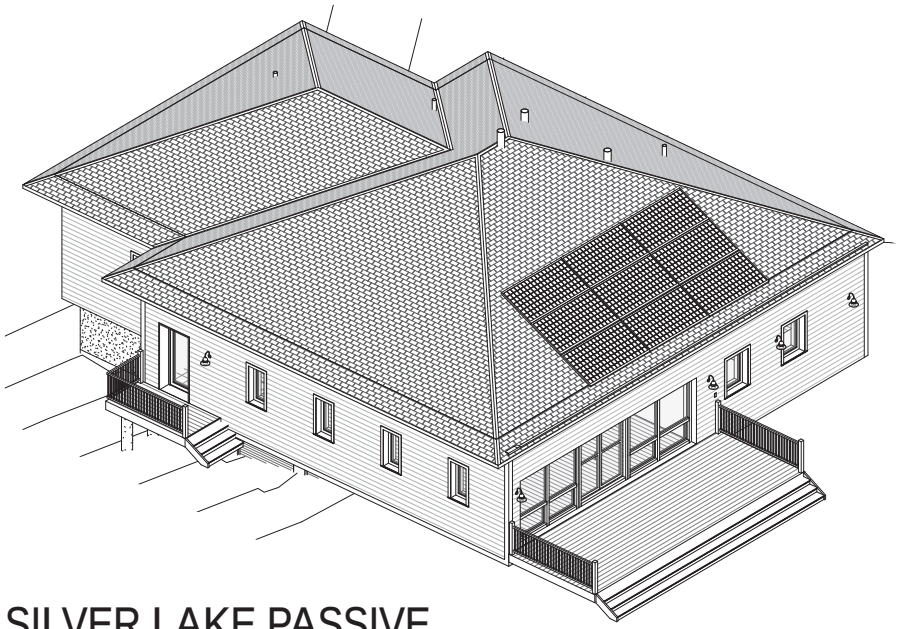
River
ARCHITECTS

SMALL SCALE COMMERCIAL RETROFITS

JAMES HARTFORD, AIA / LEEP AP / CPHC
Principle

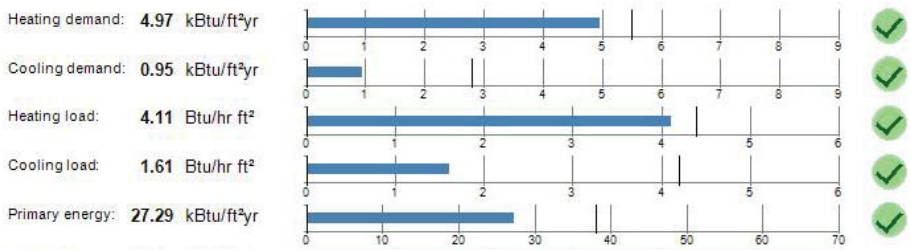
JOHN LOERCHER, CPHC
Project Manager

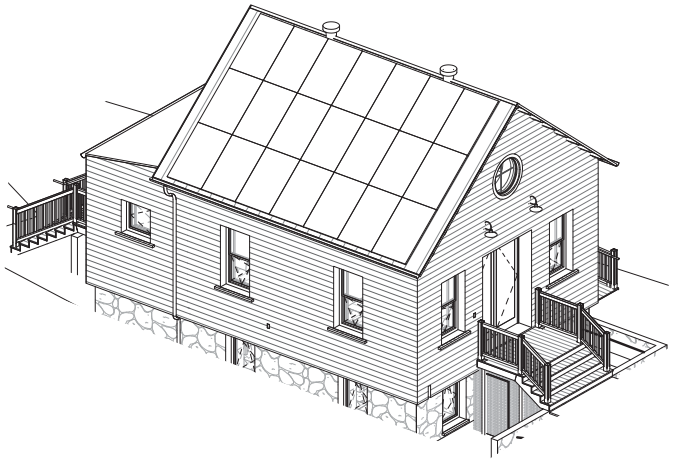


SILVER LAKE PASSIVE

CAMP & CONFERENCE CENTER LODGE

Location: Sharon, CT
Climate zone: 5a
Total iCFA: 2,422 SF

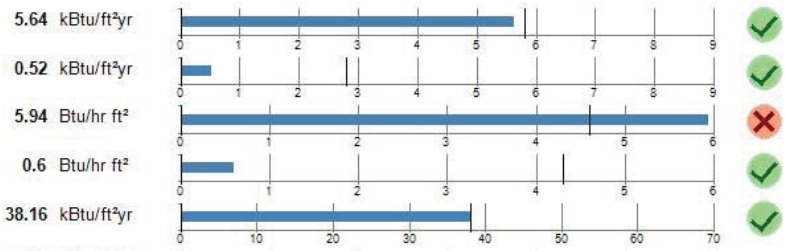




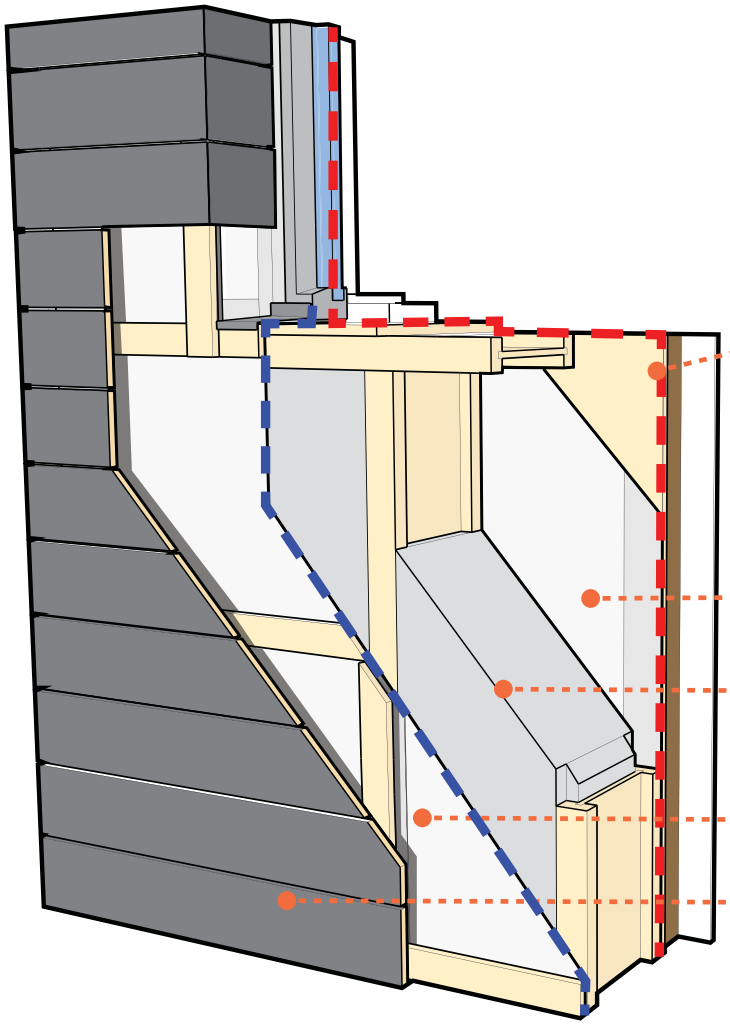
RA STUDIO

RIVER ARCHITECTS STUDIO

Location: Cold Spring, NY
Climate zone: 5a
Total iCFA: 1,096 SF



= AIR BARRIER
= WRB



EXISTING BUILDING
- framing to remain and be repaired as required
- existing cavities used for “fallback” insulation
- sheathing based on existing conditions
    a. remove and install new sheathing
    b. install new sheathing over
    c. repair and reuse existing

AIR BARRIER
- product specitication based on sheathing

INSULATED I-JOIST -or- LARSEN TRUSS WALL
- truss size determined through energy modeling
- blown in cellulose insulation

WEATHER RESISTANT BARRIER
- product specitication based on conditions

RAINSCREEN
- siding installed on staggered furring

SILVER LAKE PASSIVE

CAMP & CONFERENCE CENTER LODGE

Location: Sharon, CT
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Total iCFA: 2,422 SF

