

BERNHARDT PASSIVE HOME

Efficient by Design

BC BUILDING ENVELOPE COUNCIL
 FEBRUARY 20, 2013
 VICTORIA, BC



Why

- Fundamentally the right thing to do
 - Part of climate change solution
- Fundamentally good for business
 - Building performance not expensive if baked in
 - An improved enclosure reduces life cycle costs and increases market value

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CASCADIA ARCHITECTS
DAMANT # JOHANNKNECHT

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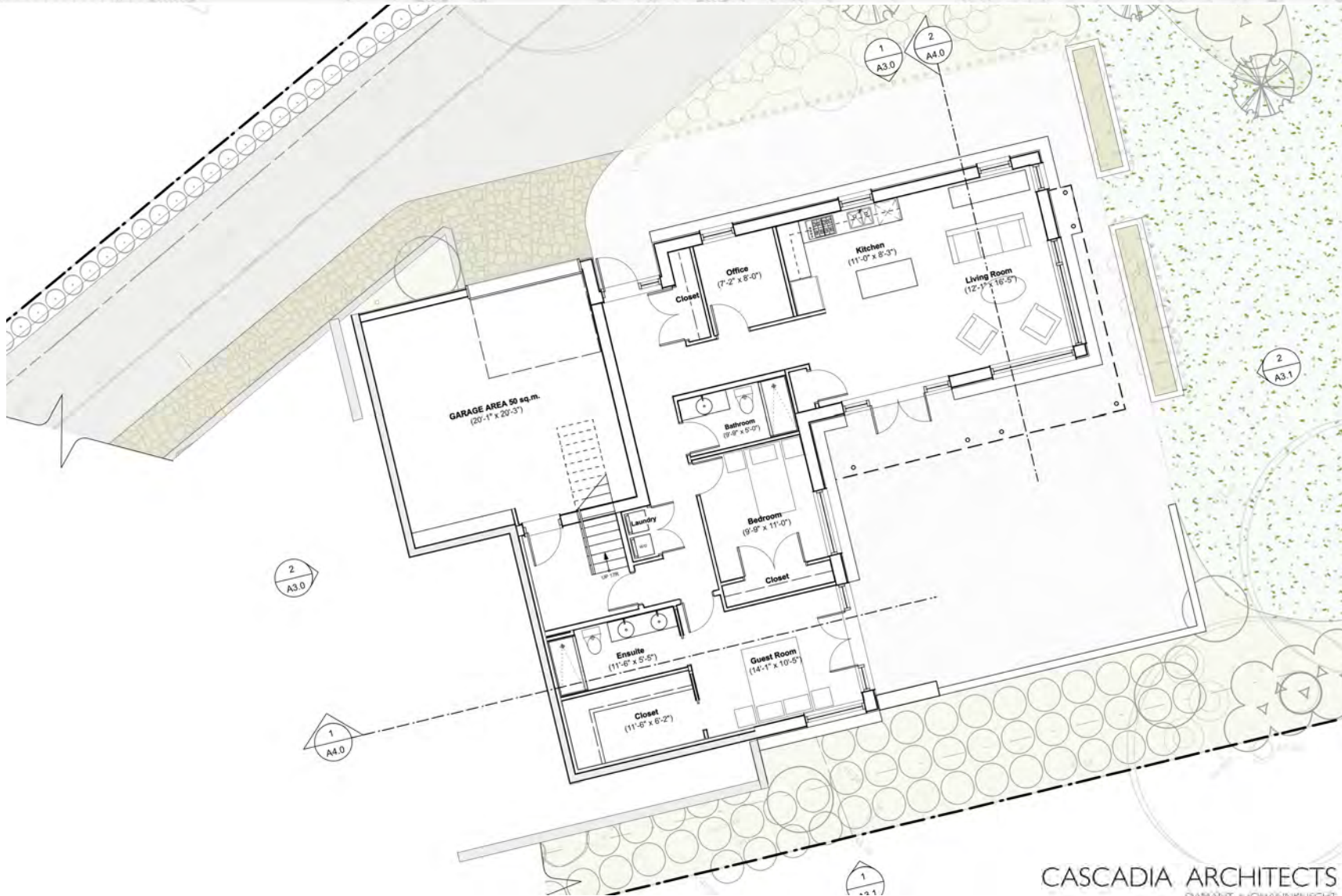
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CASCADIA ARCHITECTS
DAMANT + JOHANNKEICHT

