HUMBER

HUMBER COLLEGE SUSTAINABLE RESIDENCE

A PASSIVE CONCEPT

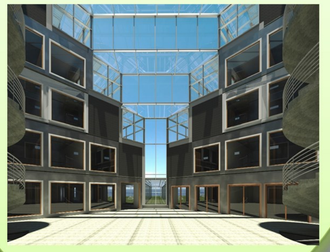
A DESIRABLE CONCEPT

OTHER COLLEGES
- Replicable
- Resizable
- Existing sustainable model

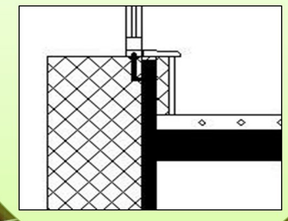
COLLEGE
- Energy Independence
- Strengthen sustainability plan
- Showcase
- Cost Effective

STUDENTS
- Sustainable living experience
- Interactive learning (living lab)
- Optimal Environmental Quality

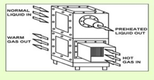
HIGH R WINDOWS

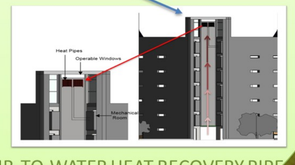


SUPER INSULATED ENVELOPE



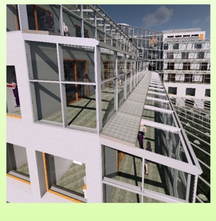
VENTILATION HEAT RECOVERY



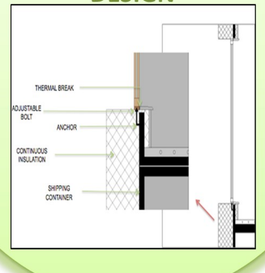


AIR-TO-WATER HEAT RECOVERY PIPE

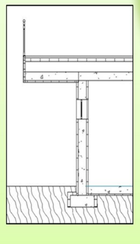
PASSIVE SOLAR



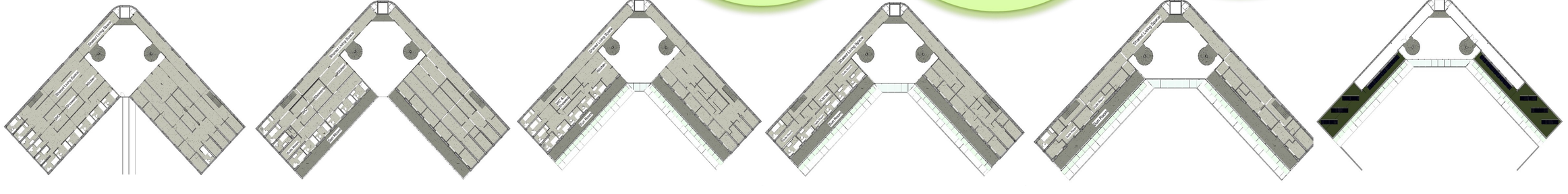
THERMAL BRIDGE-FREE DESIGN



AIRTIGHTNES



Shelby Kerbel
Murat Kinaci
2014



HUMBER COLLEGE SUSTAINABLE RESIDENCE

- 3 Ton system
- Offsets 59% of building's heating and mechanical cooling loads.
- Back-up condensing boiler with 12kW ouTput.

