



Certified
Retrofit
Passive House Institute

| classic | plus | premium |

Passive House Project Documentation

Six&Kane - EnerPHit Plus





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1. Abstract



Six&Kane, Kane, PA, US



The West Penn Power Sustainable Energy Fund is a non-profit organization that provides investment capital and grant making to spur the deployment of renewable energy and energy efficiency. In 2019 WPPSEF purchased a vacant and decaying mid-block commercial building on US Route 6 in Kane PA, a rural community, and committed to renovating the building to the EnerPHit standard, in keeping with their mission and to demonstrate the Passive House strategies, training the local workforce in the methods necessary to achieve Certification.

The community embraced and supported the project enthusiastically during and after the construction period. Several dozen local tradespeople were trained in the craft of creating and maintaining an air barrier and thermally broken envelope throughout construction. In addition, during the project, several key team members earned their Passive House credentials.

Completed in late 2022, the renovated building houses a smoothie bar, Chamber of Commerce office, a law firm, economic incubator space, the WPPSEF office and community meeting rooms.

Six&Kane achieved EnerPHit Plus Certification and is the first EnerPHit Plus Office Building in North America. Although a renovation, the building exceeds the criteria for Passive House Plus for new construction.



1.1 Data

Year of Construction	2022	Climate Zone	6 Cold
Treated Floor Area	9839 ft ²	Space Heating Demand	4.53 kBTU/sf. yr.
Heat/Humidity Recovery	85% 65%		
Average R-value external wall	25.1 hr.ft ² . °F/BTU	Primary Energy Renewable (PER)	13.75 kBTU/sf. yr.
Average R-value floor slab/basement ceiling	38.6 hr.ft ² . °F/BTU	Generation of renewable energy	37.72 kBTU/sf. yr.
U-value roof	39.9 hr.ft ² . °F/BTU	Non-renewable Primary Energy (PE)	30.03 kBTU/sf. yr.
Average U-value window	0.13 BTU/hr.ft ² . °F	Pressure Test n50	0.2 h-1
Special Features	<ul style="list-style-type: none"> • Energy Recovery Elevator • Heat Pump Water Heater in smoothie bar uses rejected heat from reach-in refrigeration units. 		

By attaining the EnerPHit Plus level of performance the building achieved an Architecture 2030 Zero Score of 15, and a Site EUI of 12 kBTU/sf. yr. against a benchmark of 76 kBTU/sf. yr. Total Greenhouse Gas Emissions are projected to be 28 metric tons CO₂e/yr against a benchmark of 121 metric tons CO₂e/yr.

1.2 Project Description

Built in 1897 as a 2-story building to house a dry goods store, the 3rd floor was added in the 1920's after the adjacent buildings were constructed. Those buildings used this building's north and south walls as their structure, creating a true party wall condition. The last occupant of the building was a Loyal Order of Moose Lodge. The roof and front façade had deteriorated to the point where both needed to be replaced. This presented the opportunity to construct new high-performance assemblies for most of the exposed envelope of the building, as well as cladding the remaining masonry walls on the rear of the building. Changing the east wall from mass masonry to a structural steel frame also allowed larger windows, admitting daylight and winter solar gain.

The climate of Kane is challenging, sitting 2000 Ft above sea level on an exposed hilltop. The winters can be cold and snowy, with a 13°F average temperature in January & February and an annual average snowfall of 92 inches. The summers are warm and often humid due to the surrounding forests.

Beyond energy performance drivers, the design of the building needed to both respect the local context yet move the streetscape in a future-looking direction. Placing the vertical circulation at the front façade provided an opportunity to share the elevator with the neighboring building. Accessibility was integrated into the new entrance design. The oversize windows not only bring light into the building but allow views of the



Chamber of Commerce offices and the gallery space from the street. The stairway lighting takes advantage of LED sources to allow color-changes seasonally or to support local celebrations and organizations. The front stone, a regional material, matches some of the materials of the surrounding buildings and gives a landmark quality to this building. The materials chosen for the back of the building, metal panels, provide durability, economy, and visual punch.

The interior of the building features locally sourced and milled maple flooring, stair treads, handrails and standing and running trim. The triple glazed timber framed curtainwall system ties into this interior wood detailing and the framing was extended on the large windows to provide an integration of structure and finish. The exposed structural elements and the painted exposed brick provide detail and human scale and the light colors and wood tones impart openness and serenity.

A major focus of the design and construction was airtightness. A fluid-applied vapor-permeable air barrier was applied to the party and rear walls after the inside surfaces were cleaned and pointed. The OSB sheathing on the roof and east wall have a factory-applied vapor-permeable air barrier attached, which was sealed with acrylic tape and flashing. The same sheathing product was used over the existing wood subfloor on the ground floor to separate the unconditioned basement from the conditioned upper floors.

The insulation scheme was to apply eight (8) in. of continuous insulation to the outside of the air barriers on the new construction and to the outside of the air-sealed and weather-sealed existing masonry. All wall insulation is graphite-enhanced expanded polystyrene foam board insulation (GPS), and the roof insulation is polyisocyanurate board. The ground floor over the basement has 12 in. of dense-pack blown-in fiberglass in the joist spaces, with four (4) in. of GPS continuous below. Interior mineral fiber insulation was added at transition zones where the party walls intersected with exterior walls and inside the structural steel frame to mitigate conditions where the frame contacted the ground, and locations where the continuous insulation needed to be reduced due to adjacent construction.

The windows are a combination of fixed and operable UPVC windows and timber-framed curtainwall. All are triple-glazed with various low-e coatings tuned to the orientation. The east façade is clad with 50mm (2 in) thick regionally sourced sandstone panels, and the rear façades are clad with ribbed steel siding. Both cladding systems are attached with thermally broken clip systems. The location of the building on busy U.S. Route 6 made combined with limited hours of free cooling and the need to maximize morning daylight penetration, dictated that the front windows to be fixed curtainwall. The fixed and operable windows are Ventana brand select series 86 (Rehau Geneo lineals) $U_f - 0.1346 \text{ BTU/hr.ft}^2\text{°F}$ with Guardian ClimaGuard triple glazed insulated glazing units with $U_g\text{-value of } 0.09 \text{ BTU/hr.ft}^2\text{°F}$ and SHGC of 42%. The curtain walls are Raico THERM+ 50 HI $U_f - 0.160 \text{ BTU/hr.ft}^2\text{°F}$ with Saint-Gobain Planitherm Ultra



XN triple glazed insulated glazing units with Ug-value of 0.09 BTU/hr.ft²°F and SHGC of 55%.

The mechanical system consists of a single Ventacity RS3000 Energy Recovery Ventilator serving the entire building. Heating and cooling are supplied by a Variable Refrigerant Flow heat pump with 12 ducted and un-ducted air handlers throughout the building.

Domestic Hot Water for the toilet rooms and office kitchenettes is heated by Eemax point-of-use electric demand heaters. The Root Bar is served by a State room air source heat pump water heater. The waste heat rejected by the commercial kitchen reach-in freezer and refrigerators located in the same room and room adjacent to the water heater is recovered by the heat pump water heater and used to heat the water.

LED lighting is used throughout the building, and all appliances are Energy Star rated.

An Otis Gen 2 Elevator with regenerative drive meeting the ISO25745 Class A efficiency rating was installed.

One hundred and two 435-Watt PV panels on the roof, plus three 305-Watt panels on the front canopy supply 47,547 kWh/yr. of on-site renewable energy.



1.3 Responsible Project Participants

Architect, Passive House
Designer, & Energy
Modeler:

Gary P. Moshier, AIA, LEED AP BD+C, CPHD
Moshier Studio

Associated Architect:

Donna L. Zariczny RA, LEED GA, CPHD
Inscale Architects

MEP Engineer:

Michael L. Norris, PE
Michael L. Norris & Associates, Inc

Structural Engineer:

Dave Brace, PE
Brace Engineering, Inc

Thermal Bridge Modeling: Rick Eckstrom CPHD-T

Dave Fraser
Peel Passive House Consulting Ltd.

Construction Manager:

Norm Horn, CPHC-T
Envinity

Passive House Certifier:

Tad Everhart
CertiPHiers Cooperative

Certification ID;

38246-38254_CO_EP_20230324_TE

PHI Project ID

6642

Project Documentation
Authors:

Gary P. Moshier, AIA, LEED AP BD+C, CPHD
Emel Guner-Ekin, Assoc. AIA
Moshier Studio

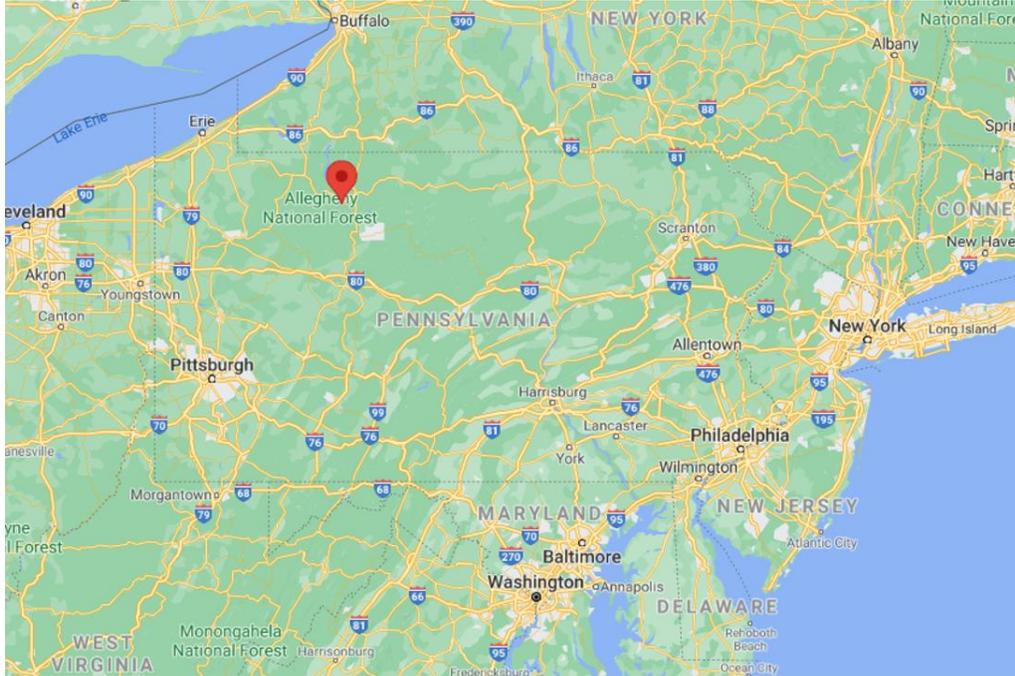
Date and Signature:

Gary P. Moshier, AIA, LEED AP BD+C, CPHD

1 September 2023



2. Location and Context



The Borough of Kane is in Northwestern Pennsylvania in the Allegheny National Forest and Pennsylvania Wilds District



Six&Kane is at 63 N. Fraley Street in Uptown Kane. Fraley Street is US Route 6 and is the main street of the borough.

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Subject Building with neighboring buildings on west side of Fraley Street



East side of Fraley street



3. Elevations

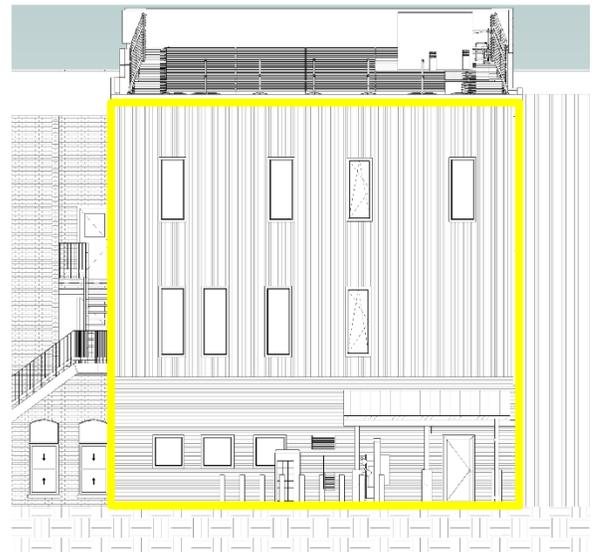
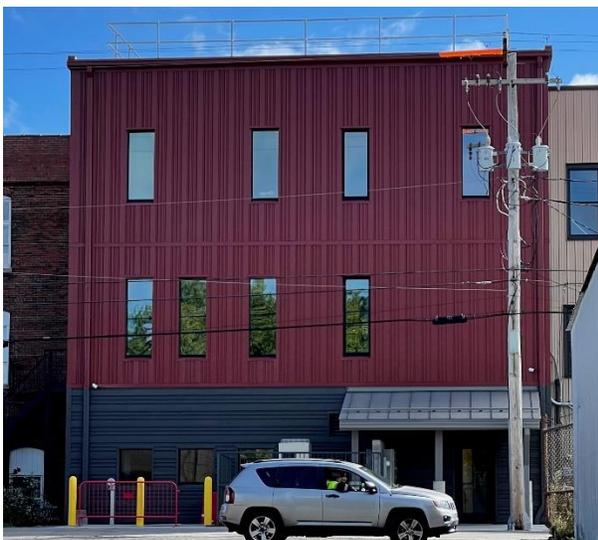
East Elevation



