



DESIGNING SUSTAINABLE HOUSING FOR ABORIGINALS IN CANADA

CONCEPTION DE LOGEMENT DURABLE POUR LES AUTOCHTONES AU CANADA

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FORMERLY FGMDA

Housing units designed in 18 Inuit and First Nations communities across Canada ; from Waswanipi (Eeyou Istchee), Quebec up to Ikaluktutiak (Cambridge Bay) Nunavut



- 01 Akulivik
- 02 Aupaluk
- 03 Inukjuak
- 04 Ivujivik
- 05 Kangiqsualujuaq
- 06 Kangiqsujuaq
- 07 Kangirsuk
- 08 Kuujuaq
- 09 Whapmagoostui / Kuujuarapik
- 10 Puvirnituk
- 11 Quaqtak
- 12 Salluit
- 13 Tasiujaq
- 14 Umiujaq
- 15 Waswanipi
- 16 Ikaluktutiak (Cambridge Bay)
- 17 Iqaluit
- 18 Nain

More than 12 housing models designed; Over 500 built Housing units



Nunatsiavut Pilot House ; 6 plex - 2 bdrms



Nunavik Pilot House ; 2 plex - 2 bdrms



Nunavik ; 4 plex - 1 bdrm



CHARS ; 3 plex - 4 bdrms



Single Family Home ; 5 bdrms



KRG ; 4 plex - Row House - 2 bdrms



Nunavik ; 2 plex - 2 bdrms



Almiq ; 8 plex - 1 & 2 bdrms



E-Gloo Single Family Home ; 3 bdrms

Sustainable Building Design must strive to achieve more than simple energy efficiency. Protection of cultural diversity is as important as protection of the environment, if not more so

Sustainability is usually addressed only in terms of technical issues related to energy efficiency, green design, bioclimatic design, etc.

For Inuit and First Nations, Sustainable Building Design has the responsibility to go one step further and to support cultural reappropriation and empowerment.

Nunatsiavut Pilot House ; 6 plex - 2 bdrms

2014-2017

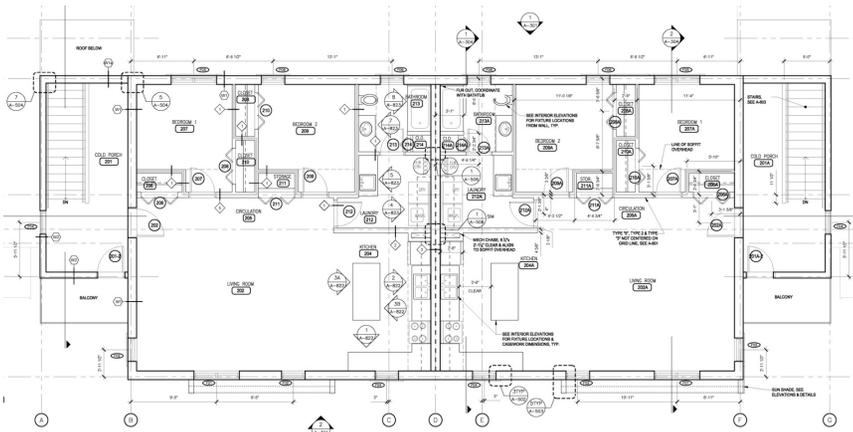
The project was launched by the Nunatsiavut Government: Sustainable Communities Initiative. as part of an integrated action plan for healthy homes in thriving Nunatsiavut Communities

The objectives were outlined in the “InosiKatigeKagiamik Illumi” (Healthy homes in Nunatsiavut) project.