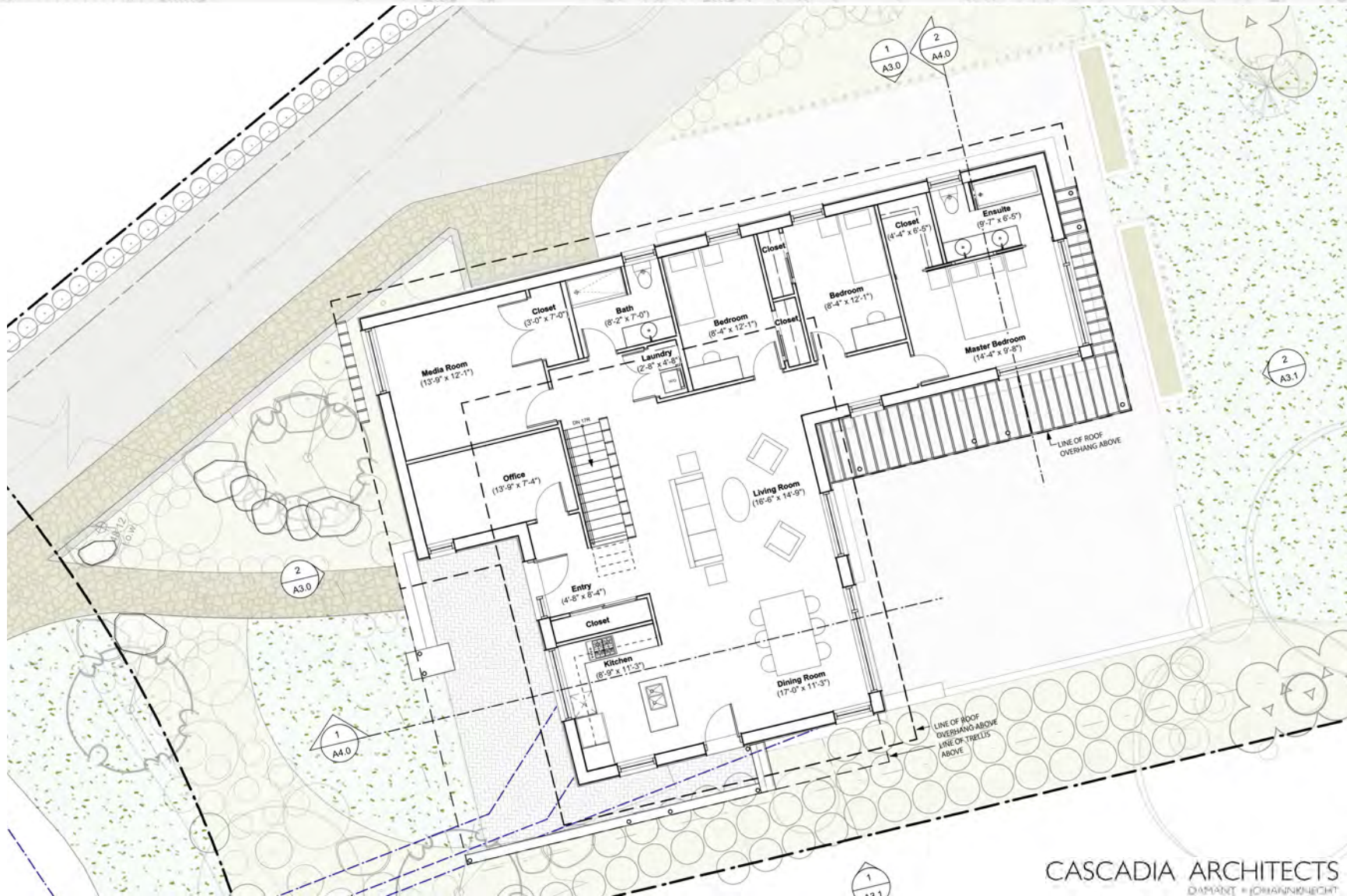
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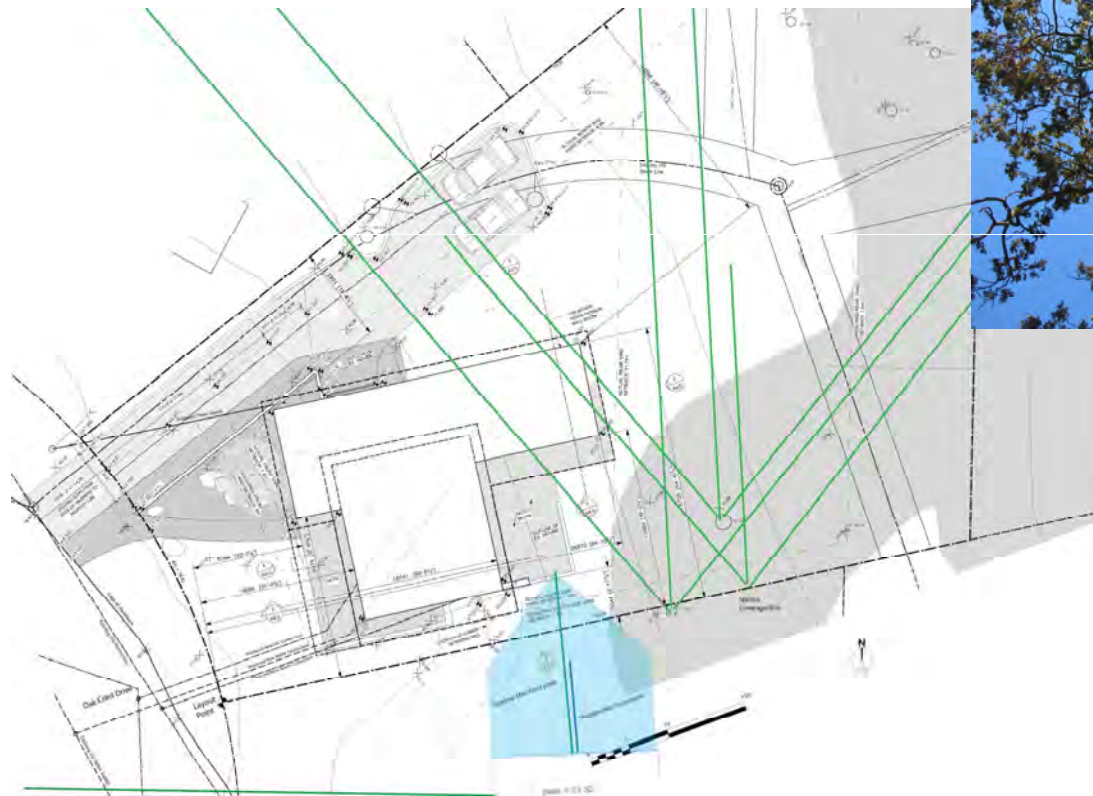
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