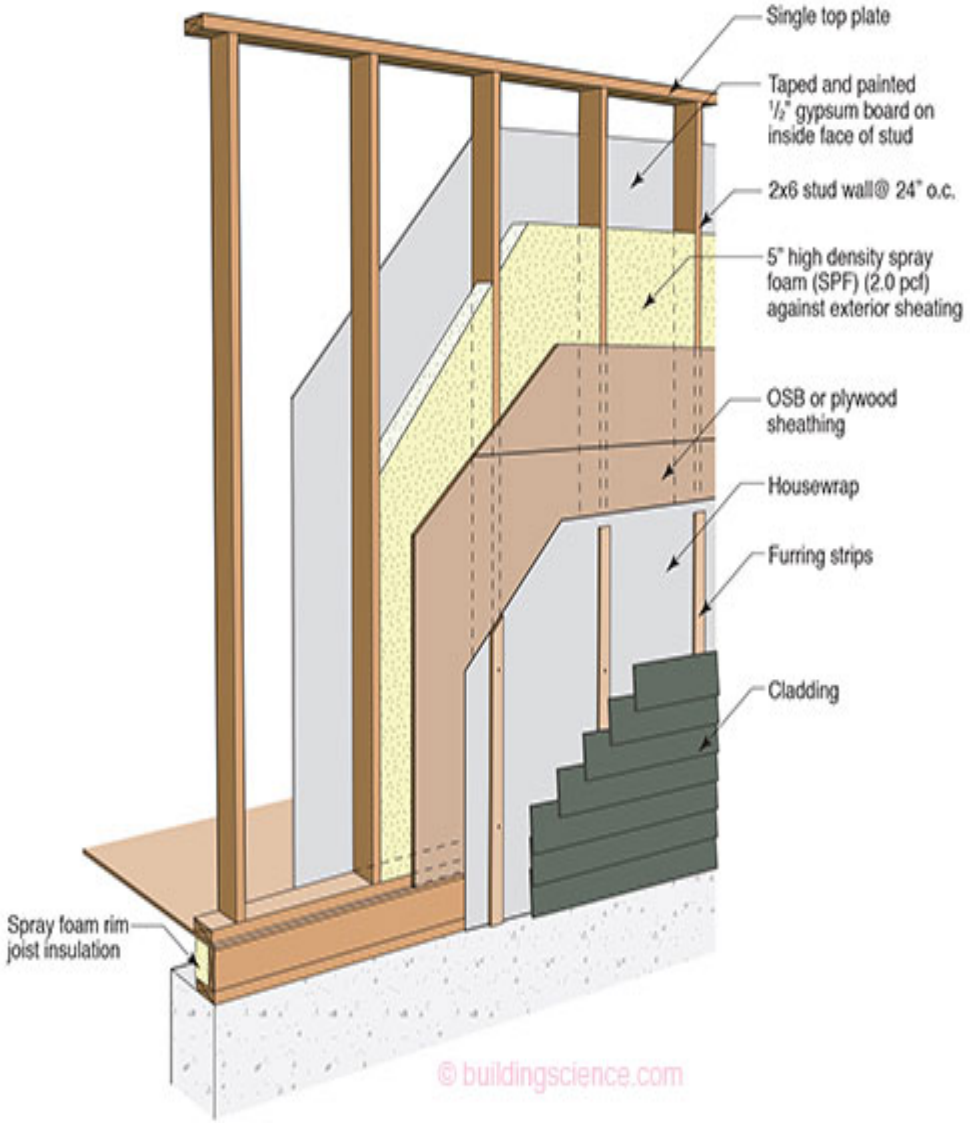
OBSERVATIONS ON MANUFACTURED FRAMING

North American Passive House Conference
September 2018

Typical Light Frame Construction

- Standard for residential construction as we know it
- Layers with framing continuous through insulation
- Continuous sheathing – surface for cladding and in-plane stiffness
- Impermeable air membrane – tight system
- R-20/ U-0.05



What to Replace Typical Framing with, in order to Meet High-Performance and/or Passive House Construction Metrics?

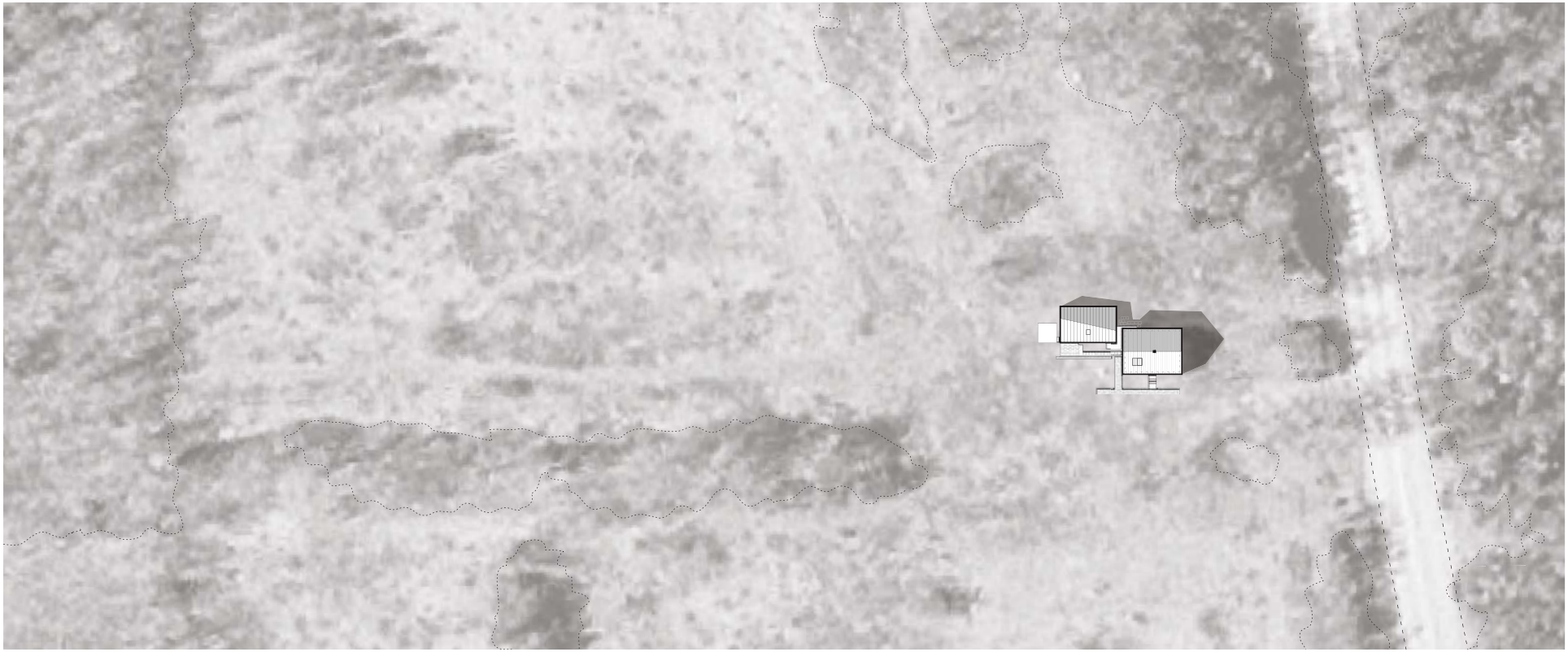
RECENT EXAMPLES

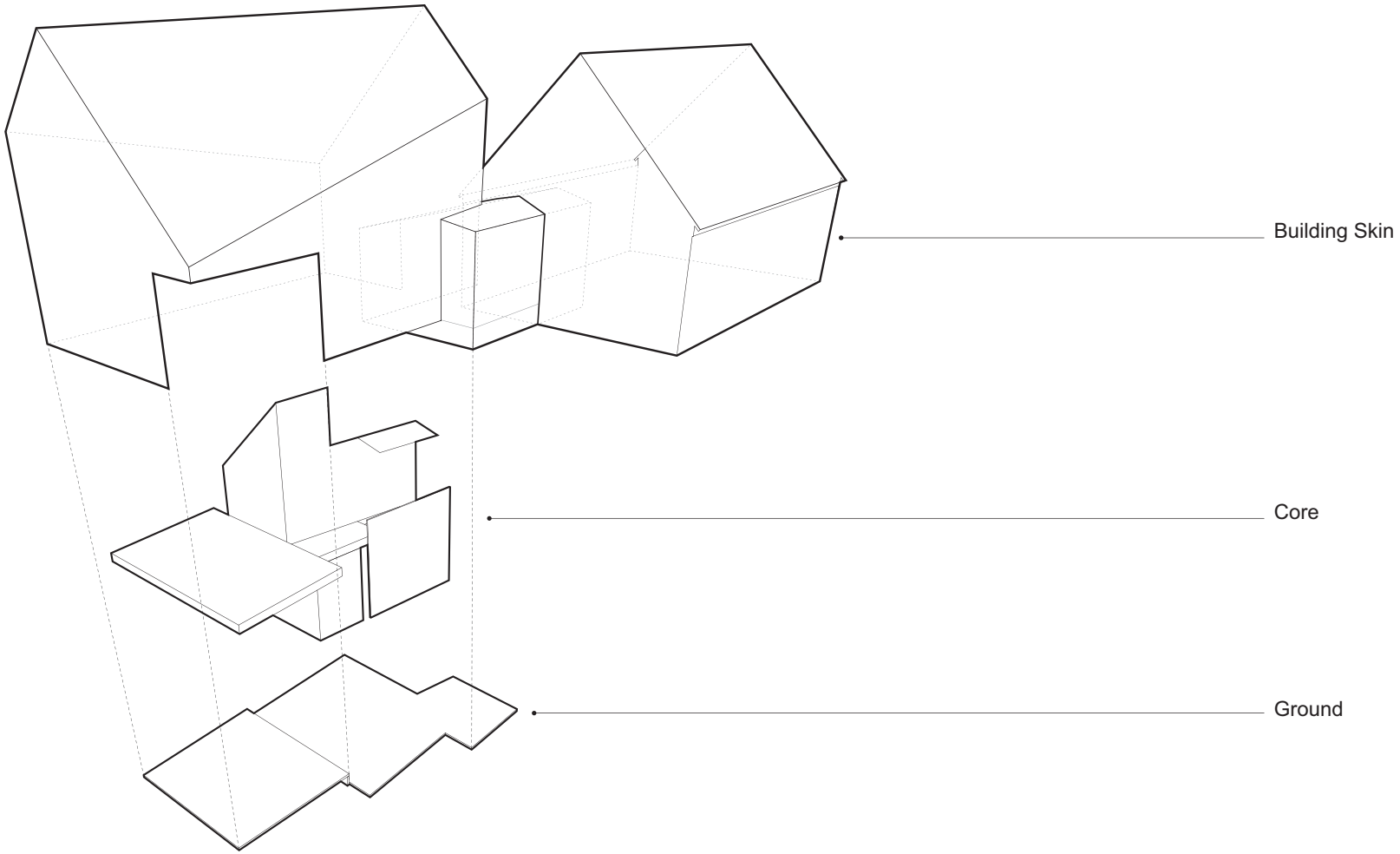
- “Klingenberg Wall”
- “Bensonwood Wall”
- “Eco-cor Wall”
- “Membrane Wall”

