



PROJECT:  
PRIMA, NON ULTIMA  
CASE STUDY

*Building a future.*



## Deep Retrofit Case Study

# **Project Description**

## **Project: Prima, Non Ultima**

**Location: Charlottetown, PEI, Canada**

**Single Family Home - 3 bedroom/2 bath**

**Total Floor Area: 1288 sq.ft (120 sq.m)**

**Year Built: 1937**

**Structure Type: Wood Framed**

**Climate Zone: 6**

**Heating Degree days: 4000**

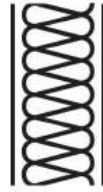
**Retrofit Status: Completed May 2025**

# **Project Priorities**

- 1.Indoor Air Quality**
- 2.Embodied Carbon**
- 3.Passive House Principles**



# Five Main Principles Of Passive House Design



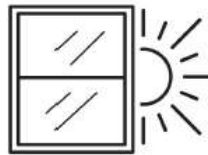
1. Super-insulation



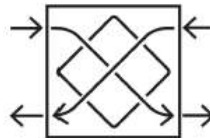
2. Airtight construction



3. Thermal bridge free

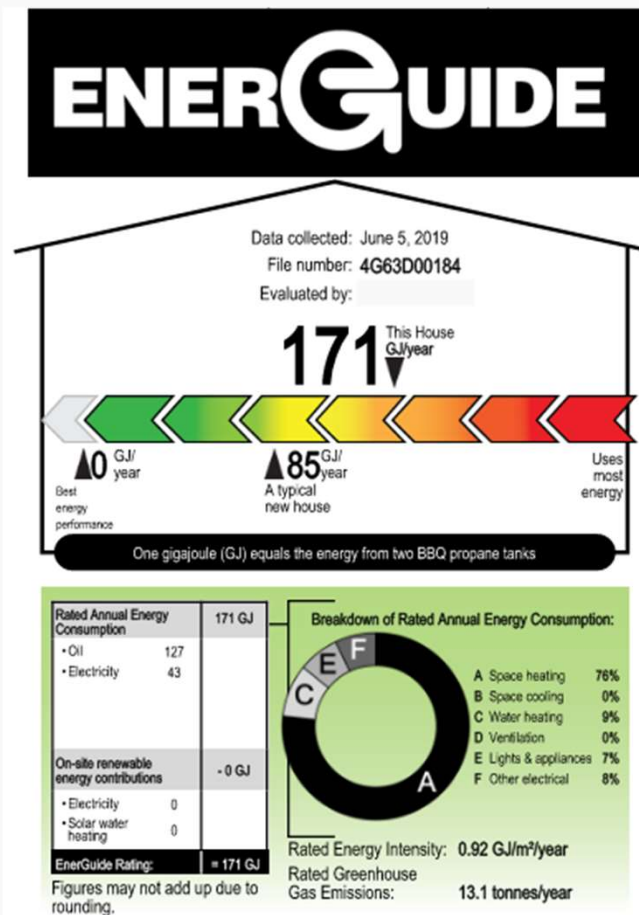


4. High quality windows with solar orientation



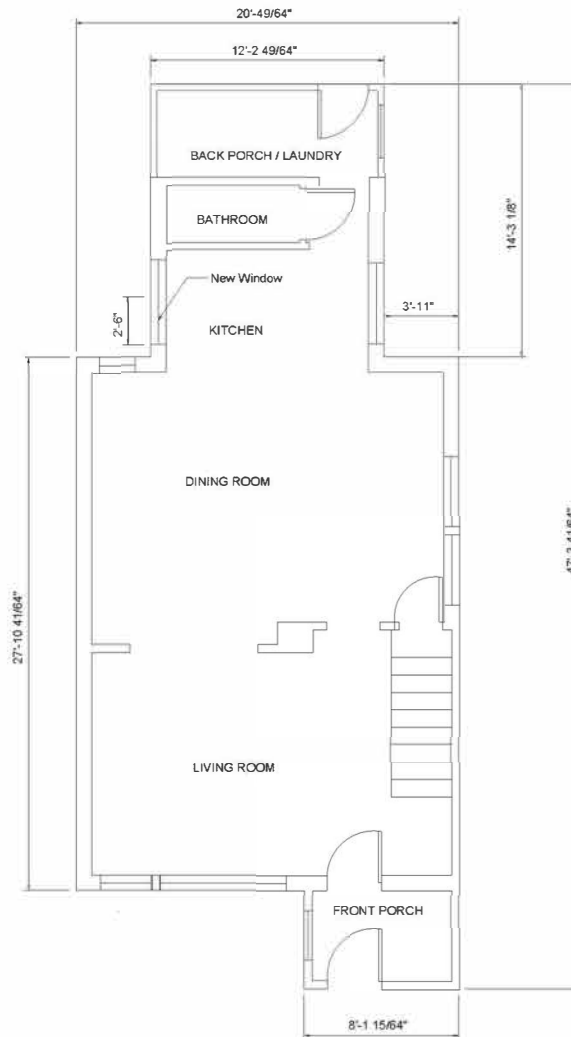
5. Ventilation system with heat recovery

# Initial Energuide Results



## AIRTIGHTNESS

Air leakage rate at 50 pascals	12.17 air changes/hour
Equivalent leakage area	1959.4 cm <sup>2</sup> (304 in <sup>2</sup> )
Normalized leakage area	5.7 cm <sup>2</sup> /m <sup>2</sup> (8.3 in <sup>2</sup> /100 ft <sup>2</sup> )



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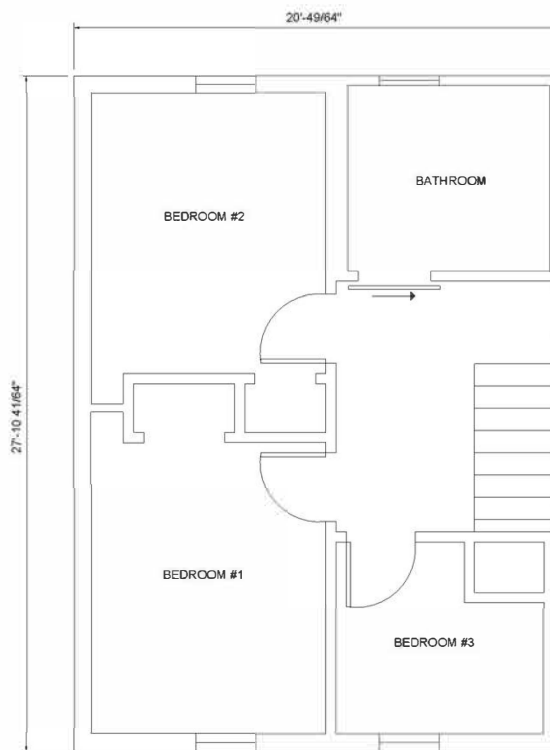
PRELIMINARY  
 Not For  
 Construction



