HOUSING RESEARCH REPORT

Case Studies for the Design of Affordable, Adaptable and Resilient MURBs for Indigenous Communities

Canada

CMHC SCHL

This study was conducted for Canada Mortgage and Housing Corporation (CMHC) under Part IX of the National Housing Act. The analysis, interpretations and recommendations are those of the consultant and do not necessarily reflect the views of CMHC.

Case Studies for the Design of Affordable, Adaptable and Resilient MURBs for Indigenous Communities

March, 2019

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Introduction

The intent of this project was to identify case studies on the topic of multi-family housing for indigenous communities showing a range of technologies and practices that can be applied to achieving high performing and culturally/lifestyle appropriate housing.

Place of Hidden Waters, Puyallup Nation Tribe
Tacoma, Washington (Photo Credit:Tucker English)

In all, eleven projects were selected to profile from a group of diverse projects reviewed in Canada and the United States. They were selected based on the replicability and applicability of their practices, technologies, strategies and philosophies to other communities. This included green building features, community engagement processes, design excellence, cultural sensitivity, and for addressing broader community needs, such as social inclusion, training and employment. The projects were selected to show a range of project types, including rental and homeownership projects, and prototype demonstration projects. Importantly, each project was reviewed for its comprehensive approach and its potential to educate and inspire other communities.

Overview of Projects

When sustainable housing is implemented within indigenous communities, the result can be healthier, more energy-efficient, and climatically appropriate housing stock that often incorporates strong cultural and historic design elements of significance to indigenous peoples. The 11 projects featured exemplify this emerging transformation in housing for indigenous peoples. They not only employ sustainable technologies and materials—low-flow plumbing fixtures, photovoltaic panels, structurally insulated panels, storm water retention, and clustered housing plans—but also establish abiding connections to heritage, culture, and the natural world.

The best practices that emerge from these case studies point to innovative ways that indigenous housing providers are using housing improvement, including green housing, to overcome challenges related to funding, infrastructure capacity, loss of cultural traditions, and economic development. Many of the project teams approached their housing developments holistically—incorporating meaningful community engagement during the design process, reaching out to establish partnerships and collaborations that later proved critical to project success, and solving complex challenges ranging from site planning to financing and tribal employment.

The projects identified through this research can be viewed as part of two groups each of which had opposite attitudes towards innovation. For some communities, innovation was pushed to its limits. The projects developed were thus used to test a large number of new building technologies and new energy efficiency technologies. On the other hand, some communities voluntarily sought low-tech solutions favouring passive design strategies and local jobs in all of the construction process. Both approaches yielded good results when aligned with the communities' resources and capabilities. Unfortunately some experiments with elaborate and complex energy efficiency technologies tended to be unfruitful and increased construction cost.

Findings

Many best practices emerged from this research, helping to show the innovative ways that indigenous housing providers are overcoming challenges including funding, infrastructure capacity, loss of cultural traditions, and economic development. In particular, many featured teams approached housing development in a holistic manner—incorporating meaningful community engagement during the design process, reaching out to establish partnerships and collaborations that later proved critical for success, and solving complex challenges, from site planning to financing and tribal employment.

The projects showcased here demonstrate that high-quality housing from within indigenous communities can be a catalytic force providing hope and strength in

