200	5
PEI	20	30	50	0	37180	11389	31
NB	10	35	50	5	38500	12694	33
Preston	10	30	30	30	42617	15121	35
Annapolis	10	40	30	20	41900	14067	34
Chutes	10	50	40	0	39965	15890	40
Mistassini	10	20	40	20	38000	5843	15
Rupert	45	20	30	5	40480	10839	27
Campb. Bay	10	35	50	5	38926	9584	25
Rutherglen	10	5	75	10	40870	4870	12
Hornepayne **	75	0	15	10	39963	20000	50
Longbody	20	15	50	15	44934	12740	28
Baden	30	15	35	20	40610	10607	26
Red Deer	20	15	20	45	40847	9347	23
Livelong	10	30	40	20	40402	6618	16
100 Mile	10	40	40	10	40000	3490	8
Carmacks	10	55	35	0	54715	23771	43
Carcross	10	40	50	0	55000	15800	29
Old Crow	10	40	30	20	55800	27290	39

* sum of Site Preparation, Foundations, Site Services and Labour cost categories

** crude estimate of subtrade cost and % for Hornepayne

4.10 QUALITY OF HOUSES AND ADHERENCE TO CODES

Field survey staff were required to inspect a sample of houses from each project and to report on code violations and on the quality of construction in terms of the low, average and high ratings of normal residential spec-built standards.

Most houses had been previously inspected by CMHC, rather than by municipal inspectors. The fact that municipal inspectors made few or no visits presumably reflects their knowledge of CMHC's involvement.

Houses inspected by field survey staff were found to be generally adequate in quality of construction, most defects being of a minor nature and primarily in exterior and interior finishes. Defects were less commonly noted than work of exceptionally high quality, particularly in the installation of air-vapour barriers and insulation.

There are several reasons for the relatively good quality of construction. Many CMHC local offices opted to have foundation work done partially or completely subcontractors, thereby ensuring a reasonably solid base for subsequent work. The houses were all very simply constructed, with framing and the installation of air-vapour barriers generally undertaken under the close supervision of construction managers, and prefabricated roof trusses were in common use. Electrical work and the roughing-in of plumbing was almost always done by skilled subcontractors . In short, only the interior and exterior finishing work was subject to major error and poor workmanship.

The participatory nature of the program undoubtedly had an effect on maintaining quality in all projects except those relatively few where clients were totally lacking in construction skills and interest. Some homeowners took enormous pride in the quality of their work, especially in the kitchens.

Relatively few code infractions were found. The 1985 National Building Code (NBC) requirement for a ventilation system capable of one-half air changes per hour has been met in only some of the designs. In the case of those few that do meet the standards, fans have been linked to dehumidistats; also, Heat Recovery Ventilators are being installed in the Carmacks project. In Nova Scotia and Saskatchewan, the 1985 NBC is not yet in force, so the requirement is not applicable.

Other observable code deviations include the absence of moisture protection on the outside of preserved wood foundations, a number of basement beams that had to be rebuilt because of faulty placement of supports and/or splices, and a number of cases where secondary bedrooms were slightly below code minima.

In summary, code violations were neither numerous nor severe, nor are they likely to affect the health or safety of residents in RNH houses.

4.12 PROGRAM, PROJECT AND UNIT COSTS

program allocations were generally $40,000 per unit, but there were exceptions. Nain received an allocation of $42,000 per unit because of its remote location. TWO Yukon projects received an extra $15,000 per unit from the YHC, while one received this amount jointly from YHC and Energy, Mines and Resources (EMR).

In several cases, regional holdbacks of $1,500 per unit were being maintained at the time of the field trips.

Cost data on projects were taken from the latest Commitment Authority forms available at the time of the interviews, while projects were very often still at the "soft" stage. Although actual costs were known for a number of elements in many projects at the time of the field trips, the cost data were developed on the basis of the original commitment. The exception to this was those few instances where the Program Officer was certain of a surplus or deficit. Cost data are therefore arranged according to the breakdowns shown on the Commitment Authority forms (except for a merging of the Materials package costs with Materials Delivery costs), and totals are the same as those provided in official commitments, but with some modification of prices within this total. Generally speaking, modifications consist of changes in, for example, subtrade costs, with a corresponding increase or decrease in the project contingency.

The cost data have been developed in Table 8 to show several different cost breakdowns, all calculated on a cost-per-unit basis. These include:

Program cost:	Cost per unit as authorized in project commitments, adjusted by estimates of surplus or deficits.
Other Contributions:	Contributions to the project by clients, municipalities, extra contributions, or other sources. Extra CMHC staff time is also included where this has been paid for out of other CMHC budgets.
Total Project Cost:	The sum of Program Cost and Other Contributions. This represents a fair assessment of what the project actually cost, without including non-financial contributions.
Land and Semites:	The actual cost (again, per unit) of funds expended for land and site services.
Net Construction Cost:	The Total Project Cost minus the amount for Land and Site Semites. This total is used extensively for comparative purposes, since the amount for Land and Services is highly variable.

TABLE 8 PROJECT COSTS, DEMO PROGRAM *

	A	B	c	D	E	F
	No. of units / hshlds	Project Costs, $, Avg. Per-unit Basis				
		rogram cost	other ontrib	otal roject (B+C)	land & service	net constr (D-E)
Nain	5	40935	0	40935	1025	39910
PEI	3	37180	0	37180	4000	33180
NB	5	38500	0	38500	8300	30200
Preston	7	39867	2750	42617	4500	38117
Annapolis	4	40000	1900	41900	9090	32810
Chutes	5	39965	0	39965	3000	36965
Mistassini	5	38000	0	38000	1786	36214
Rupert	1	39880	600	40480	6929	33551
Campb . Bay	5	38926	0	38926	2960	35966
Rutherglen	5	40000	870	40870	9920	30950
Hornepayne	3	39763	200	39963	333	39630
Longbody	5	38800	6134	44934	3359	41575
Baden	3	36500	4110	40610	0	40610
Red Deer	3	38000	2847	40847	0	40847
Livelong	6	39000	1402	40402	4480	35922
100 Mile	5	40000	0	40000	1640	38360
Carmacks **	6	54548	167	54715	7089	47626
Carcross **	3	55000	0	55000	4300	50700
Old Crow **	3	54774	800	55800	275	55525
CANADA	82	41466	1168	42634	4035	38598

* Costs as known at time of interviews.
** Yukon projects include $15,000 per unit by YHC.

An analysis of project costs indicates that "Other Contributions" and expenditures for "Land and Site Services" vary considerably across projects. The largest single item under "Other Contributions" represents extra CMHC time in the case of the Preston and the Prairie projects. Land and service costs also vary widely, mainly because land was provided free for some projects, and had to be purchased for others.

A comparison of Demo house costs with those of comparable units is of great interest, since it indicates the value of the voluntary aspect of the Demo Program. However, the

identification of comparable units is problematic. The preferable comparison would be between a Demo unit and an RNH Homeownership (Homeownership) unit, but RNH Homeownership prices are not available in Quebec or the Yukon. Also, RNH Homeownership prices include land and site services so that they must be subtracted from the total in order to institute a valid comparison. Table 9 tabulates comparative prices and their origins, with RNH Homeownership prices reduced by appropriate amounts to account for land and

TABLE 9 BASIS OF COMPARATIVE COSTS

	Comparative Cost, $/sq.m	Basis of Comparative Cost
Nain	746	RNH units, 90 sq.m, $8000 deducted
PEI	606	same as Nain
NB	606	same as Nain
Preston	698	same as Nain
Annapolis	698	same as Nain
Chutes	722	RNH units, 90 sq.m, $8000 deducted
Mistassini	722	same as Chutes
Rupert	722	same as Chutes
Campb. Bay	722	same as Chutes
Rutherglen	781	RNH units, 90 sq.m$10000 deducted
Hornepayne	781	same as Rutherglen
Longbody	705	RNH/40 price, $6500 deducted
Baden	705	same as Longbody
Red Deer	705	same as ~n-
Livelong	629	local builder's quote, same unit
100 Mile	746	RNH units, 90 sq.m, $8000 deducted
Carmacks	1047	RNH units, 90 sq.m, $8000 deducted
Carcross	772	local prices (RNH would be 1047)
Old Crow	1047	same as Carmacks

services. The final comparisons have been made using the lowest RNH Homeownership or comparable local prices, and this has resulted in a very conservative assumption.

Table 10 provides mean values for comparative unit costs, costs of Demo units, and the relationship between the two. The comparative cost assumptions are taken from Table 9, while the Demonstration unit costs represent the Net Construction costs per unit area.

Table 10 shows a wide variation in prices of all Demo units. A comparison of the mean values for comparable Demo house costs, on a $/sq.m basis, indicates that the Demo houses cost some 43 per cent less than the comparative units ($437 versus $769). This works out to a difference of close to $30,000 for a typical 90 sq.m unit.

TABLE 10 COST COMPARISON, DEMO AND COMPARATIVE UNIT TYPES

	Average of Net Constr. Costs, Comparable Units, $/sq.m	Average of Net Constr. Costs, Demonstration Units, $/sq.m	Demonstration Costs as % of Comparative unit costs
All units	$769	$437	43%
Crawl Space Units only	NA	$454	37%
Basement & Bi-level units	NA	$410	47%

Table 10 also indicates that, even though the basis of comparison is the gross ground floor area (excluding basements), the hi-level and basement units are cheaper on a cost-per-unit-area basis than the units with crawl spaces. This is an unexpected finding, but it may reflect the fact that the average gross area for crawl space unit types is 87.4 sq.m compared to the 98.6 sq.m for hi-level and basement units.

4.13 CLIENT VIEWS AND SATISFACTION

Analysis of the client interview forms indicates several clear groups of responses, along with a number of incomplete or ambiguous replies that are less useful. Responses are reviewed below according to subject area. (See Appendix 3 for tabulated data.)

House Design Process (Questions 5, 6, 12)
Those homeowners involved in the design process tended to be both partners, or the husbands only. Changes made to stock plans consisted mainly of relocating bathrooms, or adding or enlarging porches and storage. No major problems in the design process were reported. It may be concluded that future designs should allow some flexibility in bathroom locations, larger porches and porch roofs over entrances.

Construction Process (Questions 8, 9, 10, 12)
Some coordination problems were reported with CMs, but most problems were due to the winter construction schedule. Most owners would have preferred earlier notification in order to schedule construction in the spring, although some mentioned that they and their volunteers have more free time in the winter.

Construction Managers (Questions 12 & 14)
Homeowners responding to these questions were unanimous about the importance of the CM in the process, and that they were crucial in helping the clients to learn new skills. Depending on the project, comments about specific CMs ranged from rapture to polite disapproval. Comments indicated a need for additional assistance for CMs, perhaps in the form of lead carpenters.

Homeowner Participation (Questions 2 & 7)
Experiences were diverse: sane owners received little help from volunteers, while others had to turn them away. Skilled help was seen as essential.

Skills Improvement (Questions 13 & 14)
All participants learned new skills, many significantly so. Several respondents reported increased confidence in their abilities. The help of CMs and journeyman carpenters, and the work experience itself, were major factors. A five-level rating scale was used to assess the changed skill levels of clients,

1 = few skills
2 = some skills
3 = moderate skills
4 = skilled
5 = highly skilled

The average improvement in skill level of the 41 clients responding to this question ranged frun a level of 2.2 to 3.1. Because this rating is based on self-evaluation, and because it is subjective in nature, it should be treated with some caution; however, it does indicate a substantial improvement.

Functionality of House Design (Questions 15, 16, 18-33)
Owners desired modifications to stock plans primarily in kitchen and storage sizes, and preferred a full basement instead of a half basement or crawl space. In occupied houses, back and side doors were used by 50 per cent of the owners, while the front door was used only by 35 per cent. Of the three houses with handicapped occupants, two were suitable and one was not.

Client Views and Satisfaction (Questions 36-37)
Most owners expressed a high degree of satisfaction with the Program, and they indicated that acquaintances held a similarly positive view.

SECTION 5

THE ALBERTA RHAP PROGRAM

5. ALBERTA REGIONAL AND LOCAL REPORT

5.1 BACKGROUND

The Rural Home Assistance Program (RHAP) has been delivered since 1978 by the Alberta Department of Housing, through local housing associations . The Program, used in Alberta as part of a multi-pronged approach to solving the problems of isolated settlements, has had great influence on the design of CMHC's RNH Demonstration Program. TWO other major programs are delivered by the same division, namely the Rural Emergency Home Program (REHP) and the Rural and Native Housing Program (RNH). Within the RHAP Program, grants may be used for new construction or repairs, and funds may also be used to provide water and sewer services to senior citizens, disabled people and Metis. Metis settlements have about 80 per cent of their water and sewer costs paid under this program.

As of September 30, 1986, an accumulated total of 474 units had been delivered to isolated communities under the auspices of RHAP, and a further 461 units to Metis settlements. Delivery that year included commitments for 119 RNH houses and 90 RHAP units, at costs calculated by Rural Home Assistance Branch (RHAB) to be about $65,000 and $23,000 respectively.

