Community Success Story:

Reflections on Doig River First Nation's Passive House, Dane che' adliih dę' kwą

Built in 2021, Doig River First Nation's Dane che' adliih dę' kwą (People's Prayer House) demonstrated the possibilities for Passive House certified buildings in a Northern climate. The Prayer House is the northernmost Passive House certified building in North America. Four years after completing the building, project team members Shona Nelson, Jennifer Davis, and Tracy Rockwell reflect on how the project came together, the community's response, and how the building and its uses are evolving over time. They also share advice for other communities that may be considering a similar project.

The People's Prayer House is located at the core of the community near the Band Hall. Credit for all photos (unless otherwise stated): ***Doig River First Nation.***

Doig River First Nation is interested in increasing economic resilience, reducing energy costs, and constructing high-end and efficient buildings that meet the needs and preferences of their members. Their Northeastern climate can range from -40 to 40˚C, with long and cold winters alongside increasingly high temperatures and heat waves in the summer. Most buildings are heated with electric baseboards, propane, or wood stoves, and home electricity bills are very expensive. Many older homes in the community are not energy efficient. Older community buildings, which were not built to high energy-efficiency standards at the time, have had extremely high propane bills. Increasing the efficiency of new buildings to reduce heating and energy costs is a high priority. The Nation also cares about resilience in their buildings and reducing the effects of climate change.

Project Team Members:

Doig River First Nation Team

Shona Nelson, Band Manager

Jennifer Davis, Housing and Public Works Administrator

Chief & Council, Elders, and community members provided support and guidance throughout the project.

Design and Construction Partners

Senior Engineer & Project Manager: Tracy Rockwell, TD Rockwell and Associates

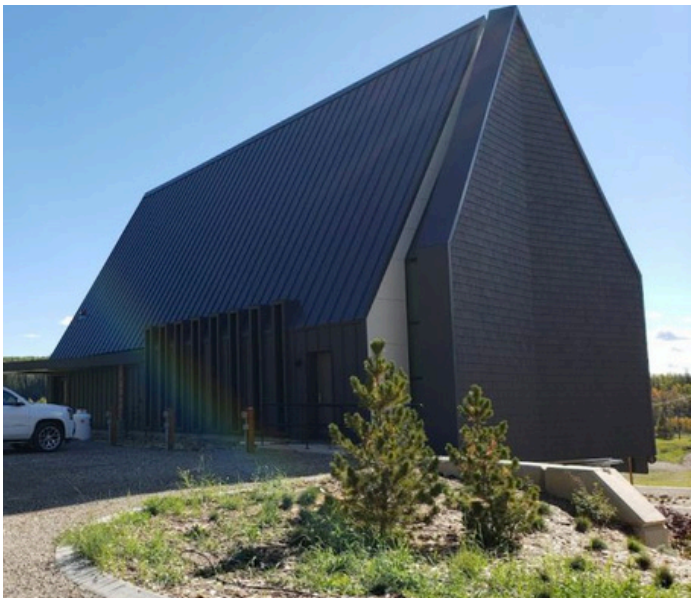
Architect: Iredale Architecture

Builder: Olafsen Construction

About Doig River First Nation:

"Doig River First Nation is Tsáá? ché ne dane, a proud Dane-zaa people indigenous to the upper Peace River region of BC and Alberta. [Their] traditional base extends in all directions from Gat Tah Kwâ, now called the city of Fort St. John. Today, members participate in the modern economy while practicing their unique language, culture and traditions... DRFN's population is 335 people and members live on and off reserve."

-- *from the* ***Doig River First Nation*** website.



The building won three Architecture and Passive House awards.

The building's location and direction help maximize winter light, minimize heat loss, and collect solar power on the rooftop.