- To inform best practices and provide guidance for community sustainability in Nunatsiavut under changing climatic and environmental conditions
- Build a pilot housing project employing best practices in energy efficient sustainable northern housing
- Create a culturally relevant multi-unit housing design that is shaped by the needs and preferences of the Nunatsiavummiut
- Monitor the completed project charting building costs, energy use and resident satisfaction
- Use the findings to develop new, affordable replicable housing designs



The design process : the story



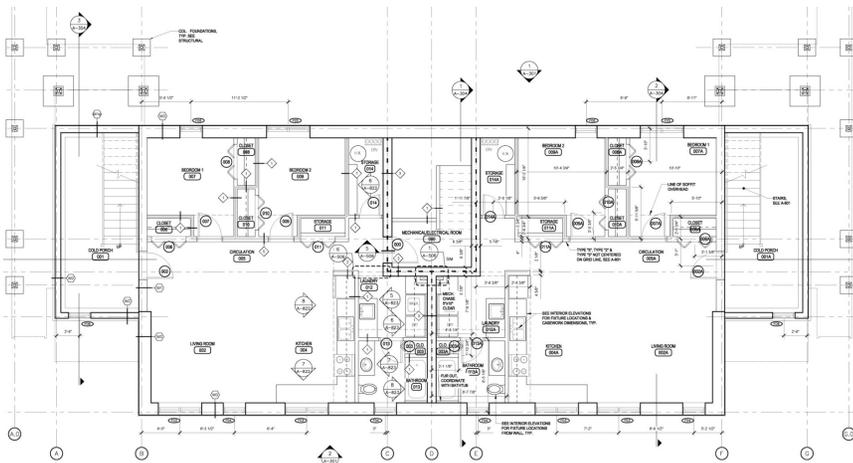
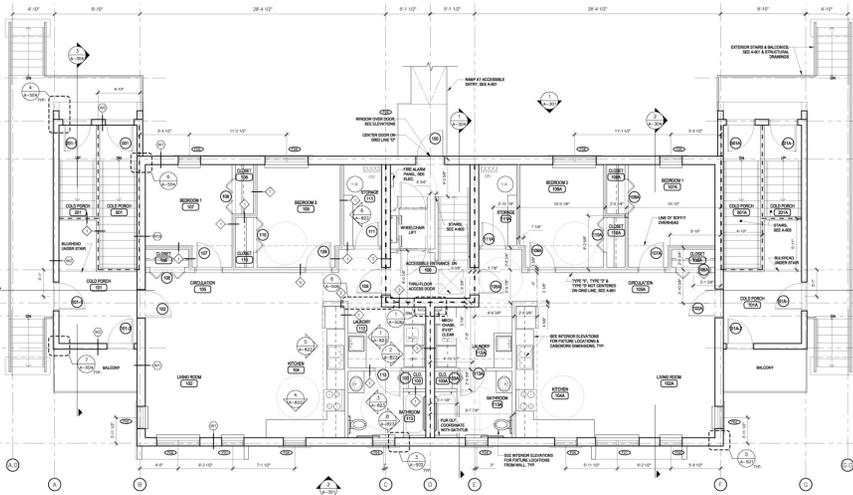
The Nunatsiavut Government: Sustainable Communities Initiative, team planned to allow maximum community participation (3 day Housing Design Charette)

Some participation was unexpected (during the housing risk assessment)

Some additional participation was solicited (second housing design charette)

As a result multiple design iterations were developed

Went much beyond simple Consultation, true Dialog was achieved.



