McCall Field Campus Redesign Project

Comprehensive Design

by Pui Huen Chan

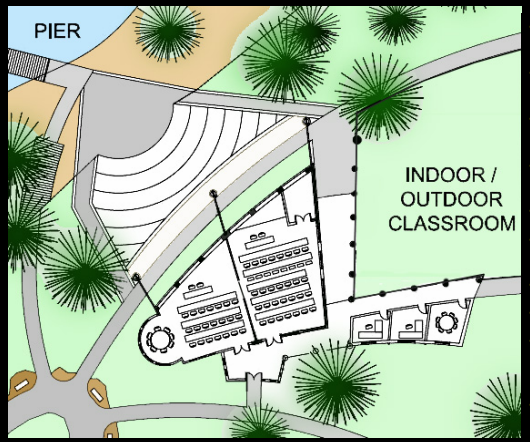
Master Plan

Master Plan

Concepts:

1. Strong Emphasis on Education
2. Views to the Lake
3. Access, both vehicular and pedestrian
4. Connection and Circulation
5. Incorporation of the Living Machine
6. Preservation of historic dining hall
7. Proper Separation of Guest and Staff
8. Incorporation of Sustainable building and site elements.

Site Plan – Indoor Classroom & Amphitheater

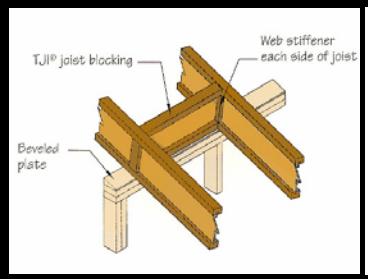


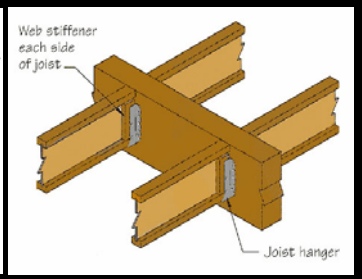
- Indoor Classrooms: 2,700 sq.ft.
- Holds 35-50 people on each side.
- Group meeting and computer space
- Moveable wall (sliding/folding partition)
- Connections to Outdoor
- Classroom and Amphitheatre
- Views to the Lake
- Outdoor space around
- Relationships to adjacent buildings and paths
- Day-lighting

Structural Systems

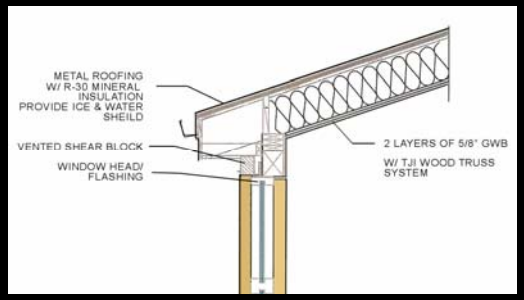
TJI Roof System

- An integral part of roof systems.
- TJI joists feature an efficient shape that enables them to carry large loads over long spans without loosing their connection to decking and floor finish.



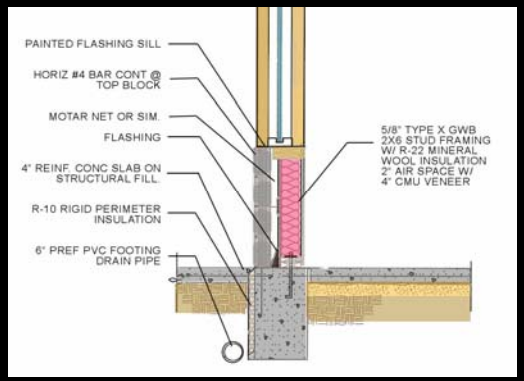


Building Envelope



- Detailed sections of wall-roof and wall-floor connections.

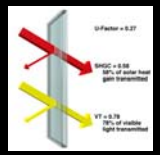
Building Envelope



- Detailed sections of wall-roof and wall-floor connections.

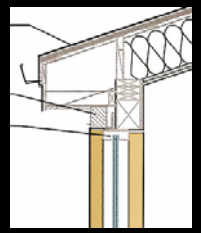
Building Envelope

- Opaque and glass cladding details.
- Thermal properties of wall and roof systems.