PROJECT NO.  
 24004  
 ISSUE DATE  
 2024-02-24  
 ISSUE NOTE  
 PRELIMINARY SET FOR  
 BUILDING PERMIT  
 DRAWN BY  
 V. G. 04/24

FIRST STOREY  
 FLOORPLAN

A1.0



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 Canada  
 Tel: 604-685-5448

**GOMEZ**  
**ENGINEERING**

PRELIMINARY  
 Not For  
 Construction

PROJECT NO.  
 24004

ISSUE DATE  
 2024-02-24

ISSUE NO. 1  
 PRELIMINARY SET FOR  
 BUILDING PERMIT

DRAWN BY  
 V. Gomez

SECOND STOREY  
 FLOORPLAN

**A1.1**

# Thermal Envelope

## Basement Ceiling (Nominal R26):

Polypropylene Mesh

2 x 8 floor joists filled w/ dense pack cellulose: R3.7/in

Pro Clima Mento 3000 Connect (AWB)

3/4" Plywood

5/8" Engineered Floor (FSC Certified)

# Thermal Envelope

## Walls (Nominal R45.5):

Fraser Wood Siding (PEFC Certified)

1x3 vertical strapping rain screen

Pro Clima Adhero (AWB)

5/8" Plywood

5" Larsen Truss filled w/ dense pack cellulose: R3.7/in

7/8" Existing Board sheathing

2x4 Existing wall studs (actual 3.75") w/ 16" O.C filled w/ dense pack cellulose. : R3.7/in

2x4 New horizontal studs on side w/ 24" O.C filled w/ dense pack cellulose: R3.7/in

Pro Clima Intello (Vapour Barrier)

1x3 Vertical Strapping

1x3 Horizontal Strapping

5/8" Type X GWB

# Thermal Envelope

## Roof (Nominal R102):

Standing Seam Metal Roof

Synthetic Underlayment per roofing Mfr

5/8" Plywood

2x4 Framing w/ 24" O.C. (Ventilation Cavity)

Pro Clima Mento Connect 3000 (AWB)

7/8" Existing Board Sheathing

2x4 Existing Roof framing w/ 24" O.C filled with 28" blown in cellulose: R3.7/in

1x3 cross strapping

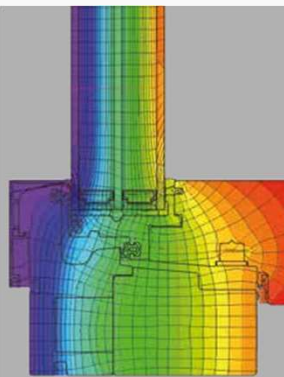
1x3 cross strapping

5/8" Type X GWB

# Windows/ Doors

## Aluminum Clad Wood

**ENERsign<sup>®</sup>** GMBH  
FENSTER + TÜREN



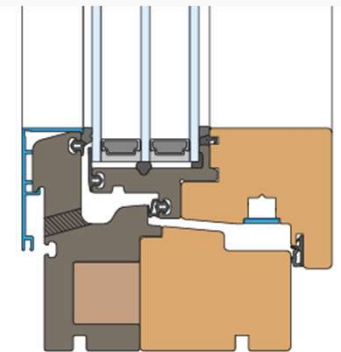
turn-tilt

### Power values window

	U <sub>f</sub> -value	width	PSI <sub>g</sub>	f <sub>RSI</sub> =0,25
	W/m <sup>2</sup> K	mm	W/mK	(-)
spacer			swisspacer ultimate pu	
below	0,64	100	0,020	0,77
side/above	0,64	100	0,020	