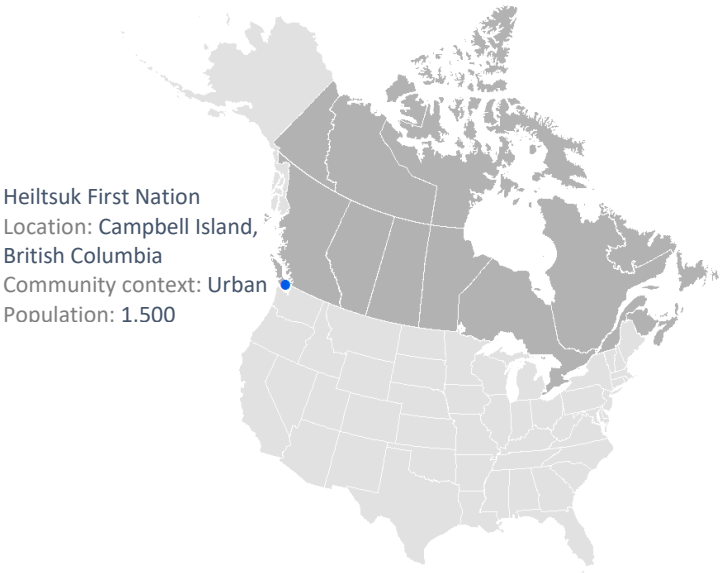
sometimes desperate conditions. It is hoped that through the dissemination of the case study research, more communities will be inspired to create and deploy strategies to provide their own culturally appropriate and environmentally responsible housing.

Note that the following profiles are deliberately brief as more extensive information on each project can be found at the sources provided. Rather than repeat already published materials, links are provided to the web site locations where more information can be found.

HEILTSUK FIRST NATION BELLA BELLA STAFF HOUSING COMPLEX

Stacked modules form the six staff housing units
Photo Credit: Mobius Architecture

The Bella Bella Passive House[1] is a six unit, two-storey, attached townhome project. The project was constructed of prefabricated modules approximately thirty-two feet long and 14 feet wide.



Project Information

Location: Campbell Island, British Columbia
Completion: 2015
Units: 6

Project Participants:

Client/Developer: Heiltsuk First Nation
Partners: Vancouver Coastal Health Authority (VCHA)
Architect: Mobius Architecture
Structural Engineer: CanStruct Engineering Group
Electrical Engineer: Opal Engineering
Passive House Consultant: Red DoorEnergy
Building Envelope: RDH Building Science
Contractor: Spani Developments
Modular Manufacturer: Britco
Cost: $2.6M

Details:

https://www.ecohome.net/guides/1115/multi-unit-passive-house-for-heiltsuk-first-nation-in-british-columbia/

https://www.passivehousecanada.com/projects/bella-bella-passive-house/

[1] Passive house: https://passivehouse.com/

DEVINE LEGACY

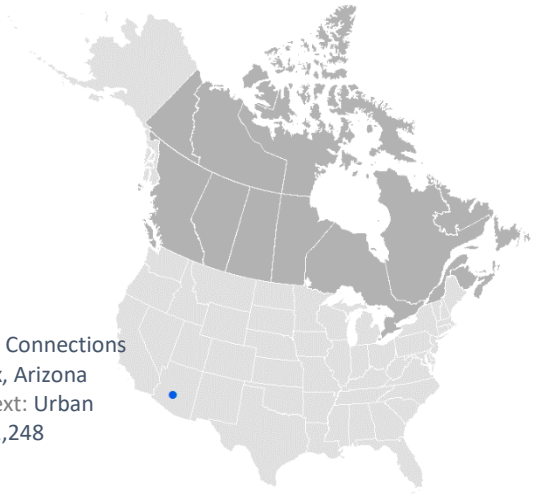
Design is based on the culture of the ancient Hohokam
Photo Credit: Perlman Architects of Arizona

Devine Legacy is a mixed-income, transit-oriented affordable housing development in Phoenix, Arizona. Developed by Native American Connections, a non-profit corporation to serve the urban Indian population of Phoenix, it contains seven different unit types, including townhomes lofts and flats. The site is strategically located for residents to gain access to work and school, with a light-rail station located one-half block away and the downtown core is less than 3 miles to the south.

