

HUDDLE TOGETHER FOR WARMTH

MULTIPLE SOLUTIONS FOR MULTI-
FAMILY PASSIVE HOUSE





BUILDINGENERGY BOSTON

AIA Provider: Northeast Sustainable Energy Association

Provider Number: G338

Huddle together for Warmth

BE16

Jesse Thompson, AIA, LEED AP, CPHC

Michelle Apigian, AIA, LEED AP, AICP

Richard O'Dwyer, Senior Principal

March 9, 2016

Credit(s) earned on completion of this course will be reported to **AIA CES** for AIA members. Certificates of Completion for both AIA members and non-AIA members are available upon request.

CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product.

Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

This course is registered with **AIA**

Course Description

We will show two mid-rise multi-family projects in the northeast that meet either the Passive House or PHIUS+ building energy standard. The Distillery's 28-unit Phase 1 building in South Boston, MA and the Bayside Anchor 45-unit project in Portland, ME, both now under construction, will be used to discuss the design and construction principles that are employed to radically reduce energy consumption and construct beautiful, low energy, and healthy urban living spaces. Details, testing data and lessons learned will be shared with a special focus on large scale air barrier implementation, efficient ventilation systems, and cost savings and funding metrics.

Learning Objectives

At the end of the this course, participants will be able to:

1. Creating an airtight envelope and minimizing thermal bridging
2. Appropriate heating and cooling strategies
3. Maximizing the benefits of a heat recovery ventilation systems
4. How to build it cost effectively

**HUDDLE
TOGETHER
FOR WARMTH!**

HISTORY
&
DESIGN

DISTILLERY PROJECT INFO

SOUTH BOSTON, MA

Phase 1- 28 UNITS: 1 BR & 2 BR

Phase 2- 37 UNITS expected

\$225 / SF

5 / 6 STORIES

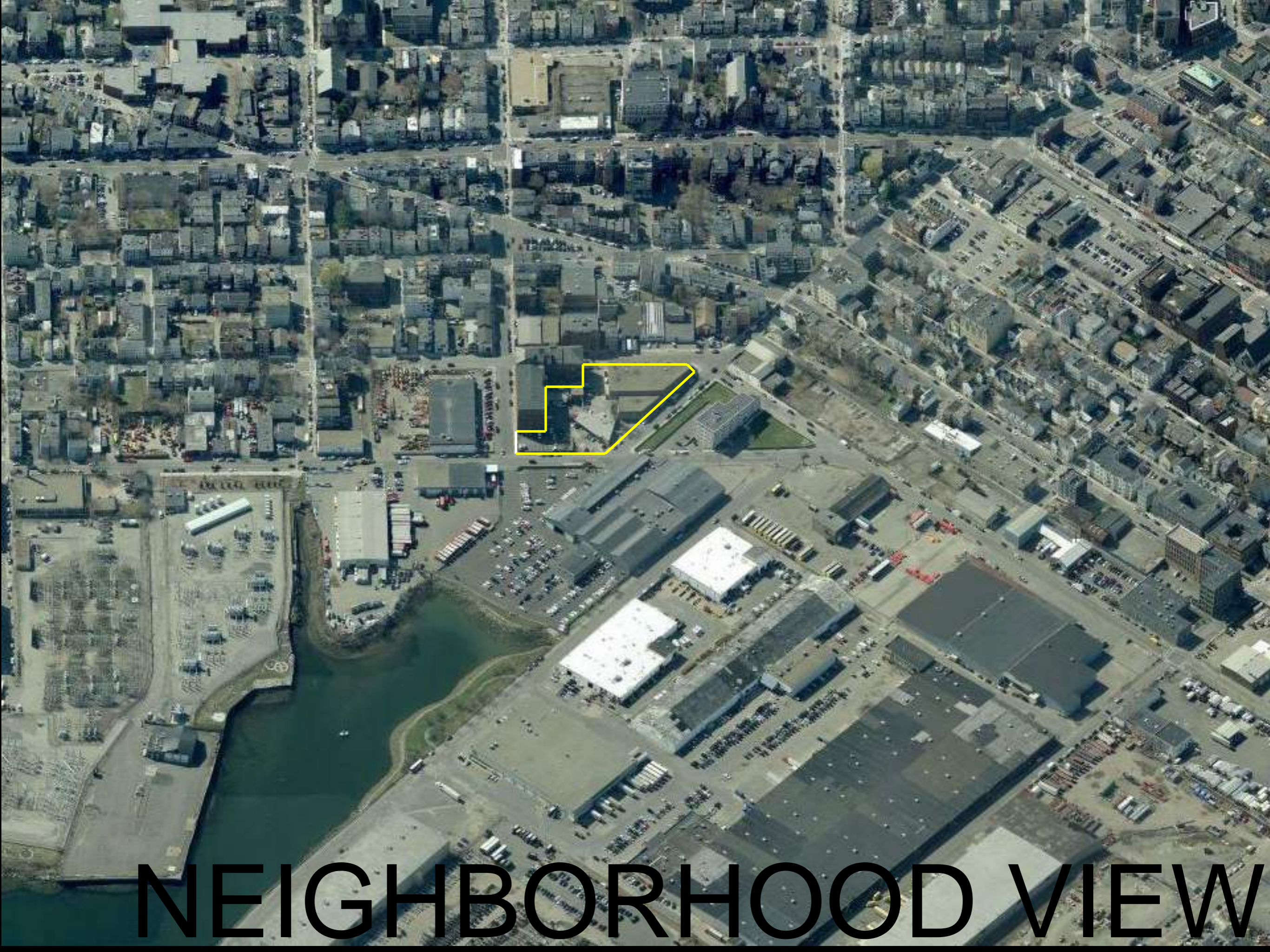
MARKET RATE RENTAL

BOSTON CLIMATE

HDD	5,838
DESIGN TEMP	11° F
JANUARY AV TEMP	29° F
JANUARY SOUTH RAD	34 kBTU
JULY AV TEMP	73° F



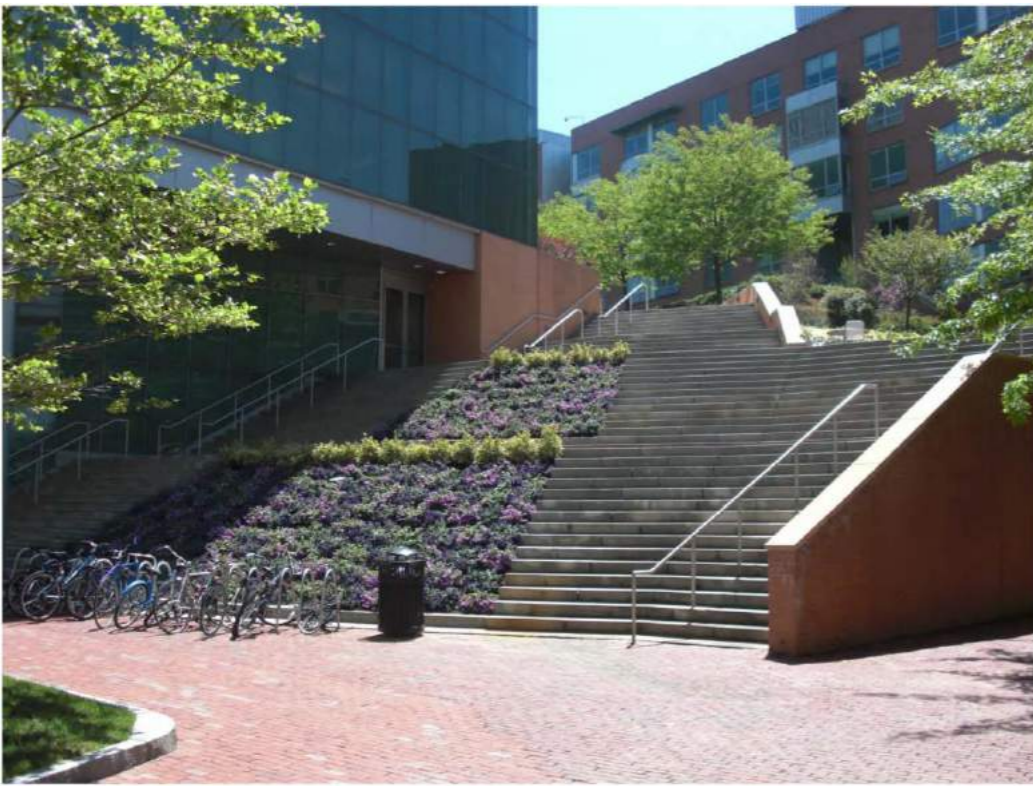
SOUTH BOSTON, MA



NEIGHBORHOOD VIEW



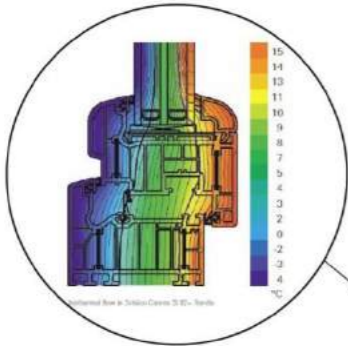




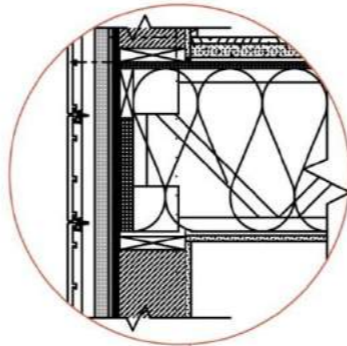
DESIGN THEMES



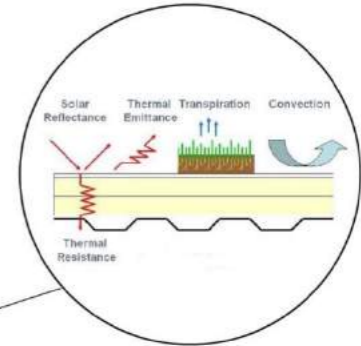




TRIPLE GLAZED WINDOWS
Offer superior energy efficiency, comfort, and noise reduction. Thermal performance is maximized through higher R-values, reduced thermal bridging and air tightness.