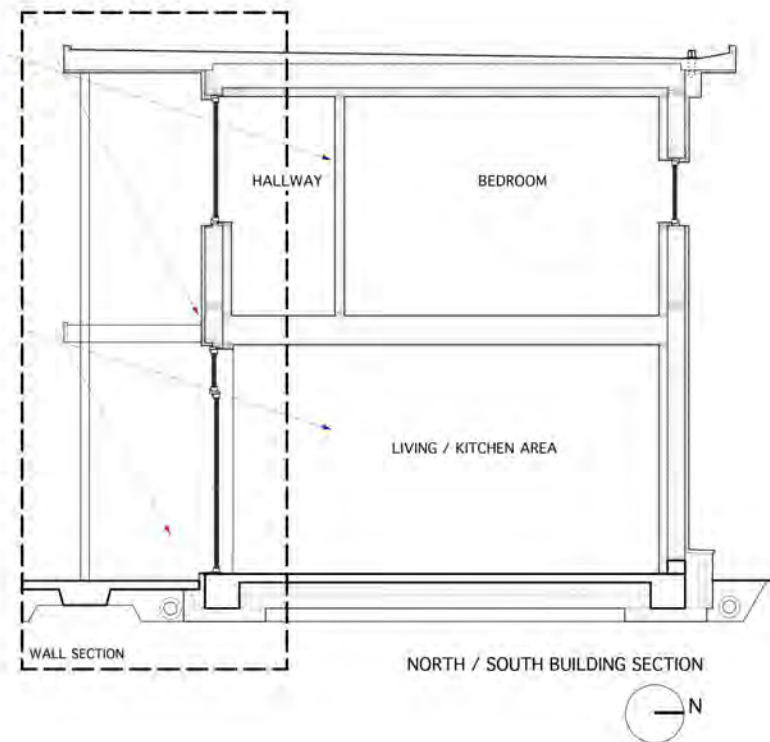
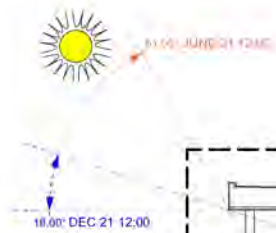
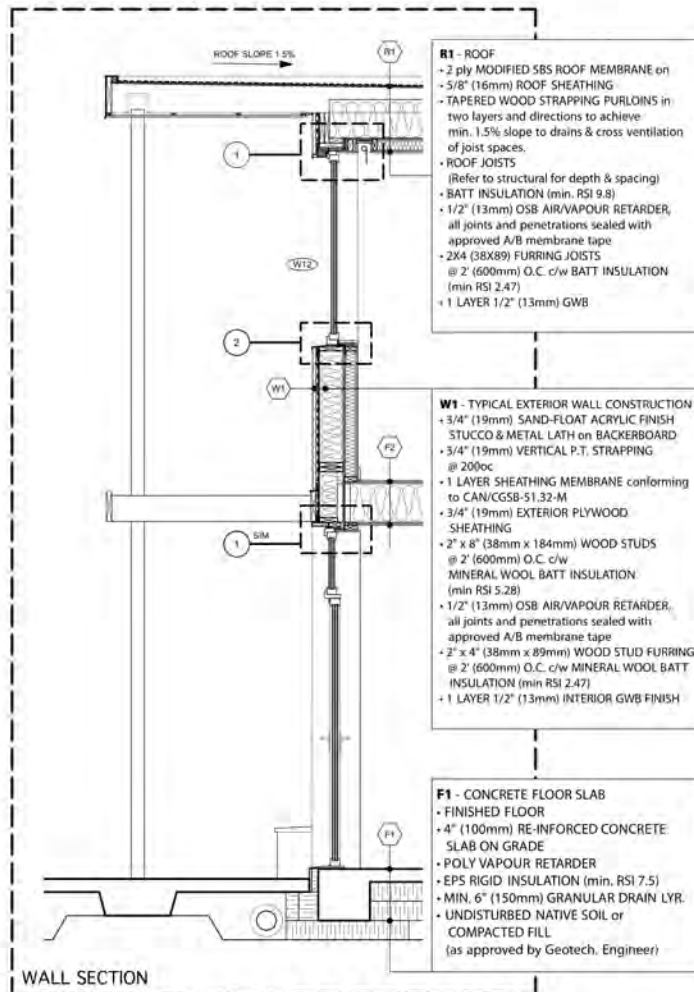
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Natural Shading



