RESEARCH REPORT

Aboriginal Housing Assessment Appendices

Canada

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Research Report

ABORIGINAL HOUSING ASSESSMENT

COMMUNITY DESIGN NEEDS & PREFERENCES AND APPLICATION OF LOCAL MATERIALS

APPENDICES

Prepared for

CMHC SCHL

Canada

Prepared by

CENTRE FOR INDIGENOUS ENVIRONMENTAL RESOURCES

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Prepared by Lisa Hardess, Rodney C. McDonald, Darren Thomas
Centre for Indigenous Environmental Resources
3rd Floor – 245 McDermot Avenue
Winnipeg, Manitoba R3B 0S6
Tel: (204) 956-0660
Fax: (204) 956-1895
E-mail: earth@cier.ca
Web: www.cier.ca

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Verbal consent was received from all participants regarding the use of the information, including any photographs, they shared with the research team for the express purposes of this report.

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1.0 Alternative Design: Notice of Study

Aboriginal Housing
Study of Local Designs and Materials

Conducted by: The Centre for Indigenous Environmental Resources (CIER)

What is the Aboriginal Housing Study?

The Aboriginal Housing Local Design and Materials Study is seeking to identify and describe the experiences of Aboriginal communities using local materials in the construction of their homes and the local design needs and preferences for the construction of their homes. The project team will visit 17 communities to learn from Chief and Council, community members, and Elders about local materials and the social and cultural aspects of housing design and construction.

The research team would like to talk to your community about housing design needs and preferences.

Why does CIER want Aboriginal Communities to Participate?

To add richness and authenticity the Aboriginal Housing Study will include the voices of First Nations who have experience using local designs and materials for housing. Individuals and communities who are willing to share their knowledge about Aboriginal housing will provide essential information for the Study. These people and communities will be recognized by other Aboriginal people for the generosity shown through sharing local methods of improving housing conditions. No documentation will be published without the written consent of the First Nations involved.

What are the outcomes of the Aboriginal Housing Study?

The information gathered for the Study will be compiled into a user-friendly document to provide other First Nations with facts, ideas and knowledge of other communities' experiences that may help them to develop their own local design and /or housing programs for local materials. The Study will include an assessment of the feasibility of using the local designs and materials highlighted in the report in other areas in Canada with similar climate and geography.

The final report will be provided to our client, Canada Mortgage and Housing Corporation (CMHC), the government of Canada's national housing authority. CMHC will make the information available as a reference document for Aboriginal communities.

Contact Lisa Hardess, Research Associate
Rodney McDonald, Sustainability Strategist
Centre for Indigenous Environmental Resources
Tel: 204-956-0660 Fax: 204-956-1895

2.0 Design: Interview Guide

Questions for Aboriginal Housing – Design Needs and Preferences

Note: examples are for the interviewer's benefit and should not be used during the interview to lead or influence responses. Questioning and encouraging the participants should be used whenever possible, although some examples may be required if the questions remains confusing to the participant.

Interview Participants (list names and title/role in the community)

Experience with Design

1. Have you ever participated in the design of your house or other building in the community?

a) If yes, who was designing the house and how did you help?

2. Have you recently renovated or built an addition to your house that better complements your lifestyle?
a) If yes, how?

3. Did the design of the house consider cultural / traditional / ceremonial needs?

a) What needs and how?

4. Did the design of the house consider the needs of this particular climate?

a) What needs and how?

5. Would you like to tell me anything else about your involvement in this process?

Design Needs & Preferences

6. Does your house suit your needs?

a) If yes, what needs and how?
b) If no, what needs and how not?

7. Are cultural, traditional or ceremonial designs or values important to you in the design of a house?

8. What would you want in your house that would meet your cultural needs? (e.g. more light, ceremonial space)

a) Can you suggest a design that would provide this? (e.g. south-facing windows, ceremonial rooms)

9. What would you want in your house that would meet your needs regarding this climate? (e.g. a place to store winter clothes; a warmer home) The north-winds, the cold…

a) Can you suggest a design that would provide this?
(e.g. a small entrance room – vestibule – that separates the main part of the house from the outside door and has space to store boots, big coats etc.)

10. Do you like the location of your windows, are there enough windows?
[1]Details…

11. Do you like the location of your doors, are there enough doors?
Details…

12. Do you like the exterior design of your house – the materials, the shape etc.?
Details…

13. Do you like the interior design of your house?

[1] * Details required include why they like / dislike a particular feature; what need it relates to; what suggestions they have for improvement etc.

a) the size of the rooms
b) the number of rooms
c) the intended function of the rooms
d) the layout of the house
Details…

14. Is your house a healthy-living space?

a) If not, why not?
b) How could it be healthier?

15. Is your house energy efficient?

a) If not, why not?
b) How could it be more energy efficient?

16. Is your house a sufficient size for all its inhabitants? How many people are in your household?

17. Does your house include a comfortable space for other members of your family?
a) If yes, what is good about that space?
b) If not, what is wrong with that space?
c) What would you like to see available for other members?
18. Does your house include a comfortable space for children?

a) If yes, what is good about that space?
b) If not, what is wrong with that space?
c) What would you like to see available for your children?

19. Does your house include a comfortable space for elderly members of your household?

a) If yes, what is good about that space?
b) If not, what is wrong with that space?

c) What would you like to see available for your elderly family members?

20. How do you heat your home in the winter? (material and infrastructure; e.g. wood and gasoline drum as fire pit)

a) Are there other methods of heating you would prefer?
b) If wood / kerosene how does the smoke / fumes vent out of the house?

21. How do you keep your home cool in the summer?

a) Are there other methods of cooling you would prefer?

22. Does the design of your house suit the cultural needs of your family? (e.g. ceremonial space hut to gut fish, hang meat, skin animals)

23. Does the design of your house suit the cooking needs of your family? (e.g. room to prepare foods for a traditional feast)

Traditional Building Methods and Designs

24. Would you prefer to live in a home that includes traditional designs or a modern, Western-style home?

a) If a traditional home, what are the design aspects of a traditional building that make it a place you want to live?
b) If a modern home, what are the design aspects of a modern building that make it a place you want to live?

25. If you could design your own house, what would be your 3 main considerations? (include more if they have more to add, try to encourage 3 issues / design features)

Housing Authority

26. How does the community feel about the current housing designs?

27. Does the community want to change the current housing design?

a) What has been done to effect change?

28. How important is it to incorporate your ancestor's lifestyle into current housing design in your community?

a) What has been done to incorporate this?

29. Is your community proposing any new development that is different than the norm?

30. If there are any other conditions (other that financial and political), in your community that prevents the community from meetings its housing needs?

3.0 Design Needs and Preferences: Research Findings by Community

3.1. DESIGN: ARCTIC FIELD VISITS

3.1.1. Hamlet of Gjoa Haven

Community Profile

The Hamlet of Gjoa (pronounced “Joe”) Haven is located on the southeast coast of King William Island. The local name of the community is *Uqsuqtuuq,* the "place of plenty of blubber," for the herds of seals that once flourished here. The population of 964 is 94% Inuit (2001 census). Seven different Inuit groups, each with their own customary hunting territory, have settled in the Gjoa Haven region. The hamlet is named after Roald Amundsen’s ship, the Gjoa, the first vessel to navigate the complete Northwest Passage (1903).

The Hudson’s Bay Company established a trading post in Gjoa Haven in 1927. Today the Northern Stores and the Qikitaq Co-op are the two main retail stores for the hamlet. The community has regular air service from Cambridge Bay (Nunavut) and Yellowknife (Northwest Territories). Suppliers to the community are transported by air or barge only. There is a modern school and health centre (nursing station); government agencies provide numerous services. Students from the neighbouring community of Kugaaruk come to Gjoa Haven to complete their secondary school education (Ellsworth, 2002).

Subsistence activities of traditional importance to this community are seal hunting, caribou hunting, musk-ox hunting, polar bear hunting, and fishing for char, trout and whitefish. The land is frozen nine to ten months of the year and the sun does not rise for approximately one month in the winter. Today, the people in the region permanently reside in housing provided in the hamlet but continue to hunt and set up seasonal camps as part of their lifestyle.

Research Findings

The interview participants have some difficulties with their current housing and offered several suggestions

> “When it’s windy the door flies open, and people complain about that when they come over. They should make the doors so they don’t fly open like that and then it gets cold in the house when you try to close the door”.

that would improve the design of their homes, both from climatic and cultural perspectives. In a cold climate such as Gjoa Haven, south-facing windows would increase the warmth inside the house during the winter months. Currently many of the houses have large north-facing windows. Members of the community have experienced windows that become permanently frosted and / or frozen shut. The interviewees also expressed an interest in skylights to let in sun and increase warmth. Doors should be situated to open in the opposite direction from the prevailing winds to prevent the door from gusting open as people enter and exit the house and to minimize the loss of heat in the winter. Problems with ice accumulating on the entrances and porches were also noted.

Insulation in the floors would help to reduce heating costs and heat loss. Thicker walls and insulation in the walls were also mentioned and the elder in the group noted that the floors and walls in his house are often very cool in the winter. In some cases houses are so cold that families cannot bathe. The interview group emphasized the need to have efficient furnaces that can be maintained locally, as well as the need for better air circulation. Including a fireplace in houses for warmth and to create a *"good space"* was another feature that the participants would like to add to future houses.

As pertains to culture, the conversations focused on the difficulties involved in comparing traditional housing used by their ancestors (who followed the caribou herds through the seasons) and current housing for a community that is, for the most part, permanently situated in Gjoa Bay. The use of igloos for housing was mentioned as a design of the past. Funds from the federal government are now used to build conventional frame homes.

The houses in Gjoa Haven are crowded and according to the participants this is caused by, and causes, many problems. A lack of funds to maintain and repair houses causes residents of houses in disrepair to move into their family's homes, thus contributing to the crowding problem. In some cases ten or more people live in a house with two or three bedrooms, designed

> There is a "lack of people coming down to see exactly what is wrong with the housing out here. Nobody comes up here and says, look this is what is wrong with your house and this is what we are going to do this summer. In the summer you hear complaints that it's only hot, but in winter they don't come up to even understand what people are going through".

for a family of four. Some of the problems that result from this crowding are noisy living conditions, loss of the dining room and a lack of adequate space in the house for children. According to the participants, many families are without sufficient funds to provide the equipment required for many children's activities (e.g. hockey at the arena) and therefore the absence of children's space in the home is more acutely felt.

Although many families in Gjoa Haven are living in a duplex or triplex, the elder suggested, *"people do not want it that way".* Noise is a problem and carries though the walls and floor. For many of these houses there is only one door and this is also a problem: *"we have to have two doors and when we build our house we have to have one back door and one entrance. We can't just have one door".* This was also a safety concern, as was the lack of a shared fire escape; at the time of the interview there had been a recent house fire.

There is a need for housing agencies (i.e. CMHC) to visit the community in both the summer and the winter to assess housing needs. The participants felt that there is a the lack of understanding on the part of government programs regarding appropriate cultural and climatic housing design, which contributes to the community's inability to live in houses that meet its needs.

Two or three new houses were being built in the summer of 2003. According to the elder who was interviewed, "*They will only build two or three new houses this summer, but they will be the way the government wants them to be. They will not be built the way the people here want them to be. It should be comfortable, warm and suitable for traditional lifestyle".*

3.1.2. Tetlit Gwich'in Tribal Council

Community Profile

Teetl-it Zheh First Nation (Fort McPherson First Nation) is located on the east bank of the Peel River about 38 km upstream from its junction with the Mackenzie River. Fort McPherson lies on the eastern edge of the Gwitch'in Dene territory. The Teetl-it Zhen

people still travel to visit relatives in the Yukon and Alaska. The band population is estimated at 760 Aboriginal people. Gwich'in and English are the languages spoken.

Traditionally the Tetlit Gwich' in peoples of the area lived a seasonally nomadic lifestyle, moving between the mountains and the river valleys according to the seasonal hunting opportunities. Caribou was and is the main food source of Tetlit Gwich' in. The Hudson Bay Company sited a trading post here in 1858, named after their chief fur trader, Murdoch McPherson, and a community grew around it, a pattern typical of many northern settlements.

Fort McPherson is a picturesque community located on a rolling plateau between the Richardson Mountains and the Mackenzie River Delta. In 1978, with the completion of the Dempster Highway (the most northerly public highway in Canada), the community became accessible by road. Fort McPherson is now a stopping place for travelers heading further north to Inuvik. Facilities available in the community include a community health centre, a school, a community centre, a park/playground, cross-country ski trails, a curling rink, an outdoor above ground pool, and a softball field. Economic activities include trapping, oil exploration, highway services, and the manufacturing of canvas products.

Research Findings

Housing funding and designs for the Tetlit Gwich'in Tribal Council is provided by the Northwest Territories Housing Corporation. Housing options in the community include one, two and three bedroom units in quad, triple and duplex units, as well as single, detached homes. A strategy for elder housing is being discussed and a senior citizens home is planned and will help to address the needs of the elders who want to remain in the community. One of the participants built his house using the blueprint and advice provided by the Housing Corporation that included two doors facing the north wind. He later built a closed-in porch for one of the doors to help conserve energy and heat in the house, and blocked off the other door. There are also some log homes in the community.

In general houses are too small and cannot accommodate extended family or visitors easily. The research participants noted that the housing designs do not consider that housing needs generally include the extended family. People often come to visit during the holidays and for funerals. One participant noted that there could be visitors all through the winter. The kitchens are too small to accommodate large meals and there is a bylaw forbidding outdoor cooking (e.g. open fires) and therefore it is difficult for people to enjoy feasts and other large gatherings involving food. Traditionally, houses in the community had more open spaces and some people would like to use this type of design again. The needs of children and a space to play and study that is separate from a space for adults is also lacking.

People in the community are involved in hunting in the winter and fishing in the summer and need space to butcher, clean and store this food. Butchering caribou inside is preferable, given the northern climate. Most homes do not have sufficient space to designate an area for this activity and instead it is done on the supper table or in the living room. The participants suggested that the housing designs could include a separate butcher room, attached to the house and heated, to accommodate this activity. This room could also provide space for a deep freeze as these appliances are very common in the community and are very large. Outside, there should be a place to dry and pound meat, and to gut and dry fish in the sun. The houses have furnaces and / or woodstoves for heat.

3.2. DESIGN: EASTERN SUB-ARCTIC FIELD VISITS

3.2.1. York Factory First Nation

Community Profile

York Factory First Nation is a Cree community of 400 situated on the south shore of Split Lake, half-way between the Town of Thompson and Hudson Bay. York Factory was originally established in 1671 on the North shores of the Hayes River to serve as a home base for the fur trading companies. With the closing of the Hudson Bay Trading Post in 1975, the community relocated to York Landing, receiving reserve status in 1989. The community of York Landing covers 970 hectares.

York Landing is accessible by air, winter road and ferry. The ferry can accommodate up to 16 vehicles and operates between York Landing and Split Lake from June to October. A winter road provides vehicle transportation from mid-January to March that enables the community to have access to Highway 280.

Facilities available in the community include a regulation size indoor hockey rink, The George Saunders Community School (grades K-10), an elders home, health station, motel, convenience store and warehouse, postal outlet and a traditional food distribution centre. Economic development for York Factory is administered by the Seepastik Development Corporation which. Other economic activities include trapping, and tourism.

Research Findings

The people of York Factory First Nation have minimal input into the design of their houses and possible alternatives are related primarily to non-cultural design aspects. For example, people often get to choose minor details, such as colour of walls and counter tops. In some occasions, people get to choose the location of their doors and windows. The newer houses are built on defined, landscaped lots, and have proper drainage slopes. This helps to keep water away from the property and keeps the

basements from flooding. The landscaped yards also help people take pride in their homes and in the community.

The major housing materials or structures (e.g. floor covering, layout) are predetermined by the building plans. In some case in the past, these items were poorly chosen and did not last over time. Although in recent years houses have been better designed and better materials have been chosen, some problems remain (e.g. size of home, number of bedrooms, no heat in the basement). NDL Construction is responsible for housing construction in York Factory. According to the participants, recent houses appear better suited to the northern climate. For example, dual pane windows are used and are an improvement on older windows and the walls in the newer houses use a two by six construction with adequate insulation. The community would like to use triple pane windows. New houses are heated by an electric furnace and also equipped with a wood furnace. This back-up heat source in important given community concerns related to power outages or problems with the primary furnace. Basements in the newer houses are also very cold in the winter and use of this space is therefore limited. The participants suggested the installation of heaters in the basements, including in-floor heating, and some people are interested in using geothermal units.

Some of the older homes are built on a concrete foundation and are not very well insulated. The heat is supplied by electricity only, which is very expensive. The participants had other concerns related to their northern climate, in particular relating to the doors and entranceways. The newer houses do not have porches, unlike many of the older houses. The porches help to eliminate direct cold airflow and wind from entering the house through the doors. Porches are also used to store coats and footwear when entering the house. The newer houses without the porches occasionally have problem with ice build up around the doors, and in extreme occasions the ice causes the door to freeze shut.

In the summer the community generally uses fans to cool their homes. In the new homes the tenants use the basements, and the furnace fan to circulate air throughout the house. There are very few air conditioning units in the community. The participants interested in geothermal units noted their cooling benefits.

Members in the new housing development seem to like the exterior design of the houses. There are some minor concerns regarding the siding. The joints' covers (installed between the siding pieces to conceal that siding edges) are falling off.