SILVER LAKE Conference Center

River ARCHITECTS

SMALL SCALE COMMERCIAL RETROFITS

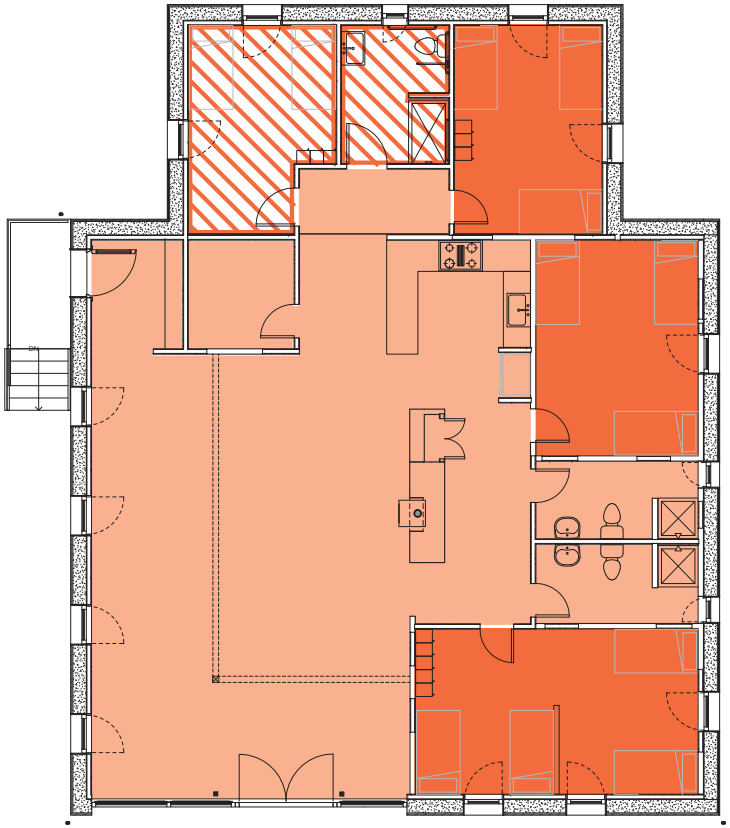
PLAN RECONFIGURATION

BEDROOM

SHARED SPACE

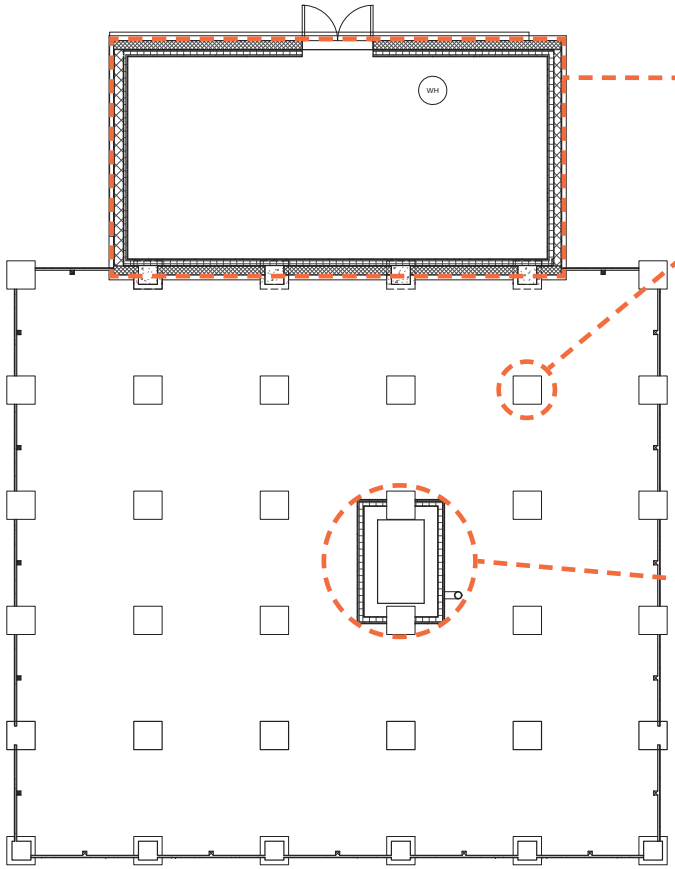
ADA ACCESSIBLE SPACE

EXISTING PLAN



RENOVATED PLAN

SILVER LAKE Conference Center



FOUNDATION / PIER PLAN

NEW SOLAR HOT WATER STORAGE ZONE (Unconditioned)
- R-23 Walls
- R-30 Slab

(36x) EXISTING CMU PIERS (Primary footings)

- Existing floor girders
- CMU piers on concrete footings
- Fully vented crawlspace

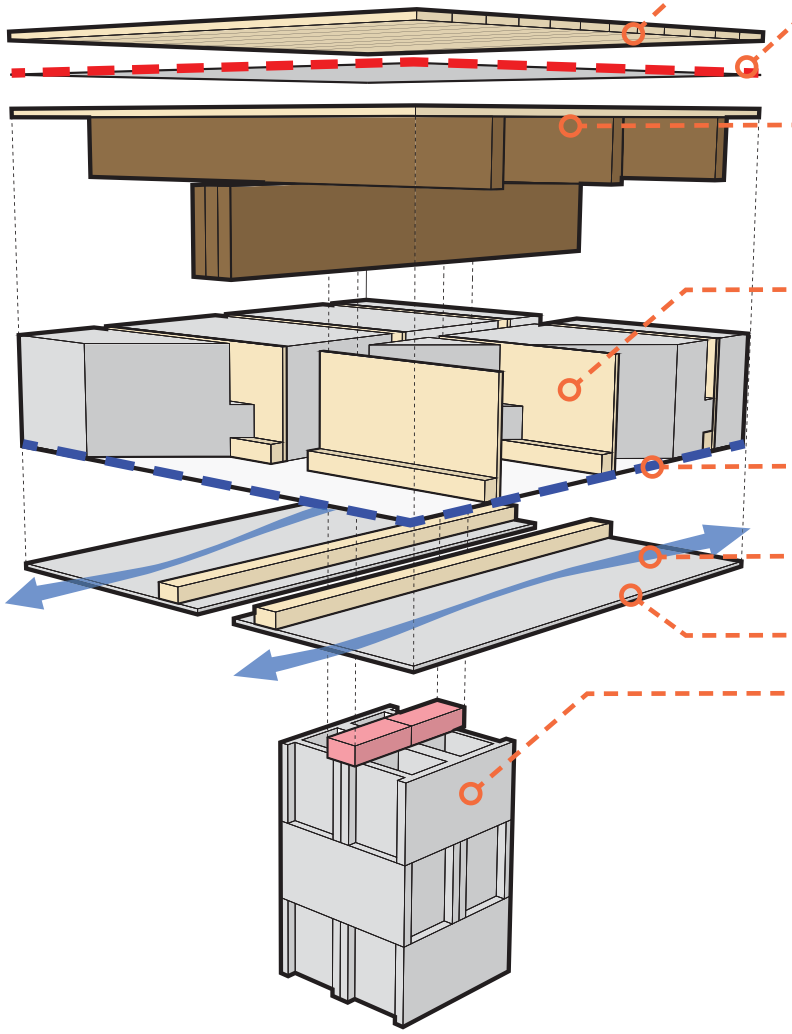
EXISTING STONE FIREPLACE

- Continuous stonework from crawlspace to roof penetration
- Strong desire from client to keep working fireplace

SILVER LAKE Conference Center

= AIR BARRIER

= WRB



NEW HARDWOOD FLOOR

CONTINUOUS AND UNINTERUPTED AIR BARRIER
- Installed between existing subfloor and new finish floor

EXISTING SUBFLOOR, JOISTS AND BEAMS
- Meets structural loads, but not enough depth to meet insulation requirements

MODIFIED LARSEN TRUSS AND CELLULOSE INSULATION
- OSB webs built off existing floor joists
- blown in dense-pack cellulose insulation

WEATHER RESISTANT BARRIER
- product specitication based on conditions (vapor)

CONTINUOUS VENTILATED GAP
- Sheathing furred out 1-1/2" min to provide continuous air gap