RHAP does not place much emphasis on self-building; in fact, the Program brochure refers only indirectly to this, stating that:

> "When the applications are approved, the housing association signs an agreement with the Department of Housing and then arranges for labour, buys construction materials and supervises the building projects."

The Program has two main types of grants for the construction of new homes: a full grant where annual family incomes are below $18,000 and half grants where incomes fall between $18,000 and $31,000. In the event, most of the Program's clients are in the lower income group: of 90 houses built in the 1986/87 year, only eight units were funded under the half-grant scheme.

The Alberta Department of Housing delivers the Program primarily through its RHAB office, located in Slave Lake, and local housing associations. The Slave Lake office has a staff of about 15 persons, including administrators and "Construction Advisors", who are generally trained carpenters.

Delivery by a housing association (a registered, non-profit association) is a requirement of the RHAP program. The housing association selects clients and establishes a priority needs

list . The RHAB office then provides technical, managerial and consulting services to help the community to complete its projects successfully. This support extends to the on-site training of unskilled labourers.

The RHAB office begins most projects by presenting its stock designs as a basis for discussion with the association. Further involvement includes approvals for payments, and individual house inspections. The RHAB thus maintains basic control over the disbursement of funds and the quality of the product, while staying out of the actual delivery process.

5.2 CMHC/ALBERTA COOPERATION

CMHC's Edmonton Branch takes no part in delivery of the RHAP Program, but since CMHC money is being contributed this year, CMHC staff will be involved in approving payments. CMHC works closely with the province in to deliver the regular RNH Homeownership Program.

Since delivery of the CMHC Demo program in Alberta would have caused considerable confusion with the very similar RHAP, CMHC agreed instead to become involved in the provincial program. Thus, the RNH Demo allocation for Alberta has been contributed to the delivery of RHAP units.

There was some early confusion as to the extent of CMHC's financial participation in this year's RHAP delivery, but the final agreement (yet to be signed at the time of the site visit), calls for a CMHC contribution of $360,000, covering half of the eligible project costs, excluding program administration. In other provinces, this sum would cover one half the costs of 18 units; since unit costs are considerably lower in Alberta, the amount is expected to cover 33 units.

5.3 RHAP DELIVERY ISSUES

Although the RHAP Program is seen as being considerably more cost-effective than other programs, such as the CMHC RNH Homeownership, the Alberta Housing Department cannot focus all its efforts here, since such a move would lead to an excessive demand, a great increase in capital commitments and, possibly, a revolt by those paying mortgages.

One worry affecting the RHAP program is that the current generous level of support for labour costs will not continue. Indeed, it appears likely that funding levels will be much lower for 1987 projects, and this is bound to have a negative effect.

It is recognized that the RNH Homeownership Program also has delivery problems. According to Alberta staff, the CMHC Core Need criteria "puts people who can't handle home ownership into homes". The result is that over 200 regular RNH units have had to be recycled because the original owners were in default in some respect. The recycling of these units involves much more time and administration than would be the case for rental units.

No mortgages apply to properties in the RHAP Program, mainly because of the general lack of clear title to land. Although the declaration of land lease rights has improved since the inception of the program, Alberta's only security is promissory notes, which have yet to be tested in the courts. Even if Alberta were to be successful in a legal dispute, the unit would revert to the local housing association, and not to the Department of Housing.

5.4 COMMUNITY SELECTION

The community selection process is carried out by the provincial Department of Housing, but the Federation of Metis Settlements is consulted at a policy level. The RHAP Program provides grants to two types of communities: Metis settlements (there are eight in the province); and Isolated Communities. All eight Metis settlements and 24 Isolated Communities were selected for inclusion in the 1987/88 Program. Since neither Isolated nor Metis communities can be designated unless a housing association has made an application, there is a strong incentive to form an association in these communities.

The associations serve other useful functions, such as obtaining funding for Manpower programs and helping to deliver other housing programs. Associations serve as a useful link between the province and the community, and the local knowledge of association members is unparalleled. On the other hand, such locally controlled organizations may also provide an opportunity for nepotism and favoritism in the selection of clients and the allocation of jobs and contracts. There was, however, no evidence that this had been the case in the two projects visited.

5.5 CLIENTELE

CMHC Core Needs definitions are not used in the RHAP, but certain income criteria are applicable. The adjusted family income criterion is based on gross family income minus $2,500 for a spouse and $500 for each dependent child. Families with adjusted incomes of less than $18,000 are eligible for the full grant, while families over $18,000 and up to $31,000 are eligible for half grants. The sudden drop of benefits at the $18,000 level could be expected to produce problems in delivery, along with a strong desire not to record a family income of $18,100. This has

apparently not occurred, probably because only 4 per cent of the clients have incomes over $18,000. In any case, the threshold is being reviewed so that a more gradual transition can be provided in the future.

A recent and still unpublished survey indicates that 90 per cent of the RHAP clients have an adjusted family income less than $15,000, and that the average number of persons in a household is about 5, compared to the Alberta average of 2.8.

5.6 HOMEOWNER PARTICIPATION

The RHAP Program involves the use of considerably more paid labour than does the RNH Demo Program in other provinces. In most RHAP projects, labourers are provided under an Alberta Manpower program, and the homeowners carry out a relatively small percentage of the total work. This is not seen as a flaw in the Program, as employment generation is an important priority in Alberta. In any case, the rates are set at a minimal level and the labourers and the construction manager are always drawn from the community, so that an element of community participation is preserved.

5.7 SERVICES

Alberta does not require the provision of water and sewers to residences, at least not in the remote areas covered by the RHAP Program. The result is that the new houses in the two projects surveyed were without running water, hot water or sewage disposal. This policy would appear to be somewhat at odds with the other stated policy that, although houses may be modest, they should be built with an emphasis on health and safety.

5.8 HOUSING DESIGNS

During the first few years of operation, log construction was the norm, until it was found that the construction process was taking as long as two years. Houses have therefore evolved towards more conventional designs with 2"X 6" wood frame and preserved wood foundations. Three designs are currently being offered: two 3-bedroom bungalow types and one 4-bedroom hi-level type. The units range from 78.4 sq.m (844 sq.ft) to 87.0 sq.m (936 sq.ft.) in size. The use of prefabricated housing units has been considered and rejected because of the RHAB's emphasis on providing employment in each locality.

Although energy performance is not a main concern of the Program, recent designs feature walls with RSI 3.52 (R20) and ceilings with RSI 7.04 (R40) insulation. The RHAB always carries

out an inspection of the completed air-vapour barrier, and 1987 designs are being modified to ensure a direct fresh air supply to furnaces and wood stoves.

One very interesting design aspect that applies to both the Owl River and Elinor Lake projects is the use of shallow footings. Despite the fact that frost generally penetrates to a five- or six-foot depth in this region, most houses are being built with footings at a four-foot depth, or even at a two-foot depth with horizontal rigid insulation. This design was developed because of the difficulty of bringing in excavating machinery to remote locations, and the foundations are generally built in soil con two feet of sand over clay. Houses built this way should, to put it mildly, heave a great deal; in fact, they do not. The design has been used since 1978, and the early versions, which had concrete walls, cracked; the recent models built with PWF walls have not.

5.9 PROGRAM AND PROJECT COSTS

Alberta projects are, on the surface, considerably less expensive than RNH Section 40 projects. As described in Section 7 of this report, the RHAP delivers houses at a much lower program cost than RNH; however, the actual total costs, including non-program funds, bring RHAP costs considerably closer to RNH Demo costs. These other funds come from two main sources: Alberta manpower program subsidies for local unskilled labour, and the administrative and labour costs absorbed within the RHAB budget.

The RHAB office had a total operating budget in 1986 of $866,000, and it estimates time allocations for each sub-program are as follows:

34% Metis Settlement new house construction
45% Isolated Communities new house construction
7% Rural Home Repair Program
14% Northern Water and Sewer Program

The RHAB office further estimates that 75 per cent of the Isolated Communities budget was used for the RHAP units funded under the CMHC-Alberta agreement. This means that each house covered under the agreement has required approximately $8,135 in non-capital costs. It should be noted that access to some of the communities in question requires chartered aircraft, and this adds appreciably to normal costs.

For the purposes of calculating the average Total Project Cost in the Elinor Lake and Owl River projects, $5,000 per unit, or about 60 per cent of the $8,135 sum mentioned above, has been added to the Program Cost. This represents the extra costs for administration and training that would not be encountered in the

normal Alberta RNH program. These estimates are crude, and it would be of interest to obtain a more accurate assessment from Alberta.

SECTION 6

THE NWT HAP PROGRAM

6. NORTHWEST TERRITORIES HOMEOWNERSHIP ASSISTANCE PROGRAM

6.1 PROGRAM OVERVIEW

Although originally a modest program fully funded by the NWT government, the Homeownership Assistance Program (HAP) has proven so economical and popular that it now forms a regular component of the federal/territorial delivery of public and low-cost housing in the Territories, with capital costs being equally divided between the NWTHC and CMHC.

Until the introduction of HAP, the bulk of housing in the NWT, other than that built for company or government employees, was public housing. These houses were built under a partnership agreement using Sections 40 and 43 NHA, which not only provided for capital funding, but also for the ongoing subsidization of rents, operating costs and maintenance. This subsidization is not included in the HAP Program, where everything other than the capital cost of the materials package and some skilled labour is paid for by the homeowner.

The 1986 Capital Budget for HAP was $11,000,000 (or $5,500,000 for each partner), and this resulted in a total of 182 housing units being built at an average cost to the Program of $60,500 per unit. This average is not necessarily reflected at the district level where costs vary widely: for example, fewer funds are needed for houses with highway access for delivery, and more for houses in remote locations where access is costly.

Policy developers for HAP are now considering the provision of grants for the purchase of existing housing, and the conversion of houses built under the (subsidized) Rural and Remote Housing Program (RRH) to some form of HAP housing.

6.2. THE CLIENTS

HAP clearly does not provide a housing solution for low-income families, since homeowners need adequate incomes to carry the costs of ownership. Therefore, core need income thresholds for families qualifying for HAP tend to be high, while people with very low incomes continue to depend on subsidized housing in those northern communities that have no viable housing market. For example, a household of five to six persons with an income of $34,000 qualifies for HAP in Yellowknife, while above the treeline the income must be $51,000. At the other end of the scale, it was noted during the 1986 Program that some resentment had been generated among people with incomes too high to qualify.

It has been recommended that CMHC institute a repayment scale based on adjusted family income and sensitive to the size

and location of families. A December 1, 1986 submission from the Hay River District Manager to the NWTHC Board of Directors requested that they forward the recommendation to the Minister responsible for the NWTHC. The submission states:

> "There was much demonstrated concern in regard to individuals who did not qualify for the Program because their income exceeded the maximums. The need for homeownership is there, and there is no alternative to the program in non-market communities. The income maximum is seen as discriminatory and inequitable. They will have the effect of encouraging individuals to terminate gainful employment in order to qualify for the program. Those individuals who are capable of repayment based on income are more than willing to do so. Community resolutions have already been sent to the Minister supporting repayment. "

6.3. MANPOWER PROGRAMS

The NWTHC/CMHC partnership provides for a labour component in the " capital budget, but this is primarily limited to site development and electrical work. In addition to the capital funding provided by the federal/territorial partnership, some funds for labour are provided under two other programs.

The Indian Community Human Resources Strategy (ICHRS) of the Department of Indian and Northern Development (DIAND) and the Student Temporary Employment Program (STEP) of the GNWT Economic Development Program both make substantial contributions to the program, as indicated in Appendix la to this report.

As outlined in Appendix la, manpower programs contributed an average of $7,118 per house in the form of labour for 1986 HAP projects. The people who have worked under these programs are labourers, paid at about $5 per hour, who tend to drift in and out of the job.

Recently, the emphasis in the manpower programs has shifted to training and, although NWTHC has tried to emphasize the value of construction work as on-the-job training, this source of funding has been increasingly threatened. Indeed, funding for project manpower is expected to be cut for the 1987 projects, and this will pose a considerable problem for NWTHC.

Clients do raise substantial amounts of money to hire help, but they are unlikely to be able to increase their personal commitments to cover any additional shortfall.

As of January 1987, actual figures for 1986 labour costs were not complete, but it would appear that, for the houses eviewed at Fort Smith and Providence, about $10,000-$15,000 was

expended for labour over and above the capital budget allowance.

6.4. HOUSE DESIGNS AND TENDERING

The NWTHC provides a variety of house plans, all of which have been tested in previous years, and all of which meet a high standard both in terms of space and the quality of materials.

The Corporation does permit clients to change the designs in certain ways. However, the changes must be shown to meet certain criteria: they must not affect the structural integrity of the house; they must not extend the construction period beyond two building seasons; loans taken by the clients to pay for changes must be within the family's capacity to repay; and changes must be approved by NWTHC before construction begins. Clients may build foundations other than the standard gravel pad, but first they must sign a "waiver of responsibility" form to save harmless the Minister responsible for the NWTHC from any subsequent problems. The range of options that may be chosen in the context of standard designs is outlined in Appendix Ib, a NWTHC document that illustrates how few and well defined those options are -- a factor that tends to keep costs within reason.