In the older houses some people are not happy with the exterior. These concerns are to due to the colour or material used to finish the house, which are in need of replacement or repair.

Residents of new houses felt that they were living in a healthy space. Participants living in the older homes are concerned with mould, mildew and moisture. These concerns range from a damp and musty smell in the basement to mould problems and safety issues. The use of an air exchanger unit was suggested by the participants.

Some residents of the newer homes felt that they were energy efficient while others stated that it was difficult to heat their homes in the winter. Some of the residents had tested their homes to expose any faults that may be allowing heat to escape. However, testing is not widely done and the cost is considered prohibitive. People in older houses believe that these houses are not energy efficient, and that renovations are the only way to address this issue.

In general, the designs of the homes in York Factory First Nation did not consider cultural needs of the community. Some community members have altered their cultural practices or adapted to the existing space. One community member commented that he uses the recreation room in the basement to process wild game. Another person built an opening in the living room wall in order to let more light in. Most people have not changed or modified their homes and noted that it would be too expensive, especially given the lack of funding assistance.

The participants felt that cultural and traditional values are important in the design of the house. However, they noted that the current designs do not incorporate these features. Some people stated that their cultural practices are inappropriate or not suitable for indoors. These activities include processing wild game such as caribou, deer, moose or fish. These activities are better suited outside or in a separate unit, such as a shed or workshop outside the main house. The participants felt that these aspects of their

culture could not be considered in the design of the main portion of the house but could be addressed through outbuildings. The need for a bigger living room or common room in order to include cultural, traditional, and / or ceremonial activities was also noted. While the cooking area was generally considered adequate, it is too small for specific activities, such as preparing for a feast or processing wild game. More cupboard space in the kitchen would also be useful. Some community members hold large gatherings such as dinners in their homes and the space in the current housing designs do not support these events.

For some of the participants, lack of space was a significant issue. Residents of bigger, new homes felt that the home was adequate for the number of occupants, while those in older houses felt that the house was too small for the number of occupants. In general there are not enough bedrooms for everyone and many bedrooms are shared. This was a concern, especially for people with older children and with both male and female children. A second washroom for large households was also a requested design alteration. Narrow hallways were another concern expressed by one of the participants. The present width of four feet is considered too narrow and a six-foot hallway would be more appropriate. This width could better accommodate elderly people, especially those with walking devices such as a cane or walker.

The issue of comfortable space for the different members of the household was raised, in particular the lack of space for children. The newer homes are built with a recreation room in the basement and children use this space to play, study and do other activities. The participants noted that this multi-purpose room allowed the children to be “out of the way” when dinner was prepared or while entertaining other adults. The older homes didn’t have such an area, and children are often forced to use the kitchen or living room for activities such as homework or recreational activities. The issue of comfortable spaces for elderly members of the family was also discussed. Participants with elderly family at home noted the newer homes are difficult for the elderly, since the new homes are bi-level and the stairs proved to be a difficult obstacle for some of the elderly members.

In addition to financial and political factors, the severe climate in York Factor is considered to limit the community’s ability to meet its housing needs. The ground does

not thaw until June, resulting in a short building season and limited accessibility. During the summer, the community is accessible by ferry, and operation is dependent on an ice-free river and adequate water levels. When water levels are low the ferry cannot operate and the building materials and supplies are not delivered. A lack of adequate building sites is also a limiting factor. The community is looking for new areas for potential development.

The community would like to be involved in the design of their homes and have the opportunity to choose their own designs. The interview participants noted that the extreme need for housing combined with the limited housing budget results in basic/poor designs that are not suitable to the climate or the culture, including family size. Currently, the community is not proposing any new developments that differ from the current designs.

3.2.2. Naskapi Nation at Kawawachikamach

Community Profile

The Naskapi First Nation occupies the Kawawachikamach Reserve, which is located 15 km northeast of Schefferville, near Lake Matemace and covers 326.34 hectares. The reserve is home to 570 Aboriginal people who speak Naskapi and English. Kawawachikamach is the only Naskapi Nation in Canada and was the last Native group to enter into contact with white people in Quebec. Before 1956, the Naskapis lived a nomadic life, traveling over a vast territory; the name of the community means “meandering waters”. Starting from 1956, they shared the Lac John reserve with the Montagnais. After the signing of the Northeastern Quebec Agreement in 1978, the Naskapis settled at Kawawachikamach (The Native Trail, 2003).

Kawawachikamach can by reached only by air or by train from the municipality of Sept Îles, 510 km towards the south, on the north shore of the Saint Lawrence River. Within the community there is a paved road network (2,880 meters) and more than 128 houses. Housing is the single largest asset owned by the community and is comprised mostly of single-family dwellings, duplexes, apartments and maisonettes.

Facilities available in the community include a police station, a school, a fire station, a community hall, a recreation centre, a parish hall, a community radio station, a child-care centre and a gymnasium. Economic activities include trapping, handicrafts, tourism, a restaurant, a store, a service station, taxi service, and heavy machinery.

Research Findings

When Kawawchikamach was first established as a reserve the community was given lands that included developed areas. In 1982, the community constructed 3 homes through a training program, which they classified as phase I homes. In 1983 the community moved to “model A” homes, classified as phase II homes. Over the years a total of 40 of this style of home were built, some with concrete and wood foundations. In the recent years the community has switched to using preserved wood foundation. Since 1983, 120 homes have been built over 18 different phases. The First Nation government charges rent of approximately $40 a week for the houses.

The community of Kawawachikamach has some opportunity to participate in the design of their homes. The First Nation government and the Department of Public Works (DPW) work with an architect from Montreal to design homes that are suitable for the climate and that address the needs of the community. The First Nation government reviews the developments and the building processes of previous housing initiatives. This is done to analyze the building design and techniques to reveal problems, oversight or shortfalls that may have occurred, or provide suggestions for better techniques for future developments. This review takes place either at the end of a building season or prior to a new building season. The residents of Kawawachikamach also can give input into the design of the homes. This has lead to an evolutionary process in the planning and design of houses in the community.

The community has a chance to express their concerns over housing issues and designs at local community meetings. People can also bring forward housing concerns to the Chief and Council or directly to the DPW. The DPW conducts housing inspections throughout the year to check for minor and major repairs needed in various homes. At these inspections community concerns are documented and brought to the attention of

the director. During the annual review of the housing sector any concerns brought forward by the community that year are investigated and changes are incorporated into the design and construction of the new houses.

The DPW has written a Housing Policy Manual that was adopted by Chief and Council in April 2002. The policy manual outlines policies and procedures, responsible authority for housing maintenance, submitting request for housing maintenance, evaluation of requests and procedure of notification of DPW decision. The responsibility of housing maintenance lies with both the DPW and the tenant. A list of responsibilities of each party is outlined in the policy manual. If any maintenance or repair is required that is not within DPW's responsibilities then it is the tenant's responsibility to cover the costs. Any renovations that the tenant feels are necessary and are approved by the DPW are then the tenant's sole responsibility. This review by the DPW ensures that renovations are done according to building codes.

When a tenant moves out of a house in the community, the DPW proceeds to renovate the house and repair any damage left by the previous tenant, if necessary. Repairs that are not on the DPW list of responsibilities, are assessed, itemized and repaired, and the bill for the repair is sent to the previous tenant. Once this is complete a new tenant can than move in. In situations where the house has fallen into disrepair, and the housing owners are not completing their responsibility, DPW steps in and repairs the house. Again, the cost of the repairs is invoiced to the residents. Administrative sanctions are practiced if a homeowner does not pay invoices for repair and monies owed to the homeowner by the community may be garnished in order to pay for the cost of the repairs.

Older houses built in the first years of housing construction by the First Nation government experienced several problems that have been addressed and generally solved over time. These problems included basement flooding and mould, deteriorating flooring materials, no air-exchange units and oil furnaces. Older homes continue to require maintenance or modifications. An underground stream was also discovered in the community that contributed to frost-freeze and cracking of the foundations.

Over time, basements have been eliminated from the houses in the community and houses have increased in height from bungalows to bi-level houses and two story houses. The two story houses do not have a liveable basement but a three-foot crawlspace for access and repairs. House insulation has also improved. New walls are comprised of two separate wall components: insulated outer wall framed with a two-by-six inch lumber, combined with a two-by-three inch framed, insulated inner wall, which are separated by a vapour barrier. Houses built during the first building phase have oil furnaces and wood stoves as a secondary heat source, and newer homes have electrical and wood furnaces. Windows and doors are also more efficient in the newer houses. Overall, the evolution of house design in Naskapi has resulted in houses that are better suited to the cold climate.

Some of the newer houses have both a heated and unheated porch, as a design request within the community. The cold porch is used to store food, including wild game. Several community members also use their wood furnaces for cultural activities such as processing wild game by using the area to hang and dry meat and fish. Other cultural design considerations that have been addressed in the new houses include the need for additional space. New houses tend to have extra family rooms, more bedrooms and more bathrooms. Houses now have five bedrooms (instead of three) and can include a first floor living room and second floor den, if desired in the planning stages. At the suggestion of the community, houses can have their bathrooms split in two such that the bathtub is in one small room and the toilet and sink in another. A second bathroom can also be roughed in on the second floor, if desired, and left for finishing at the tenant's expense. These modifications to the design of the houses have helped to alleviate the crowding that many households experience and provide additional spaces for children.

Regarding the needs of elders, there are five elder units in the community and a separate building plan that incorporates the needs of the elders. These units are single level, bungalow style homes with two bedrooms. The houses include a main floor washer and dryer, large hallways for easy mobility, and a very large bathroom area, to accommodate walking devices. All the fixtures in the bathroom such as the bathtub and sink area have supports (e.g. hand holds) to assist the elderly.

Other buildings in the community also incorporate cultural needs. For example, the community hall has a round room to accommodate local cultural activities. This room was incorporated due to the community working closely with the architect in designing the facility. Paul Mameamskum (Director of Public Works) stated that local people build 90 to 95% of all buildings in the community. New training programs are developed for the community if a new design feature is incorporated, so the community can continue to do the majority of all construction themselves. The design features and materials of houses also consider the skill set within the community (e.g. experience with wood versus metal), which further increases community involvement in housing construction.

According to interview participants, the housing system in Kawawachikamach is designed to instil pride and the sense of ownership. The system treats all residents as housing owners and not tenants, which has resulted in well-maintained houses. Community involvement in the housing design and the continuous evolution of design has resulted in houses that meet the people's cultural and other needs. According to the participants in this research, the majority of residents in the new houses are satisfied with their homes from physical and cultural perspectives.

3.3. DESIGN: WESTERN SUB-ARCTIC FIELD VISITS

3.3.1. Liidlii Kue First Nation

Community Profile

The **Liidlii Kue First Nation** is located on an island at the confluence of the Mackenzie and Liard Rivers, and is within the village of Fort Simpson. Fort Simpson is the regional centre for the Deh Cho. Its population of about 1,200 has a large percentage of Dene, with the remaining divided between Métis and non-aboriginal. Fort Simpson was built about 1804 by the Northwest Company and has the distinction of being the oldest continuously occupied trading post on the Mackenzie River. It was then known as "Fort of the Forks". The village became a permanent settlement in July 1822 when the Hudson's Bay Company began construction of a trading post. It was named after Sir George Simpson, the first governor of the amalgamated Northwest and Hudson Bay Company. The Dene people know the area as Liidlii Due, "the place where the rivers come together". For hundreds of years this location was a special place to gather and celebrate after the summer break-up of ice.

The Liidlii Kue First Nation population is estimated at 1006 Aboriginal people who speak English and South Slavey. The village is accessible by road for most of the year. In the summer Fort Simpson can also be accessed by ferry and in the winter vehicles can cross via the ice bridge. Interruptions to access occur during break-up (during April or May) and freeze-up (during November or December) of the Liard River. At these times people and goods are flown across the river by helicopter. Fort Simpson also has two airports, the larger one approximately 15 km from the village.

Facilities available in the community include: a hospital, churches, a school, RCMP detachments, a community hall, a retail store, convenience store, an arena, a curling rink, a library, a museum, a campground, a hotel, a motel, a seasonal pool, and a park/playground. Economic activities include government, transportation, tourism, trapping, handicrafts, logging and a sawmill.

Research Findings

The land base of the Liidlii Kue First Nation (LKFN) is scattered around the community of Fort Simpson. The First Nation, the Metis and the non -Aboriginal communities share the total land base of the community of Fort Simpson.

In LKFN there are a limited number of housing designs and choices. For example, the exterior siding is either beige or green. This lends itself to all houses looking very similar. One of the people interviewed noted that in the village of Fort Simpson the Aboriginal homes are easily identified. There are an average of five people in one home. Most houses are a single level and some do have basements. There have been few difficulties with the basements.

The people of LKFN do not have an opportunity to contribute to the design of their homes. The people interviewed for this research appear to be relatively satisfied with their current homes regarding suitability to the local northern climate. They noted that cultural, traditional and ceremonial aspects of design are important but are not currently considered. Many cultural and spiritual practices currently take place in cabins outside of Fort Simpson or on the land. Regarding the floor plan of their houses, people would prefer one large room that includes the kitchen, living room and dining room in lieu of three small rooms. This would allow for comfortable family gatherings in the houses.

The Chief has resided in her home for more that 14 years and overall she is satisfied with her home. The house has managed well in the northern climate and has not caused her any real problems. As with all homes, there is some minor maintenance that is needed in her home, in particular, floor repairs.

There were community members that indicated that the windows that were used in the housing designs are too small and do not allow for much light to enter the home. There was also a concern that the windows may be too small to serve as an emergency escape route. The design of the window itself was also discussed, as the materials used in the construction of the windows do not seem to meet the needs of the LKFN. The new PVC windows do not appear to be dealing well with the northern climate and window frames have cracked and broken under extreme conditions in the winter. The

temperature difference between the inside and outside appears to play a role, given that some LKFN members like to heat their homes to very high temperatures in the winter. These frames cannot be serviced or fixed by LKFN so when a window fails, the costly solution is to replace the entire unit. In some of the older homes there are wood frame windows that seem to be more suitable. These windows can be repaired locally so a faulty component can be fixed or replaced within the community, at a lower cost then the PVC windows

Most of the houses in LKFN use fuel furnaces for heating. According to the interview participants, the preferred method of heating for many of the community members is wood burning stoves. They feel that wood burning stoves are better and healthier that the fuel furnaces. However, the insurance is higher for homes with wood burning stoves due to a potential increase in the risk of fire. Many community members believe that these high premium payments are unjustified and have used wood burning stove their entire lives and have witnessed few related fires within the communities.

There have been some concerns in the community regarding healthy houses as some homes were condemned, and one demolished, due to mould. The interviewees noted that faulty work and the age of these houses likely played a significant role. While other homes in the community have not experience this degree of problem, there still are some homes in the community with minor mould problems.

The housing in the community considers the elderly members. Many of the homes are a single level so homes are ready for an elder to move it. These homes are often modified through the addition of a ramp or other walking aid, and may include lowering the cupboards. LKFN also has an elders' housing complex that has small one-bedroom apartments with a main floor laundry. There are other complexes in the community to meet the needs of different groups, including a multiunit singles complex for LKFN single members who do not qualify for the LKFN housing program. The units are a bachelor type unit with the basic appliances, such as a fridge and stove. The units appear well kept and in good condition. The maintenance is covered by the LKFN Housing Corporation.

The LKFN manages their housing program through the NWT Housing Corporation (NWTCH). Before 1989, Section 95 homes were given to band members, however now the members must pay a fee to help pay back the mortgage (The Non-Profit Rental Housing Program Section 95 provides financial assistance to build or rehabilitate rental housing on reserve). The Housing Corporation does all inspections of the units when they are built. The Homeowner reps, from the Housing Corporation do the upkeep and any renovation inspections of existing homes. These representatives are employees of the Housing Corporation and act as liaison between the homeowners and the Housing Corporation. This program also provides training for local people in housing construction. The Housing Corporation has no plans to change the materials or designs of the houses built within the community. The LKFN business arm, NOGHA Enterprise (a Slavey word) builds all the housing units and ensures they are built to the national building code. There are no periodic inspections of the homes. The only information about the homes comes from complaints files with the NWTCH. These inspections tend to occur in conjunction with a post-construction housing follow-up.

Many people within the community are not satisfied with the housing program. There are many people in the community who need homes and there are not enough resources to meet all the needs within the community. The housing program is available to people with a certain income range. Many people in the community fall outside the required income bracket for home ownership. These people either make more than the program ceiling or less than the programs minimum. For those who fall below the income levels needed for the waiting list, there is a Fort Simpson Housing Authority (FSHA) (a non-Aboriginal association) that provides low-income housing for people in the area.

All applicants to the housing program have to meet all requirements before they can be granted a house, both when they apply and when their name reaches the top of the waiting list. If someone does not meet the criteria, their name is moved down the list until another unit is available and they meet all these criteria. There are many people who have been waiting for a home for ten years or more, due to this process.

The types of housing units the FSHA manages vary in types and designs. The houses range from single-family units to multiplex units. The single-family houses have between

two and four bedrooms. Families have no choice in the type of unit that is built for them and are offered housing as their names reach the top of the waiting list. When families acquire a home through the NWTCH, the possible increase in family members is not a factor. There are therefore members whose families have expanded and their current house is too small to meet their needs. Homeowners have the ability to renovate and add on to their existing home. However all modifications of the homes must pass through the NWTCH. All plans must be inspected and approved by the Housing Corp., before any construction is to take place.