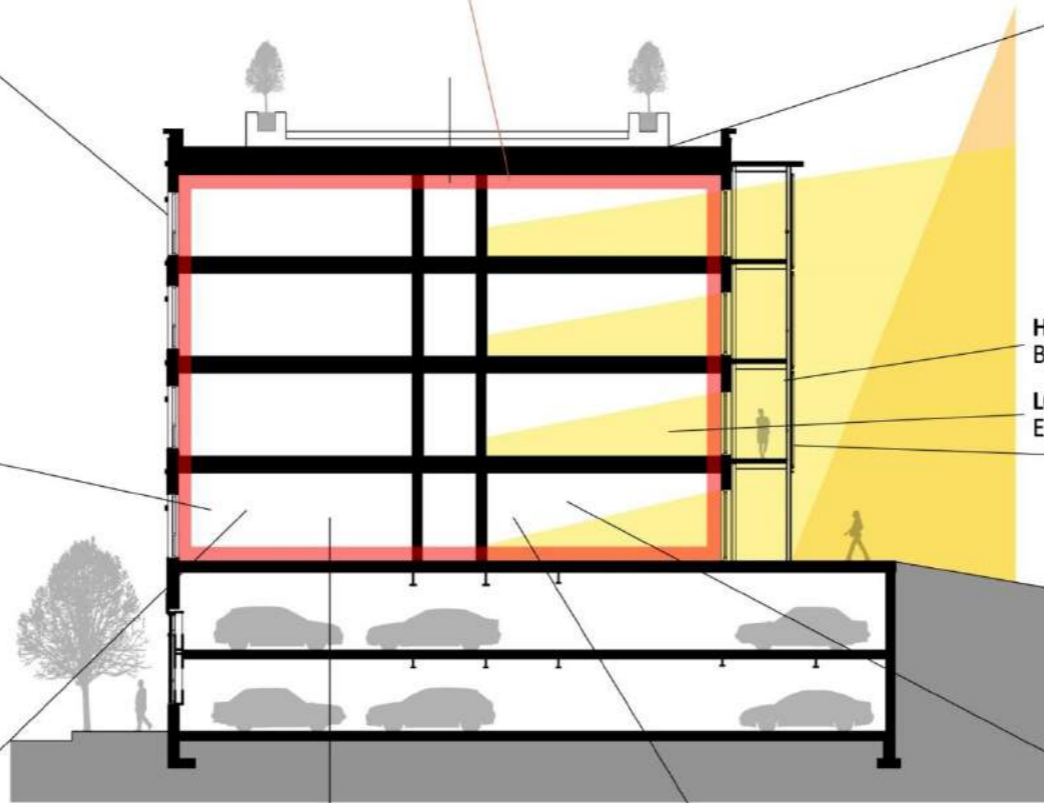
PASSIVE HOUSE ENVELOPE
Enhances comfort and reduces energy use by 80-90% integrating a high performance shell with air tightness and robust insulation to maintain a consistent temperature.



COOL ROOF
Reduces the heat island effect. A high albedo coating provides reflectivity to reduce the heat island effect. Planted containers absorb heat and capture rainwater reducing storm water runoff.



ENERGY STAR APPLIANCES
Reduce long term operating costs and overall load through high efficiency refrigerators and dishwashers.



HIGH SUMMER SUN
Blocked from entering

LOW WINTER SUN
Enters to warm space



SLIDING SUNSCREEN LOUVERS
Providing flexible sun control to limit heat gain during the summer while allowing passive solar gain in the winter.



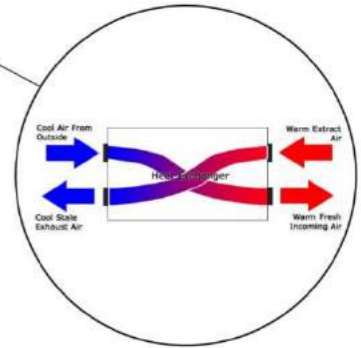
HIGH EFFICIENCY LIGHTING
Combines LED + Energy Star fixtures with occupancy sensors to reduce lighting load.



WATER CONSERVING FIXTURES
Including low flow faucets, showerheads, and toilets to conserve water, which in turn conserves energy by reducing the water delivery, treatment and heating demand.

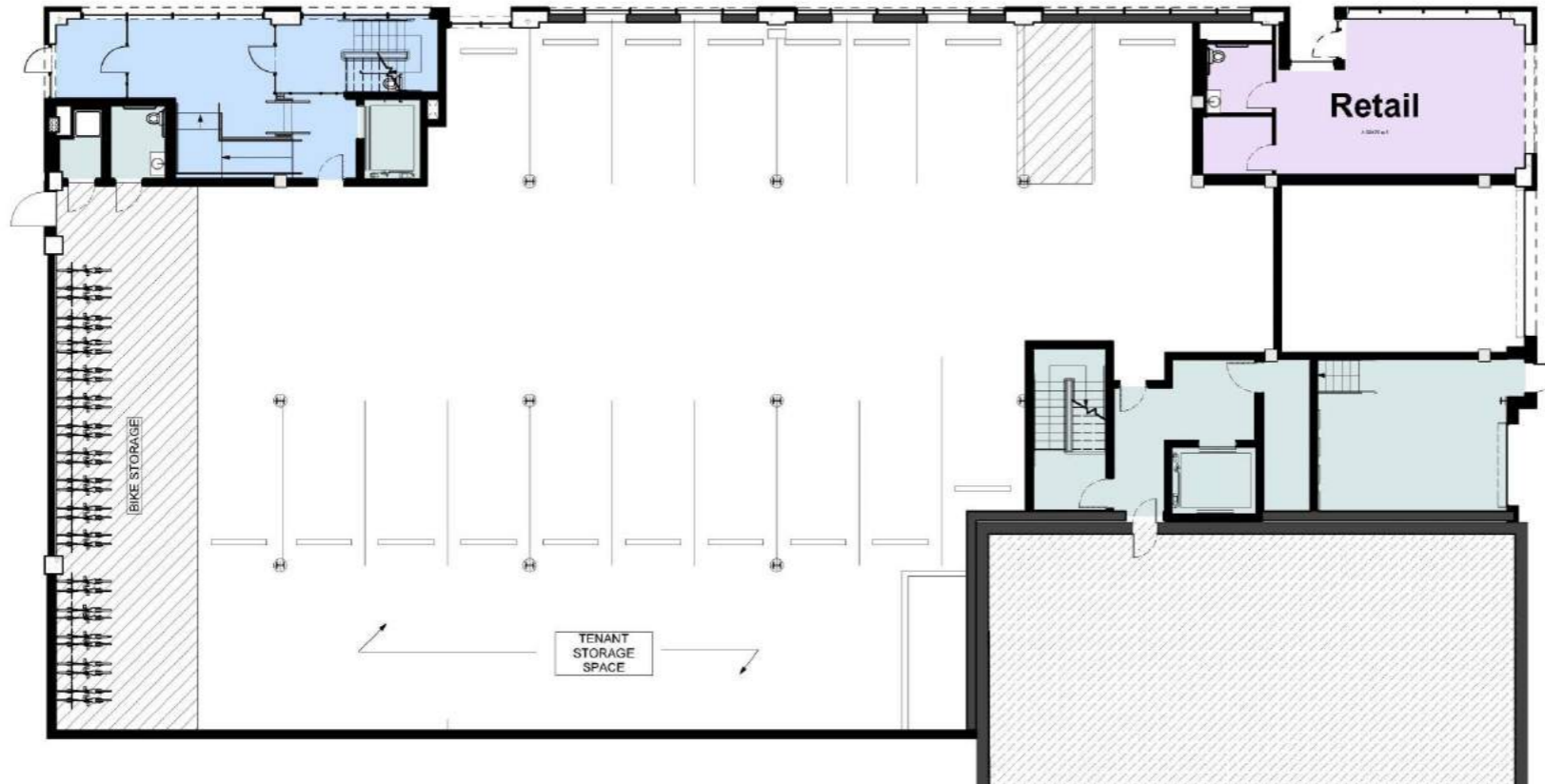


CONDENSING DRYERS
Help maintain the air tight building envelope by providing energy efficiency without exhausting substantial quantities of indoor air.