THERMAL INSULATION OUTLINE

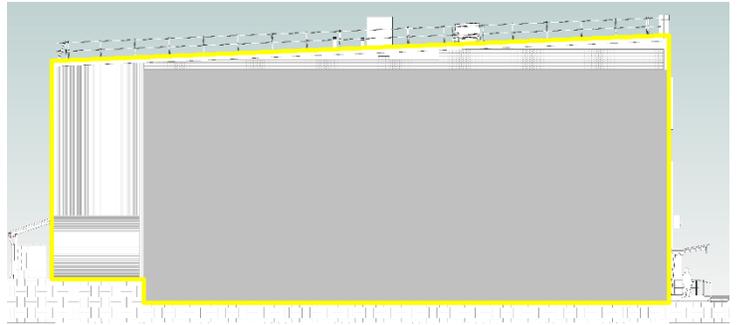


West Elevation

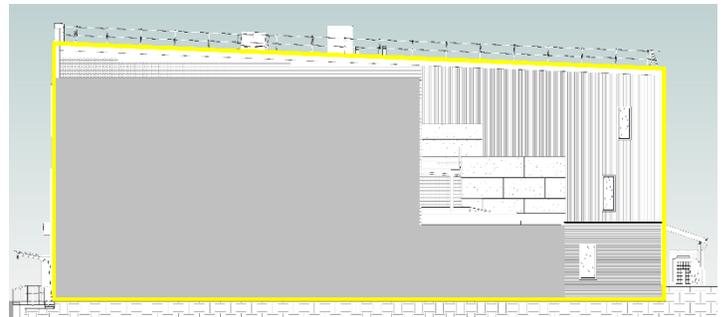




South Elevation

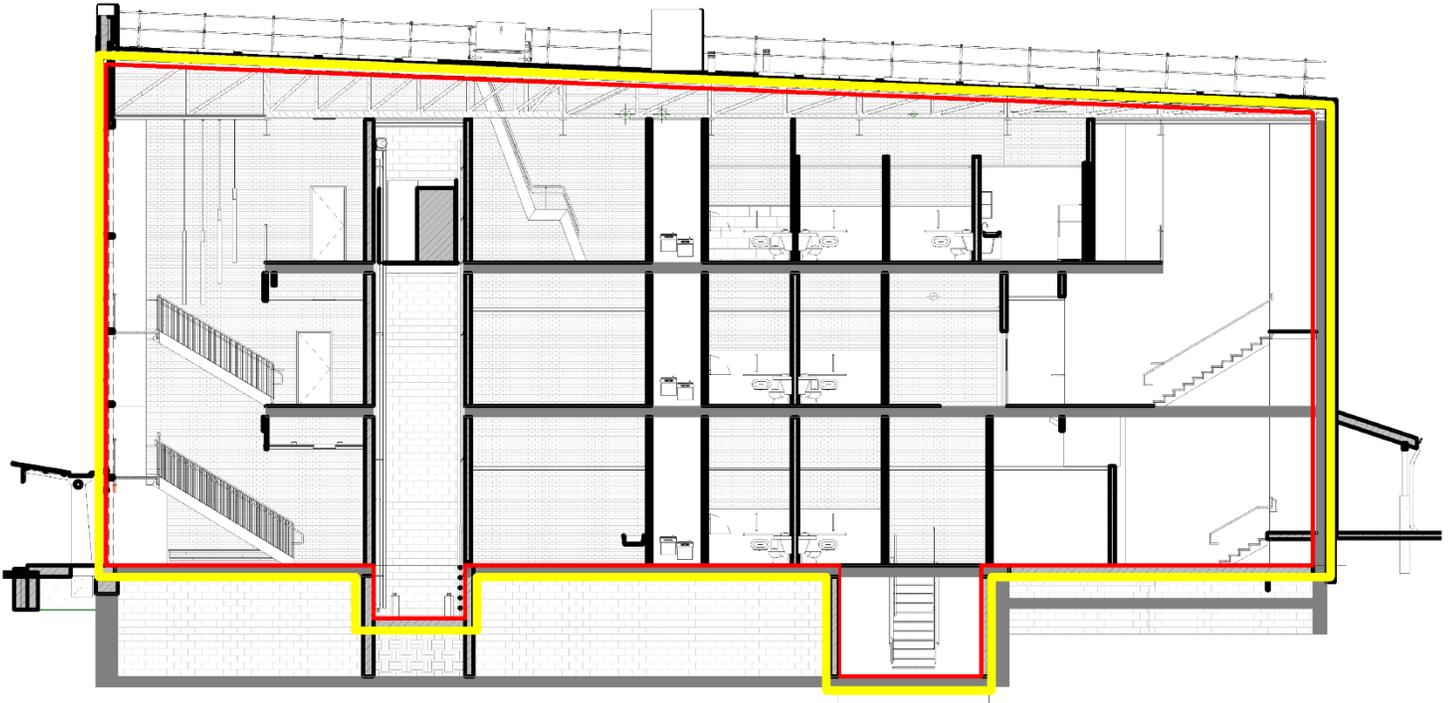


North Elevation

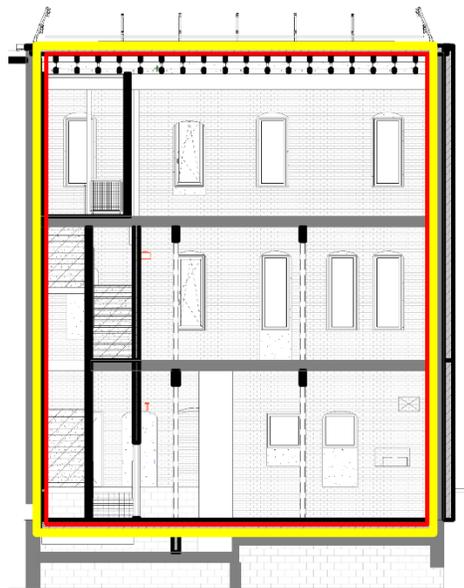




4. Building Sections



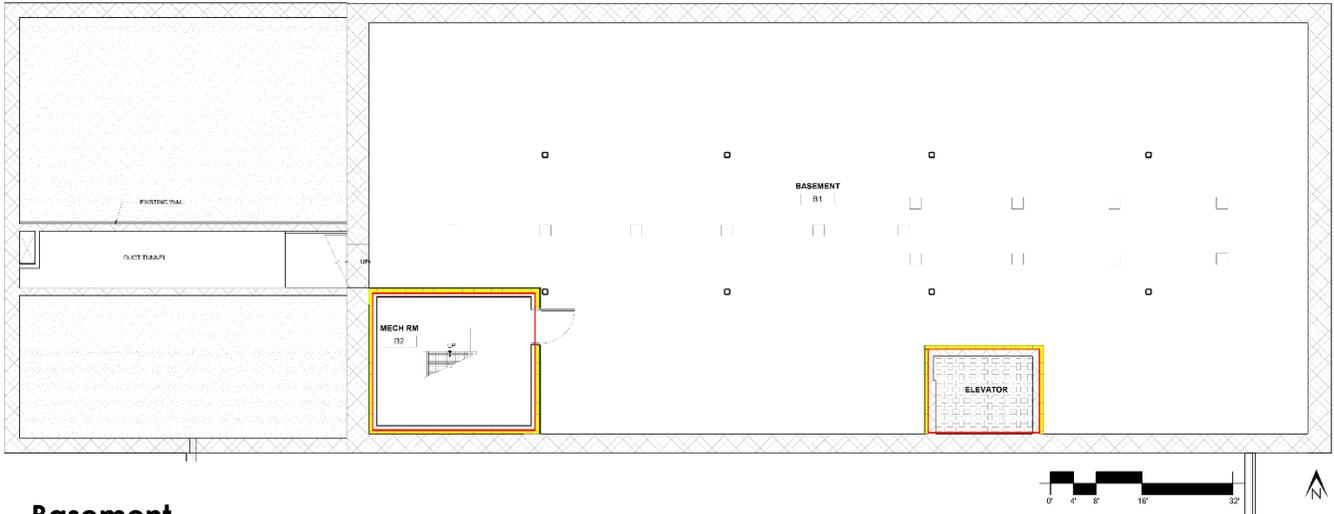
East-West Section



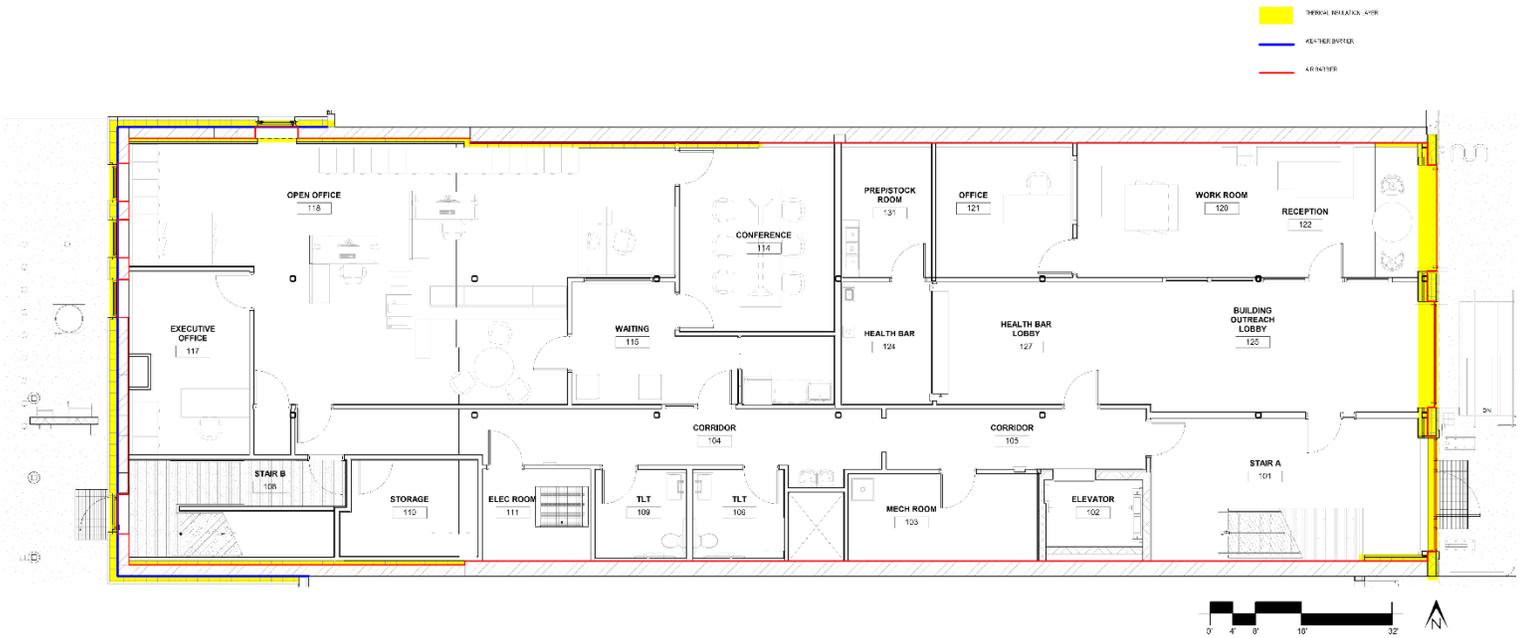
North-South Section



5. Floor Plans



Basement

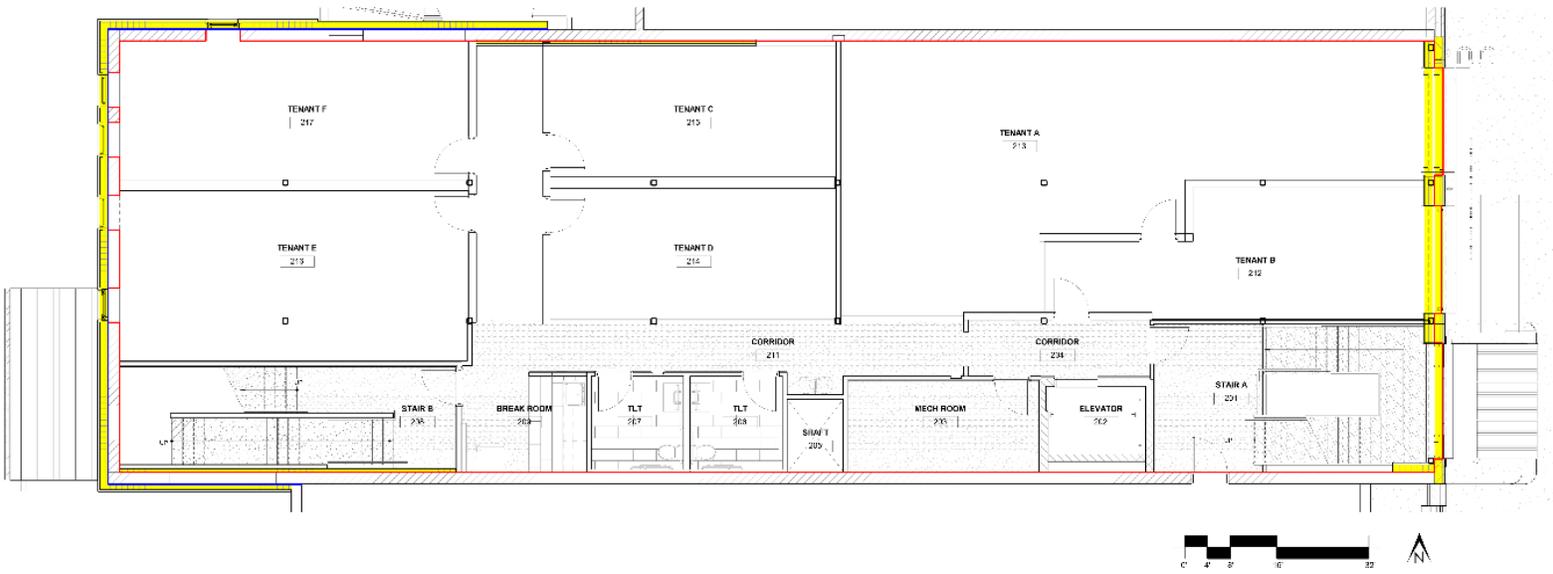


First Floor



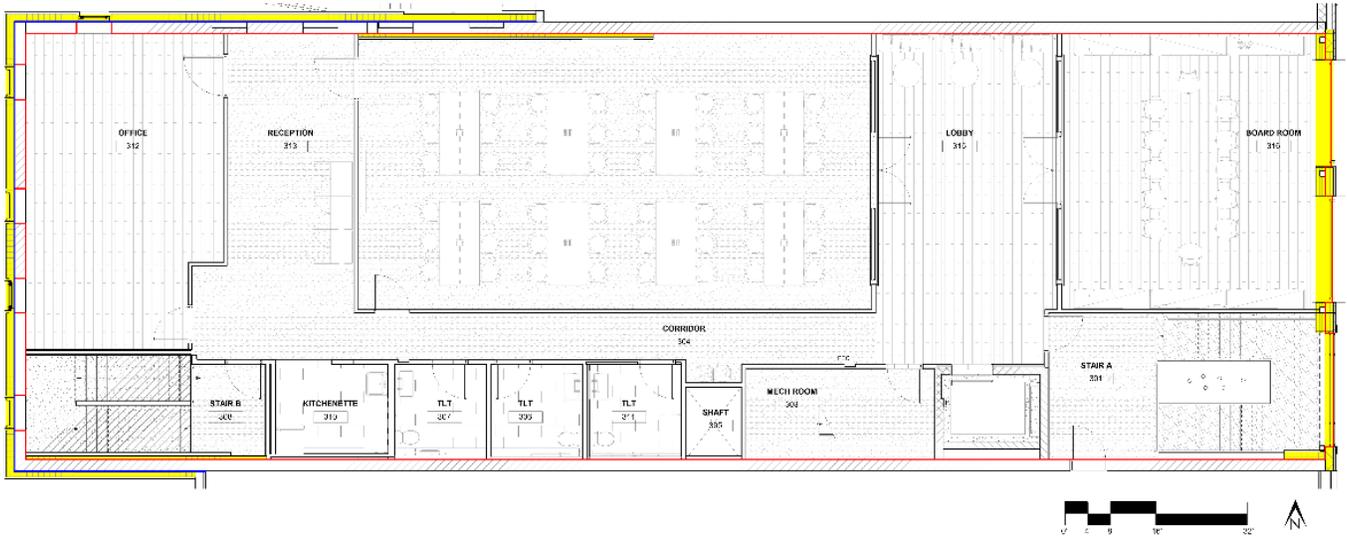
Six&Kane Project Documentation

- TOTAL MECHANICAL
- MECH. UNITS ONLY
- AIRWAYS



Second Floor

- TOTAL MECHANICAL
- MECH. UNITS ONLY
- AIRWAYS



Third Floor



6. Interior Photos



Fraleley Street Lobby



Gallery & Root Bar



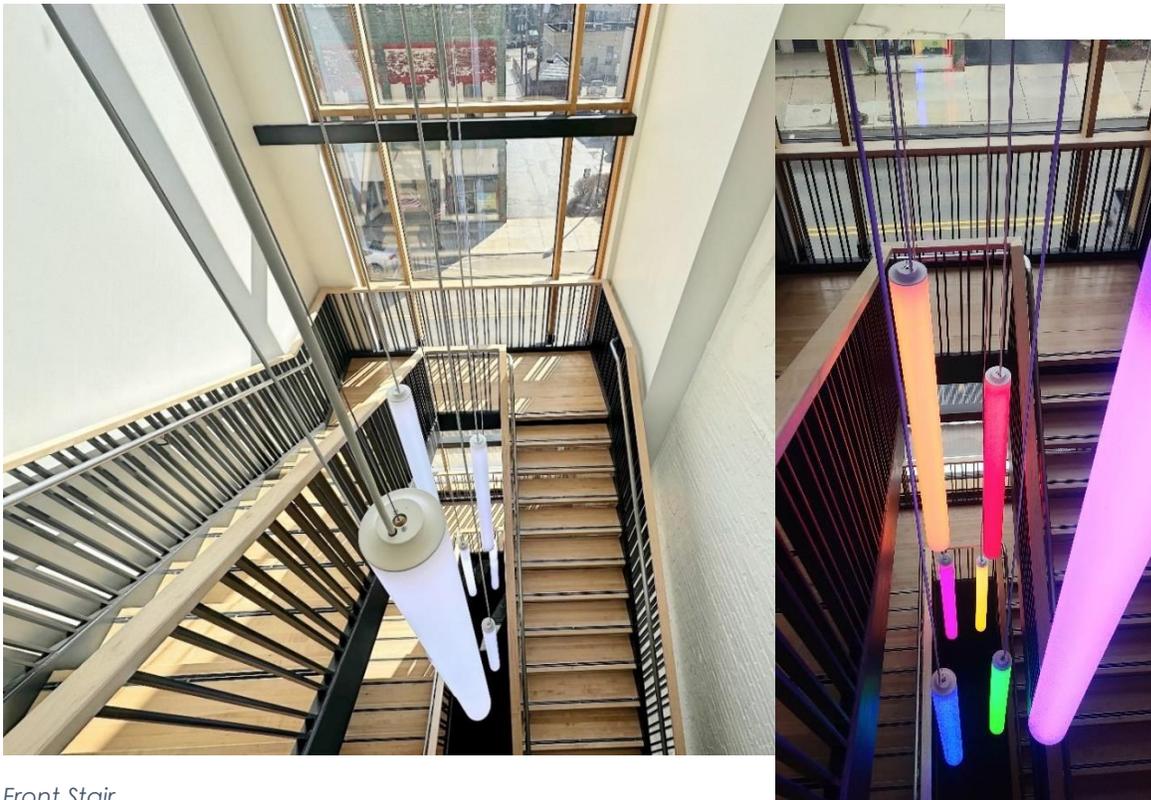
Gallery



Detail of extended curtainwall frame



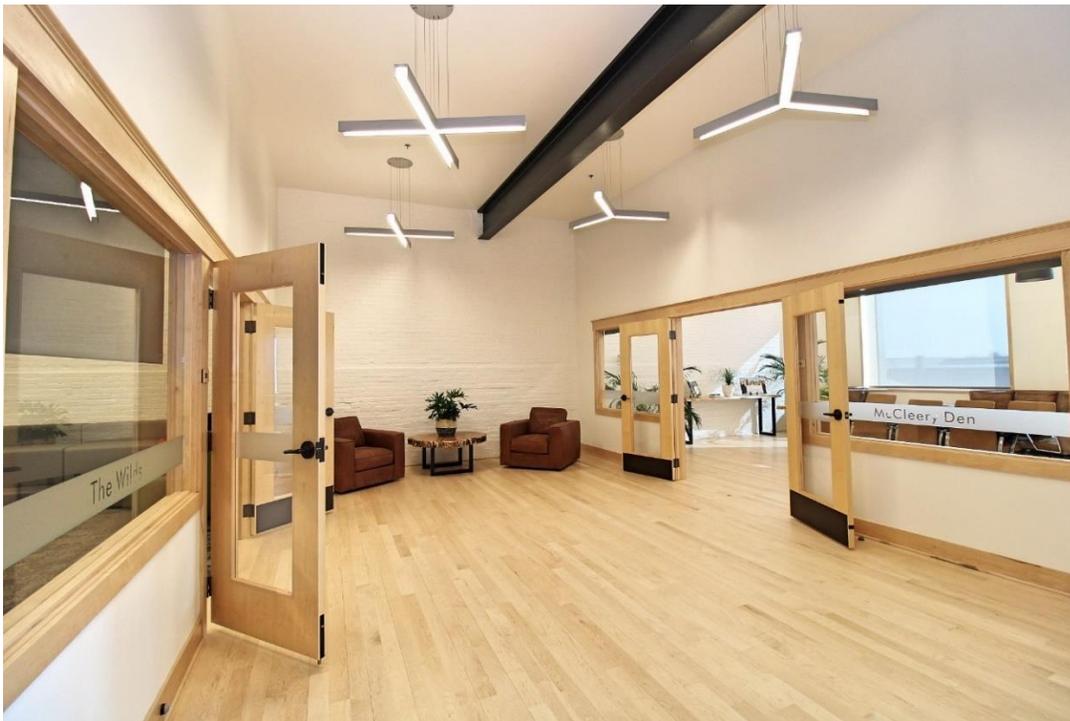
Business Incubator Collaborative Space showing frame of curtainwall



Front Stair



McClery Den



Third Floor Lobby



The Wilds



WPPSEF Office



7. Existing Conditions



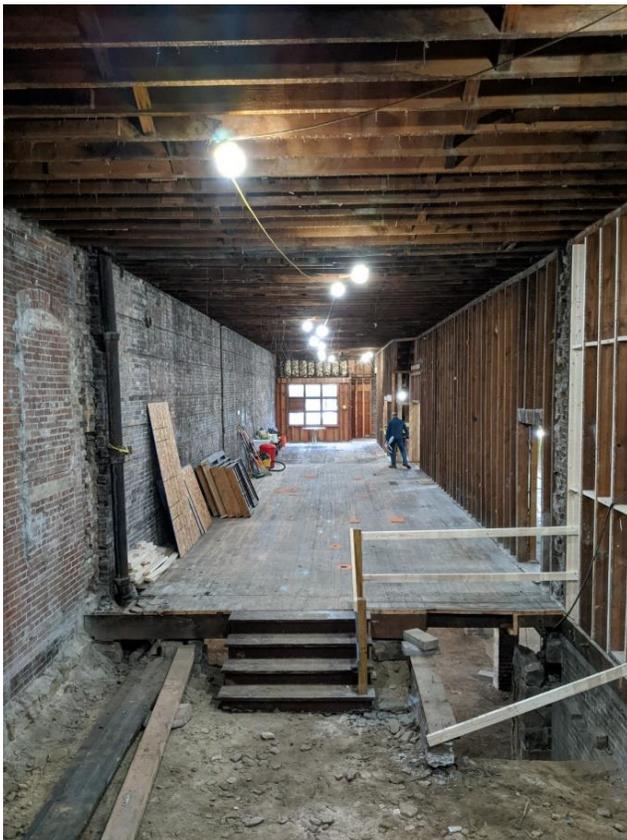
Aerial View from East



West Side



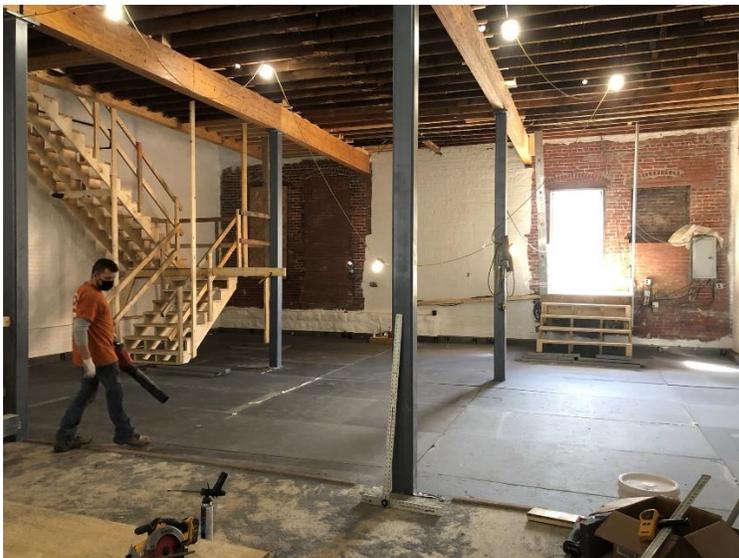
Third Floor



First Floor – note center wall

8. Thermal Envelope

Foundation



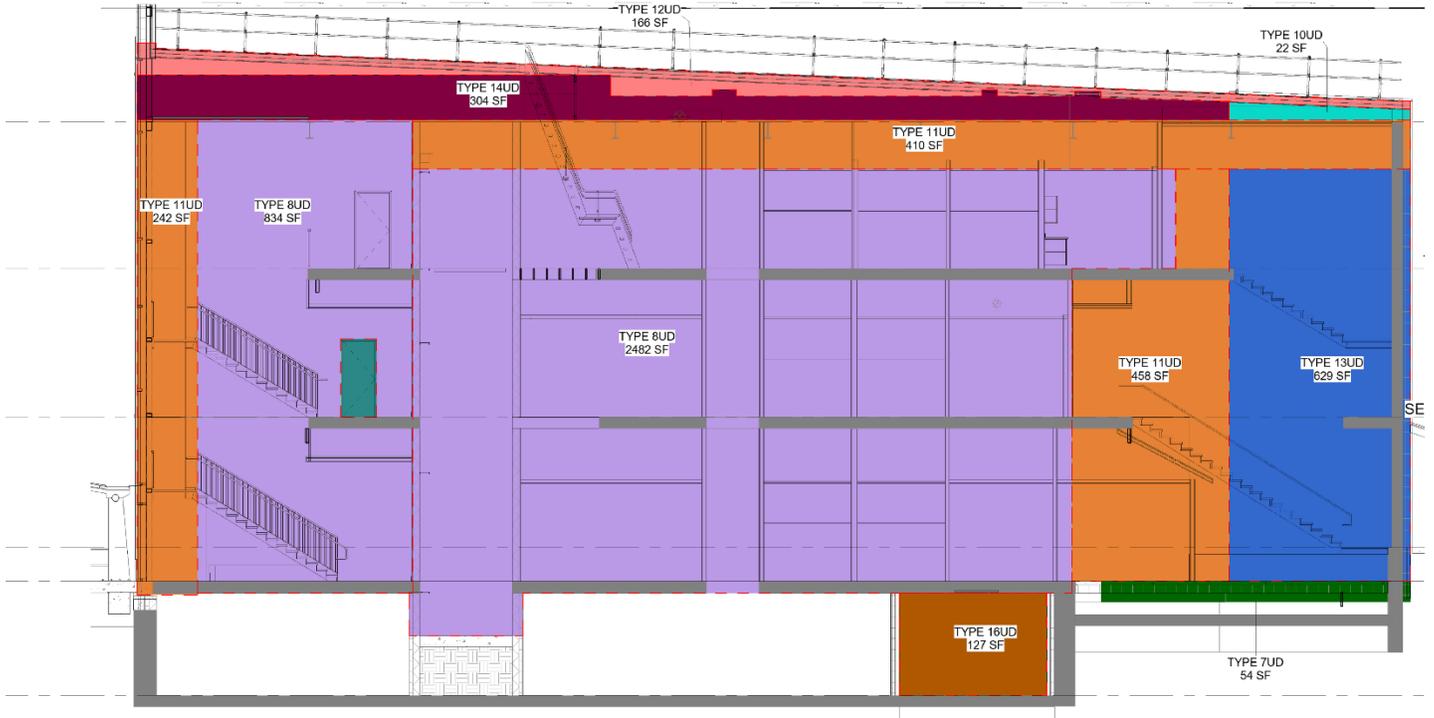
Peel Passive House Consulting Calculations