The community wants to change the current housing program, however there is not a current focus on design. For people with incomes that are higher than is allowed by the housing program, the community is considering providing or guaranteeing loans for these people to own a home. This program would allow people to apply for a mortgage at a financial institution that would be guaranteed by the LKFN government. This plan is still in a very early stage of development. The housing program also needs to include follow up to ensure that the program is meeting people's needs and help the Housing Corporation to modify its housing program.

The LKFN is starting to look into new methods of building. The Chief and Council have been informed of a local sawmill that produces logs for building log homes. The Chief has expressed an interest in exploring the option of building log homes in the community. This would create local jobs and use local materials and allow for the money spent on housing to remain in the community.

Many of the community members expressed a sense of pride regarding their house, akin to pride of ownership. This could be seen in the way that they care for their homes. Many of the homes were in good shape and only in need of minor repairs. The Chief stated that a sense of ownership and pride is important to maintaining the homes within the communities.

The Chief indicated that apart from financial or political barriers the only other major barrier to LKFN meeting its housing needs is a lack of land. The area around Fort Simpson is small and there are very few suitable building spaces. The Chief stated that the way in which land was appropriated was not suitable for LKFN. She also indicated

that the community of Fort Simpson would have to be involved if LKFN wanted to expand its land base.

3.3.2. Fort Simpson Métis Nation

Community Profile

The Fort Simpson Métis Local #52 represents approximately 110 Métis people who are residents of Fort Simpson, providing political representation and associated programs to its members. The Métis Local participates in the NWT Métis Nation and is currently a member of the Northwest Métis Federation of the NWT.

The majority of Sub-arctic Métis live on the northern edges of the Alberta, Saskatchewan and Manitoba and in the Mackenzie District of the North West Territories. Sub-arctic Métis generally exist as minorities within the several northern communities, including Fort Simpson. These Métis are distributed throughout several northern communities.

Research Findings

The Métis local in the village of Fort Simpson falls under the NWTCH and has a Housing Committee that oversees the housing program for the Métis in the area. This committee looks after the housing design selection, the tenant selection and the maintenance of all units. These homes are built and owned by the NWTHC.

The housing program in the Métis community is run in a manner similar to a mortgage system and the Métis members approach the Committee for loans. The NWTHC finances the homes and gathers the funds from government programs and bank loans to build new houses. The tenants must apply for a house and meet the Committee's requirements, which are similar to a bank mortgage. The Housing Committee looks at the income of the family, the employment history and the tenant's ability to maintain a home. While the requirements are not as stringent as at a bank, the Committee considers additional factors such as family relationships. The stability of the family unit is a significant consideration and if a couple is in an unstable relationship the Committee

may not approve the application. Families (versus single people and couples without children are) are most often selected for the program.

Tenants' mortgage payments are based on total household income. The measurement of this income is a major concern with most of the tenants, which can result in rapid fluctuation of their mortgage payments. In some instances, mortgage payments have increased from $340 to $1000 in the last six months. These types of fluctuations are based on total income of the household, however according to the interview participants, this total is not well investigated. An apparent increase in income does not necessarily result in an increased ability to meet mortgage payments. In one case, an increase in income in the family unit due to a post-secondary education loan caused an increase in the mortgage payment. The people applying to the housing program must have land to be eligible for a new house. Housing lots can be purchased by individuals, families or can be Crown land. Lots are sometimes used as collateral against the mortgage and if a community member defaults on a loan payment, the Métis Housing Committee can repossess the lot.

The housing program for the Métis community uses a top down approach. The NWTCH chooses designs and contractors without input from its members. When funding for a house is available for someone on the waiting list, they must take the opportunity and can choose from one of the pre-selected designs. If they do not like the designs available then people have the option of giving up the opportunity for a house and having their name removed from the waiting list. This interview participants believe that this "take it or leave it" approach to housing is not acceptable. The tenants feel that the housing program needs to be changed.

The community has a few opportunities to influence the design of their homes. Given the high mortgage payments associated with having a house, they also believe that they should participate in the housing design. The tenants have a choice of three floor plans. Two of the plans are single floor units without a basement and the third is a bi-level home with a basement. Many people like the idea of a basement as it gives them more room and options to expand if the family grows. The basement option requires that the tenant to pay an additional $10,000 upfront, to cover the cost of the basement. Most members cannot afford to pay this and therefore have to choose the single level homes.

The tenants have a choice of design when it comes to the style of flooring, tiles and cupboards, and colour for paint and siding. Major structural features, however, cannot be changed. The floor plans are pre-designed and any major changes to the floor plan would require a new plan to be drawn and submitted for approval. In most cases changes are not allowed. Minor changes in the design of the home such as addition of windows, porches, and extra bedrooms can be done at an additional cost to the tenants.

The current housing design includes little consideration of cultural activities. The houses are too small for regular family events and large gatherings. People in the community who continue to practice hunting and gathering cannot use their houses for any of the related activities (e.g. preparing game, skins or fish). Some of the participants stated that they have to travel to the others' homes to participate in cultural activities.

Issues such as the flooring were discussed. Below the floor of the home is a crawl space that is not heated. The flooring for a majority of the units is not insulated. Some people have heated the floor area and this has led to some problems with mould. One participant stated that the air in her home is very unhealthy, and the young infants in her home were starting to get ill. Many people do not like the oil furnaces that are used to heat their homes and would prefer wood heating. They feel that wood heating is cleaner and healthier. The housing committee is concerned with the environmental and insurance repercussions of wood stoves in the homes.

According to a few of the participants, the conditions of the homes are very poor. There are problems with the homes ranging from minor aesthetic problems to structural problems. One member who obtained his three bedroom one-story home in 1994 has had it remodelled and renovated twice. Each time he experienced the same problems with the floors and walls separating. The foundation has shifted (which may be a result of melting permafrost) and this is causing a number of problems with the entire house, which has buckled and has broken windows. The crawl space below the home was also overcome with mould, which exacerbated an existing asthma condition in one of the occupants. There were also issues with the periodic backing up of the sewer into the home. On the outside the fascia has fallen off. This is not an isolated case; the neighbouring house also suffers the same type of problems. Poor planning and poor

designs have lead to a large amount of money to be spent in repairing the Métis community's homes. Some of the tenants (who are in mortgage-type agreements with the NWTHC for their houses) would like the NWTHC to release them from their agreements and pay back the equity that they have paid into the home because of these conditions.

In other homes, outdated material was used, for example, older style telephone cables that are not capable of providing high-speed Internet service. In one case, the homeowner replaced these lines. Other members have complained about cracks and chips in flooring and walls when they took possession of the homes. The homes seemed to be in need of repair before anyone was living in them. The overall feeling expressed by the participants is that there has been poor housing construction that may not meet building code standards. Many members feel that there needs to be something done regarding the contractors or the conditions of the homes. They believe that if the homes were properly built with appropriate designs there would be less of a need for renovations and the money associated. This would result in more funds to build additional houses.

The Housing Committee uses a local contractor to build the homes. There are concerns that the contractor may not do the best job or use the best materials. However if the Housing Committee does not use this First Nation contractor then the Committee would have to rely on outside contractor. This would in turn have an impact on the local economy, as the money spent on housing would leave the community. The participants were concerned about a lack of house inspections and some do not recall an inspection ever being done on their homes. Some people have had house inspections but have not seen the report or seen any action based on the findings.

3.4. DESIGN: NORTHEAST WOODLANDS FIELD VISITS

3.4.1. Membertou First Nation

Community Profile

Membertou First Nation is located in the city of Sydney in Nova Scotia, within the Unamaki traditional tribal district. It belongs to the greater tribal group of the Mi'kmaq Nation. Membertou includes approximately 1000 members. Programs and services available to its residents both on and off the reserve include access to education, social security, health, economic development, human resources, justice, and recreation programs.

Community members are involved in various entrepreneurial activities including operation of convenience stores, a gas station, a barber shop, furniture and office supplies, medical supplies, home oil delivery, construction project management services, computer products, computer programming, web design, plumbing, brick laying, and welding. Other commercial ventures include environmental remediation (Sydney Tar Ponds Clean Up), construction of gas distribution and pipelines, and a retail mall construction and management. Membertou is also involved in the development of a Mi'kmaq Museum, Cultural and Heritage Center and a project related to herbal medicines. In January 2002 Membertou received official ISO 9001:2000 certification, making them the first Indigenous Government in Canada to meet internationally recognized business standards.

Research Findings

There are approximately 1000 members of Membertou First Nation. As of early 2003 there were 188 names on the waiting list for housing. According to the housing authority in Membertou only two or three units are built each year.

The interviewees did not discuss any concerns regarding the housing designs of their houses. The primary barriers to building houses and incorporating additional or alternative design needs that were identified were finances and time.

3.4.2. Six Nations

Community Profile

Six Nations of Grand River First Nation is located approximately eight kilometres southeast of Brantford, Ontario. The original tract, recognized legally in 1784, covered an area of six miles on either side of the Grand River, from its source to its mouth. By 1828, two-thirds of this land had been lost to land sales, land leases and squatters' rights. In 1842, the British Crown recognized the remaining land as Six Nations Indian Reserve Number 40.

Six Nations has an on-reserve population of approximately 11,100, the largest in Canada. Six Nations people refer to themselves as the Haudenosaunee, meaning “People Building a Long House”, or the Ongwehonweh, meaning the "Original People" or "First People" of this land. Six Nations is actually six separate nations of people who have agreed to live under the traditional law of governance; the Mohawk, Onondago, Seneca, Cayuga, Oneida, and Tuscarora.

Economic activities in the community include cultural centres and museums, radio station, tourism, newspaper, clothing stores, handicrafts, consultants and architects. Services include hotels, a senior’s home, an employment and training centre as well as the services available in the nearby community of Brantford.

Research Findings

Community members in Six Nations of the Grand River have various opportunities for involvement in the design of their homes and as a result the general sentiment of those interviewed in the community is that the houses meet the needs of the people.

The housing programs in Six Nations are based on a different system than many other First Nations in Canada. The community land base is broken down into smaller sections with each section being "owned" by an individual. The individual members of the community hold a certificate of possession (CP) as title for the area. This does not give them true ownership as the title may only be passed to someone from the community. The community housing system includes four methods of obtaining housing: bank mortgages, band mortgages, rent-to-own, and rental units.

According to the Director of Six Nations housing, the band has used private ownership as a driving force to help the community meets it own housing needs.

Each band member has the option of applying through a bank to receive a standard mortgage to build or buy a house. The prospective resident applies to the bank through conventional bank channels and is subject to a credit check. Once the band member is pre approved for a mortgage it is guaranteed by the First Nation government. According to the Housing Director, this makes these reserve mortgages more acceptable to some financial institutions. The Royal Bank of Canada and the Bank of Montreal have granted these types of mortgages. In each case, each member approved for a mortgage must sign over an acre of land as collateral to the band. This land is held in trust until the loan is paid in full. In case of default, the band pays the bank loan and acquires the acre of land.

The First Nations government also offers band-funded mortgages. This program is similar to the bank option in terms of qualifying for the loan; the only real differences are the payments are made to the First Nation government instead of the bank and the interest rates are based on a 7% simple interest rate. As with the bank mortgage each member approved for the program must sign over an acre of land as collateral to the band.

Six Nations Council also builds units under Section 95 of the *National Housing Act*. These units are band owned and are built with funds lent by CMHC or financial institutions. These homes are then leased to band members (at a minimum monthly cost, determined by the type of house) who agree to make regular rental payments. Each member is required to pay 30 % of their adjusted income or the shelter component

allowance received from social assistance to a maximum equivalent to the lower end market rents. To allow residents to become homeowners, band members can enter into an agreement with the Six Nations housing authority where the rent that is paid is applied towards the price of the house. Once the price of the house has been completely covered by the total rent paid then the title and ownership of the house is transferred to the resident. Section 95 homes are assigned to band members at a lower cost then other homes (such as a private home with mortgage) in the community. This has created a problem of fairness within the community where homeowners with outside mortgages (i.e. with a financial institution) pay interest while those renting-to-own only pay simple interest. The Housing Authority is looking for a solution to equalize these programs.

In conjunction with these other programs, there are units in the Six Nations community that are owned directly by the band. These homes are strictly rental units and there are no agreements for ownerships. These are specifically built to house elders or physically disabled members. There are two types of units that are set aside for the specific use of the elders: single dwelling log homes, and multiunit complexes. As in other programs the elder has to apply and be placed on a waiting list. In this situation, unlike others, an elder can decline a unit and remain on the waiting list when they become eligible for a home. This is due to the different types of units available for the elders. Other homes in this program are designed for intellectually disabled or those needing living assistance. These are single dwelling units, located in a centralized area, near the healthcare centre and help these people to lead normal, healthy lives.

The Residential Rehabilitation Assistance Program (RRAP) is a federally administered program by CMHC. RRAP provides funds to bring housing to a minimum level of health and safety and to extend the usefulness of a home by another 15 years, assuming regular maintenance and upkeep. The Six Nations of the Grand River acts as an agent for CMHC to deliver this program. This money is used to fix up existing units that are in disrepair. The money is based on a forgivable assistance system and up to $16,000 is available. Applicants to this program must own their home and land (i.e. CP) and have an annual income below the set standard. The owner must have resided in the home for a period of five years in order to apply for the forgivable portion. In conjunction to this

there is a program to allow for repairs and upgrade for disabled members. An additional $16,000 can be granted to complete repairs and upgrades.

All of the houses built through the housing programs have to meet the National Building Codes. Six Nations also has a set of standards that supplement the National Building Codes. Regarding design, homeowners choose all new home designs under the mortgage and band loan programs. The Housing Authority is not involved in the design features or layout of the homes; however, it approves all housing designs and plans. This allows for individual members to customize their home and allow for individual choices. Consequently there is a variety of different styles, types and sizes of homes in Six Nations. Each homeowner can meet their own family needs and as well meet their cultural and regional needs as they see fit. Regarding existing houses, RRAP provides opportunities for band members to renovate their homes, presuming the house and renovations conform to the National Building Code. This fund, however, is not intended to completely redesign a house.

The design that was most common among the houses included in this research is an open area concept. The living room dining room area was often enlarged or combined in order to create a large family area that could be used at times of large family gatherings. Other features that are common in new houses are separate areas for children, such as a rumpus or recreation room. This allows children to play in areas other than the living room or the kitchen and provides for more individual time and space. During the initial design, the individual homeowner can allow for specific needs such as considerations for elderly members or cultural activities such as carving, painting or preparing game.

Options such as heating and cooling systems, insulation and exterior features are also up to the individual homeowner. Some homes are installed with environmentally friendly units such as high efficiency furnaces and geo-thermal units to heat their homes. Given the expense often involved, some homes have less efficient systems. In the summer some residents use their geothermal units for cooling whereas others use a more conventional central air system. Some band members have gone beyond the minimum standards for insulation and opted to spend more to increase the R-value of their homes.

As far as exterior features, they range very widely in types, designs and material used (e.g. brick, vinyl siding, wood) and reflect personal preferences of the residents.

Regarding the internal environment of their houses, some participants (including residents of both new and older homes) felt that their home was not as healthy as it should be. Some of the newer homeowners were concerned with mould accumulation due to airtight construction and believe that the indoor air quality is poor and justifies the need for air exchangers. The issue of energy efficiency was also very mixed, in terms of new and older homes, with some residents of older homes who were pleased with the efficiency of their homes and other residents of newer homes who felt there should be greater efficiency.

Despite this innovative approach to housing design, ownership and residency, there are areas that could be improved. Participants felt that not all of their design needs or wants were considered when designing a home, but acknowledge that oversights do occur both on the part of the homeowner and the building contractor. There were homeowners who in hindsight would have changed certain design features, such as larger living areas or common rooms. Overall, the research participants believe that the current housing system in Six Nations is successful and provides houses that suit the community's cultural needs. There is high diversity among the private homes and the design of new homes is limited only by the needs, the wants and the means of the owner.

The Six Nations government designs the houses that are under its direct control and has added funds to the Section 95 homes in order to meet the needs of their members. The Housing Authority tries to accommodate the needs of the community when designing the home. According to the Director of Six Nation Housing, care was taken to choose floor plans that allowed for family gatherings and personal space for family members and issues such as healthy homes and energy efficiency were addressed in all possible ways, given the resources available. The exterior designs of the home were similar in design but the material chosen to finish the exterior varied. This provides a better sense of neighbourhood than would cookie-cutter houses. Although individual desires for colour, materials and layout of these homes was not always perfectly suited to all residents, the research participants believe that overall the Six Nations owned homes are very well built and designed.

3.5. DESIGN: PLAINS FIELD VISITS

3.5.1. Pasqua First Nation

Community Profile

The Pasqua First Nation reserve is located 10 km west of Fort Qu'Appelle and covers 8960 hectares. Pasqua signed Treaty 4 on September 15, 1874. The northern boundary of the reserve occupies most of the south shore of Pasqua Lake and on the eastern boundary is south of Echo Valley Provincial Park. In the immediate uplands, the topography consists of relatively flat land with coulees from the valley extending southwest throughout the central part of the reserve. Climatically, the reserve is in the mid-latitude steppe climate zone. This zone is characterized by hot summers, cold winters and moderate precipitation associated with variable weather patterns. The annual precipitation ranges from 14-17 inches, with an average of 40 inches of snowfall. This snowfall equals approximately 25% of precipitation. 71% of the land is generally dry throughout the year, however 24% and 5% of the land is regularly, or occasionally flooded, respectively.

