Glasswood Project

Sam Hagerman
Hammer & Hand
GLASSWOOD OFFICE
COMMERCIAL PASSIVE HOUSE RETROFIT

SAM HAGERMAN
Owner Hammer and Hand Inc.
President Passive House Alliance
Portland, OR

1020 SE HARRISON ST. PORTLAND, OREGON 97214
503.232.2447
INTRO: BUILDING HISTORY

YEAR BUILT: 1916
BABER SHOP
UPHOLSTERY SHOP
GUITAR REPAIR SHOP
MULTI-FAMILY

TFA 1380 ft²
PASSIVE: TO BE OR NOT TO BE?

SECOND LEVEL: OFFICE SPACE

<table>
<thead>
<tr>
<th>24</th>
<th>Partition Wall to Neighbor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1885.3 ft²</td>
</tr>
</tbody>
</table>

No heat losses, only considered for the heat load calculation.

MAIN LEVEL: RESTAURANT

• ADIABATIC/PARTITION
• EUROPEAN APPROACH
• PRIMARY ENERGY
• EXCEPTIONS
WALL ASSEMBLY

R-33

CODE WALL R-13 + R-3.8CI
OR U-0.064 (R-15.6)
AIR-BARRIER

PHnw Spring 2012

HAMMER & HAND

1020 SE HARRISON ST. PORTLAND, OREGON 97214

503.232.2447
WET-FLASH WINDOW DETAIL

- LIQUID-APPLIED
- AIR-TIGHT
- VAPOR PERMEABLE
- DEVELOPED LOCALLY
- RIGOROUSLY TESTED
**WINDOWS**

**CASCADIA 300 TILT & TURN**

**CARDINAL GLASS:** R-7.52  
\[U_{\text{cog}} = 0.13\]  
**SHGC 0.54**

**FIBERGLASS FRAME:** R-4.51  
\[U = 0.22\]

**INSTALLED ~ R-5**

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### Cascadia Windows & Doors

**300 Fixed Thermal performance as per EN ISO 10077-2 and EN673**

<table>
<thead>
<tr>
<th>Glazing</th>
<th>U-Factor Total Window (W/m²K)</th>
<th>U-Frame (W/m²K)</th>
<th>T</th>
<th>Ucentre of Glass (W/m²K)</th>
<th>SHGC centre of glass</th>
<th>Frame Height (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IR65-uog-Cung (360)</td>
<td>0.86</td>
<td>2.15</td>
<td>0.544</td>
<td>0.268</td>
<td>0.542</td>
<td>72.4</td>
</tr>
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<td>IR65-uog-Cung (360)</td>
<td>0.96</td>
<td>2.15</td>
<td>0.544</td>
<td>0.268</td>
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**300 Tilt & Turn Window Thermal performance as per EN ISO 10077-2 and EN673**

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<th>SHGC centre of glass</th>
<th>Frame Height (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IR65-uog-Cung (360)</td>
<td>0.80</td>
<td>2.26</td>
<td>0.496</td>
<td>0.269</td>
<td>0.542</td>
<td>72.4</td>
</tr>
<tr>
<td>IR65-uog-Cung (360)</td>
<td>1.00</td>
<td>2.26</td>
<td>0.496</td>
<td>0.269</td>
<td>0.542</td>
<td>72.4</td>
</tr>
</tbody>
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**301 Door Thermal performance as per EN ISO 10077-2 and EN673**

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</tr>
</thead>
<tbody>
<tr>
<td>IR65-uog-Cung (360)</td>
<td>1.00</td>
<td>2.23</td>
<td>0.460</td>
<td>0.289</td>
<td>0.542</td>
<td>34.7</td>
</tr>
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<td>IR65-uog-Cung (360)</td>
<td>1.00</td>
<td>2.23</td>
<td>0.460</td>
<td>0.289</td>
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LIGHTING