Project Information

Location: Phoenix, Arizona
Completion: 2011
Number of Units: 65

Construction Cost: $11.1M USD
Cost per Unit: Varies: $160,000 USD Avg.
Cost per m^2: $1,566 USD
Cost per sq. ft.: $145 USD



<u>Project Participants</u>
Client/Developer: Native American Connections
Architect: Perlman Architects of Arizona
Design Architect: Pyatok Architects
Contractor: Adolfson & Peterson Construction
Syndicator: National Equity Fund
Financial Partners: City of Phoenix, Arizona Department of Housing, Federal Home Loan Bank, U.S. Department of Housing and Urban Development (HUD)
Partners: Arizona State University Stardust Center, Daniel Glenn

Details:

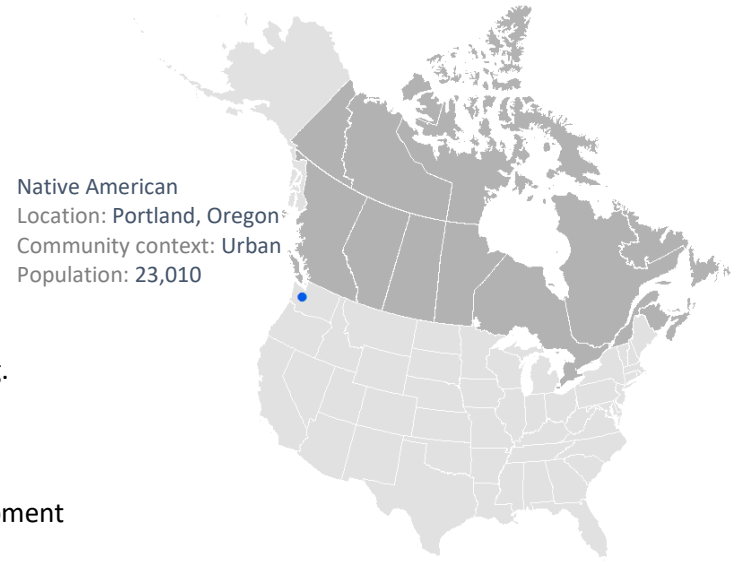
http://www.huduser.gov/portal/Publications/pdf/SCIC_Best_Practices.pdf

KAH SAN CHAKO HAWS

Kah San Chako Haws ('East House' in Chinook) is a modular multi-family affordable housing project. It has 3 two bedroom, 3 one bedroom, and 3 studio apartments. The project was constructed with 15 factory-built modules. NAYA Family Center, a Native American social service non-profit organization, is the owner of the project. The goal of Kah San Chako Haws was to set the stage for a new generation of affordable housing that costs less to build, is more quickly erected, has higher quality, improved unit design, and, reduced environmental impact.

Kah San Chako Haws nine-unit apartment building
Photo Credit: Emmons Modular

Project Information



Location:	Portland, Oregon
Completion:	2013
Number of Units:	9
Construction Cost	$1.7M USD
Cost per Unit	Varies: $204,572 USD Avg.

Project Participants
Client: Native American Youth and Family Center
Developer: Guardian Affordable Housing Development
Architect: Emmons Modular
Structural Engineer: Tornberg Consulting
Contractor: Walsh Construction
Green Consultant: Earth Advantage
Civil Engineer: MGH Associates
Modular Manufacturer: Blazer Industries
Development Consultant: Guardian Real Estate Services
Financial Partners: Portland Housing Bureau, Meyer Memorial Trust, Capital Pacific Bank, US Department of Housing and Urban Development (HUD), Home Forward, State of Oregon

Details:

https://www.huduser.gov/portal/Publications/pdf/CaseStudy_Naya_scinic.pdf

OHKAY OWINGEH PUEBLO OWE'NEH BUPINGEH REHABILITATION PROJECT

Home accesses from plaza
Photo Credit: Atkin Olshin Scade Architects

Owe'neh Bupingeh is composed of four plazas, which were once surrounded by several hundred homes. Most of the units had been abandoned by 2005 due to poor condition. This multi-phased renewal project, completed in 2013, balanced rehabilitation with renovations of the homes, permitting contemporary life and cultural traditions to comfortably coexist and allowed families to return to the sacred core of the Pueblo.