Results for the interior column penetrations with Armatherm and Neopor base isolation

- Chi-value = 0.311 W/K
- fRSI = 0.85 (with conservative boundary condition of ground of -10°C)



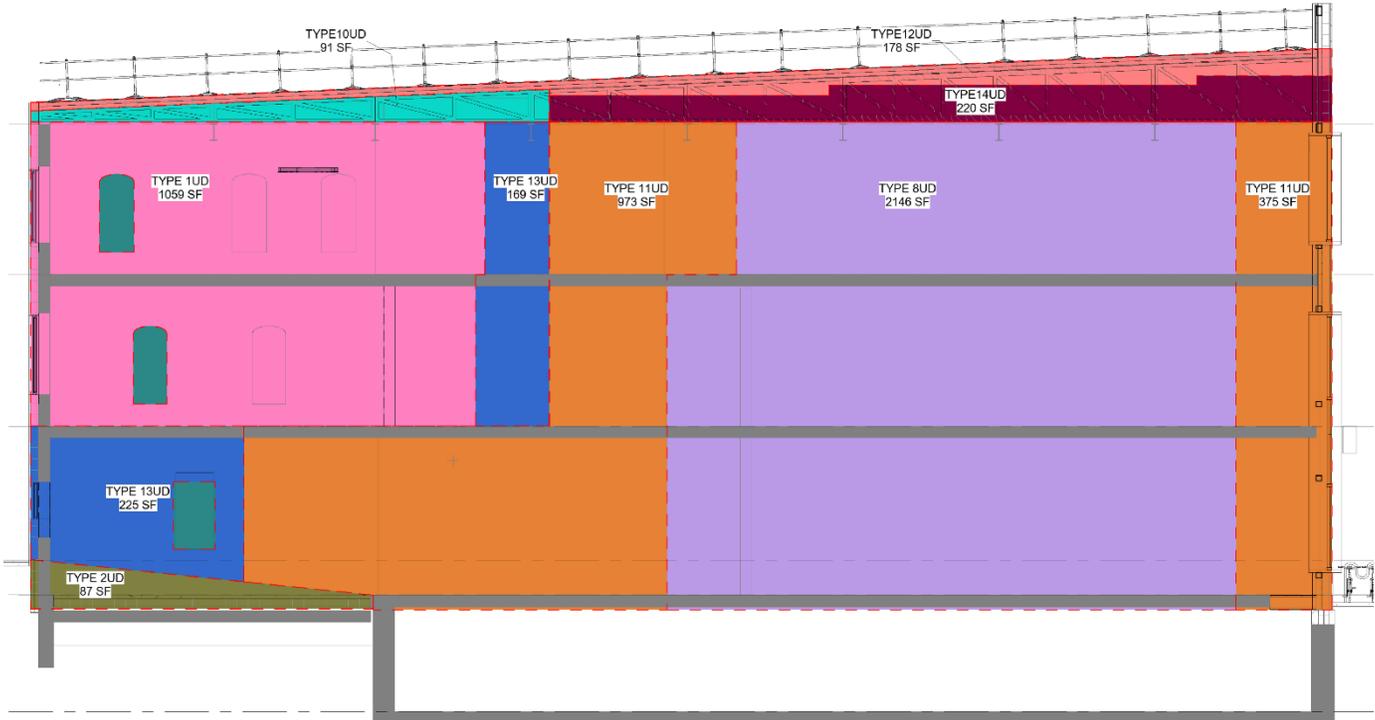
Walls



South Wall Assembly Key Elevation



Basement Wall Assembly Key Elevations



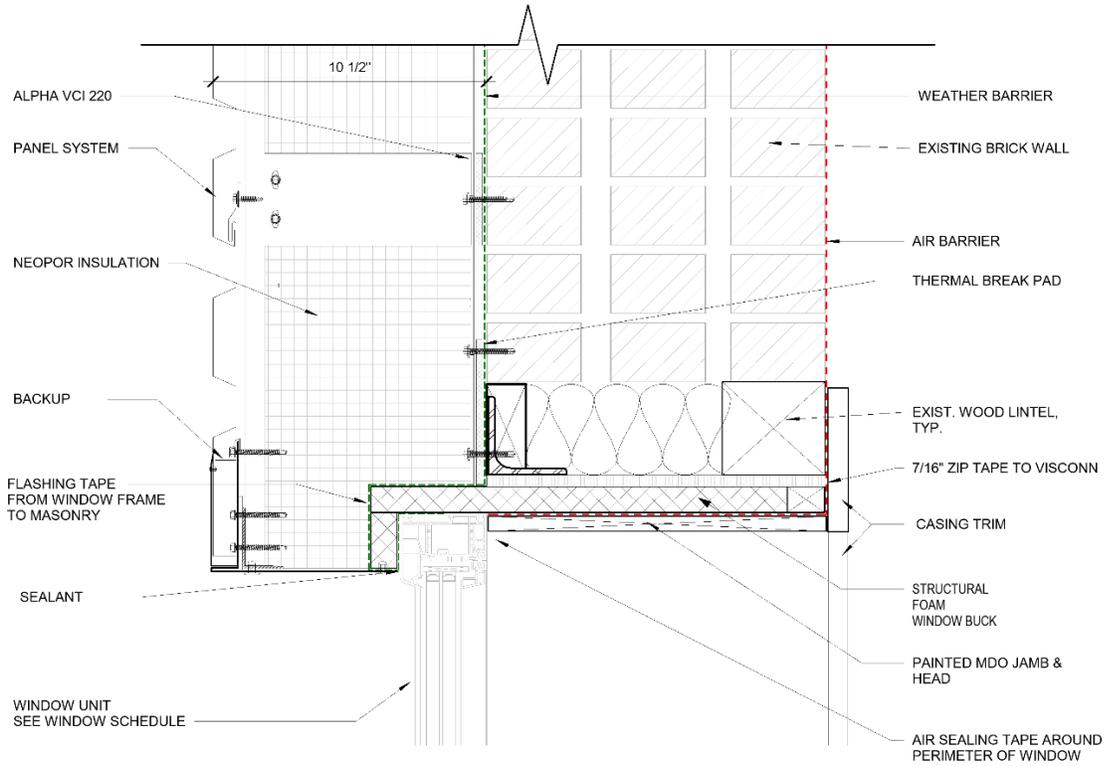
North Wall Assembly Key Elevation



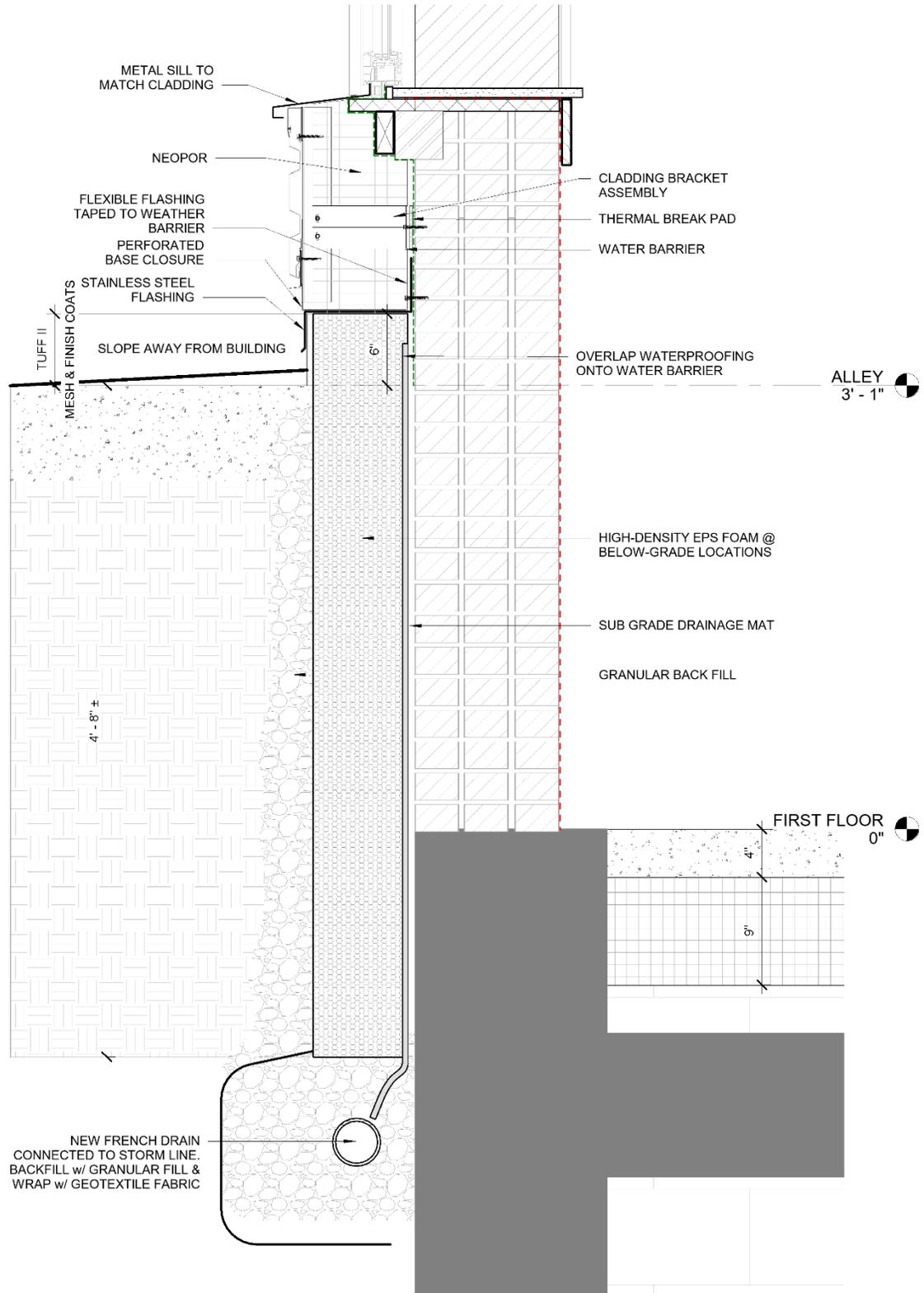
East Wall Assembly Key Elevation



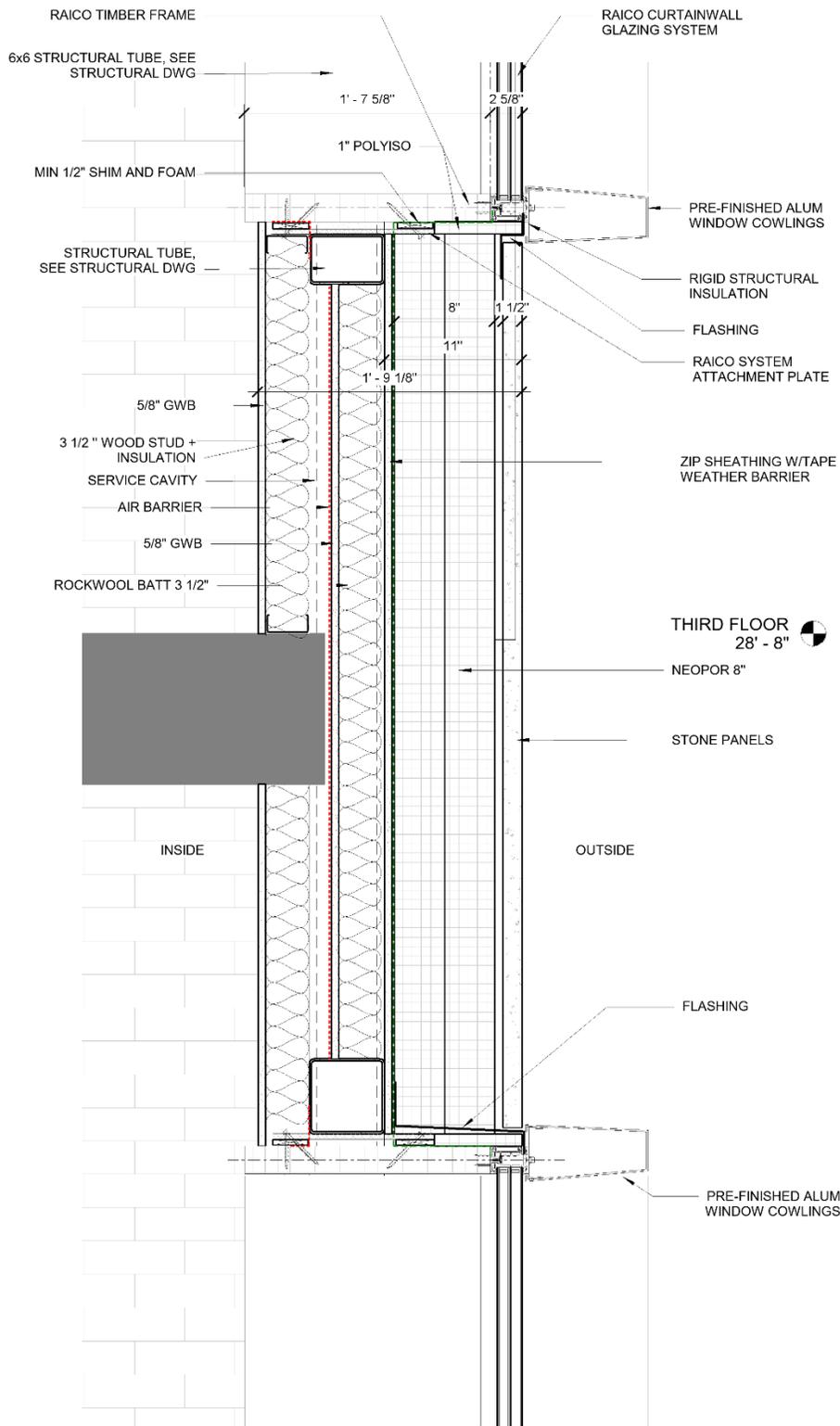
East Wall Assembly Key Elevation



Rear Wall Section - Wall Assembly 01 UD



Rear Wall Section - Wall Assembly 02 UD



Front Wall Section – Wall Assembly 03 UD



Assembly no.	Building assembly description		Interior insulation?			
01ud	Existing Masonry with Exterior Insulation and Cladding - Ambient					
Heat transmission resistance [hr.ft².F/BTU]						
Orientation of building element	2-Wall	interior R _{si}	0.74			
Adjacent to	1-Outdoor air	exterior R _{se}	0.23			
Area section 1	R per inch	Area section 2 (optional)	R per inch	Area section 3 (optional)	R per inch	Thickness [in]
EPS Board Type VII - Neropor	4.80					8.00
Fluid Applied Weather Barrier						
Existing Masonry	0.12					12.00
Fluid Applied Air Barrier						
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
100%						20.00 in
U-value supplement	0.03	BTU/hr.ft².°F		R-value: 18.3		hr.ft².°F/BTU

Assembly no.	Building assembly description		Interior insulation?			
02ud	Existing with Exterior Insulation against Ground					
Heat transmission resistance [hr.ft².F/BTU]						
Orientation of building element	2-Wall	interior R _{si}	0.74			
Adjacent to	2-Ground	exterior R _{se}	0.00			
Area section 1	R per inch	Area section 2 (optional)	R per inch	Area section 3 (optional)	R per inch	Thickness [in]
Dimpled waterproofing						0.25
EPS Board Type VII - Neropor	4.80					8.00
Fluid Applied waterproofing						0.06
Parge Coat	0.21					0.25
Existing Masonry	0.12					12.00
Fluid Applied Air Barrier						0.06
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
100%						20.62 in
U-value supplement		BTU/hr.ft².°F		R-value: 40.6		hr.ft².°F/BTU



Assembly no. 03ud	Building assembly description New East Stone Clad Wall - Ambient		Interior insulation?	
Heat transmission resistance [hr.ft².F/BTU]				
Orientation of building element 2-Wall	interior R _{si}		0.74	
Adjacent to 1-Outdoor air	exterior R _{se}		0.23	

Area section 1	R per inch	Area section 2 (optional)	R per inch	Area section 3 (optional)	R per inch	Thickness [in]
Sandstone Panels	0.06					1.50
U-Kon Girts/Airspace	1.34					2.50
EPS Board Type VII - Neropor	4.800					8.00
Zip Sheathing - Weather Barrier	1.11					0.50
Rockwool CavityRock	3.20	Metal Stud, 20 GA, 16" O.C.	0.00			6.00
Zip Sheathing - Air Barrier	1.11					0.44
Rockwool ComfortBatt Service Cavity	3.20		0.00	Wood Stud	1.11	3.50
GWB	0.69					0.63

Percentage of sec. 1 90%	Percentage of sec. 2 0.3%	Percentage of sec. 3 10.0%	Total 23.07 in
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U-value supplement 0.01	BTU/hr.ft².°F	R-value: 36.0	hr.ft².°F/BTU
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Assembly no. 05ud	Building assembly description Floor over Ventilated Basement		Interior insulation?	
Heat transmission resistance [hr.ft².F/BTU]				
Orientation of building element 3-Floor	interior R _{si}		0.97	
Adjacent to 3-Ventilated	exterior R _{se}		0.97	

Area section 1	R per inch	Area section 2 (optional)	R per inch	Area section 3 (optional)	R per inch	Thickness [in]
Zip Sheathing - Air Barrier	1.11					0.44
Existing Wood	1.11					0.88
Blown Fiber Glass 1.56 lb/cf	2.88	Joists	1.20			12.00
Air Barrier						
EPS Board Type VII - Neropor	4.80					2.00
DensGlas GWB	0.69					0.63

Percentage of sec. 1 88%	Percentage of sec. 2 12.5%	Percentage of sec. 3	Total 15.94 in
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U-value supplement	BTU/hr.ft².°F	R-value: 43.4	hr.ft².°F/BTU
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Assembly no.	Building assembly description		Interior insulation?			
10ud	Gable Truss plus Clad Masonry					
Heat transmission resistance [hr.ft².F/BTU]						
Orientation of building element	2-Wall	interior R _{si}	0.74			
Adjacent to	1-Outdoor air	exterior R _{se}	0.23			
Area section 1	R per inch	Area section 2 (optional)	R per inch	Area section 3 (optional)	R per inch	Thickness [in]
Rockwool Board	3.20					4.00
Rockwool Board	3.20	Stud Frame	1.20			1.50
PolyIso Component of Zip R Sheathing	4.75					1.50
OSB Component of Zip-R Sheathing	1.11					0.44
Existing Masonry	1.20					12.00
EPS Board Type VII-Neopor	4.80					8.00
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
80%		20.0%				27.44 in
U-value supplement		0.03		BTU/hr.ft².°F		R-value: 23.7 hr.ft².°F/BTU