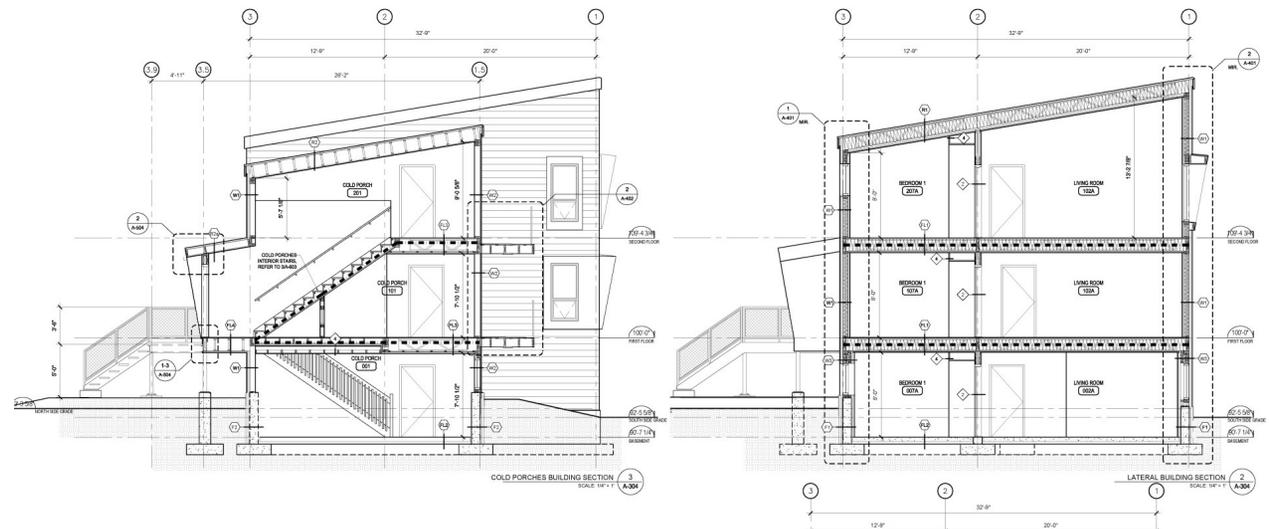
Elders and young people were identified as the groups within the community with the greatest housing need

SOCIAL/CULTURAL ISSUES – PARTICIPANTS RECOMMENDATIONS

- * An open concept design for the living room/dining room/kitchen area
- * More lighting in the living room as this is where people sew
- * Providing some privacy for bedrooms through the use of an indirect connection to the living area
- * Private entrances for each apartment
- * The design of staircases that do not allow views into other peoples' apartments
- * Entrance porches built as 'warm spaces' for household equipment storage
- * Large pantries for the storage of bulk food
- * A kitchen with adequate counter space and a double sink
- * A separate laundry room/area.
- * Larger bedrooms that would allow doubling up
- * Larger bathrooms that do not 'feel claustrophobic'.
- * A utility/service room for cleaning and maintenance
- * Outdoor storage sheds for the storage of outdoor gear

TECHNICAL ISSUES – PARTICIPANTS RECOMMENDATIONS

- * Common heating systems and individual controls in each unit
- * The issue of fire and the potential for fire to spread from one unit to another.
- * The issue of sound transmission and that this be carefully addressed
- * The need/importance of larger porches and for more storage space
- * A wood stove as a heating option
- * Carrying out a snow/wind study to ensure that snow drifting is considered
- * Addressing the foundation issue and noting that while the concept of heating crawlspaces has not provided adequate frost protection, it has provided a needed storage area that is used in many homes
- * Maximizing energy efficiency
- * Maximizing solar heat gains by proper building orientation and the installation of lots of good quality windows for day lighting and a connection to the outdoors



Construction; location: Nain

Scheduled to start during the summer of 2016 and be completed over the winter of 2017

Post-Construction: Monitor the completed project charting building costs, energy use and resident satisfaction.

Resident satisfaction will be studied by way of interviews to compare wellness in their current housing with wellness in their new home.



Nunavik Pilot House ; 2 plex - 2 bdrms

2012-2016

The Société d'habitation du Québec (SHQ), Quebec's Housing Agency, launched the project to design a new and improved 2 bedroom duplex for residents of Nunavik (Quebec).

Overarching objectives set out for the new Duplex were:

- Culturally responsive

- Foundation design better adapted to climate change and preservation of the tundra

- A level of energy efficiency equal to or close to the Passiv House standard

- Improving aerodynamics to reduce wind resistance and the ensuing heat loss.