In previous years, no particular codes were observed, but as CMHC insists on NHA standards, these are now generally applied.

Tendering for the HAP Program is aggregated for several projects, a procedure that is intended to reduce costs. No supplier is barred from tendering; however, the NWTHC has introduced a weighting scale that favours bona fide northern contractors by 10 per cent on contracts between $5,000 and $1,000,000, and by 5 per cent on amounts exceeding this, to a maximum adjustment of $175,000. Tenders are based on complete drawings, specifications and a detailed materials and crating list, and are quoted FOB the community. To minimize the confusion (and costs) caused by variations in crating, the bill of materials specifies the allocation of material by crate number. Of course, with so many units being built, it is worthwhile for both the NWTHC and the suppliers to work with such detailed tender packages.

Prefabricated houses are considered undesirable in areas supplied by highways, perhaps because of their wide use in early public housing and the notorious failure of one type. The NWTHC has produced a wide range of standard plans and, since CMHC joined HAP as an equal funding partner, these are being modified to meet the full NHA standards. In 1987, however, the range of house plans will be reduced and client options will be restricted to non-structural modifications.

There are three categories of delivery: by highway, winter road or water. In the past, tenders for housing packages were called in the south as well as the north, but the 1987 tender call for highway delivery was confined to northern advertising sources. Once delivered to the community, materials are stored at the site, in secure compounds or in warehouses.

6.5 INFORMATION DISSEMINATION AND TRAINING

In the past, HAP clients have been gathered together, at the expense of the NWTHC, at some central for a two- or three-day training workshop. This concentrated schedule has been found too difficult, however, for relatively unskilled people, and in 1987 more time will be spent working with individual clients in their own communities. Videotapes will be prepared for some training material, and these can be retained and used for reference by the client on a home video. The new procedure will also allow program staff to establish links with the local associations and bands that obtain manpower grants.

The documentation for all aspects of this Program, while already excellent, is being improved in 1987 so that a more itemized cash flow schedule can be introduced. This will provide useful information on the progress of individual houses during construction, as well as providing a detailed record of expenditures which will (hopefully) include non-budget funding from government or private sources other than the NWTHC/CMHC partnership.

6.6 THE CONSTRUCTION PROCESS

Construction managers (referred to as "supervisors" in the Program) are usually local journeymen who not only oversee and manage the projects, but also work on the houses. Hiring is done locally, often by the band councils, and supervisors are paid out of ICHRS and STEP funding.

Supervisors may manage one or several HAP projects, their involvement being more intense where clients are lacking in skills . There were more than 60 supervisors involved at one time or another in the 1986 program, and it is clear that this high turnover of staff is one of HAP's major problems.

6.7 COSTS OF THE PROGRAM

The administrative cost of this program is difficult to assess, since site visits, for example, are often omnibus affairs dealing with all kinds of community housing. However, officers of the NWTHC estimate that the administrative costs of HAP during the

development and construction stages are equal to, or lower than, those of public housing projects. Once a dwelling has been handed over to its owner, there have been few complaints requiring attention.

The NWTHC experience indicates that the HAP approach, compared to that adopted for previous public housing programs, results in considerable capital cost savings. An even more significant source of economy is the freedom from operating subsidies which, in public housing programs, represent the largest proportion of the present value of housing unit costs.

Capital costs per unit in the HAP program range from $60,458 to $80,721, whereas RNH Homeownership houses in the same areas cost from $123,000 to $190,000. Obviously, even without taking into consideration HAP's lack of long-term operating commitments, the savings are substantial. A table produced by the NWTHC (Appendix Ic) compares the present value of HAP with RNH Section 40 public housing in five NWTHC administrative districts. Data taken from the table, as displayed in Table 11, illustrates the considerable savings engendered by the HAP Program.

The cash contributions of clients are also of interest. Available figures are unreliable but, as shown in Table 12, they indicate that the client's input can be significant. Since debts of any magnitude could jeopardize a family's ability to survive the responsibilities of homeownership, it is probably desirable to monitor the clients' cash outlay, the source of the money (whether it is borrowed or not), and the use to which it is put. A listing of items or functional elements that clients want in their houses and are willing to pay for would also be useful.

TABLE 11

Ratio of Present Value Costs, HAP to Section 40

District	Capital Cost	Capital + Operating
Baffin	1 : 2.35	1 : 5.16
Keewatin	1 : 2.32	1 : 5.18
Kitimeot	1 : 2.38	1 : 5.96
Inuvik	1 : 2.32	1 : 4.66
Yellowknife	1 : 2.03	1 : 4.11

The level of client cash input appears to be unique to HAP and rarely occurs in the CMHC Demonstration program. The following figures were reported during interviews.

TABLE 12 HAP CLIENT CONTRIBUTIONS

NWTHC Record #	Client Cash Contribution	Purpose
Ft.Smith		
1.	1,375	N.A.
2.	N.A.	
3.	40,000	Full basement, layout
4.	200	N.A.
5.	11,000	Full basement
Ft.Prov.		
15.	1,000	Miscellaneous changes
16	10,000	Enlarged porches, roof
17.	12,000	Mat' 1s, labour, roof design
18.	3,500	Labour, f raining
19.	Nil	

Costs for HAP units and costs for the RNH Demonstration program, it should be noted, have been recorded differently. HAP figures have been broken down by individual house, but servicing costs have not been broken out. In CMHC Demonstration projects, on the other hand, we have adopted the practice of deducting highly variable costs, such as land and site services, from the total capital costs in order to obtain a net construction cost. This method appears to provide a less skewed basis for comparative cost analysis.

SECTION 7

COMPARATIVE PROGRAM MANAGEMENT AND DELIVERY

7 COMPARISON OF THE RNH DEMO PROGRAM WITH ALBERTA AND NWT

7.1 FINANCIAL COMPARISONS

A common perception of the Demo Program is that, while its products are low in cost and certainly cheaper than those produced under the NWT HAP Program, Demo units are far more expensive than those produced under the Alberta RHAP Program. Analysis shows that this is true if Program costs are compared, but that the differential in true project costs is considerably less than it appears on the surface.

National cost data for the Demonstration Program (repeated here from Table 8) are compared with those of Alberta in Table 13. The comparison reveals that, while the Program Costs for the RHAP program are considerably lower than those for the Demonstration Program, the large Other Contributions, mainly for the provision of paid labour, bring costs to about the same level as the average Net Construction Costs for the Demonstration Program. It should be recalled that $5,000 per unit of this cost for the Alberta RHAP is an educated guess of the amount of extra administrative and training time expended by RHAB, and this cost would not be incurred for the normal Alberta RNH Program.

The NWT HAP Program has very high Program costs and other contributions, resulting in a net construction cost that is about 95 per cent higher than that of the Demonstration Program.

TABLE 13 PROJECT COST COMPARISONS

	A	B	c	D	E	F
	No.of units / hshlds	Project Costs, $, Avg.Per-unit Basis				
		program cost	other contrib	total project (B+C)	land & service	net constr. (D-E)
Elinor Lake	2	22684	16316	39000	1908	37092
Owl River	4	19693	19739	39432	0	39432
ALBERTA	6	21397	18598	39328	636	38692
Fort Prov.	5	46000	31101	77101	0	77101
Fort Smith	6	45683	30401	76084	2500	73584
NWT	11	45827	30719	76546	1364	75183
CANADA	82	41466	1210	42675	4035	38640

In Section 4.12, Table 10, Demo house costs were compared to RNH or other comparable units. These data are repeated in Table 14 (below), presented alongside similar data for Alberta and NWT. The comparable costs for Alberta are derived from RNH units in the province (obtained from the Alberta Department of Housing), while the NWT comparable costs are taken from data on NWTHC Section 40 housing units.

TABLE 14 COMPARISON OF NET CONSTRUCTION COSTS

	Comparable Units, $/sq.m	Net Constr. Cost, $/sq.m	% Reduction in unit costs
Canada, 82 units	769	437	43%
Alberta, 6 unit sample	488	423	13%
NWT, 11 unit sample	1113	689	38%

When the net construction costs in Table 13 are converted to a cost per unit area basis in Table 14, comparison indicates that the Alberta units are about 3 per cent less expensive than the Demo units, while the NWT HAP units are about 57 per cent more costly. The higher NWT costs are relatively easy to explain, in view of higher materials and labour costs, and because of the need (in Permafrost areas) to build the equivalent of a basement above grade, thereby incurring higher costs.

In the case of the RNH Demonstration and the NWT HAP Programs, the self-build unit prices are significantly lower than those for comparable units in the respective regions. The reduction is considerably less for the Alberta RHAP units, probably because of the relatively low proportion of sweat equity in these units.

This premise can be tested by comparing the data from Table 7 (on page 22) with those in Table 15. The comparison shows that, while the proportion of Alberta and NWT project funds expended on subtrades and labour varies between 35 per cent and 44 per cent, the percentage in Demo projects varies from 5 per cent to 62 per cent, with an average value of 28 per cent. In other words, a smaller proportion of CMHC Demo funds tend to be expended on subtrades and paid labour costs.

TABLE 15 COMPARATIVE SUBTRADE AND LABOUR INPUTS

	Percent labour inputs				Total Project cost, $/unit	subs & labour cost, * $/unit	subs & labour as % of total
	Const mngr.	subs, labor	home owner	volun teers			
ALBERTA RHAP							
Elinor Lake	10	75	15	0	34000	15110	44
Owl River	10	70	20	o	35492	12181	35
NWT HAP							
Fort Prov.	10	60	25	5	77101	32801	43
Fort Smith	10	35	50	5	76804	27032	37

* sum of Site Preparation, Foundations, Site Services and Labour cost categories

7.2 COMPARATIVE TECHNICAL REQUIREMENTS

A comparison of the units built under the three programs reveals that the gross areas of the RNH Demo and the RHAP units are very similar, while the HAP units are somewhat larger. When unit areas are grossed up by adding 50 per cen of basement areas, the "equivalent area" comparisons indicate a similar situation. These data are shown in Table 16 below.

TABLE 16 COMPARISON OF DEMO AND COMPARATIVE UNITS

	Number in Sample	Gross Unit Areas		Equiv. Unit Areas	
		Area sq.m	Ratio	Area sq.m	Ratio
RNH Demo Canada, All units	82	90.6	1.00	106.3	1.00
Alberta, All units	6	93.0	1.03	107.5	1.01
NWT, All units	11	109.2	1.21	118.5	1.11

7.3 CONTRASTS AND SIMILARITIES IN THE PROGRAMS

The three programs are very similar in structure and delivery, as befits their developmental history. The RNH Demonstration program has clearly benefitted from the experience gained in the other two programs. All three programs have their strengths and weaknesses .

The RHAP Program provides housing at lower program costs than the Demonstration Program, despite the more extensive use of subtrades and labour; but there is no difference when non-program costs are included. One would assume that the Alberta approach, with its use of carpenter-trainers provided by the Program as well as construction managers provided by the housing associations, would result in a greater improvement in homeowner skills than in the Demonstration Program; but this was not verifiable from the small sample of homeowners interviewed.

The constraints of difficult building conditions and high transportation costs have encouraged the development of a clear and economical design options policy and sophisticated materials crating techniques in the HAP Program. Although the developments in crating techniques may not be applicable outside the NWT, the idea of taking a few standard designs with a limited number of design sub-options is certainly well worth emulating.

Although the design of the RNH Demonstration Program benefitted from the experience of the RHAP and HAP Programs, it cannot be fairly compared with the other two programs because it is a new program, with inevitable teething problems, to say nothing of the special problems of having been launched in the fall. And yet, despite this handicap, the Demonstration Program appears to compare well both in terms of delivery and product with the RHAP and HAP Programs.

SECTION 8

CONCLUSIONS

8. CONCLUSIONS

The projects reviewed in this study reflect a wide variety of conditions and circumstances. The conclusions drawn from an analysis of the study findings, as presented in this Section, are the basis of suggestions for adjustment and improvement of the Program. However, given the different and sometimes conflicting conditions, the suggestions are not fully complementary, and some of them may also be too expensive to implement. Therefore, in Volume 3 of this report, an attempt has been made to integrate the proposals, and to present them as economically feasible solutions .

8.1 STAFFING AND ROLES

Perhaps because this program is new and challenging, there was a fair amount of unorthodox CMHC activity in some areas: for example, the Prairie Regional Architect and other staff members worked on site at Long Body Creek; while at Baden and Red Deer, a contract CMHC inspector and the RNH program officer had a hand in construction. While these CMHC staff people received normal pay for their activities, there were also voluntary activities: most of the Halifax Office staff turned out at 6:30 on a Saturday morning to frame one of the Preston houses.

All CMHC staff who were interviewed were enthusiastic about the program and worked long and hard to make it successful. In the first year, this reaction is to be expected, but it might be prudent to reduce CMHC staff participation and limit it to those nominated staff members who have direct technical or administrative responsibilities since there is no point in providing artificially favorable conditions for the program during the demonstration period.

Failures are often as informative as successes, and if projects need major efforts on the part of CMHC staff to reach successful completion, the logic of completing them under the Demonstration Program should perhaps be questioned. This kind of attitude is, of course, not very useful to the field manager who is faced with the reality of projects, deadlines and people. Perhaps the lesson to be learned from projects such as Preston and Longbody is that more human and financial resources may be needed for certain types of projects, and that the local CMHC staff should have more influence over the client selection process.