CEMENTITIOUS CLADDING MATERIAL

EXISTING CMU AND BRICK FOUNDATION PIER

SILVER LAKE Conference Center

3M ‘3015’ AIR BARRIER
- 36” wide rolls overlapping to ‘shrink wrap’ existing floor and ensure air-tightness on a less-than-ideal substrate

FULLY TAPED OSB SUBFLOOR
- a new subfloor is installed and fully taped to create a fail safe in our airtight floor

PRO CLIMA ‘INTELLO’ AIR BARRIER
- Air barrier and smart vapor control installed on existing rafters

.035 cfm/sf

SILVER LAKE Conference Center

River ARCHITECTS

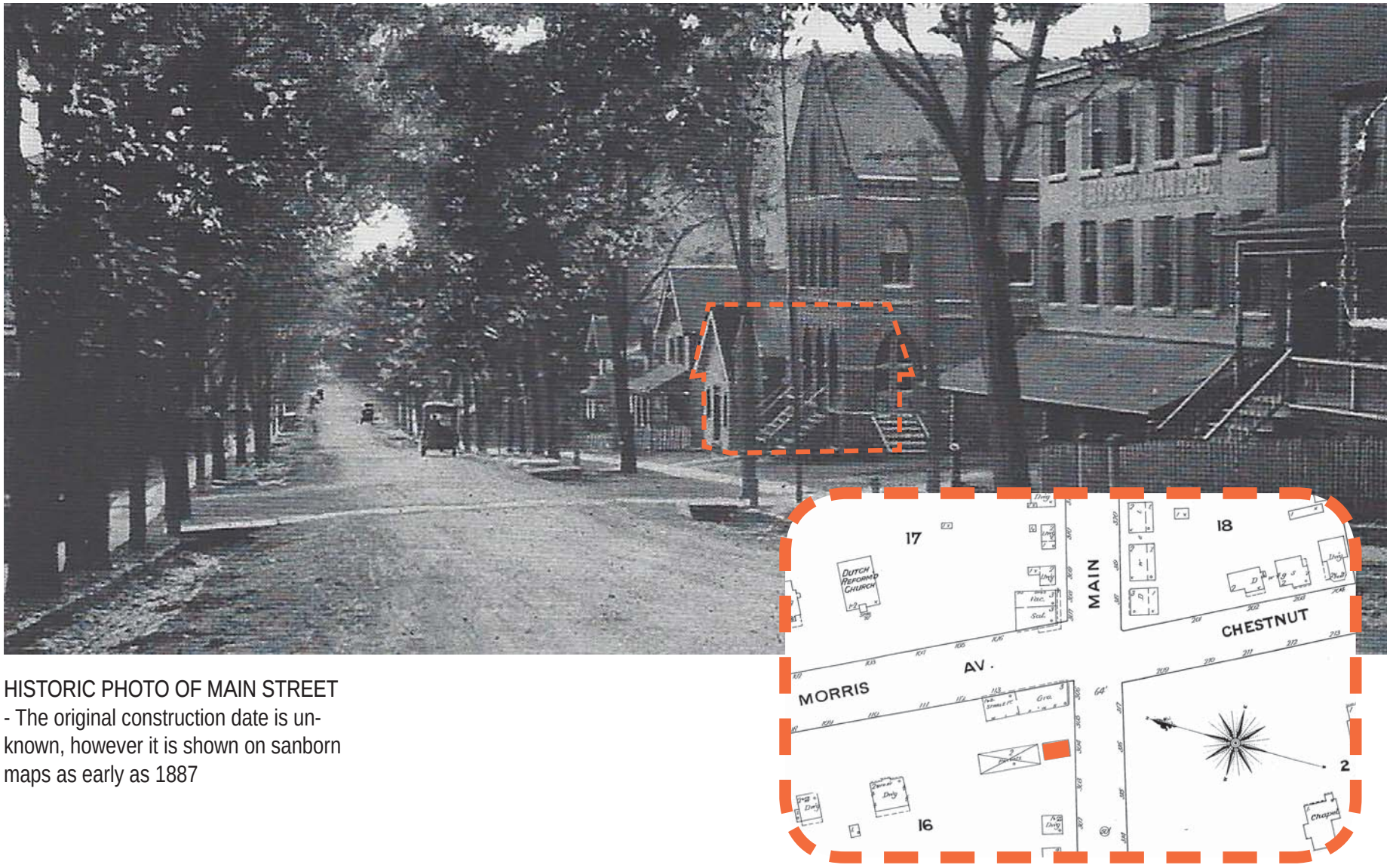
SMALL SCALE COMMERCIAL RETROFITS

FINISHED PROJECT

SILVER LAKE Conference Center

RA STUDIO
RIVER ARCHITECTS STUDIO

Location: Cold Spring, NY
Climate zone: 5a
Total iCFA: 1,096 SF



HISTORIC PHOTO OF MAIN STREET
- The original construction date is unknown, however it is shown on sanborn maps as early as 1887

