

WHAT ARE THE APPLICATIONS?

To test the applicability of the module sizes in a school design a case study was completed for an existing school design that follows the standard school space size requirements. This case study examines how the school could be redesigned using only the **Kit-of-Parts** modules, where there are opportunities for future expansion, and exploring how many of each module would be used to recreate this school.

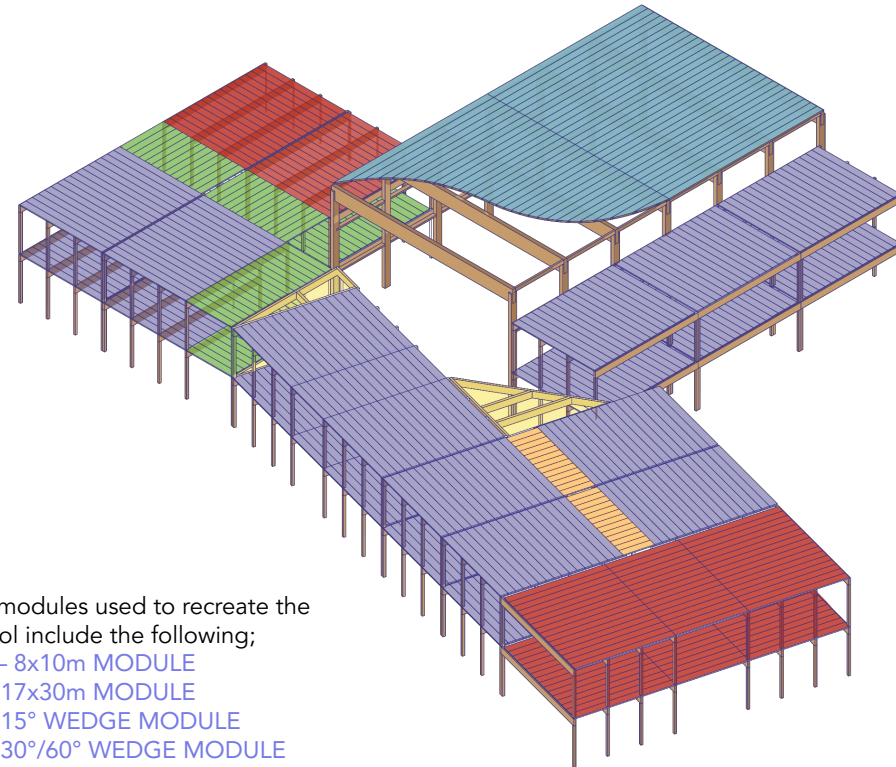
CASE STUDY: K-6 SCHOOL

This school design supports 350 students from K-6. The programmatic breakdown of the school spaces can be seen in the table below. Using only standard modules this school can be recreated to make the same space sizes, and maintain the same architectural richness found in this school design.



CASE STUDY PROGRAMMING CHART

	AREA	#
Instructional Spaces	m2	
Regular Core Classroom	80	10
Elementary Science	95	
Large Ancillary Classroom	130	
Small Ancillary Classroom	90	2
Gymnasium	430	
Gym Storage	43	
Library	140	
Non Instructional Space	m2	
Admin/Staff Support	227	
Basic Wraparound Services	20	
Flexible Space	84	
Accessible Washroom	12	
Washrooms	42	
Phys Ed Office/ Change Rooms	70	
Recycle Room	11	
Wiring Network	30	
Mech and Elec Room	108	
Storage	64	