8.2 ROLE OF THE CONSTRUCTION MANAGER

In virtually all our interviews with CMHC program staff and homeowners, the construction manager has been identified as the

driving force behind successful implementation of projects. The high quality of these people is surprising since they were hired at short notice, often only weeks before construction began.

Clients typically regarded the construction manager as being at the heart of the project, to the extent that one field office suggested that visits by CMHC staff should be kept to a minimum as these visits disrupted the relationship between the client and the construction manager.

It is unfortunate that a good construction manager can only be hired for the duration of the job, necessitating another search in subsequent years. As the program develops, it might be possible to stagger projects so that the construction manager can move from one project to the next and extend the contract from four to eight or more months of each year.

Locally hired construction managers were generally found to operate more easily because of their familiarity with local people and conditions. However, the fact that construction managers were frequently drawn from other parts of a region caused no apparent problem.

8.3 SELECTION OF PROJECTS AND CLIENTS

Community and client selection were visualized as two relatively distinct processes in the Programme Guidelines, but in fact they overlap, with the designation of a community often reflecting the presence of eligible clients. This possibly undesirable overlap may be unavoidable.

While the greater proportion of client families have been in genuine need of accommodation -- most frequently because of chronic overcrowding and deteriorating housing conditions -- there have been some exceptions.

Field comments on client selection include:

- Clients have been selected who are incapable of building their own house, or of obtaining regular volunteer or replacement labour.

- Using mtive organizations to select native clients has caused (or is likely to cause in the future) sane resentment among low income, non-mtive families.

- Newly formed families with the potential of earning adequate incomes may be receiving assistance prematurely.

- There have been indications of nepotism or favoritism in the selection of clients by some organizations.

These relatively common perceptions suggest that the client selection process should be firmed up, and that CMHC should be more active in reviewing the process. This may be difficult to achieve, given the desirability of giving the lead role to local or regional groups in the process, but the development of a more rigorous client rating scheme may be helpful.

We therefore suggest that a standard rating form be developed that clearly justifies the choice made from among all applicants, and which-itemizes the applicant characteristics that are, or are not, acceptable. It would be useful to have the application forms of both successful and unsuccessful applicants retained in one place and available for future monitoring and evaluation.

The experience of the Rural and Native Housing Program (RNH) may be useful in this regard. The RNH Program allows up to 5% of the local dwelling Maximum Unit Price (MUP) to be used for the selection of clients, using native and other organized groups. Municipalities and other public bodies are also canvassed for the names of qualified applicants. Individuals are expected to apply after public information and consultation meetings and annual lists are then compiled from which the most deserving clients are selected.

The RNH Homeownership Program has had its fair share of adverse public reaction over the years from private homeowners who believe that the program is an unfair giveaway to people rejected from the program who question the selection process. Those areas where there has been a higher level of public consultation appear to have registered less criticism.

There were indications in the field that there is a latent resentment, particularly among RNH Homeownership participants, who are required to make a down payment or the equivalent in land and who then pay rent or make mortgage payments. The extreme public and media reaction to the Demonstration Program in the Yukon and B.C. may, in part, be due to the overgenerous housing that was provided, but equally it may be due to a poor public explanation of the intent of the Demonstration and extent of the homeowners' input. No regional or local office was able to undertake the latter activity due to the late commitment of the Program and the March 31 deadline.

It might be possible to reduce some of the public resentment of the Demonstration Program if it were to be delivered together with the RNH Homeownership and rental programs, so that the Demonstration Program would be seen as one component of a wider housing initiative covering a wide range of ethnic groups, income levels and family conditions.

Counseling would then be aimed at matching a client family to the program best suited to its needs, whether Demo, RNH Homeownership or rental.

For monitoring purposes, it would not be difficult to isolate those houses built under the Demonstration rules as long as the procedures for budgeting and accounting were carefully followed, and there should be no problem differentiating between funds derived from the Demonstration or the RNH budgets. There would be administrative differences, but once the Demonstration houses were allocated, their administration would follow the current practice for both programs.

8.4 PIGGY-RACK PROGRAMS

One objective of this program is to demonstrate that savings can be made in the provision of safe and sanitary housing to certain rural people by using their labour to build modest housing that they will own outright. When houses go beyond being "modest" and start to compete in size and quality with privately built houses in the same areas, the kind of adverse community reaction seen in a few of the Demonstration projects may be expected in almost any community across Canada.

This raises the question of whether "add-on" contributions should be permitted in a demonstration program. These donations appear in a number of forms and include: land owned by the client (discussed in Section 4) , cash contributions by the client, input from federal, provincial and territorial job creation and student programs, unbilled labour provided by CMHC officers, grants for special features (EMR, R2000 program), free municipal land and service hookups, etc.

Since these contributions tend to be merged with the Program funds, it is often difficult to determine whether the Program funds alone are adequate to build the houses. In the Preston project, for example, kitchen and bathroom flooring had not been provided at the time of the site visit, because of the fear that Project funds would run out, and this was in a project that featured a CMHC Inspector acting as construction manager and paid for out of other Branch funds. We believe that the Program Manager and the other Branch staff did the right thing; they had to produce a successful project; but it would have been more useful to the Program if we were more certain of how much of a shortfall would have been caused by sticking to the normal project funding levels.

Another problem caused by relying on a variety of non-Program contributions is the considerable time and energy required to gain access to them. One example relates to the former Small Settlements Housing Assistance Grants in the NWT.

While not a current example, the following quote from a NWT paper (source lost) is still useful as a cautionary tale.

> "Officially these SSHAG houses cost $10,000 to build; the amount of material we provide. In reality the costs range from $20,000 estimated for Snowdrift to $30,000 plus for the houses in Hay River. These additional monies had to be collected in bits and pieces from various government departments or agencies. Snowdrift required negotiations with Canada Works, LEAP and Industrial Training, all separate sections within the Department of Employment and Immigration. The Hay River project involved Canada Works, STEP (Department of Economic Development), Territorial DPW (an apprentice carpenter as trainer) and the Department of Indian Affairs. In addition to these sources of funding, other agencies involved included Band and Municipal Councils, Town Plarming and Lands and Forestry."

The stamina of any group, rural and otherwise, that can survive this kind of bureaucracy can only be admired, and the four houses that were produced are a monument to the dedication of the clients, the NWTHC and the trainer hired to work a site. The unnamed author continues:

> "But, as stated earlier, these houses actually cost between $20,000 and $30,000. It is important that we recognize what it has cost to build these houses and find ways to make that kind of money available. Otherwise the SSHAG Program will continue to be a hit and miss program with only peripheral significance within the Co-ration, as well as being very inadequate to meet the expected demand for homeownership in the NWT."

These points indicate the need to avoid "piggy-back" donations during this demonstration phase, so that the cost data can be based on the CMHC funding alone. This would allow a true test of the optimum size and type of house achievable with this funding in each region. However, while it is necessary to test out the Demonstration Program, it is also essential that the houses should be completed, and in a satisfactory way. The reliance on non-Program contributions in some projects indicates that the current maximum funding level of $40,000 is insufficient in some areas to achieve this, and that there will still be a need for some source of supplementary funding. This is not surprising, in view of the spread of construction costs across the country.

Piggy-back programs are undesirable, but cannot be banned until some alternative has been developed. Since there is still a need for supplementary funding in some areas, the only solution would appear to be a sparing allocation of extra funds from the National Office to those regions that have a proven need because

of technical problems or higher construction costs. We suggest that this course of action be investigated.

8.5 HOUSE DESIGNS

Most projects allowed clients to choose from two or three designs, although six projects offered only one unit type. The amount of modifications made to Demo designs was moderate, and consisted mainly of substituting a basement for a crawl space, or moving partitions. The custom designs produced in the Yukon represent a very different situation, and this may also have been a factor in arousing local antagonism in two of those projects.

With the exception of the custom designs produced in the Yukon, most of the house plans are simple and adequate, and were mostly stock designs available "off the shelf", with many being based on RNH house types. Not all were suitable for unskilled people to build, and some of the custom designs appear to have been designed by people who did not understand the program objectives .

Program and project managers are quite aware of this problem, and all those interviewed were actively working on improved designs for 1987. Most delivery staff interviewed agreed that a limited number of stock designs for the program would be helpful, as long as program managers retained the right to use them or not, as local requirements dictated. It would not be a particularly onerous task to produce a set of some six house types with very simple working drawings and detailed bills of quantities derived from the better 1986 house plans, and with added features discussed in this chapter. (See "Core House Concept".)

Too much detail, and multiple choices of design elements or materials for one unit should be strictly avoided. Interviews with construction managers and homeowners did not indicate that much attention had been paid to plans once the structure was up, particularly where homeowners themselves went to suppliers to order goods, and there they had a wide range of choices. The bill of quantities should, naturally, be as detailed and precise as possible in order to prepare accurate preliminary estimates, particularly where the complete package is delivered to the site from a distance. However, where goods are in good supply locally, this requirement need not eliminate the selection of materials by clients.

No difference in the quality and convenience of the finished dwelling was apparent between those projects where full working drawings were available, and those where the drawings were worked out on-site between the client and the construction manager. The

reason for this is not clear; however, it is probable that most clients could not deal with working drawings, and thus they depended heavily on knowledgeable construction managers for on-site interpretation of the drawings.

Plans with metric dimensioning had to be immediately converted to Imperial by the construction managers. Plan dimensioning should therefore be in Imperial, or at least have Imperial dimensions expressed alongside the metric. If metric dimensioning is taught at all rural schools, its impact appears to be about the same as that of Latin, Greek or any other dead methods of communication.

8.6 OPTIMUM SIZE OF HOUSES

In the Annapolis project, there has been a determined effort to reduce the house size to an absolute minimum by the use of the "hearth" unit, a two-bedroom detached house with a gross finished area of 59.1 sq.m. The Net Construction Cost of this unit, however, was $555/sq.m -- the highest in the program outside of the Yukon. These results can be compared to a two-bedroom detached house built in New Brunswick for a cost of $376/sq.m for a 80.3 sq.m unit.

These comparative figures strongly suggest that construction costs do not increase continuously as the house gets larger. Once the minimum threshold costs of land, services, heating, plumbing fixtures and so on are paid, the provision of extra space is relatively inexpensive, particularly when the labour component is supplied free by the homeowner.

The optimum size for a house must be decided once the local conditions are known, but from an examination of average project costs it seems unlikely that the cost of a dwelling will noticeably decrease once the house size goes below 80 to 85 sq.m.

Although houses in northern areas of Canada tend to be larger than elsewhere because of the large amount of time spent in the house during the cold season, the houses at Carmacks and Carcross are overly generous for this type of program.

8.7 PROVISION OF EASEMENTS

It was estimated in the field that the additional cost of a basement over a crawl space is about $3,000 in materials, for which cost the homeowner gains space equal to that of the habitable floor and can move laundry and storage facilities from the habitable floor to the basement and (if the design of the dwelling is suitably modified) can finish space for at least two additional bedrooms.

Some of the more economical designs in this program, for example, those in Mistassini, consists of a generous two-bedroom house of 80.3 sq.m with a basement designed to provide two additional bedrooms, toilets, a laundry and a recreation space, all for a net construction cost of $36,214. The net cost of $451/sq.m is only applicable to the upper floor and is likely to be substantially less for finishing the basement.

A useful variation of the basement is the hi-level design where one enters the house at a half-landing. The houses at Chûtes-aux-Outardes have an upper floor area of a modest 75.8 m which is a self-contained two-bedroom unit. At a construction cost of $36,965, or $488/sq.m, this compares well with two-bedroom units on a crawl space; however, here the lower floor can be finished by the homeowner to provide two extra bedrooms and a range of laundry, storage and recreation facilities at very little cost -- at a bargain for the homeowner's family at marginal extra cost to the program.

One drawback of additional space in general, and basements in particular, is that additional operating costs are incurred, and these are applicable over the life of the house. This can pose a significant problem for low-income homeowners.

8.8 THE 'CORE' HOUSE CONCEPT

From what has been said above the most efficient use of the money available appears to be the construction of a small core dwelling with an unfinished basement or lower floor that can be finished by the homeowner after the house has been handed over. In some ways, this approach resembles the 'shell' housing that was popular in the Atlantic provinces at one time, except that here the homeowner takes over a fully habitable dwelling and can undertake further finishing as time, money and the size of the family allow. The skills gained by the homeowner in building the house should be fully adequate to do the work without supervision or assistance.

This approach may go some way to reducing criticism of the program -- the homeowner will take over a very modest two-bedroom house and the conversion of unfinished space to bedrooms will be at the homeowners' own discretion and cost.

A variation of this is to design the core house in such a way that the homeowner can build an extension in the future. This was discussed with homeowners in New Brunswick where young families have moved into modest two-bedroom houses. One family had already considered the possibility of raising the house to turn the crawl space into a habitable basement as the family grew, but since access could not be from the existing upper floor without the loss of a bedroom, an outside stair would be

required. A simple extension would be cheaper, although if this were placed in the most convenient position (on the kitchen door side), a trip to the bathroom from the new bedrooms would be by way of the kitchen. Simple modifications at the design stage could remedy this problem.