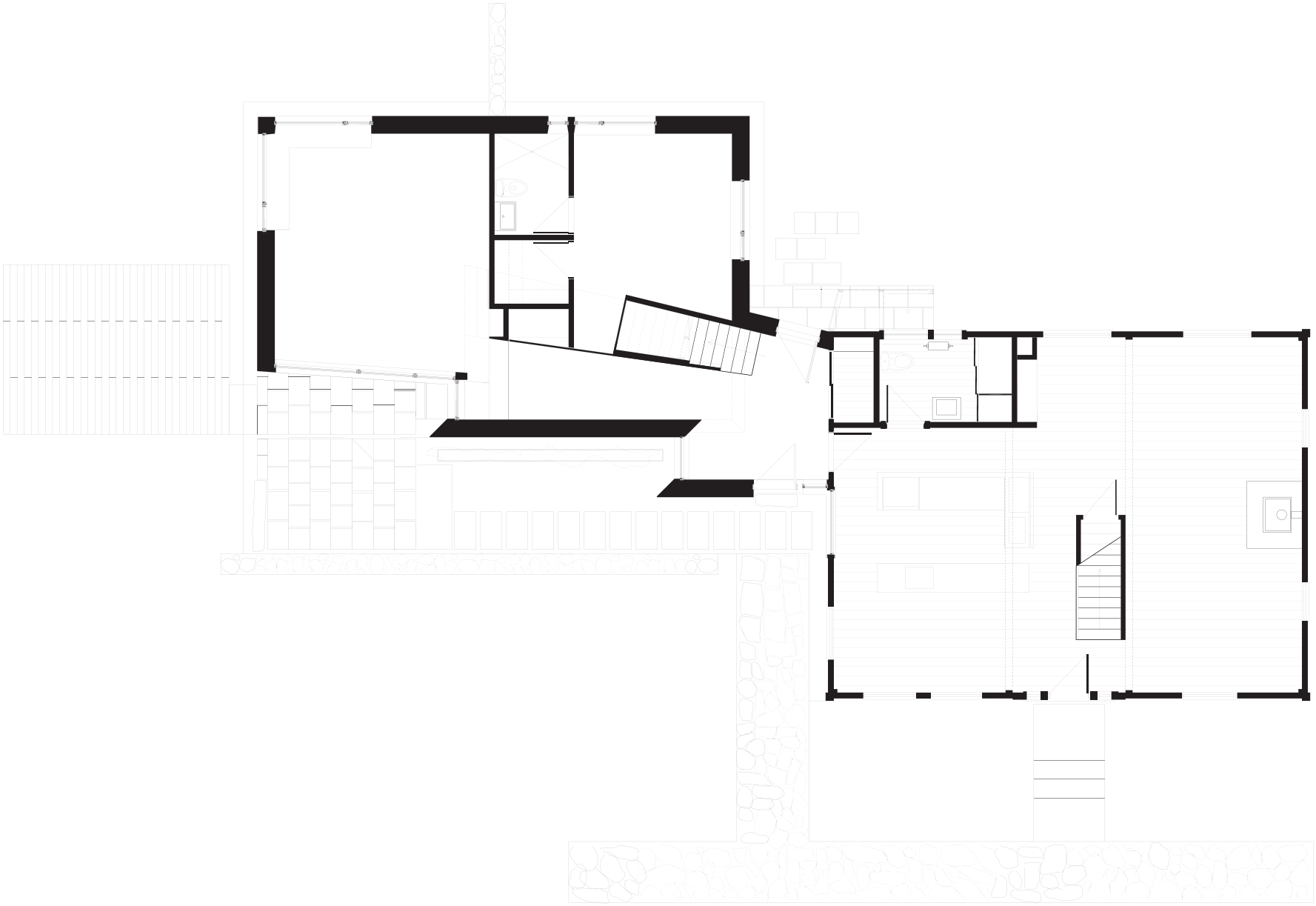
Freeman, Maine

1,700 SF/ 1,244 TFA

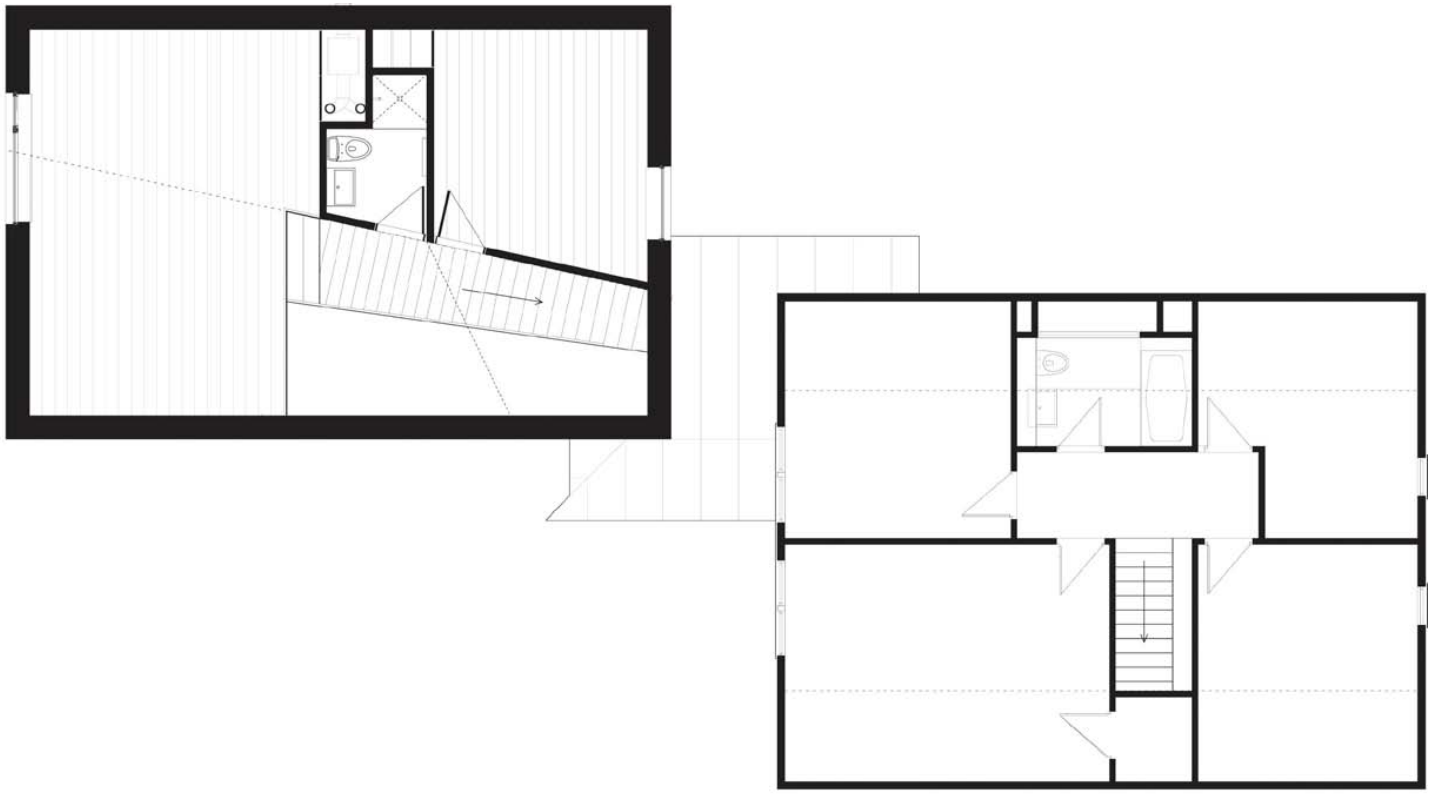
7,500 Heating Degree Days



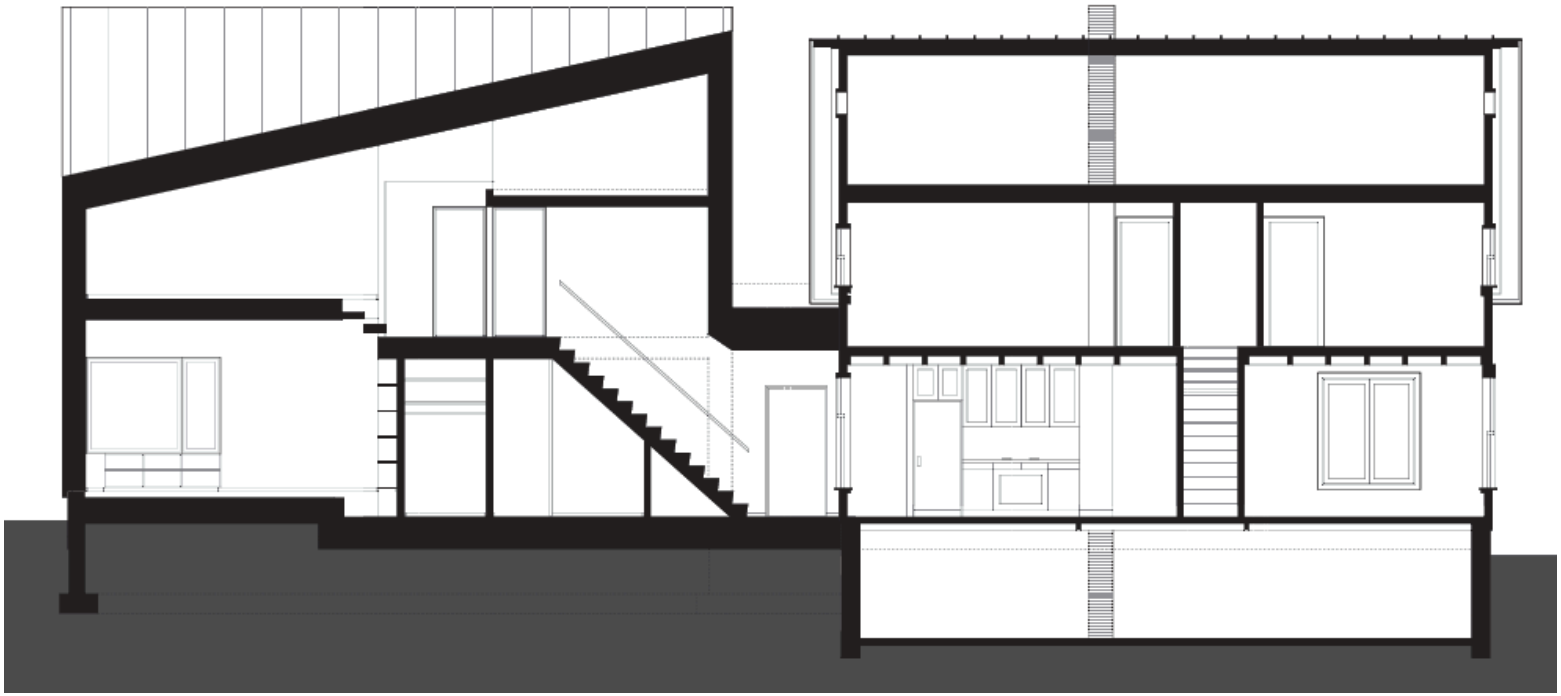

Building Skin
Core
