INDIGENUITY

Alfred Waugh Architect AIBC, OAA, MRAIC, LEED AP
Formline Architecture
INDIGENOUS KNOWLEDGE

- Knowledge is experiential based on observations of nature through a long history of time.
- Nature is at the center of the value system and all living things are interconnected.
- Knowledge is passed on through oral tradition through stories and the teachings of our elders.

WESTERN SCIENCE

- Knowledge is based on scientific analysis and isolating elements in nature to understand its underlining mechanics to allow for manipulation and invention.
- Human kind is at the center of the value system and nature serves it.
- Knowledge is passed on through the written word, mathematics, and computer code.

RECONCILIATION OF HOW WE LIVE ON EARTH

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ENVIRONMENT-INDIGENOUS LANDSCAPE
DISPLACEMENT VENTILATION

- Passively cooled
- 100% outdoor air handling unit
- Operable windows
- Fresh air earth loop
- Computer fluid dynamic modelling to calibrate ventilation requirements to occupant load
AIR INTAKE TOTEM
USER CONTROLLED + DDC CONTROLLED OPERABLE OPENINGS
EXHAUST OPENINGS
CALIBRATED TO OCCUPANT LOAD
THE IMPORTANCE OF CEDAR
TIMBER DETAILING

• Interpretation of the slotted post and beam connection for the Coast Salish Long house

• 25mm Tight fit stainless steel pins with 2mm taper

• Knife plate base connection

• Glulam columns 175mm x 380 to 456mm

• Glulam beams sized to span from 175 x 532mm to 722mm
CEREMONIAL HALL  |  INTERPRETATION OF THE BIG HOUSE
WOVEN CEDAR DETAIL

• Inspired from the bullrush matt used to keep the draft out of Longhouses.

• 45mm x 6mm cedar strips woven between 16mm diameter wood dowels

• Panel models 1524mm wide
1. Doug Lafortune  
   Coast Salish

2. Charles Elliot  
   Tsartlip First Nation

3. Rande Cook  
   Kwakw’wakw

4. Luke Marston  
   Coast Salish

5. Morris (Moy) Sutherland Jr.  
   Nuu-chah-nulth

6. Rick Harry  
   Squamish Nation

John Livingston - Art Coordinator

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UNIVERSITY OF TORONTO SCARBOROUGH
INDIGINOUS HOUSE
Toronto, Ontario
SITE CONTEXT
LANDSCAPE PLAN - GROUND COVER
VIEW FROM THE WEST LOOKING UP THE RAMP AND AT THE SUNKEN GARDEN
WIGWAM – CULTURAL PRECEDENT
CEREMONIAL GATHERING PLACE
DEVELOP A PASSIVE MECHANICAL SYSTEM INSPIRED BY THE WIG WAM BUILDING

DESIGN A SUPER INSULATED BUILDING ENVELOPE INSPIRED BY THE WIG WAM DOUBLE WALL SYSTEM USING SWAMP MOSS OR TULLE REEDS TO INSULATE A CENTRAL LAYER

TRANSLATE THE BIRCH-BARK CYLINDER TO A MODERN EARTH TUBE SYSTEM TO BENEFIT FROM THE STABLE TEMPERATURES OF THE GROUND TO TEMPER THE INTAKE AIR FOR THE BUILDING DEPENDING ON THE SEASON
BASEMENT FLOOR PLAN - MECHANICAL ENERGY RECOVERY VENTILATOR DIAGRAM

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VENTILATION DIAGRAM – SUMMER MODE

- Roof top air source heat pump concealed by a metal slat screen integrated into the roof form. If the ground source cooling is sufficient, we may be able to greatly reduce or delete these units.

- Provide triple glazing and a super insulated envelope to meet passive house requirements to reduce the amount of energy required for cooling.

- During extreme summer conditions, a supplemental cooling coil will be provided in the ERV. It will connect to the roof top air source heat pump.

- Air intake passes through a ground source cooling loop to reduce the temperature and dehumidify the air circulated by the HVAC system.

- 2.7m (9ft) below grade:

- Sculptural concrete ventilation totem intake connected to 160m of 750mm diameter earth tubes to provide tempered supply air to the main HVAC unit.
Higher level motorized mechanical dampers provide ventilation through stack effect to provide free cooling for the larger gathering places and atrium and serve as exhaust for the overall building.

Operable windows in offices and meeting rooms provide natural ventilation and free cooling.

In spring and summer when temperatures are in a range of 10°C to 25°C, the HVAC system and the ground source loop can be turned off.

Provide triple glazing and a super insulated envelope to meet passive house requirements to reduce the amount of energy required for heating.
VENTILATION DIAGRAM – WINTER MODE

Provide triple glazing and a super insulated envelope to meet passive house requirements to reduce the amount of energy required for heating.

Heating provided by a heating coil either in straight with the forced air displacement system and supplemented in glazed areas by electric trench heaters.

Air intake passes through a ground source heating/cooling loop to temper the air to reduce the amount of heating is required and dehumidifies the air.

Sculptural concrete ventilation totem intake connected to 160m of 750mm diameter earth tubes to provide tempered supply air to the main HVAC unit. Pipes to slope back to concrete base where condensate will disperse to a French drain base.

2.7m (9ft) below grade

Mechanical basement
THANK YOU!

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