Whether the approach used involves the future finishing of a basement or the construction of an addition, it is important to provide a bit of "slack" space to allow the family to expand in the short term without having to embark on a major construction project. In this context, the production of two-bedroom houses would seem to be a questionable step, except in the case of older couples.

8.9 COLLABORATION OF CLIENTS AND SUBTRADES

The Program Guidelines require that most of the work should be carried out by homeowners, while specialized subtrades should only be used for electrical, plumbing rough-in and other exceptional uses. The goal was clear and valid, but exceptions were commonplace. In several projects, subtrades were used to build foundations; in a few others paid (or indirectly paid) labourers helped to do the framing. In one or two projects, specialized tradesmen have been brought in to do drywall taping and plastering. Homeowners were consistently involved in insulation work, air-vapour barrier installation, roofing, siding and most interior finish work.

While these tendencies may distress the developers of the Program, most cases reflected a certain logic. Time was short, and it was necessary to close in the houses before conditions became too cold and dark. The decision to use subtrades for foundations in some projects was made in the context of inexperienced homeowners who, if they messed up the framing, would be doing damage that was more remediable than if they messed up the basement construction.

With a more relaxed building schedule expected for the 1987 and subsequent years, the problem is likely to diminish. A more rigorous screening of clients would also ensure that they would have the skills required for the critical tasks.

8.10 COSTS AND CONTINGENCIES

In some cases, quite substantial contingency sum: were found to remain in project budgets at the time of monitoring, as most of the houses neared completion. While much of this money may be devoted to the legitimate completion of the houses, in some cases project officers clearly consider that such sums can be used for the funding of desirable 'extras' -- for example, an add-on

chimney for a wood stove or an outside storage shed. The uncertainty in this respect highlights one of the problems of undertaking monitoring before project completion.

It should perhaps be made clear that these houses, while being built to conventional levels of convenience and quality must -- if adverse public reaction is to be avoided -- be built at the lowest cost possible, and it is important that the maximum cost of the houses permitted under the program does not regularly become the minimum. Project officers and construction managers have all developed ideas that will reduce the cost of the demonstration houses in the future; however, this experience will be of great value only if the result is lower house prices. If the savings are spent on 'extras' of any kind, house costs will continue to rise to the local program maximum.

In some regions, there has been a Regional Office holdback of $1,000-$1,500 on each house, and this has been used to subsidize houses in high-cost areas or has been held at the regional level as funds to help out projects that have overrun their project allocation of funds.

8.11 FUNDING FOR LAND AND SITE SERVICES

Where clients owned the land on which their house was to be built, no program money was used for this purpose. In most projects, however, at least some project funds were used to acquire land or to provide services.

Services frequently consisted of a well and septic tank, paid for out of program funds, but municipal mains were sometimes available at no cost to the project (Campbell's Bay). In other cases there were no site services at all(Nain, Long Body Creek, Red Deer Lake and Baden) . Bringing in hydro to Long Body Creek was very expensive.

One of the problems encountered in the delivery of the Program was the variation in costs between projects where land and services had to be acquired, and others where these items were supplied by owners, municipalities or others. As an example, it is unfair to compare the Annapolis project, where land and site services cost $9090 per unit, with other projects where there was no such expenditure. Putting it another way, it is very difficult to implement a Demonstration project within a $40,000 ceiling where almost one-quarter of the budget is used before one begins to build the houses.

A useful tactic might be to have two budgets for the program, one for the provision of a site and site services and one for the construction of the dwelling. These budgets would each have a maximum and the money would not be interchangeable

between the two, for example:

Regional contingency fund	$ 1,000	(all these budgets
Land and site services	$ 5,000	could be regionally
Construction and other costs	$34,000	adjusted)

Money saved in the land and site service budget would be returned to the regional office in the program and would then be added to the regional contingency fund for redistribution to projects in need.

This arrangement could have several effects: first regional staff would encourage program officers to select as many clients as possible who can provide their own building sites, or to look for low-priced sites. Like the early AHOP, this is a rural program, and its effectiveness will be greatly weakened if land costs are allowed to rise.

Second, it will eliminate the unfair cost advantage of those projects where land or services, or both, were provided at no cost to the project, and the money saved was rolled into construction of the dwelling.

It is important that a national demonstration program should maintain a stable base from which to identify and measure local variations; by removing most troublesome variable costs (land and site services) , the remaining activities, construction and associated fees and charges, will induce stricter accounting measures, as well as providing 'clean' construction costs for easier comparison with other residential development in the area.

8.12 MORTGAGE AMOUNTS

The current program does not take into account the varying equity contributions of clients, such as land or site services. In most projects the value of mortgages was established at the same level for all clients, regardless of the actual size or cost of individual units. This has resulted in inequities, since one client may have contributed a serviced lot for the construction of a very modest house, while another homeowner in the same project made no land or services contribution and/or received a larger and more expensive unit. Both clients may have signed a mortgage for $40,000, but the actual value of the two properties might differ by up to $10,000, as in Rutherglen.

We therefore suggest that estimates should be made of individual house values, and that the value of land and site service equity contributions also be taken into account. The final mortgage amount would then be different for each homeowner and would fully reflect the differences in equity donated and value received.

The disadvantage of such an approach is that it would require appraisals of values for land and site services. This would add a layer of administrative complexity and increase the cost of delivering the program.

8.13 A STRUCTURE FOR PARTICIPATION AND FINANCIAL EQUITY

One of the problems experienced in the program has been the uneven level of homeowner participation in the construction process. Where participation has been minimal, it has sometimes been due to a lack of client skills or conflicting job commitments, a situation that could have been avoided by a better client selection process. In some other projects, low client participation has been due to a poor construction manager, or a lack of interest on the part of the clients.

Another problem encountered in certain projects has been public antipathy towards the Program, due to a perception that the clients are getting something for nothing. Demo clients are certainly getting a good deal, but our analysis shows that the cost differential within Canada between Demo units, and the lower of RNH Homewonership or local comparable units, is close to $30,000, or a 43% reduction for a 90 sq.m house. Much of this differential is due to the volunteer labour provided, so it is reasonable to say that clients and other volunteers make a significant contribution to the total, notional, value of the house.

An idea that may address both of these issues is to place a notional and higher value on the property, up to a level that takes into account most of the value of the volunteer labour - say, $60,000. Homeowners and other volunteers would then earn credits as they work, reducing the total amount by the value of their labour. Assessment of the labour provided would be made by the construction manager. Credit would also be made for the value of land and services provided.

The result of adopting this approach would be that the final value of the property, at the mortgage signing stage, will have been reduced by the value of these inputs. Clients who have made strenuous efforts to work, and to enlist their friends in the process, will be rewarded by having a lower mortgage amount - and vice versa. There would be a continuing encouragement of participation in the construction process. General community opinion of the Program should also be improved, since the linkage between effort and reward will be made more explicit.

Use of this procedure will require other adjustments in the Program. Appraisals would have to be made of land and services contributions . Construction Managers will have to maintain a closer watch on who is doing what on each site; but other

findings indicate that this would be desirable in any case. An embellishment of the basic idea is to have a formal assessment of construction skills before work begins, and to set up a credit scale for, say, three levels of performance. The credits earned could then be set at the equivalent of, say, $5, $7.50 and $10, depending on the level of performance. This would provide an additional inducement to learn on the job and would also give construction managers more control over the labour force.

It is important to note that it is not proposed that money should change hands in this scenario; credits would be earned until such time as the project is closed out and the mortgage papers signed.

8.14 VARIABLE FORGIVENESS

There has been considerable public reaction, particularly in the west, to the short five-year forgiveness period which has led to the public viewing the program as being a 'give-away' scheme.

Discussions with CMHC project officers suggest that a ten-year forgiveness period would be acceptable; however, if it went above ten years it was felt that CMHC could end up with repossessions, emergency repair and all the administrative problems inherent in rental programs.

In at least one local office, the view was expressed that annual forgiveness should be equated to the annual costs to the public purse of rental or alternate housing costs that would have to be otherwise provided, and the idea that CMHC should have the right of first refusal when a family wanted to sell has been raised.

In an attempt to marry these comments with our previous observations on the need for variable mortgage amounts (see 8.12), we suggest that a variable forgiveness formula should be implemented. The forgiveness period would begin at five years for loans of $35,000 or less, increasing by one year for every $1,000 increase in the loan up to a maximum of $50,000 and 20 years.

Under this arrangement, there would be a clear benefit to the homeowner in keeping the CMHC input into a house to the minimum, while rewarding the homeowner's own input in terms of land, services and labour which bring down project costs. The Corporation would also benefit from such an arrangement, as there would be a direct relationship between the forgiveness schedule and the amount of the corporation's cash input.

To complement this scheme, we suggest that CMHC should have the right of first refusal when the owner sells or wishes to

abandon a dwelling (for example, where there is no resale value) for a period extending to five years past the forgiveness period. It is suggested that during the CMHC option period, the assessed replacement value of the dwelling should be the basis of reimbursement, less the value of the unforgiven loan and less (an optional) 10% to cover administration and rehabilitation costs.

This arrangement would ensure a fair return to all clients for their labour and earned equity regardless of whether they live in a market area or not, and CMHC receives a house at a fair price. Table 17 brings together both of these ideas:

TABLE 17 VARIABLE FORGIVENESS AND CMHC OPTION PERIODS

Loan Amount	Forgiveness Period	CMHC Option Period
$35,000 or less	5 years	10 years
$40,000	10 years	15 years
$45,000	15 years	20 years
$50,000 or more	20 years	25 years

8.15 MONITORING

On-going monitoring is important in this Program. In view of our experience this year, we suggest that subject areas of special interest include actual project costs (including non-program contributions) and client characteristics.

The monitoring of project costs requires the application of the "Commitment Authority" form. We suggest that this form should be modified to assist in future monitoring. It should be a single form, cumulative over the full period of the project, with different sections of the form being completed as the work progresses.

APPENDIX 1

HAP DATA

APPENDIX 1 a MANPOWER PROGRAM ALLOCATIONS TO HAP PROJECTS

1986 HAP LABOUR ALLOCATIONS (ICHRS & STEP)

COMMUNITY	UNITS	ICHRS ALLOCATION	$/UNIT	STEP $ BY # OF UNITS	TOTAL $ PER UNIT
ARCTIC RED RIVER	3	$26,250	$8 ,750	S6,495	S'10,9"15
t-T. MCPHERSON	3	%26,250	$8,750	s6,495	$10,915
CO VILLE LAKE	1	$5,632	S5,632	$2,165	$7,797
t-T. GOOD HOPE	7	$23,865	%3 ,409	$15,155	35,574
FT. NORMAN	4	$23,8155	$5,966	$8,660	$8,131
AKLAV IK (WEST)	4	*35,000	$8,750	s8 ,660	$10,915
AKLAVIK (EAST !	4	$28 ,000	$7,000	s10,244	$9,561
INUVIK	2	5"14,000	$7,000	$5, "122	$9,561
TuK1OYAKTUK (WES	1	so	$0	S2, 165	$2,165
TUKTOYAKTUK (EAST	3	$21,000	57,000	$7,683	$9,561
PAULATUK	2	$14,000	$7,000	$5,'122	$9,561
SACHS HARBOUR	2	$14,000	$7,000	$5,122	$9,561
EDZO	1	S6,000	$6,000	$2, "165	$8, "165
DETAH	2	$12,000	S6 ,000	$4,330	$8,165
RAE	9	$54,000	S6,000	$19,485	$8,165
LATHAM ISLAND	3	$18,000	$6,000	$6,495	$8,165
RAE LAKES	3	$"1s,000	$6,000	S6,495	$8,165
LAC LA MARTRE	4	$24,000	S6,000	$8,660	$8,165
SNOWDRIFT *	3	%17,305	S5,768	$6,495	37,933
FT. SMITH	6	so	so	s12,990	S2, 165
FT. RESOLU11ON	5	so	so	%10,825	s2,165
FT. PROVIDENCE	5	s25 ,980	$5,196	S10,825	$7,361
FT. SIMPSON	7	S36,379	$5,197	$15,155	s7,362
HAY RIVER	3	$0	so	$6,495	$2,165
HAYRIVER RESERVE	5	$25 ,985	$5, 197	S10,825	s7,362
JEAN MARIE RIVER	2	S"10,394	$5, "197	$4,330	s7,362
KAKISA LAKE	1	$5, '197	$5, 197	S2, 165	%7,362
TROUT LAKE	2	S'10,394	$5, 197	$4,330	$7,362
WRIGLEY	5	s25 ,985	$5,'197	s10,825	$7,362
NAHANNI BUTTE	2	$10,394	$5, 197	$4,330	$7,362
FT. LIARD	6	$31,182	$5,"197	s12,990	%7,362
CAMBRIDGE BAY	4	$28,000	$-/,000	$10,244	$9,561
COPPERMINE	3	$21,000	$7,000	$7,683	99,561
HOLMAN ISLAND	4	$28,000	$7,000	$10,244	$9,561
BAKER LAKE	5	$15,385	$3,077	$12,805	$5,638
CORAL HARBOUR	2	$6,154	$3,077	$5, 122	$5,638
CHESTERFIELD INLE	1	$3,077	$3,077	s2,561	$5,638
HEPULSE BAY	1	$3,077	$3,077	$2,561	$5, 63a
ESKIMO POINT	10	S30 ,770	$3,077	S25,610	$5,638
RANKIN INLET	7	$21,539	$3,077	$17,927	$5 , 638
BAFFIN DISTRICT	32			$81,952	$2,561
TOTAL/AVERAGE	'179	s720,059	$5, 106	S420,007	$7,118

APPENDIX 1b CLIENT OPTION LIST, 1986 HAP PROGRAM

client Option List
1986 H.A.P.Program Tender 86-01-003

1. Detah - 1 Type A Frame Construction c/w shingle rmf package, delete crates 12 and 13; delete item 14 and 32 in lumber package. 1 Type B Frame Construction c/w metal roof package: delete crates 12 and 13; delete item 14 and 32 in lumber package.