Pasqua membership is approximately 1200 with 250 people living on the reserve. The native languages of these people are Cree and Ojibway. Facilities available on the reserve include a band office, a health clinic, a storage building, a building supply warehouse, a fire hall, and a water treatment plant. Pasqua First Nation's land base consists of agricultural land. In the early years of the reserve, most of the band members lived in the valley near the lake in small log houses with outside insulation of mud on the walls and roofs. The valley and the lake were looked upon as a never failing provider of life in the form of food, shelter and resources for income (e.g., hay, wheat, potatoes, corn, root vegetables, livestock).

Research Findings

Based on the interviews conducted for this research there are some cultural and non-cultural concerns related to

The elder interviewed for this research noted that bungalows, with only a crawlspace for storage, would be much more suited to elder people's needs.

housing design. Discussions focused on basements, space available, the size of the houses, and an absence of a variety of housing types.

Basements were identified as a problem for elderly people in the community. In many homes, the basements have been finished to create additional living space (e.g. bedrooms, living room) for young families with children. For elderly people whose families have mostly left home, or for older people receiving new homes, steep stairs make the basements unsafe and basements without sufficient windows or doors are seen as a fire hazard. Basements without sufficient ventilation are a source of mould. New systems being installed in the community are intended to alleviate the problem of sewer back-ups experienced in many of the houses.

The climate in the prairie region includes extreme temperature changes and freeze-thaw of the ground and foundations that result in constant movements of the foundations and basements of the houses. This shifting results in frequent need for maintenance and repairs that are often not completed. To avoid this problem, the interview group suggested building houses without basements. The reserve area is large and Pasqua could build larger bungalows to compensate for the space lost by eliminating basements.

Space was a concern for virtually all of the participants. Some of the houses have two or three families living together. These overcrowded conditions are a result of too few houses in the community and a lack of funds to renovate existing homes or to build new ones. The participants noted that these houses and their interiors (appliances, lights, carpets, etc.) wear out faster. According to the participants, crowded conditions have also resulted in psychological and emotional stress in the community.

Many people felt their homes did not have a sufficient number or size of bedrooms and bathrooms. It was noted that oftentimes the contractors simply reduce the size of the rooms to create additional bedrooms while the overall square footage of the house is not increased. There is a need for larger dining areas to accommodate family dinners and gatherings. In some houses the kitchen and dining areas are combined, creating *“small, cramped quarters”.* One man noted that there is not space in his house for everyone to sit down together for a meal and that he often eats his own dinner while sitting on the couch.

Regarding the suitability of current housing design features for the local lifestyle, additional suggestions include a desire in the community for better floor plans that include bigger kitchens and living rooms; verandas and decks; entrance-ways (that are big enough to accommodate a family visit versus a narrow staircase up to the front door); mud rooms (to minimize cleaning requirements and maintain temperature inside the house proper); and woodstoves or fireplaces for aesthetic atmosphere and an alternative heat source.

Interviewee's identified the following barriers to meeting the housing needs in the community: lack of capital, lack of local building skills, and a local attitude that does not support house maintenance or repair. Regarding this lack of care, an interviewee noted that this is perhaps fostered by the fact that most people in the community do not own their houses, resulting in comments such as *"it's not my house so why should I pay for it".*

There have been recent plans to build a multiplex house and / or a senior's house. Although one of the elders at the interview stated that she would never give up her privacy for such a living situation, others noted the health and safety benefits and access to social activities that would be associated with a senior's house. Other group housing options were also discussed. Pasqua has a lot of single people without housing. These people tend to move between the community and urban centers but many of them wish to live in Pasqua First Nation. The participants noted that a multiplex design could address the need for additional houses. Instead of moving in with other family members and thus creating overcrowded housing, this would provide an additional option that allowed people to remain in the community. There is also an interest in community houses that provide a living situation where many families can live together in a single building, share a common area, and also have their own private rooms. This concept of living close to family also relates to overall community planning and the interview group noted that they would prefer a community setting where the houses were close together.

Pasqua First Nation is not currently building housing using alternative design, however the First Nation government would like to pursue this in the future. According to the participants, 'CMHC designs' are currently used to design new homes. It was noted that

CMHC designs allow for carports and / or covers over vans but that no one in the community has ever requested either of these. This would be a design area where a local preference could be substituted in lieu of vehicle covers. Housing designs that include a porch, veranda or solarium are potential additions that participants would like considered.

Despite the concerns raised during the interview, the Pasqua interviewees stated that they were generally content with their homes. The most important design requirement associated with cultural activities as identified by the interviewees in Pasqua First Nation relates to occasions when large groups gather together in a house. This leads to a need and preference for larger kitchens, larger and separate dining rooms and larger living rooms. One member of the community has completed renovations on this own and now has a large living room that he uses for cultural activities (e.g. PowWows and ceremonies).

3.5.2. Piapot First Nation

Community Profile

The Piapot Indian Band occupies the Piapot Reserve, which is located 29 km north and 11 km east of Regina, Saskatchewan and covers 8310 hectares. The band signed Treaty 4 on September 9, 1875. Originally located in Manitoba, Chief Payepot eventually relocated his band north of Regina. Piapot First Nation is Band #75 of the Federation of Saskatchewan Indian Nations. Piapot's population is approximately 1300 with more than 450 people living on the reserve. The native language is Cree. Facilities available on the reserve include a band office, an arena, a fire hall, a recreation centre and a school. The reserve land base is primarily agricultural land. Hunting is also a community activity.

Research Findings

Piapot First Nation consists of 149 homes, 48 of which were built with funding from CMHC. The people of Piapot are not included in the design of the homes. An external construction crew builds houses with funding from CMHC. The participants felt that this had resulted in a loss of community spirit in the First Nation. In the past the community was involved in the design and construction of its housing and people would come together to help each other build houses. The group felt that these events helped to create a close community. Preparing houses for the winter was also a community activity and at these times there would be a feast to feed everyone involved. The research participants felt that the lack of community-organized housing design and construction has contributed to a loss of community identity.

In general the opinions of the participants are that houses are small, have poor air exchange and do not consider many of the important activities that occur regularly in many First Nation cultures. For example, in Piapot much of the cooking and making tea requires boiling. The homes are not equipped with air-to-air exchange units and moisture tends to accumulate in the houses. Moisture has contributed to mould growth and an unhealthy living environment. People have noticed film on their windows, rotting window mouldings and a reduced life of windows of only five or six years. The moisture also causes the windows to freeze shut.

According to the participants, the houses in the community are small and have an insufficient number of bedrooms. The CMHC houses are based on the needs of a family of four or five and no not take into account the size of an Aboriginal family or the extended family that may form one household. The interview group noted that many First Nations people, including members of Piapot, share their homes with family members and that it is natural to open their homes to family members that are in need. The housing shortage that exists in Piapot (as in other First Nations) means that most families need to share their homes with others. In some cases people who have moved away from the community return to find there are no houses available and must move in with family.

The children in Piapot generally have to share their bedrooms. This becomes more difficult as the children get older and need more space and privacy. A lack of, or small,

living room area results in little space for children to play, for adults to entertain or to engage in cultural activities (e.g. crafts).

The majority of the homes have basements that are a combination of wood and concrete materials. The two-story design of houses and the use of basements as additional living space is considered difficult for elderly people who may not be able to negotiate stairs. A group home for elders in the community was suggested. A group home could also provide living space for single parents and single people who are unable to get housing on the reserve but would like to relocate back to the community. The participants noted that this community approach to housing may not be desired by all people, however, it would provide a means of living in the community, as well as an opportunity to receive and give support that reflect an important part of First Nation culture. The need for porches was also identified. Although they are a regular feature of the houses built by the First Nation government, the CMHC houses do not have porches. This is a desired feature in the community as a porch can accommodate some outdoor cultural activities, provides space to store food / a large freezer, and minimizes cold air and mud from entering the house.

The research participants felt that the homes built through CMHC were not consistent with the lifestyles of First Nations people. They would like to see future housing be developed with community input regarding the design.

3.6. DESIGN: NORTH WEST COAST FIELD VISITS

3.6.1. Tsawout First Nation

Community Profile

The Tsawout First Nation is located on the southern tip of Vancouver Island, approximately 30 km north of Victoria and can be reached via the Pat Bay Highway. The First Nation includes 241 hectares and is within an earthquake zone which experiences a high risk of erosion. Tsawout was created in 1957 when the Saanich Tribe divided into five bands: Pauquachin, Tsawout, Tsartlip, Tseycum, and Malahat. Tsawout is part of the Coast Salish linguistic group.

The Tsawout population on reserve is approximately 300. The homes on the reserve have a piped-in water supply connected to the Central Saanich System and have sewer disposal. Central Saanich provides fire, police and health care services. Facilities available on the reserve include a longhouse, a band office, a cultural centre, and a community hall. Economic activities include locally owned commercial enterprises, fishing, hotels, and trailer parks.

Research Findings

"The way all of my family members are, they all have extended family in their houses and their houses haven't been adapted to meet those needs"

According to the participants the community has a desire to change their current housing to better reflect their specific needs. Concerns with currently houses include lack of space and fire hazards related to windows and doors that no longer open (due to poor construction and / or shifting of the house) and the use of electric heat. Overall, the community would prefer bigger houses with larger kitchens and more, larger bedrooms. Many of the houses are crowded and older children (>20 years) often remain at home due to the lack of housing in the community. It is more difficult for single people to obtain housing in the community as preference is given to elders and families. People in the community entertain and have family gatherings in their homes and do not currently have the space to do this. One of the

interview participants noted that one man in the community has a house with an open-floor plan, without hallways, to provide more space to entertain and to allow for flexible use of the space.

Many of the houses currently have basements with high ceilings that result in front doors that are raised up from the ground. These entrances require up to 12 steps, and are a safety concern in the community. The community would prefer to have basements that extend further underground so there are five to six steps down to the basement from ground level and first to six steps up to the front door (“ a half sunk house”).

Group homes (e.g. townhouses, apartments) were suggested as a means of providing additional housings and support for elders, young families and single people. Common areas could also provide the space for large gatherings and dinners. It was acknowledged that some people would not choose to live in this type of group situation, however, the interview group was aware of an apartment-style living situation that is successful in a nearby First Nation.

3.6.2. Kitsumkalum First Nation

Community Profile

Kitsumkalum is one of fourteen Tsimshian Tribes that has occupied traditional territories in northwest British Columbia for thousands of years. In modern times, the Tsimshian Nation now consists of seven tribes: Gidestsu (Kitasoo or Klemtu), Gitk'a'ata (Hartley Bay), GitkxaaLa (Kitkatla), Gits'ilaasu (Kitselas), Gitsmgeelm (Kitsumkalum), Lax Kw'Alaams (Port Simpson) and Metlakatla. Kitsumkalum has traditional territory in the Kitsumkalum Valley with property rights along the Skeena River, and along the northwest coast of British Columbia. The population is approximately 265 (2001 census).

Kitsumkalum is located 5 km west of the town of Terrace on Highway 16. The Terrace and Kitsumkalum area has unique climatic conditions and experiences more freeze/thaw than other coastal rainforest regions and has few dry days. The Kitsumkalum land is located at the junction of the Skeena and Kitsumkalum River. Part of the land is on the

floodplain of the Skeena River and part is on the mountainside. Housing has been located along the valley beside the mountain, on terraces cut into the mountain and on the floodplain closer to the river. There is a large swampy area between the mountainside and floodplain development. This wet area is only passable on foot if it freezes during the winter.

The community has a community hall, education buildings, administration offices, gas station and housing. There is less than 100 houses built on the reserve and many people remain on a waiting list. In total there have been eight building projects. No housing projects were in progress at the time of the research (August 2003) but a new development is in the planning stage. 84 of the houses on the Kitsumkalum land were built using the social housing program.

Research Findings

Four meetings were scheduled with social housing occupants to gain their input about the process, aspects of design and housing suitability. These interviews were conducted in the participant's house or at the office of the Housing Coordinator.

Four meetings were arranged with five homeowners – 4 single mothers with young children at home, 1 of who is the community housing coordinator for Kitsumkalum, and an older woman who has lived in her house with her husband since the 1960s. The interview participants are all part of the social housing program and have received housing on the reserve. The participants' houses are part of three different development projects. The oldest house was built in the 1960's, two houses were built in the 1990's and the last house was completed in 2000.

The general impression given by the interviewees is that there are significant housing concerns in the community. The issues relate to funding, availability, application, the quality of housing stock (for design) and construction. The housing seems to meet basic level of need but does not consider culture, lifestyle and specific site location. The research participants noted that the reserve is not a " *typical white suburb".* The future housing tenants are generally not involved in the design of their houses. At times the blueprints are available prior to construction and different options exist, however, any

changes to the existing design add to the overall cost of the house. Generally there is no money to available to request changes.

The oldest house in the study was located on the lot in the 1960's. This house was moved from Kitimat and converted into a single-family unit. The house is a two-story dwelling with a wood storage area at one end. The house uses a wood-electric furnace. The upper levels contain the living quarters while the basement is used for storage but also contains two bedrooms. The bedrooms were roughed in but not completed.

Two other houses discussed and visited were built in the 1990's. The current Housing Coordinator is a tenant in one of the homes and is a single mother and owner of a two-story house located on a terrace overlooking the highway towards the river. There are seven individuals staying in the dwelling and space is limited.

The other house that was included in the research is located on the terrace above the main community centre and sports field and is rented by a single mother with three daughters. The house consists of two-stories with the main living quarters on the upper portion. Work has been done to the basement to convert it into additional living space. Due to a recent accident, issue of accessibility in the house has been raised. Major problems have surfaced due to the lack of space, planning and layout of the house. Another participant in the interviews obtained her house by applying for a personal loan. There are nine individuals in their dwelling and it is very crowded. There have been many problems dealing with the contractors for her house. A lawsuit and counter-suit was filed about deficiencies and incomplete work in project.

The newest house that was visited is occupied by a single mother with two young children. This project development was placed in a new section of land. This land is on the flood plain of the Skeena River. The house is a two-story three-bedroom dwelling. The house was built above ground with a crawl space area. This tenant had the opportunity to choose between two housing designs.

The participants' houses were all social housing projects. Many of the homeowners were able to pick their house plan from a select sample but no major design decisions were made. In many cases, the tenants have no choice in the design of housing they receive.

The tenants do have the opportunity to add or change features in the house, but these changes increase the price, which is paid by the homeowner. Some individuals make the changes while others do not make any. People who provided sweat-equity during the building of the house were able to make small changes and adjustments during construction. The interviewee felt that the presence of the homeowners during the house construction provided a second set of eyes to make sure the work was done properly.

The group noted that the housing could be made more suitable for the people if the contractors were required to work with the community and gathering information of their lifestyles and needs. The current housing plans used in Aboriginal housing projects are produced by developers and are not suitable to the specific climate or community needs.

Family members visiting and staying in a house for short and extended periods of time is a common occurrence in Kitsumkalum. Some houses have a number of different relatives and friends occupying available rooms. Out-of-town relatives often stay with family when visiting the community and in the past, the houses were able to accommodate more people. As many of the new houses are overcrowded and have multi-generations living together, there is no space to accommodate relatives and their belongings. Community members feel cut off because they cannot help the people and accommodate them in their home.

To alleviate this problem, the research participants suggested that the houses need more flexible space and plans that accommodate multiple families in a single household. Currently, the living rooms in the new houses tend to be undersized or in a configuration that does not suit having many guests over. The smaller sized rooms prevent the homeowner from providing enough seating, space for movement and, in some cases, space for a cot or extra sleeping spot. Combining the space from the dining room, which is not used in many of the households, with the living room might be enough area to accommodate a family gathering.

Housing for single men and women is needed in the community as well. It is difficult for single people to obtain housing in the community if they do not have children. The interviewees noted that many individuals want to live within their own community but do not want to overburden their relatives. These individuals need private space for

themselves, which is not available in the overcrowded conditions of most of the housing in the community right now. The current housing is designed for single-family use and has space that is not versatile or expandable. The newer houses do not have the available space or facilities to accommodate cultural activities. There is a tendency to leave these houses and travel to the parents or grandparent's house to participate in the preparation of food, fish and gatherings.

The older house has a fairly open floor plan without hallways. The living room and kitchen area is connected with a large opening that allows air to flow from one side of the house to the other. There is also enough space to have a gathering of people in the home. When the living room fills up extra people move into the kitchen area. The people in the kitchen not cut off from the other group and are still apart of the gathering.

Cultural activities extend outside the house and onto the surround property, for example, out buildings are created for activities surrounding food gathering and preparation. Currently, these spaces are not available and this lack of space was mentioned during the interviews. The house that has the most additions and changes made to meet cultural activities has a work area built behind the main dwelling. The lot contains a smokehouse, fish cutting and cleaning space, an area for mending nets and working on the fishing boats. An area is also set aside for gardening and structures were built for drying fish and other food products. The local youth are planning to build a skateboard park on part of the lot behind the house.