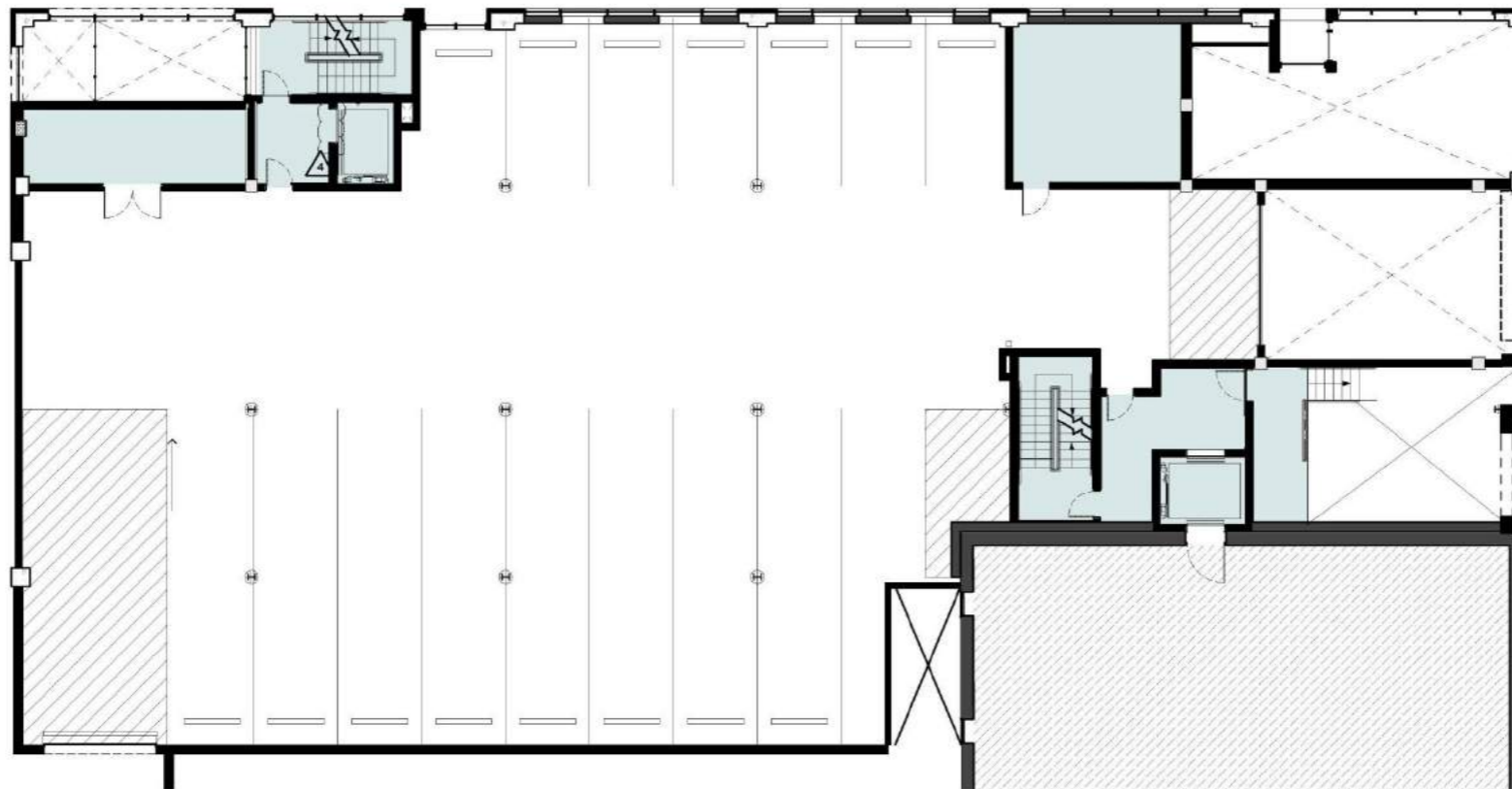


HEAT RECOVERY VENTILATION
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LEVEL 1