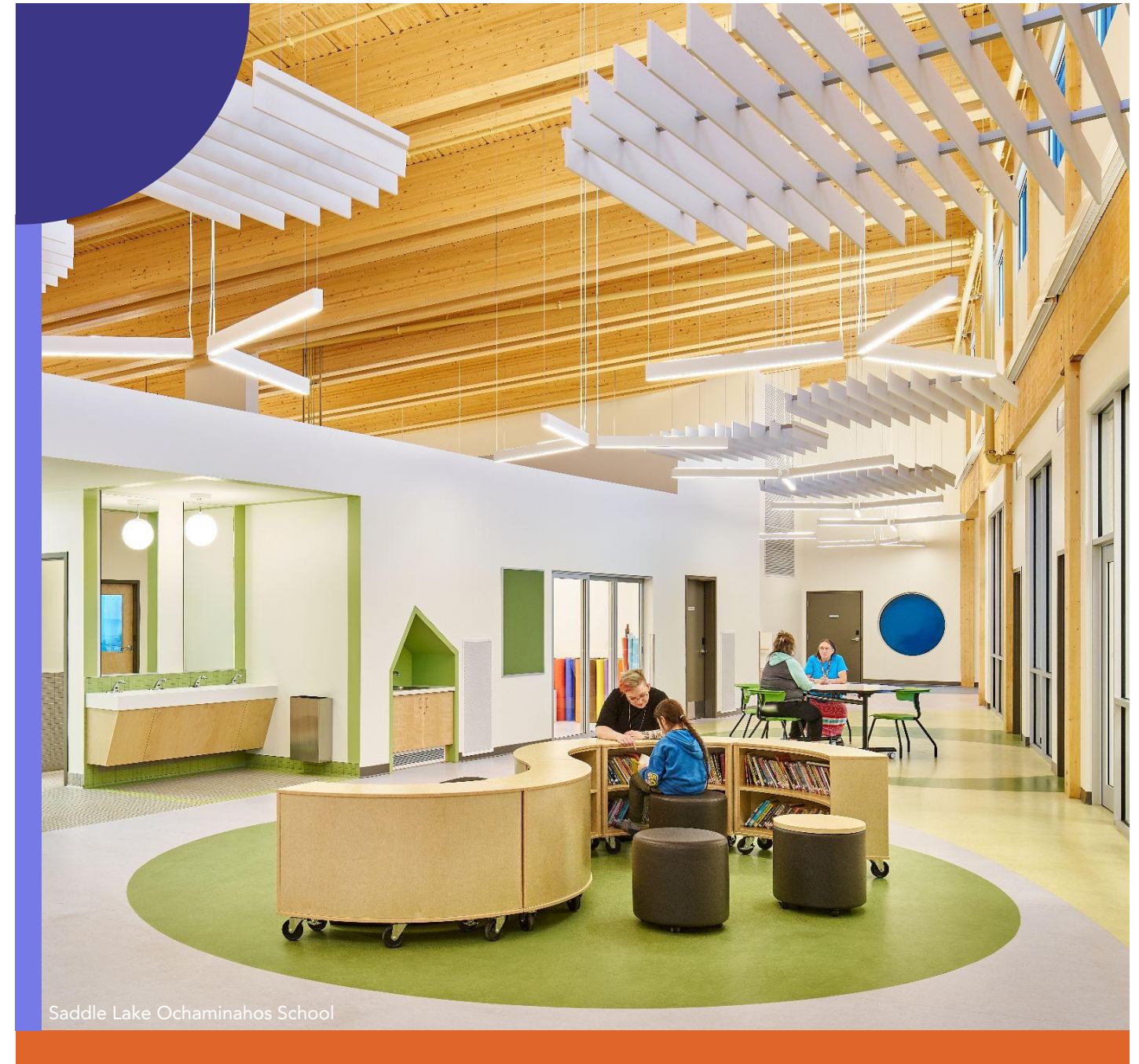


The modules used to recreate the school include the following;
 [28] – 8x10m MODULE
 [1] – 17x30m MODULE
 [2] – 15° WEDGE MODULE
 [2] – 30°/60° WEDGE MODULE
 [8] – BRIDGE MODULE

WHAT'S NEXT?

The **Kit-of-Parts** system for school construction has a lot of potential by saving time, money, and complexity while providing more enjoyable spaces that are flexible for changing needs.

The **Kit-of-Parts** system provides a great opportunity for improving the current design practices to build schools quickly to meet the growing needs.



Kit-of-Parts Standard School Concept

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CAN SCHOOLS BE MADE OF A KIT-OF-PARTS?

How can a school be designed in a modular way to reduce time and cost in the design and construction, without reducing the quality of the school environment for students?

WHY KIT-OF-PARTS SCHOOLS?

A **Kit-of-Parts** allows for a school to be designed using a number of presized modules in different combinations to support the required programming.

BUDGET

The benefit of using a **Kit-of-Parts** system is that the components are designed and engineered once. The addition of components increases the size of the school but does not increase the complexity of the structural engineering. By increasing the efficiency of the structure through repeated modules, the cost to engineer and manufacture parts decreases, reducing the cost of the schools.