In this situation there is significant space available behind the house since it was one of the first projects developed. The new projects have substantially smaller land included with the house, which limits the possibility of adding on these types of outdoor cultural spaces. Suggestions for these outdoor work and cultural areas include electrical outlets, water access (hot and cold) and level areas for equipment. By including these things in the planning of the larger development, issues such as drifting smoke from smokehouses can be mediated. In addition to these outdoor facilities, a root house would be useful. The smokehouse is too cold during the winter and the basement is too warm to keep certain goods. A root house structure would enable the family to store perishables grown in the garden during the summer months. It was also seen as a very efficient method that would require no additional utility costs.

Outdoor activities in Kitsumkalum often include food preparation. Traditional foods prepared, stored or frozen by households in the community include fish, berries, seaweed, herring eggs, halibut, clams and cockles. These foods require preparation areas, big tables and exterior area to work, as the foods are often too messy to prepare inside. In addition to the outdoor space indoor space and appropriate electrical outlets are also required to accommodate the large freezers used to story the food. The older house contains four freezers (one for fish, another has meat and one has baked goods). Most elders do have freezers and according to the interview participants, others would use freezers if they had the room, outlets or space. The freezers have caused problems in the winter when faulty or low-capacity wiring has resulted in electricity failures.

Currently housing does not provide adequate accessibility for elders. According to the research participants, the main problem is the stairs and front entrance area of most houses. Upon entering the house the person must proceed up or down the stairs to the desired level. Almost all of the houses on the reserve are two-story, with the upper level accessible only by stairways. These stairs are either a long set with no landing or a steep set with a curve and landing. Usually the risers are higher than normal to provide the level change in as little space as possible. The higher riser often causes people to misjudge their steps and loose their balance. People have fallen up and down the stairs in the houses.

In the elders houses there is not enough space for movement. Some people become locked off from their homes because they cannot get the wheelchair outside of the bedroom or to other areas of the house. There is a lack of accessibility to rooms such as the bathroom and down hallways. One of the participants suggested that a separate suit, attached to the family house might be a preferred option. The suite would be one level, without stairs, and would include an area for meetings and visitors, a kitchen area and place for cultural activities (craft making, fish cutting, etc) for active elderly people.

Houses that are built on grade are ideal for older residents. The individuals do not have to travel up and down stairs to access bedrooms and facilities such as the washer and drier. The topic of accessibility was a concern for homeowners, visitors, and emergency personal. The existing houses do not have the space to accommodate stretchers and

paramedics have problems navigating around tight corners, down steep stairs and through narrow hallways and staircases.

The research participants do not consider their houses to be energy efficient. One house had a wood furnace that was converted to a natural gas furnace and now has an electric unit. Another house was converted from propane to natural gas but is still cold inside. Some houses do not have chimneys and therefore do not have an option to use a wood-burning unit as a secondary, less expensive, heat source. The community is concerned with the increasing cost of natural gas and the ability of the utility company to shut off the natural gas. Changing furnaces usually causes the change of other appliances such as the water heater. These additional costs could be avoided with proper planning and research before construction. The interviewees suggested that radiant heating might be an option for heating their homes.

Each house uses natural ventilation during the summer to keep cool. However the current locations of the windows do not assist in this cooling method. In most cases the windows are placed only on two exterior walls and the interior walls stop air movement. The community would prefer natural airflow provided by windows on all exterior walls and open spaces in the interior of the houses to provide cross-ventilation. The participants would also like patio doors that could provide airflow through the house and alternative fire exits needed for the upper level of the houses.

Natural ventilation helps to prevent moisture from being trapped in the house. This excess moisture leads to mould growth. The mould can cause serious health problems. Some family members within the households have asthma and allergies that are present only when they reside in the house. When they travel and stay in other locations the symptoms and reactions go away till they return home. Another concern with mould in the household is the products used by companies that remove and prevent mould from growing.

Most of the participants agreed that linoleum or tile was their choice of flooring. Movement in wheelchairs and other assistance products is easier with linoleum and tile. The floors are also easier to clean and maintain. Carpet was seen to foster mould

growth and allergens in the house. Wood flooring was not mentioned in the meetings, which could be due to it not being installed in any of the housing projects.

The interview participants stressed that all the houses in the community need space that is open, flexible and versatile so that it can be used for gatherings, living quarters, recreation or storage area. The flexibility is needed as the members of the household grow and change. Rooms that were bedrooms could become work areas, recreation space may be converted to living quarters.

The new houses are not easily adapted to include different interior layouts or to accommodate additional members of the household. Often the “workable” space like the basement does not have the potential to be renovated into living quarters. Some homeowners have finished recreation rooms and bedrooms in the basements, yet there is often minimal electricity in this area. Generally there are not enough electrical outlets in the houses in the community and power bars are used to accommodate the appliances. The electrical supply is often interrupted due to an overload.

The current house entrances are not designed for emergencies. Stretchers and hospital beds cannot fit through these spaces, up the stairs or around the corners. The house design is not accessible and movement can be hindered. Smaller houses have smaller walkways. Many of the houses have problems with the location and number of doors in the dwelling. Some of the doors are in inappropriate locations, some flood when it rains and others are improperly installed. Basement doors, that were added in after the house was complete, have flooding problems. The landings are usually below ground level and have improper drainage. The climate of the area has high moisture and rainfall.

A mentioned before the upper level of the houses usually has one exit. Having only one exit from a level can be a hazard if that exit became blocked with fire. With the addition of additional exits or patio doors, the area underneath the porch can become external storage space for outdoor equipment or awkward items. The patio can also be screened in creating an outdoor sitting or working space.

An arctic entrance was included as a design feature desirable for the climate in the area. The arctic entrance or mudroom provides extra storage space for coats, footwear and

prevents mud and dirt from being tracked into the house. This area could also house a freezer, which is desirable in the households for the traditional gathering and storage of fish, meat, berries and baking goods. Simple features such as the mudroom provide the house with options and help to improve energy efficiency. The mudroom, veranda, screened in porch can be used in almost any climate and provides the extra space needed for coats, shoes and gives the house a little more storage space.

There are no traditional designs noticeable in the current housing stock. There are cultural elements applied to other building structures on the reserve but nothing that has extended into the housing sector. Housing plans are prepared by the developers and do not reflect cultural issues, lifestyle, climatic considerations and building site locations. Local materials are not utilized and construction of alternative designs (e.g. log homes) is not considered. According to a local inspector, the construction of log homes utilizes local logging material is feasible and could provide training for individuals in the community.

A recent project in the community has seen the training of band members in the production of log homes. The training project is left unfinished on the reserve. One of the interview participants has worked in log homes and seen the benefit of the open spaces that are versatile and adaptable. She would like to live in a log home and noticed that these homes had far fewer maintenance problems and repair needs.

The community members and tenants prevent the community from meeting housing needs. Many of the tenants cannot prove that they can maintain the homes. The tenants/ homeowners are responsible for minor/major repairs and there is a waiting list for basic home maintenance. There have been community meetings on housing, with workshops, but only two tenants showed up. A lot of the repairs are needed due to the deficient workmanship and problems left over from the original construction. In many cases the homeowners paid more money to complete work that was already paid for in the original construction price. The repairs can range from minor window insulation to major structural and foundation problems.

Many shortcuts and poor building practices plague the houses in Kitsumkalum, which has caused major repairs and, in some cases, serious structural and drainage problems.

For example, house structure supports for the main structural beams were improperly installed. Other projects are plagued with window, door, siding, roof, water piping, electrical, and so on. CMHC does not inspect for quality but for progress and project completion. According to the participants, the basic attitude of the contractor/workers/previous housing coordinator was “I don’t have to live there”.

There is a desire in the Kitsumkalum community to have the homebuilders work with them in designing. The community would like to see their lifestyle’s addressed in the new development. At the housing symposium in Esquimalt there was a presentation done by a consulting firm about the way in which they help communities and family design and plan. The “Little Big Houses of the Esquimalt Nation” are modern and have a custom design aspect since they look at the lifestyles, culture and needs of the families. The consultant looked at the lifestyle and culture of the people, needs and desires, and produced designs that speak to the aboriginal community. These housing designs made a great impression on the individuals at the symposium and made them realize that there are alternatives available.

It was suggested that the homeowners bring in their own inspectors that will thoroughly look at the work that is being done. This would help prevent problems and more costs in the future. There is no funding in the social housing program for this extra expense and so it is placed with the homeowner. According to a local inspector, more technically competent people need to be on staff with institutions such as Indian and Northern Affairs Canada. These people could train local people on housing design and construction to increase local involvement in housing.

The youth are planning to build a skateboard park on the reserve. The location would be away from traffic. The park would be located on the property of one of the landowners since no area is set aside for this type of development. The kids are included in the planning (including materials and equipment) and fundraising for the project. The inclusion of the youth in the project helps to raise their awareness of issues surrounding housing, building and planning and is an opportunity to create interest in future tradesmen, designers and organizers.

A big problem is the Kitsumkalum community is the lack of involvement of its own members regarding housing issues. Housing workshops have been offered but attendance was generally low. According to the Housing Coordinator, those that do attend and are provided with the information gain significantly from the things they hear and see. The interview group raised the questions as to how to encourage more involvement from the other homeowners after the houses are built.

3.7. DESIGN: PLATEAU FIELD VISITS

The community representatives from Okanagan and Westbank First Nations participated in the interview together.

3.7.1. Okanagan Indian Band

Community Profile

The Okanagan Indian Band covers 10603.3 hectares and services seven reserves. The Joint Reserve Commission allotted the reserve on October 15, 1887. The band is part of the Salishan linguistic group.

The Okanagan First Nation population is approximately 1,600 people with approximately 50% living on the reserve. The community is accessible by road and air; has water supplied by piped system from none reservoirs, five community wells, 165 individual wells, and three pump houses. Sewage for the reserve is disposed in septic tanks. Police protection and health care for the people of the reserve is available in Vernon. Fire protection and rural postal service is provided on the reserve.

Facilities available on the reserve include a church, a band office, a fire hall, utility buildings, a community hall, a works building, and an education building. Economic activities include hay fields, laundromat, fast food restaurant, a campsite, a trailer court, a marina, a grocery store, a backhoe contractor, a mixed farming operation and lease property.

3.7.2. Westbank Indian Band

Community Profile

Westbank First Nation is one of seven communities that make up the Okanagan Indian Band. In 1902, the Post Office gave the band this name to indicate their position on the Okanagan Lake. Commissioner O'Reilly allotted the reserve in 1860. The band is part of

the Salishan Linguistic group. The population is approximately 430, with approximately 250 people living on the reserve.

The community is accessible by road and air; has water supplied by piped system as well as community well and septic tanks for sewage disposal. Police and health care services are provided in Kelowna. Facilities on the reserve include a band office, a church and a kindergarten school. The focus of the administration in recent years has been to encourage private investment on reserve. A number of community members are involved in their own businesses or in land development. The First Nation government's property management company leases owned premises to Western Indian Agricultural Corp. and others. The band also operates an extended care home, a construction company, a moccasin factory, the Okanagan Trading Post, a marina and restaurant, a mobile home park, a water slide, a drive-in theatre, and farm small holdings.

Research Findings

In general there is a feeling that culture and traditional needs have not been incorporated into the housing designs in the communities. Houses built by the ancestors of the Okanagan and Westbank First Nations people were round, not square. One of the participants noted that there are Aboriginal philosophies that living in square houses is not healthy.

"If we had our druthers, we would build a house that has the potential to accommodate the needs of an applicant for the rest of their lives. And we would try to anticipate what changes might take place in that person's life so that all the needs could be accommodated if those needs came. That would be ideal. "

Both Okanagan and Westbank First Nations are experiencing challenges related to housing. As is the case in many Aboriginal communities the houses are too small for the number of residents. The research participants emphasized that the current housing programs require the First Nation governments to build houses that suit only the current needs their members. The likely expansion of a one-child family, for example, cannot be considered when a house is provided to this family. The majority of the people in the communities remain in their first house for their lifetime, however, there are few to no resources available to renovate

houses and the housing needs of these people therefore often surpass their available space.

According to the participants, houses that are 1000 square feet that are build with CMHC funding, are not of adequate size. The communities do not understanding the reasoning behind this size of a house, and would like to have between 1500 and 1800 square feet. There are too few bedrooms and the existing ones are small. The living space including the kitchen is too small, especially given that *"when people come over to visit, where you normally end up is the kitchen".*

Most of the houses have unfinished basements. Several people who participated in the research would like to use the basement for additional living space but do not have the financial capacity for renovations. For families with many members living together in one house, a finished basement would make the living arrangements more comfortable. A participant from Westbank First Nation noted that he would like *"… a larger house with a suite in the basement so it can be for your kids when they get older and they don't have to move away, or maybe the kids can take over the house and the parents move down".* Some of the houses have mudrooms, which are useful in keeping weather and dirt or mud out of the house. People in the communities do a lot of outdoor work and would like these areas to be larger. Currently the mudrooms do not provide enough space for them to clean up after working outside.

Some houses in the communities have been renovated to accommodate the needs of elderly and people with disabilities. There are some new houses being built to consider some of these needs from the outset; for example, hallways that are wider, larger bathrooms and wider doors to accommodate wheelchairs. There are discussions related to special facilities for elders, including several *"bundle type units that will be around a care centre"*.

4.0 Local Materials: Notice of Study

Aboriginal Housing
Study of Local Designs and Materials

Conducted by: The Centre for Indigenous Environmental Resources (CIER)
and Tall Grass Development

What is the Aboriginal Housing Study?

The Aboriginal Housing Local Design and Materials Study is seeking to identify and describe five examples of Aboriginal communities using local materials in the construction of their homes. CIER staff will visit three of these communities to learn from the community and its leaders how the materials were used and what successes and challenges were involved. Tall Grass Development staff will visit 18 communities to look more specifically at the social and cultural aspects of housing design and construction. Other studies that have looked at the feasibility of using locally available materials in Aboriginal communities will also be used.

Why do CIER and Tall Grass Development want First Nations Participation?

To add richness and authenticity the Aboriginal Housing Study will include the voices of First Nations who have experience using local designs and materials for housing. Individuals and communities who are willing to share their knowledge about Aboriginal housing will provide essential information for the Study. These people and communities will be recognized by other Aboriginal people for the generosity shown through sharing local methods of improving housing conditions. No documentation will be published without the written consent of the First Nations involved.

What are the outcomes of the Aboriginal Housing Study?

The information gathered for the Study will be compiled into a user-friendly document to provide other First Nations will facts, ideas and knowledge of other communities' experiences that may help them to develop their own local design and /or housing programs for local materials. The Study will include an assessment of the feasibility of using the local designs and materials highlighted in the report in other areas in Canada with similar climate and geography.
The final report will be provided to our client, Canada Mortgage and Housing Corporation (CMHC), the government of Canada's national housing authority. CMHC will make the information available as a reference document for Aboriginal communities.

Contact Lisa Hardess, Research Associate
Rodney McDonald, Sustainability Strategist
Centre for Indigenous Environmental Resources
Tel: 204-956-0660 Fax: 204-956-1895

CENTRE FOR INDIGENOUS ENVIRONMENTAL RESOURCES

TALL GRASS DEVELOPMENT

5.0 Local Materials: Interview Guide

Aboriginal Housing Study of Local Designs and Materials Research Guidelines

Thank you for helping CIER with our research on Aboriginal communities who are using local materials. Please answer the following questions to help CIER understand the experiences of your community. If you have any photographs or designs and would like to share them we would greatly appreciate it. No documentation will be published without your consent.

Materials

- What are they?
- Where are they from, specifically?
- How are they harvested / mined / gathered etc.?
- When is this done?
    - Season
    - Frequency
- How much is required?
    - Per house
    - Per 'harvest'
    - For the manufacturing process / plant?
- Who manages the materials?
- Who owns the materials?
- Who 'harvests' the materials?
- Why was this material chosen?

Preparation

- Is preparation of the materials required? If so, what / how?
- Where is the preparation done?
- Who does this?
    - Labour?
    - Plant ownership?
    - If not First Nation, why not?

- When is preparation done?
    - Season
    - Frequency
- Is the preparation process continuous / intermittent?
- How are materials transported to and from the preparation area/plant?
    - Who provides the labour for this?
    - Machinery for this? From where? How costly and how was it bought?
    - Vehicles for this? From where? How costly and how were they bought?

Construction

- Who builds the homes?
    - Is the labour local, if not why not?
- Did the necessary skills exist in the community?
    - If yes, how so / from what?
    - If no, how were these brought to the community?
    - Was a non-Aboriginal person hired / hired for teaching?
- Who manages construction?
    - Has it been successful?
    - Has management been constant or have the roles changed / managers changed?
    - How was this management determined?
- How many homes have been built?
- What is the average cost of building these homes?

Sustainability

- When did the community begin using local materials for housing?
- Is this use of local materials still occurring on a regular basis?
    - If not, how frequently?
    - If not, what were the barriers to regular construction with local materials?
- Has the work been consistent over the years or intermittent / periods of work?
    - If consistent, how was this maintained?
    - If intermittent why was this the case?

    - What is required to achieve consistent local construction of housing?

- What are the benefits to the community?
    - Environmentally
    - Economically
    - Socially
    - Culturally

- What are the disbenefits / disadvantages to the community?
    - Environmentally
    - Economically
    - Socially
    - Culturally

Birth of the Initiative

- What led to the community choosing to build with a local material?
- How was this received in the community?
    - What questions did the community have?
    - If concerns were raised, what were they?
    - How did the leadership gain support for the idea?
- Was the decision-making done with the whole First Nation?
    - If not, who was involved?
    - How did the leadership engage its members in the decision-making?
    - Was this easy or challenging and why?