Ground



First Floor Plan

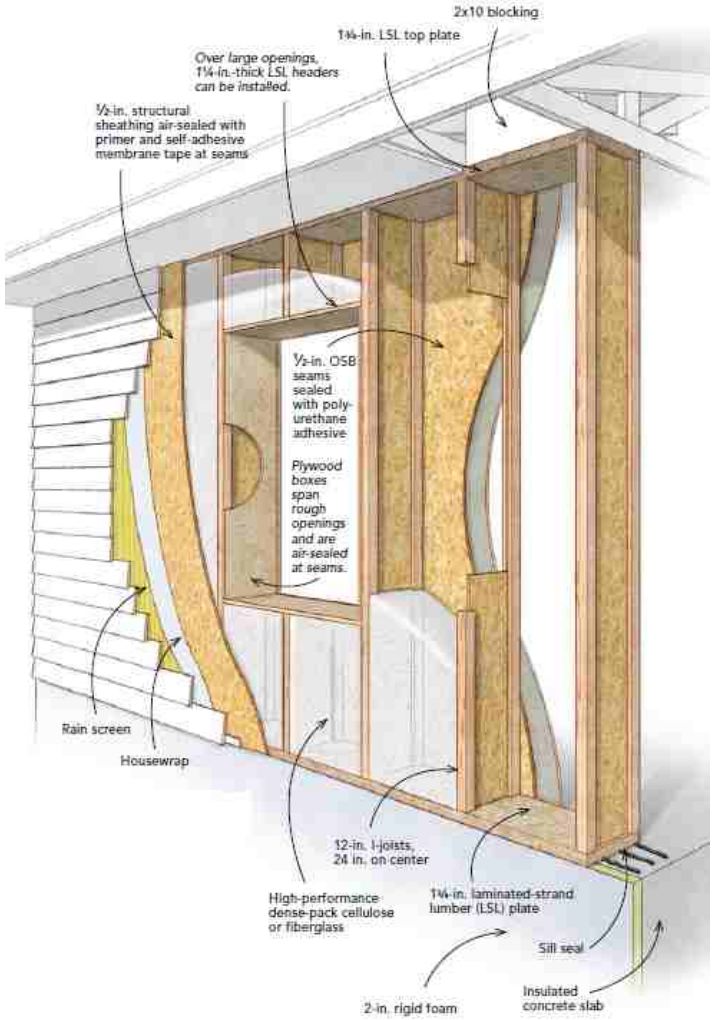


Second Floor Plan



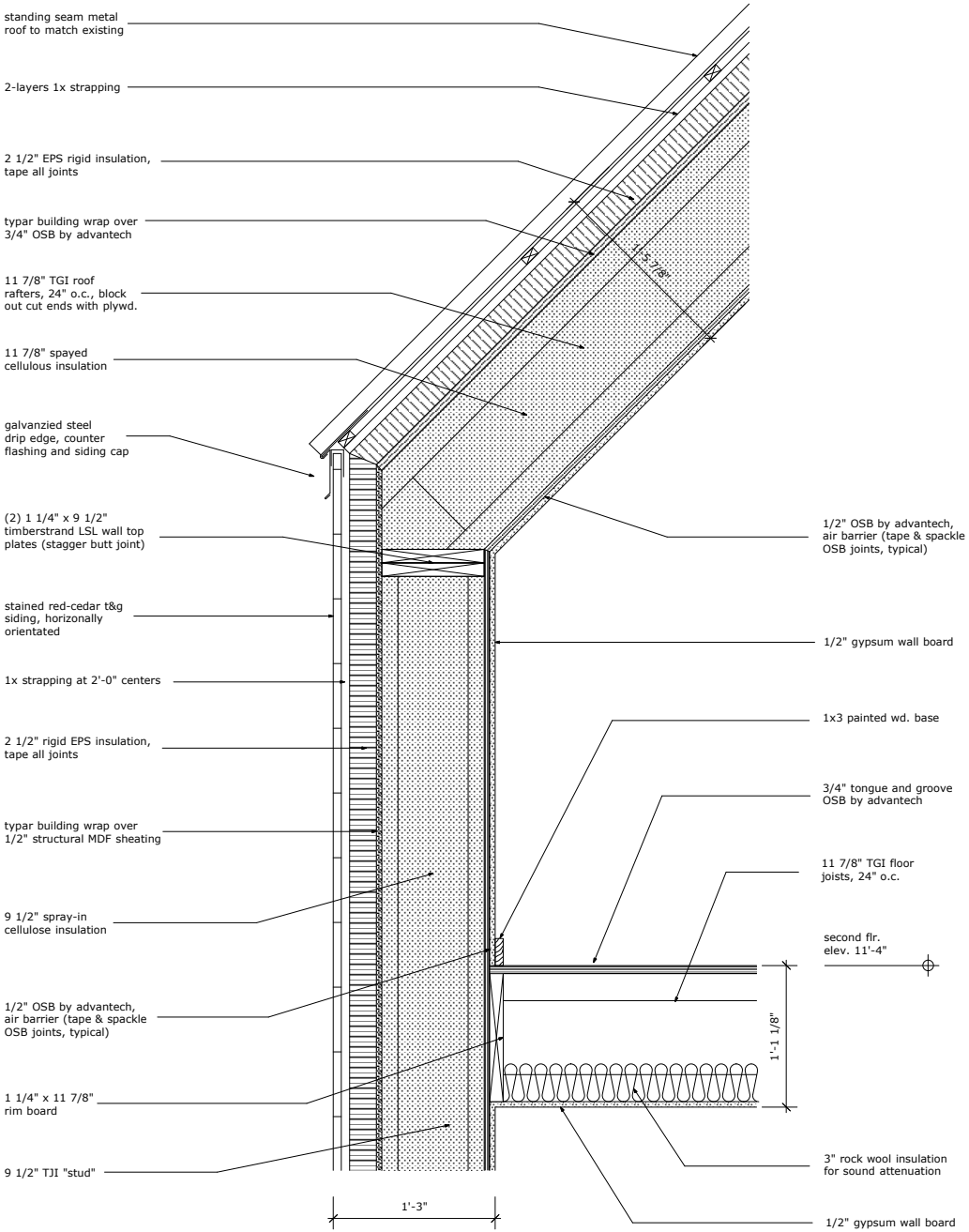
Cross Section

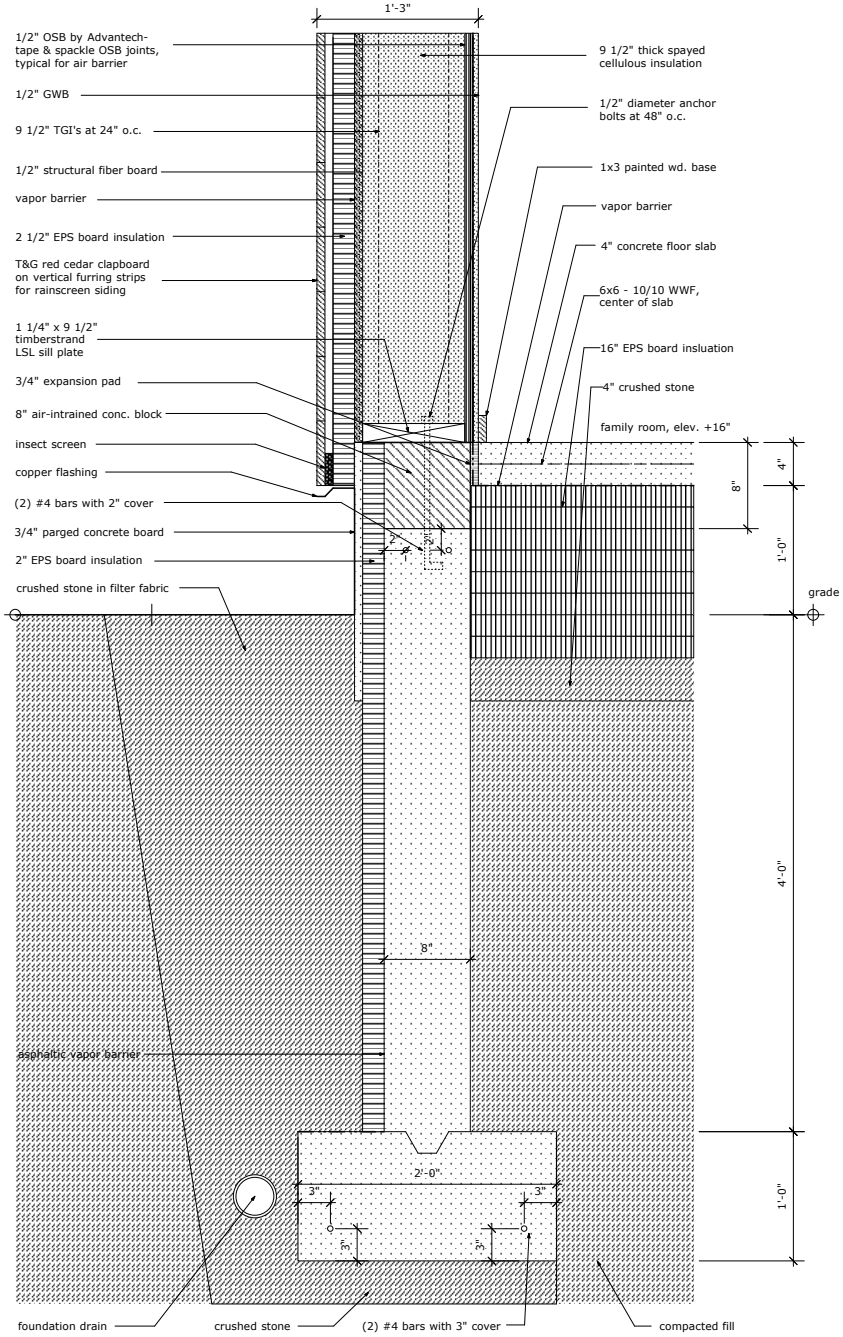
"Klingenberg Wall"