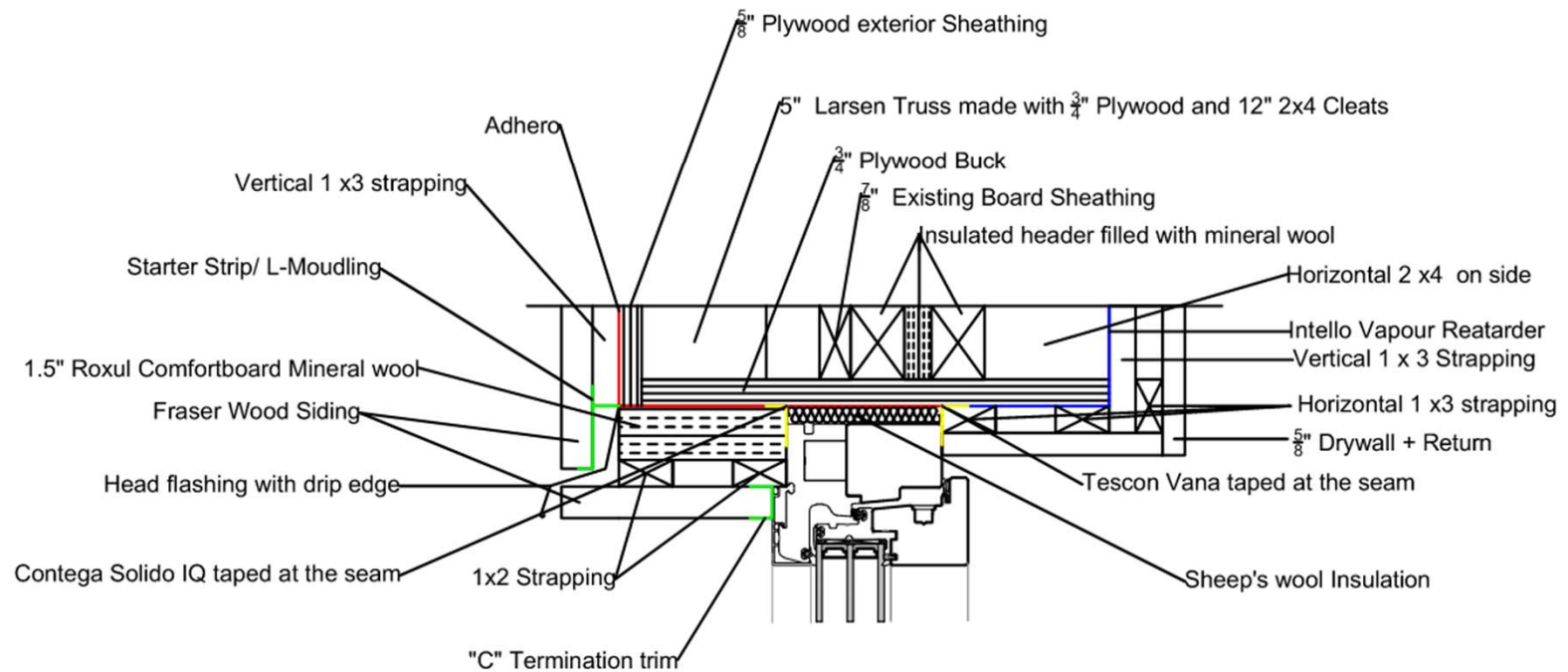
### Power values window

standard test size		W/m <sup>2</sup> K	mittlerer PSI <sub>g</sub>	U <sub>window</sub>
1.260 x 1.480 mm				
glass U-value	U <sub>g</sub>	0,52	0,020	0,60
window U-value	U <sub>w</sub>	0,60		
glass U-value	U <sub>g</sub>	0,53	0,020	0,61
window U-value	U <sub>w</sub>	0,61		