Reflection

- Is this a successful approach to local housing needs?
- Would you encourage other First Nations to initiate a similar project?
- What advice would you give a First Nation wanted to build with local / alternative materials and designs?
    - What were your community's successes?

  - What were your community's challenges?

- Has there been any evaluation of the successes / failures of this initiative regarding:
  - The use of local materials
  - The sustainability of the use of local materials
  - The use of local labour
  - The increase in local capacity
  - The cost-effectiveness of the housing
  - The effect on local housing needs and quality

Additional Comments:

Thank you very much for your time!

6.0 Local Materials: Site Visit Notes

6.1. Aboriginal Housing – Site Visit (Clay)

Notes from January 13th and 14th 2003 trip to Sumas First Nation, B.C.
Interview with Beatrice Silver, Chief, Sumas First Nation

Sumas Clay Products donated the brick for the Community Centre (when was this built?) and the planned longhouse (round brick outside with oblong inside for ceremonies and dancing). The Band had a ceremony in October 2002 to honour the Sumas Clay Plant employees, one of whom is a community Elder who began work at the plant when he was 15 years old.

The community has a long waiting list for new houses. They are in need of space and have land on the other side of the trans-Canada highway where approximately 50 acres will be reserved for housing. There are also plans for a shopping mall and possibly a hotel and convention center with casino on this land. Chief Silver would like to see these constructed with 100% Sumas Clay brick and has told the consultants working for the First Nation that this must be written into the contract. As a long-term goal she plans to negotiate for an overpass between the two reserve lands.

The past Chief did not support the use of brick for local housing. He was in office for over two decades and was also not supportive of the Brick plant itself. Consequently there are no homes on site that are made entirely of brick. Many homes have chimneys and foundations made from local brick and some have local brick garages (see photos).

Beatrice Silver has been Chief since April 2001 and is very supportive of the plant and the use of brick. She will be promoting the use of the community's brick on-reserve and for nearby First Nations looking for housing resources. She has been to a CMCH meeting to discuss their support of brick houses. Current CMCH houses are not performing well and many are cracking and shifting. Chief Silver is curious if this is, in part, due to the nearby drilling however if this were the case other neighbouring homes off-reserve would also have problems. There haven't been any problems with the Community Center or nearby off-reserve brick homes. She has a brick home is off-reserve.

The past Chief and CMCH believe that using brick would be more expensive. The current Chief and manager of Sumas Clay (Dave Topper) refute this. Chief Silver would like to see the calculations that prove that the use of local brick would in fact be more expensive. Initial cost with brick can be more expensive primarily due to the labour costs of bricklayers. She noted that the labour costs for carpenters are very expensive. In addition, Sumas First Nation has the brick plant on-site and would have access to the brick at reduced cost. Even if initial costs were higher, Chief Silver plans to promote the use of brick for its durability, insulating capabilities and reduces incidences of mould.

The manager of the plant is also willing to donate brick for housing and promotes the use of brick for its long-term strength and insulating capabilities "I would like to see every house in the community be brick". There are currently 4 trained bricklayers in the community. When the brick has been approved for use in housing Chief Silver plans to initiate an on-reserve training program using local expertise and external support. She plans to contact a BC college that offers bricklaying courses to suggest the use of the Sumas Clay Plant and community for use as an on-site training location.

Both Chief Silver and Mr. Topper noted that the majority of the community wants to use the brick for their homes and have in the past. Chief Silver believes that presenting ideas and plans for the community should be presented to the people for their input and support. The people of Sumas First Nation are finding their voices and are now being ask to participate in the decision-making. Before she runs again for office in 2005 the Chief plans to have a plan for brick housing in place and approved by the community. This will then be presented to CMCH and INAC for support.

"When we use our own brick to build our own homes and buildings, we will offer reduced-price brick for other reserves and will welcome other First Nations to use our brick".

Advantages:

- Environmental: a very clean material, minimal transportation
- Economic: our resources, our labour, long-term housing use
- Social: strengthen pride in the community, pride re: community center, longhouse
- "own brick, own hands"

- Cultural: "…strengthen people spiritually by using and building our own materials and with our own hands".

The Band plans to be involved in increasing the marketing of their brick for export and use in neighbouring reserves.

Notes from Interview with Dave Topper, Manager, Sumas Clay Products

The Sumas First Nation reserve includes a clay mine and a clay brick plant. The clay reserves are deep and still contain significant amounts of clay. Tunnel mining was used in the past and 35 miles of tunnels still exist beneath the mine. The brick is a unique red colour ….

The Sumas mine is adjacent to the Claybourn mine (non-Aboriginal).

The plant has the capacity to produce many kilns of clay in a year. In the 1987 100 kilns were burned. The kilns are an English design, complete with underground tunnels for circulation, are considered by the plant manager to be some of the best in Canada. Numbers have decreased in recent years, due in part to a decrease in the overall demand for brick and a shift in consumer preference towards cultured stone. Also, a significant buyer using the plant recently changed suppliers. In 2001 and 2002, 16 and 15 kilns were burned, respectively. Sumas Clay does produce some specialty clay and has the only beehive kiln in British Columbia. Sumas Clay also sells its brick internationally and sends 65% of its brick to the United States and 3% to Japan.

The clay is harvested from the mine by blasting and drilling, using a local air track owned by an Elder, and brick-plant employee, in the community. Claybourn trucks deliver the large pieces of clay to the Claybourn plant for primary crushing. Pieces of clay can be as large as a car and the Sumas crusher is not designed for such large sizes. After primary crushing local trucks transport the clay to the Sumas plant for secondary crushing. Occasionally Sumas plant picks up smaller pieces for secondary crushing directly from the mine. There are also occasions where the Sumas plant uses local trucks to transport large clay pieces to the Claybourn plant for crushing.

The work at the plant is often seasonal as wet weather causes slippery conditions in the mine and the clay cannot be harvested. In mild winters, such as the one in 2002/2003 work can continue throughout the year. In past years some staff would not work during the winter however with staff number as low as they currently are, most staff can work year-round.

Dave Topper would like to see every house in Sumas First Nation made of brick and would donate brick for this purpose. He donated bricks and his time for the new Community Centre, built by community volunteers.

6.2. Aboriginal Housing – Site Visit (Log)

Notes from March 4th and 5th 2003 trip to Nibinamik First Nation, ON.

Interview with Richard Beaver (Band Councilor), James Beaver (Band Councilor, housing portfolio), Lawrence Yellowhead (Deputy Chief) and Randy Wabasse (Family Resource Worker)

Nibinamik First Nation was official recognized in 1975. Since that time approximately 80 log homes have been built. 4-5 homes were built per year and provided local employment during the harvesting and construction periods.

- One house requires 5 people – 1 foreman and 4 labourers.
- One house totals 18-20 weeks of work, including harvesting, site preparation and construction.
- The average cost of one house is estimated at a total of $40,000.
- A housing shortage remains in the community; approximately 20 homes are currently on the waiting list.
- Summer Beaver is not currently building with logs but is buying cut lumber from outside the community to build plywood and siding homes. This is expensive, especially when materials must be flown in. Houses cost more than $90,000 each to build.

- Many houses are very small (most have 2 rooms, common areas with kitchen and bathroom) and contain a large number of family members. Crowding is a problem.
- Some log homes have been renovated / had extensions added to create more space. Other extensions were required when running water came to the community in the late 1990s. CMHC funding has been directly at these renovations / extensions.

Materials:

- Spruce trees; some cut on reserve, others off reserve (don't get work permits just go and cut in nearby areas, on reserve or otherwise); so some material is owned by the First Nation, other is Crown (? – on disputed land?)
- Local crews are hired to go out and cut trees with their own chain saws
- Cutting takes place in the winter (March and April) and sometimes in summer (when it is easier to peel the bark from the tree)

- In the past, crews cut every year but not recently. There was an extremely damaging forest fire (approximately 50,000 hectares were burnt) in 1992 that impacted the First Nation's ability to cut trees for housing. Recently it has purchased lumber from an external sawmill to build houses.
- When logs were being but for housing, a crew of 1-5 people was hired by the Band for a 3-week contract; this involved cutting down the tree, peeling the bark and cutting the logs into useable lengths.
- Summer Beaver has been building log homes since the 1970s, and earlier for log houses that were built on the trapping lines. The community began in 1975. Logs were chosen for building material because they were locally available and the community members had experience building log homes.

Preparation:

- Summer Beaver had a local sawmill that was used to cut logs into rough timber and planks (2x4, 2x6, 1x6). This burnt down a few years ago.
- There are currently 2 mobile sawmills – 1 owned by the Band office, 1 by the local store. The Band would like to hire a manager to run the sawmill and there

is interest in the community. Currently, however, the Band does not have the funds to create this position.

- The sawmills are necessarily used for the logs being used in log houses – sometimes the chain saws cut the logs to size and that is sufficient.
- The logs are cut after they are harvested – either by the sawmill or the chain saws – and then left to dry out until the summer when construction takes place. The logs are transported from the forest by skidoo or boat. Local people are hired to transport the materials and use their own vehicles.
- The areas for new houses also require site preparation – clearing the land and removing stumps. There isn't the heavy equipment available for this work so it is very labour intensive and takes time. For example, stumps are removed by inserting another piece of wood as a level and knocking the stump lose to haul it away. Although not the easiest method, this also provided local employment.

Construction:

- The labour is primarily local. The guest cabin and nursing station were built by an outside, non-Aboriginal contractor. For residential houses, Sandy Yellowhead designed and supervised the majority of the houses.
- The skills for building log houses existed in Summer Beaver via the knowledge of older men who had used logs to build their own homes and trappers' cabins for many years. This skill is passed on to the younger generation as they work in crews with more experienced log builders. Summer Beaver has also received funding to train younger local people in log building. Funding from HRDC, channeled through Mamo, (on which Board many First Nations sit) where proposal are reviewed and funds allocated. Summer Beaver has had successful Residential Housing Construction Training proposals in the past. Local trainers are hired and 5-6 people usually undergo training.
- The Band manages the construction of new homes on the reserve. Occasionally people build their own houses with private funds.
- CMHC has provided funding primarily for extensions / renovations to existing log homes (to increase the size of the house; to allow for running water). Funding for the actual building of log houses has come primarily from INAC, Mamo and minor capital investments.

- There are 4 types of log construction used: vertical logs with a bottom notch; horizontal logs with notches in the top ends; alternate stacking; and vertical stacking with concave shaping on the bottom.
- The vertical log with bottom notching is the most popular. It is easier and faster to build.

Sustainability:

- Local materials have been in use since 1975, and before. Tree harvesting and construction have occurred on a regular basis since that time with 4-5 houses being built each year, until very recently. The First Nation home built the last log in 1999; private individuals have built their own homes out of logs more recently.
- Barriers to continued construction include the forest fire in the early 1990s; lack of funding for an operator for the portable sawmill; and the many guidelines and stipulations surrounding building codes and subsequent CMHC funding.

- Benefits to the community due to log house construction;
- Environmental – trees are a renewable resource
- Economic – local materials are free; the labour and expertise are locally available, the revenues from home building stay in the community
- Social / Cultural – pride in using own materials, building with local skills and labour; “Summer Beaver is one of a kind [the log houses are] culturally appropriate and tie in with nature…it demonstrates who we are, as Aboriginal people, and we are keeping our identity”.
- There aren’t really disadvantages; except when resources aren’t locally available. If resources weren’t nearby the cutting crew would have to go farther which would cost more. (paraphrase)

Birth of the Initiative:

- When the community began building log homes, government funding was not available, nor were building codes standards required.
- The majority of the community is in favour of using logs – most people are not worried about whether or not a house meets building codes rather a cost effective means of shelter.

- Decisions are made in 2 ways – by the elected Council; via community presentations. The Band often notifies the community on housing issues via radio and have received feedback, often from people involved in housing and construction who want to add their ideas and suggestions.

Reflection:
The interviewees believe logs homes have provided a successful approach to local housing needs. Summer Beaver would encourage other communities with available local resources to consider logs. Foremen and designers from Summer Beaver have provided training in log home construction to nearby First Nations (Wanaman Lake, Weibique, North Caribou etc.).

Successes include:

- cost effective building of homes;
- retention of revenue in the community;
- retention of log building skills in the community

Challenges include:

- maintaining an adequate skill level in the community (some carpenters have moved on to other jobs, youth have to undergo training);
- the houses can shift as the logs dry and age (can result in cracks and gaps that require additional insulation);
- houses with tall ceilings are not heat efficient (one house has been retrofitted with a drop ceiling and insulation put in the space and is now warmer); and
- log houses are heavy and when built on clay soils can shift
- A fuel spill that occurred in the mid 1990s will be cleaned-up this year. The Band office has not been able to use this site for development until remediation is complete. Following this, the Band will prepare a 20-Year Capital Planning Study for INAC in 2004. The community will be involved and asked what they want, in terms of housing, and this will be reflected in the Plan. The belief is that the community will want to build and live in log homes and, consequently, the Chief and council believe that this Plan will include building additional log homes.

Interview with Chief Roger Beaver.

Chief Beaver worked as a contractor in the past and built many log homes, using his own designs and workers he hired and trained. He took building courses (but did not complete the program) in Thunder Bay, including carpentry and used Ontario building codes when he built his homes. He noted that it is not always the case that building codes are used as many people have built their own homes without this training. This has decreased the life of some of the log homes (to between 20 and 25 years) that weren't built to handle snow loads etc.

Chief Beaver provided information on the different methods for building log houses that he has used in the past. *(note: these notes will not be included in the report for the Aboriginal audience as this is not intended as a training manual)*

In 1975 and 1976 non-Aboriginal contractors and builders (funded by the Ontario government) came to Summer Beaver to build the school, the health centre etc. Local labour was used and many people learned building skills from this experience. Since then, most people have acquired these skills from others in the community (fathers, brothers). The community has 2 building instructors (Chief Beaver and Sandy Yellowhead) who taught in the community and in nearby communities. For example, Chief Beaver went to Webique to train a First Nation tourist outfitter in log building techniques and to help build log houses for this operation.

Nibinamik First Nation is does not currently have reserve status. Chief Beaver noted this may change by the end of 2003. CMHC does not currently inspect houses in Nibinamik. A housing inspector from the Tribal Council visits Nibinamik and sends his reports to CMHC. Chief Beaver noted that it is generally the electrical and plumbing systems that are inspected.

According to the Chief, CMHC does not fund building houses but have funded extensions or renovations to existing houses (for additional space and to accommodate plumbing when the community moved to running water in 1997).

To obtain wood in the past Chief Beaver applied for work permits from the Ontario Ministry of Natural Resources, however, others have simply cut wood near to the community to build their own houses.

The trees used for log homes were cut by chain saw and typically done by a crew of 3 people – 1 person to lead and mark suitable trees (e.g. 7 inch diameter, straight, suitable length depending on type of log house to be built) and 2 people to cut. The trees were then debarked and left standing up (to prevent rotting) to dry for approximately 2 month. Cutting is typically done during the winter months. When the community needed timber, logs with either brought back to the community to be run through the sawmill, or 1 of the 2 portable sawmills were taken into the bush and used to cut the trees into timber on site.

The primary sawmill in the community is not longer functional due to a fire in 1999. The 2 portable sawmills are 11 and 13 horsepower. 1 is owned by the company managing the Winter Road (which is owned by the Band) and 1 is owned by the community store. There are no plans to replace the larger sawmill, however, Chief and Council are thinking of ordering an HDP40 portable sawmill. This sawmill has 40 horsepower capability, can cut longer pieces of timber and as a hydraulic arm that can transport logs.

Since the forest fires in 1992 the community has not be using local logs for houses. Some logs have been cut for rough lumber and some houses have been built with this local resource. For the most part, however, the community now purchases building materials from suppliers further south. The cost to build a house from purchased materials is approximately $120,000 whereas a log house is approximately $70,000. Chief Beaver noted that the house is more expensive largely due the cost of the materials and shipping required. Local labour is used to build these new houses, however, more labour was required in the past (and therefore more people were working) when the community was cutting its own logs.

In 1992 the Chief at that time signed a document stating that Nibinamik First Nation would no longer build log houses and would use purchased framing materials. The current Chief is in favour of a democratic process and would like to engage the community to determine what types of houses they would like. Nevertheless, at the moment it is not possible to build with local logs as this more difficult and more expensive after the fire in 1992. Since the fire, crews cutting trees need to go approximately 10 miles outside of the community to find trees.

Benefits:

- Log houses, if built proper, perform well and last a long time. The house's ability to hand the cold, snow loads etc. depends on the skill and training of the supervisor
- Building log houses created more employment (than using prefabricated building materials), more people in the community were working which increased personal pride.
- Local materials cost less than building materials shipped to Nibinamik First Nation.

Disadvantages:

- In the absence of properly trained supervisors and builders, log homes can have problems with drafts and cracks.
- Many homes in the community use open wood stoves for heating (also open diesel drums) that creates dust and respiratory problems, especially in houses with cathedral ceilings. Drop ceilings are being used and log stoves are encouraged (the Band recently bought 20 log stoves to sell in the community).

Advice to other Aboriginal communities

If they have a lot of logs that are within a reasonable distance, they could build log houses with their own materials. If no one in the community is trained in log house construction, invest in proper training.

