Passive House Child Cares (made easy!)

Presented by

Adam James – Ryder Architecture
Mary On – Integral Group
Integral Group experience in Passive House

Charter Telecom
Soo Valley
3510 Fraser Street
Private Residence
Gastown Childcare Facility
Integral Group experience in Passive House

Hornby Island Fire Hall

Fire Hall 17 Redevelopment

388 Skeena

Clayton Heights Community Centre

University of Toronto Scarborough Residence
The brief….

- Two child cares, 37 children in each
- Built on the roof of existing parkades in downtown Vancouver
- Lightweight, no seismic upgrade of the existing structure
- “City of Vancouver objective to design to achieve LEED Gold certification (with a 30% reduction in energy use over the requirements of the current Vancouver Building By-law) and to achieve Passive House Standard Certification”
- Architect of Record, Acton Ostry Architects Inc.
- Mechanical and Electrical Engineer, Integral
- Energy Modelling, Stantec
Challenges

- Site and Solar Access
- Building in the Sky
- Stakeholder Concerns
- Air Quality
- Acoustics
- Being First
- Plumbing Services Connections
Challenge 1 – Site and Solar Access
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**Challenge 1 – Site and Solar Access**

![Aerial view of the city]

**10 am**

**12 pm**

**2 pm**

ACTON OSTRY ARCHITECTS
Passive House Child Cares (made easy!)

Challenge 1 – Site and Solar Access

Roof: R-115
Walls: R-65
Floor: R-75

Form Factor
1380m²
380m² = 3.6
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Challenge 2 – Building in the Sky

Roof: R-115
Walls: R-65
Floor: R-75

Form Factor 1380m²
380m² = 3.6
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Challenge 2 – Building in the Sky

ACTON OSTRY ARCHITECTS

INTEGRAL
Revolutionary Engineering
Passive House Child Cares (made easy!)
Challenge 2 – Building in the Sky
Passive House Child Cares (made easy!)

Challenge 2 – Building in the Sky
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Challenge 3 – Stakeholder Concerns

Acoustics – will the HRV be noisy?
Airtightness – can we open the window?
District Energy – can we connect to it?
Cost – what is the Passive House premium?
Maintenance – who can we get to service the mechanical system?
Vestibules – we need them!
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Challenge 4 – Air Quality

Vancouver has some of the cleanest air in North America, however…

= Provision made for MERV 15 + carbon filters (for Forest Fire events)
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**Challenge 5 – Acoustics**
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Challenge 5 – Acoustics
Passive House Child Cares (made easy!)

**Challenge 5 – Acoustics**

- OITC
  - Walls >50
  - Roof > 45

- 66 dBA = loud traffic
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Challenge 6 – Being First…

10.2.2.8. Building Envelope Vestibules

1) Except as permitted in Sentence (2), in a building required to comply with this Article 4, there shall be an enclosed vestibule in all building entrances separating a conditioned space from the exterior, designed such that:
   a) all doors opening into and out of the vestibule shall be equipped with self-closing devices,
   b) the interior and exterior doors of the vestibule shall be separated by no less than 2.1 m when closed,
   c) the exterior envelope of a conditioned vestibule shall comply with the design requirements for a conditioned space, and
   d) the interior and exterior envelope of an unconditioned vestibule shall comply with the design requirements for a semi-heated space.

2) An enclosed vestibule is not required for:
   a) a building entrance with revolving doors,
   b) a door not intended to be used as the building entrance,
   c) a door opening directly to the exterior from a dwelling unit,
   d) a building entrance, in a building less than 278.7 m² in gross floor area,
   e) a door which is separate from the building entrance and opens directly to the exterior from a space that is less than 278.7 m² in gross floor area,
10.2.2.8. Building Envelope Vestibules

1) Except as permitted in Sentence (2), in a building required to comply with this Article, there shall be an enclosed vestibule in all building entrances separating a conditioned space from the exterior, designed such that:
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   d) a building entrance, in a building less than 278.7 m² in gross floor area,
   e) a door which is separate from the building entrance and opens directly to the exterior from a space that is less than 278.7 m² in gross floor area, and
   f) a building pursuing certification with the Passive House (PHI) standard.
Passive House Child Cares (made easy!)

Challenge 6 – Being First…
Passive House Child Cares (made easy!)
Challenge 6 – Being First…

Exterior Door hardware – is complicated…

North Elevation
GLAZING TYPE W2
Total Units 1
high performance vinyl/ fiberglass exterior window + door
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**Challenge 7 – Plumbing Services Connections**

- Connects to existing water, sanitary, storm & fire protection systems in parkade
- Tenant spaces between the Childcare and the water and sanitary connections
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Challenge 7 – Plumbing Services Connections

Minimize and coordinate penetrations (9 total)
Passive House Child Cares (made easy!)
**Target Certification**

### Cordova Street

<table>
<thead>
<tr>
<th>Specific building characteristics with reference to the treated floor area</th>
<th>Treated floor area m²</th>
<th>Criteria</th>
<th>Alternative criteria</th>
<th>Fullfilled?²</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Space heating</strong></td>
<td>379.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating demand kWh/(m²h)</td>
<td>14</td>
<td>≤ 15</td>
<td></td>
<td>yes</td>
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<tr>
<td>Heating load W/m²</td>
<td>11</td>
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<tr>
<td><strong>Space cooling</strong></td>
<td></td>
<td></td>
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<tr>
<td>Cooling &amp; dehum. demand kWh/(m²h)</td>
<td>6</td>
<td>≤ 15</td>
<td></td>
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<tr>
<td>Cooling load W/m²</td>
<td>5</td>
<td>≤ 12</td>
<td></td>
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<tr>
<td>Frequency of overheating (&gt; 25 °C) %</td>
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<td>Frequency of excessively high humidity (&gt; 12 g/kg) %</td>
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</tr>
<tr>
<td>Pressurization test result n₅₀ 1/h</td>
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<td>≤ 0.6</td>
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<td>yes</td>
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<tr>
<td><strong>Non-renewable Primary Energy (PE)</strong></td>
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<td>PE demand kWh/(m²h)</td>
<td>138</td>
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QUESTIONS
THANK YOU