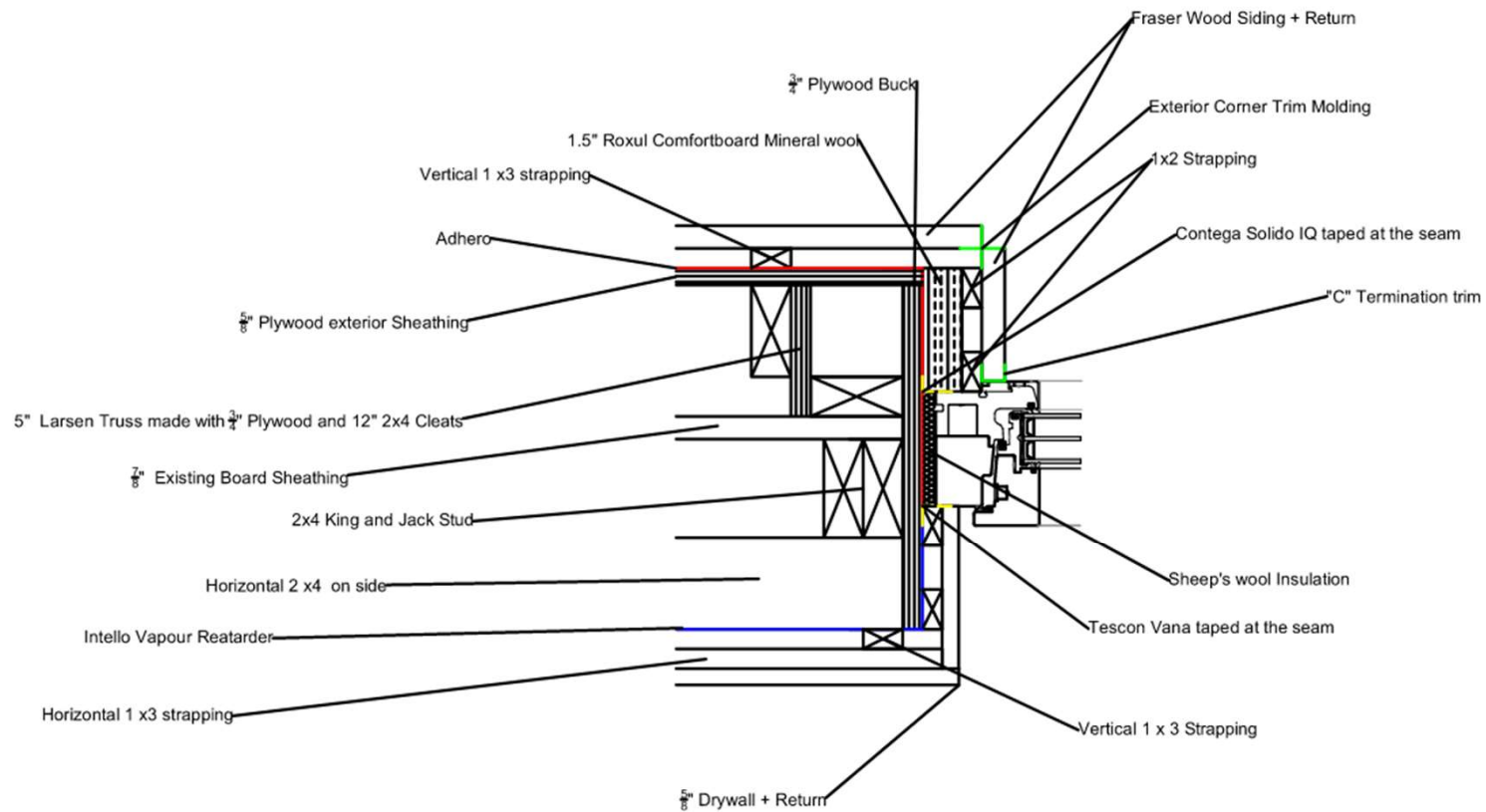




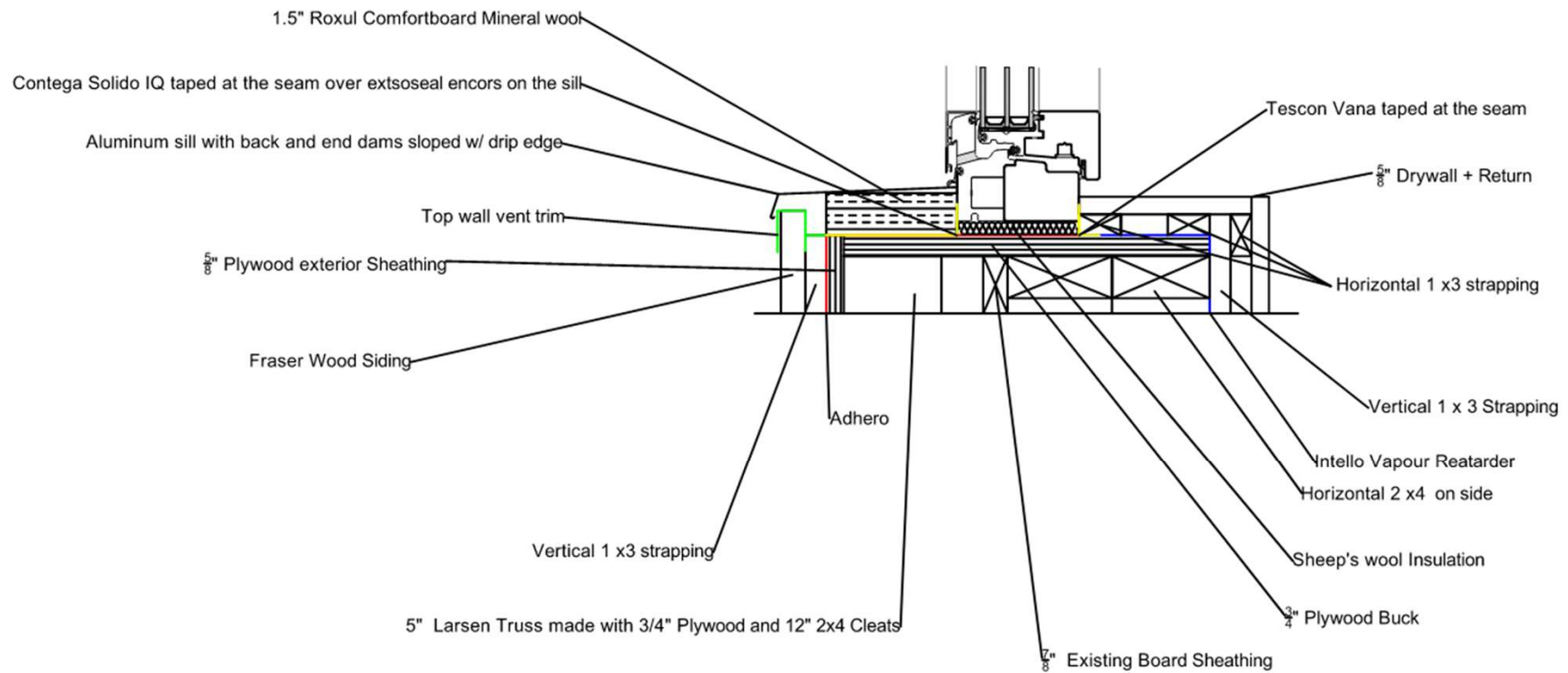
## Window Head Section Detail



## Jamb Section Detail



## Window Sill Detail



# Mechanical Systems

## **Ventilation:**

Zehnder ComfoAir Q350 ERV

## **Air Purification:**

Coway Air Mega 150 (HEPA Filtration)

## **Dehumidification:**

Sante Fe Ultra70 Whole Home Dehumidifier

## **Heating:**

Fujitsu 15000 BTU Mini Split

Convect Air Electric Backup (2 kW)

## **IAQ Monitoring:**

Air Things View Plus (Radon, PM2.5, PM1, CO<sub>2</sub>, VOC, Humidity, Temp, Pressure)