Look at the different methods of building log houses to meet local physical and cultural needs. (for example, in Nibinamik, people do not want the exposed logs in the interior and prefer paneling – as the Chief noted, a case of wanting what you don't typically have)

6.3. Aboriginal Housing Site Visit (Straw Bale)

Notes from January 23rd and 24th 2003 trip to Northern Cheyenne Reservation and Crow Reservation, Montana, USA.

Location: Northern Cheyenne Community Centre (Muddy Hall)
Northern Cheyenne Reservation, Montana
Contact: Otto Braided Hair (406-477-8026) / Jeff Hamby (406-477-8696)

On January 24, 2003 at about 8:30 a.m. Rodney McDonald visited the Northern Cheyenne Literacy Centre at Chief Dull Knife College on the Northern Cheyenne Indian Reservation. At that time he met up with Mr. Jeff Hamby who was familiar with both the Literacy Centre project and this project, the Muddy Hall Community Centre.

Most of the information about his building was gathered during a four or five hour span of time spent with Mr. Jeff Hamby. Time was spent at the Literacy Centre site and then Mr. Hamby took Mr. McDonald around the community on their way to the Muddy Hall Site. At the Muddy Hall site Mr. Otto Braided Hair joined the discussion.

Like the interior of the Literacy Centre, the interior of this building was not complete. In the case of this building, workers were in the process of applying the stucco to the interior side of the bale walls and erecting the interior partition walls. Also, the exterior side of the bale walls still required the finishing coat of stucco. (Insert comment about the warmth in the building even though not complete)

This project is a 260 square foot straw bale addition to an existing stick frame building, which is used for community events such as weddings, funerals, and voting.

Straw Bales

- What type of straw was used? Why?
    - o
- How were the bales sourced?
- Where are they from (how many miles from the building)? Who harvested the material?
    - o Farmer in Washington State. The farmer will ship 4-500 bales at a time, which is enough for two buildings.
- Who located the bales and coordinated their delivery to the building site?
- How were the bales transported?
- Were the bales specially designed or sized for building?
- How many bales were required for the structure?

- ~220 bales

Preparation

- Was preparation of the bales required? If so, what / how?
  -
- Where was the preparation done? By whom?
  -
- When was preparation done?
  -
- How were the bales kept dry during construction?
  - The bales were stored in the existing building.

Design

- Who designed the house/building?
  - David Reiley, University of Pennsylvania (814-404-5067.
  - They were modified under the direction of the tribal council member.
- Did the homeowner or building user(s) participate in the design?
  - Tribal Council was involved in design. The councillor for the district in which the community hall resides will be moving into the straw bale portion of the building. This contributed to the Council's interest in the design.
- Did the design have to meet any building codes?
  - The plans sent to USDA Rural Development for approval.
- Was special consideration given to the characteristics of the site (topography, solar gain)?
  -

Construction

- Who built the house/building?
  - Otto did the foundation for the building. Half a dozen students from the Literacy Centre project began working at the community hall and as the exterior walls at the Literacy Centre neared completion, more students joined at the community hall.
  - High school students from the community also came out to learn about straw bale building. It has become part of their curriculum(?).

  - At the time of the visit the building was being finished by three members of the community who had been hired to complete the job, plus Jeff.
- Did the necessary skills exist in the community?
  - What skills are required?
    - Stacking bales, stucco.
  - What **new** skills did the builders require?
    - Tying bales, stucco and general contraction skills.
- Was there an orientation to building with bales?
  - Who conducted the orientation?
  - When? How?
  - Were any printed materials provided?
- Who managed the construction?
  - David Reiley at the start. Jeff took over once the students left.
- How long did it take to build the walls? And to build the entire building start to finish?
  -

Structure

- Are the straw bale walls load-bearing or in-fill?
  - Load beaging
- Are the interior partition walls also straw bale?
  - No
  - The walls are 2x4 construction with ½ inch of DuraRock (a cement fibreboard). Durable and long lasting material. The DuraRock will be covered with ¼ inch stucco finish coat – the material used for the finishing coat on the interior side of the bales walls.
- How are the walls finished (inside and out)?
  - stucco
- Is there a “truth window”?
  - Yes
- What is the foundation? Is there a basement?
  - Concrete. No basement
- What is the flooring material?
  - Not finished at time of visit
- What is the roofing material? How is the roof insulated?

- Metal roof

- How is the house/building heated and cooled?
  -
- How is the electrical and plumbing run trough the walls?
  -
- In addition to the straw bales, are their any other environmental features of the building?
  - No
- Are there any special maintenance requirements?
  - No

Birth of the Initiative

- What led to the decision to build with straw bales?
  - Volunteer labour provided by students. The volunteer labour allowed them to afford to build a larger building.
  - The original building is too cold in the winter and there is a belief that the straw bales will be warmer.
  - Otto Braided Hair, a member of the tribal council wrote a grant proposal for the money for the project. He has been very involved in the project.
- What support was there from outside the community?
  - Government?
  - Organization?
    - University, Red Feather
  - Individual?
    - Volunteers
- How was this been received in the community?
  - What questions did the community members have?
  - If concerns were raised, what were they?
    - There is a small amount of concern because there was not enough time for the University students to complete this project or the Literacy Centre. Although some feel this is not to great of an issue because the labour is volunteer.
  - Was the community leadership supportive of the idea?
    - The leadership thinks its very positive

        - Some people in the community are sceptical because of the outside help from the Universities (volunteer labour and design services). Trust is an issue for historical reasons and time is just needed to build the trust. The community needs to know from experience that the Universities are there for the long haul.
    - Was this easy or challenging and why?
        -

Comfort

- How does the house/building "feel" overall?
    -
- Is the indoor temperature of the house/building comfortable for occupants?
    - Is it warm enough in the winter? (Average outdoor temperature?)
    - Is it cool enough in the summer (Average outdoor temperature?)
- Is/was there any odour from the straw? (If there was initially, how long did it last?)
    -

Economics

- What was the cost of the building?
    - Cost of straw bales?
        -
    - Cost of other building materials?
        -
    - Labour cost?
        - Volunteer
- How was the house or building financed?
    -
- How expensive is it to heat? How does this compare to other buildings?
    - It is hard to get a good measure of success until the completed building has been in use for a full season. They think the heating costs will be less.

Sustainability

- Is this a viable material to build with in your community?
    - They encourage others to try it.
- What is required for acceptance of straw bale building?
    -
- What are the lasting benefits to community members, in terms of new skills?
    - With this project Jeff is trying to teach job skills and obtain recognition for the workers. Jeff has three guys working with him and another two who are interested.
    - There are opportunities to build houses in the community and if people get a bit of money to build houses they will need experienced help. There are a few people in the community who now want a straw bale home.
    - Jeff thinks that if future homeowners have a chance to lay their hands on the home during construction they will take better care of it. "If they put their own energy into it they will have more pride."
- What are the benefits to the homeowner/building owner and community?
    - Environmentally
    - Economically
    - Socially
        - Because of the ease of building with straw bales, training opportunities are open to almost anyone in the community. Unfortunately the community does not realize this training opportunity because the normal practice of construction is that a contractor is the builder. The thinking that "someone else does it" is an obstacle.
    - Culturally
- What are the disadvantages to the homeowner/building owner and community?
    - Environmentally
    - Economically
    - Socially - Community
        - The community does not understand the importance of volunteerism. Volunteers are an important component of these projects.
    - Culturally

Reflection

- Is this a successful approach to local housing needs?
    - o
- Would you encourage First Nation communities in Canada to build with straw bales?
    - o
- What advice would you give a First Nation communities who want to build with straw bales?
    - o Obtain bales locally.
    - o If using volunteers from the outside it might be better to being in smaller groups of people, or if using a large group to distribute the labour amongst more than one project at a time.
    - o Before arriving in the community be sure that someone speak with the volunteers about the importance of building trust, or respecting other community values.
    - o The community members must be shown that they can participate in the construction and they have to shown the benefits.
- What were the successes?
    - o The funding came from the same agency that provided the loan to Martha Bear Quiver. The agency was thus already familiar with straw bale structure, which sped up the process. Success builds upon success.
- What were the challenges?
    - o
- Has there been a formal evaluation of the successes / failures of this initiative regarding:
    - o The use of local materials
    - o The sustainability of the use of local materials
    - o The use of local labour
    - o The increase in local capacity
    - o The cost-effectiveness of the housing
    - o The effect on local housing needs and quality

Location: Residence of Martha Bear Quiver and Family
Northern Cheyenne Reservation, Montana

Contact: Martha Bear Quiver (406-592-3636)

On January 23, 2003 at about 3:30 p.m. Rodney McDonald met with Martha Bear Quiver in her home on the Northern Cheyenne Indian Reservation in South Eastern Montana.

Martha Bear Quiver, her husband Curtis and their four children were living in a small HUD home rental unit and discovered the straw bale construction method during a trip to the neighbouring Crow reservation, where they toured an earlier Red Feather Development project, the home of Peggy White. Martha and Curtis procured a mortgage through the USDA and Red Feather along with its partners built the first 4-bedroom, 2-bath home to date. Martha Bear Quiver and family are the owners of the Northern Cheyenne Nation's first straw bale home. (Red Feather web site.)

The Bear Quiver home was completed in July 2001.

Straw Bales

- What type of straw was used? Why?
    - Contact Robert Young (Red Feather)
    - 3-string bales
- How were the bales sourced?
    - Contact Robert
- Where are they from (how many miles from the building)? Who harvested the material?
    - The bales are from Washington State. Could not locate bales in Montana. A number of bales in Montana are round bales and thus not suitable for building.
    - The bales used in a home on the crow reservation (the home that inspired Martha) are 2 string bales from a local rancher.
- Who located the bales and coordinated their delivery to the building site?
    - Robert Young
- How were the bales transported?
    - Semi tailor.
- Were the bales specially designed or sized for building?
    - No. Regular bales.
- How many bales were required for the structure?

- About 300. There are extras, which were going to use to build a garage but which may now not be suitable for building because of age and having gotten wet.

Preparation

- Was preparation of the bales required? If so, what / how?
  - No preparation was required prior to construction.
  - Some bales were cut to size where needed.
- Where was the preparation done? By whom?
- When was preparation done?
  - Some of the bales were cut to fit in smaller spaces when needed.
- How were the bales kept dry during construction?
  - The bales arrived after the foundation was ready on or about July 2 2001, 3 or 4 days before the start of construction.
  - Bales were covered with a tarp when delivered and each day after construction. It did not rain during construction.

Design

The objective of the design was to use the space efficiently. The design began in November 2000 and was completed in May 2001. This was the very first time that a homeowner in the community had the opportunity to participate in the design of their home.

- What is the design?
  - 1,600 sq. feet, 4 bedrooms, 2 bathrooms, living room, dining area, kitchen and laundry area. There is also an airlock at the front door.
- Who designed the house/building?
  - House was designed by students at Pennsylvania State University
- Did the homeowner or building user(s) participate in the design?
  - Yes, the homeowner participated in the design of the house. Principally the floor plan for the home. The design went through four iterations; the iterations being the result of deign changes requested by the homeowner. The first design was two bedrooms and the homeowner desired four. The final three iterations were variations of the four-bedroom design, the variation being primarily the layout of the kitchen and primary bathroom.
  - Due to the geographic distance between Martha, Red Feather and the University, there were no face-to-face meetings during the design phase.

Every iteration of the floor plan design was faxed to Martha at her place of work. To provide her feedback, Martha participated in conference calls with Red Feather and a representative from the university or she communicated her preferences to the University via Robert Young of Red Feather. Martha did not meet Robert Young until April 2001 and she did not meet the university professors until they arrived at the building site to begin construction.

- Did the design have to meet any building codes?
    - The design had to meet the standards of Rural Development (part of the US Department of Agriculture). An individual from Rural Development visited the house on the Crow Reservation and spoke with Robert Young.
- Was special consideration given to the characteristics of the site (topography, solar gain)?
    - The first design had the main living spaces on the south side of the house with large sliding glass doors. Martha preferred the front of the house to face north, in the direction of a mountain view.

Martha is very happy with the design of the home. In retrospect she would have included French doors at the back of the home off of the kitchen to a deck and perhaps placed the dining room in a different location (it is close to the bathroom and one of the bedrooms).

Construction

Construction started on the home on or about June 14, 2001 and was completed the last week of July 2001. At the time this was the largest load bearing straw bale home that Red Feather had ever built.

- Who built the house/building?
    - The foundation was poured on or about June 14 by individuals from the Navy and the Northern Cheyenne Housing Authority, who also helped with the decking.
    - The house was built largely with volunteer labour from outside the community.
    - The building crew arrived on July 4, 2001 and the bale walls started going up on July 8, 2001.
    - The labourers during the first week of construction were mostly university students from (Washington State? Penn State?). Red Feather volunteers

took over after. Martha participated in the construction every day she was not working. On days that she had to work she would work a half-day and then build in the afternoon and the early evening.

- There was not much participation in the construction of the home by the community. Some members of the community were not comfortable with the non-native volunteers/visitors who came to build the home. Martha has had non-native friends since childhood and attended Washington State University, which largely accounts for her comfort level with the non-native volunteers.
- Her family (husband and two teen-aged children) like the idea of a straw bale house but they often waited for Martha to be at the building site before participating. Martha had hoped her family would have been more involved in the construction of the home.
- The Northern Cheyenne Housing Authority also send people to help with the stucco.

- Did the necessary skills exist in the community?
  - Yes
  - What skills are required?
    - Building with straw bales is low tech. Martha learned by watching and with guidance from the students who had participated on other projects.
  - What **new** skills did the builders require?
    - Knowing how to properly stack the bales and apply the stucco.
- Was there an orientation to building with bales?
    - Not Per se. The students knew what to do when they arrived because many of them had worked on other projects. For those who were new to building with straw bales, help was provided by those with experience.
  - Who conducted the orientation?
  - When? How?
  - Were any printed materials provided?
- Who managed the construction?
  - The construction was managed by Bill Cannon, a Red Feather Volunteer. Bill was also the electrician.

- How long did it take to build the walls? And to build the entire building start to finish?
    - The walls went up in two or three days. The application of the stucco took three days for the exterior side of the bales and three days for the interior side of the bales. There are three layers of stucco on each side and the layers were applied one day per layer. The roof took two days and the remainder of the construction time was allocated to finishing the interior of the home.

An inspector from Rural Development visited the site during construction to ensure that things were done properly and that the applicable standards were being maintained. Bill Parson from the Rural Development Office in Billings.

Structure

- Are the straw bale walls load-bearing or in-fill?
    - Load bearing.
- Are the interior partition walls also straw bale?
    - No. The wall are lumber with a plaster coat similar to the inside of the perimeter walls.
- How are the walls finished (inside and out)?
    - Stucco
- Is there a “truth window”?
    - Yes
- What is the foundation? Is there a basement?
    - Concrete foundation. No basement, just crawlspace.
- What is the flooring material?
    - Carpet and ceramic tile
- What is the roofing material? How is the roof insulated?
    - Metal roof
- How is the house/building heated and cooled?
    -
- How is the electrical and plumbing run trough the walls?
    -

- In addition to the straw bales, are their any other environmental features of the building?
    - Hi efficiency water heater
- Are there any special maintenance requirements?
    - No

Birth of the Initiative

- What led to the decision to build with straw bales?
    - Red Feather helped to build a straw bale home for a family on the neighbouring Crow Reservation. Martha visited this home on the Crow Reservation after reading about it in the Billings Gazette. She liked that the home felt airy, cozy, natural, and that it had lots of windows. She learned that in the summer the house remained cool even thought it was quite hot outside. Martha had not done much research into straw bale homes prior to the construction of her home, but she has since taken an interest and completed a bit of research.
- What support was there from outside the community?
    - Government?
        - Mortgage procured through the USDA
    - Organization?
        - Red Feather, University of Pennsylvania
    - Individual?
        - Volunteer
- How was this been received in the community?
    - What questions did the community members have?
        -
    - If concerns were raised, what were they?
        -
    - Was the community leadership supportive of the idea? OR How did the leadership gain support for the idea?
        -
    - Was this easy or challenging and why?
        -

Comfort

- How does the house/building "feel" overall?
    - The home feels peaceful to her, unlike modular homes. Martha postulates that perhaps because straw bale homes have thicker walls they feel more solid and secure.
- Is the indoor temperature of the house/building comfortable for occupants?
    - Is it warm enough in the winter? (Average outdoor temperature?)
        - The house stays very warm in the winter.
    - Is it cool enough in the summer (Average outdoor temperature?)
        - The house remains cool in the summer (it is not centrally air conditioned).
- Is/was there any odour from the straw? (If there was initially, how long did it last?)
    -

Economics

- What was the cost of the building?
    - Cost of straw bales?
        -
    - Cost of other building materials?
        - Total cost of home (including appliances) was $63,000.00 (not including the cost of transporting the bales).
    - Labour cost?
        - All labour was volunteer.

Martha also considered a modular home (the typical HUD house in her community). All of the models she liked were beyond what she could afford, as they were in the $81,000+ range. The only modular home she could afford (budgeted below) was 1200 square feet (400 square feet smaller than her less expensive straw bale home).

Home:	$56,000.00
Transport and Crane:	$3,100.00
Set-up	$6,800.00
Foundation	$4,750.00
TOTAL	$70,650.00

Also, Martha mentioned that the costs of a stick frame home would have been about $100.00 per square foot ($70,000 for a 700 square foot home – half the size of her straw bale home).