LEVEL 2





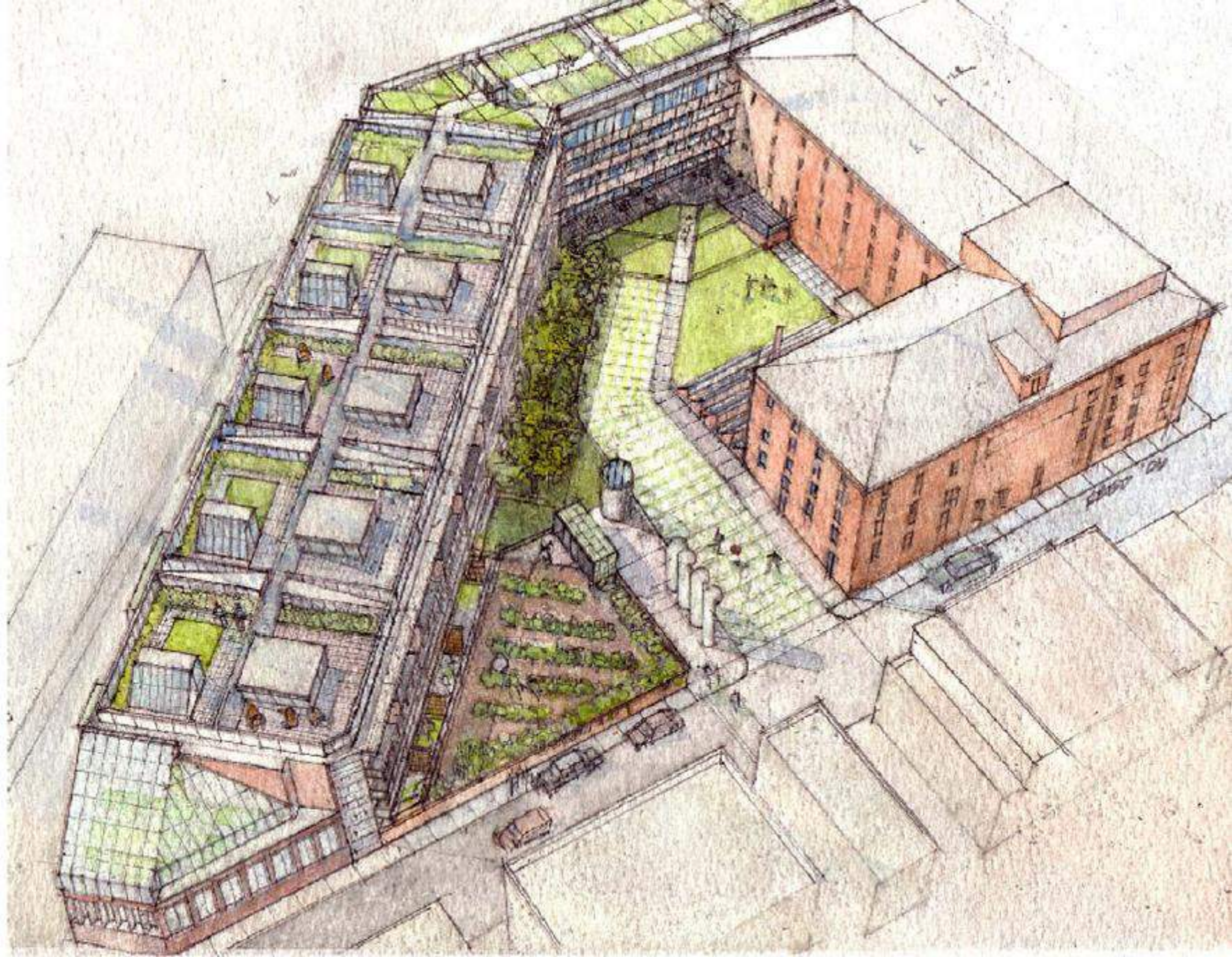
LEVEL 3

LEVEL 4



LEVEL 5/6





BAYSIDE PROJECT INFO

PORTLAND, ME

45 UNITS: STUDIO, 1 BR & 2 BR

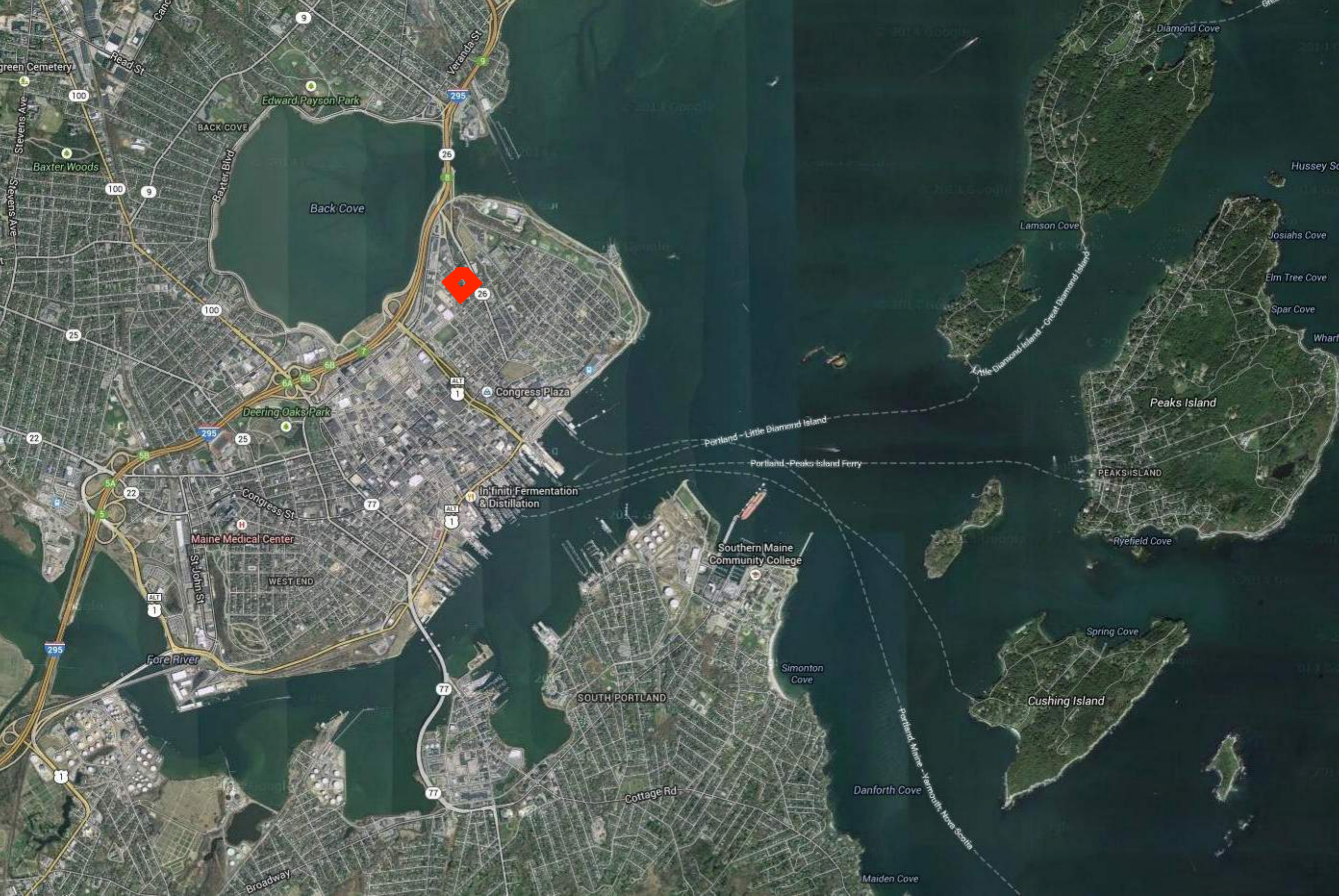
\$145 / SF

4 STORIES

TAX CREDIT SUBSIDIZED RENTAL

PORTLAND CLIMATE

HDD	7,300
DESIGN TEMP	4° F
JANUARY AV TEMP	20° F
JANUARY SOUTH RAD	35 kBTU
JULY AV TEMP	70° F



PORTLAND, MAINE



NEIGHBORHOOD VIEW







LOWERING THE COST OF HOUSING COMPETITION

buying real viagra without prescription

HOME **WINNING ENTRY: BAYSIDE ANCHOR** RUNNER UP: ACCDC TEAM ABOUT THE COMPETITION



Team: Portland Housing Development Corporation
 Avesta Housing
 Wright-Ryan Construction
 Kaplan Thompson Architects
 Maine Affordable Housing Coalition
 Location: Portland, Maine.
 Total Built Area: 38,272 SQF.

2013



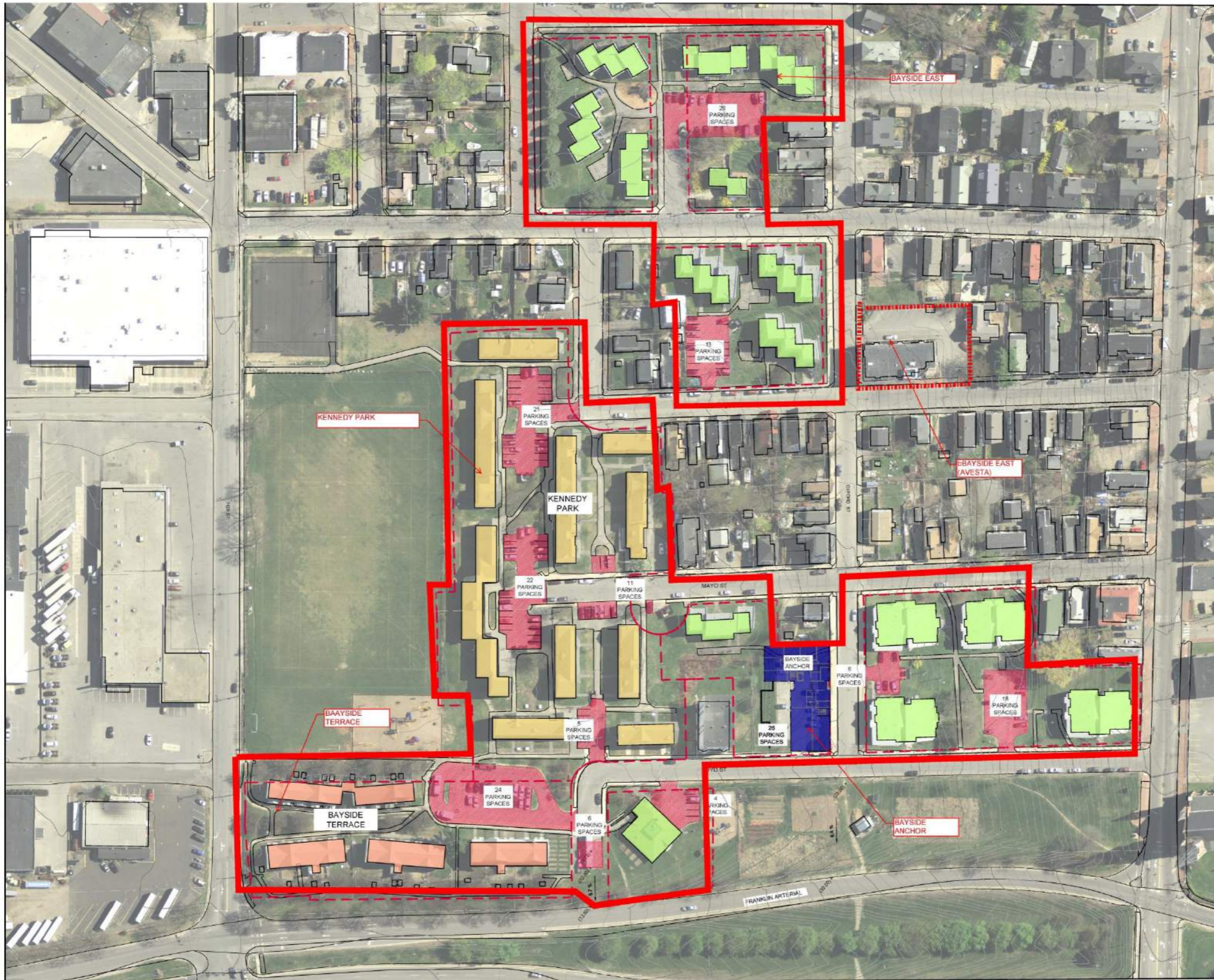
The Deutsche Bank Americas Foundation and Enterprise Community Partners, Inc. (Enterprise) have announced the winning proposals of the Lowering the Cost of Housing Competition, an effort to support and highlight new approaches to achieving high-quality, lower-cost affordable housing for diverse populations. The Bayside Anchor development program, of Portland, Maine, captured the top prize while the ACDDC team of Austin, Texas, was awarded a prize to further research its proposal.

Bayside Anchor has been awarded \$250,000 in program-related investment (PRI) for its prefab, 42-unit multifamily housing proposal. The judges were impressed by the design innovation and multitude of lowering cost approaches that will be deployed, as well as its potential replicability by other affordable housing developers. The Bayside Anchor has been designed to *Passivhaus* (ultra-low energy) standards and will include energy efficient measures such as solar photovoltaic panels on the roof and a courtyard for storm water management. These features, as well as ground floor community development space, will benefit low-income residents earning at or below 60 percent area median income (AMI).

Bayside Anchor sponsor, Portland Housing Development Corporation (PHDC), was also awarded a \$25,000 prize to support work that will create a lifecycle underwriting tool that will enable developers, policy makers and financiers to better understand the implications of choices made during the development process. The Bayside team is comprised of Avesta Housing, Wright-Ryan Construction, Kaplan Thompson Architects, Maine Affordable Housing Coalition and PHDC, an affiliate of the Portland Housing Authority.