2. Edzo - 1 Type B Frame Construction c/w metal roof package; delete mechanical items 221, 222, 224 and 226 thru 251 inclusive; add 1 Crane 3-183 Toilet complete with seat; add plumbing brass trim C3016, 3/8" angle supply pipe with stop and escutcheon.

3. Fort Providence - 4 Type A Frame Construction c/w shingle roof package. 1 Type B Frame Construction c/w shingle roof package.

4. Fort Rae - 1 Type A Frame Construction c/w metal roof package; delete crates 12 and 13; delete item 14 and 32 in lumber package. 8 Type B Frame Construction c/w metal roof package; delete crates 12 and 13; delete item 14 and 32 in lumber package.

5. Fort Resolution - 2 Type A Frame Construction c/w metal roof package. 1 Type B Frame Construction c/w shingle roof package. 1 Type C Frame Construction c/w metal roof package.

6. Fort Simpson - 2 Type A Frame Construction c/w shingle roof package; delete mechanical items 221, 222, 224, 226 thru 251 inclusive; add 1 Crane 3-183 Toilet complete with seat; add plumbing brass trim C3016, 3/8" angle supply with stop and escutcheon.
- 3 Type B Frame Construction - same options as above.
- 1 Type C Frame Construction - same options as above.

7. Fort Smith - 3 Type A Frame Construction c/w shingle roof package; delete mechanical items 221, 222, 224 and 226 thru 251 inclusive; add 1 Crane 3-183 toilet complete with seat: add plumbing brass trim C3016, 3/8" angle supply pipe with stop and escutcheon.
1 Type B Frame Construction - same options as above.
1 Type D Frame Construction - same options as above.
1 Type A Frame Construction - same options as above except metal roof package.

8. Hay River - 1 Type A Frame Construction c/w metal roof package. 2 Type B Frame Construction c/w shingle roof package.

9. Kakisa Lake - 1 Type B Frame Construction c/w shingle roof package; delete mechanical items 221, 222, 224 and 226 thru 251 inclusive; add1 only 45 gallon C.S.A. approved water holding tank.

10. Latham Island - 2 Type A Frame Construction c/w metal roof package: delete crates 12 and 13; delete items 14 and 32 in lumber package; delete sewage tank and water tank. 1 Type C Frame Construction same options as above.

APPENDIX 1 C **PRESENT VALUE** COMPARISONS, HAP AND SEC. 40 **PROGRAMS**

PRESENT VALUE
HAP - VS - SEC 40 PH

District (Program)	Capital cost*	Present Value cost of Projected Ongoing O&M**	Total Present Value Cost
Baffin			
H. A.P.	$ 80,721	$ NIL	$80,721
P.H.	190,000	226,738	416,738
Keewatin			
H. A.P.	76,291	NIL	76,291
P.H.	177,000	218,158	395,158
Kit ikmeot			
H.A. P.	73,563	NIL	73,563
P.H.	175,000	263,616	438,616
Inuvik			
H. A.P.	62,440	NIL	62,440
P.H.	145,000	146,047	291,047
Yell owknife			
H.A. P.	60,458	NIL	60,458
P.H.	123,000	125,418	248,418

• - Public Housing is derived from the Maximum Unit Price of a 3 bedroom **unit** in given **community.**

HAP unit price includes: $5,000.00/unit **for supervisor & 13,440/unit** for 3 trainees as per submission to Federal Government.

Does not **include** soft costs to the N.H.T.H.C. , such as travel, due to variable nature of these costs, and the fact that they are considered to be equal for both programs.

** - Includes payments for: Power, Fuel, Mater & Sanitation, Taxes, Maintenance, Administration.

Does not include revenue collected for rent.

Present value calculations assumes 5% inflation, 10% long term borrowing cost and 50 year project life.

APPENDIX 2

DATA TABULATIONS

	NO OF UNITS	TYPE OF FOUNDATION	BED now	ROOMS poss	UNIT AREA gross	UNIT AREA equiv	PROJECT program	COSTS const
Nain	2	crawl sp	3	0	84.7	84.7	38825	0
	2	crawl sp	3	0	88.3	88.3	40125	0
	1	crawl sp	5	0	122.6	122.6	47775	0
PEI	2	crawl sp	3	0	89.1	89.1	37180	0
	1	crawl sp	2	0	80.0	80.0	37180	0
NB	3	crawl sp	2	0	71.4	71.4	38500	0
	1	basement	3	2	80.3	120.5	38500	0
	1	crawl sp	3	0	80.3	80.3	38500	0
Preston	2	bi-level	4	0	108.2	108.2	39867	2750
	3	basement	3	2	85.7	128.6	39867	2750
Annapolis	1	crawl sp	2	0	59.1	59.1	40000	1400
	1	crawl sp	3	0	69.5	69.5	40000	1400
	2	basement	3	2	69.5	104.3	40000	1400
ATLANTIC	24		3.0		83.9	97.4	39491	1119
Chutes	5	bi-level	2	2	113.7	113.7	39965	0
Normandin	5	basement	2	2	80.3	120.5	38000	0
Rupert	1	slab	3	0	104.5	104.5	39860	600
Campb. Bay	5	basement	3	2	88.2	132.3	38926	0
QUEBEC	16		2.4		94.7	121.0	39021	88
Rutherglen	5	basement	3	2	88.2	132.3	40000	879
Hornepayne	3	slab	3	0	84.7	84.7	39763	2500
ONTARIO	8		3.0		86.9	114.5	39911	619
Longbody	1	crawl sp	3	0	80.7	80.7	38800	6134
	4	crawl sp	4	0	93.6	93.6	38800	6134
Baden	1	crawl sp	3	0	80.7	80.7	36500	4110
	2	crawl sp	4	0	93.6	93.6	36500	4110
Red Deer	1	crawl sp	4	0	93.6	93.6	38000	2847
	2	crawl sp	3	0	80.7	80.7	38000	2847
Livelong	6	basement	3	2	80.3	120.5	39000	1402
PRAIRIES	17		3.4		85.9	100.0	38324	3527
100 Mile Hse	4	crawl sp	3	0	84.7	84.7	40000	0
	1	basement	3	2	84.7	127.1	40000	0
Carmacks	1	basement	3	2	96.6	144.9	54548	167
	1	basement	2	1	96.6	144.9	54548	167
	1	bi-level	2	2	144.9	144.9	54548	167
	2	bi-level	3	2	115.2	115.2	54548	167
	1	crawl sp	3	0	130.1	130.1	54548	167
Jarcross	2	bi-level	3	2	115.2	115.2	55000	0
	1	basement	3	2	137.7	137.7	55000	0
Old Crow	1	crawl sp	3	0	89.2	89.2	55000	800
	2	crawl sp	4	0	89.2	89.2	55000	800
YUKON	12		3.0		111.2	119.2	54774	284
CANADA	82		3.0		90.8	107.2	41465	1165

	PER UNIT AVERAGE (IN $) total	land/ serv.	netcost	COMP UNITS $/sq.m	COST COMP gross $/sq.m	% diff
Nain	38325	1025	37300	746	440	41
	40125	1025	39100	746	442	41
	47775	1025	46750	746	381	49
PEI	37180	4000	33180	606	372	39
	37180	4000	33180	606	415	32
NB	38500	8300	30200	606	423	30
	38500	8300	30200	606	376	38
	38500	8300	30200	606	376	38
Preston	42617	4500	38117	698	352	50
	42617	4500	38117	698	445	36
Annapolis	41900	9090	32810	698	555	20
	41900	9090	32810	698	472	32
	41900	9090	32810	698	472	32
ATLANTIC	40610	5270	35340		421	
Chutes	39965	3000	36965	722	325	55
Normandin	38000	1786	36214	722	451	38
Rupert	40480	6929	33551	722	321	56
Campb. Bay	38926	2960	35966	722	408	44
QUEBEC	39058	2854	36205		382	
Rutherglen	40870	9920	30950	781	351	55
Hornepayne	39963	333	39630	781	468	40
ONTARIO	40530	6325	34205		394	
Longbody	44934	3359	41575	705	515	27
	44934	3359	41575	705	444	37
Baden	40610	0	40610	705	503	29
	40610	0	40610	705	434	38
Red Deer	40847	0	40847	705	436	38
	40847	0	40847	705	506	28
Livelong	40402	4480	35922	629	447	29
PRAIRIES	41850	2569	39281		457	
100 Mile Hs	40000	1640	38360	746	453	39
	40000	1640	38360	746	453	39
Carmacks	54715	7089	47626	1047	493	53
	54715	7089	47626	1047	493	53
	54715	7089	47626	1047	329	69
	54715	7089	47626	1047	413	61
	54715	7089	47626	1047	366	65
Carcross	55000	4300	50700	772	440	43
	55000	4300	50700	772	368	52
Old Crow	55800	275	55525	1047	622	41
	55800	275	55525	1047	622	41
YUKON	55058	4688	50369		453	
CANADA	42634	4035	38598		425	

	NO OF UNITS	TYPE OF FOUNDATION	BDW ROOMS now	BDW ROOMS poss	UNIT AREA gross	UNIT AREA equiv	PROJECT COSTS program	PROJECT COSTS other
ALBERTA								
Elinor Lake	1	bi-level	4	0	123.1	123.1	22654	15516
	1	crawl sp	3	0	86.9	86.9	22654	15511
Owl River	2	basement	4	2	87.0	130.5	20753	19789
	2	crawl sp	3	0	87.0	87.0	20753	19789
TOTAL/AVG	6		3.5		93.0	107.5	21397	18598
NWT								
Fort Prov.	3	crawl sp	4	0	116.0	116.0	46000	31101
	1	crawl sp	3	0	116.0	116.0	46000	31101
	1	crawl sp	3	0	88.5	88.5	46000	31101
Fort Smith	1	crawl sp	5	0	118.0	118.0	45683	30401
	1	crawl sp	4	0	116.0	116.0	45683	30401
	1	crawl sp	3	0	131.5	131.5	45683	30401
	1	basement	4	2	118.0	177.0	45683	30401
	1	basement	3	2	88.5	132.8	45683	30401
	1	crawl sp	2	0	76.2	76.2	45683	30401
TOTAL/AVG	11		3.5		109.2	118.5	45827	30719

	PER UNIT AVERAGE (IN $) total	land/ serv.	netcost	COMPR UNITS $/sq.m	COST COMP gross $/sq.m	% diff
ALBERTA						
Elinor Lake	39000	1908	37092	488	301	38
	39000	1908	37092	488	427	13
Owl River	40492	0	40492	488	465	5
	40492	0	40492	488	465	5
TOTAL/AVG	39995	636	39359		423	
NWT						
Fort Prov.	77101	0	77101	1113	665	40
	77101	0	77101	1113	665	40
	77101	0	77101	1113	871	22
Fort Smith	76084	2500	73584	1113	624	44
	76084	2500	73584	1113	634	43
	76084	2500	73584	1113	560	50
	76084	2500	73584	1113	624	44
	76084	2500	73584	1113	831	25
	76084	2500	73584	1113	966	13
TOTAL/AVG	76546	1364	75183		689	