Ohkay Owingeh Pueblo
Location: Ohkay Owingeh, New Mexico
Community context: Remote
Population: 6,309

Project Information

Location**:** Ohkay Owingeh, New Mexico
Completion: 2013
Number of Units**:** 29
Construction Cost: $5.1M USD
Cost Per Unit : $175,000 USD
Cost per m^2 : Phase I: $1,242 USD Phase II: $1,436 USD
Cost per sq. ft**.** Phase I: $115 USD | Phase II: $133 USD

Project Participants
Client/Developer: Ohkay Owingeh
Developer: Ohkay Owingeh Housing Authority
Architect: Atkin Olshin Scade Architects
Contractor: Avanyu General Contracting, Inc.
Development Consultant: Concept Consulting Group Partners
Partners: U.S. Department of Housing and Urban Development (HUD) Office of Native America Program, Chamiza Foundation, National Park Service, New Mexico (NM) Mortgage Finance Authority, NM Historic Preservation Division, McCune Charitable Foundation, National Trust for Historic Preservation

Details:

http://www.huduser.gov/portal/Publications/pdf/SCIC_Best_Practices.pdf

PLEASANT POINT PASSAMAQUODDY TRIBE KIKUNOL HOUSING

The Kikunol housing project is located in Pleasant Point at the northeastern tip of the United States. The Passamaquoddy people have inhabited this historic area for thousands of years. In the form of a semicircle, the site plan references traditional gathering protocols. The 17 multifamily homes were designed to blend with a wooded landscape and to honor symbols and shapes that are part of the Passamaquoddy heritage.

Maximum solar gain and exposure
Photo Credit: Design Group Collaborative

Pleasant Point Passamaquoddy Tribe
Location: Pleasant Point, Maine
Community context: Remote
Population: 749

Project Information

Location: Pleasant Point, Maine
Number of Units: 17
Construction Cost: USD $4.45M
Cost Per Unit: USD $82,000 - USD $177,000
Cost per m^2: USD $1,361
Cost per sq. ft.: USD $126

Project Participants
Client: Pleasant Point Housing Authority
Developer: Passamaquoddy Tribal Government
Architect: Design Group Collaborative
Contractor: Blaine Casey Contractor and Coastline Homes
Project Engineer: James W. Sewall Company
Project Engineer: Hedefine Engineering & Design
Development Partner: U.S. Department of Housing and Urban Development (HUD)

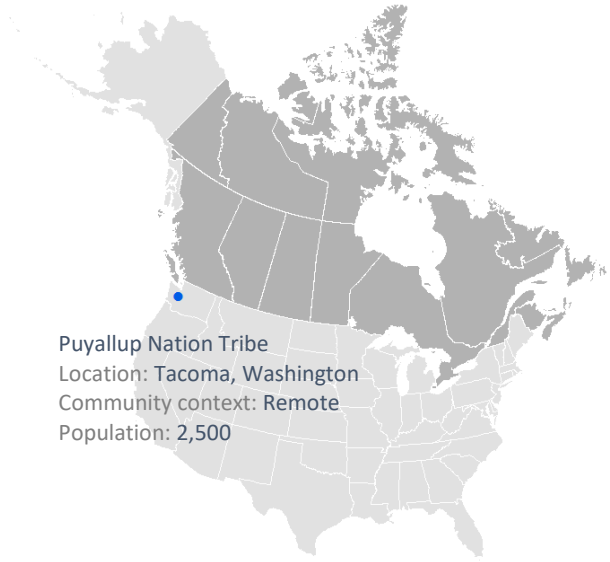
Details:

http://www.huduser.gov/portal/Publications/pdf/SCIC_Best_Practices.pdf

PUYALLUP NATION TRIBE PLACE OF HIDDEN WATERS

Place of Hidden Waters represents culturally and environmentally responsive new housing for the Puyallup Tribe in the Pacific Northwest, one that achieved Leadership in Energy and Environmental Design (LEED) for Homes Platinum certification. The project is located on traditional Puyallup tribal lands on a hill overlooking the Puget Sound tidal flats. The design emulates the rectangular, shed-roofed form of a traditional Coast Salish longhouse, using a variation of the modern townhouse courtyard.