River ARCHITECTS

SMALL SCALE COMMERCIAL RETROFITS

BUILDING SECTION

= AIR BARRIER
= WRB

THERMALLY BROKEN LIGHT WELLS IN PLACE OF EXISTING ATTIC VENTS

EXISTING FRAMING

NEW INSULATED EXTERIOR CAVITY

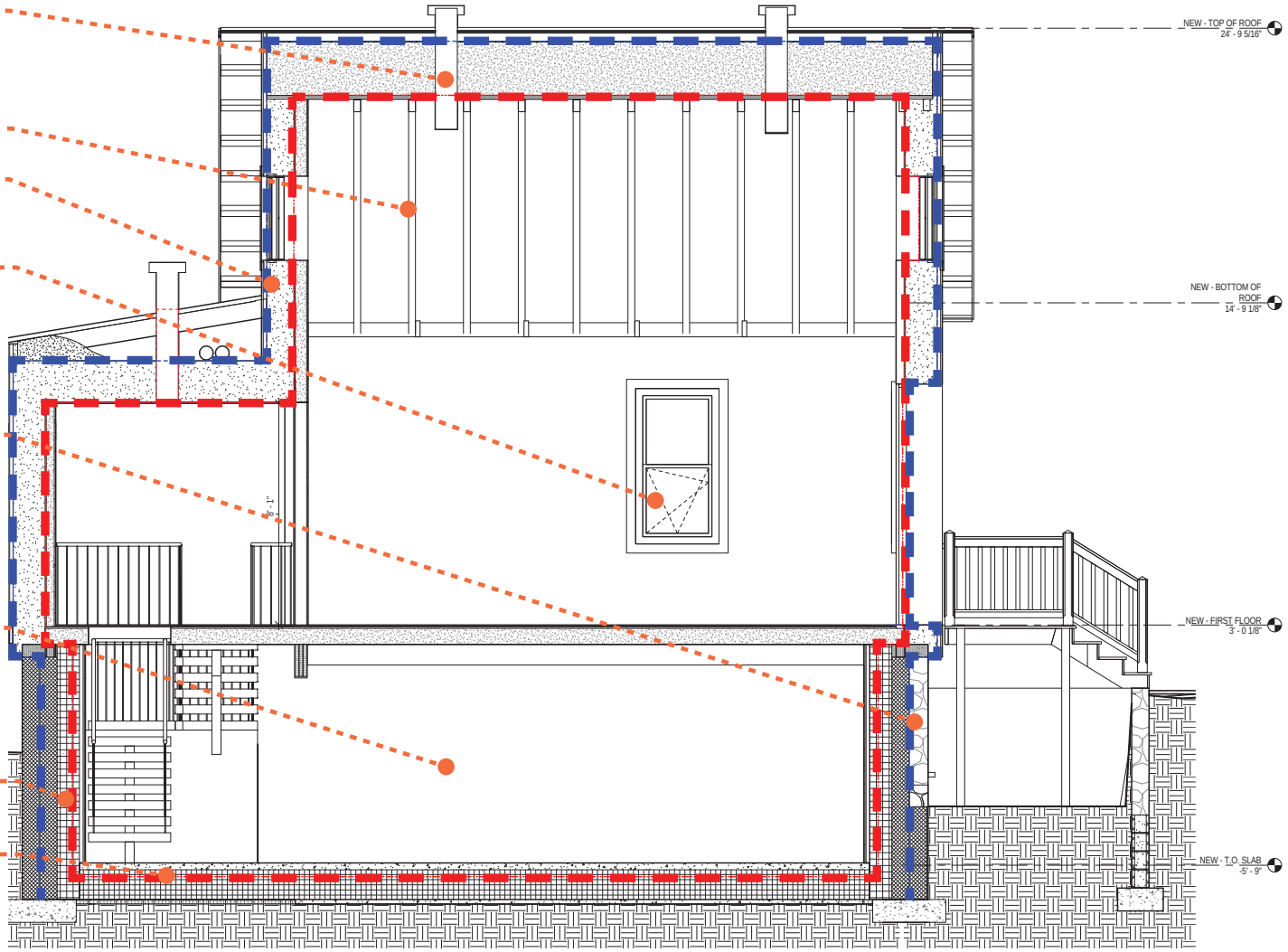
HIGH PERFORMANCE SIMULATED DOUBLE HUNG WINDOWS

STONEWORK TO MATCH HISTORIC ORIGINAL

BUILDING RAISED FOR HABITABLE BASEMENT

RECYCLED EPS INSIDE FOUNDATION WALL

CONTINUOUS AIR BARRIER BELOW SLAB



EXCAVATION FINDINGS

- While the existing foundation seemed to be in good condition from inside, excavation for a new rear foundation wall revealed that was not the case.

INTERIOR BRACING

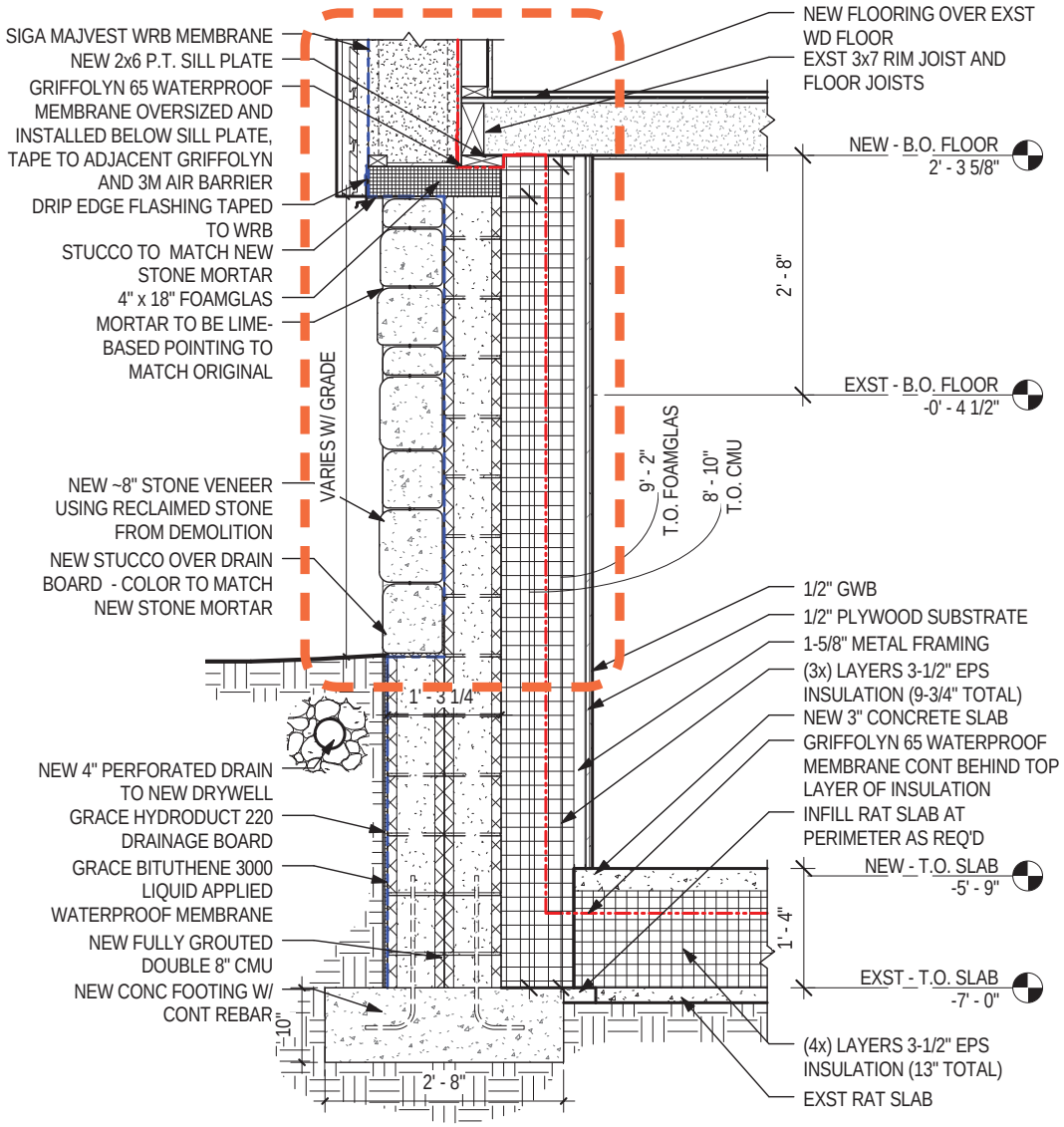
- The building was rigorously braced to ensure things stayed in place while moving the building

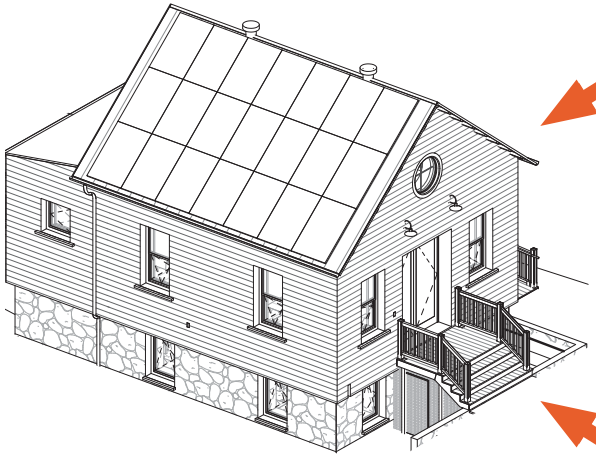
TEMPORARY LOCATION

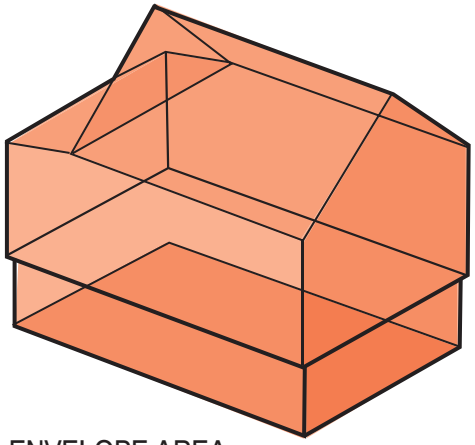
- While originally the building was to be only lifted for repairs, the additional work required a complete temporary move

NEW FOUNDATION WALL

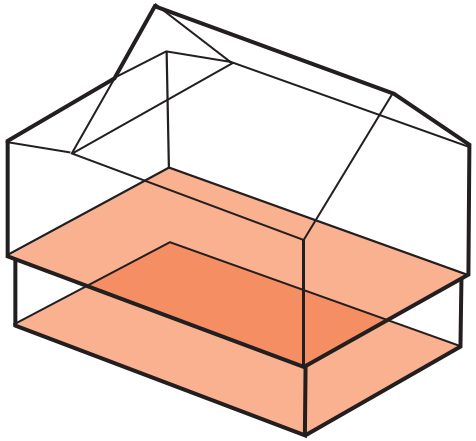
- Once the new foundation wall was complete and cured, the building was moved and set back in place - 2'-8" higher than the original