R total = 48.7

U value = .02

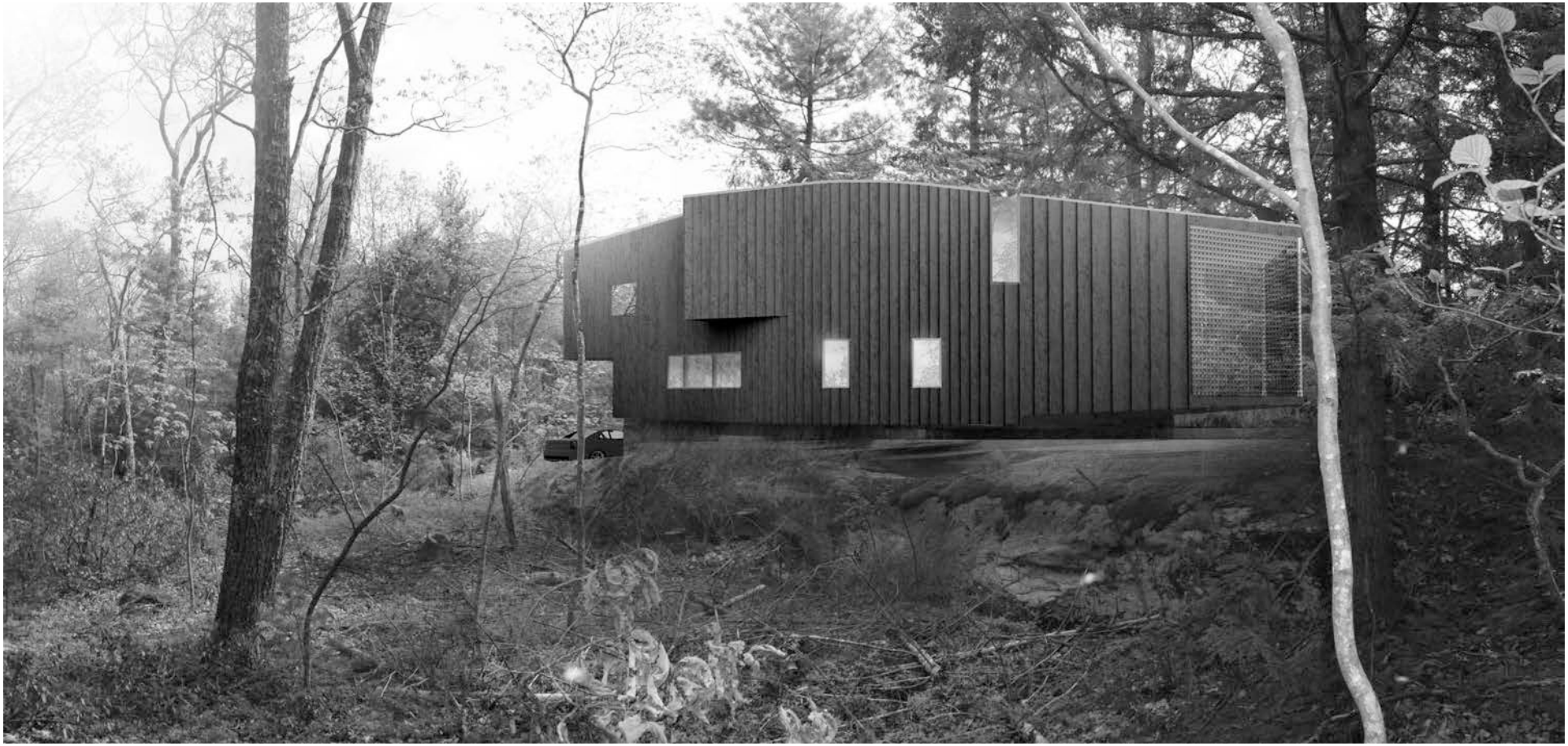

standing seam metal
roof to match existing
2-layers 1x strapping
2 1/2" EPS rigid insulation,
tape all joints
typar building wrap over
3/4" OSB by advantech
11 7/8" TGI roof
rafters, 24" o.c., block
out cut ends with plywd.
11 7/8" spayed
cellulous insulation
galvanzied steel
drip edge, counter
flashing and siding cap
(2) 1 1/4" x 9 1/2"
timberstrand LSL wall top
plates (stagger butt joint)
stained red-cedar t&g
siding, horizonally
orientated
1x strapping at 2'-0" centers
2 1/2" rigid EPS insulation,
tape all joints
typar building wrap over
1/2" structural MDF sheating
9 1/2" spray-in
cellulose insulation
1/2" OSB by advantech,
air barrier (tape & spackle
OSB joints, typical)
1 1/4" x 11 7/8"
rim board
9 1/2" TJI "stud"
1'-3"
11 7/8"
1/2" OSB by advantech,
air barrier (tape & spackle
OSB joints, typical)
1/2" gypsum wall board
1x3 painted wd. base
3/4" tongue and groove
OSB by advantech
11 7/8" TGI floor
joists, 24" o.c.
second flr.
elev. 11'-4"
1'-1 1/8"
3" rock wool insulation
for sound attenuation
1/2" gypsum wall board

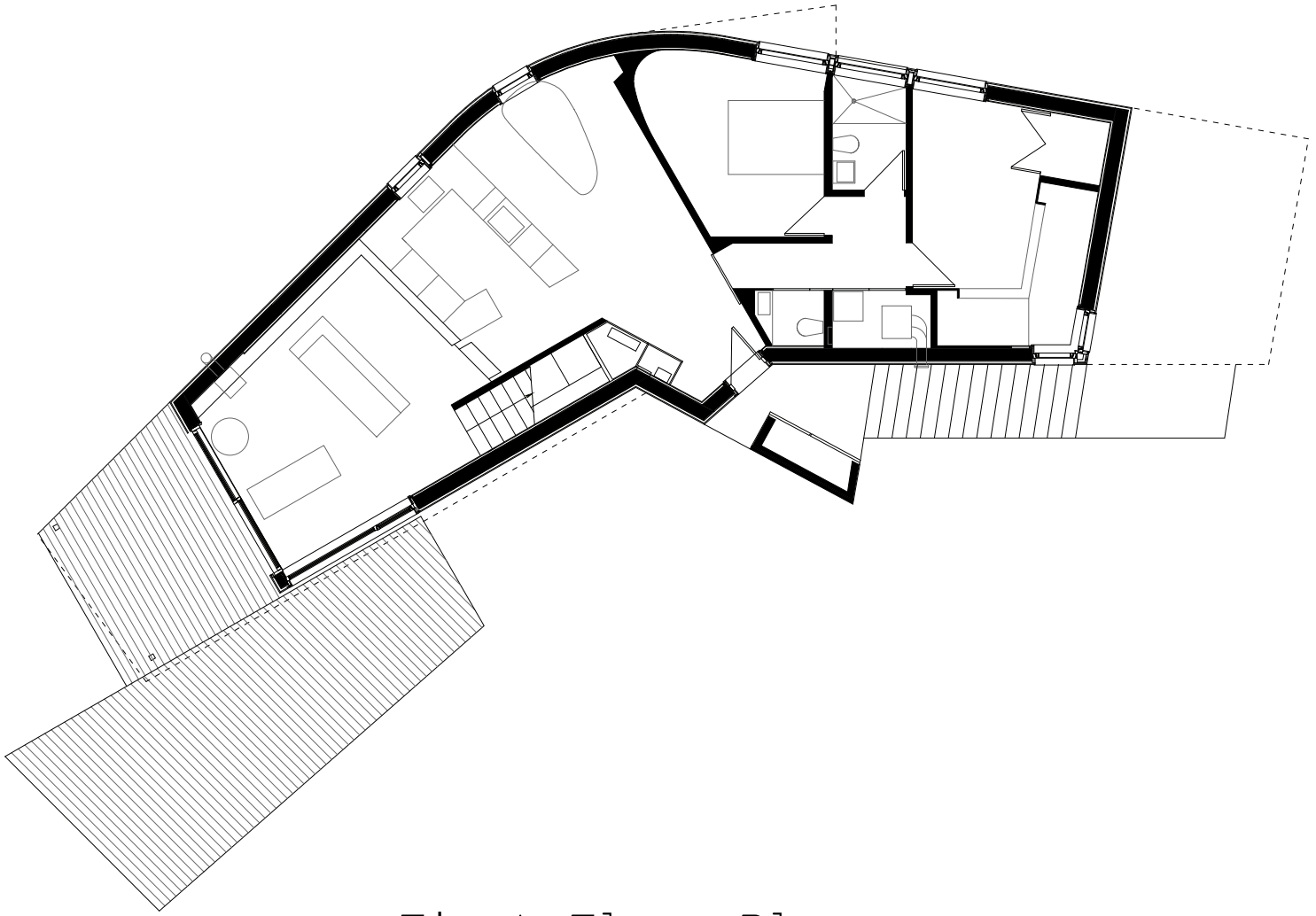

1'-3"
1/2" OSB by Advantech- tape & spackle OSB joints, typical for air barrier
1/2" GWB
9 1/2" TGI's at 24" o.c.
1/2" structural fiber board
vapor barrier
2 1/2" EPS board insulation
T&G red cedar clapboard on vertical furring strips for rainscreen siding
1 1/4" x 9 1/2" timberstrand LSL sill plate
3/4" expansion pad
8" air-intrained conc. block
insect screen
copper flashing
(2) #4 bars with 2" cover
3/4" parged concrete board
2" EPS board insulation
crushed stone in filter fabric
9 1/2" thick spayed cellulous insulation
1/2" diameter anchor bolts at 48" o.c.
1x3 painted wd. base
vapor barrier
4" concrete floor slab
6x6 - 10/10 WWF, center of slab
16" EPS board insluation
4" crushed stone
family room, elev. +16"
2"
3"
4"
8"
1'-0"
grade
4'-0"
8"
asphaltic vapor barrier
2'-0"
3"
3"
3"
3"
1'-0"
foundation drain
crushed stone
(2) #4 bars with 3" cover
compacted fill