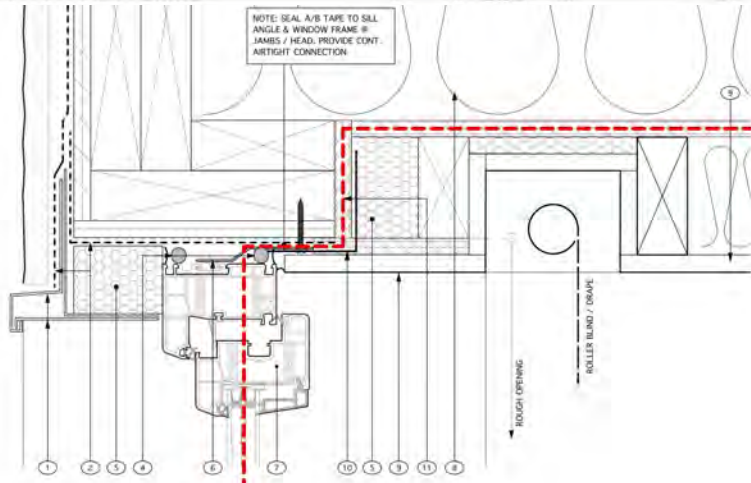
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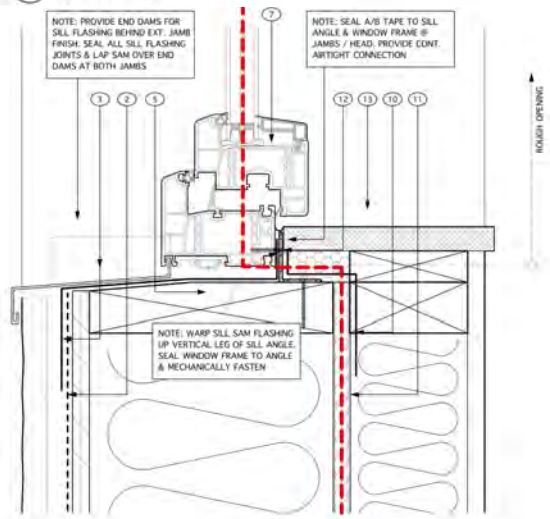