Assembly no.	Building assembly description		Interior insulation?			
11ud	Transition Wall plus Party Wall					
Heat transmission resistance [hr.ft².F/BTU]						
Orientation of building element	2-Wall	interior R _{si}	0.74			
Adjacent to	1-Outdoor air	exterior R _{se}	0.23			
Area section 1	R per inch	Area section 2 (optional)	R per inch	Area section 3 (optional)	R per inch	Thickness [in]
Existing Masonry	0.12					12.00
Visconn Air Barrier						0.25
Rockwool ComfortBoard 80	3.20					4.00
GWB	0.69					0.63
Service Cavity	1.30	Wood Framing 2x4 @16" O.C.	1.20			4.00
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
91%		9.4%				20.88 in
U-value supplement				BTU/hr.ft².°F		R-value: 20.8 hr.ft².°F/BTU



Assembly no.	Building assembly description		Interior insulation?			
12ud	Parapet Extensions					
Heat transmission resistance [hr.ft².F/BTU]						
Orientation of building element	2-Wall	interior R _{si}	0.74			
Adjacent to	1-Outdoor air	exterior R _{se}	0.23			
Area section 1	R per inch	Area section 2 (optional)	R per inch	Area section 3 (optional)	R per inch	Thickness [in]
Rockwool Board	3.20					1.50
Rockwool Comfortboard	3.20	Stud Frame	1.20			1.50
Polyiso component of Zip R Sheathing	4.75					1.50
OSB Component of Zip R Sheathing	1.11					0.44
Poyiso Insulation	4.75					12.00
TPO Membrane	0.60					0.06
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
93%		6.7%				17.00 in
U-value supplement		BTU/hr.ft².°F		R-value:		74.9 hr.ft².°F/BTU

Assembly no.	Building assembly description		Interior insulation?			
13ud	Transition Wall plus Exterior Cladding					
Heat transmission resistance [hr.ft².F/BTU]						
Orientation of building element	2-Wall	interior R _{si}	0.74			
Adjacent to	1-Outdoor air	exterior R _{se}	0.23			
Area section 1	R per inch	Area section 2 (optional)	R per inch	Area section 3 (optional)	R per inch	Thickness [in]
Rockwool Cavity Rock	3.20					8.00
Existing Masonry	0.12					12.00
Visconn Air Barrier						
Rockwool ComfortBoard 80	3.20					4.00
GWB	0.69					0.63
Service Cavity	1.30	Wood Framing 2x4 @16" O.C.	1.20			3.50
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
90%		10.0%				28.13 in
U-value supplement		0.01 BTU/hr.ft².°F		R-value:		31.4 hr.ft².°F/BTU



Assembly no.	Building assembly description		Interior insulation?			
14ud	Gable Truss plus party wall					
Heat transmission resistance [hr.ft ² .F/BTU]						
Orientation of building element	2-Wall	interior R _{si}	0.74			
Adjacent to	3-Ventilated	exterior R _{se}	0.74			
Area section 1	R per inch	Area section 2 (optional)	R per inch	Area section 3 (optional)	R per inch	Thickness [in]
Rockwool Board	3.20					4.00
Rockwool Comfortboard	3.20	Stud Frame	1.20			1.50
Polystyrene component or ZIP Sheathing	4.75					1.50
OSB Component or ZIP Sheathing	1.11					0.44
Existing Masonry	0.12					12.00
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
93%		6.7%				19.44 in
U-value supplement		BTU/hr.ft ² .°F		R-value: 27.8		hr.ft ² .°F/BTU

Assembly no.	Building assembly description		Interior insulation?			
15ud	Elevated Slab over Ventilated Basement					
Heat transmission resistance [hr.ft ² .F/BTU]						
Orientation of building element	3-Floor	interior R _{si}	0.97			
Adjacent to	3-Ventilated	exterior R _{se}	0.97			
Area section 1	R per inch	Area section 2 (optional)	R per inch	Area section 3 (optional)	R per inch	Thickness [in]
Concrete	0.06					5.00
20 ga Metal Deck	0.01					0.03
EPS Board Type VII - Neropor	4.80					6.00
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
100%						11.03 in
U-value supplement		BTU/hr.ft ² .°F		R-value: 31.0		hr.ft ² .°F/BTU



Assembly no. 16ud	Building assembly description Basement Mechanical Room Walls		Interior insulation?			
Heat transmission resistance [hr.ft².F/BTU]						
Orientation of building element 2-Wall	interior R _{si} : 0.74					
Adjacent to 3-Ventilated	exterior R _{se} : 0.74					
Area section 1	R per inch	Area section 2 (optional)	R per inch	Area section 3 (optional)	R per inch	Thickness [in]
GWB	0.69					0.63
Rockwool Comfortbatt	3.20	Wood Studs @ 24" O.C.	1.20			3.50
Zip Sheathing w/Air Barrier	1.11					0.44
Rockwool Comfort Board 80	3.20					4.00
				Furring Strips	1.11	0.75
DensGlass Sheathing	0.69					0.63
Percentage of sec. 1 83%		Percentage of sec. 2 6.7%		Percentage of sec. 3 10.0%		Total 9.94 in
U-value supplement			BTU/hr.ft².°F			R-value: 26.0 hr.ft².°F/BTU

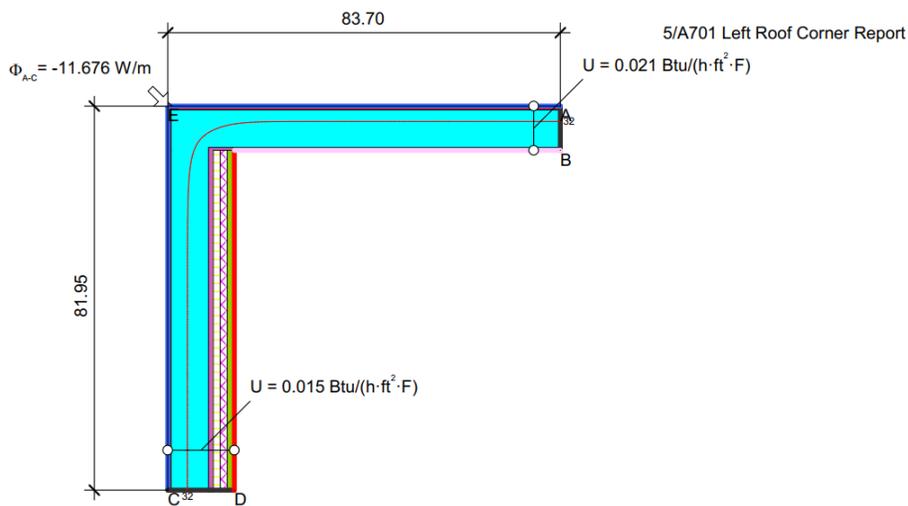
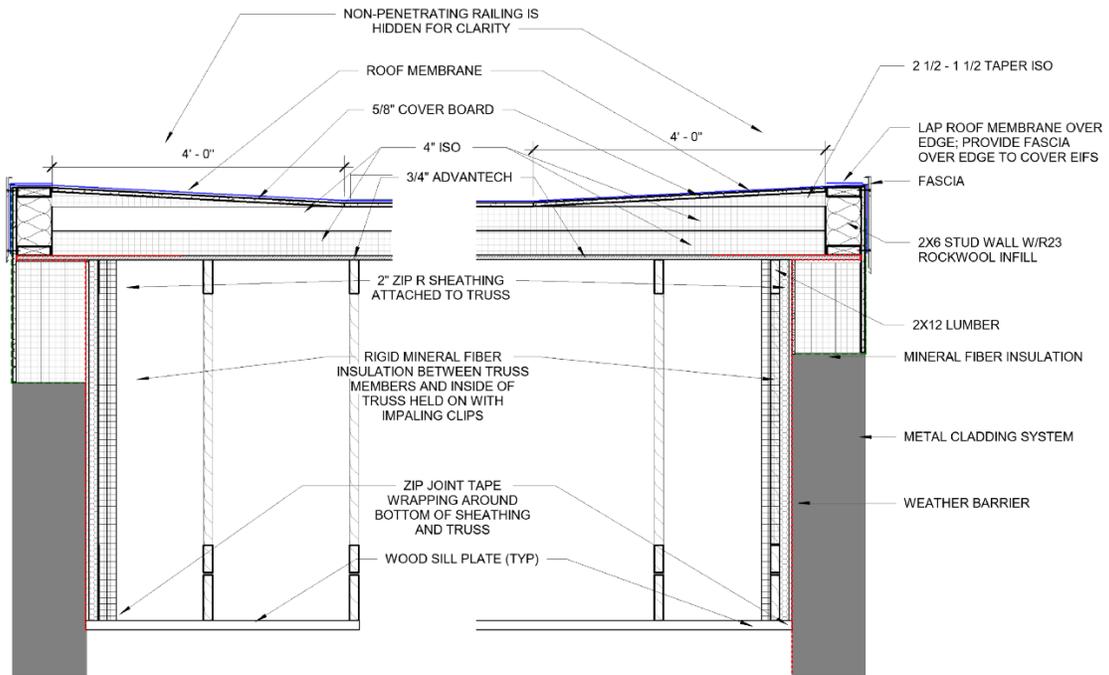
Roof

Assembly no. 04ud	Building assembly description Roof		Interior insulation?			
Heat transmission resistance [hr.ft².F/BTU]						
Orientation of building element 1-Roof	interior R _{si} : 0.57					
Adjacent to 1-Outdoor air	exterior R _{se} : 0.23					
Area section 1	R per inch	Area section 2 (optional)	R per inch	Area section 3 (optional)	R per inch	Thickness [in]
Advantech OSB Roof Sheathing	1.11					0.75
Vapor Barrier						
Poyiso Insulation - Faced	4.75					8.00
TPO Membrane	0.24					0.13
DensDeck Prime Coverboard	0.69					0.63
Percentage of sec. 1 100%		Percentage of sec. 2		Percentage of sec. 3		Total 9.50 in
U-value supplement			BTU/hr.ft².°F			R-value: 40.1 hr.ft².°F/BTU



9. Junction Details

Roof



$$\psi_{A-E,C} = \frac{12.143}{54,0} - 0.021 \cdot 6.975 - 0.015 \cdot 6.829 = -0.025 \text{ Btu}/(\text{h}\cdot\text{ft}\cdot\text{F})$$

Material	λ [Btu/(h-ft-F)]	ϵ	μ [-]
EPS R4/in	0.021	0.900	1.000
EQ Truss	0.032	0.900	1.000
Plywood 500 kg/m ³	0.075	0.900	135.000
Polyiso Foam LTTR	0.015	0.900	1.000
Rockwool R44in (1)	0.021	0.900	1.000
TPO Cover Board R2.5 (1)	0.033	0.900	1.000
TPO Roofing	0.347	0.900	1.000

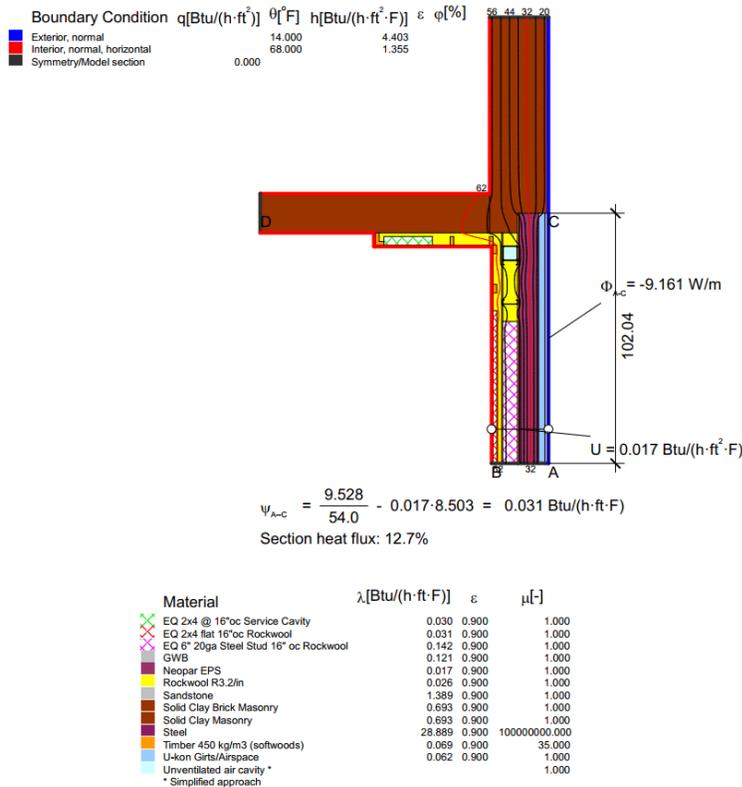
Boundary Condition	q [Btu/(h-ft²)]	θ [°F]	h [Btu/(h-ft²·F)]	ϵ	ϕ [%]
Exterior, ventilated	14.000		1.355		
Interior, heat flux, upwards	68.000		1.761		
Interior, normal, horizontal	68.000		1.355		
Symmetry/Model section	0.000				



Front wall

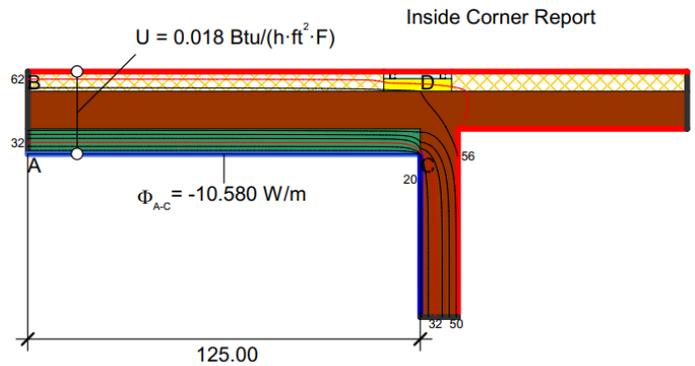


NE Corner Report





Side wall at neighboring building



$$\Psi_{A-c} = \frac{11.003}{54.0} - 0.018 \cdot 10.417 = 0.016 \text{ Btu}/(\text{h}\cdot\text{ft}\cdot\text{F})$$

Section heat flux: 10.7%

Material	λ [Btu/(h·ft·F)]	ϵ	μ [-]
Gypsum 600 kg/m3	0.104	0.900	7.000
Neopor	0.017	0.900	1.000
Rockwool R3.2	0.026	0.900	1.000
Solid Clay Masonry	0.693	0.900	1.000
Steel	28.889	0.900	100000000.000
Wall Type D1 EQ	0.037	0.900	1.000
Unventilated air cavity *			1.000
* Simplified approach			

Boundary Condition	q [Btu/(h·ft²)]	θ [°F]	h [Btu/(h·ft²·F)]	ϵ [%]
Exterior, normal		14.000		4.403
Exterior, ventilated		14.000		1.355
Interior, normal, horizontal		68.000		1.355
Symmetry/Model section	0.000			



10. Windows

Front windows and curtainwall



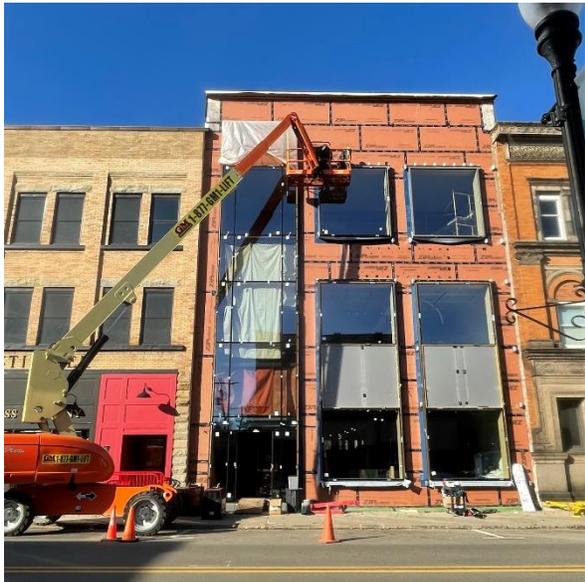
RAICO Timber Frame assembly.



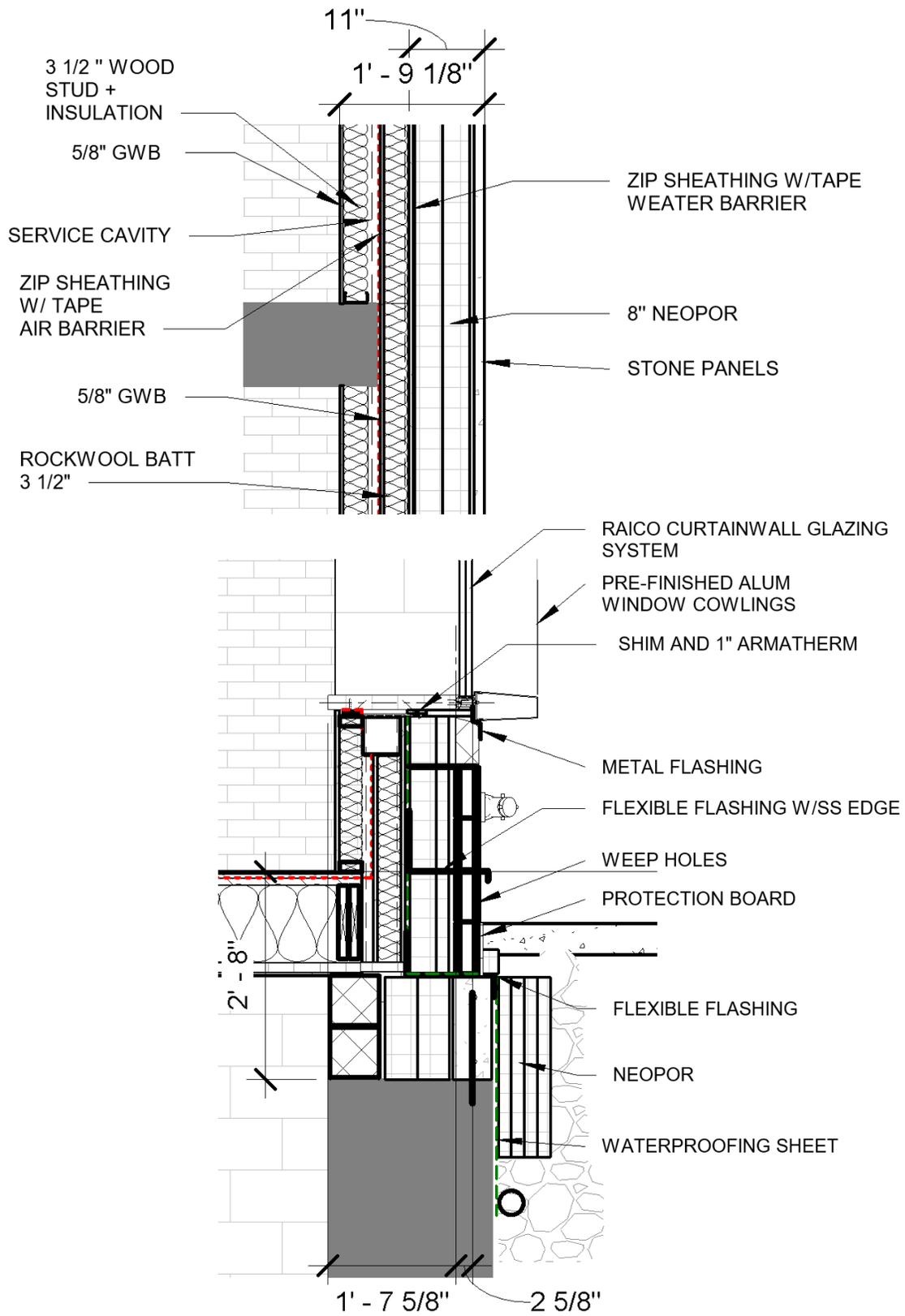
Installation of frame



Installation of curtainwall glazing



Installation of window glazing.