- Pumps heated water from GSHP through tubing laid under floor.
- Delivers heat from floor surface via infrared radiation.
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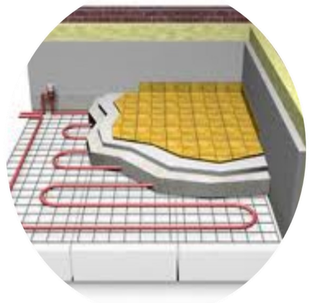
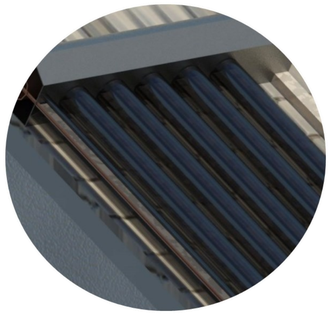
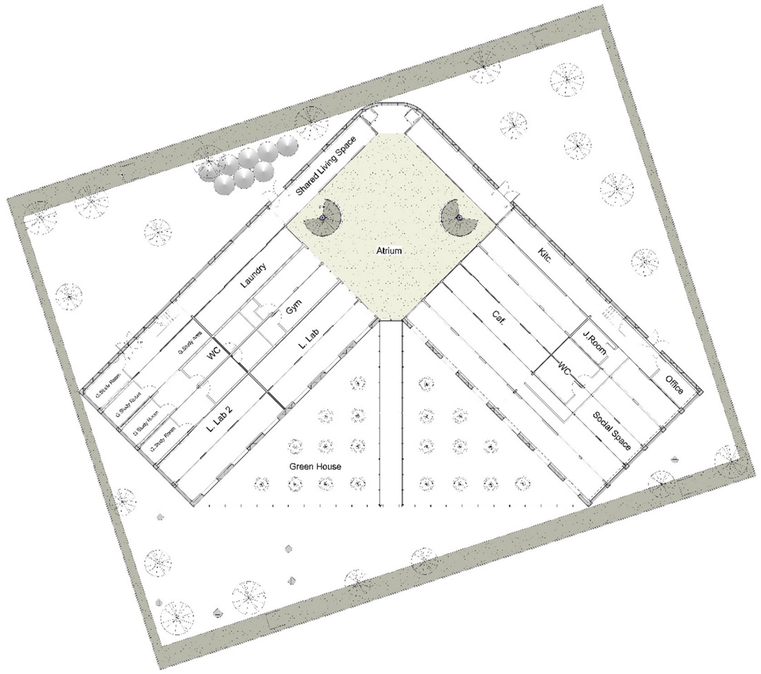


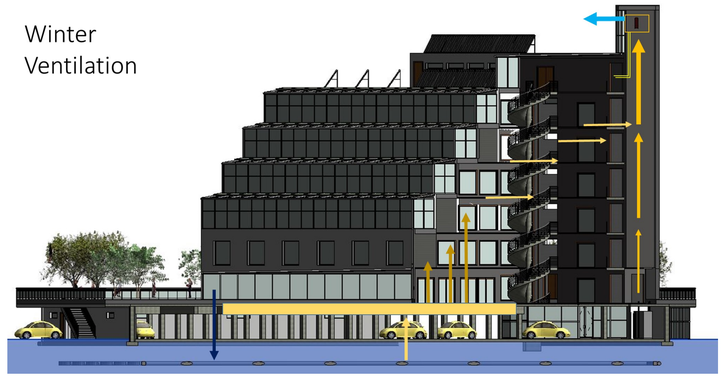
- Collect heat by absorbing sun's energy in form of electromagnetic radiation.
- Estimated to offset 46% of annual heating load.





Summer Ventilation

Winter Ventilation



A PRACTICAL CONCEPT

- Work as fresh air intake, pre-conditioning fresh air entering building.
- Reduce heating/cooling required for building.
- Sloped design & drainage system remedy potential for condensation problems.

- Cradle-to-cradle model
- Up-cycling of durable, structurally sound, easily stacked, locally sourced, economical structure.
- 184-40' High Cube containers.

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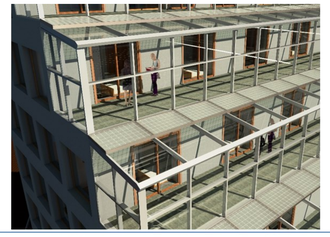
- Monitors and controls mechanical, ventilation, humidity control, lighting and water systems.
- Living lab as educational tool.



- 128 BI Solar PV panels - total power capacity = ~ 31 kW
- Critical component of summer shading on south building side.

- Draws fresh pre-conditioned air from earth tubes.
- Heat pipe technology recovers heat without use of any mechanical system.
- 2-0.98m^2 windows operated by the building automation system determine ventilation needs within building.