PHANTOM LAKE PASSIVHAUS
Lessons from the Field

Passive House Northwest
9th Annual Conference
30 March 2018

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Sunshine Construction

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VELOCIPEDE architects

(Dan Whitmore
Indicator Consulting)
view of lake to south

street

driveway

garage

house

trees

flood line

view

wetland

lake

tall trees shade house

view of lake to south
south side, lake view
south side, lake view
north side, entry
north side, entry
great room
great room
2-story house, attached garage
TFA = 2790 ft²
great room
4 bedrooms
3-1/2 bathrooms
3-car garage with storage loft
slab = R-40
10” EPS

roof = R-83
9-1/4” EPS
11-7/8” BIBs

wall = R-45
4” polyiso
5-1/2” BIBs

envelope, air barrier
roof, primary joists
outrigger

roof, overhang outriggers
typical section
typical section at entry tower

roof cricket
ATTACHED GARAGE
at attached garage
at attached garage

typical section
1-1/2" = 1'-0"

CONCRETE SLAB
FREE-DRAIN GRAVEL
10 MIL POLY AIR BARRIER (DASHED)
LAP OVER STEMWALL
ACOUSTICAL SEALANT
WALL BASE
2" EPS CONT AT PERIMETER
6" EPS FOAM

INSULATION
GWB

1/2" PLYWOOD WITH TAPED SEAMS (AIR BARRIER)
2x6's AT 24" OC
WEATHER WRAP (DASHED) LAP OVER METAL FLASHING AT STEMWALL
SIDING
FURRING (3/4" DRAINAGE PLANE)
4" POLYISO OUTSULATION
APPLY SPRAY FOAM AROUND ALL HOLD-DOWNS
METAL FLASHING AT STEMWALL, LAP UP WALL, WITH METAL DRIP EDGE, HEMMED
CONCRETE FOUNDATION STEMWALL OFFSET FROM OUTSIDE FACE OF STUD 4-1/2"

FACE OF FRAMING (GRID)
at attached garage

typical section
at attached garage

typical section
UPPER FLOOR AT EXTERIOR WALL

1-1/2" = 1'-0"

WRB

CAVITY INSULATION AT RIM

SEE DETAIL 1A7.1 FOR NOTES IN COMMON
at attached garage

typical section
PIN PILES
footings outside envelope
15 pin piles inside envelope
pin pile installation
interior pin piles
Continuous air barrier
continuous insulation
(2) ROWS OF PANEL EDGE NAILING OVER HOLDOWN POST

SHEATHING CAN BE PLACED ON EITHER SIDE OF WALL

SHEARWALL PER PLAN

(3) #4 CONT TOP AND BOT

(5/8" Ø AT 48"oc ELSEWHERE)

1'-6"

RIGID INSULATION PER ARCH

2x PLATE OVER 40 MIL VYCOR RUBBER TAPE w/ AB PER SHEARWALL SCHEDULE

SLAB ON GRADE PER PLAN

HOLDOWN PER PLAN

PIPE PILE PER PLAN

pin pile penetration
penetrates insulation  
penetrates air barrier
interior climate

4” concrete slab

10” EPS foam

soil

HTflux materials
HTflux temperature
Heat Flux View

Simulation resolution: 0.1 in; Cell count: 950,813

T-B #2 Pin Piles

$\Psi = 0.201 \text{ BTU/h.ft}^2\text{F}$

$U_{2u} = 0.028 \text{ BTU/h. ft}^2\text{F (8.347 in)}$

$U_{1u} = 0.031 \text{ BTU/h. ft}^2\text{F}$

HTflux heat flux
**Transmission heat losses - thermal bridges**

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**WUFI Passive report**
LIFT AND SLIDE SILL
(3) Generous beads of acoustical sealant