Nunavik agencies involved in the steering committee were:

- Kativik Municipal Housing Bureau (KMHB)

- Kativik Regional Government (KRG)

- Makivik Corporation



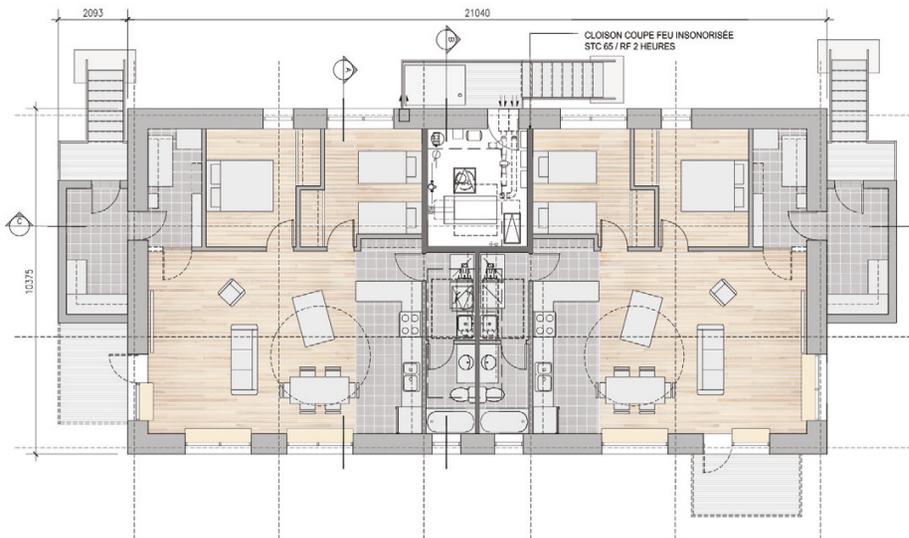
The design process : the story

The Société d'habitation du Québec (SHQ), the Kativik Municipal Housing Bureau (KMHB), the Kativik Regional Government (KRG) and the Makivik Corporation invited a large group of community stakeholders from around Nunavik to participate in a 2 day Housing Design Charette.

The outcome was a report listing, illustrating and explaining the expectations of the various stakeholders.

This report and the overarching objectives were handed over to the architects commissioned to develop the plans and specifications.

The final iteration of the design was submitted to a select few community stakeholders for comments, all of which were positive and supportive.



SOCIAL/CULTURAL ISSUES – PARTICIPANTS RECOMMENDATIONS

Unit should be on one-level for better overall accessibility and interaction.

Large cold and warm porches to allow storage of large traditional gear, butchered animal parts, etc.

Large open, central, living-dining-kitchen to allow for traditional gatherings, eating “country food” on the floor, etc.

Kitchen is equipped with mobile island counter to enlarge open space when required
Kitchen is equipped with high density polyethylene panels that can be laid out on floor as cutting boards.

Dual purpose second exit, even if not required by code, the balcony can be used for short summer BBQ's

Larger circulation spaces, stairs, corridors, etc.

Increase soundproofing between rooms.

Increase storage space, locked cabinet for hunting rifles and ammunition
Create storage space in attic space made available through use of “arctic roof”.

Separate laundry room with a sink.

More heavy duty finishes, kitchen counters, floor finishes and bathroom finishes.

Individual exterior entrances should be spaced as far apart as possible to preserve intimacy.

Large South-facing windows and openable windows to allow cross ventilation.

TECHNICAL ISSUES – SHQ and STEERING COMMITTEE OBJECTIVES

Foundation design better adapted to climate change and preservation of the tundra
Piles were used

A level of energy efficiency equal to or close to the Passiv House standard

Heating 15 kWh/m².year or max load 10W/m²

Air tightness; < than 0.6 AC at 50Pa

Annual Energy Consumption: < than 120kWh/m² per year

Building Envelop performance: < than 0.15 W/m²K with no thermal bridges

Windows, triple pane, UG: < than 0.8W/m²K g value (glass SHGC) more than 50%

Mechanical ventilation with a minimum of 75% of heat recovery

Achieved:

Maximize passive solar energy (large South-facing windows)