BAYSIDE ANCHOR





LEGEND


- EXISTING PARKING
- KENNEDY PARK
- BAYSIDE TERRACE
- BAYSIDE EAST
- BAYSIDE ANCHOR
- PHA LAND HOLDINGS

PARKING COUNT	EX. DU	PROP. DU	EXISTING PARKING	PROPOSED PARKING
KENNEDY PARK	45	45	60	60
BAYSIDE TERRACE	24	24	30	30
BAYSIDE EAST	86	86	67	67
BAYSIDE E. OVERFLOW	/	/	26	0
BAYSIDE ANCHOR	0	46	0	0

TOTAL	155	201	183	157
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Cars / Units			1.18	0.78
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* Does not include on street parking

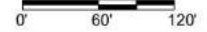


BAYSIDE ANCHOR

PHA PARKING COUNT

OSFORD STREET, PORTLAND MAINE

DATE: JANUARY 10, 2014 BY: CARROLL ASSOCIATES



CAMPUS PARKING PLAN



NEIGHBORHOOD VIEW

UNIT MIX: GROUND FLOOR

Zone Category	Quantity
1 BR	4
EFFICIENCY	2
	6

UNIT MIX: TOTAL

Zone Category	Quantity
1 BR	34
2 BR	6
EFFICIENCY	5
	45

UNIT MIX: TOTAL BUILDING

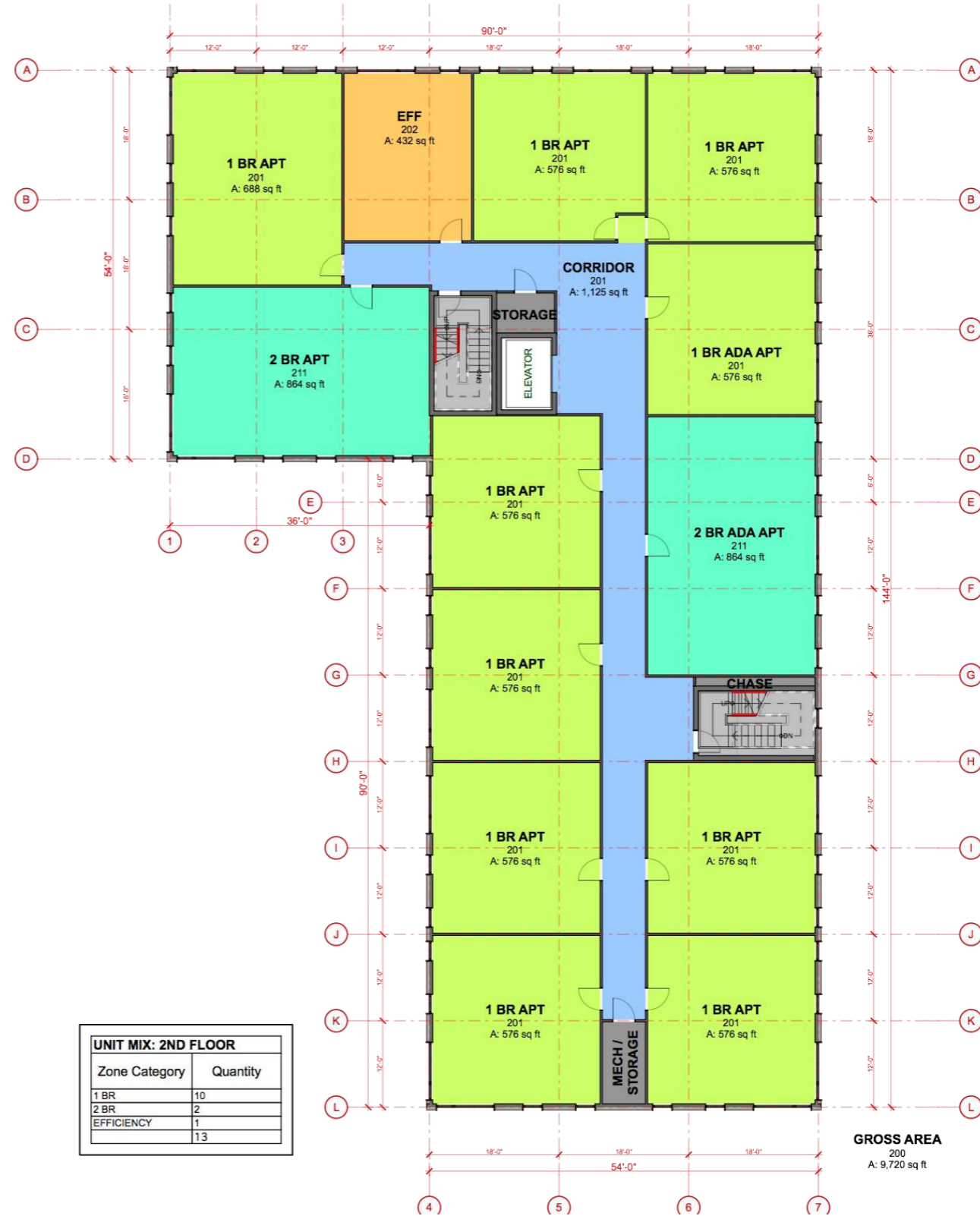
Floor (Story)	Zone Category	Quantity
1st FLOOR	1 BR	4
1st FLOOR	EFFICIENCY	2
2nd FLOOR	1 BR	10
2nd FLOOR	2 BR	2
2nd FLOOR	EFFICIENCY	1
3rd FLOOR	1 BR	10
3rd FLOOR	2 BR	2
3rd FLOOR	EFFICIENCY	1
4th FLOOR	1 BR	10
4th FLOOR	2 BR	2
4th FLOOR	EFFICIENCY	1
		45

GROUND FLOOR PROGRAM

ID	Zone Name	Area	Zone Category
100	GROSS AREA	9,592	GROSS AREA
101	LOBBY	778	CIRCULATION
102	COMMUNITY ROOM	413	COMMUNITY SERVICE FACILITY
103	OFFICE	69	COMMUNITY SERVICE FACILITY
104	LAUNDRY	205	UTILITY
105	TRASH	245	UTILITY
107	MAINT.	49	UTILITY
107	MECH	96	UTILITY
108	BIKE STOR.	283	UTILITY
109	ADA	58	UTILITY
109	ADA	58	UTILITY
111	EFFICIENCY	432	EFFICIENCY
111	EFFICIENCY ADA	432	EFFICIENCY
112	1 BR APT	540	1 BR
112	1 BR APT	576	1 BR
112	1 BR APT	576	1 BR
112	1 BR APT	576	1 BR
121	HEAD START	1,244	COMMUNITY SERVICE FACILITY
122	PHA NEIGHBORHOOD SERVICE HUB	1,242	COMMUNITY SERVICE FACILITY
123	COMMUNITY POLICE	260	COMMUNITY SERVICE FACILITY