Align

1/4" gap with caulk

Wood threshold w/ 1/2" roundover

Air barrier lap over top of stem wall

Bead of adhesive

Jamb beyond

Provide 1/2" gap between ledger & concrete w/ 1/2" deck spacers

Sill at lift & slide

3" = 1'-0"
1/8" GAP WITH CAULK
WOOD THRESHOLD W/ 1/2" ROUNDOVER

(1) GENEROUS BEAD OF ACOUSTICAL SEALANT

ALIGN

PROVIDE 1/2" GAP BETWEEN LEDGER & CONCRETE W/ 1/2" DECK SPACERS

EUROCLIME LIFT+SLIDE UNIT,
(BASED ON DRAWING HS.88.GU-934.00.6 DATED 2012-04-13)

JAMB BEYOND

CUSTOM SHAPED, TYPE 46,
EPS FOAM BLOCK, W/ 1/4" MITERED CORNER AT STEMWALL

SILL AT LIFT & SLIDE

3" = 1'-0"
ψ = 0.049 BTU/h.ft°F

slab at perimeter, square edge
slab at perimeter, beveled edge

Ψ = 0.025 BTU/h.ft°F
slab at perimeter, beveled edge, 2x4 mudsill
ROOF CRICKET
attached garage

typical
tower

attached garage

cricket
cricket overframed
HOUSE ROOF AT UPPER EAVE

1-1/2" = 1'-0"

typical condition
where roof meets side wall
but isolated void under cricket
outrigger back span onto main roof across cricket
outriggers back span onto main roof  east half of cricket overframed
west half has extra EPS on top of outrigger backspans

east half has EPS on top of air barrier sheathing over overframing
roofing underlayment complete at cricket
Jon’s slides start here...
QUESTION & ANSWER
Passive House
Winter Construction
Ready to air seal the roof?
Passive House

Winter Construction

Options for rain season framing:

• Tarp as you go & dry after weathering in

• Full shrink wrap

• Wait until spring
Passive House
Winter Construction

• Tarp as you go & dry after weathering in

Pros:
  – Less costly tarping
  – May keep job on schedule
  – The hope that this winter will be dryer than usual

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Air Sealing the Roof
Roof Tarping
Roof System

• Not all 2x10’s are 9 ¼”
• EPS ordered as 4 5/8” came as 4 ½”
• No good way to dry if 2x10’s, EPS or upper sheathing installed when wet
• Pre-drying 2x10 & sheathing & hoping for enough time without rain
Air Sealing the Roof
Roof System

• Furring up sheathing
• Placing EPS
• Foaming around EPS
• Hoping not to damage Prosco seams on lower roof
• Alternative assembly Options for rain season? One sided SIPs panels?
Roof System
Other Tarping Options
Shrink Wrap Tarping

60x40 area, 32’ high, for New Construction

Ballpark costs:

• $17,500 Scaffolding rental for 4 weeks, setup & take down
• ($1200 for each additional month)
• $12,600 Shrink wrapping
Shrink Wrap Tarping

Possible savings:
• Less framing labor
• Faster air sealing
• Less tarping
• No drying time & costs

Less plastic tarping
Drying the House

Framing below 16% RH before insulation
• Fans & spot heaters until its fully enclosed
• Heaters & humidifiers after enclosure
• Sub-flooring, under plates & beams longest to dry
• Removing mold on lumber
Air Sealing the Foundation

Concrete polisher asking for 2” above radiant tubes making for a 5” thick slab

Siga Fentrim (black) & Wiglov (white) 10 mil Peminator VB
Air Sealing the walls
Air Sealing the walls

• When to use SIGA tape
• When to use Prosoco

SIGA Wigluv & Prosoco Joint Seam Sealer

SIGA Wigluv tape lets light through
Installing Windows & Doors

- Extra ½” under Lift & Slide door important to getting it dead level
Installing Windows & Doors

- Using a Chain Hoist & the Spider
Working with the Client

• How detail oriented? How involved?
• Managing expectations
• The budget & transparency
• Trust issues
• Learning to treat everyone well
Motivating & Training Subs

- Framers
- Electricians & Plumbers
- HVAC
- Air sealing specialty team
Learning Opportunities for Field Workers

- Builder’s workshop
- Conferences & tours
- Colleagues
- Skill specific training workshops
- YouTubes
- Consultant & product reps
- 1 day a week internship/training for air sealing & installing windows & doors-for someone who helps the job
- Flashcards
Jon’s slides start here...