- How was the house or building financed?
    - The land for the home was given to Martha by her brother; the land is not tribally owned. Therefore she was eligible for a loan from an outside source. Martha received a loan from Rural Development (U.S. Department of Agriculture). (She is the first person on her reservation to receive a loan to build a home?) This was the first time that a homeowner in the community received a loan from an outside source for a home. To qualify for the loan Martha had to take classes about home ownership, maintenance and repair. She found these classes very useful. Indian Health Service (HIS) dug the well and installed the sewer and septic. Martha did not have to pay for the costs of this work – paid for by the tribe.
- How expensive is it to heat? How does this compare to other buildings?
    - For the calendar year 2002, the propane bill was $600.00. The propane is used for heating, as well as by the hot water heater, the kitchen stove, and the clothes dryer. When I visited in January Martha had spent $300 since August on propane.
    - Martha spoke with someone in her community who lives in a similar sized (stick frame / modular?) home, who in 2000 spent three times the amount Martha's family did for heating alone (Note: what fuel type?)

Sustainability

- Is this a viable material to build with in your community?
- What is required for acceptance of straw bale building?
- What are the lasting benefits to community members, in terms of new skills?
- What are the benefits to the homeowner/building owner and community?
    - Environmentally
        - The home is environmentally safer
    - Economically
    - Socially
    - Culturally

- What are the disadvantages to the homeowner/building owner and community?
    - Environmentally
    - Economically
    - Socially
    - Culturally

Reflection

- Is this a successful approach to local housing needs?
    -
- Would you encourage First Nation communities in Canada to build with straw bales?
    -
- What advice would you give a First Nation communities who want to build with straw bales?
    -
- What were the successes?
    -
- What were the challenges?
    -
- Has there been a formal evaluation of the successes / failures of this initiative regarding:
    - The use of local materials
    - The sustainability of the use of local materials
    - The use of local labour
    - The increase in local capacity
    - The cost-effectiveness of the housing
    - The effect on local housing needs and quality

Additional Comments

I asked Martha if she was nervous about being the first person in her community to build a straw bale home. She said no. That the home was something she wanted

An article about the home appeared in the July 13, 2001 issue of the Billings Gazette.

I asked Martha, “If you had the opportunity to speak to a First Nation community about straw bales homes, what is the one thing you want to be sure to day?” Martha’s response: “If they are willing to commit volunteer labour to help each other it [building homes with straw bales] is better.”

Location: Crow Agency Study Hall
Crow Indian Reservation, Montana
Contact: Curtis Yarlott (406-784-4505) / Jack Joyce (406-477-8696)

On January 24, 2003 at about 3:30 p.m. Rodney McDonald visited the Crow Agency Study Hall. He met with Curtis Yarlott of St. Labre Indian School and Jack Joyce, the teacher of the students who initiated the project.

The Study Hall began as an idea of four female Native American Crow Indian eight-grade students, who refer to themselves as the Rez Protectors. They are aware of the housing problem in their community and decided to research something they'd heard about – building with straw bales.

The building was being finished during the visit. The application of the stucco to the interior side of the straw bale walls was complete, as was the partition wall and interior ceiling. Electricity had been connected and final connections and testing of sewer and water were in progress.

They built and tested a model of a straw bale wall and then decided that they could demonstrate the benefits of straw bale buildings if they built a building that the community could tour. They won a $25,000 award from a national foundation and with money from two other sources and the help of Red Feather Development Group built the structure.

The building will function as a study hall. It is owned by the Crow Tribe and leased to St. Labre Indian School. The building will be maintained and operated by Little Big Horn College, a tribal community college.

This project is well documented in popular literature. This literature will be used to supplement this report. The literature will also be included in the final report.

Straw Bales

- What type of straw was used? Why?
    - Wheat. Rice also works.

- How were the bales sourced?
- Where are they from (how many miles from the building)? Who harvested the material?
    - Washington farmer. Local bales could not be used because the required bale format and baler is not existent locally.
- Who located the bales and coordinated their delivery to the building site?
    - Red Feather
- How were the bales transported?
    - Semi-trailer
- Were the bales specially designed or sized for building?
    - No
- How many bales were required for the structure?
    - Ask Robert Young

Preparation

- Was preparation of the bales required? If so, what / how?
    - Were bales modified in anyway for construction?
        - Only when smaller ones needed for specific spaces.
- Where was the preparation done? By whom?
    - On site.
- When was preparation done?
    - As needed.
- How were the bales kept dry during construction?
    - Tarps

Design

- Who designed the house/building?
    - University of Washington
    - Contact: Sergio Palleroni, Dept of Architecture, U Washington (206-543-2018)
- Did the homeowner or building user(s) participate in the design?
    - The students had input into the design, including interior colours and finishes.
- Did the design have to meet any building codes?

  - No, because the structure on the Reservation. The plumbing, wiring and roof system are designed to meet existing codes elsewhere. The sewer and gas were inspected for code by the Crow Housing Authority
- Was special consideration given to the characteristics of the site (topography, solar gain)?
  - No

Construction

- Who built the house/building?
  - Volunteers from all over the county with guidance from the University.
- Did the necessary skills exist in the community?
  - The project did not attract many members of the Crow Reservation. Not sure why.
    - What skills are required?
    - What **new** skills did the builders require?
- Was there an orientation to building with bales?
  - Every day there was a meeting at the start to go over things with the builders. It was a learn by doing process. Group leaders were those individuals who had done this before.
- Who managed the construction?
  - University of Washington and Red Feather
- How long did it take to build the walls? And to build the entire building start to finish?
  - 2 days to stack the bales.
  - 3 weeks to complete the entire building
  - Time has to be allowed between coats of stucco

Structure

- Are the straw bale walls load-bearing or in-fill?
  - Load bearing
- Are the interior partition walls also straw bale?
  - 2x4 studs with wonder board and finished with same stucco used for bale walls
- How are the walls finished (inside and out)?
  - Stucco
- Is there a “truth window”?

  - Yes
- What is the foundation? Is there a basement?
  - Concrete walls. Aggregate floor. Crawl space.
- What is the flooring material?
  - Carpet and ceramic tile
- What is the roofing material? How is the roof insulated?
  - Metal
- How is the house/building heated and cooled?
  - Radiant floor hot water heating. No cooling.
- How is the electrical and plumbing run trough the walls?
  -
- In addition to the straw bales, are there any other environmental features of the building?
  - No
- Are there any special maintenance requirements?
  - Make sure exterior remains sealed. Must seal cracks.
  - Nothing for the interior.

Birth of the Initiative

- What led to the decision to build with straw bales?
  - Team of four eight-grade students wanted to confirm or dispel the conjecture about building with straw bales. They built a test wall and were then encouraged to submit their project to a national award foundation.
- What support was there from outside the community?
  - Government?
  - Organization?
    - Columbus Foundation
    - Red Feather
    - Westmoreland Resources
    - Oprah Winfrey's Miracle Network
    - Schoolkit International
  - Individual?
    - Students' teacher
- How was this been received in the community?
    - Building open officially on February 4, 2003

        - One indicator is that most empty buildings in the community are vandalized. This building has remained empty, and will be until after the official opening, and yet it has not been vandalized.
    - What questions did the community members have?
    - If concerns were raised, what were they?
    - Was the community leadership supportive of the idea? OR How did the leadership gain support for the idea?
    - Was this easy or challenging and why?

Comfort

- How does the house/building "feel" overall?
- Is the indoor temperature of the house/building comfortable for occupants?
    - Is it warm enough in the winter? (Average outdoor temperature?)
    - Is it cool enough in the summer (Average outdoor temperature?)
- Is/was there any odour from the straw? (If there was initially, how long did it last?)

Economics

- What was the cost of the building?
    - Cost of straw bales?
    - Cost of other building materials?
        - $47,000
        - Roof was donated
        - Heating system donated
    - Labour cost?
- How was the house or building financed?
    - $75,000 budget.
        - $25,000 from Oprah Winfrey's Miracle Network
        - $25,000 from Christopher Columbus Foundation
        - $25,000 from Westmoreland Resources
- How expensive is it to heat? How does this compare to other buildings?
    - Expectations are that heating costs will be low.

Sustainability

- Is this a viable material to build with in your community?

- o
- What is required for acceptance of straw bale building?
  - o
- What are the lasting benefits to community members, in terms of new skills?
  - o
- What are the benefits to the homeowner/building owner and community?
  - o Environmentally
  - o Economically
  - o Socially
  - o Culturally
- What are the disadvantages to the homeowner/building owner and community?
  - o Environmentally
  - o Economically
  - o Socially
  - o Culturally

Reflection

- Is this a successful approach to local housing needs?
- Would you encourage First Nation communities in Canada to build with straw bales?
  - o Jack Joyce: “Build one and become involved. The real beauty is that these houses pay for themselves in terms of efficiency to heat.”
  - o Having the community involved in building the structure provides a sense of ownership.
- What advice would you give a First Nation communities who want to build with straw bales?
- What were the successes?
- What were the challenges?
- Has there been a formal evaluation of the successes / failures of this initiative regarding:
  - o The use of local materials
  - o The sustainability of the use of local materials
  - o The use of local labour
  - o The increase in local capacity
  - o The cost-effectiveness of the housing

- The effect on local housing needs and quality

7.0 Local Materials: Comparison of Prototype Straw Bale Designs

PENNSTATE 1855 The American Indian Housing Initiative

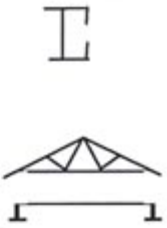
Prototype 1: May 1999 - Crow Reservation, MT

Plan	**Cost**
load bearing walls	$35,000 Total cost
interior framed walls	$28/SF Material cost
	24% Contracted work
Section	**Schedule**
1.5 Story	27 Day shell and core
28' Span trusses	15% Semi skilled labor
	85% Skilled labor

Prototype 2: July 2000 - Lakota Reservation, SD

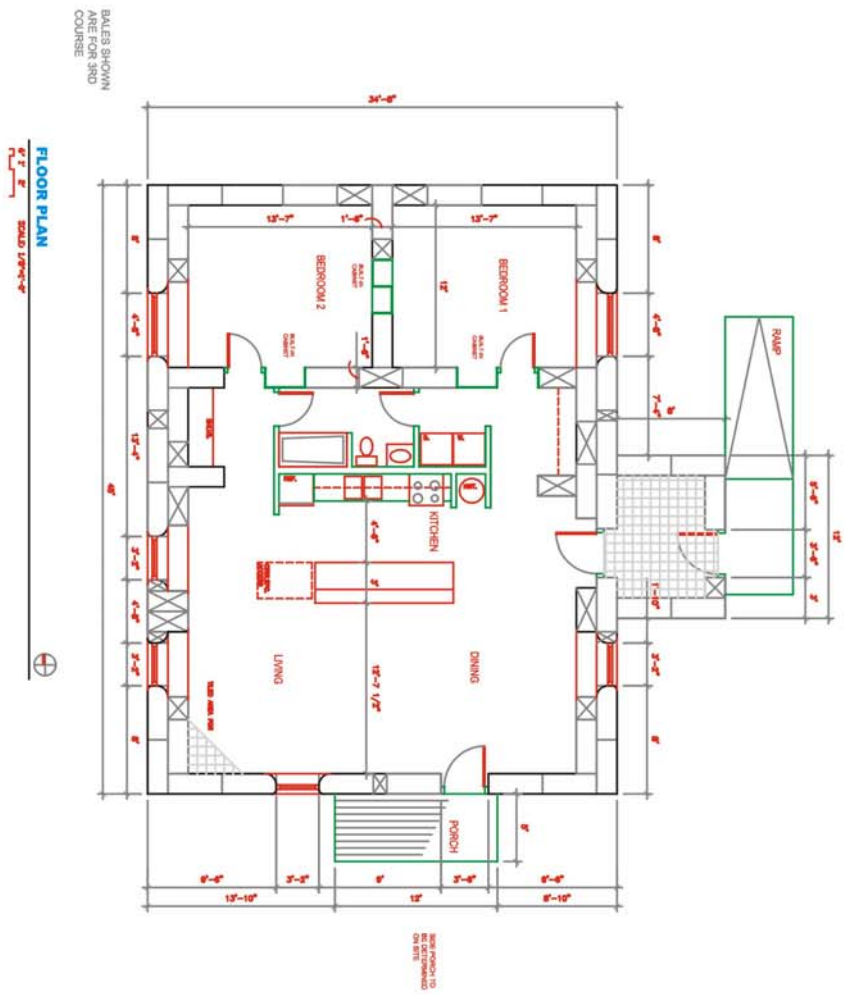
Plan	**Cost**
load bearing walls	$40,000 Total cost
interior utility core	$30/SF Material cost
interior straw wall	17% Contracted work
Section	**Schedule**
1 Story	14 Day shell and core
32' Span trusses	35% Semi skilled labor
	65% Skilled labor

Prototype 3: July 2001 - Northern Cheyenne Reservation, MT



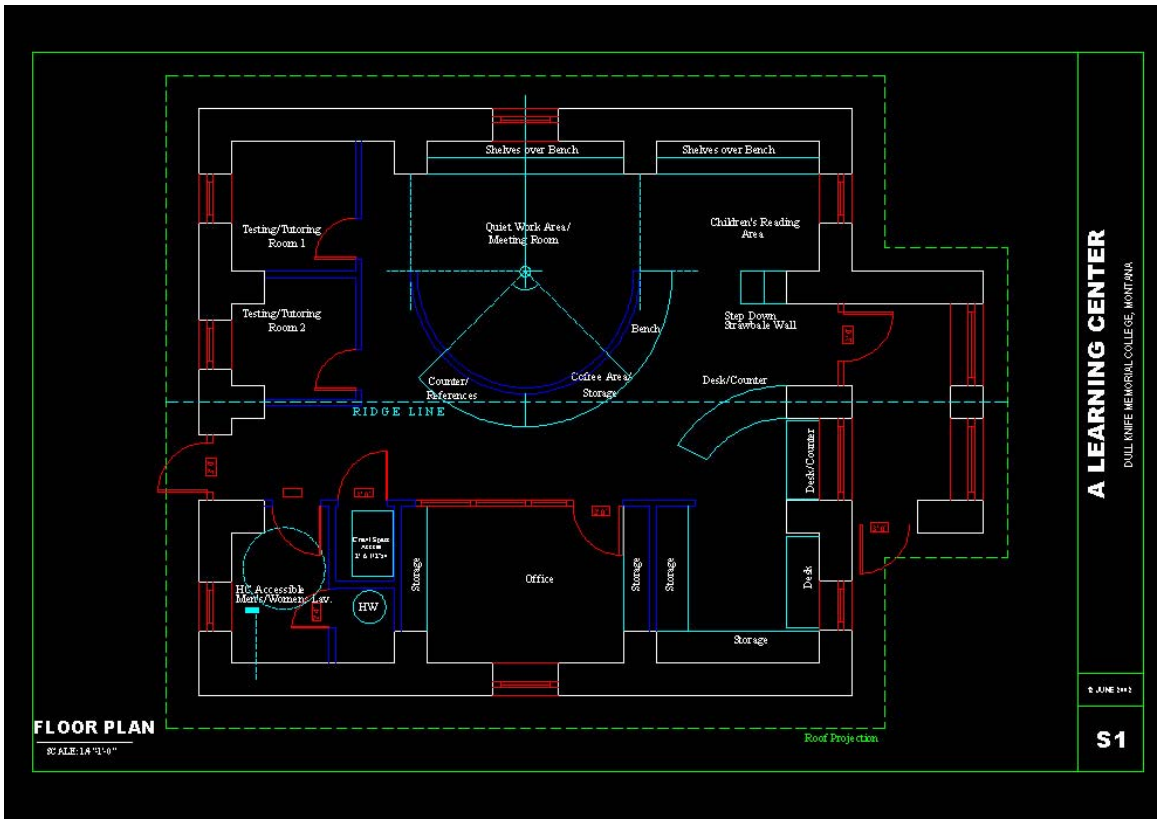
Plan	**Cost**
load bearing walls	$63,000 Total cost
interior utility core	$45/SF Material cost
interior straw walls	16% Contracted work
Section	**Schedule**
1 Story	21 Day shell and core
36' Span trusses	38% Semi skilled labor
	62% Skilled labor

8.0 Local Materials: Straw Bale House Prototype Design, version 2



S3 | JULY 2000 | **STRAW BALE HOUSE PROTOTYPE, VERSION 2** | PINE RIDGE, SOUTH DAKOTA | UW UNIVERSITY OF WASHINGTON | STRAWBALE DESIGN BUILD SUMMER 2000

9.0 Local Materials: Northern Cheyenne Literacy Centre Floor Plan


Shelves over Bench
Shelves over Bench
Testing/Tutoring Room 1
Quiet Work Area/ Meeting Room
Children's Reading Area
Testing/Tutoring Room 2
Bench
Step Down Strawbale Wall
Counter/ References
Coffee Area/ Storage
Desk/Counter
RIDGE LINE
Desk/Counter
Office
Storage
Storage
Storage
Desk
Storage
HW
Roof Projection
A LEARNING CENTER
DULL KNIFE MEMORIAL COLLEGE, MONTANA
FLOOR PLAN
S1

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