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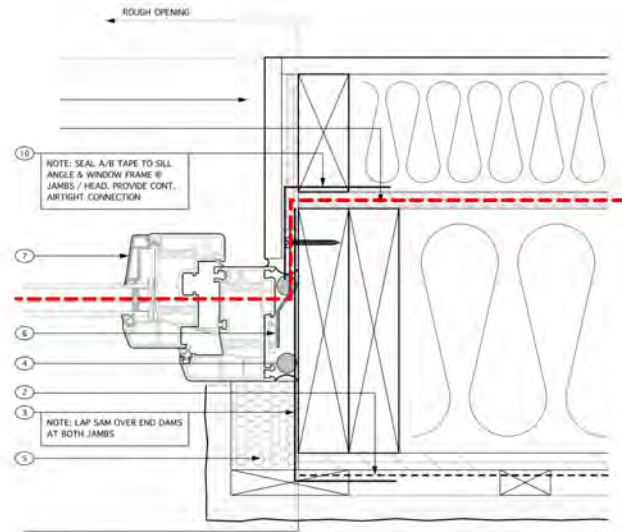
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1 Head detail - Tilt & Turn window
Scale: Half Actual Size



2 Sill detail - Tilt & Turn window
Scale: Half Actual Size



3 Jamb detail - Tilt & Turn window
Scale: Half Actual Size

NOTE LEGEND

- 1 1/2" x 1/4" 22ga. METAL FLASHING
- 2 BUILDING WRAP
- 3 SELF-ADHERING W/P MEMBRANE (SAM)
- 4 CONT. FLEXIBLE EXT. GRADE SEALANT & FOAM BACKER ROD - FRONT AND BACK OF WINDOW FRAME
- 5 RIGID INSULATION
- 6 WINDOW REBATE FASTENER CLIP
- 7 WINDOW FRAME & GLAZING TO MEET RHPV PERFORMANCE REQ'TS.
- 8 JUST SPACE w BATT INSULATION - SEE ASSEMBLY LISTINGS
- 9 GYPSUM WALLBOARD
- 10 SELF-ADHERING A/B TAPE & SEALANT PROVIDE CONT. CONNECTION OF USE A/B LTK WITH WINDOW FRAME
- 11 DSB A/B LAYER
- 12 CONT. 1/2" x 1/2" ALUM. SILL METALL ANGLE
- 13 1" ENG. w SOLID STONE SILL

Slab Construction

Foam Tray



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- Slab construction



Wall Installation

- Walls panels
- Flat trusses for roof
- TJI joists between floors hung on lintel inside walls