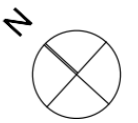


GROUND FLOOR PLAN



UNIT MIX: 2ND FLOOR	
Zone Category	Quantity
1 BR	10
2 BR	2
EFFICIENCY	1
	13

GROSS AREA
200
A: 9,720 sq ft



TYPICAL UPPER PLAN

4 STORIES

TYPE VA

1 HOUR UNIT TO UNIT

2 HOUR STAIRS

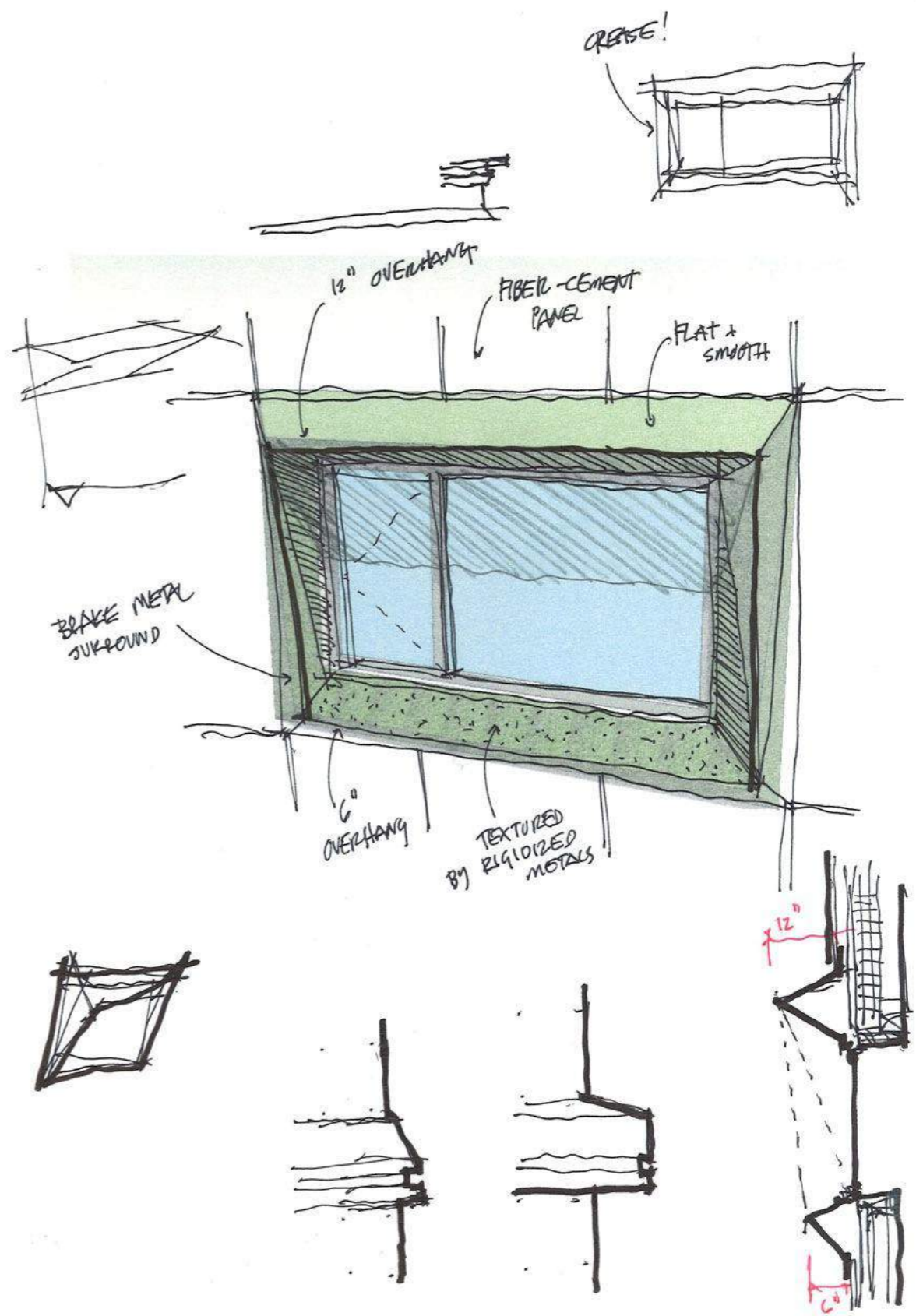




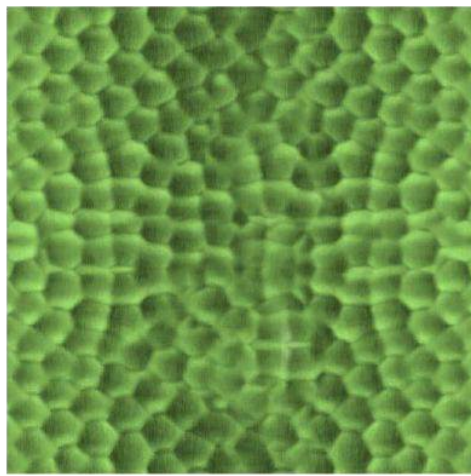
DESIGN THEMES



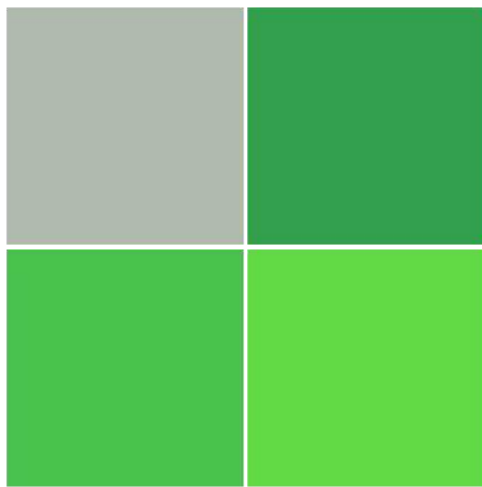
DESIGN THEMES



DESIGN SKETCHES



2 DECORATIVE METAL ACCENT PANELS



3 SMOOTH FIBER-CEMENT PANELS



4 FIBER-CEMENT BASE SIDING PATTERN

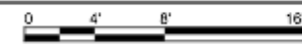


1 SW DETAIL ELEVATION
SCALE 3/8" = 1'-0"

BUILDING ELEVATIONS



1 **SOUTHWEST ELEVATION**
SCALE: 1/8" = 1'-0"