Front wall sections



Rear Windows



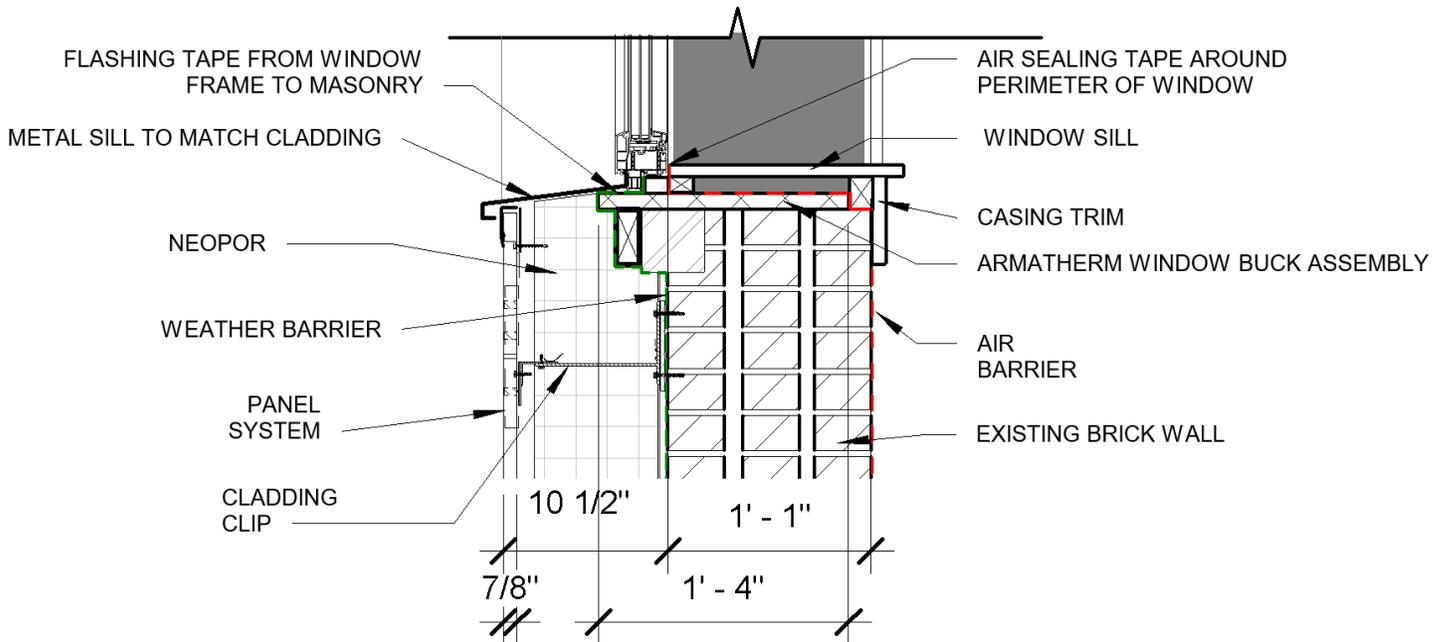
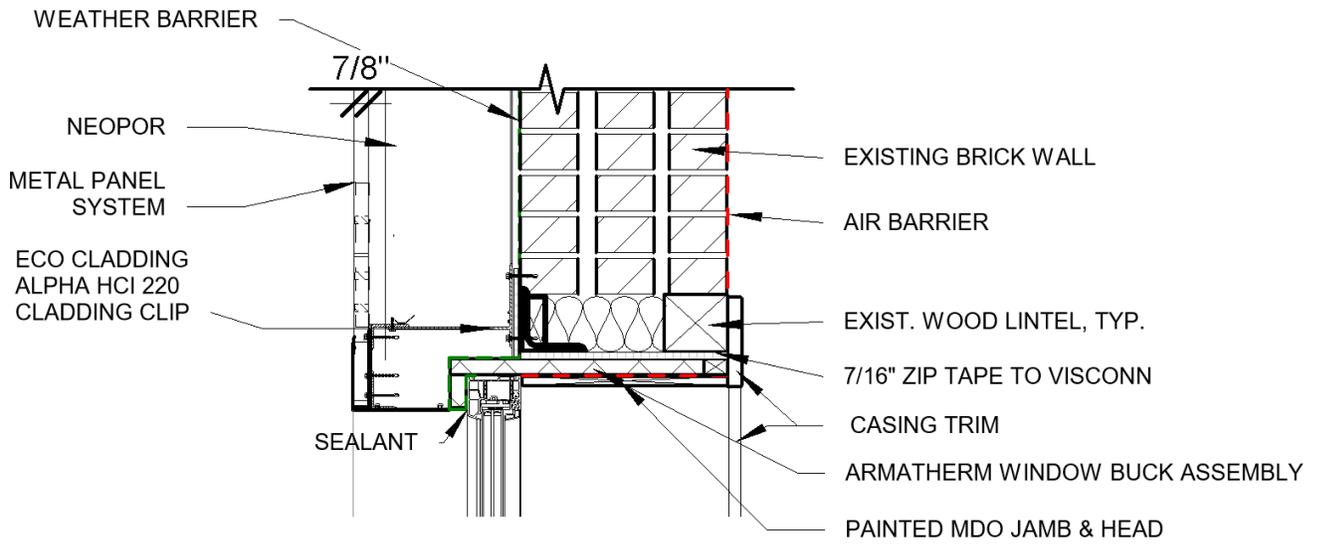
Armatherm window buck assembly in place.



Ventana windows in place and flashed.



Interior taping of window and buck.



Rear window details



11. Infrared Images

Front elevation of Six&Kane, with neighboring buildings. Taken at approximately 10:00pm (after dark), with outdoor temperature about 42°F, and cloudy skies. The temperature span of the color scale is a total of 21.9°F, from 30.0°F to 51.9°F. Taken at an oblique angle, which is not ideal for quantitative analysis of thermograms, but was necessary to be able to fit the full height of all the buildings in one photo from the sidewalk on the opposite side of the street.

Rear elevation of Six&Kane, with neighboring buildings. Taken at approximately 10:15pm (after dark), with outdoor temperature about 42°F, and cloudy skies. The temperature span of the color scale in this photo is a total of 18.5°F, from 30.5°F to 49.0°F

For both photos, the color palettes are in the following order:

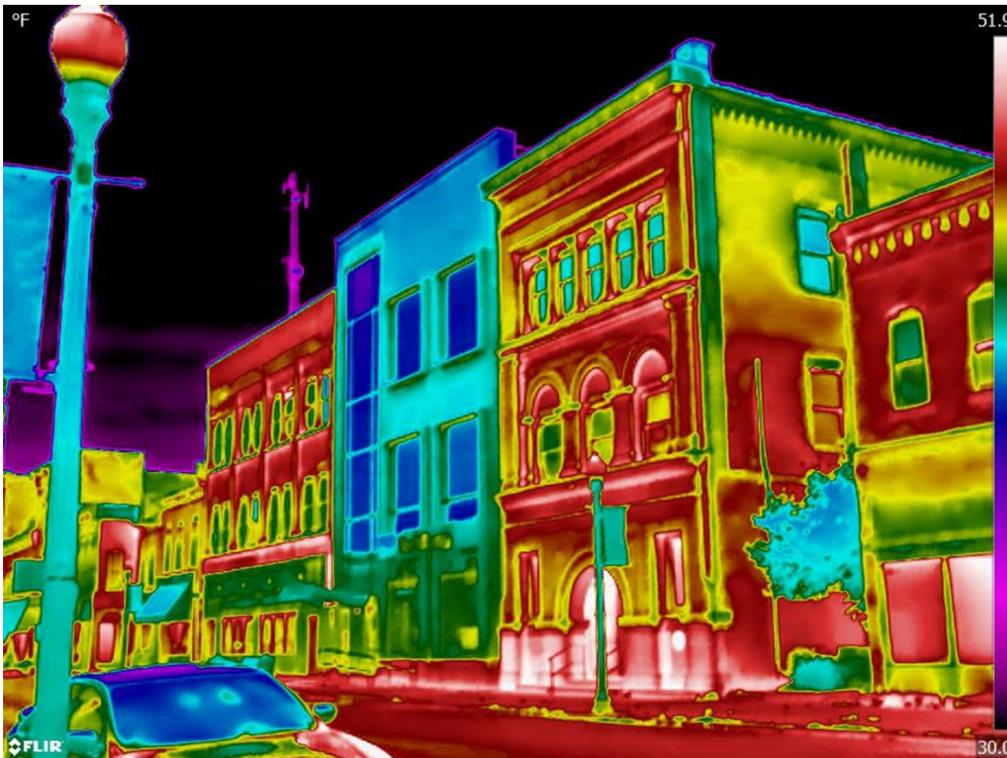
- Rainbow high contrast – Many colors through the palette enables seeing fine details and gives a better sense of depth than other palettes.
- Rainbow – A smoother distribution of color than rainbow high contrast, less sense of depth, but good for reading patterns of thermal contrast on a planar surface.
- Lava – Dramatic differences in color from cold end to hot end of the scale. Being very dark, the coolest things look “more cold,” and being very bright, the warmest things look “more hot.”
- Iron – Limited range of colors from cold to hot enables quick reading of contrast without overwhelming the viewer’s visual processing. This palette is the default setting on many infrared cameras and is the setting we use while actively observing with the camera.
- Grayscale – Eliminates the distraction of colors when reading a thermogram. Black = coldest items in image; white = warmest items. Some say this palette is best for clear, unbiased analysis of temperatures. Enables slower, more deliberate study.
- Arctic – Split between two color groups, yellow and blue, this palette groups warmer items together on the yellow side, and cooler items together on the blue side.

Images and Narrative by Rob Hosken, AIA, BECxP

Building Performance Architecture, WPPSEF Board Member



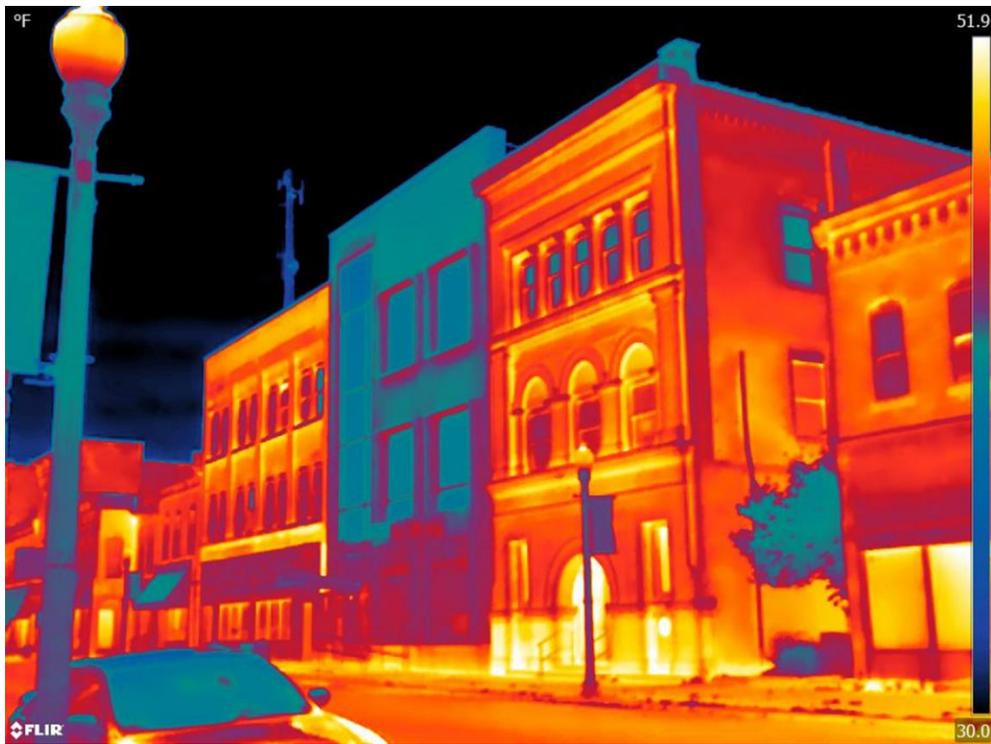
Front elevation of Six&Kane



Rainbow high contrast.