SIGA MAJVEST WRB MEMBRANE
NEW 2x6 P.T. SILL PLATE
GRIFFOLYN 65 WATERPROOF MEMBRANE OVERSIZED AND INSTALLED BELOW SILL PLATE, TAPE TO ADJACENT GRIFFOLYN AND 3M AIR BARRIER
DRIP EDGE FLASHING TAPED TO WRB
STUCCO TO MATCH NEW STONE MORTAR
4" x 18" FOAMGLAS
MORTAR TO BE LIME-BASED POINTING TO MATCH ORIGINAL
NEW ~8" STONE VENEER USING RECLAIMED STONE FROM DEMOLITION
NEW STUCCO OVER DRAIN BOARD - COLOR TO MATCH NEW STONE MORTAR
NEW 4" PERFORATED DRAIN TO NEW DRYWELL
GRACE HYDRODUCT 220 DRAINAGE BOARD
GRACE BITUTHENE 3000 LIQUID APPLIED WATERPROOF MEMBRANE
NEW FULLY GROUTED DOUBLE 8" CMU
NEW CONC FOOTING W/ CONT REBAR
NEW FLOORING OVER EXST WD FLOOR
EXST 3x7 RIM JOIST AND FLOOR JOISTS
NEW - B.O. FLOOR
2' - 3 5/8"
2' - 8"
EXST - B.O. FLOOR
-0' - 4 1/2"
VARIES W/ GRADE
9' - 2"
T.O. FOAMGLAS
8' - 10"
T.O. CMU
1' - 3 1/4"
1/2" GWB
1/2" PLYWOOD SUBSTRATE
1-5/8" METAL FRAMING
(3x) LAYERS 3-1/2" EPS INSULATION (9-3/4" TOTAL)
NEW 3" CONCRETE SLAB
GRIFFOLYN 65 WATERPROOF MEMBRANE CONT BEHIND TOP LAYER OF INSULATION
INFILL RAT SLAB AT PERIMETER AS REQ'D
NEW - T.O. SLAB
-5' - 9"
1' - 4"
EXST - T.O. SLAB
-7' - 0"
10"
2' - 8"
(4x) LAYERS 3-1/2" EPS INSULATION (13" TOTAL)
EXST RAT SLAB





ENVELOPE AREA
- proportional to *transmission heat loss*
- $H_t = U * A * \Delta T$

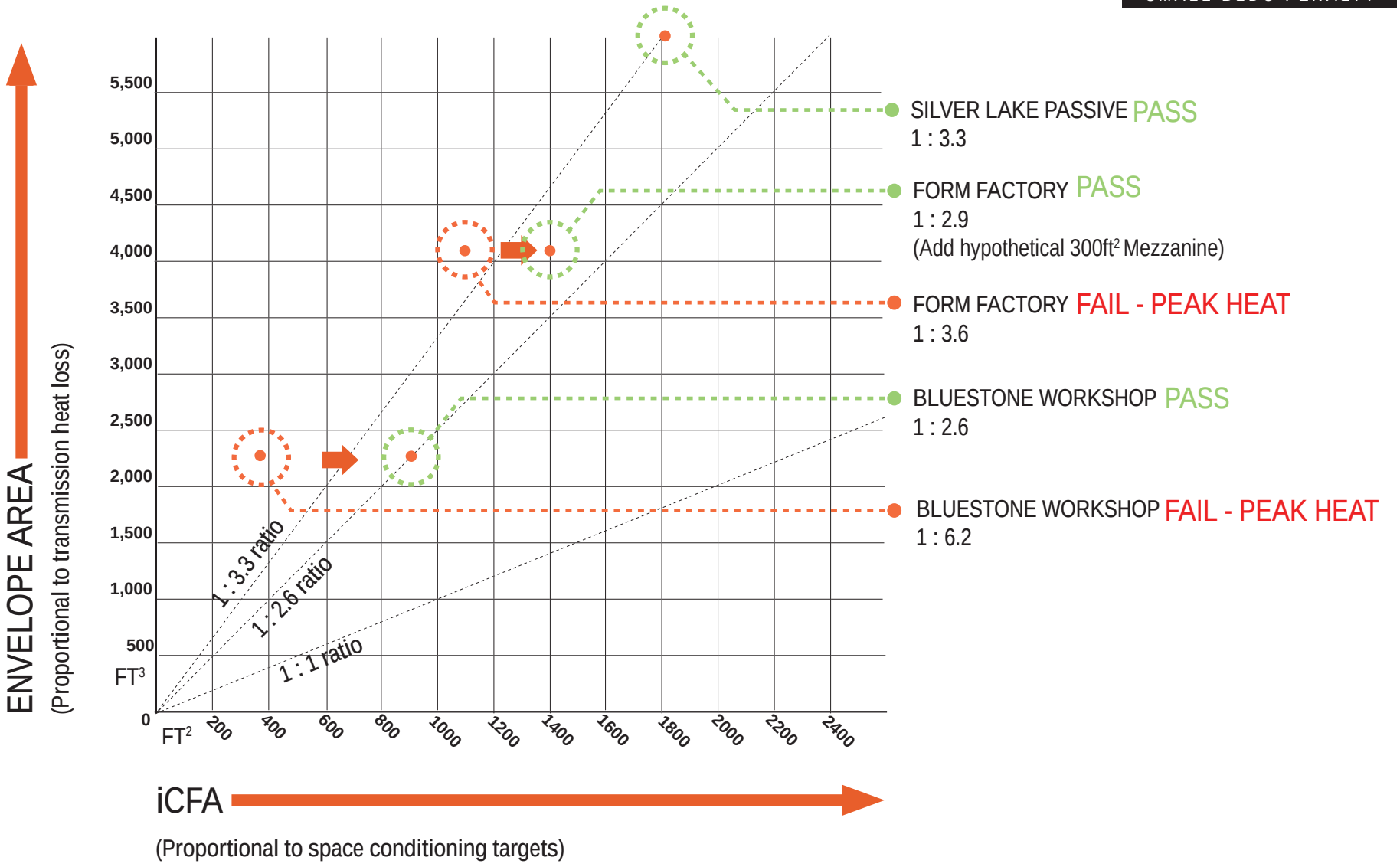


iCFA (WALKABLE FLOOR AREA)
- proportional to *space conditioning* targets

iCFA : ENVELOPE AREA

- Indirect way of putting pressure on material efficiency through compact forms and attached units during design

But, what about existing building retrofits that already have a set envelope?


ENVELOPE AREA
(Proportional to transmission heat loss)
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
FT³
0
FT²
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
1 : 3.3 ratio
1 : 2.6 ratio
1 : 1 ratio
iCFA
(Proportional to space conditioning targets)
SILVER LAKE PASSIVE PASS
1 : 3.3
FORM FACTORY PASS
1 : 2.9
(Add hypothetical 300ft² Mezzanine)
FORM FACTORY FAIL - PEAK HEAT
1 : 3.6
BLUESTONE WORKSHOP PASS
1 : 2.6
BLUESTONE WORKSHOP FAIL - PEAK HEAT
1 : 6.2

3M zehnder SIGA

Spruce Mountain, Inc.