BUILDING ELEVATIONS



50% DOCUMENTS



90% DOCUMENTS



100% DOCUMENTS

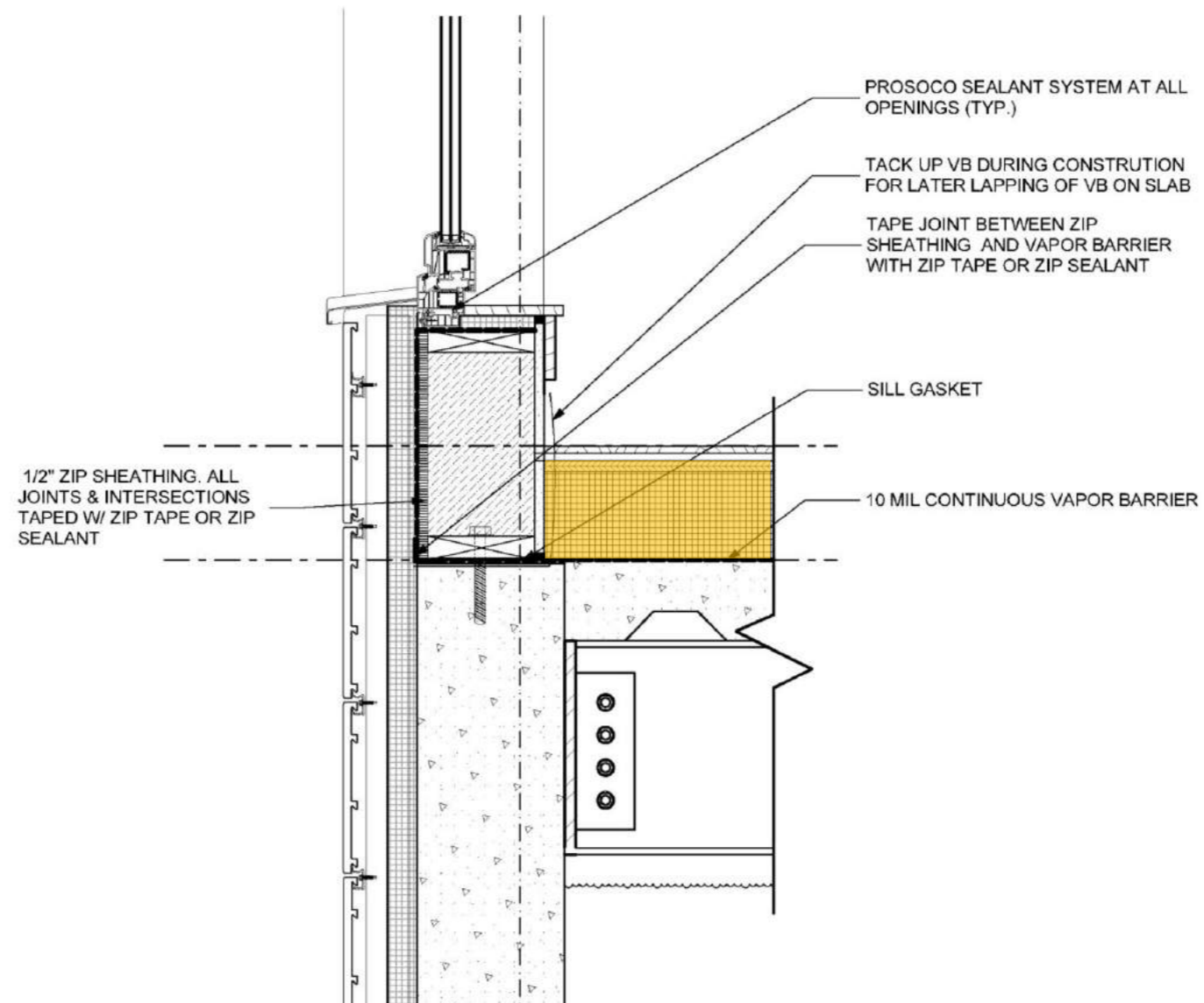


100% DOCUMENTS

INSULATION

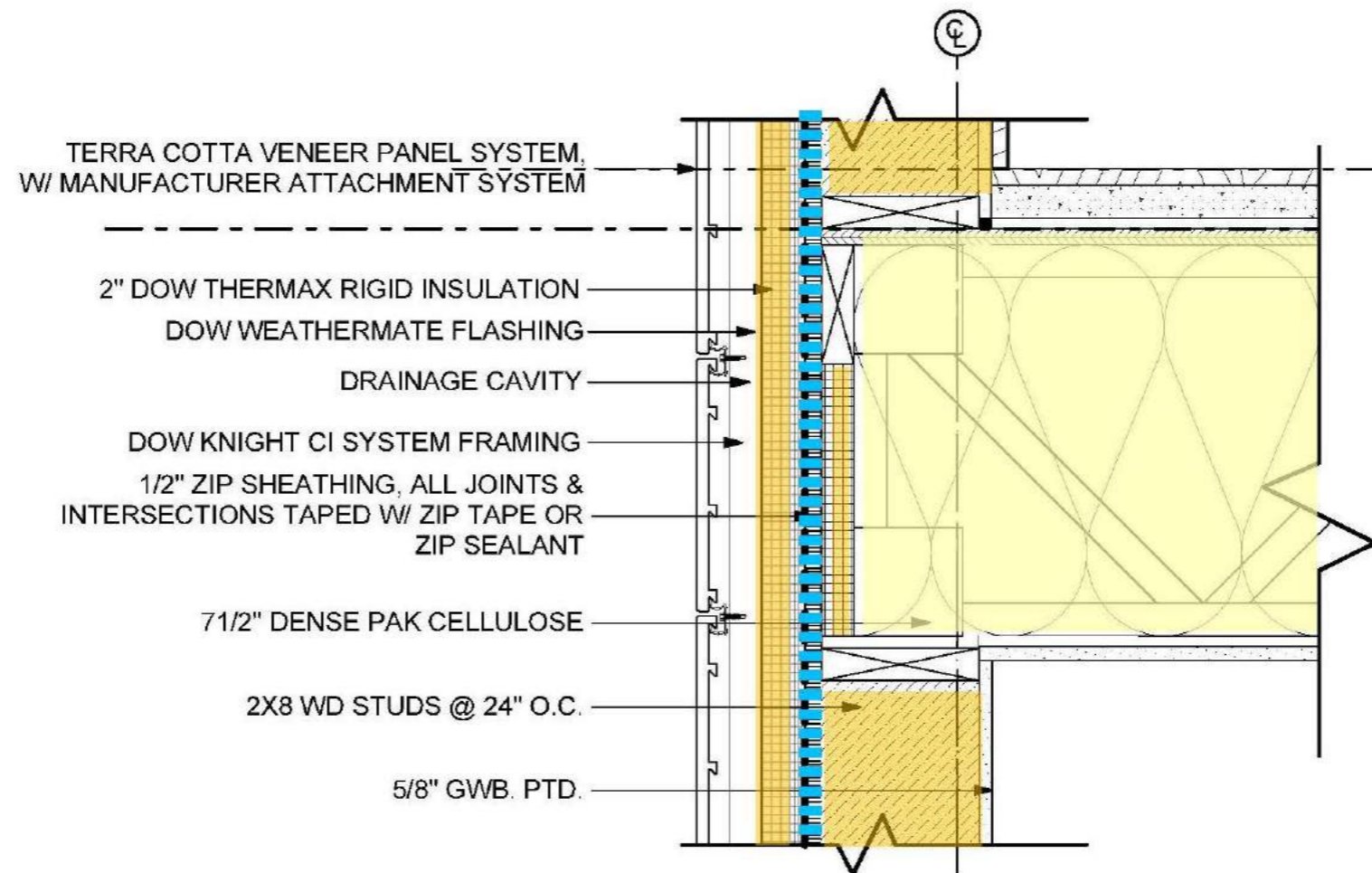
THE
DISTILLERY

SLAB



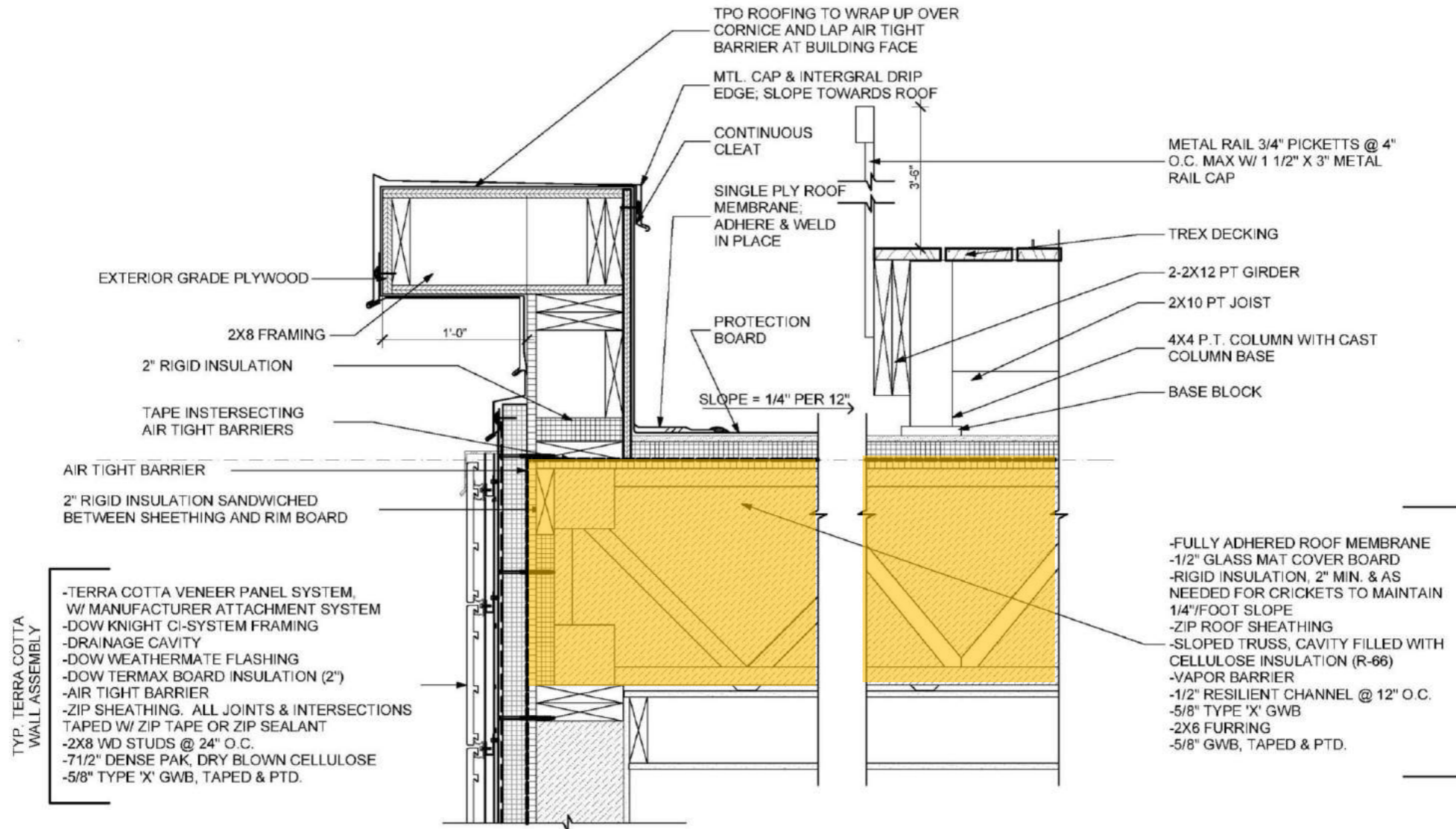
- 6" EPS ABOVE DECK (R-23)

WALLS



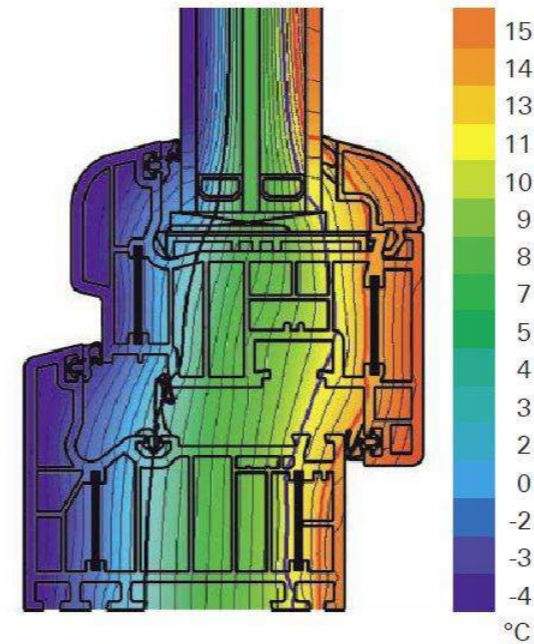
- 3" MINERAL WOOL – CONTINUOUS
- 2X8 CAVITY FILLED WITH CELLULOSE
- R-54
- CELLULOSE IN FIRST 3' OF TRUSS BAY