Saugerties, New York

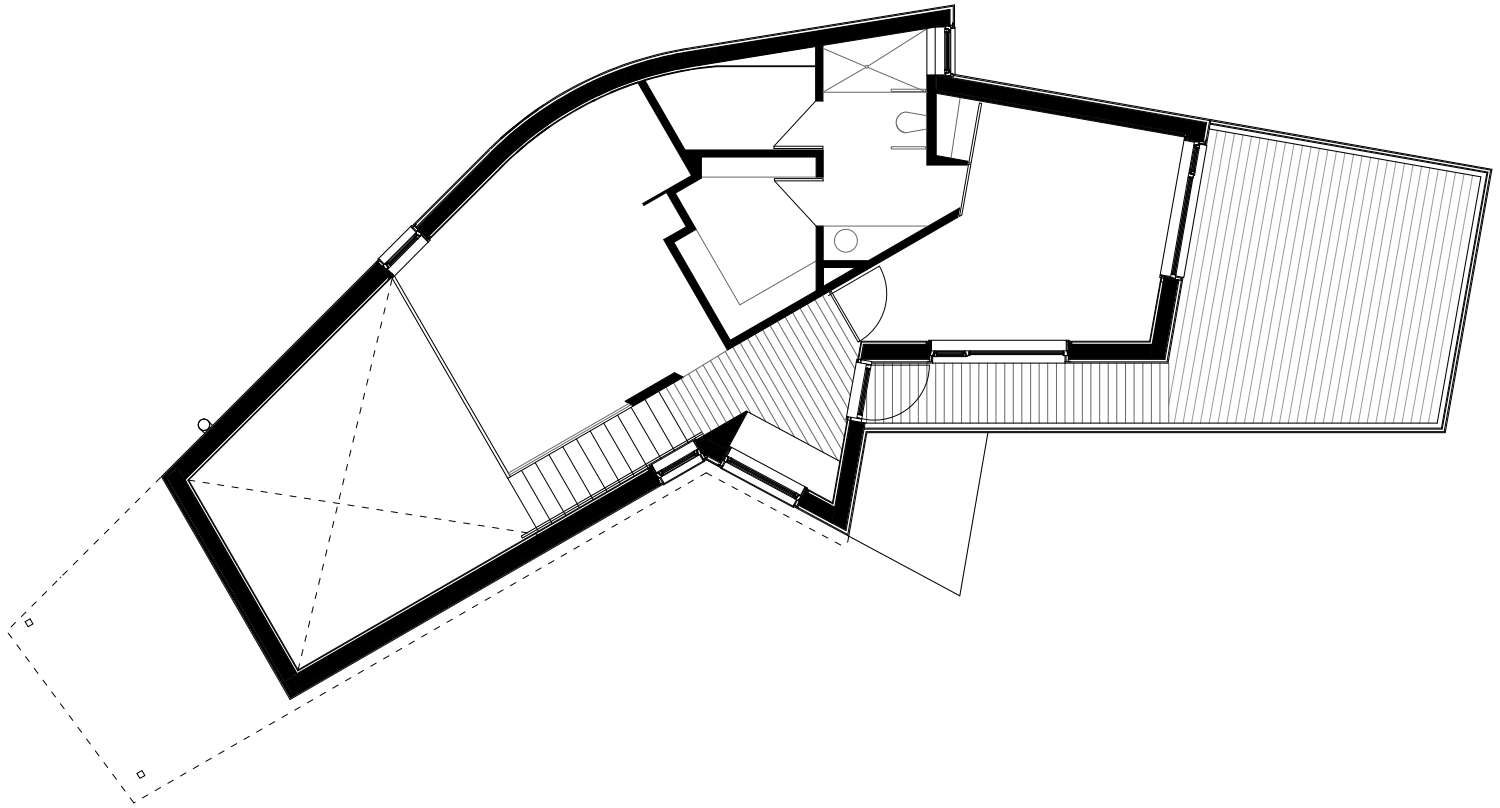
1,506 SF/ 852 TFA

6,438 Heating Degree Days

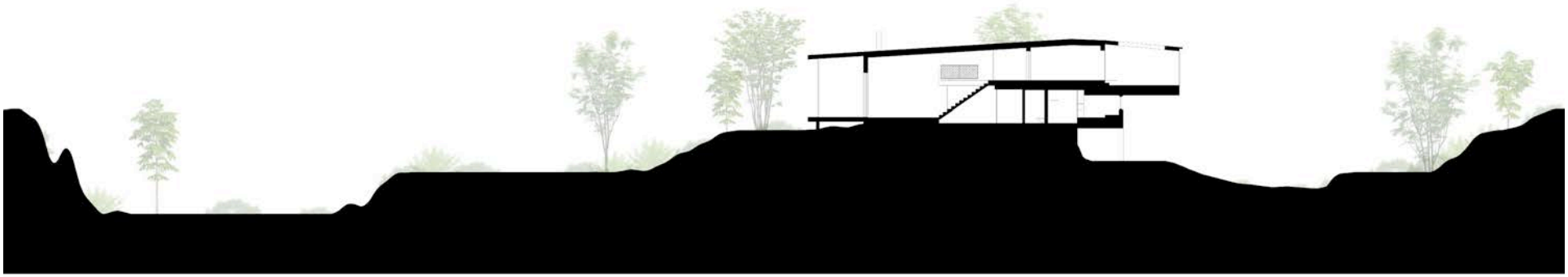




First Floor Plan

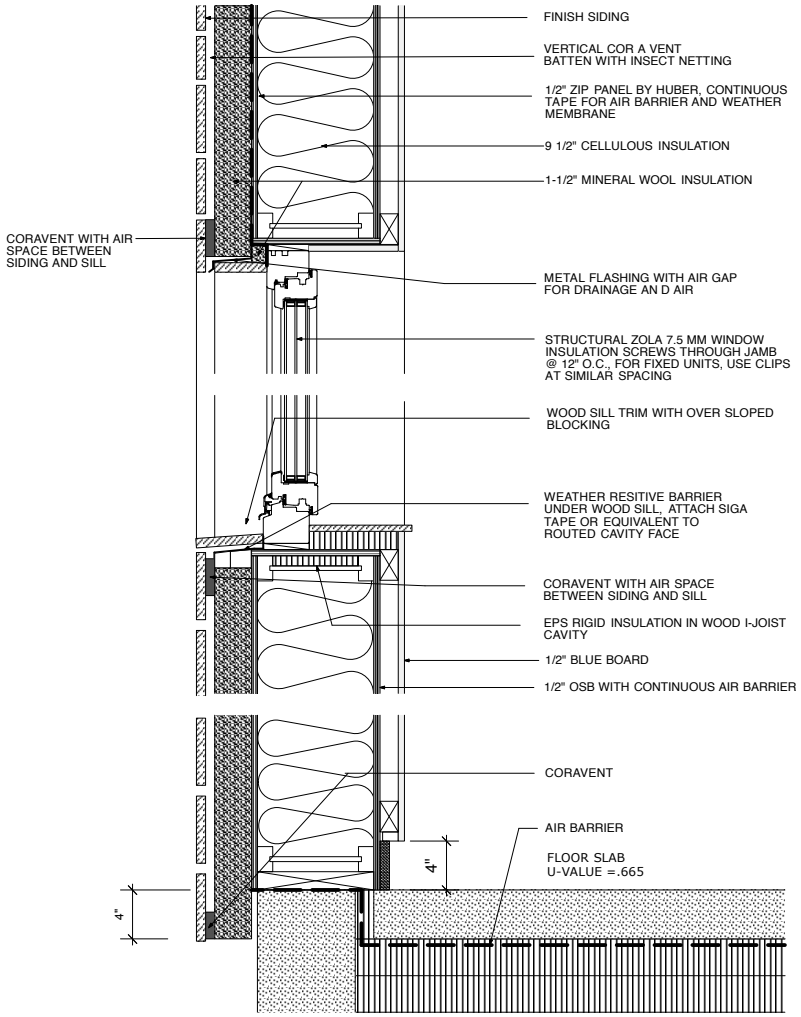


Second Floor Plan



Cross Section

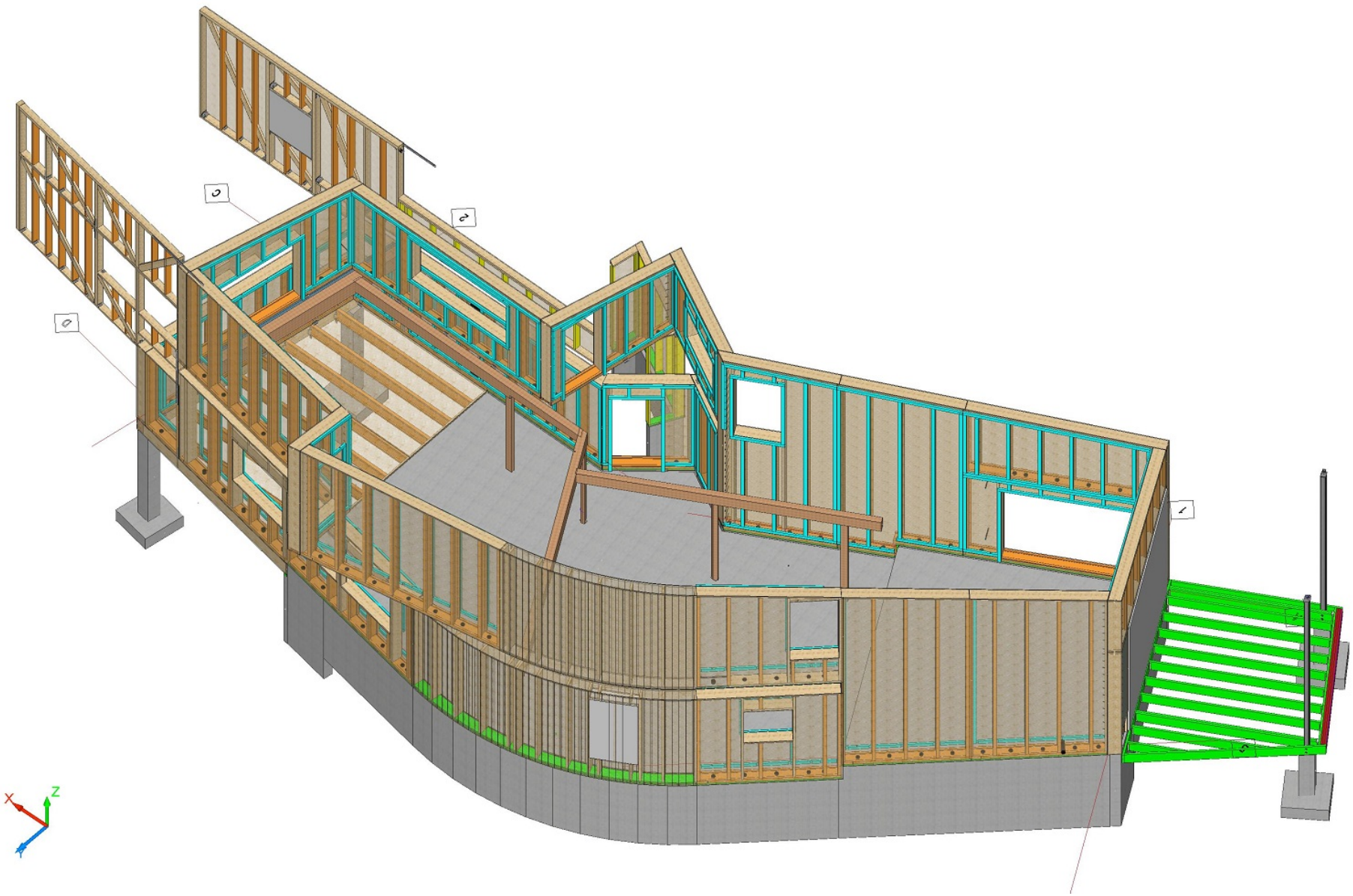
“Bensonwood Wall”



R total = 46

U value = 0.0215

Bensonwood - 3D Building Information Model



Bensonwood – High Performance Buildings

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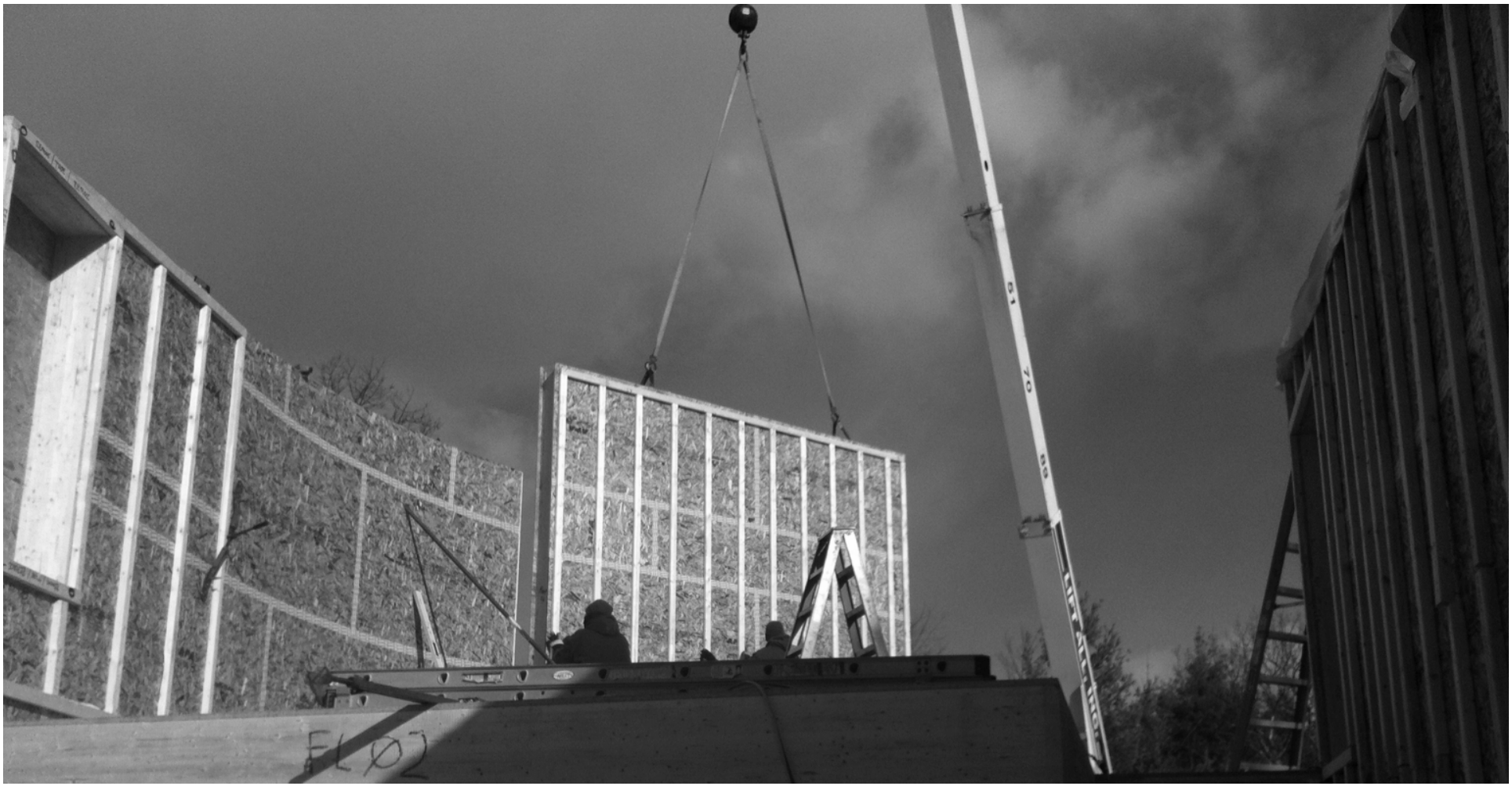