Rainbow



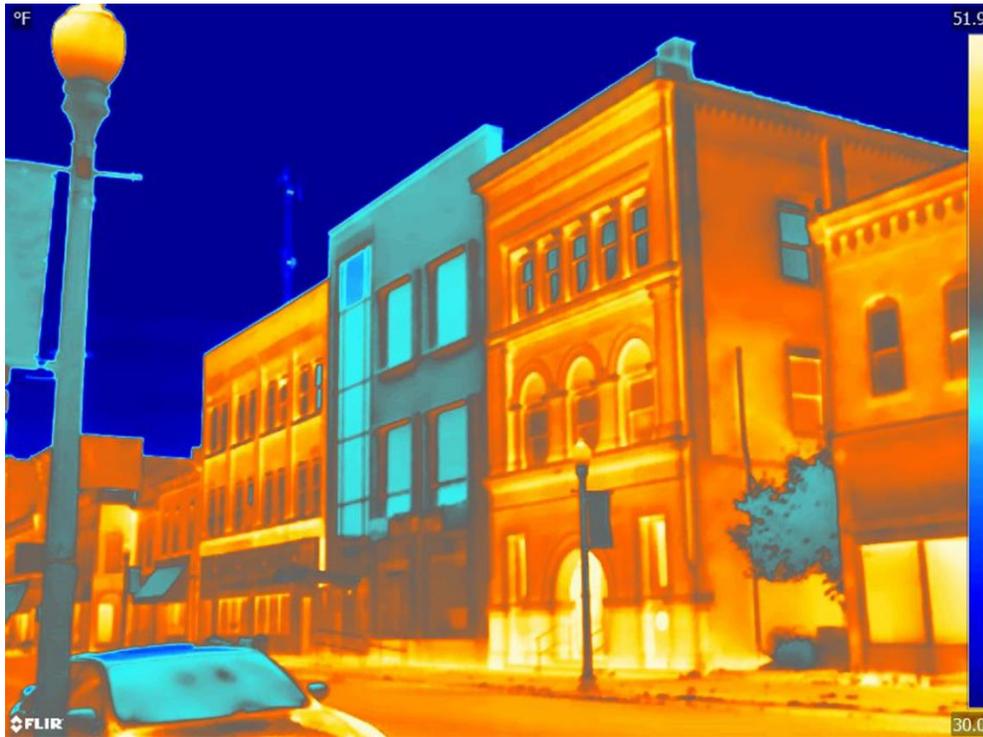
Lava



Iron



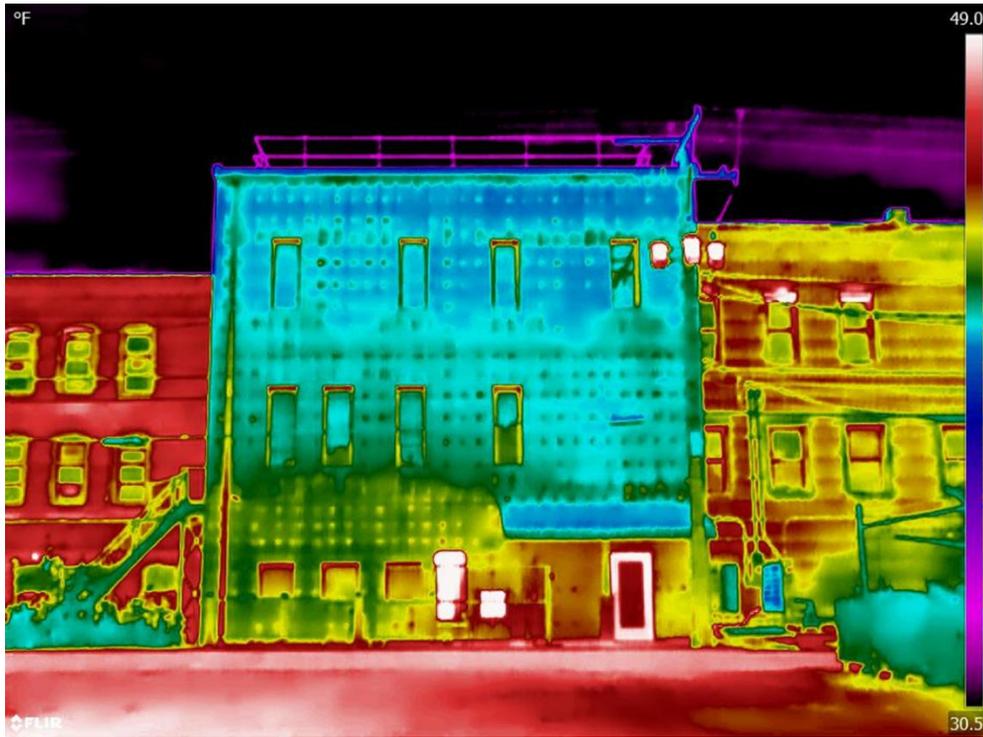
Greyscale



Arctic



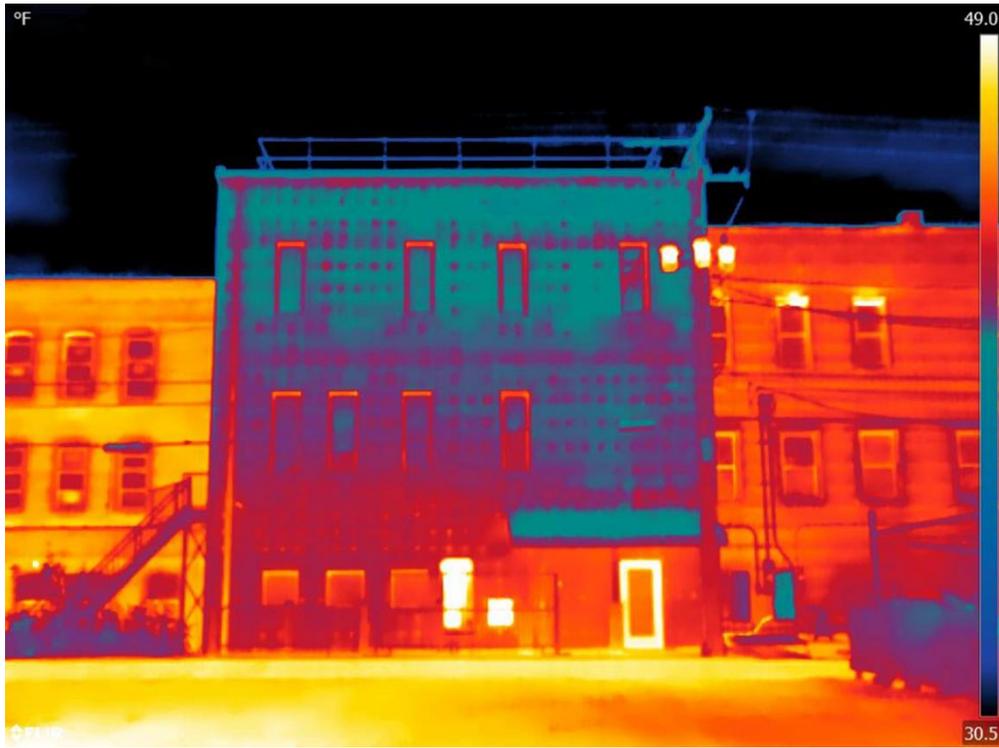
Rear elevation of Six&Kane



Rainbow high contrast



Rainbow



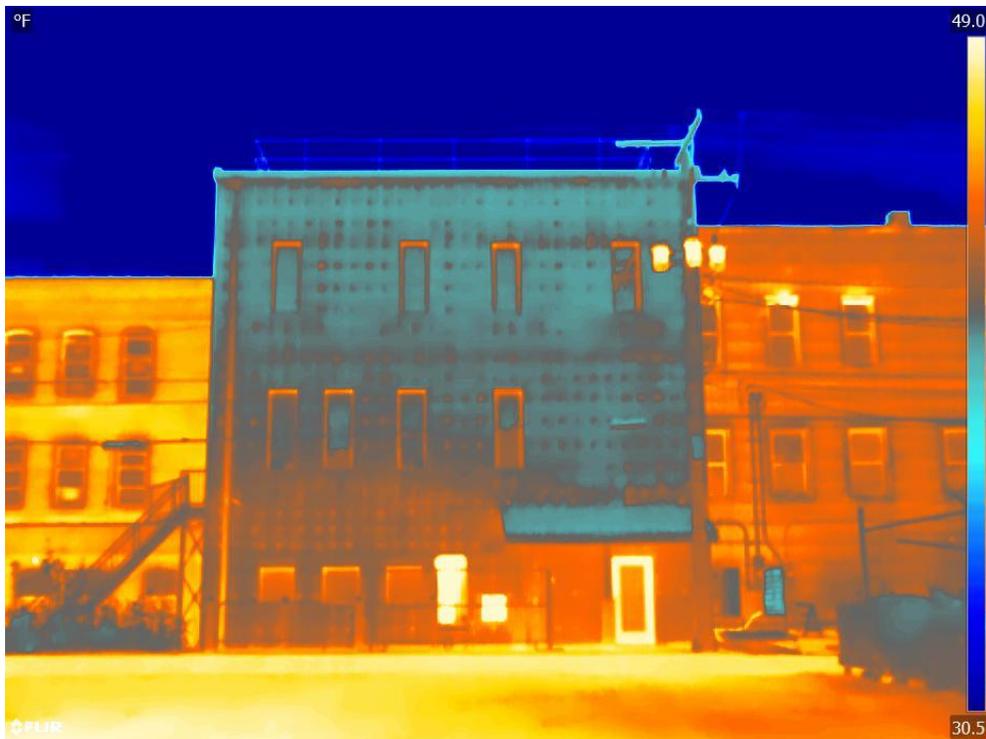
Lava



Iron



Greyscale



Arctic



12. Airtight Envelope

BUILDING LEAKAGE TEST

Date of Test: 9/19/2022 Test File: 63 Fraley St final

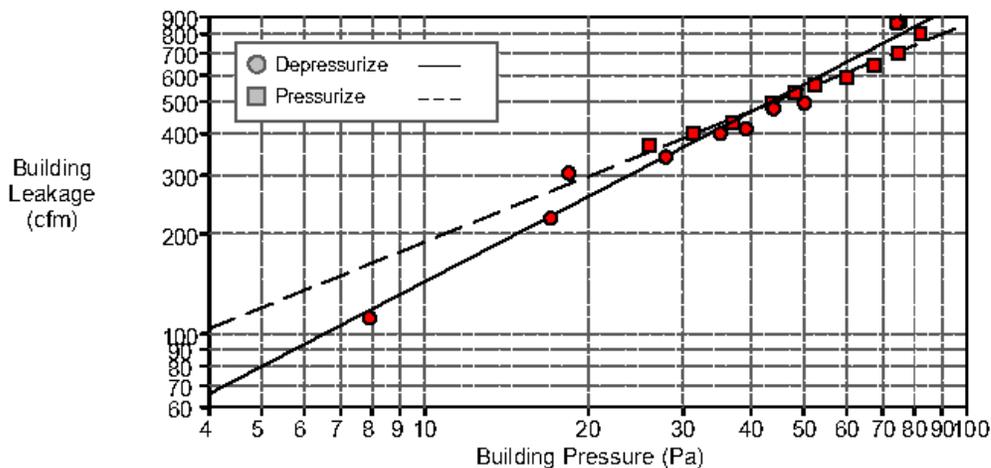
Technician: Rhett Major

Project Number: The Wilds

Customer: 63 Fraley St., LLC,
Limited Liability Co.
40 North Pennsylvania Ave.
Suite 510
Greensburg, PA 15601
Phone: 814-441-1100
Fax:

Building Address: The Wilds
63 N. Fraley St.
Kane, PA 16735

Test Results at 50 Pascals:	Depressurization	Pressurization	Average
V50: cfm50 (Airflow)	563 (+/- 10.0 %)	543 (+/- 2.3 %)	553
n50: 1/h (Air Change Rate)	0.24	0.23	0.23
w50: cfm/ft ² (Floor Area)	0.0608	0.0587	0.0598
q50: cfm/ft ² (Envelope Area)	0.0341	0.0329	0.0335
Leakage Areas:			
Canadian EqLA @ 10 Pa (in ²)	42.2 (+/- 16.7 %)	55.5 (+/- 10.3 %)	48.9
in ² /ft ² Surface Area	0.0026	0.0034	0.0030
LBL ELA @ 4 Pa (in ²)	18.8 (+/- 27.2 %)	29.4 (+/- 16.0 %)	24.1
in ² /ft ² Surface Area	0.0011	0.0018	0.0015
Building Leakage Curve:			
Air Flow Coefficient (Cenv) cfm/Pa ⁿ	20.6 (+/- 44.0 %)	42.9 (+/- 24.7 %)	
Air Leakage Coefficient (CL) cfm/Pa ⁿ	20.4 (+/- 44.0 %)	41.7 (+/- 24.7 %)	
Exponent (n)	0.848 (+/- 0.124)	0.656 (+/- 0.063)	
Correlation Coefficient	0.98417	0.99309	
Test Standard:	EN 13829		
Test Mode:	Depressurization and Pressurization		
Type of Test Method:	A		
Regulation complied with:	PHI n50 ≤ .8 1/h		





BUILDING LEAKAGE TEST Page 2 of 5

Date of Test: 9/19/2022 Test File: 63 Fraley St final

Building Information

Volume (ft ³)	142484
Floor Area: (ft ²)	9252
Surface Area: (ft ²)	16508
Height (ft)	45
Uncertainty of Dimensions (%)	5
Year of Construction	2022
Type of Heating	Air source heat pump
Type of Air Conditioning	Air source Heat Pump
Type of Ventilation	HRV
Building Wind Exposure	Partly Exposed Building
Wind Class	Light Breeze

Equipment Information

Type	Manufacturer	Model	Serial Number	Custom Calibration Date
Fan	Energy Conservatory	Model 3 (110V)		-
Micromanometer	Energy Conservatory	DG700	5356	10/14/2021



13. Heating and Ventilation System



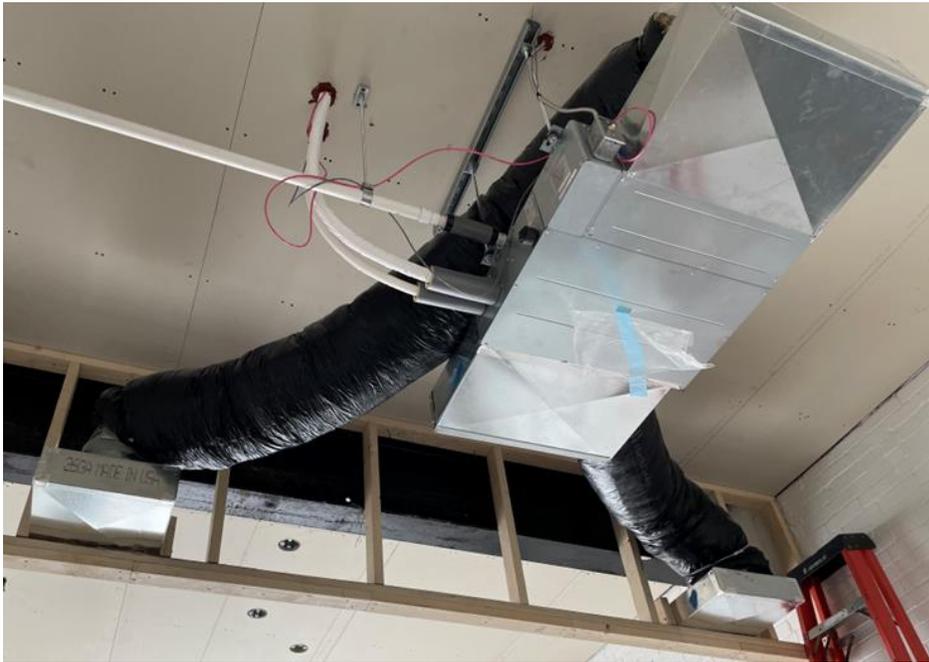
Ventacity VS3000Rte ERV



Fujitsu VRF Heat Pump



Wall mounted cassette



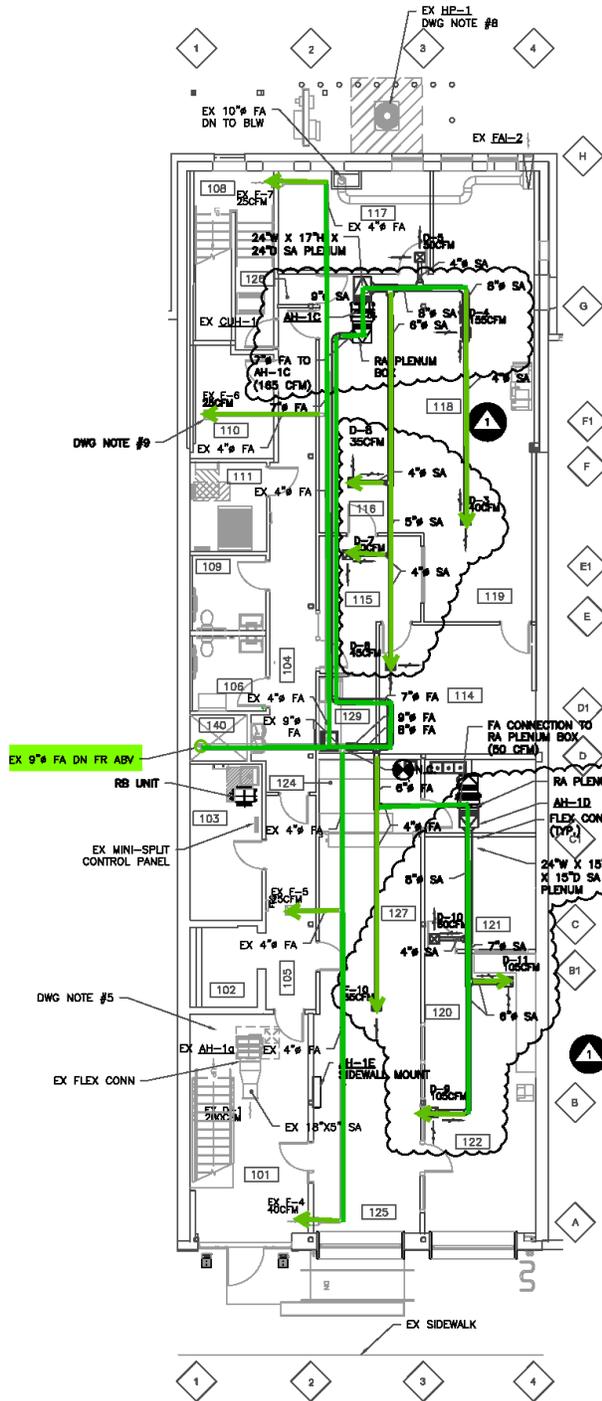
Ducted AHU



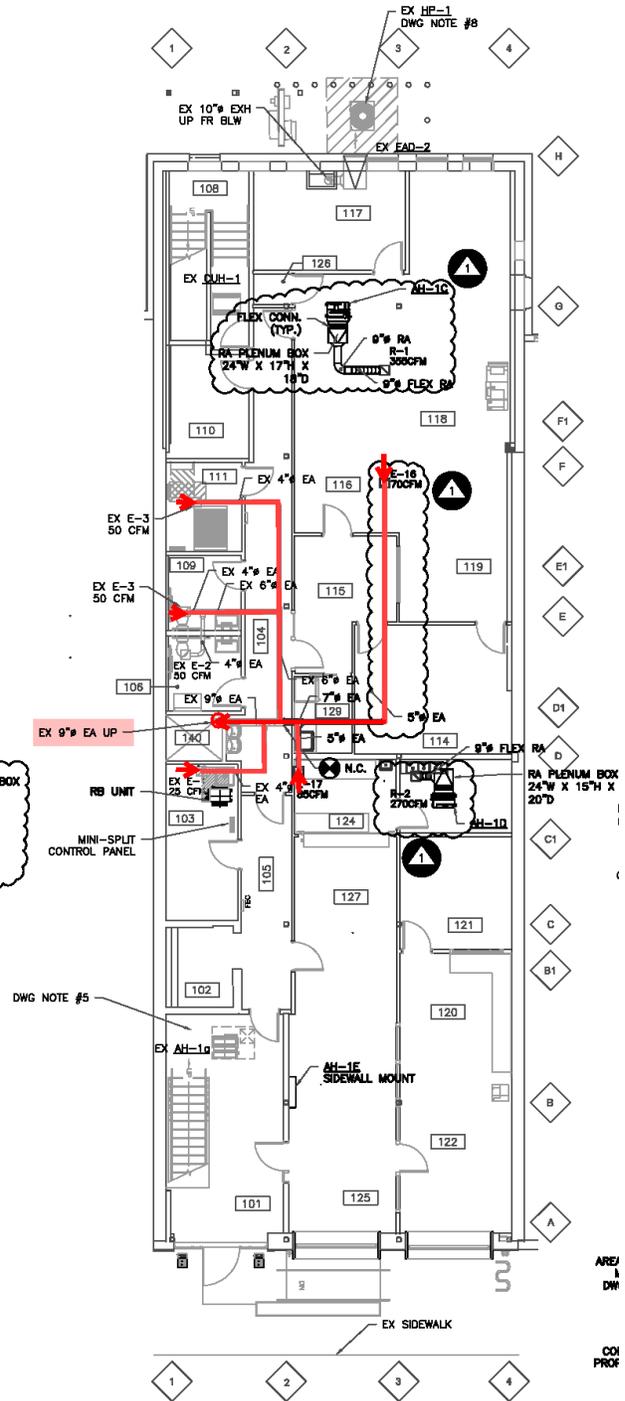
Ceiling Cassette



Ventilation Diagrams

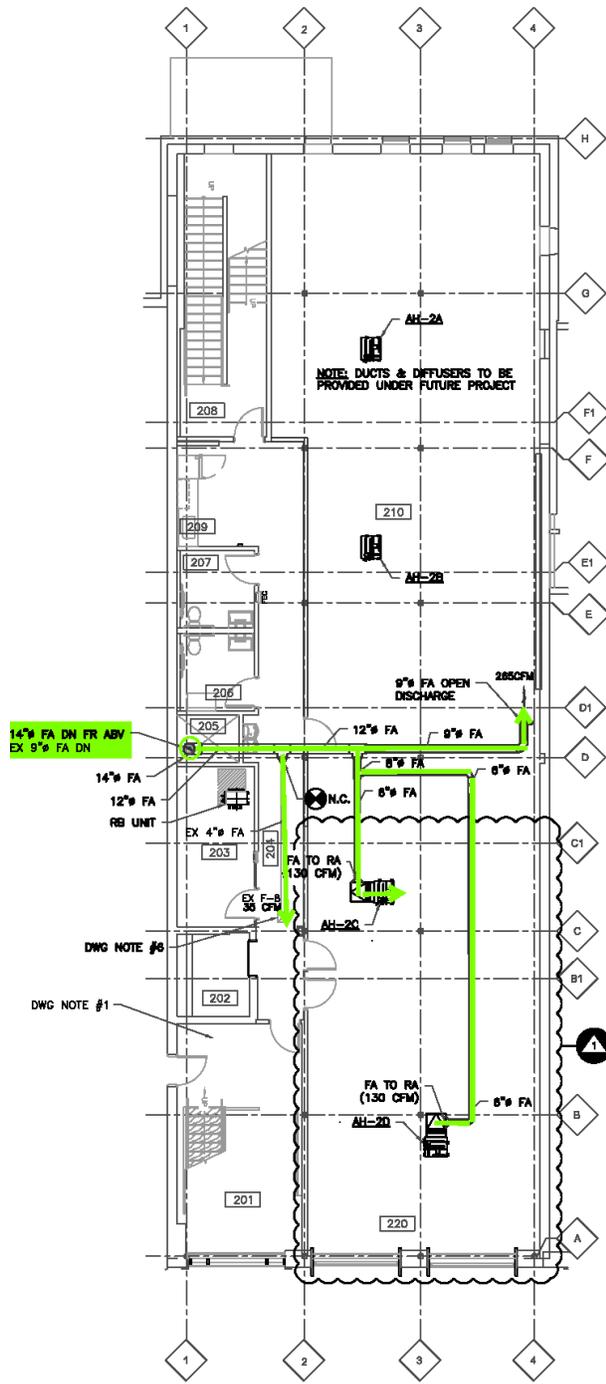


FIRST FLOOR PLAN – HVAC SUPPLY AND FRESH AIR – NEW WORK
3
1/21 SCALE: 1/8" = 1'-0"

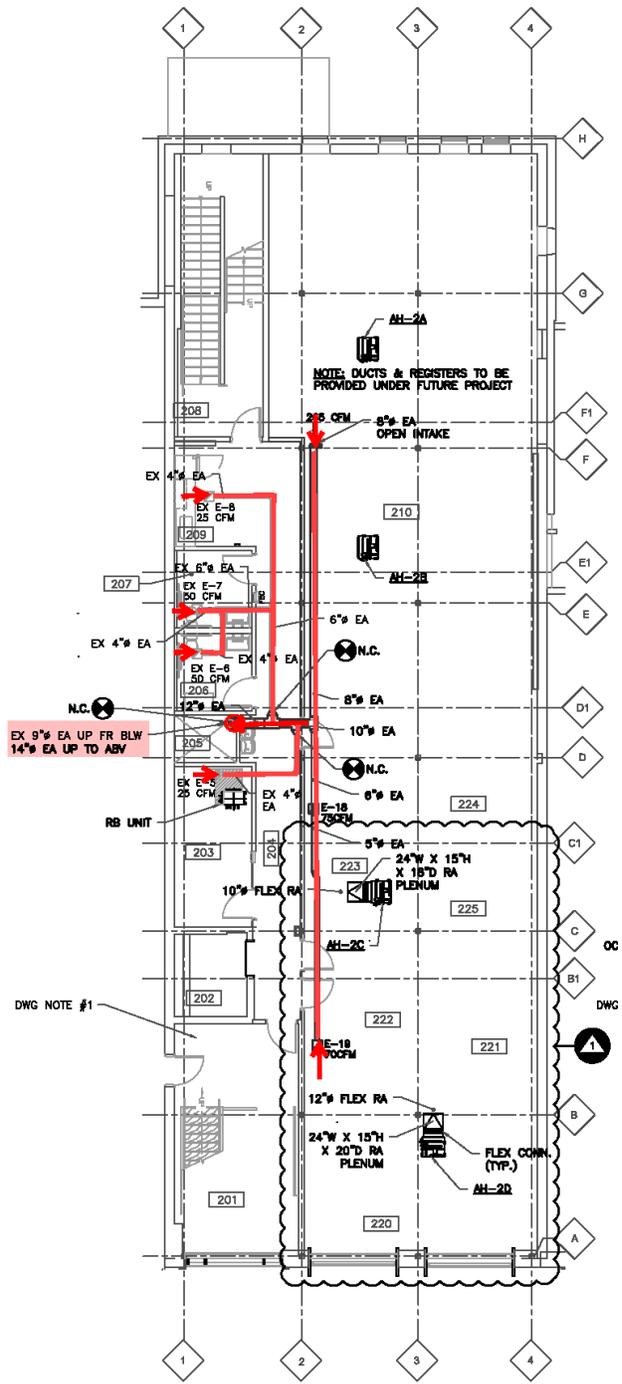


FIRST FLOOR PLAN – HVAC EXHAUST AIR AND RETURN – NEW WORK
2
1/21 SCALE: 1/8" = 1'-0"