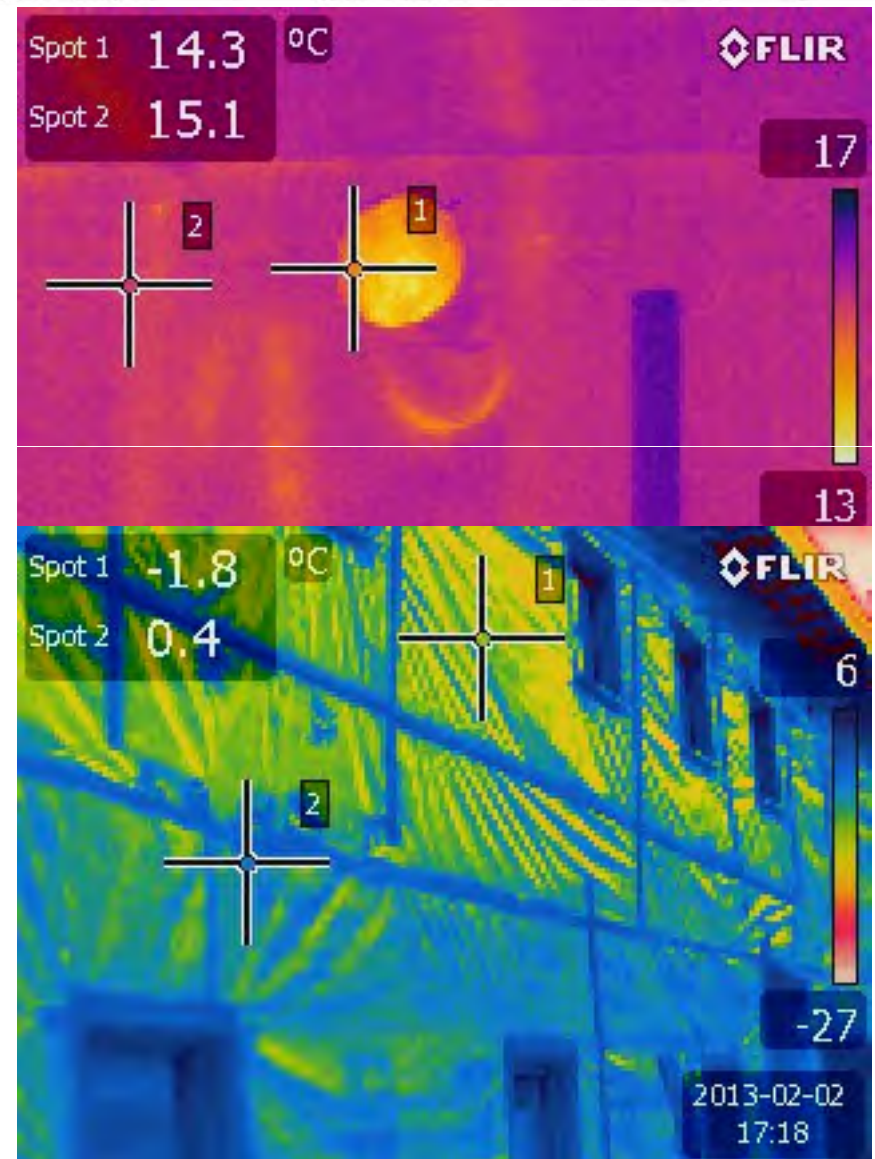
Wall assembly

- Plywood exterior sheathing
- 2 X 8 studs 2' o.c.
- OSB interior vapor & air barrier taped with SIGA tapes
- OSB continuous from concrete to top of wall and across ceiling
- 2 X 4 service cavity installed inside OSB after first blower door test

Wall & Ceiling

Insulation

- Blown in cellulose, 5 year guarantee
- Rock wool bats in ceiling
- Checked for gaps & thermal bridges with thermal imaging camera