A planning process guided by the community

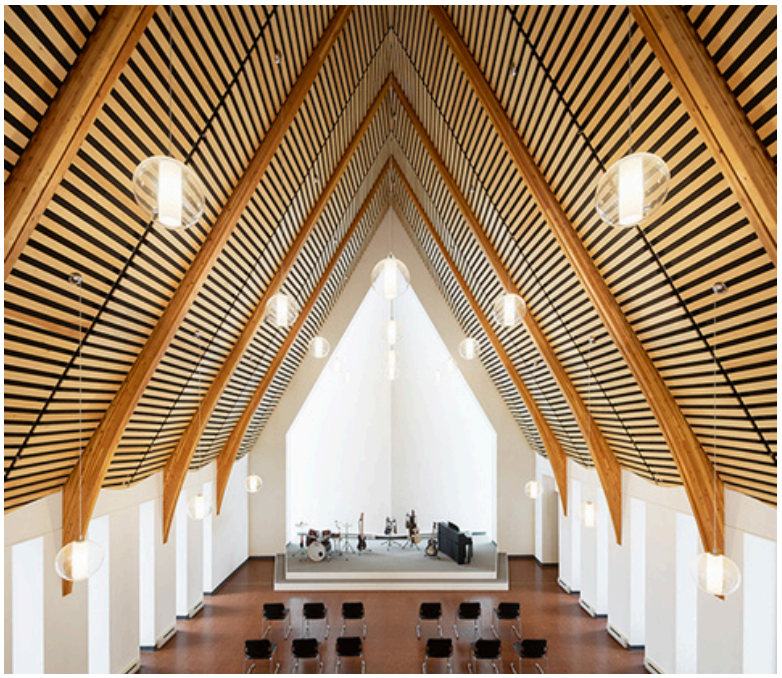
Doig River First Nation has a Comprehensive Community Plan and a Cultural Spaces Plan which guide the development of quality cultural buildings and gathering spaces. A new multi-use building was highly requested by Band members. The community wanted to see a new multi-use spiritual space and performance space. In the rest of the building would be an Elders' room and a place for the children's early learning program.

The planning team worked with Chief and Council to plan the new building, and did an in-depth engagement process to guide the project. One of the Nation's key engagement methods is the World Café, a trade-fair style event with booths where residents can engage with different topics and projects. To hear directly from the community, the planning team also held small-group meetings with Elders and future users of the building. These conversations made sure the project was closely aligned with the needs and priorities of the community.

Community members also toured a residential Passive House in nearby Fort St. John, to learn more about this construction style and experience what the building could feel like when finished.

The building is already showing significant energy savings

The community and planning team were interested in taking the new building's energy efficiency to a passive house level, seeing it as a pilot project for the Nation. The building was designed by Iredale Architecture and built by Olafsen Construction using a hybrid of site-built and prefabricated components. It achieved Passive House Institute US certification, meaning it achieves the highest standard of energy-efficiency, using 90% less energy than a conventional building. Tracy Rockwell, a consultant who helped plan and deliver the project, says the Prayer House heating costs are around $2000 a year, compared to the Administration building's typical $50,000 in heating costs.



The performance space takes up the main floor of the building.
*Photo credit: **Iredale Architecture.***

Bringing together design, function and comfort

The building's placement, and the direction it faces, were chosen to capture winter sunlight and reduce heat loss. The steep metal roof can easily shed snow, and rooftop solar panels are placed to collect energy. The tightly sealed envelope has both interior and exterior insulation.

The main floor performance area has curtain walls to create atmospheric lighting, and a wooden slat ceiling with an acoustic membrane for better sound quality during performances and music classes. The lower floor houses a childcare space for HeadStart programming and after-school care, next door to an Elders' room.

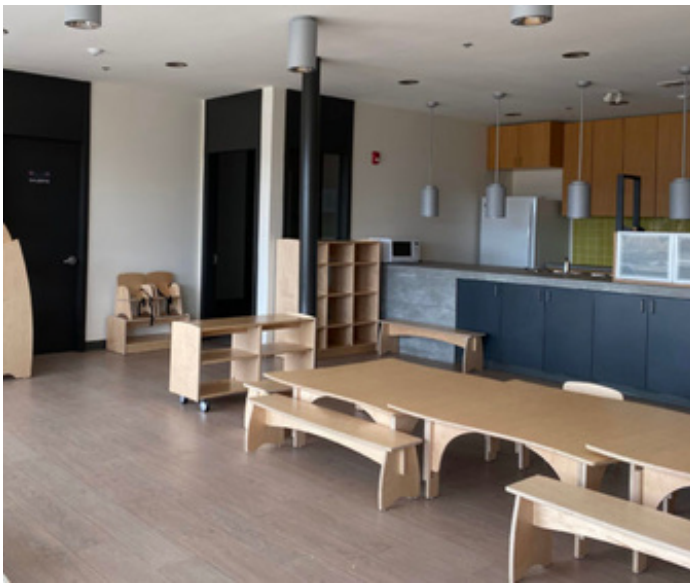
The atmosphere in the building is warm and cozy, especially in winter. Shona Nelson, Band Manager, says community members appreciate the Prayer House's design and ambiance, and take pride that the building is high-quality, innovative, and aligns with the Nation's values.

Due to its Passive House design, the building can also serve as an emergency gathering space: propane tanks are known to sometimes freeze/gel in extreme cold, leaving people with no heating at home, but they can stay warm at the Prayer House.