# Mechanical Systems

## **Domestic Hot Water (Manifold setup):**

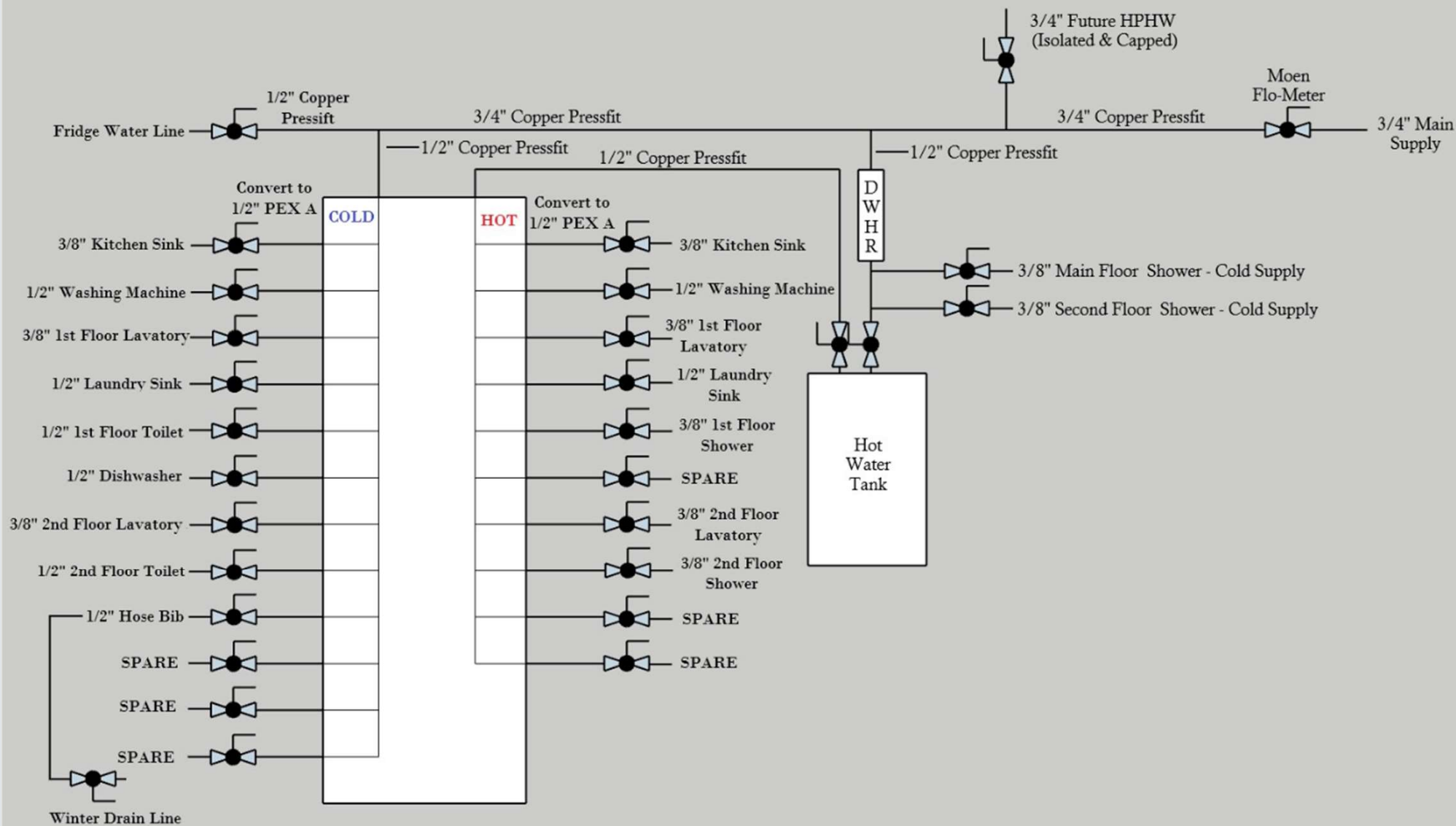
50 Gallon Electric Tank

Flo by Moen Smart Water Shutoff

Hot water lines insulated with ½" Armaflex

## **DWHR:**

3" x 39.5" (46.1% Eff)



# Electrical Systems

## Electrical:

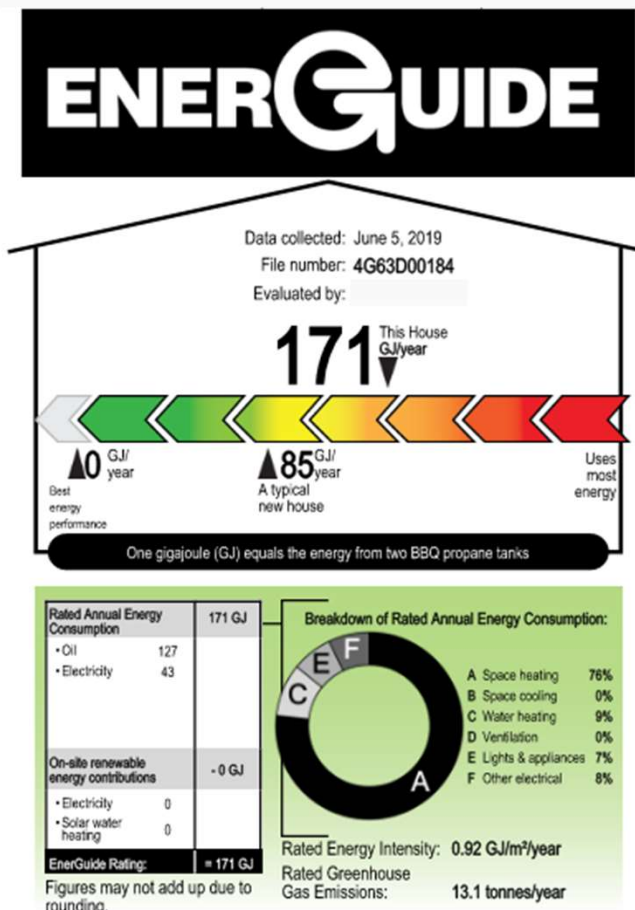
Upgrade to 200 Amp service from 100 Amps

Leviton Combo Meter Main Exterior panel for exterior plugs/lighting, heat pump compressor, future EV and potential future ADU. Built in pass through to feed 100 Amp Leviton Smart Load Center inside building.

Both panels are fitted with whole home energy monitors for real time monitoring and data trending on each individual circuit.

Performance testing scheduled to commence in Jan 2026.

# Initial Energuide Results

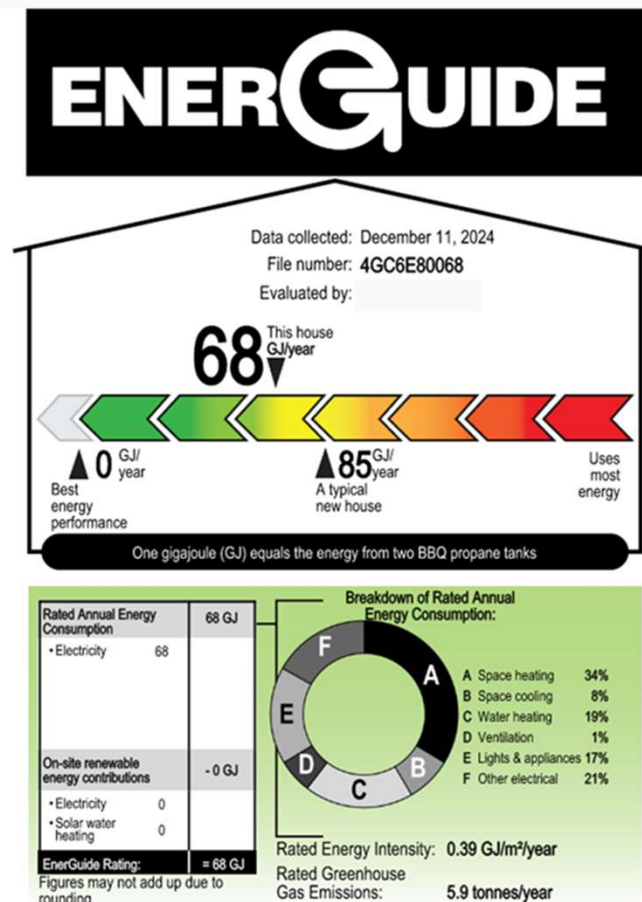


## AIRTIGHTNESS

Air leakage rate at 50 pascals	12.17 air changes/hour
Equivalent leakage area	1959.4 cm <sup>2</sup> (304 in <sup>2</sup> )
Normalized leakage area	5.7 cm <sup>2</sup> /m <sup>2</sup> (8.3 in <sup>2</sup> /100 ft <sup>2</sup> )



# Final Energuide Results



## AIRTIGHTNESS

Air leakage rate at 50 pascals	0.57 air changes/hour
Equivalent leakage area	77.4 cm <sup>2</sup> (12 in <sup>2</sup> )
Normalized leakage area	0.2 cm <sup>2</sup> /m <sup>2</sup> (0.3 in <sup>2</sup> /100 ft <sup>2</sup> )

# Summary Results\*

	Initial	Final	% drop
Annual Energy Consumption	171 GJ/Yr	68 GJ/Yr	60.2%
Space Heating Demand	130 GJ/Yr	23 GJ/Yr	82.3%
Airtightness	12.17 ACH	0.57 ACH	95.3%

\*Estimated Annual Consumption and Space Heating demand. Performance Testing for Actual Annual Consumption and Space Heating Demand will begin in Jan 2026.