	NO OF Units	TYPE OF FOUNDATION	UNIT AREA gross	UNIT AREA equiv	IN $) $/cost	COMPR Units $/sq.m	COST, COMP gross $/sq.m	diff
Hornepayne	3	slab	84.7	84.7	37630	781	456	41
Rupert	1	slab	104.5	104.5	33551	722	321	56
Old Crow	1	crawl sp	89.2	89.2	55525	1047	622	41
Old Crow	2	crawl sp	89.2	89.2	55525	1047	622	41
Annapolis	1	crawl sp	59.1	59.1	32810	698	555	20
Longbody	1	crawl sp	80.7	80.7	41575	705	515	27
Red Deer	2	crawl sp	80.7	80.7	40847	705	506	28
Baden	1	crawl sp	80.7	80.7	40610	705	503	29
Annapolis	1	crawl sp	69.5	69.5	32810	698	472	32
100 Mile Hse	4	crawl sp	84.7	84.7	38360	746	453	39
Longbody	4	crawl sp	93.6	93.6	41575	705	444	37
Nain	2	crawl sp	88.3	88.3	39100	746	443	41
Nain	2	crawl sp	84.7	84.7	37300	746	440	41
Red Deer	1	crawl sp	93.6	93.6	40847	705	436	38
Baden	2	crawl sp	93.6	93.6	40610	705	434	38
NB	3	crawl sp	71.4	71.4	30200	606	423	30
PEI	1	crawl sp	80.0	80.0	33180	606	415	32
Nain	1	crawl sp	122.6	122.6	46750	746	381	49
NB	1	crawl sp	80.3	80.3	30200	606	376	38
PEI	2	crawl sp	89.1	89.1	33180	606	372	39
Carmacks	1	crawl sp	130.1	130.1	47626	1047	366	65
Carcross	2	bi-level	115.2	115.2	50700	772	440	43
Carmacks	2	bi-level	115.2	115.2	47626	1047	413	61
Preston	2	bi-level	108.2	108.2	38117	698	352	50
Carmacks	1	bi-level	144.9	144.9	47626	1047	329	69
Chutes	5	bi-level	113.7	113.7	36965	722	325	55
Carmacks	1	basement	96.6	144.9	47626	1047	493	53
Carmacks	1	basement	96.6	144.9	47626	1047	493	53
Annapolis	2	basement	69.5	104.3	32810	698	472	32
100 Mile Hse	1	basement	84.7	127.1	38360	746	453	39
Normandin	5	basement	80.3	120.5	36214	722	451	38
Livelong	6	basement	80.3	120.5	35922	629	447	29
Preston	5	basement	85.7	128.6	38117	698	445	36
Campb. Bay	5	basement	84.7	127.1	35966	722	425	41
NB	1	basement	80.3	120.5	30200	606	376	38
Carcross	1	basement	137.7	137.7	50700	772	368	52
Rutherglen	5	basement	88.2	132.3	30950	781	351	55

ALL CASES $/SQ.M
71.86 Std.De gross
437.10 Average

144.80 Std.De compar
768.08 Average

11.04 SD, % of Comp
41.75 Average

GROSS AREAS
16.35 SD, or wi type
87.33 Average

21.26 SD, ba ement type
97.77 Average

CRAWL SPACE $/SQ.M
63.49 Std.Dev gross
453.24 Average

BASEMENT AND BILEVEL, $/SQ.
56.22 Std.Dev gross
412.90 Average

CRAWL SPACE % OF CUMP
9.43 Std.Dev gross
36.88 Average

BASEMENT BILEVE , % OF CUMP
10.96 Std.Dev gross
46.67 Average

	NO OF UNITS	TYPE OF FOUNDATION	UNIT gross	AREA equiv	($IN $) netcost	CUMPR UNITS $/sq.m	Cost gross $/sq.m	CUMP % diff
ALBERTA								
Owl River	2	crawl sp	87.0	87.0	40132	488	461	5
Elinor lake	1	crawl sp	87.0	87.0	37092	488	426	13
Elinor Lake	1	bi-level	123.1	123.1	37092	488	301	38
Owl River	2	basement	87.0	130.5	40132	488	461	5
NWT								
Fort Smith	1	crawl sp	76.2	76.2	73584	1113	966	15
Fort Prov.	1	crawl sp	88.5	88.5	77101	1113	871	22
Fort Prov.	3	crawl sp	116.0	116.0	77101	1113	665	40
Fort Prov.	1	crawl sp	116.0	116.0	77101	1113	665	40
Fort Smith	1	crawl sp	116.0	116.0	73584	1113	634	43
Fort Smith	1	crawl sp	118.0	118.0	73584	1113	624	44
Fort Smith	1	crawl sp	131.5	131.5	73584	1113	560	50
Fort Smith	1	basement	88.5	132.8	73584	1113	831	25
Fort Smith	1	basement	118.0	177.0	73584	1113	624	44

ALBERTA

ALL CASES $/SQ.M

68.67 Std.De gross

396.32 Average

GROSS AREAS

17.02 SD, cr wl type

99.03 Average

NWT

ALL CASES $/SQ.M

101.72 Std.Dev ross

684.14 Average

GROSS AREAS

14.16 SD, craw type

111.56 Average

APPENDIX 3

CLIENT SURVEYS

House design (design process)

Responses to Questions 5, 6, 12.

House	Designers	Change	Problems
PEI	2	None	None
NB	2	None	None
NB	---	Added basement	None
Pres	---	None	None
Pres	1	Patio door in back, mas . chimney for wood stove	None
Anna	2	Added porch; opened both closets to bedroom	None
Anna	2	Changed full wall to half wall at basement stairs	None
Chut	2	See Plan #3	None
Chut	2	Reclaimed storage from lost space; grill for heat	None
Rupe	1	See plan	None
camp	2	Took out wall	None
camp	2	None	None
camp	1	None	None
Ruth	2	See plan. Better materials for floors and kitchen	See CM
Ruth	1	roved a wall	See CM
Ruth	1	Kitchen cupboard	See CM
Ruth	5	Two small walls	See CM
Ruth	4	roved one wall	See CM
Horn	2	None	None
Horn	1	None	None
Horn	0	None	None
RedD	1	None	None
RedD	2	None	None
RedD	2	None	None
Long	---	Movedlv.rm door to accommodate entry closet	None
Long	2	Made two bedrooms into four	None
Long	0	None	None
Long	2	Moved a bedroom to other side; cut overhang	None
Live	0	No option	
Live	0	No option	
Live	0	No option	
Live	0	No option	
100	NA	Adjoins existing structure; will add porch roofs	None
100	0	None	None
100	0	None	None
100	0	None	None

continued

House design (design process), continued

House	Designers	Change	Problems
Carm	2	Architect followed owner's design	None
Carm	2	None	None
Carm	2	None	None
Carm	2	None	None
Carm	2	May change bedrooms later	None
Carm	2	Architect followed owner´s design	None
Care	2	Advised architect of requirements	None
Care	2	Added back windoww in basement	None
Old	1	Enlarged washroom; moved door not to open to kitchen	None
Old	1	Architect followed owner´s design (open floor plan)	None
Old	2	Architect followed owner's design (2 bedroom windows)	None
Elin	2	Basement storage for potato, wood; 1 bedrm only?	None
Elin	---	None	None
Owl	---	? unreadable	None
Owl	2	? unreadable	None
Prov	---	Moved bathrm upstairs; moved windows; enlarged porch	None
Prov	1	Changed roof; sweatbox instead of shed; larger porch	None
Prov	1	Changed roof; insulated porch and added window; moved window to 2nd floor and across house	None
Prov	3	Opened up 1st fl walls; moved bathroom upstairs	None
Prov	1	None	None
Smit	0	Partition betw. kitchen and lv.room, left out in BR	None
Smit	2	Adapted "A" design, increased size 24x25 to 24x36	None
Smit	2	Moved bathroom upstairs; added front porch	None
Smit	2+	Full basement; kitchen cabinets; linoleum flooring	None
smit	0	Changed bathroom door to acommodate wrong tub	None
Smit	3	Moved washroom to 1st fl; moved utility room; extra upstairs bedroom; enlarged porch	None

Construction Managers (CM)
Responses to Questions 12, 14, 38.

House	Response
NB	CM helped to improve skills
NB	CM helped with advice
Chut	CM helped to improve skills
Camp	CM helped to improve skills
Rupe	improvement due to CM
Camp	CM helped to improve skills
Ruth	CM had few meetings during construction
Ruth	CM only dropped of supplies, was inside only twice
Ruth	CM was away for up to a week
Ruth	CM would leave a job partly finished; did not schedule well
Ruth	CM was too busy, delivered materials late
Horn	helped to imrpove skills
Bade	worked well with good supervision
Long	good advise from CM
Long	learned a lot from CM
Live	CM showed proper technique
Live	CM always around to solve problem
100	conflict between CM and inspector held up work
100	learned a lot from CM
Carm	was nice to have some help from CM when stuck
Carm	would not have been possible without CM
Carm	never knew when CM was coming / great working with CM, shows tricks
Carm	learned sequencing from CM
Carm	CM was not-available (scheduling difficulties)
Carm	CM was not available for roof (working with others)
Care	CM is good teacher
OldC	learned from CM, had lots fun
Prov	CM helped to improve skills
Prov	CM not attentive

Skill improvement
Responses to Questions 13, 14.

House	Before	After	Reason
NB	2	4	CM, mother-in-law on job (?)
NB	5	5	CM helped with advice
NB	3	4	
Pres	1	3	being there
Pres	4	5	doing it (carpentry)
Anna	1	2	doing it, help from foreman
Anna	3	4	doing it
Chut	2	3	experience
Chut	2	4	help from CM and inspector
Rupe	2	4	CM
camp	2	3	help from CM
camp	2	3	demonstration by CM
camp	1	2	experience (2nd hand opinion of wife)
Ruth	3	4	experience on the job, CM
Ruth	2	4	experi ence
Ruth	4	4	experience with group
Ruth	5	5	
Ruth	3	4	working with group
Horn	3	4	experience
Horn	1	3	learning from CM
Horn	1	4	working with the contractor
Bade	3	4	took course in job-related training
Bade	2	4	went to carpentry school
RedD	2	4	
RedD	1	3	
RedD	1	2	
Long	1	2	learned from CM
Long	2	4	learned from CM
Long	2	3	working on site, good advise from CM
Live	3	3	more confidence
Live	1	2	
Live	2	3	
Live	2	3	learned from CM and other owner
Live	2	3	doing it; instruction from CM
100	3	3	experience
100	2	2	experience
100	3	3	learned from CM, picked up tricks
100	3	4	doing it; never did before (wiring, carpentry, cede)

continued

Skill improvement (continued)

House	Before	After	Reason
Carm	4	"4	help from CM; learned R-2000
Carm	2	3	experience, demonstration by CM
Carm	2	2	learned little tricks from CM
Carm	3	3	learned sequencing from CM; paid for R-2000 course
Carm	1	2	experience; paid for R-2000 course
Carm	2	2	broadened skills; new ideas from R-2000 course
Care	2	3	experience and CM
Care	3	4	
Old	1	2	learned from CM
Old	2	2	experience, working with others
Old	3	3	experience
Elin	1	2	
El in	3	4	experience
Owl	4	4	
owl	2	4	learned from carpentry instructor in site
Prov	3	4	"tripled his knowledge"
Prov	2	3	learned from CM
Prov	3	3	
Prov	2	3	"learned a bit"
Prov	5	5	
Smit	4	4	
Smit	2	3	
Smit	3	3	learned from hired journeyman carpenter
Smit	5	5	all labour on site were journeymen
Smit	4	4	
Smit	3	3	

House design (in use)
Responses to Questions 15, 16, 31, 32, 33.

House	Hcpd	Door	Best features	Changes wanted
NB	NA	Front		Bigger living room
NB	NA	Side		Bigger bedrooms
Pres	NA	Back	Not moved in	
Pres	NA	Back	Not roved in	
Anna	NA	Back	Not moved in	
Anna	NA	Back	Not moved in	
Chut	NA	Front	Full basemt	Laundry loc'n; size; storage space
Chut	NA	Front	Everything	---
Rupe	NA	---	Notmoved in	More space
camp	NA	Side	---	One bedroom too small
camp	NA	Side	---	---
camp	NA	Side	---	Side door closet; more kit.storage
Ruth	NA	Side	Private, roomy	Bigger bedroom, higher basement
Ruth	NA	Side	Comfortable	Bigger bedroom and bathroom
Ruth	NA	Side	Clean, comfortable	Location of fridge
Ruth	NA	Side	No mice	Basement door
Ruth	NA	Side	Comfortable	Add porch, enlarge kitchen
Horn	Yes	End		More bedrooms, storage, laundry
Horn	NA	Front	Open space	Place for laundry
Horn	NA	Side	warm	Porch, full basement
Bade			Not moved in	Half basement; remove kit.vestib.
RedD			Not moved in	Eave projection, half-wall lv/kit
RedD				Divide kit & lvrm; two doors
RedD			Notmoved in	Bigger kitchen window
Long	NA	Kitchen	Spacious, quiet	Close off kitchen with door
Long	NA	Kitchen		None
Long	NA	Kitchen		Patio and deck
Live			Not moved in	More kitchen, entry closet space
Live			Not moved in	More space, garage, fix basement
Live			Not moved in	Porch at kit.entry; move bathrm
Live			Not roved in	Extra bedrm in basement
Live			Not moved in	Bedrm small; move bathroom
Live			Not roved in	Bigger closet; children's rm in bm
100	Yes	Front		Roof over entrances
100	NA	Front	Not moved in	Extra bedroom, storage, bigger cl
100	NA	---	Not moved in	Kitchen design
Carm	---	---	Not roved in	Dutch hip to straight gable roof

continued

House design (in use), continued

House	Hcpd	Door	Best features	Changes wanted
Old	Yes	Porch	Not rewed in	
Elin	No	Front	---	---
Elin	NA	Front	Warn, easy maintain. ---	
Owl	NA	Back	Lv.rm space and design	
owl	NA	Frt bsmt	Just moved in	Wants stair landing
Prov	---	---	Not rewed in	Move stove to comer to gain space
Prov	NA	Front	No rent!	Longer unit; post flush with wall
Prov	NA	Front	Not moved in	Heating ducts
Prov	---	---	Not roved in	Beams flush with 1st fl ceiling
Prov	---	---	Not moved in	Larger utility room
Sit-it	---	---	Not roved in	Larger kitchen; concrete found-n
Smit	---	---	Not moved in	Larger house; full basement
Smit	---	---	Not moved in	Larger kitchen; dining area
Smit	NA	Front	Open space	Location of entry, chimney
Smit	NA	Back		Basemt for furnace; larger lv.room
Smit	---	---	Not rewed in	Basemt for wood stove, not oil

Construction process

Observed state of completion and responses to Questions 8, 9, 10, 12.