Courtyard
Photo Credit: Tucker English



Project Information

Location: Tacoma, Washington
Completion: 2011
Number of Units: 20
Construction Cost: Phase 1: USD $2.6M | Phase II: USD $2.1M*
Cost per Unit : Phase 1: USD $260,000 | Phase II: USD $210,000*
Cost per m^2: Phase 1: USD $1,793 | Phase II: USD $1,458*
Cost per sq. ft.: Phase 1: USD $166 | Phase II: USD $135*
*Estimated Costs

Project Participants

Client/Developer:	Puyallup Nation Housing Authority
Design Architect:	Daniel Glenn, AIA
Architectural Firm:	Environmental Works
Contractor:	Puyallup Nation Housing Authority and Marpac
Civil Engineer:	Haozous Engineering
Structural Engineer:	Malsam Tsang Engineering Corporation
Landscape Architect:	Thomas Rengstorf and Associates
Partner:	Ecotope

Details:

http://www.huduser.gov/portal/Publications/pdf/SCIC_Best_Practices.pdf

SAUGEEN FIRST NATION SUSTAINABLE HOUSING PILOT PROJECT

Successful approach to self-construction
Photo: Derek Laronde and Saugeen First Nation

The Saugeen First Nation, a rural Ontario community with a population of 725, led the development of an 8 unit energy efficient low-rise social housing project. The project was completed in 2010 after a very short development period. From the time the funding was approved to completion was only 135 days. Using primarily a local labour force, the community is very proud to have met the tight construction schedule. A self-construction method helped meet the deadline and shift community attitudes toward highly energy efficient residential buildings.

Project Information

Location: Near Southampton and the mouth of the Saugeen River, Ontario
Completion: 2010
Number of Units: 8 three bedroom units in one multi-family lodging
Construction Cost: CAD $1.5M
Cost per Unit: Varies: CAD $187,500 Avg.

Project Participants
Client/Developer: Saugeen First Nation
Partners: Sustainable Housing Foundation, various materials manufacturers
Consultants: Four Winds Inc., Aboriginal Building and Construction Services Corp.
Contractor: Self-Construction by the Saugeen First Nation

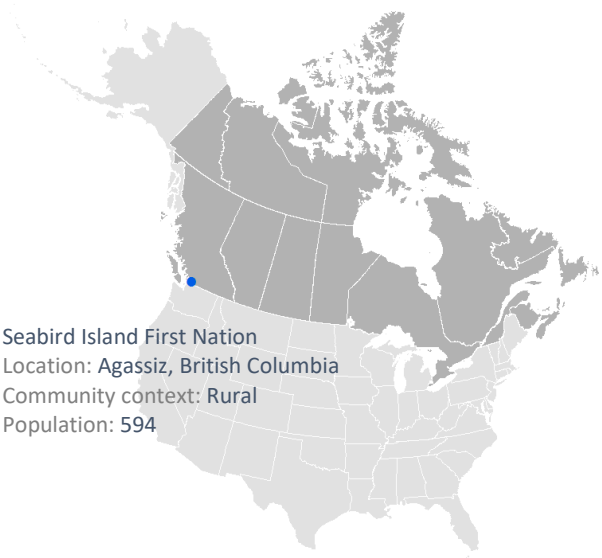
SEABIRD ISLAND FIRST NATION SUSTAINABLE HOUSING DEMONSTRATION PROJECT

Single family unit
Photo: Broadway Architects

In 2002, the Seabird Island First Nation of British Columbia partnered with Canada Mortgage and Housing Corporation's (CMHC) Assisted Housing division and Indian and Northern Affairs Canada (INAC), along with sponsoring suppliers and manufacturers to demonstrate best practices and new approaches to building a small scale, affordable, and sustainable medium-density housing project for the Seabird Island community. Employment and information transfer opportunities for Seabird Island residents were fostered through a "self-construction" delivery model. An important goal of the project was to develop practical and affordable design solutions for First Nations housing that could be transferred to communities across Canada.