# Costs

## Retrofit Costs\*:

Approx. \$350/sq.ft

- IAQ: \$\$
- Embodied Carbon: revenue neutral - \$
- Passive House: \$\$\$

\* Does not including initial purchase price of building and lot.









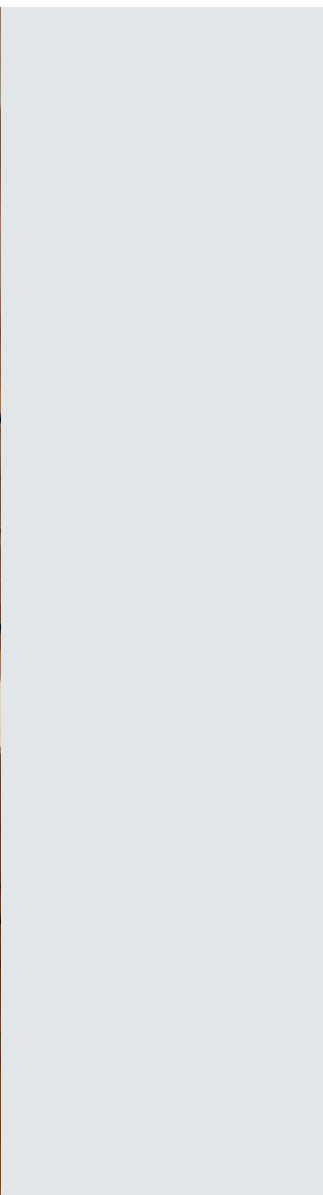


