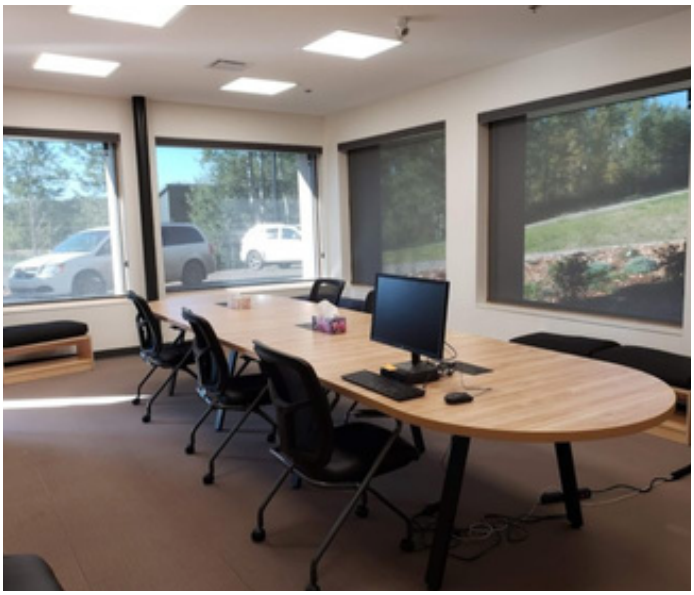
Unexpected challenges with the Passive House

At first, the project team was concerned with keeping the building warm in the winter, but now they are dealing with a different issue: overheating. In the summer, the Prayer House sometimes gets too hot to be functional. For example, during a heat wave that lasted a week and a half, the building became unbearably hot. Adding a cooling system is in the works, but has been a challenge because of the thick walls and tight building envelope: air loss through the envelope would undermine the building's efficiency.

In general, it has been hard to make changes to the building now that it's finished. Because Passive House is a high technical standard and has innovative design features, it can be difficult to find contractors who are comfortable and experienced working on Passive House buildings.



The building houses childcare and an early learning program.



An Elders' meeting room on the ground floor of the building.

A view of the building's setting, with autumn leaves surrounding it.

Planning for a vibrant Cultural District

Shona was able to secure funding for the Nation to develop more amenities around the Prayer House geared towards children and families: a playground, garden, and sliding hill. The landscapes and buildings are aesthetically and ecologically linked with the nearby river. According to plan, this Cultural District has come together over time to create a welcoming space for both indoor and outdoor activities.

A nature-inspired playground was placed next to the Prayer House building.

Moving forward with energy-efficient homes

Doing River First Nation sees pilot projects like the Prayer House as a way to try out different approaches to building, learning what works well for their community. For future builds, the Nation intends to aim slightly below the Passive House standard. This provides more flexibility in the design and lowers costs, while still offering the benefits of high energy-efficiency standards. The next housing units for Elders were not built to full Passive House standards, but one step down, and are still considered highly energy efficient. For new-build homes, the Nation is currently working to Step Code 3. The Nation also ensures their new buildings are designed to be ready for future energy efficiency upgrades, adaptations and maintenance. This forward-thinking approach will lead to future energy savings and resilience.

We are thankful to Shona Nelson, Jennifer Davis, and Tracy Rockwell for sharing their experience for this case study.

Advice & Lessons Learned:

Energy Efficiency, Savings & Comfort:

- A Passive House building can be successful in Northern B.C. The Prayer House is warm in winter, resilient, and low-emissions.
- Energy costs have been excellent for a building this size. It has been very affordable.
- Consider in advance how to keep the building warm in winter and cool in hot summers.

Planning, Contracting & Construction:

- The upfront costs of a high-efficiency building will be much higher per square foot. Weighing upfront costs and predicted energy savings can help leadership and the community make informed decisions.
- When unfamiliar with Passive House, builders may want to include more risk in the cost. Try to find an experienced Passive House contractor. Make sure to have a contingency fund, and try to avoid high-risk contracts to retain control of project costs.
- Find a Project Manager and engineer who will advocate for the community's needs and have experience with high-efficiency buildings.

Adapting & Maintaining the Building:

- Consider who will take over the building maintenance after the contractors leave: arrange in-depth training for staff members.
- The building was designed with space for Elders, but became a youth-focused space due to use and demand. Adapting the building physically has been challenging due to the thick walls and tight building envelope.
- Renovating and maintaining high-performance buildings can be expensive because these are fairly new techniques. For tradespeople, training and experience with Passive House buildings can be helpful in reducing costs.

FIRST NATIONS HOME ENERGYSAVE IS SUPPORTED BY:

REAL ESTATE Foundation OF BC · BC Hydro · FORTIS BC · Vancity

PROGRAM ADMINISTERED BY:

Fraser Basin Council