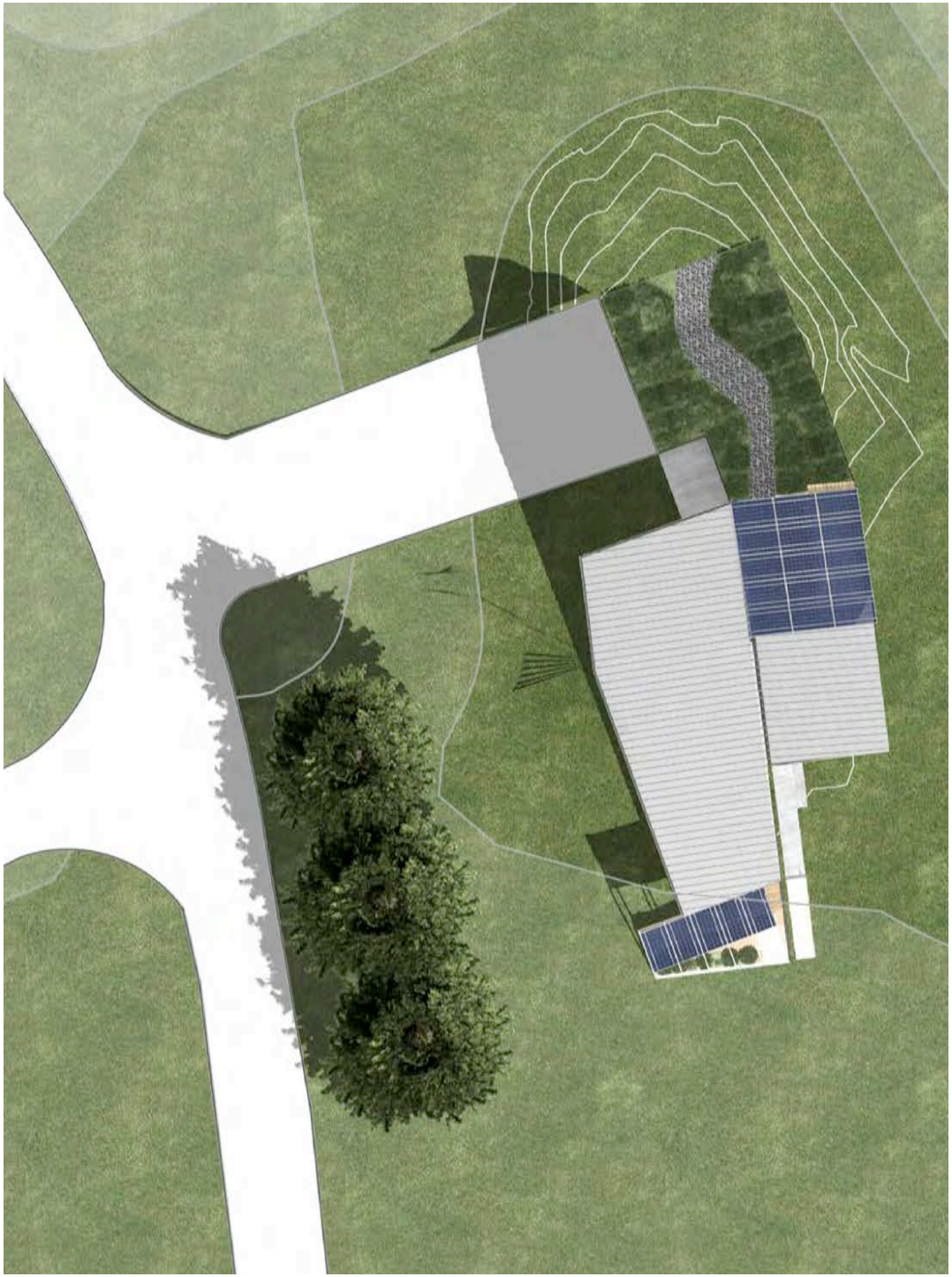
Bensonwood – High Performance Buildings

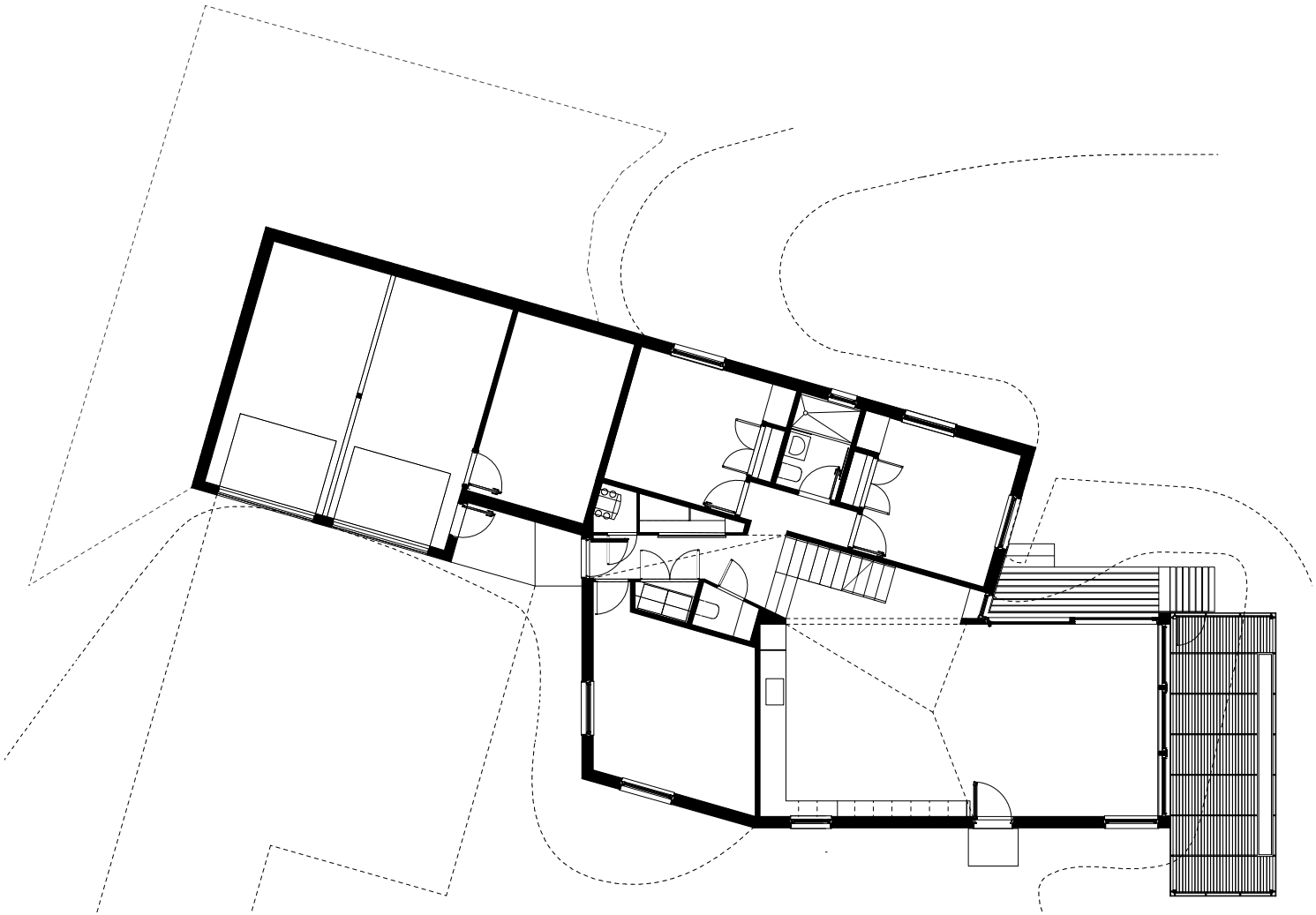
Bensonwood – High Performance Buildings

Nashua, New Hampshire

3,252 SF/ 1,650 TFA

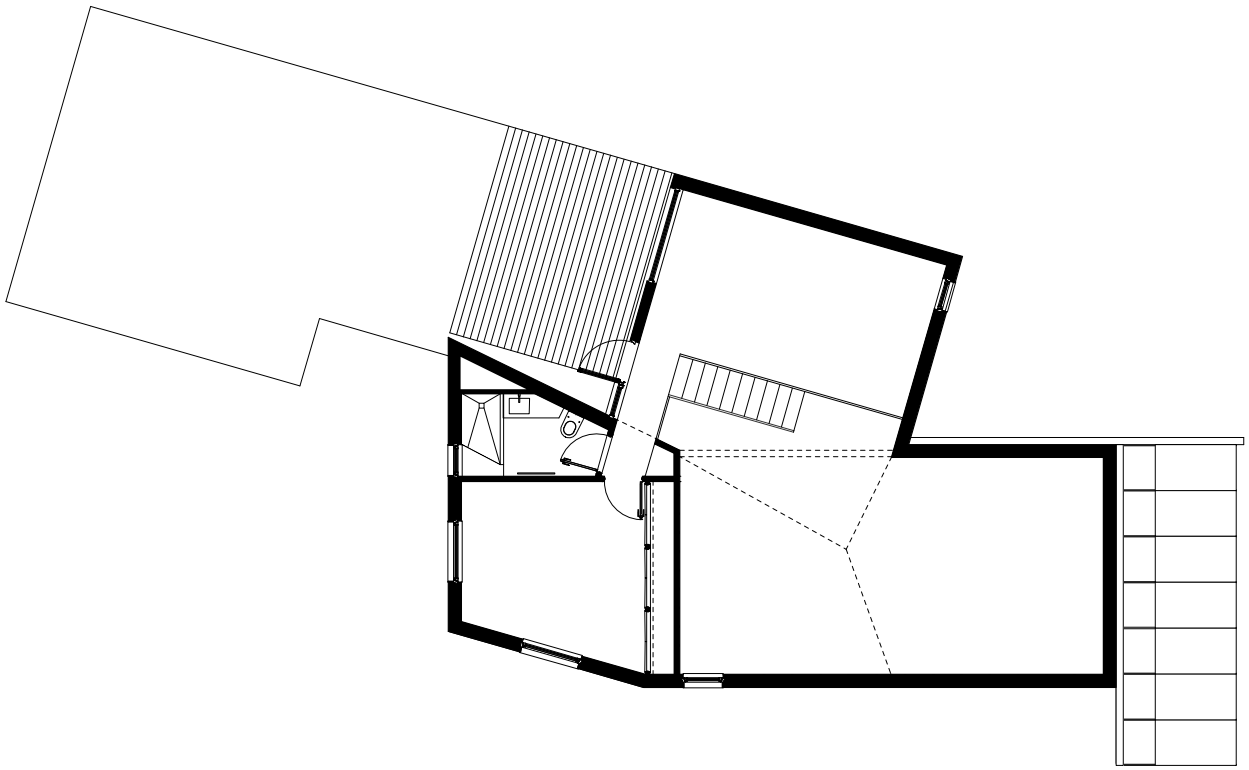
5,200 Heating Degree Days





First Floor Plan

x



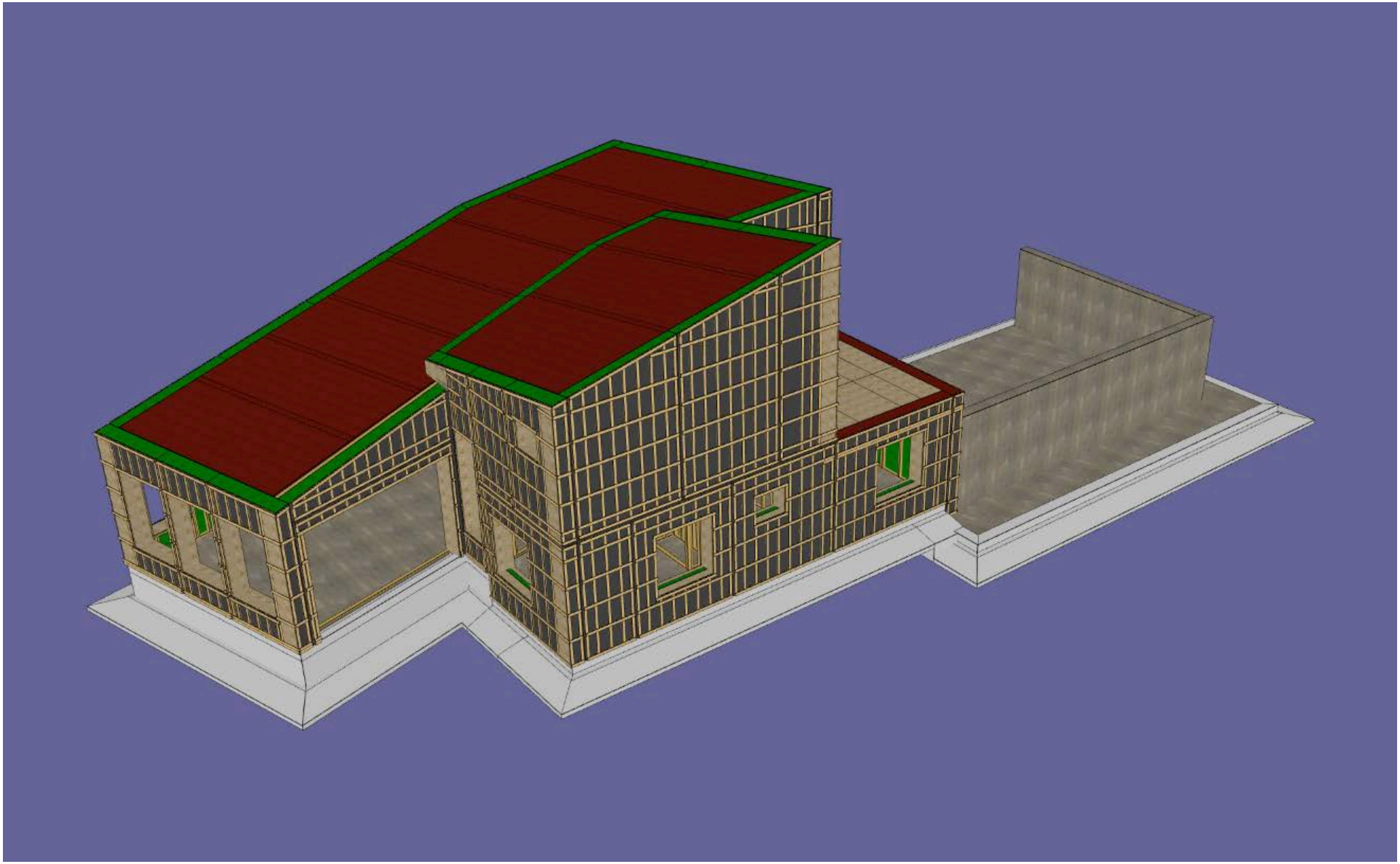
Second Floor Plan

“Ecocor” Wall

R total = 48.7

U value = 0.02

Ecocor - 3D Building Information Model




PLUS
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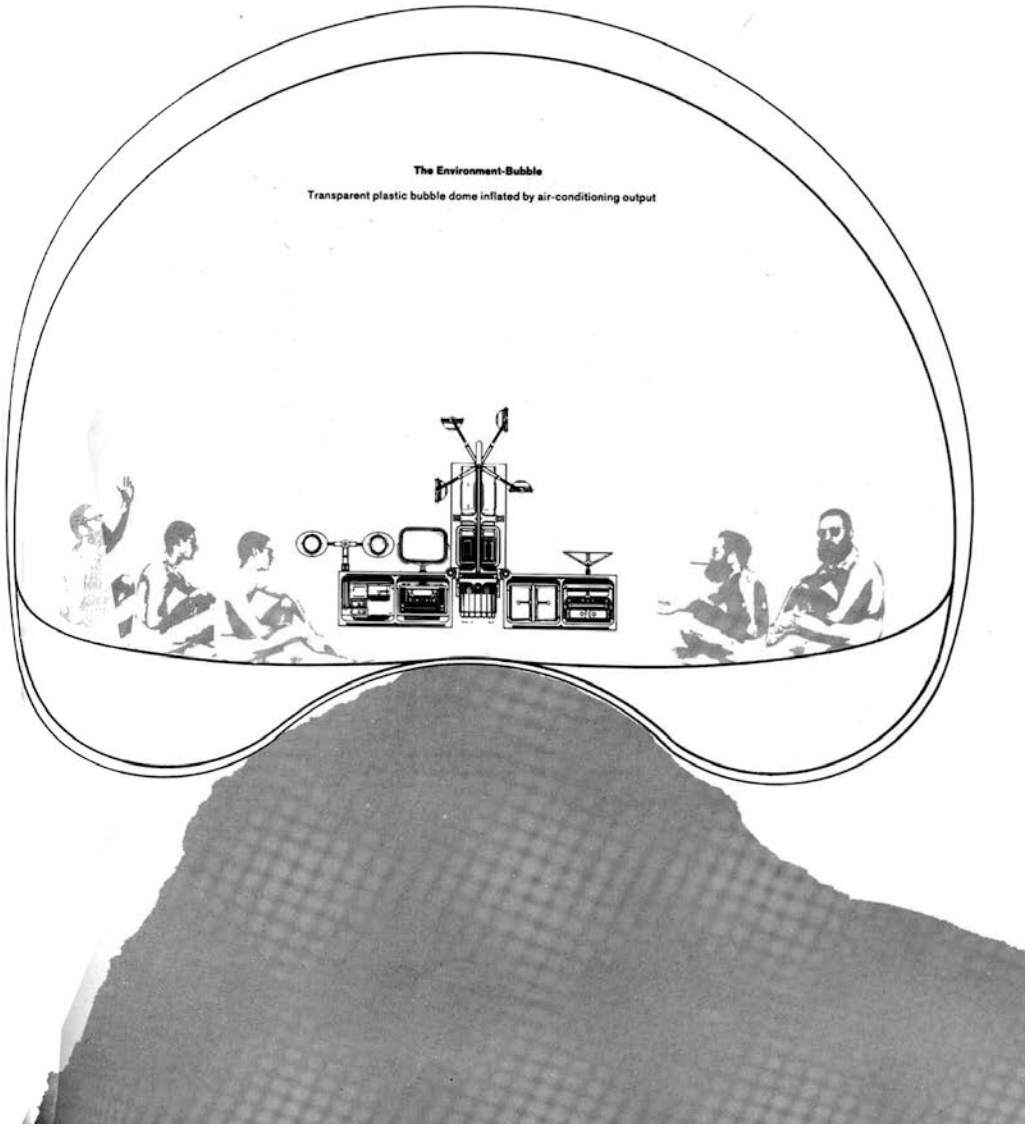
PLUS


2150