- **DAYLIGHTING SENSORS**
- **CODE 0.92 w/sf**
- **GOAL=50%+ REDUCTION**
- **LIGHTWAY SOLAR TUBES?**
MECHANICALS

SINGLE HEAD DUCTLESS MINI-SPLIT
ZEHNDER COMFOAIR 550
HEAT PUMP WATER HEATER*

\[
\frac{1}{EF} + \frac{1}{COP} \left(1 - \frac{1}{EF}\right)
\]
COST: CODE VS PASSIVE HOUSE

~$15 SF ADDITIONAL COST FOR PASSIVE HOUSE UPGRADE
PUMPKIN RIDGE PASSIVE HOUSE

WEST ELEVATION

NORTH ELEVATION

EAST ELEVATION

SOUTH ELEVATION
PUMPKIN RIDGE PASSIVE HOUSE

Solar Site Survey Results for: Farris 1

1020 SE HARRISON ST. PORTLAND, OREGON 97214 503.232.2447
PUMPKIN RIDGE PASSIVE HOUSE

- WINDOW VALUE ENGINEERING
- LESS FRAME MORE = MORE GLASS
- GLASS PERFORMANCE > FRAME
  - > SOLAR GAIN
  - < HEAT LOSS
PUMPKIN RIDGE PASSIVE HOUSE

- TJI LARSEN TRUSS
- CELLULOSE INSULATION 20,000+ lbs
- AIR-BARRIER AND SERVICE CAVITY
- CONTINUOUS FOAM BELOW GRADE
McMinnville Habitat for Humanity

Matthew Daby
m.o.daby design llc
DESIGN:
Matthew Daby / m.o.daby design

PASSIVE HOUSE CONSULTANT:
Graham Wright / Wright on Sustainability

A case study of the challenges and considerations when design meets affordable housing meets Passive House.

A McMinnville Area

HABITAT FOR HUMANITY Development
• 3.5 acre site (Approximately 235 ft. x 600 ft.)
• Existing streets to the N and E
• Major highway and frontage road to the S and SW
• Single family residential neighborhood to the N, NE, and SE
• Commercial development to the SE
• Church, parking lot, and utility station to the W
• Highly visible site at the entrance to McMinnville
THE RESPONSIBILITY

McMinnville Area
Habitat for Humanity®

OUR MISSION is to partner with low-income families by offering homeownership opportunities through the construction of simple, safe and affordable homes.

OUR VISION is a community where substandard housing no longer exists.

✓ HIGHLY ENERGY EFFICIENT

✓ EXTREMELY LOW OPERATION COST

✓ LOW MAINTENANCE
1. For the families: Passive House is the best suited building standard to fulfill that responsibility.

2. For Passive House: To see if the standard can be achieved in the face of challenging requirements.
THE CHALLENGE

DENSITY
MULTIPLE
SHADING
CONDITIONS
AUTO ACCESS
VOLUNTEER
LABOR
WALL THICKNESS
STANDARIZED
SYSTEMS

GREENSPACE
AFFORDABILITY
ACCESSIBILITY
FAMILIAR
MATERIALS
& PROCESS
PEDESTRIAN
FRIENDLY
VIEWS

SOLAR ACCESS
CONTEXT
SMALL TREATED
FLOOR AREA
PASSIVE HOUSE

AESTHETIC
VARIETY

35 UNITS
• R-65 FIBERGLASS / RAISED HEAL TRUSS ROOF
• R-59 DOUBLE 2X4 STUD WALLS / FIBERGLASS @ 14” THICK
• R-50 SLAB ON GRADE CONCRETE / 8” EPS FLOOR
• THERMALLY BROKEN 2 POUR FOUNDATION WALL / FLOOR
• EXTERIOR O.S.B. / SIGA TAPE AIR BARRIER
• O.S.B. / SIGA TAPE AIR BARRIER INSTALLED UNDER ROOF TRUSSES
• 2X6 CEILING JOISTS AS INSTALLATION LAYER
• ZEHNDER COMFOAIR 200 H.R.V.
• WINDOWS? (CURRENTLY U = 0.20 CASCADE. NEED 0.16 FOR PASSIVE HOUSE)
THE PROTOTYPE: (PASSIVE HOUSE?)
WE WANT YOUR WINDOWS & DOORS.

m.o.dabydesign

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