First Floor

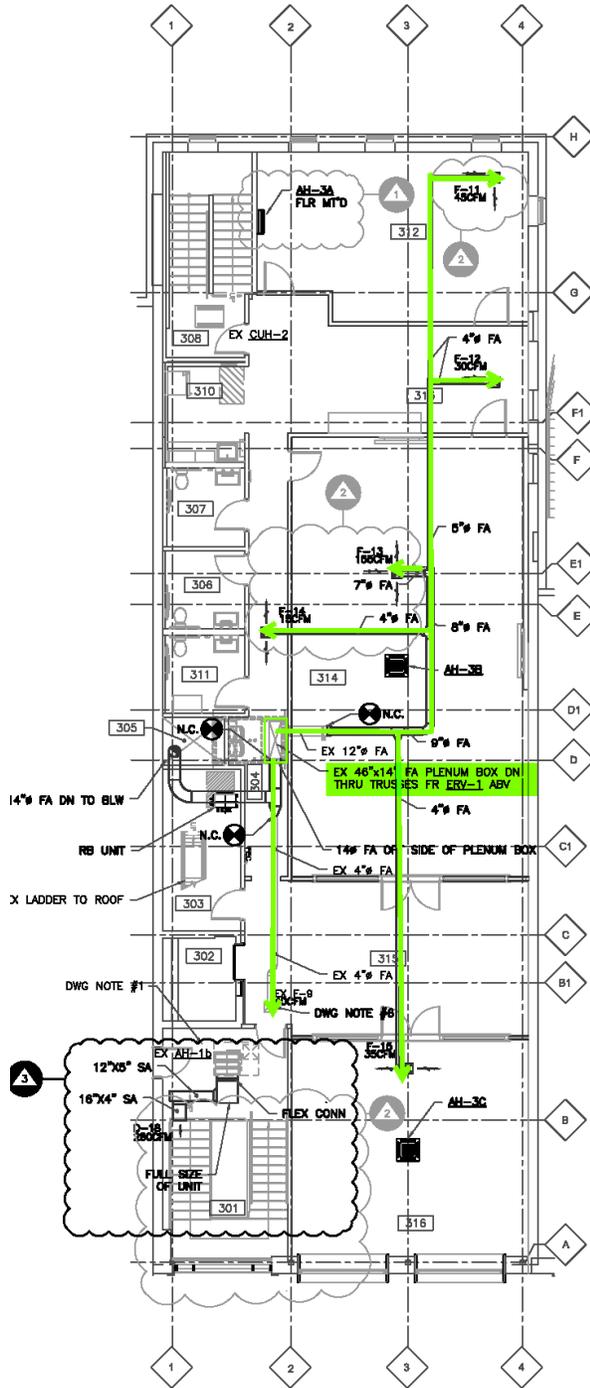


3 SECOND FLOOR PLAN - HVAC SUPPLY AND FRESH AIR - NEW WORK
SCALE: 1/8" = 1'-0"

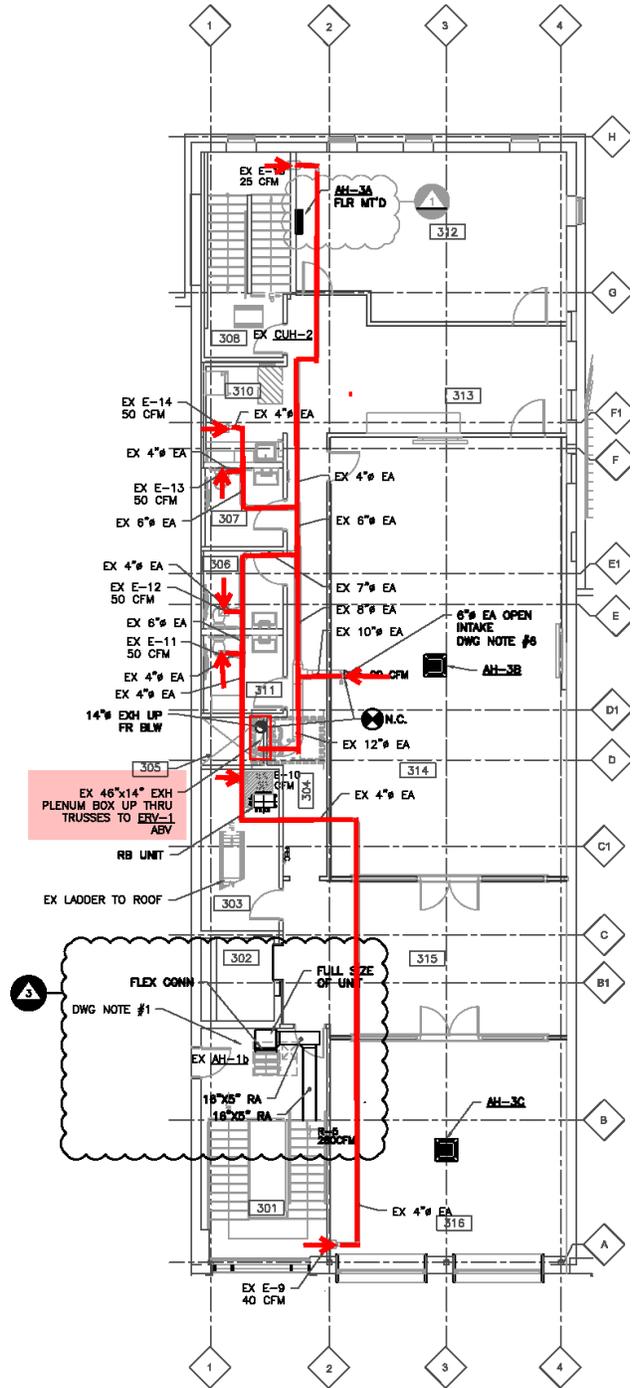


2 SECOND FLOOR PLAN - HVAC EXHAUST AIR AND RETURN - NEW WORK
SCALE: 1/8" = 1'-0"

Second Floor

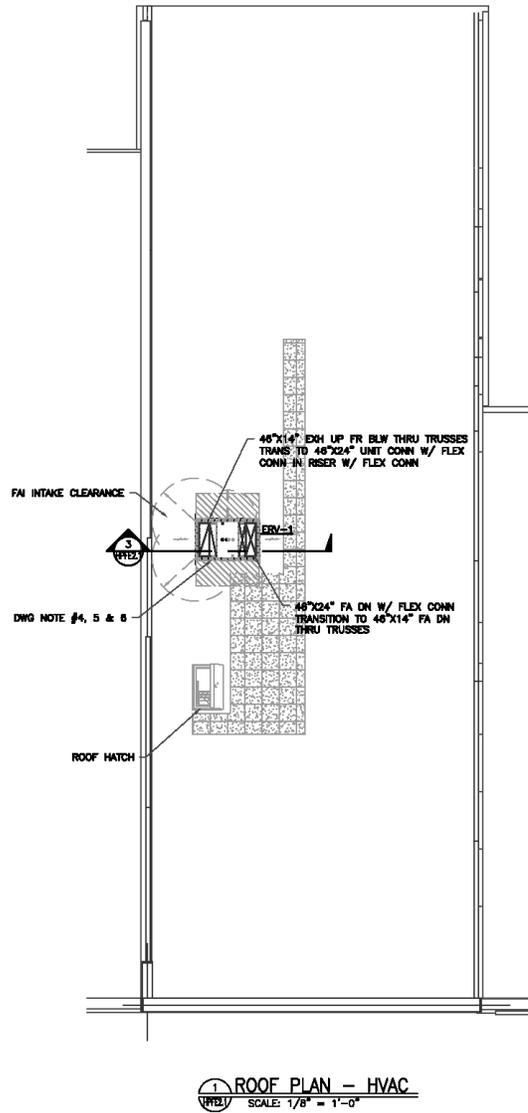
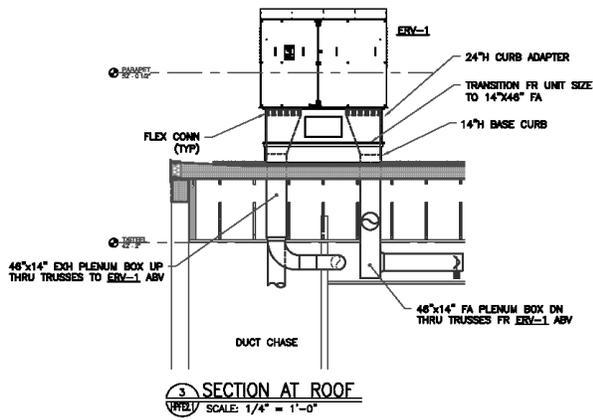


THIRD FLOOR PLAN - HVAC FRESH AIR AND SUPPLY - NEW WORK
DWG NOTE #1
DWG NOTE #6
SCALE: 1/8" = 1'-0"



THIRD FLOOR PLAN - HVAC EXHAUST AIR - NEW WORK
DWG NOTE #1
SCALE: 1/8" = 1'-0"

Third Floor



Roof



14. Domestic Hot Water



Heat pump water heater in Root Bar



Second Floor Restrooms

Typical point-of-use water heaters



15. Passive House Planning Package

EnerPHit Verification



Building: Six&Kane
 Street: 63 N. Fraley Street
 Postcode/City: 16735 Kane
 Province/Country: PA US-United States of America
 Building type: Mixed Office/ Assembly /Retail
 Climate data set: ud-01-Bradford PA
 Climate zone: 2: Cold Altitude of location: 2034 ft

Home owner / Client: 63 Fraley Street LLC
 Street: 40 North Pennsylvania Avenue, Suite 110
 Postcode/City: 15601 Greensburg
 Province/Country: PA US-United States of America

Mechanical engineer: Michael L. Norris & Associates, Inc.
 Street: 171 Technology Drive, Suite 300
 Postcode/City: 16827 Boalsburg
 Province/Country: PA US-United States of America

Certification: CertiPHiers Cooperative
 Street:
 Postcode/City: Portland
 Province/Country: OR US-United States of America

Architecture: Gary Moshier - Moshier Studio
 Street: 363 Newburn Drive
 Postcode/City: 15216 Pittsburgh
 Province/Country: PA US-United States of America

Energy consultancy: Gary Moshier - Moshier Studio
 Street: 363 Newburn Drive
 Postcode/City: 15216 Pittsburgh
 Province/Country: PA US-United States of America

Year of construction: 2022
 No. of dwelling units: 1
 No. of occupants: 55.0

Interior temperature winter [°F]: 68.0
 Internal heat gains (IHG) heating case [BTU/(hr.ft²)]: 1.19
 Specific capacity [BTU/F per ft² TFA]: 23.2

Interior temp. summer [°F]: 77.0
 IHG cooling case [BTU/(hr.ft²)]: 1.19
 Mechanical cooling: x

Specific building characteristics with reference to the treated floor area		Alternative criteria		Fullfilled? ²
		Criteria	Alternative criteria	
Space heating	Treated floor area ft²			
	Heating demand kBTU/(ft²yr)	9839	9.51	yes
	Heating load BTU/(hr.ft²)	4.53	-	
Space cooling	Cooling & dehum. demand kBTU/(ft²yr)	4.32	4.75	yes
	Cooling load BTU/(hr.ft²)	1.30	3.69	
	Frequency of overheating (> 77 °F) %	4.27	-	-
	Frequency of excessively high humidity (> 0.012 lb/lb) %	-	10	yes
Airtightness	Pressurization test result n ₅₀ 1/hr	0.3	1.0	yes
Non-renewable Primary Energy (PE)	PE demand kBTU/(ft²yr)	0.2	-	-
Primary Energy Renewable (PER)	PER demand kBTU/(ft²yr)	30.03	14	yes
	Generation of renewable energy (in relation to projected building footprint area) kBTU/(ft²yr)	13.75	17	
		37.72	19	

² Empty field: Data missing; '-': No requirement

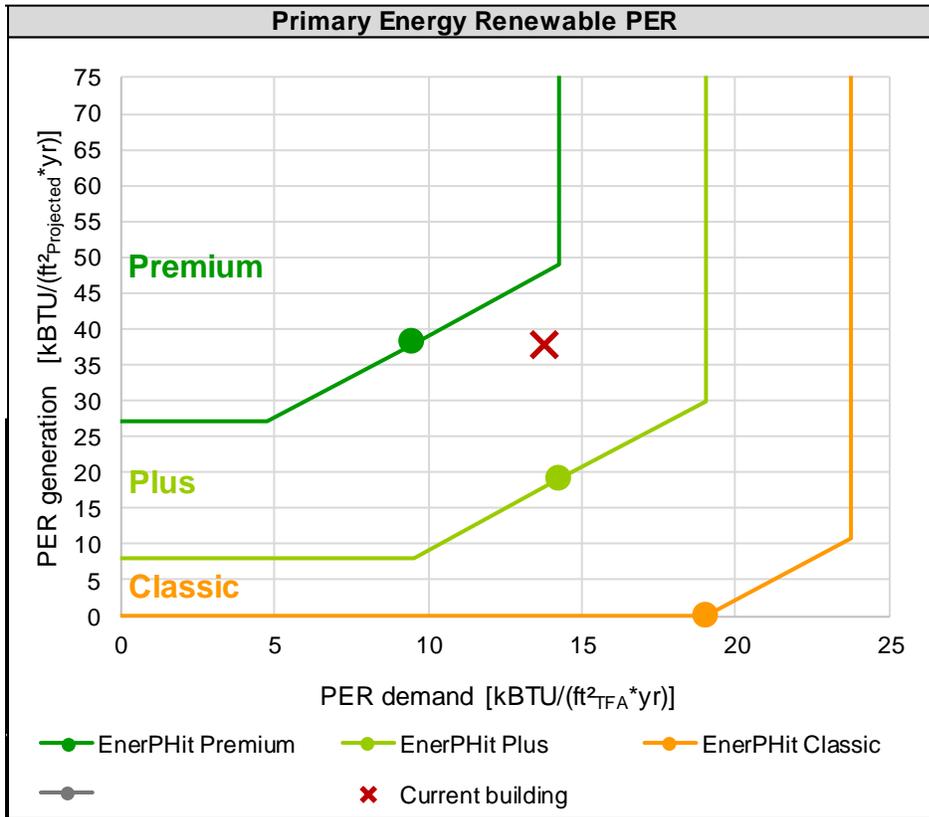
I confirm that the values given herein have been determined following the PHPP methodology and based on the characteristic values of the building. The PHPP calculations are attached to this verification.

Task: 1-Designer
 First name: Gary
 Surname: Moshier
 Issued on: [blank]
 City: Pittsburgh

EnerPHit Plus? yes
 Signature: [blank]



16. Primary Energy Renewable



17. Construction Cost

\$5,940,000

18. Acknowledgments

Photographs by Norm Horn, Envinity; Gary Moshier, Moshier Studio; Rob Hoskin, Building Performance Architecture; Sixty Foot Films and West Penn Power Sustainable Energy Fund.



19. Construction Photos



Demolition of East facade



Shoring and temporary enclosure



Erection of steel framing



Roof demolition and replacement



New roof assembly



New East wall ready for windows and cladding



Mockup



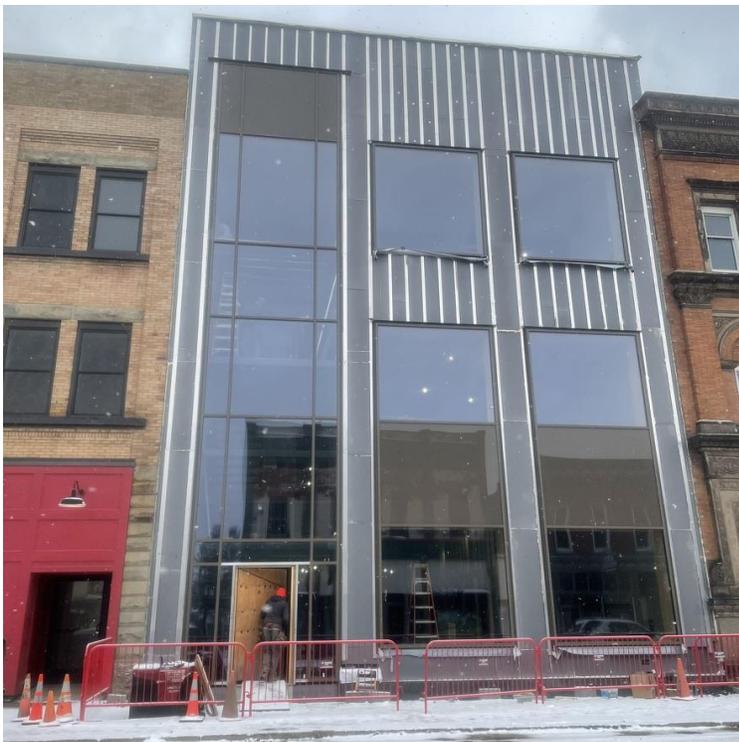
Installation of curtainwall frames...



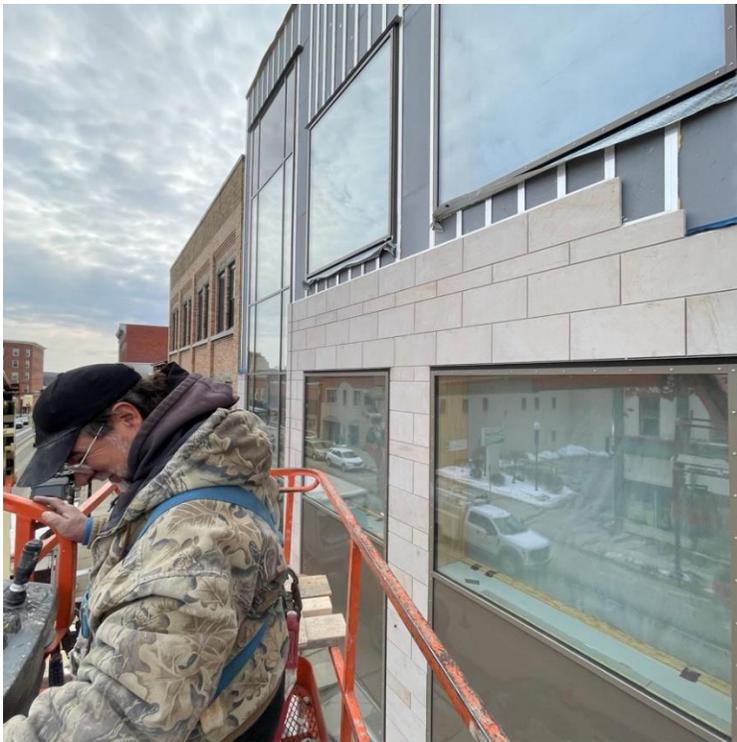
...and glass.



Installation of cladding clips and insulation



Ready for stone panels



Setting the panels



West and South façade insulation and cladding



Parging at joist pockets
before Visconn
application, typical.





Applying the first coat of Visconn on masonry walls, second floor, typical.



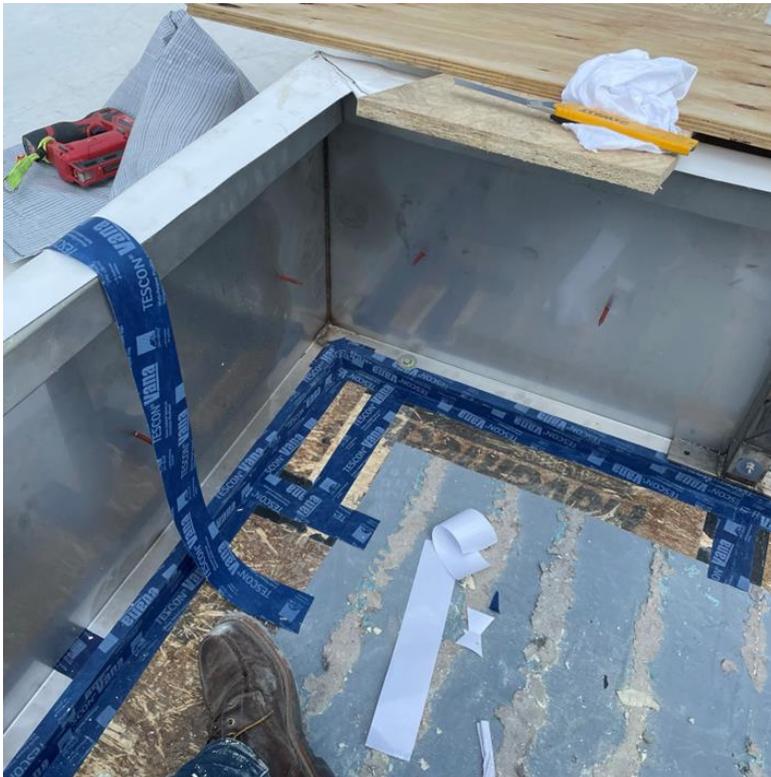
Applying a second coat, third floor, typical.



Third floor, NE corner, prior to adding more interior insulation to mitigate thermal bridge at building intersection with neighbor.



After addition of return wall to insulate corner



Attaching 2" Armatherm to the ERV roof curb and taping to the roof deck/air barrier.



Lining the inside of the ERV curb with layers of 2" Rockwool board and filling the space around the ducts with Rockwool batts



West entry door threshold condition.