TIMELINE

The use of the **Kit-of-Parts** system reduces project timelines. Having standard components reduces the complexity of fabrication, thus reducing construction time, in addition to reducing engineering time for calculations and shop drawings. The structural elements go together using simple connections that use repeating details to reduce project complexity and fabrication time, resulting in shorter lead times.

21ST CENTURY LEARNING

Using mass timber structure in school designs leads to the 21st Century Learning model through creating welcoming and warm spaces with the use of wood. Having exposed structure can also support learning about material qualities, physics, and sustainability from a real example in their school.



Saddle Lake Ochaminahos School



WHAT ARE THE BENEFITS?

The **Kit-of-Parts** system is beneficial in multiple ways. Not only does it improve budget, timelines, and flexibility in school designs, it also provides benefits to the quality of the spaces, supports 21st Century learning, and sustainability goals.

SUSTAINABILITY

A benefit of using mass timber structure is its sustainability in comparison to other structural materials. The sustainability of wood positively contributes to achieving LEED certified schools through lower embodied carbon, **Alberta materials**, and rapidly renewable materials.

FUTURE ADDITIONS

The use of **Kit-of-Parts** in school design allows future additions to the school with lower cost, quicker timelines, and better quality than current modular classrooms. Schools can be expanded and contracted to accommodate changing neighbourhood needs.

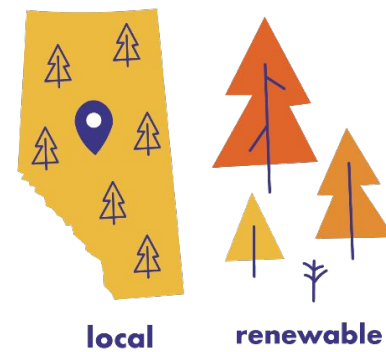
FLEXIBILITY

Although there are a small number of module types, the possible arrangements are not limited. The inclusion of angled modules allows changes in orientation within the building, which can create special moments without adding complexity. Space size and arrangement are flexible through the use of different module configurations and combinations. The design of the modular system is simple yet flexible.

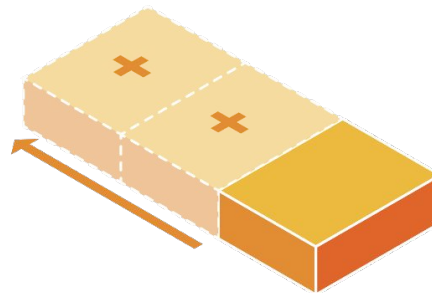
SCALABILITY

The module system is scalable for the range of school types such as elementary, middle or high schools, and amount of students required. The amount of modules in each school is simply scaled to accommodate the necessary amount of students, classrooms required, and type of school. Future scaling is also possible through easy additions that can be connected to the schools.

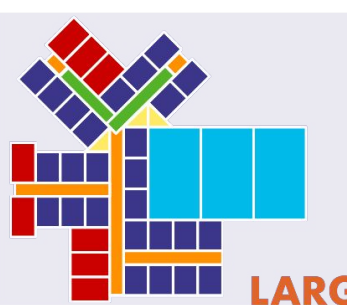
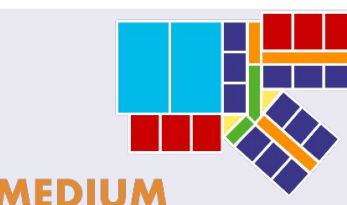
SUSTAINABILITY



+ FUTURE ADDITIONS +



← FLEXIBILITY →



HOW DOES THE KIT-OF-PARTS WORK?

Each **Kit-of-Parts** includes “Modules” that are self supporting. Each Module is built of standardized, factory controlled, mass timber structural elements, including columns, beams, and “Westdeck”. Module dimensions are designed to support typical classroom and gym sizes. Western Archrib and our design team have optimized the design of our **Kit-of-Parts school into only 6 different Modules, allowing for single-storey or two-storey schools.**

LEARNING MODULE

8mx10m: The most commonly used module in school planning, the 8m x 10m unit can be rotated and connected on any side to support a wide range of spaces. Partitions may be added within or between modules for design flexibility.