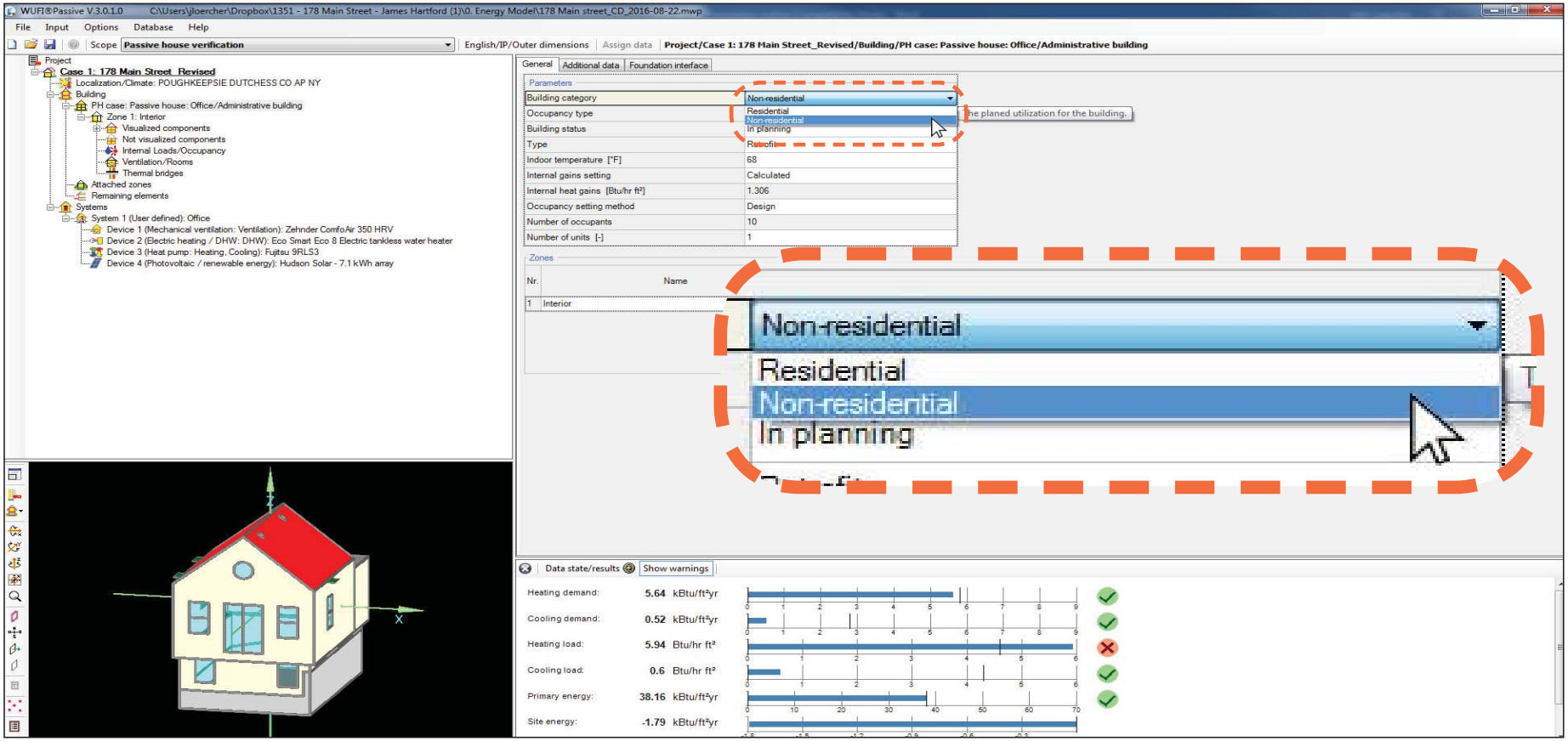
SDV Carpentry, Inc.

Coill Dubh Masonry

HUDSON SOLAR

YARO windows + doors

ESTIMATED COMPLETION : NOV ‘16


WUFI®Passive V.3.0.1.0 C:\Users\jloercher\Dropbox\1351 - 178 Main Street - James Hartford (1)\0. Energy Model\178 Main street_CD_2016-08-22.mwp
File Input Options Database Help
Scope Passive house verification
English/IP/Outer dimensions
Assign data
Project/Case 1: 178 Main Street_Revised/Building/PH case: Passive house: Office/Administrative building
Project
Case 1: 178 Main Street_Revised
Localization/Climate: POUGHKEEPSIE DUTCHESS CO AP NY
Building
PH case: Passive house: Office/Administrative building
Zone 1: Interior
Visualized components
Not visualized components
Internal Loads/Occupancy
Ventilation/Rooms
Thermal bridges
Attached zones
Remaining elements
Systems
System 1 (User defined): Office
Device 1 (Mechanical ventilation: Ventilation): Zehnder ComfoAir 350 HRV
Device 2 (Electric heating / DHW: DHW): Eco Smart Eco 8 Electric tankless water heater
Device 3 (Heat pump: Heating, Cooling): Fujitsu 9RLS3
Device 4 (Photovoltaic / renewable energy): Hudson Solar - 7.1 kWh array
General
Additional data
Foundation interface
Parameters
Building category
Non-residential
Residential
Non-residential
In planning
Occupancy type
Building status
Type
Retrofit
Indoor temperature [°F]
68
Internal gains setting
Calculated
Internal heat gains [Btu/hr ft²]
1.306
Occupancy setting method
Design
Number of occupants
10
Number of units [-]
1
Zones
Nr.
Name
1
Interior
Non-residential
Residential
Non-residential
In planning
Data state/results
Show warnings
Heating demand: 5.64 kBtu/ft²yr
Cooling demand: 0.52 kBtu/ft²yr
Heating load: 5.94 Btu/hr ft²
Cooling load: 0.6 Btu/hr ft²
Primary energy: 38.16 kBtu/ft²yr
Site energy: -1.79 kBtu/ft²yr

WUFI®

= WEEKEND (FULL OCCUPANCY)

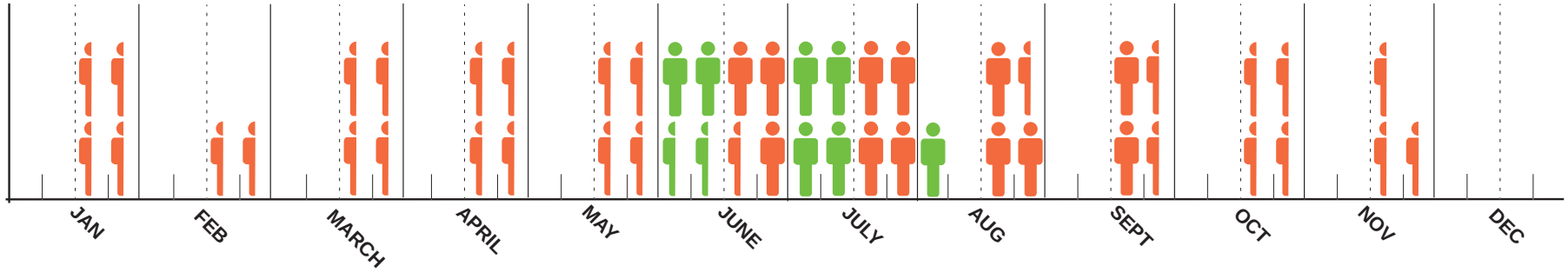
= WEEKEND (REDUCED OCCUPANCY)

= WEEKDAY (FULL OCCUPANCY)

= WEEKDAY (REDUCED OCCUPANCY)