8" Neopor below grade, 2" XPS under slab, 1" Armatherm threshold saddle



20. Major Product Sources and Contractors

Masonry

Trendstone Ground Face Block
Bloom Run and Roaring Run Sandstone

Metals

Structural Steel
Decorative Stairs and Front Canopy
Front Wall Cladding Clips
Rear Wall Cladding Clips

Wood

Zip Sheathing
Stair treads, Flooring, Railings and
Standing and Running Trim
Roof Trusses

Thermal And Moisture Protection

Internal Air Barrier

Exterior Water-Resistant Barrier
Structural Foam Insulation
Mineral Fiber Insulation
Graphite Enhanced Extruded Polystyrene
Roofing Membrane and Insulation
Metal Siding

Openings

Glazed Timber Curtainwall and Windows
UPVC Windows
Aluminum Storefront Doors

Elevator

Mechanical

Energy Recovery Ventilator
VRF Heat Pump

Plumbing

Lavatories
Point of use water heaters
Root Bar Heat Pump water heater

Electrical

Stair Chandelier
Pendant Fixtures
Linear Wall Fixtures
Other Lighting

Steger Masonry

Echelon Masonry
Russell Stone Products

Dinsmore Welding and Fabricating

Dinsmore Welding and Fabricating
Dinsmore Welding and Fabricating
U-Kon
EcoCladding

J.A Luciano & Sons Builders

Huber Engineered Woods
Collins Wood products

Keystone Truss and Manufacturing

Proclima Visconn & Visconn Fibre/
Cavallaro Paint and Restoration

Prosoco Cat 5

Armatherm

Rockwool

Neopor/Brinc Building Products

Carlisle/Marcon Roofing

Nexgen Metal Design Systems

Raico/Tanner Windows and Doors

Ventana USA

Kawneer Arconic

Otis Gen 2 with regenerative drive

Allied Systems

Ventacity VS3000Rte

Fujitsu Airstage VR-II

Allied Systems

Bradley Verge with Washbar Technology

Eemax

State HPX 50 DHPT

Elco Electrical

OCL Tubie 5

Fluxwerx Profile Spoke & View

Star Tek Beam

Lithonia



21. SI Values

Year of Construction	2022	Climate Zone	6 Cold
Treated Floor Area	914.05 m ²	Space Heating Demand	14 kWh/ m ² yr.
Heat/Humidity Recovery	85% 65%		
Average U-value external wall	0.23 W/(m ² K)	Primary Energy Renewable (PER)	43 kWh/ m ² yr.
Average U-value basement ceiling/floor slab	0.15 W/(m ² K)	Generation of renewable energy	119 kWh/ m ² yr.
U-value roof	0.142 W/(m ² K)	Non-renewable Primary Energy (PE)	95 kWh/ m ² yr.
Average U-value window	0.75 W/(m ² K)	Pressure Test n50	0.2 h-1
Special Features	<ul style="list-style-type: none"> • Energy Recovery Elevator • Heat Pump Water Heater in smoothie bar uses rejected heat from reach-in refrigeration units. 		

Assembly no.	Building assembly description			Interior insulation?		
01ud	Existing Masonry with Exterior Insulation and Cladding - Ambient					
Heat transmission resistance [m ² K/W]						
Orientation of building element	2-Wall	interior R _{si}	0.13			
Adjacent to	1-Outdoor air	exterior R _{se}	0.04			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
	0.000		0.000		0.000	0
EPS Board Type VII - Neropor	0.030		0.000		0.000	203
Fluid Applied Weather Barrier	0.000		0.000		0.000	0
	0.000		0.000		0.000	0
Existing Masonry	1.202		0.000		0.000	305
Fluid Applied Air Barrier	0.000		0.000		0.000	0
	0.000		0.000		0.000	0
	0.000		0.000		0.000	0
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
100%		0.0%		0.0%		50.8 cm
U-value supplement	0.17	W/(m ² K)		U-value:	0.310	W/(m ² K)



Assembly no.	Building assembly description		Interior insulation?			
02ud	Existing with Exterior Insulation against Ground		<input type="checkbox"/>			
Heat transmission resistance [m ² K/W]						
Orientation of building element	2-Wall	interior Rsi	0.13			
Adjacent to	2-Ground	exterior Rse:	0.00			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Dimpled waterproofing	0.000		0.000		0.000	6
EPS Board Type VII - Neropor	0.030		0.000		0.000	203
Fluid Applied waterproofing	0.000		0.000		0.000	2
Parge Coat	0.687		0.000		0.000	6
Existing Masonry	1.202		0.000		0.000	305
Fluid Applied Air Barrier	0.000		0.000		0.000	2
	0.000		0.000		0.000	0
	0.000		0.000		0.000	0
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
100%		0.0%		0.0%		52.4 cm
U-value supplement	0.00 W/(m ² K)	U-value: 0.140 W/(m ² K)				

Assembly no.	Building assembly description		Interior insulation?			
03ud	New East Stone Clad Wall - Ambient		<input type="checkbox"/>			
Heat transmission resistance [m ² K/W]						
Orientation of building element	2-Wall	interior Rsi	0.13			
Adjacent to	1-Outdoor air	exterior Rse:	0.04			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Sandstone Panels	2.404		0.000		0.000	38
U-Kon Girts/Airspace	0.108		0.000		0.000	64
EPS Board Type VII - Neropor	0.030		0.000		0.000	203
Zip Sheathing - Weather Barrier	0.130		0.000		0.000	13
Rockwool CavityRock	0.045	Metal Stud, 20 GA, 16" O.C.	45.071		0.000	152
Zip Sheathing - Air Barrier	0.130		0.000		0.000	11
Rockwool ComfortBatt Service Cavity	0.045		45.071	Wood Stud	0.130	89
GWB	0.209		0.000		0.000	16
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
90%		0.3%		10.0%		58.6 cm
U-value supplement	0.06 W/(m ² K)	U-value: 0.158 W/(m ² K)				



Assembly no.	Building assembly description				Interior insulation?	
04ud	Roof				<input type="checkbox"/>	
Heat transmission resistance [m ² K/W]						
Orientation of building element	1-Roof	interior Rsi	0.10			
Adjacent to	1-Outdoor air	exterior Rse:	0.04			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
	0.000		0.000		0.000	0
Advantech OSB Roof Sheathing	0.130		0.000		0.000	19
Vapor Barrier	0.000		0.000		0.000	0
Poyiso Insulation - Faced	0.030		0.000		0.000	203
TPO Membrane	0.601		0.000		0.000	3
DensDeck Prime Coverboard	0.209		0.000		0.000	16
	0.000		0.000		0.000	0
	0.000		0.000		0.000	0
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
100%		0.0%		0.0%		24.1 cm
U-value supplement	0.00 W/(m ² K)	U-value: 0.142 W/(m ² K)				

Assembly no.	Building assembly description				Interior insulation?	
05ud	Floor over Ventilated Basement				<input type="checkbox"/>	
Heat transmission resistance [m ² K/W]						
Orientation of building element	3-Floor	interior Rsi	0.17			
Adjacent to	3-Ventilated	exterior Rse:	0.17			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
	0.000		0.000		0.000	0
Zip Sheathing - Air Barrier	0.130		0.000		0.000	11
Existing Wood	0.130		0.000		0.000	22
Blown Fiber Glass 1.56 lb/cf	0.050	Joists	0.120		0.000	305
Air Barrier	0.000		0.000		0.000	0
EPS Board Type VII - Neropor	0.030		0.000		0.000	51
DensGlas GWB	0.209		0.000		0.000	16
	0.000		0.000		0.000	0
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
88%		12.5%		0.0%		40.5 cm
U-value supplement	0.00 W/(m ² K)	U-value: 0.131 W/(m ² K)				



Assembly no.	Building assembly description				Interior insulation?	
06ud	Slab on Grade				<input type="checkbox"/>	
Heat transmission resistance [m ² K/W]						
Orientation of building element	3-Floor	interior Rsi	0.17			
Adjacent to	2-Ground	exterior Rse:	0.00			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Concrete	2.404		0.000		0.000	127
Air/Vapor Barrier	0.000		0.000		0.000	0
EPS Board Type VII - Neropor	0.030		0.000		0.000	152
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
100%		0.0%		0.0%		27.9 cm
U-value supplement			U-value:			
0.00 W/(m ² K)			0.189 W/(m ² K)			

Assembly no.	Building assembly description				Interior insulation?	
07ud	Spandrel Panel				<input type="checkbox"/>	
Heat transmission resistance [m ² K/W]						
Orientation of building element	2-Wall	interior Rsi	0.13			
Adjacent to	1-Outdoor air	exterior Rse:	0.04			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
GWB	0.209		0.000		0.000	16
Rockwool Batt	0.045	Metal Stud	45.071		0.000	89
Gypsum Sheathing & Air Barrier	0.209		0.000		0.000	16
EPS Board Type VII - Neropor	0.030		0.000		0.000	279
Spandrel Glass	0.160		0.000		0.000	6
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
100%		0.1%		0.0%		40.6 cm
U-value supplement			U-value:			
0.00 W/(m ² K)			0.090 W/(m ² K)			



Assembly no.	Building assembly description				Interior insulation?	
08ud	Party Wall				<input type="checkbox"/>	
Heat transmission resistance [m²K/W]						
Orientation of building element	2-Wall	interior Rsi	0.13			
Adjacent to	3-Ventilated	exterior Rse:	0.13			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Existing Masonry	1.202		0.000		0.000	305
Fluid Applied Air Barrier	0.000		0.000		0.000	2
Percentage of sec. 1	100%	Percentage of sec. 2	0.0%	Percentage of sec. 3	0.0%	Total
						30.6 cm
U-value supplement	0.00	W/(m²K)		U-value:	1.947	W/(m²K)

Assembly no.	Building assembly description				Interior insulation?	
09ud	Elevator Shaft in Basement				<input type="checkbox"/>	
Heat transmission resistance [m²K/W]						
Orientation of building element	2-Wall	interior Rsi	0.13			
Adjacent to	3-Ventilated	exterior Rse:	0.13			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
CMU	1.202		0.000		0.000	197
Air Barrier	0.000		0.000		0.000	0
Foil faced Polyiso Board	0.030		0.000		0.000	152
Percentage of sec. 1	100%	Percentage of sec. 2	0.0%	Percentage of sec. 3	0.0%	Total
						34.9 cm
U-value supplement	0.00	W/(m²K)		U-value:	0.184	W/(m²K)



Assembly no.	Building assembly description				Interior insulation?	
10ud	Gable Truss plus Clad Masonry				<input type="checkbox"/>	
Heat transmission resistance [m ² K/W]						
Orientation of building element	2-Wall	interior Rsi	0.13			
Adjacent to	1-Outdoor air	exterior Rse:	0.04			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Rockwool Board	0.045		0.000		0.000	102
Rockwool Board	0.045	Stud Frame	0.120		0.000	38
Polyiso Component of Zip R Sheathing	0.030		0.000		0.000	38
OSB Component of Zip-R Sheathing	0.130		0.000		0.000	11
Existing Masonry	0.120		0.000		0.000	305
EPS Board Type VII-Neopor	0.030		0.000		0.000	203
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
80%		20.0%		0.0%		69.7 cm
U-value supplement	0.17	U-value:		0.240 W/(m ² K)		

Assembly no.	Building assembly description				Interior insulation?	
11ud	Transition Wall plus Party Wall				<input type="checkbox"/>	
Heat transmission resistance [m ² K/W]						
Orientation of building element	2-Wall	interior Rsi	0.13			
Adjacent to	1-Outdoor air	exterior Rse:	0.04			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Existing Masonry	1.202		0.000		0.000	305
Visconn Air Barrier	0.000		0.000		0.000	6
Rockwool ComfortBoard 80	0.045		0.000		0.000	102
GWB	0.209		0.000		0.000	16
Service Cavity	0.111	Wood Framing 2x4 @16" O.C.	0.120		0.000	102
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
91%		9.4%		0.0%		53.0 cm
U-value supplement	0.00	U-value:		0.273 W/(m ² K)		



Assembly no.	Building assembly description				Interior insulation?	
12ud	Parapet Extensions				<input type="checkbox"/>	
Heat transmission resistance [m²K/W]						
Orientation of building element	2-Wall	interior Rsi	0.13			
Adjacent to	1-Outdoor air	exterior Rse:	0.04			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Rockwool Board	0.045		0.000		0.000	38
	0.000		0.000		0.000	0
Rockwool Comfortboard	0.045	Stud Frame	0.120		0.000	38
Polyiso component of Zip R Sheathing	0.030		0.000		0.000	38
OSB Component of Zip R Sheathing	0.130		0.000		0.000	11
Poyiso Insulation	0.030		0.000		0.000	305
TPO Membrane	0.240		0.000		0.000	2
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
93%		6.7%		0.0%		43.2 cm
U-value supplement	0.00 W/(m²K)	U-value: 0.076 W/(m²K)				

Assembly no.	Building assembly description				Interior insulation?	
13ud	Transition Wall plus Exterior Cladding				<input type="checkbox"/>	
Heat transmission resistance [m²K/W]						
Orientation of building element	2-Wall	interior Rsi	0.13			
Adjacent to	1-Outdoor air	exterior Rse:	0.04			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
	0.000		0.000		0.000	0
Rockwool Cavity Rock	0.045		0.000		0.000	203
	0.000		0.000		0.000	0
Existing Masonry	1.202		0.000		0.000	305
Visconn Air Barrier	0.000		0.000		0.000	0
ROCKWOOL ComfortBoard 80	0.045		0.000		0.000	102
GWB	0.209		0.000		0.000	16
Service Cavity	0.111	Wood Framing 2x4 @16" O.C.	0.120		0.000	89
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
90%		10.0%		0.0%		71.4 cm
U-value supplement	0.06 W/(m²K)	U-value: 0.181 W/(m²K)				



Assembly no.	Building assembly description				Interior insulation?	
14ud	Gable Truss plus party wall				<input type="checkbox"/>	
Heat transmission resistance [m²K/W]						
Orientation of building element	2-Wall	interior Rsi	0.13			
Adjacent to	3-Ventilated	exterior Rse:	0.13			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
	0.000		0.000		0.000	0
Rockwool Board	0.045		0.000		0.000	102
	0.000		0.000		0.000	0
Rockwool Comfortboard	0.045	Stud Frame	0.120		0.000	38
Polyiso component of Zip R Sheathing	0.030		0.000		0.000	38
OSB Component of Zip R Sheathing	0.130		0.000		0.000	11
Existing Masonry	1.202		0.000		0.000	305
	0.000		0.000		0.000	0
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
93%		6.7%		0.0%		49.4 cm
U-value supplement	0.00	W/(m²K)	U-value:		0.204	W/(m²K)

Assembly no.	Building assembly description				Interior insulation?	
15ud	Elevated Slab over Ventilated Basement				<input type="checkbox"/>	
Heat transmission resistance [m²K/W]						
Orientation of building element	3-Floor	interior Rsi	0.17			
Adjacent to	3-Ventilated	exterior Rse:	0.17			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Concrete	2.404		0.000		0.000	127
20 ga Metal Deck	14.423		0.000		0.000	1
EPS Board Type VII - Neropor	0.030		0.000		0.000	152
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
100%		0.0%		0.0%		28.0 cm
U-value supplement	0.00	W/(m²K)	U-value:		0.183	W/(m²K)



Assembly no.	Building assembly description					Interior insulation?
16ud	Basement Mechanical Room Walls					<input type="checkbox"/>
Heat transmission resistance [m ² K/W]						
Orientation of building element	2-Wall	interior Rsi	0.13			
Adjacent to	3-Ventilated	exterior Rse:	0.13			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
	0.000		0.000		0.000	0
GWB	0.209		0.000		0.000	16
Rockwool Comfortbatt	0.045	wood Studs @ 24" O.C.	0.120		0.000	89
Zip Sheathing w/Air Barrier	0.130		0.000		0.000	11
Rockwool Comfort Board 80	0.045		0.000		0.000	102
	0.000		0.000	Furring Strips	0.130	19
DensGlass Sheathing	0.209		0.000		0.000	16
	0.000		0.000		0.000	0
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
83%		6.7%		10.0%		25.2 cm
U-value supplement	0.00 W/(m ² K)	U-value: 0.218 W/(m ² K)				

Roof

Assembly no.	Building assembly description					Interior insulation?
04ud	Roof					<input type="checkbox"/>
Heat transmission resistance [m ² K/W]						
Orientation of building element	1-Roof	interior Rsi	0.10			
Adjacent to	1-Outdoor air	exterior Rse:	0.04			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
	0.000		0.000		0.000	0
Advantech OSB Roof Sheathing	0.130		0.000		0.000	19
Vapor Barrier	0.000		0.000		0.000	0
Poyiso Insulation - Faced	0.030		0.000		0.000	203
TPO Membrane	0.601		0.000		0.000	3
DensDeck Prime Coverboard	0.209		0.000		0.000	16
	0.000		0.000		0.000	0
	0.000		0.000		0.000	0
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
100%		0.0%		0.0%		24.1 cm
U-value supplement	0.00 W/(m ² K)	U-value: 0.142 W/(m ² K)				



EnerPHit Verification



Building:	Six&Kane		
Street:	63 N. Fraley Street		
Postcode/City:	16735	Kane	
Province/Country:	PA	US-United States of America	
Building type:	Mixed Office/ Assembly /Retail		
Climate data set:	ud--01-Bradford PA		
Climate zone:	2: Cold	Altitude of location:	619.9632 m
Home owner / Client:	63 Fraley Street LLC		
Street:	40 North Pennsylvania Avenue, Suite 510		
Postcode/City:	15601	Greensburg	
Province/Country:	PA	US-United States of America	
Mechanical engineer:	Michael L. Norris & Associates, Inc.		
Street:	171 Technology Drive, Suite 300		
Postcode/City:	16827	Boalsburg	
Province/Country:	PA	US-United States of America	
Certification:	CertiPHiers Cooperative		
Street:			
Postcode/City:		Portland	
Province/Country:	OR	US-United States of America	
Interior temperature winter [°C]:	20.0	Interior temp. summer [°C]:	25.0
Internal heat gains (IHG) heating case [W/m²]:	3.8	IHG cooling case [W/m²]:	3.8
Specific capacity [Wh/K per m² TFA]:	132	Mechanical cooling:	x

Architecture:	Gary Moshier - Moshier Studio		
Street:	363 Newburn Drive		
Postcode/City:	15216	Pittsburgh	
Province/Country:	PA	US-United States of America	
Energy consultancy:	Gary Moshier - Moshier Studio		
Street:	363 Newburn Drive		
Postcode/City:	15216	Pittsburgh	
Province/Country:	PA	US-United States of America	
Year of construction:	2022	Interior temperature winter [°C]:	20.0
No. of dwelling units:	1	Internal heat gains (IHG) heating case [W/m²]:	3.8
No. of occupants:	55.0	Specific capacity [Wh/K per m² TFA]:	132

Specific building characteristics with reference to the treated floor area PHPP has not been completed; it is not valid as verification (see 'Check' worksheet)

	Treated floor area m ²	Value	Criteria	Alternative criteria		Fulfilled? ²
				Criteria	Alternative criteria	
Space heating	Heating demand kWh/(m ² a)	14	≤ 30	-	-	yes
	Heating load W/m ²	14	≤ -	-	-	
Space cooling	Cooling & dehum. demand kWh/(m ² a)	4	≤ 15	15	15	yes
	Cooling load W/m ²	13	≤ -	-	12	
	Frequency of overheating (> 25 °C) %	-	≤ -	-	-	-
	Frequency excessively high humidity (> 12 g/kg) %	0	≤ 10	-	-	yes
Airtightness	Pressurization test result n ₅₀ 1/h	0.2	≤ 1.0	-	-	yes
Non-renewable Primary Energy (PE)	PE demand kWh/(m ² a)	95	≤ -	-	-	-
Primary Energy Renewable (PER)	PER demand kWh/(m ² a)	43	≤ 45	43	43	yes
	Generation of renewable energy (in relation to projected kWh/(m ² a) building footprint area)	119	≥ 60	-	55	

² Empty field: Data missing; '-' No requirement

I confirm that the values given herein have been determined following the PHPP methodology and based on the characteristic values of the building. The PHPP calculations are attached to this verification.

EnerPHit Plus? yes

Task:	First name:	Surname:
1-Designer	Gary	Moshier
Issued on:		City:
		Pittsburgh

Signature: _____