High level of airtightness

High level of insulation (roof, R 59.14/RSI 10.34); (walls, R 54.18/RSI 9.556); (floor R57.58/ RSI10.155)

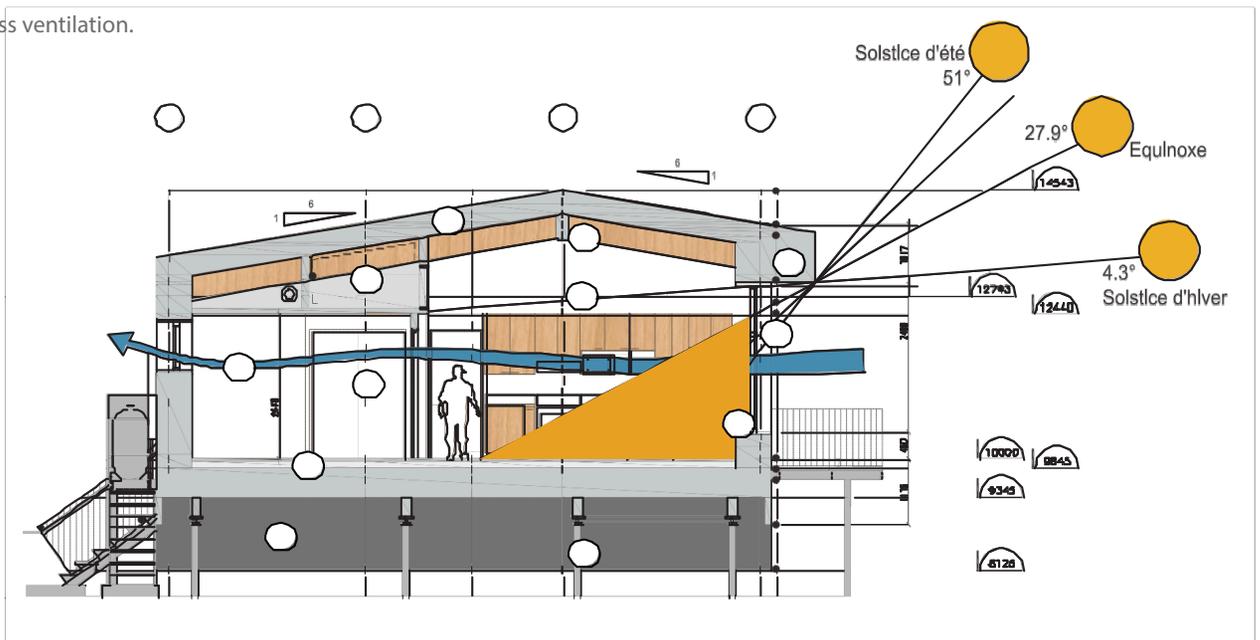
High performance doors and windows (RSI 1.760 and 1.230)

Glycol Boiler, connected to hot-water heater

2 high efficiency (85%)Heat Recovery Ventilators (HRV)

Pre-heating of exterior air intake

Improving aerodynamics to reduce wind resistance and the ensuing heat loss.



Construction (by Makivik Corporation):

Location: Quaqaq, Ungava Bay coast

Start summer 2015

Delivered early winter 2016



Post-Construction:

Two families on the housing waiting list are to move in as soon as possible

An exemplary breakthrough in monitoring strategy

A very comprehensive, remote monitoring program was set in place. (17) variables will be monitored;

electricity consumption

heating oil consumption

HRV °T output

Return air °T at HRV,

Humidity level of return air at HRV

CO2 level

General °T level

Window and door opening detectors

Frequency of use of dryer,

Frequency of use of kitchen and bathroom exhausts,

°T of water in water tank,

°T of hot water,

°T of water in sewage tank,

Volume of water delivered,

Volume of hot water produced and volume of sewage removed)

Monitor the completed project charting building costs, and resident satisfaction

Resident satisfaction will be studied by way of interviews to compare wellness in their current housing with wellness in their new home





MEEGWETCH
NAKURMIK
MERCI
THANK YOU