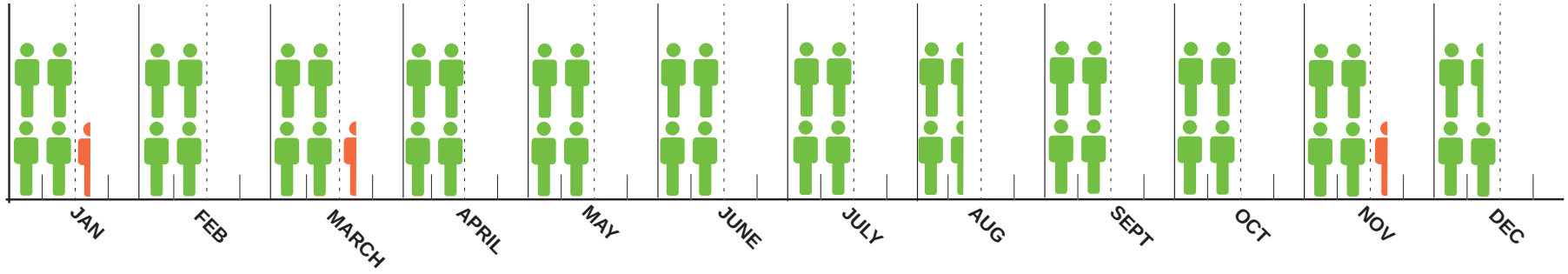
SILVER LAKE PASSIVE

CAMP & CONFERENCE CENTER LODGE



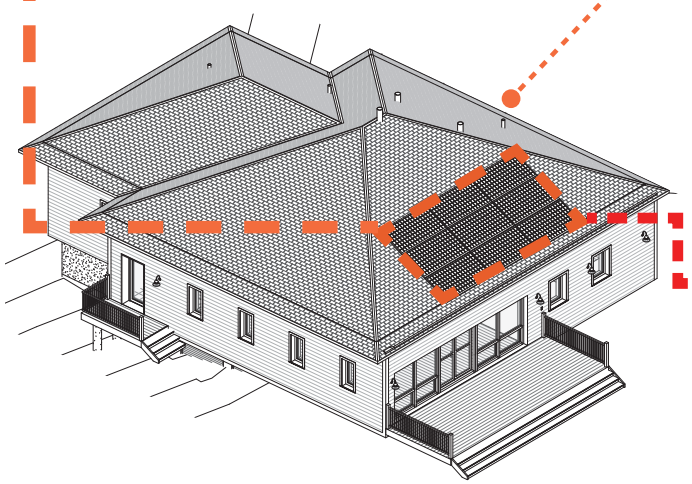
RA STUDIO

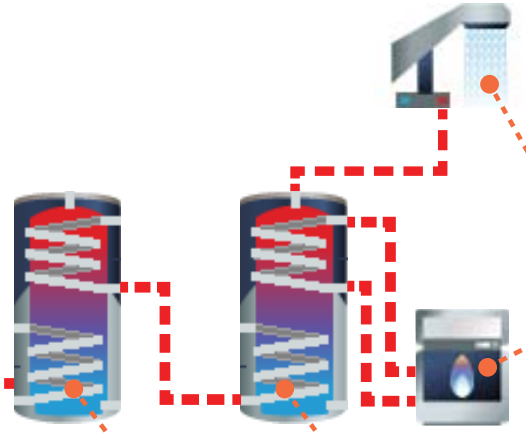
RIVER ARCHITECTS STUDIO



Wagner Solar

77% Solar Contribution





SOLAR HOT WATER COLLECTORS
- (4x) Euro L20 AR panels
- 112 ft^2 Surface area
- 30° Inclination
- Direct Southern exposure

SUPPLY:
- 100 gal / day
- 120° F

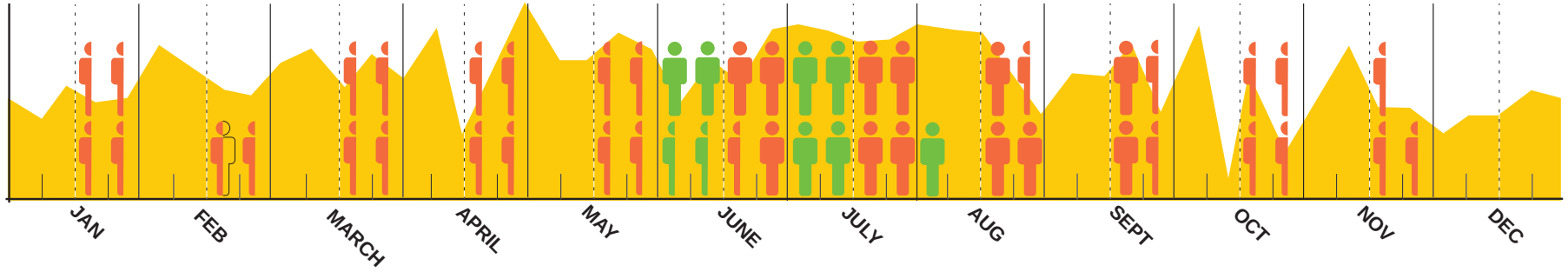
SMALL GAS-FIRED BOILER
- 30 kBTU/hr capacity

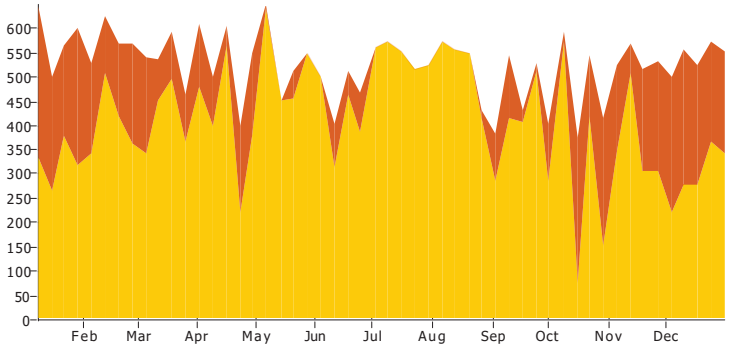
(2x) HOT WATER TANKS
- 120 gal capacity
- Located in basement

18 occupants x 4.3 gal / day = 77.4 gal / day

SILVER LAKE PASSIVE

CAMP & CONFERENCE CENTER LODGE



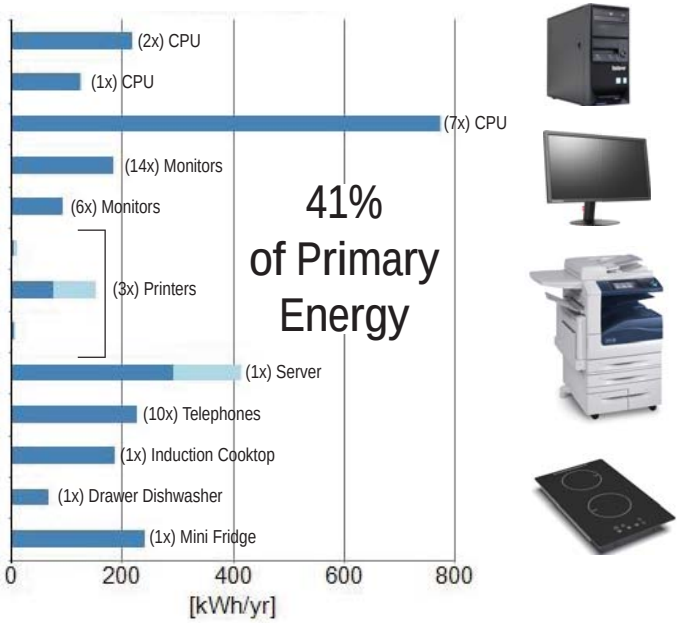


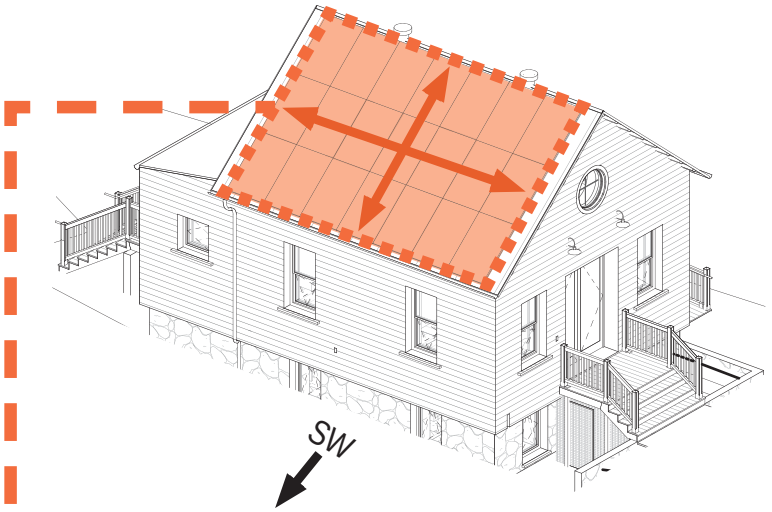
SYSTEM
- 77% Solar hot water
- 42% System efficiency

= TOTAL ENERGY CONSUMPTION

= SOLAR CONTRIBUTION

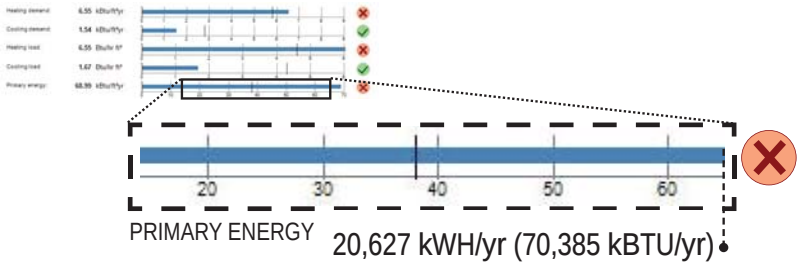
Total equipment load:
7,991.6 kWH/yr (29,268 kBTU/yr)