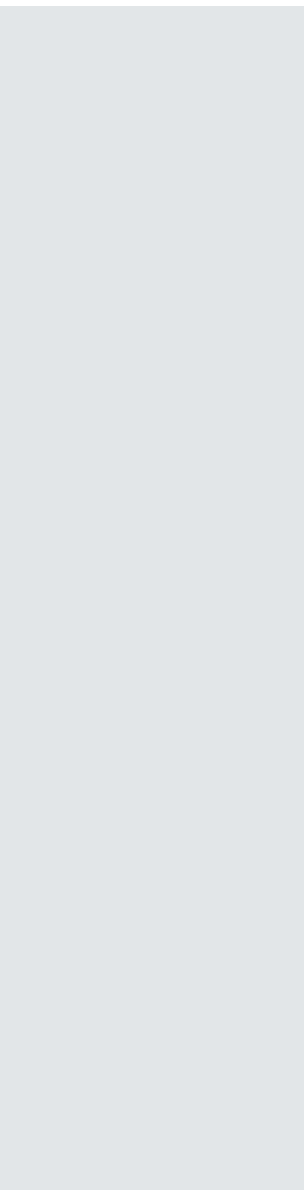




























































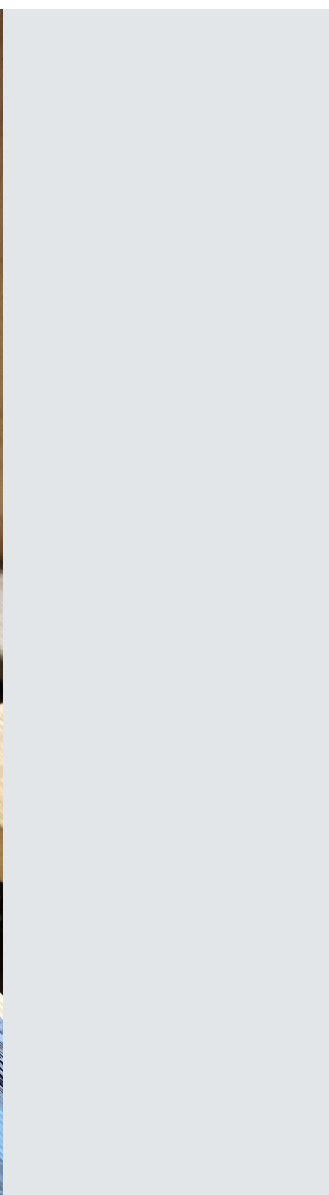


















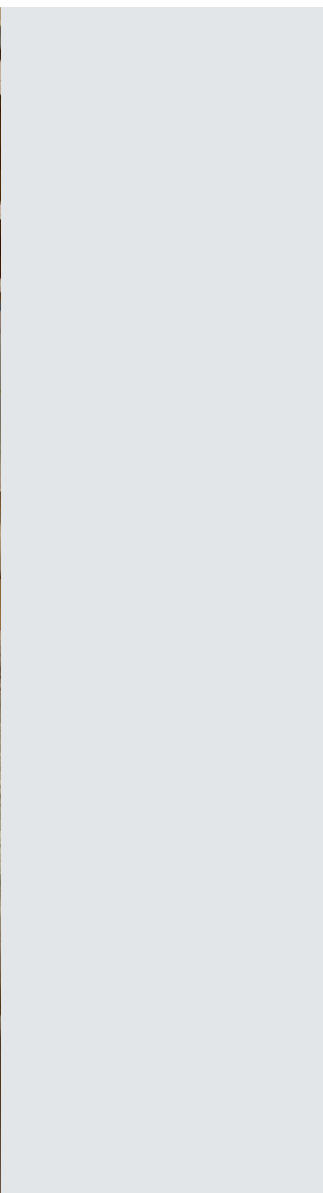




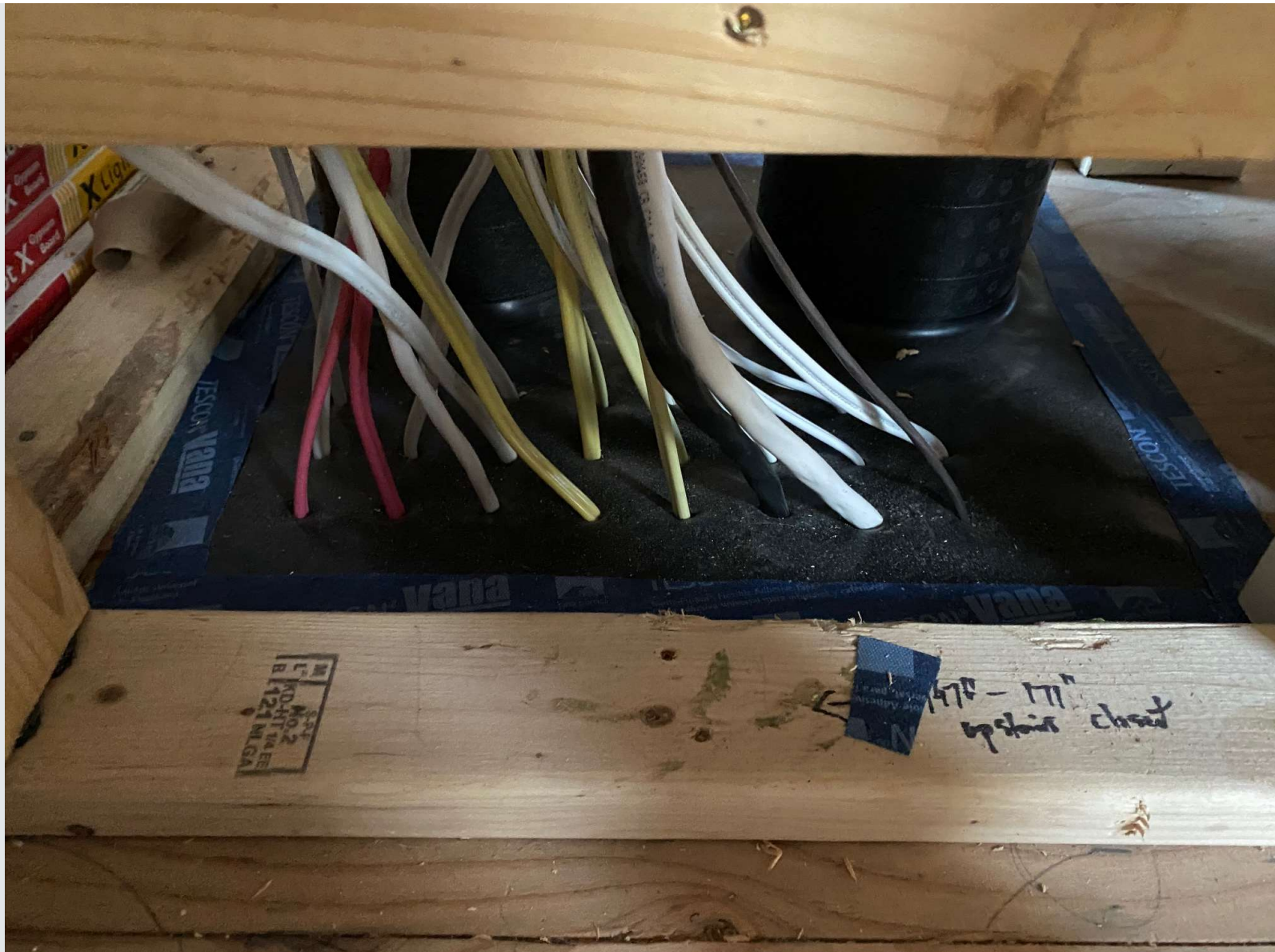










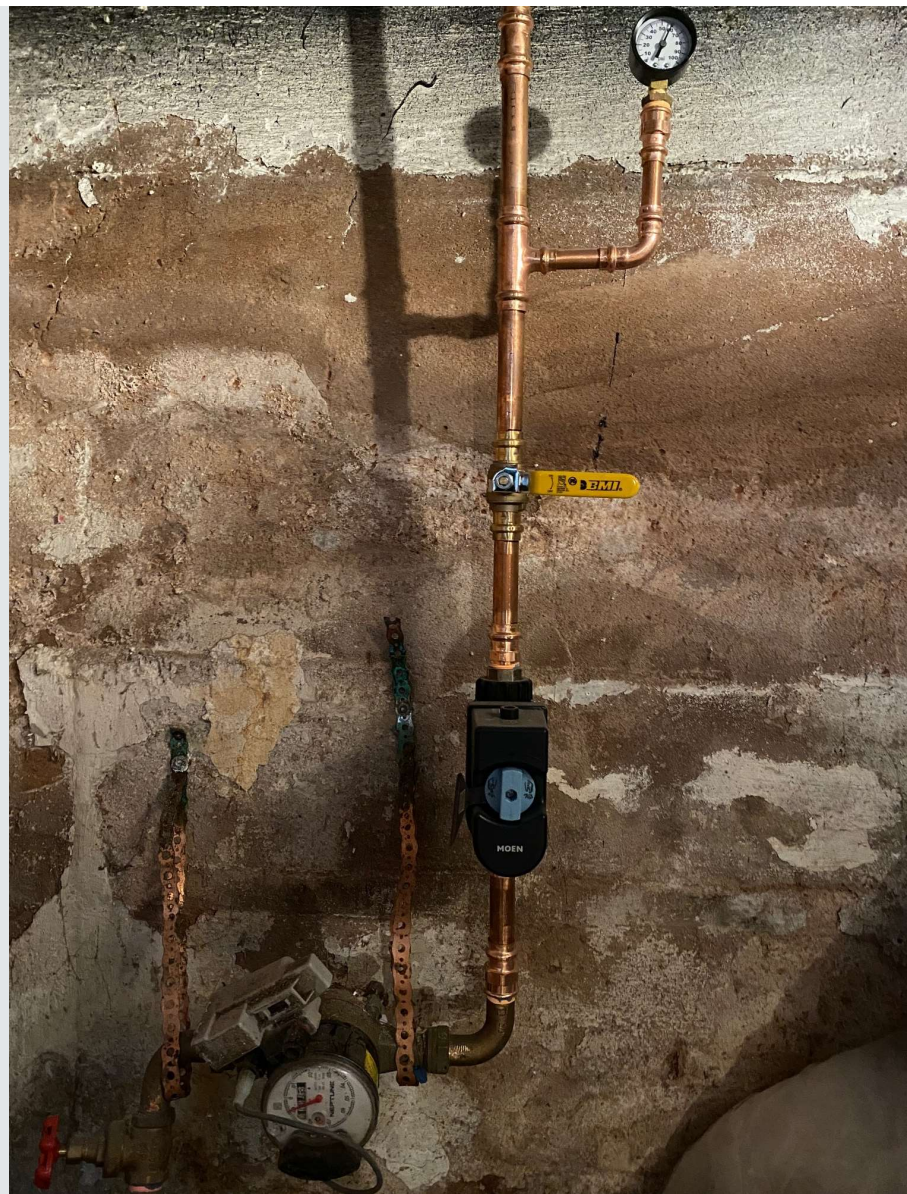