LK-02
INTELLO

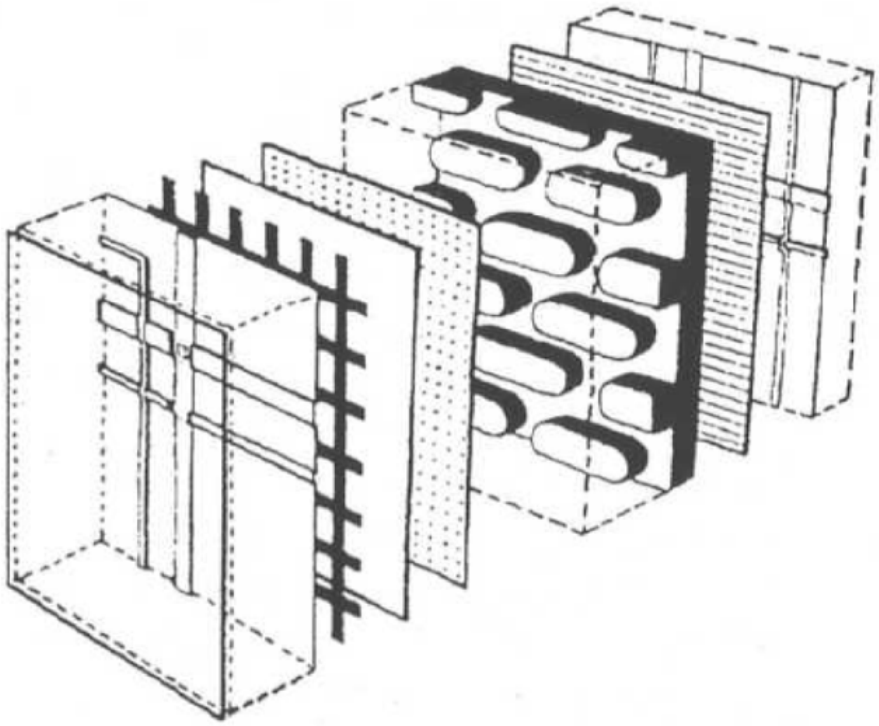
NEXT GENERATION (?)

Environmental Bubble – Rayner Banham (1965)



Mike Davis – Polyvalent Wall (1981)

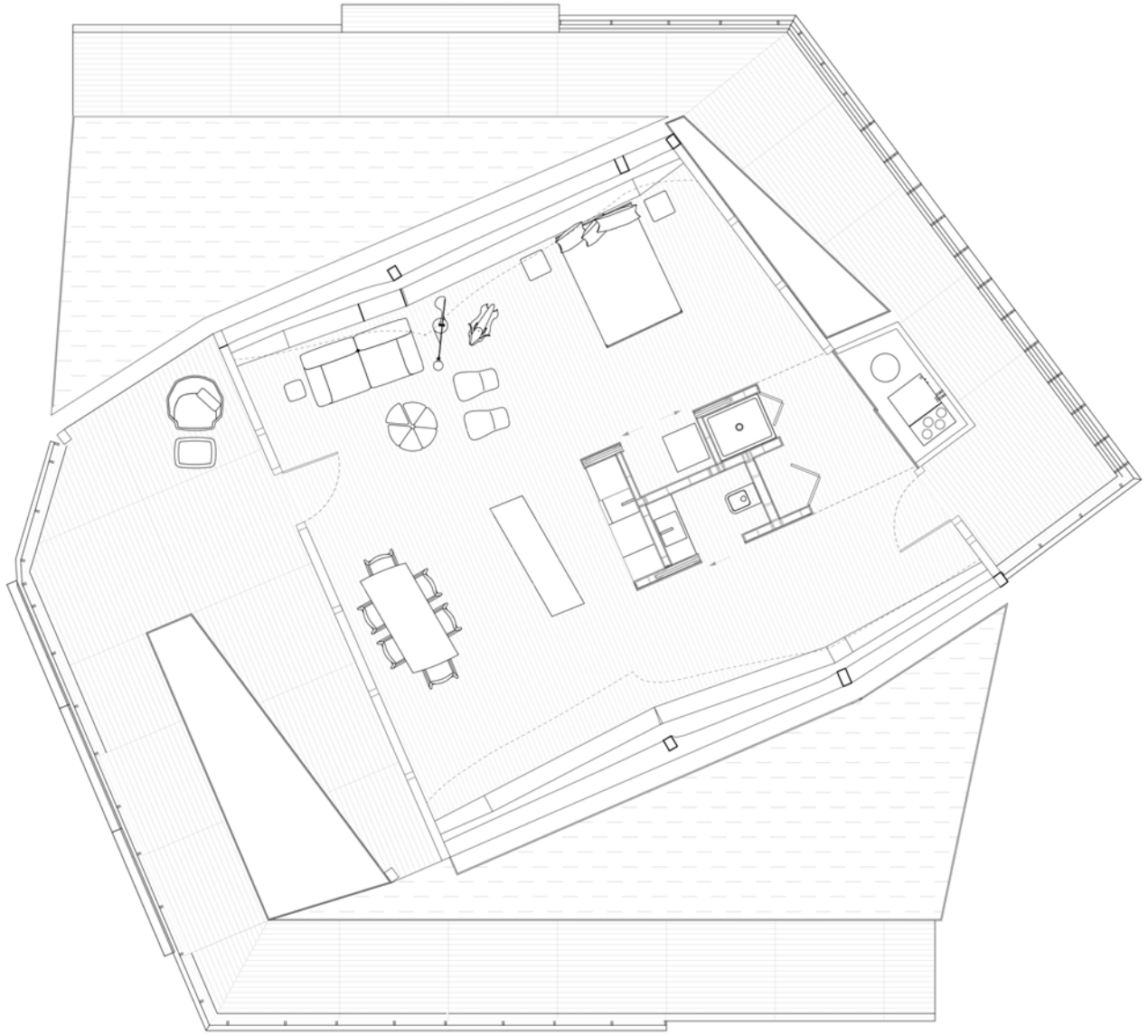
1. Silica weather skin and deposition substrate;
2. Sensor and control logic layer, external;
3. Photoelectric grid;
4. Thermal sheet radiator/selective absorber;
5. Electro-reflective deposition;
6. Micro-pore gas flow layers;
7. Electro-reflective deposition;
8. Sensor and control logic layer, internal; and
9. Silica deposition substrate and inner skin.