House	Compl.	Cash	Equipment	Materials	Tools	Probl -
PEI	63%	0	0	0	Loan	None
NB	100%	0	0	0	Own	None
NB	100%	1500	0	0	Loan	None
NB	---	0	0	0	Own	None
Pres	---	0	0	0	Friends	---
Pres	---	1000			Own	None
Anna	---	0	Dozer rent		OK (?)	---
Anna	---	---	0	0	Own	None
Chut	100%	3000	0	0	Own	Rain
Chut	100%	250	Stove, appliances		Loan	None
Rupe	---	8500	Cem mixer			Winter, illness
camp	95%	---	0	0	Own	Water when excavating
Camp	---	30		Paint	Own	None
Camp	---	150	C	C	---	---
Ruth	100%	1200		Lumber	Own	Delays in delivery
Ruth	98%	400	0	0	Own	Imttentive CM
Ruth	98%	100	0	0	Own	Delays in delivery
Ruth	98%	500		Fixtures	Own	Delays in delivery
Ruth	98%	1000		Lumber, trim	Own	Delays in delivery
Horn	100%	0	0	Cabinets	Own	---
Horn	100%	0	0	0	0	None
Horn	100%	0	Stove	Asbestos	Own	None
Bade	---	0	0	0	0	None
Bade	---	1300	Truck	0	Own	None
RedD	---	0	0	0	Own	Disagree with CM
RedD	---	0	0	0	CMHC	Behind sched; need lbr
RedD	---	0	0	0	own	None
Long	100%	0	0	0	CMHC	None
Long	100%	0	0	0	None	No machinery
Long	---	0	0	0	None	Personal
Live	100%	300	0	0	Own	None
Live	100%	300	Light fixt	0	Own	None
Live	100%	130	0	0	None	None
Live	100%	350	0	0	Own	None
Live	100%	400	0	0	Own	None
Live	100%	500	0	0	CMHC	None
100	40%	0	0	0	Own	None
100	40%	0	0	0	Own	CM/inspector conflict
100	40%	0	0	0	Own	Timing (winter)
100	50%	0	0	Lumber	Own	None

continued

construction process, continued

House	Compl.	Cash	Equipment	Materials	Tools	Problems
Carm	25%	0	0	0	Own	Late start
Carm	40%	750	0	Finish	Own	Scheduling with CM
Carm	30%	?		Fuel (light)	Own	Scheduling. Rushed
Carm	33%	0	0	0	Own	Too cold (winter)
Carm	25%	0	0	0	Own	Scheduling. Busy time
Carm	30%	?	Grader	0	Own	CM too busy.
Care	25%	0	0	0	Own	Hard physical work
Care	60?	0	0	Some	Own	None
Old	90%	1000+	0	Logs	Own	Delayed to move church
Old	30%	2400	0	Logs	Own	Delays, work in winter
Old	60%	0	0	0	Loan	None
Prov	85%	3500	0	0	Own	None
Prov	95%	10000	0	1000	Own	Wiring, plumbing
Prov	75%	12500	Incl.	Incl	Own	CM not attentive
Prov	85%	1000	0	Some	Own	Fix crooked walls
Prov	60%	0	0	0	Own	Location
Smit	85%	1000		Paint,wood	Own	None
Smit	60%	11000	0	0	Own	None
Smit	50%	1400	0	0	Own	None
Smit	100%	40000	0	Concrete	Own	Zealous inspector
Smit	70%	200	0	0	Own	None
Smit	75%	?		Lumber	Contr.	None
Elin	90%	0	0	0	---	---
Elin	100%	100	0	0	Loan	None
Owl	100%	500	Appliances		Loan	None
owl	75%	10000	0	0	None	None

Participation
Responses to Question 2, 7.

House	Adults	Children	Req.workers	Occasional
PEI	2	0	2	Friend
NB	2	2	2	
NB	2	3	2	
NB	2	1	2	
Pres	1	2	2 (brother)	CMHC crew, weekend vols
Pres	3	2	3 (wife,son)	3 vols for framing
Anna	2	1	2 (wife)	Relatives
Anna	2	2	3 (father-in-law, brother)	---
Chut	2	1	1	Hired substitute
Chut	3	0	2 (wife)	---
Rupe	2	1	1	2 relatives
camp	2	2	1	---
camp	2	1	1	---
Camp	3	2	2	---
Ruth	2	2	2	Group
Ruth	1	2	1	Group
Ruth	1	0	1	Family, friends
Ruth	2	3	5	
Ruth	4	1	5	Friends on weekends
Horn	3	2	3	
Horn	3	1	2	
Horn	2	1	2	
Bade	2	1	1	3-4 friends, relatives
Bade	3	2	3	One hired
RedD	2	1	4	3 volunteer relatives
RedD	3	0	2	2-5 volunteers
RedD	2	7	2	2-3 volunteers
Long	2	5	2	
Long	2	6	1	
Long	2	6	2	One volunteer
Live	2	3	1	Relatives; friends
Live	2	3	2	Relatives
Live	2	2	2	
Live	2	2	5	Relatives
Live	2	1	2	Mother
Live	2	3	2	
100	4	0	3	Neighbors
100	2	2	2	Friends, neighbors
100	2	2	2	Not sufficient
100	2	3	2	Father-in-law, volunteers

continued

Participation, continued

House	Adults	Children	Reg.workers	Occasional
Carm	2	0	1	Few volunteers
Carm	2	2	2	Volunteers for 20+ p.days
Carm	1	2	1	Daughters, hired, vols
Carm	2	0	2	---
Carm	2	2	2 (brother-in-law)	Friends
Carm	2	2	1	Not sufficient
Care	3	1	3	
Care	2	2	4	
Old	2	1	2 (brother)	---
Old	2	3	2 (brother)	Hired carpenter
Old	3	1	2 (son)	---
Elin	5	2	2 (son)	---
Elin	1	2	2 (son)	---
Owl	2	3	1	---
Owl	2	3	---	---
Prov	2	1	2	---
Prov	2	2	2 (son)	---
Prov	2	5	1	Hired
Prov	2	2	---	---
Prov	2	3	1	Friends
Smit	2	2	1	---
Smit	2	3	5	---
Smit	2	2	5	Relatives
Smit	2	2	4	---
Smit	5	0	2	---
Smit	2	4	3 (son, son-in-law)	---

Client views and satisfaction
Sums of responses to Questions 18-30, 36-37. See also House design.

House	Good	Bad	NA	No data	Do it again?	Know others?
PEI	2			9	---	---
NB	10		1	0	Yes	Yes
NB	9		2	0	Yes	Yes
NB	6		5	0	Yes	Wide interest
Pres			1	10	Yes	Yes, many
Pres	3			8	Yes	Yes, half dozen
Anna	1	1		9	Yes	Yes, several
Anna	2			9	Yes	Yes, half dozen
Chut	8	1	2	0	Yes	Yes, lots
Chut	9	1	1	0	yes	Yes, lots
Rupe				11	Yes (start early)	Yes, in family
camp	1		1	9	No (long weeks)	Yes, lots
camp				11	Yes	Yes, lots
camp	1		1	9	yes	Yes
Ruth	8	3			Yes	Two families
Ruth	9		2		yes	No
Ruth	9	1	1		Yes	Two families
Ruth	9	1	1		Yes	Three families
Ruth	8	2	1		Yes	Five-six families
Horn	6	4	1		Yes	Brother
Horn	7	4			Yes	Couple of people
Horn	8	1	2		Yes	Six
Bade				11	Yes	Yes, rels & friends
Bade				11	Yes	Yes, eight applic.
RedD				11	Yes	Lots
RedD				11	Yes	Yes, 4-5
RedD				11	Yes	Yes, 3-4 more
Long	7	1		3	Yes	Yes
Long	9			2	Yes	Lots
Long	10	1		0	Yes	A lot
Live				11	Yes	Yes
Live				11	Yes	Lots
Live				11	Yes	A few
Live				11	Yes	Lots
Live				11	Yes	Lots
Live				11	Yes	Half of country
100	2	4		5	Yes	Yes, quite a few
100	2	3	4	2	Yes	Yes, sure, lots
100	2			9	---	---
100	3	2		6	---	Yes, several

continued

Client views and satisfaction, continued

House	Good	Bad	NA	No data	Do it again?	Know others?
Carm				11	---	Yes, about four
Carm				11	Yes	Yes, a couple
Carm	1			10	---	Yes, lots more
Carm				11	Yes, not winter	Yes, about three
Carm				11	Yes	Yes, some
Carm				11	No	shit would hit fan
Carc	1			10	Yes	Yes, lots
Care				11	Yes	Yes
Old	1			10	Yes	Yes, a few
Old	1			10	Yes	Yes, three more
Old				11	Lucky to finish	Yes, son
Elin	8	2		1	---	---
Elin	8	3		0	Yes	Yes
Owl	11			0	Yes	Yes
Owl	2	1		8	Yes	Many
Prov				11	Yes	Yes
Prov	9	1		1	Yes	Yes
Prov	1			10	Yes	Yes
Prov				11	Yes, single	Yes, quite a few
Prov				11	Yes	Yes
Smit				11	Yes	Yes, many
Smit				11	Yes	Yes, lots
smit				11	---	Yes, at least couple
Smit	10			1	Not unless. . .	Yes, a lot of people
Smit	9	1	1	0	Yes	Probably
Smit				11	Yes	Yes

APPENDIX 4

CLIENT SURVEY FORM

HOMEOWNER INTERVIEW Project _____

person(s) interviewed _____ date _____

1. Flow long have you been living in this house? (if not occupied, estimate when it will be) _____

2. How many adults and children live permanently in your household? adults: _____ under 18: _____

3. How many relatives or friends are likely to be staying with you for long periods of time? _____

4. Is anyone in your household handicapped? (specify) _____

5* How many people in your household were actively involved in helping to design the house? _____

6. Did you make any changes in the original design of the house, or in the type of materials used? _____

7. How many people in your household were actively involved in helping to build the house? _____

8. How much cash did you contribute towards building this house? _____

9. How much & what kind of equipment or materials did you contribute? _____

10. What kind of tools did you provide for the construction process? _____

11. Do you like the location of the house? _____

12. Comment on any problems you had during the design or construction process _____

_____

_____

13. Please estimate the knowledge of construction of members of your household before and after involvement in the project:

	before	after
1. few skills	|___|	|___|
2. some skills (amateur do-it-yourself)	|___|	|___|
3. moderate skills (skilled do-it-yourself)	|___|	|___|
4. skilled (s--professional)	|___|	|___|
5. highly skilled (professional)	|___|	|___|

(IF HOMEOWNER HAS NOT YET MOVED IN, SKIP TO 33)

14. If skills improved, what was it mainly due to (experience, construction manager etc.) _____

15. Is the design of the house suited to the needs of handicapped members of the household? |___|___|___| yes no NA _____ comment

_____

16. What entrance do you use most often, and why? _____

_____

17. How many of the following vehicles are owned or used by the people who usually live here, and where are they most often parked or stored?

type	No.	where parked/stored
car	_____	_____
truck	_____	_____
skidoo	_____	_____
boat	_____	_____
other	_____	_____

18. Are the parking or storage arrangements satisfactory? |___|___|___| _____
yes no NA comment

_____

19. Is there enough wood storage space? |___|___|___| _____
yes no NA comment

_____

20. Does the house have enough outside storage? | | | | yes no NA comment

21. Does the house have enough interior storage? | | | | yes no NA comment

22. Does the kitchen work well? | | | | yes no NA comment

23. Is there sdequate kitchen storage? | | | | yes no NA comment

24. Is the house comfortable during cold weather? | | | | yes no NA comment

25. Does the heating system work well? | | | | yes no NA comment

27. Is it easy to operate your heating sys t em? | | | | yes no NA comment

28. How much fuel are you using for heating?

29. Is the air inaide the house good to breathe during the winter? | | | | yes no NA comment

30. Are the doors and windows easy to operate during the winter? | | | | yes no NA comment

31. What do you like best about living in this house?

32. What do you like least about living in this house?

33. What would you change in the design if you could do it again?

34. If the RNH Demonstration Program had not been available, how would you have improved your housing situation?

35. Was the RNH Homeownership Program an option?

36. Do you know of other people who would like to build their own house as you have done?

37. Would you do it again?

yes	no	NA	comment

38. Other comments