Wood Framed Double Glazed Window

1. Double-glazed with Moderate-Solar-Gain Low-E, Argon/Krypton Gas.
2. Wood-framed windows perform well with frame **U-factor** in the range of 0.3 to 0.5 Btu/hr-sq. ft-°F.
3. U-factor = .27-35
   SHGC = .58 (58% of solar heat gain transmitted)
   VT = .78 (78% of visible light transmitted)

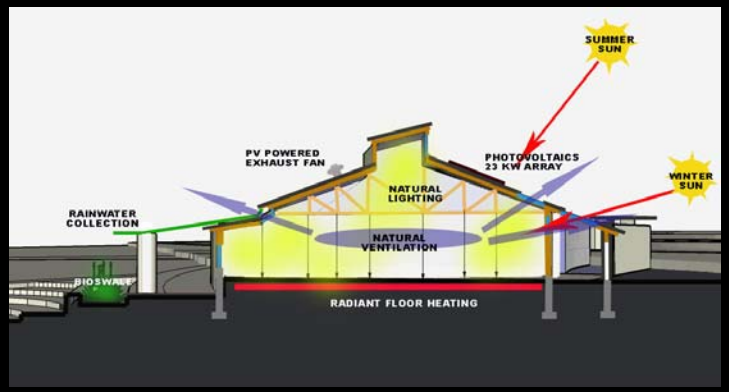


Straw Bale Wall System

1. Straw has a relatively low R-value per inch, the thick bales produce approximately an R-36 wall.
2. In contrast to the timber used for building houses, straw can be grown in less than a year in a sustainable production system.
3. Cool in summer, warm in winter

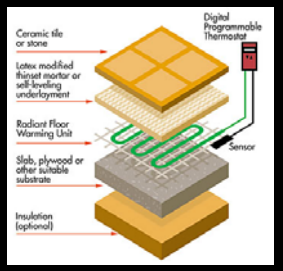
Environmental System

- Diagrammatic of primary and back-up systems for heating, cooling, lighting, and water.



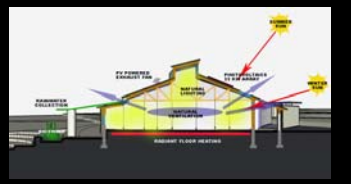
Environmental System

- **Bios wale**
  - An open, porous landscaped channel that is graded to divert, retain, and filter site and building runoff for treatment and purification.
- **Radiant Floor Heating system**
  - use a radiant floor (hot water) heating system in order to compensate the heat loss of the building components. It is not only one of the most efficient ways to provide heat directly to all over spaces in the building but it can also creates three times more comfortable condition than other heating systems

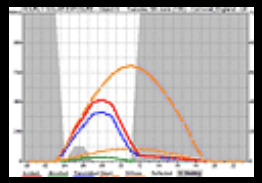


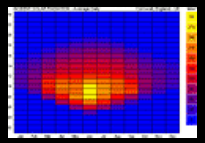
Environmental System

Solar Access

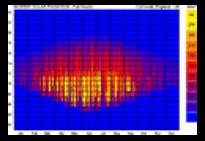


Hourly solar gains for single day.





Monthly average hourly gains over whole year.



Actual hourly gains over whole year.

Spatial System

- Diagrammatic of access (ADA), sequence, overlap, nesting, hierarchy, served, service—all that apply.

Building Materials

1. Mineral Wool Insulation	Average	Low	Average
2. CMU Blocks	High	Low	Low
3. Straw Bale Wall System	Low	Low	Average
4. Wood Framed/ Double Glazed Window	Average	Average	High
5. Metal Plate Roofing	Average	Low	Low
6. TJI Roof system	Low	Average	Low

Carbon Neutral Design

Carbon Emissions Reduction Strategies:

1. **Incorporation of Passive Systems for Building Design:**
   - Use of Natural day-lighting in buildings
   - Daylight reduces the need for electric lights, contributing significantly to energy conservation.
   - Passive Heating and Cooling
2. **Use of Bio-swales:**
   - Control storm water and melted snow runoff
   - Clean the stored water for use on site, or send back to the lake.
3. **Use of Solar Photovoltaic System:**
   - PV panels supply 50 percent of the electricity for the classroom. As the classroom building requires much less hot water than do the dining hall and lodges, so it makes sense to convert the sun's heat energy into electricity there.
4. **Use of Green Insulation and Building Materials**
   - Mineral wool Insulation contains an average of 75% post-industrial recycled content. It doesn't require additional chemicals to make it fire resistant, and it can be used in two different insulation forms.

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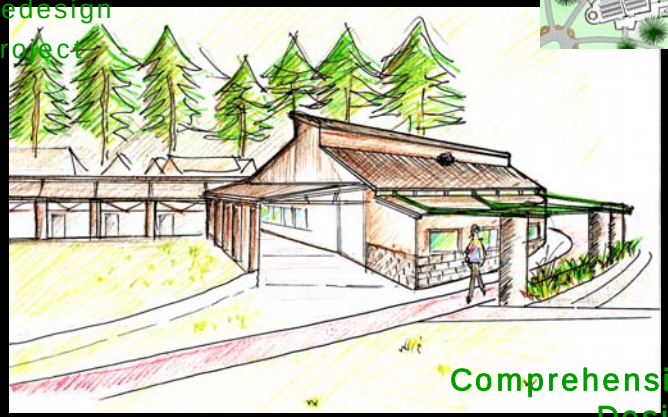

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