12mx10m: With a larger footprint, this module suits specialized programs like technical education or science labs, offering room for equipment, workstations, and collaboration.

17mx30m MODULE

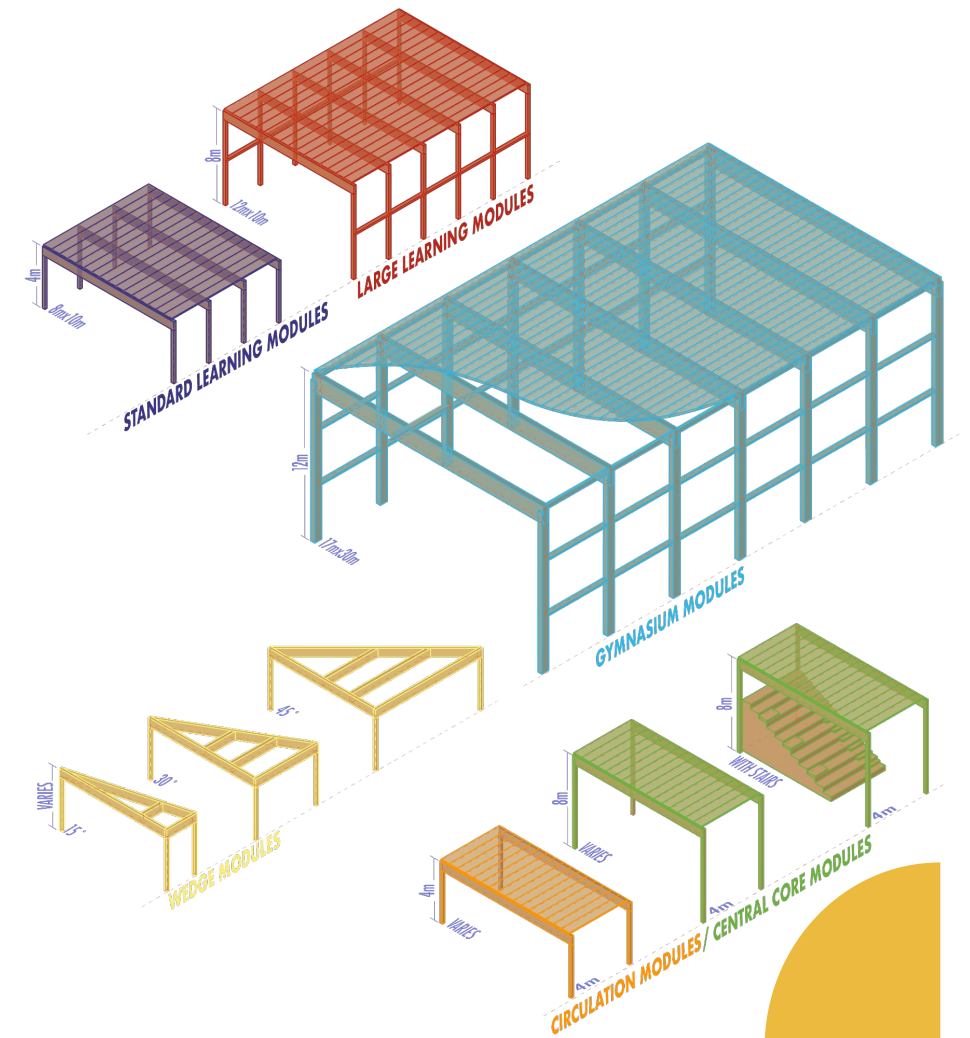
A key part of every school is the **gymnasium**. The 17mx30m module is designed to accommodate the size and height required in a gym. Two gym modules can be added together to accommodate a middle school sized gym, or three modules can be added together for a high school sized gym.

WEDGE MODULES

Wedge modules (15°, 30°/60°, and 45°) add unique spatial and design possibilities to the **Kit-of-Parts**, offering customization without increasing design complexity or significantly impacting fabrication and engineering time.

CIRCULATION / CENTRAL CORE MODULES

These 4m-wide modules use Western Archrib’s “Westdeck” decking to connect nearby structures without long spans. They can also serve as central hubs for learning commons or social areas, with features like atrium stairs for seating and interaction.



POSSIBLE MODULE CONFIGURATIONS