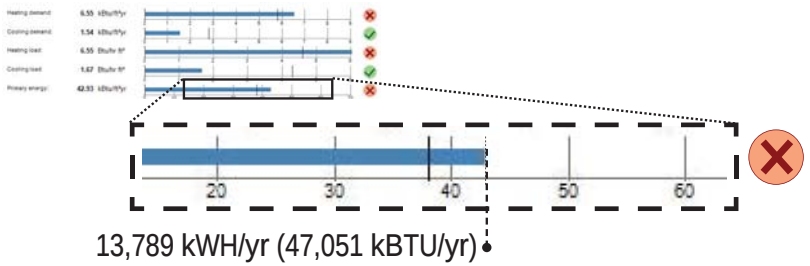


HUDSON SOLAR

7,107 kWH/yr (24,226 kBTU/yr)



PRIMARY ENERGY 20,627 kWH/yr (70,385 kBTU/yr)



13,789 kWH/yr (47,051 kBTU/yr)

CA200 ERV @ 100 cfm
(125 max cfm)

ERV efficiency: 80% (derated 12%)
Electrical efficiency: .63 W/cfm

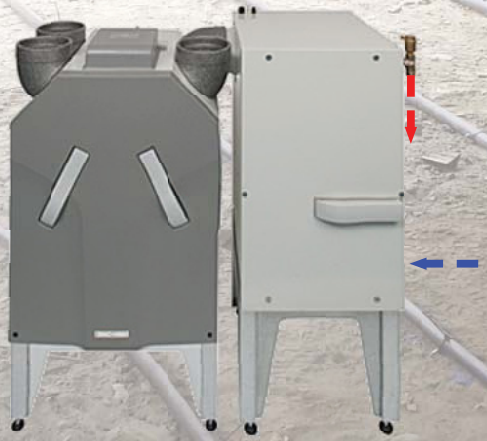
CA350 HRV @ 100 cfm
(215 max cfm)

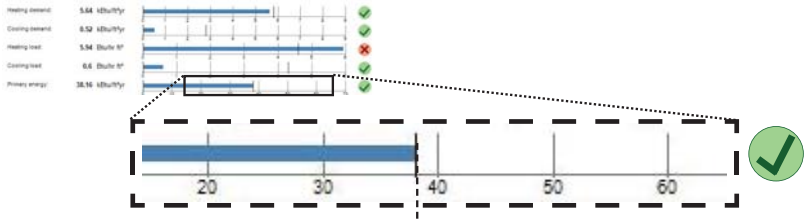
HRV efficiency: 89%
Electrical efficiency: .32 W/cfm

+

ComfoFond
Geothermal heat exchanger

Efficiency: 60%

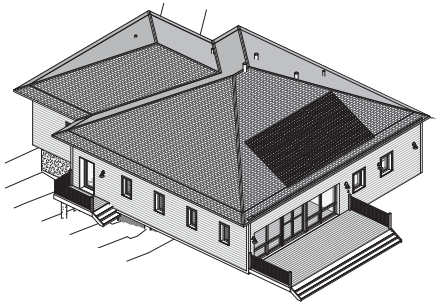


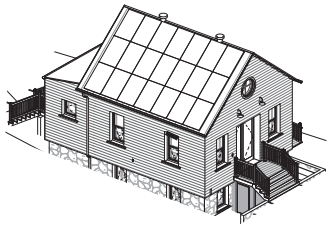


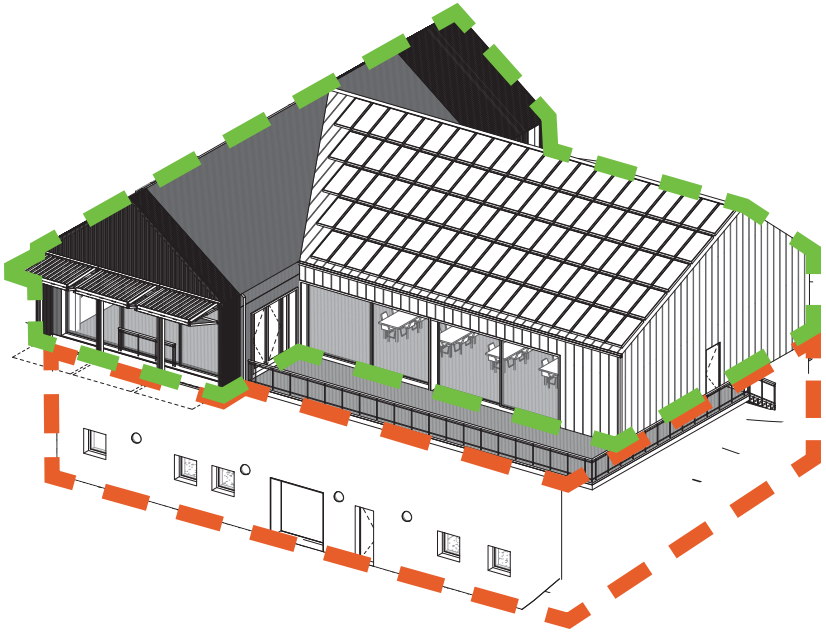
12, 219 kWH/yr (41,823 kBTU/yr)

Target = 12,218 kWH/yr

WHAT'S NEXT? → *MULTI-ZONE COMMERCIAL*







SEMINARY HILL

COMMERCIAL CIDERY & EVENT SPACE

Location: Callicoon, NY

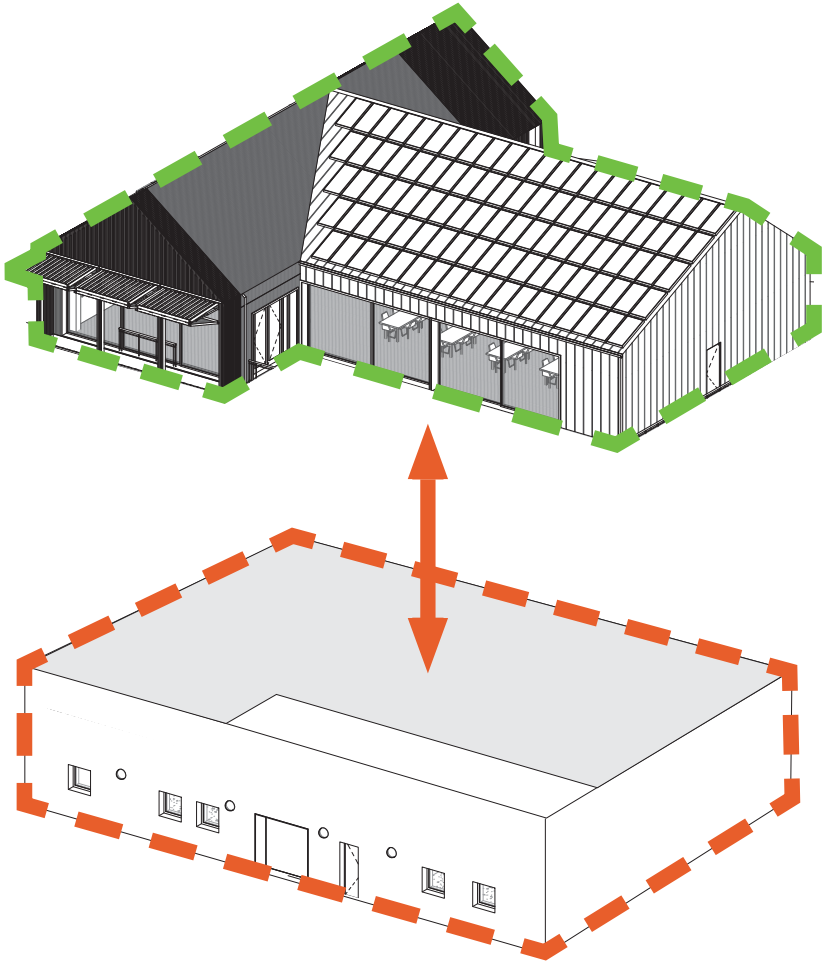
Climate zone: 6a

ZONE 1: Cidery

Total iCFA: 3,598 SF

ZONE 2: Event Space

Total iCFA: 3,053 SF



What happens when PHIUS standards move from ***human*** comfort ...

Heating set temperature: 68° F
Cooling set temperature: 77° F

... to ***apple*** comfort?

Heating set temperature: 55° F
Cooling set temperature: 70° F

River
ARCHITECTS

THANK YOU

CONTACT INFO:

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