Project Information

Location: Eight kilometres north of the community of Agassiz on the Fraser River, BC.
Completion: 2004
Number of Units: 7 two and three bedroom units
Cost per m^2: CAD $1,026 for a single story slab on grade house | CAD $1,296 for the two story finished dwellings
Cost per sq. ft.: CAD $95 for a single story slab on grade house | CAD $120 for the two story finished dwellings



Project Participants

Client/Developer:	Seabird Island First Nation
Partners:	CMHC, INAC, Private sector
Design Architect:	Rob Sieniuc, AIBC
Architectural Firm:	Broadway Architects (Rob Sieniuc + Associates)
Contractor:	Self-Construction by the Seabird Island First Nation

Details:

- ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Archives/CA1_MH_04B77.pdf
- ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/RHT-PenRT/66373.pdf
- https://eppdscrmssa01.blob.core.windows.net/cmhcprodcontainer/sf/project/archive/research_2/e_98_d9_c66_2006.pdf

ST. REGIS MOHAWK TRIBE SUNRISE ACRES PHASE 2

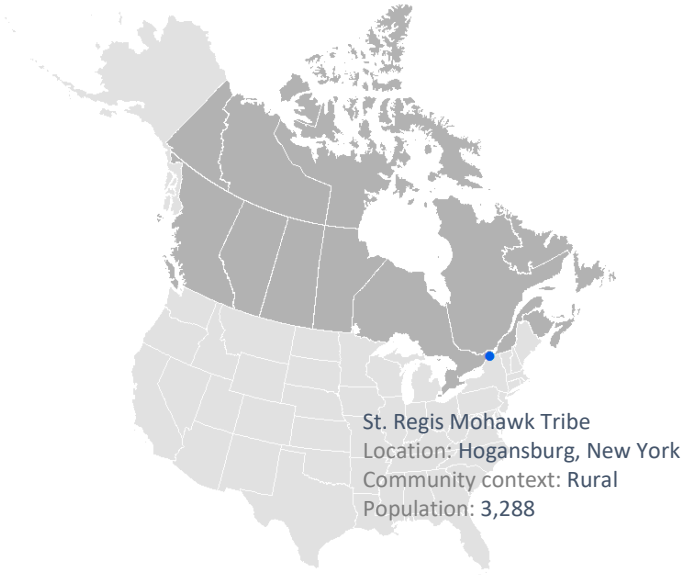
Quad-plexes and PV arrays
Photo: Akwesasne Housing Authority

When the Akwesasne Housing Authority (AHA) in Hogansburg, New York began the second phase of its Sunrise Acres project, an additional 20 units of seniors housing southwest of an existing 20-unit complex, it was interested in sustainability and renewable energy sources, but did not initially have funding to incorporate such features. After AHA was fully immersed in the design phase, new funding allowed for the additional components but presented the challenge of modifying existing plans to integrate sustainable energy systems.

Project Information

Location: Hogansburg, New York
Completion: 2011
Number of Units**:** 5 single-story four unit buildings (20 apartments)

<u>Project Participants</u>
Client: Akwesasne Housing Authority
Partners: US Department of Housing and Urban Development (HUD)
Design Architect: Barry Halperin, AIA
Architectural Firm: Beardsley Design Associates



Details:

https://www.huduser.gov/portal//Publications/pdf/SCIC_Final_Report.pdf

WAGMATCOOK FIRST NATION COMMUNITY PLAN AND HOUSING PILOT PROJECT

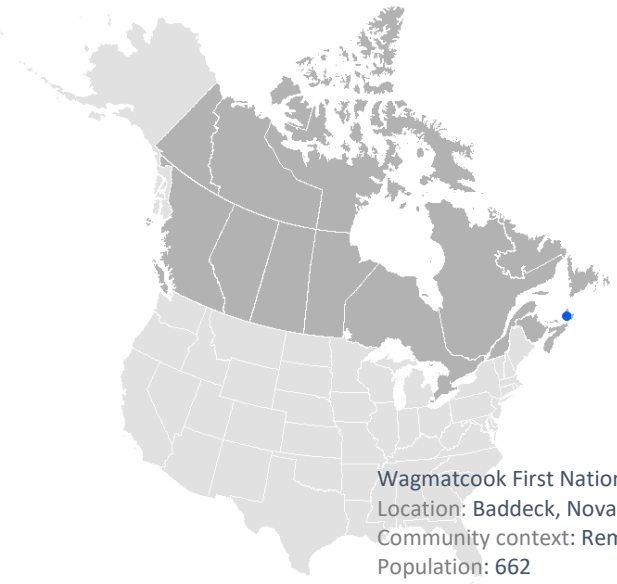
Façade rendering
Image Credit: Cities and Environment Unit (Dalhousie University)

Wagmatcook First Nation of Nova Scotia has had a successful working relationship with the Cities & Environment Unit (CEU) of Dalhousie University for over a decade. CEU worked with the community to produce Wagmatcook's Community Development Plan in 2002 and completed a Plan Update in 2014. Band members identified sustainable housing as a key issue during the planning process. CEU developed a design guideline document to support Wagmatcook with the identification and selection of sustainable building technologies appropriate for a multi-family housing pilot project being planned for the community.

Project Information

Location: Baddeck, Nova Scotia

Project Participants
Client: Wagmatcook First Nation
Partners: CEU Dalhousie University, Canada Mortgage and Housing Corporation (CMHC)



Details:

- https://dalspace.library.dal.ca/handle/10222/65370
- https://search.library.utoronto.ca/details?9918510

YALE FIRST NATION TS'I'TS'UWATUL' LELUM ASSISTED LIVING

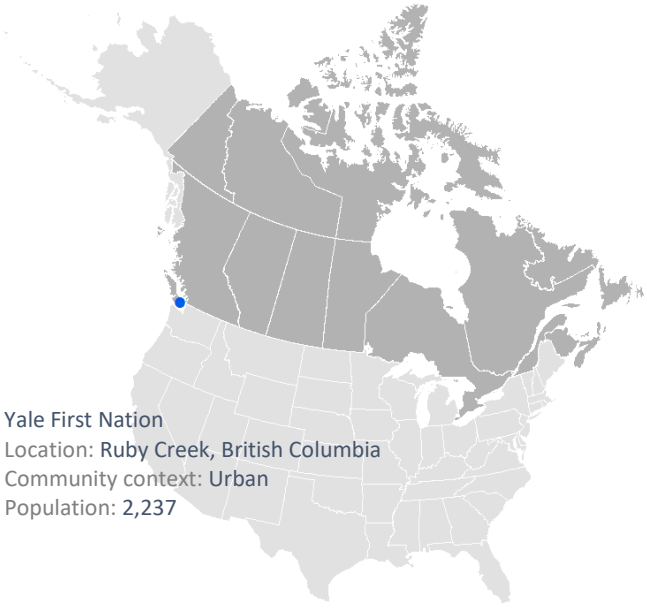
Like many First Nations households in British Columbia, homes in Yale First Nation struggle with high heating bills that can come to over $200 a month. When Yale decided to invest in building new rental housing, they turned to Britco, a modular building company, to construct 10 two-bedroom units in a pair of buildings that meet the highly energy efficient Passive House standard[1].

Project Information

Location: Ruby Creek, British Columbia

Design rendering of six-plex
Photo: Britco

Completion: 2017
Number of Units: 10 on six-plex and four-plex
Construction Cost: CAD $14.7M



Project Participants

Client/Developer: M'akola Housing Society
Partners: Cowichan Elders, BC Housing, Vancouver Island Health Authority
Design Architect: Jackson Low, AIBC, RAIC
Architectural Firm: Low Hammond Rowe Architects, Victoria BC

Details:

https://www.cmhc-schl.gc.ca/en/housing-observer-online/2018-housing-observer/yale-sixplex-first-passive-house-canada

https://www.cmhc-schl.gc.ca/en/data-and-research/publications-and-reports/low-energy-buildings-yale-first-nation-sixplex

cmhc.ca