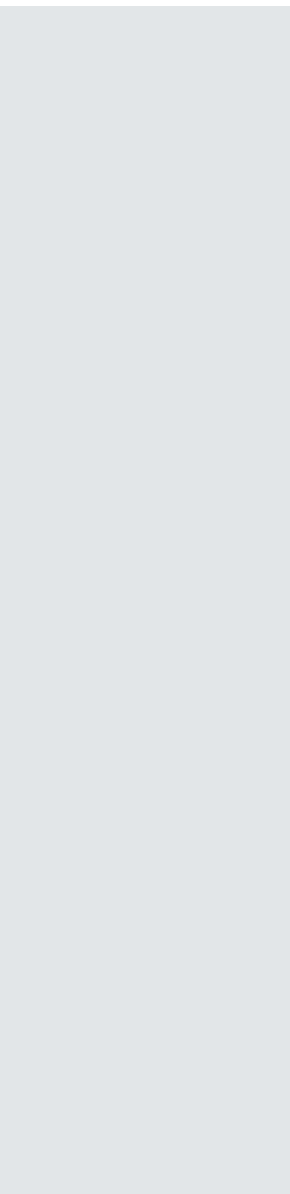
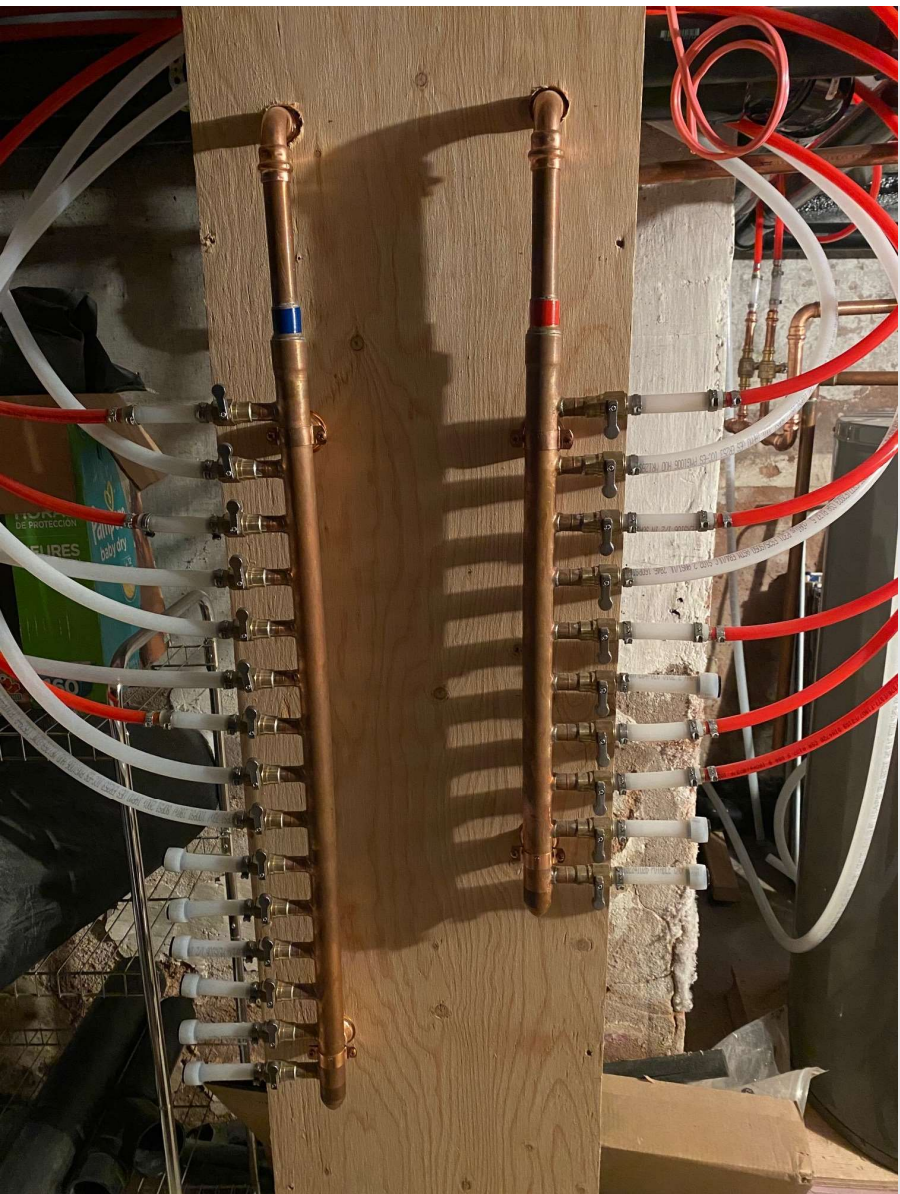


3-4  
MO-2  
KODAK  
B 121 MGA

Blue  
Adhesive  
Tape

147" - 171"  
up stairs chest













# GOMEX ENGINEERING

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