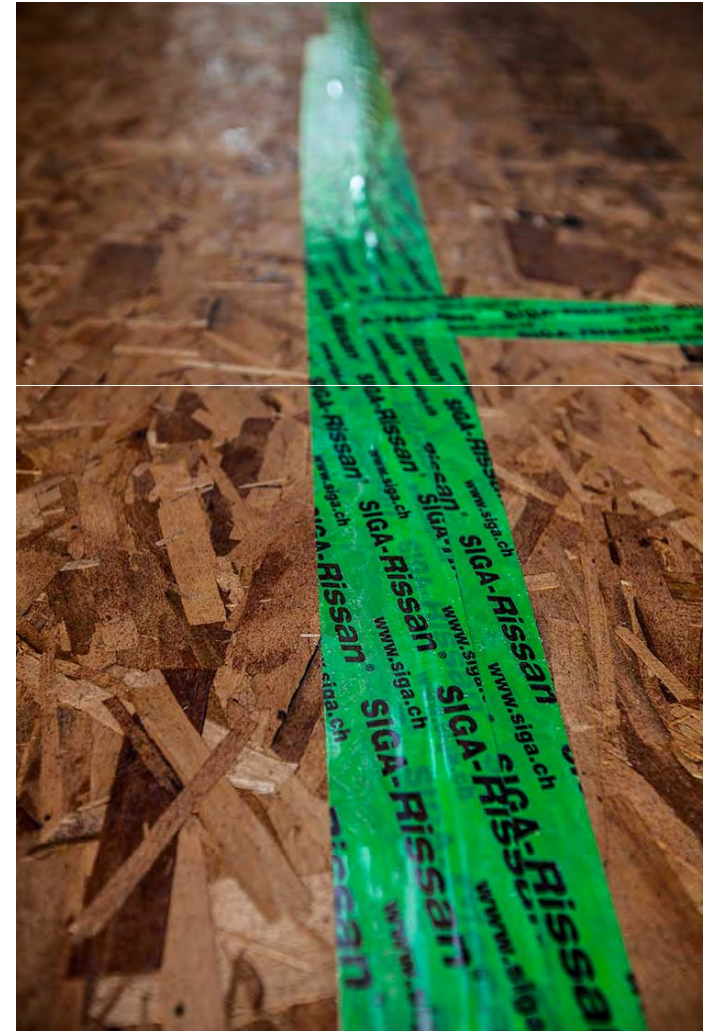
Air tightness

- Achieved primarily through continuous interior air barrier not subject to penetrations.
- High quality windows and doors
- Use appropriate air sealing products
- Reduced aperture blower door unit
- Use thermal imaging camera to locate leaks
- Results: 0.27 pressurization, 0.35 depressurization

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- Air tightness



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Building Solutions

- Plumbing & mechanical
 - Zehnder HRV
 - Gas DHW with hydronic coil for space heating
- Electrical
 - Lighter loads
 - Bathroom & kitchen exhaust part of HRV
 - Wireless power consumption monitoring
 - Minimize envelope penetrations.

Windows & Doors

- Impact of alternate SHG coefficients
- Thermal bridge free window installation
- Quality windows & doors provide long term comfort & performance



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- PHPP results
 - Specific Space Heating Demand: 11kWh/(m²a)
 - Heating Load: 11 W/m²
 - Specific Primary Energy Demand: 76 kWh/(m²a)

Cost Savings – Comparable Building requires:

- In floor heating & wall radiators
- Heat distribution runs to perimeter
- Make up air for range hood
- Mechanical cooling
- Larger heat source
- Kitchen and bathroom vents

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Cost Comparison

Same House Same Location Same Contractor

	Passive Construction Costs	Conventional Construction Costs
Design	\$30,000.00	\$25,000.00
Concrete slab, walls, Foam insulation	\$45,000.00	\$35,000.00
Wood framing	\$62,000.00	\$52,000.00
Windows & doors	\$42,500.00	\$33,000.00
HRV, heating and air management	\$9,000.00	\$36,500.00
Electrical	\$17,000.00	\$20,000.00
Insulation - walls & ceilings	\$12,000.00	\$8,000.00
All other costs - contractor fees, plumbing, interior and exterior finishing. Landscaping, roofing	\$421,000.00	\$421,000.00
Total Construction Cost	\$638,500.00	\$630,500.00

Cost of living

	Passive Construction Costs	Conventional Construction Costs
Cost of Energy Per month	~\$75.00	~\$210.00
Extra mortgage costs	~\$42.00	\$0.00
Total Cost of living per month	\$117.00	\$210.00

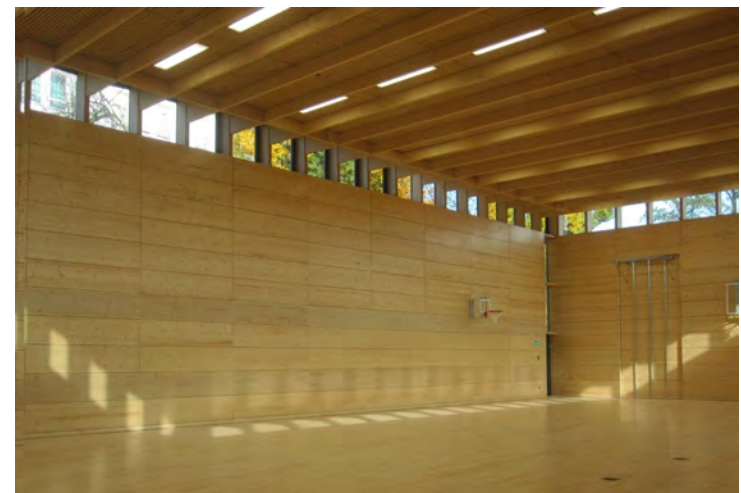
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Victoria Truss 2007 LTD 

canem™



**BERNHARDT
CONTRACTING** LTD



**EuroLine
Windows INC.**

City Service
PLUMBING & HEATING

Thank You

on behalf of Bernhardt Passive Home

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