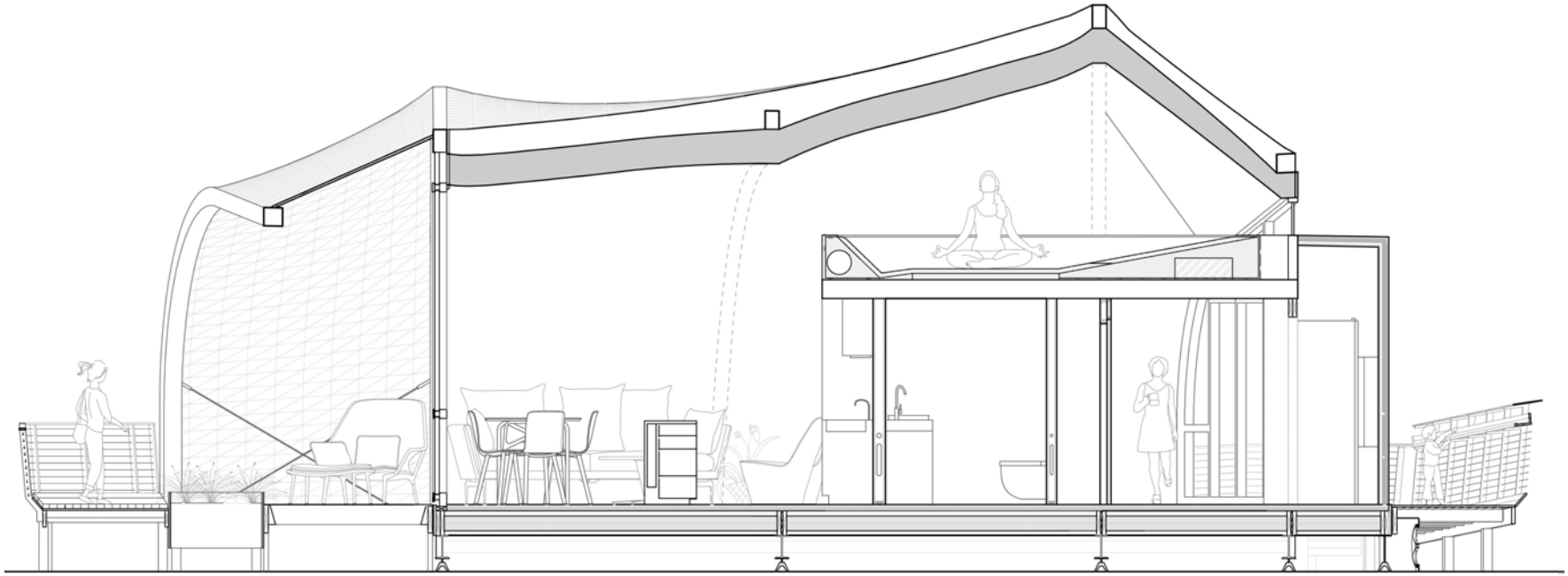
Techstyle Haus

978 SF/ 825 TFA

4,575 Heating Degree Days



Floor Plan

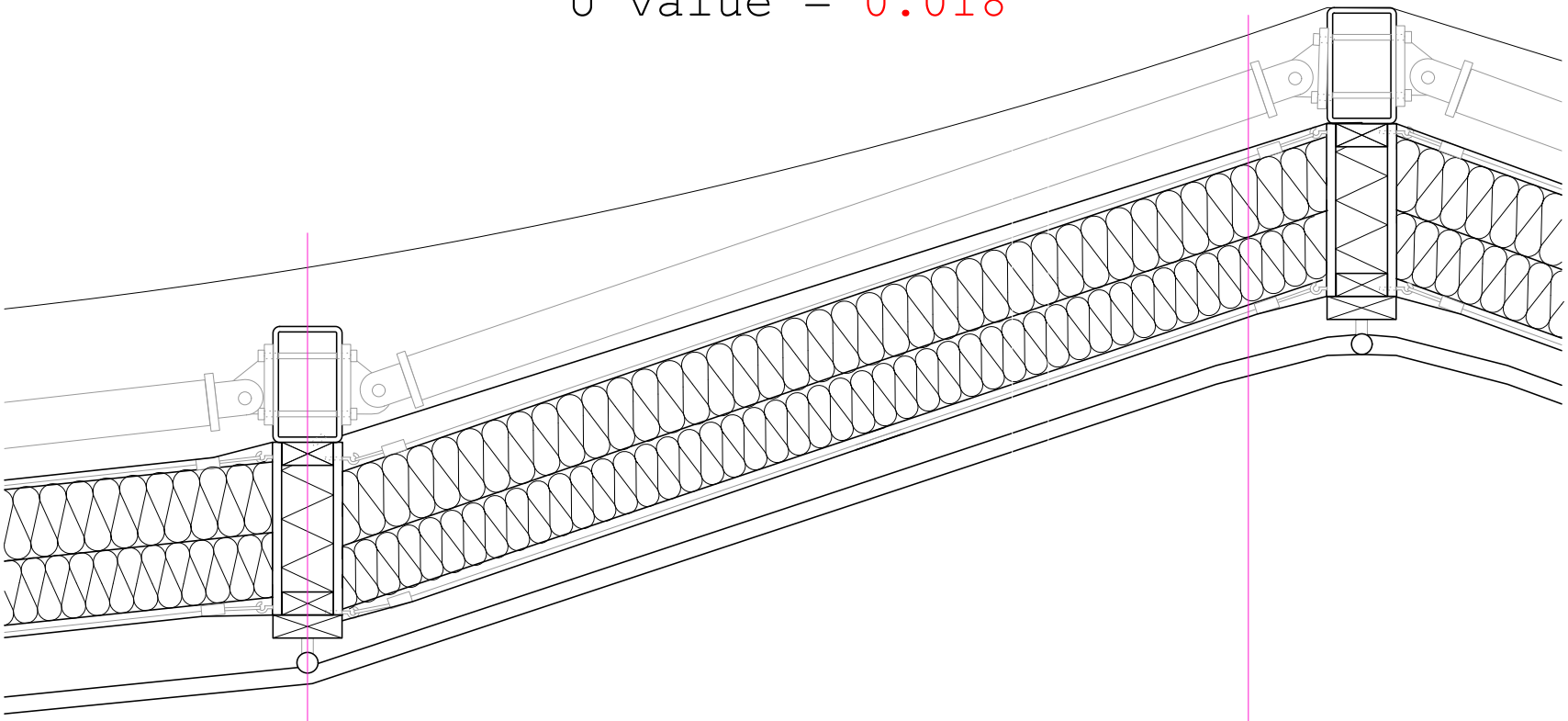


Cross Section

“Membrane” Wall

R total = 55

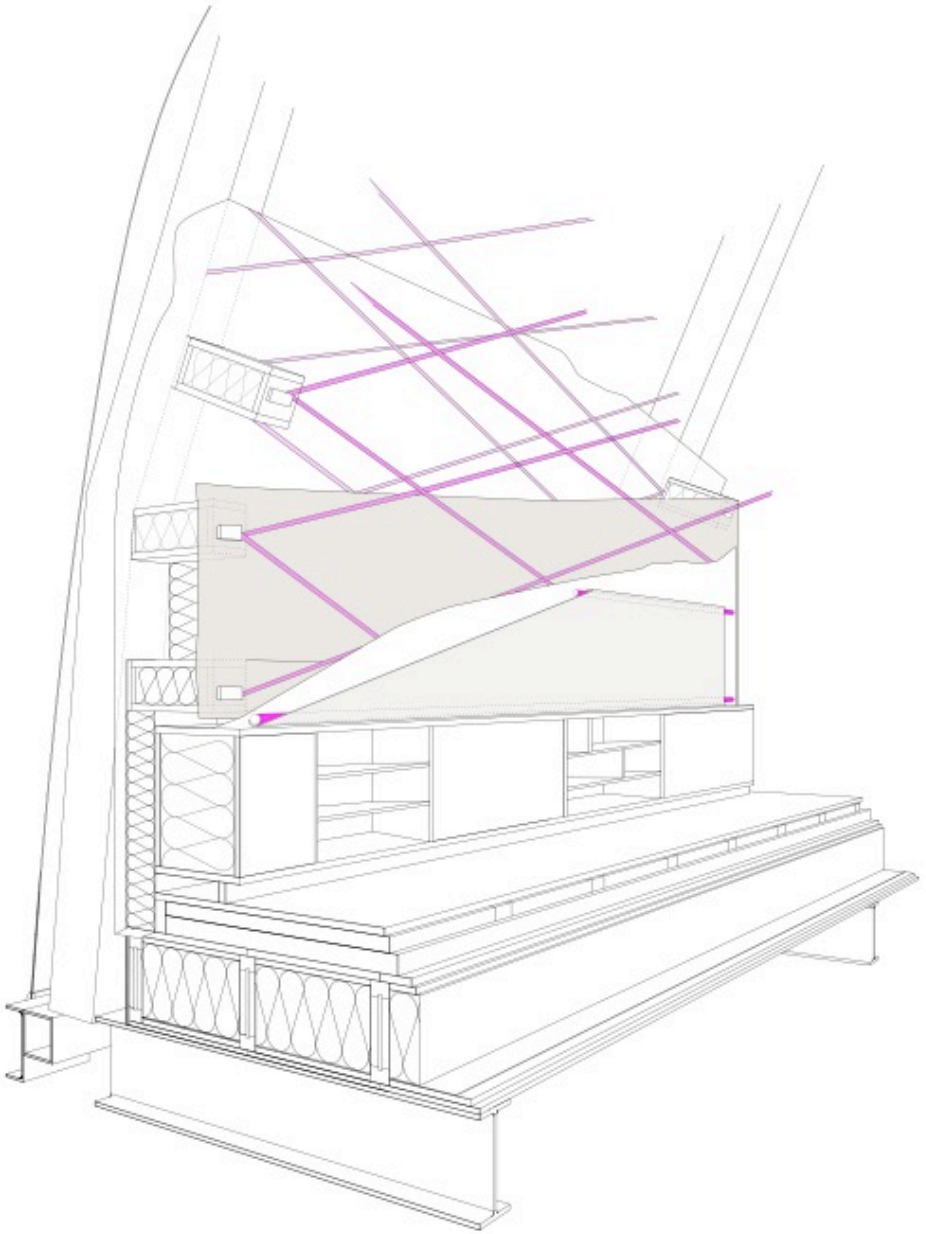
U value = 0.018



SHEERFILL EXTERNAL MEMBRANE
HOLLOW STEEL SECTION (HHS)
WEATHER BARRIER (TAPED TO STEEL)
1.5” WOOD BLOCKING
TENSIONED NYLON STRAPPING
ATTACHED TO STEEL EYELET
BOXFRAME SPACER

SHEERFILL EXTERNAL MEMBRANE
AIR GAP BETWEEN STEEL FRAMES
WEATHER BARRIER (TAPED TO STEEL)
TENSIONED NYLON STRAPPING ATTACHED TO STEEL EYELET
ISOVER INTEGRA 032 ZKF MINERAL WOOL INSULATION
TENSIONED NYLON STRAPPING ATTACHED TO STEEL EYELET
ISOVER VARIO AIR BARRIER
LIGHT BLOCKING TEXTILE
ALUMINIUM INTERIOR TEXTILE SUBSTRUCTURE
INTERIOR TEXTILE

“Membrane” Wall




ISOVER
Vario KM Duplex UV

THANK YOU