ROOF



- TRUSS CAVITY FILLED WITH CELLULOSE R-64

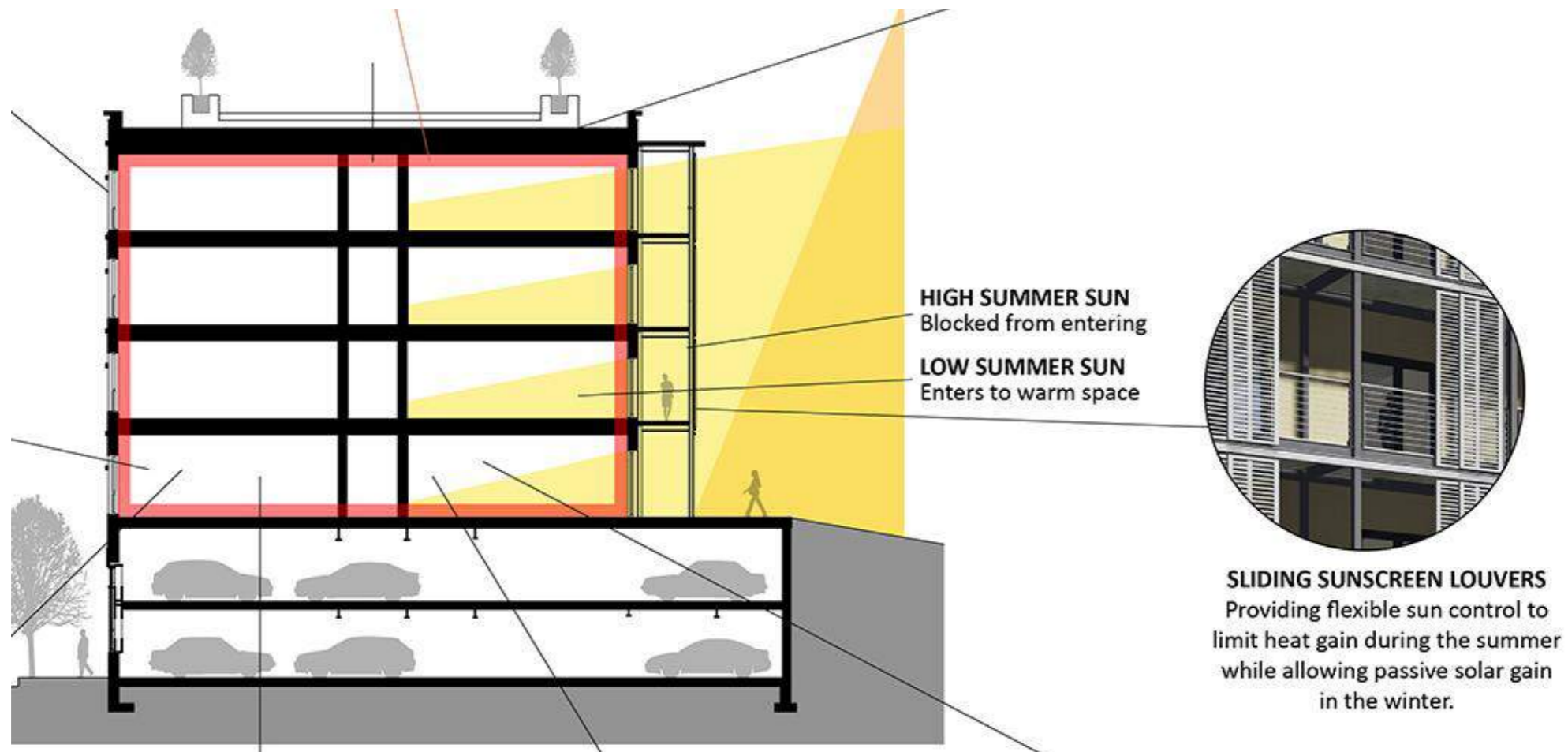
WINDOWS



Isothermal flow in Schüco Corona SI 82+ Rondo

- KLEARWALL PVC (U- 0.134)

SHADING

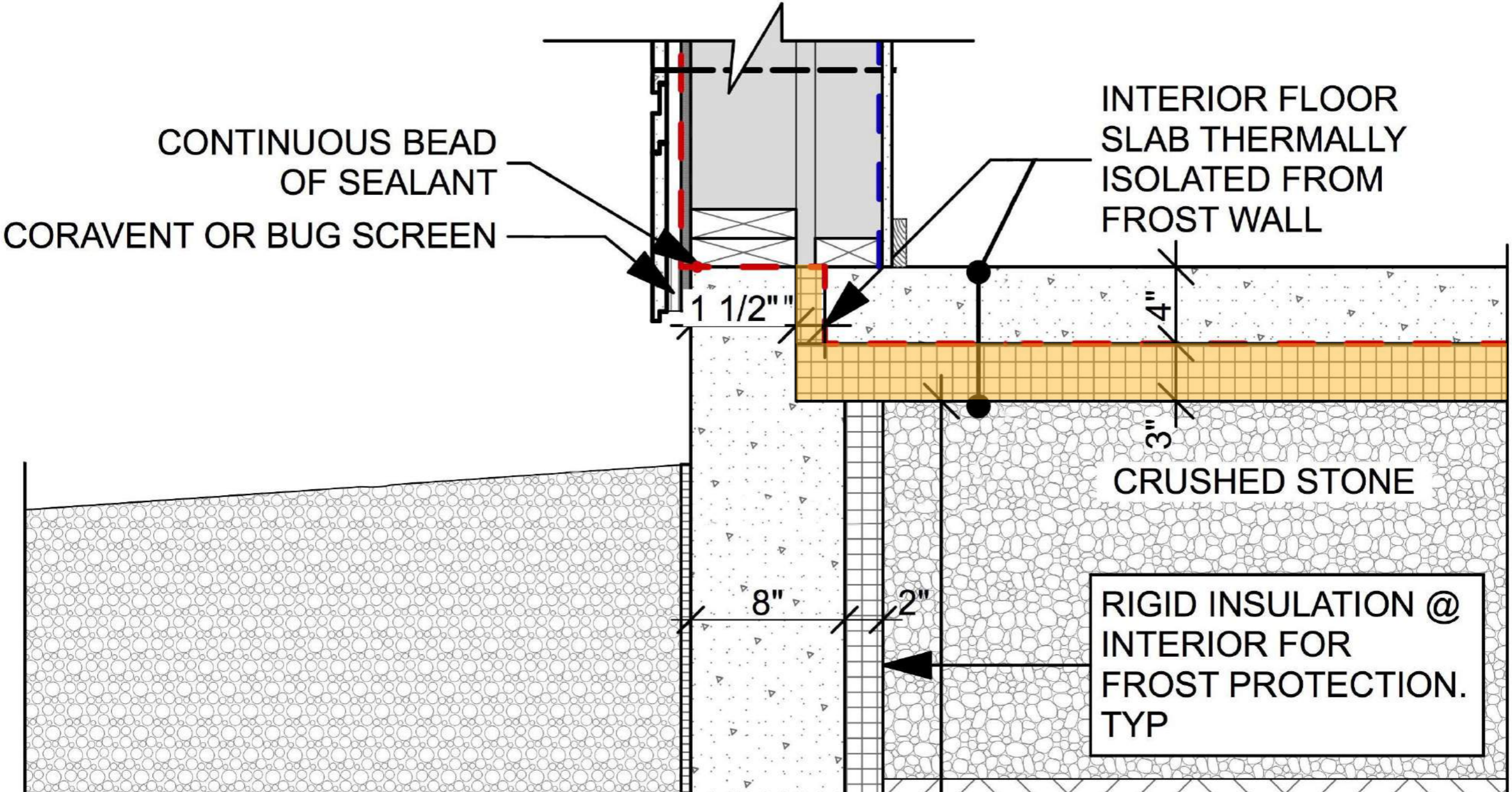


- **MOVEABLE SCREENS ON SOUTH SIDE**

BAYSIDE
ANCHOR

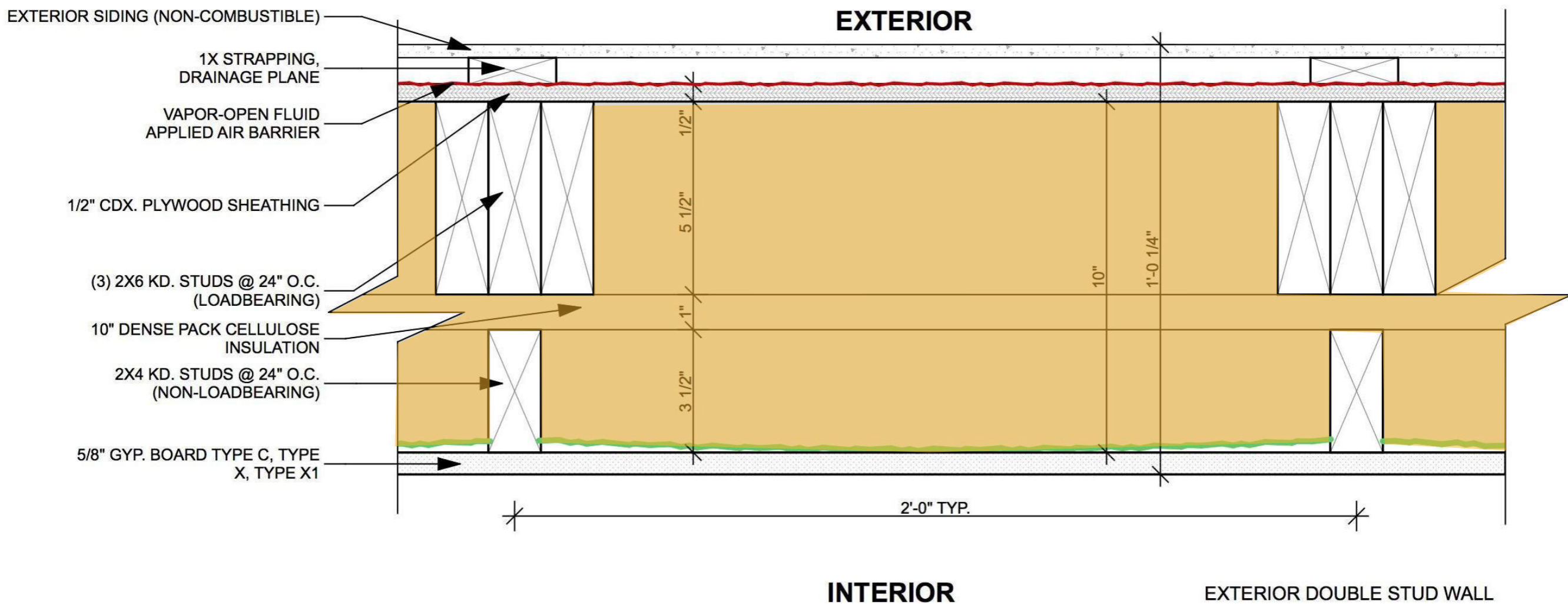
CONCRETE SLAB W 3" EPS

R - 13



10" DOUBLE STUD WALL

R - 32.7

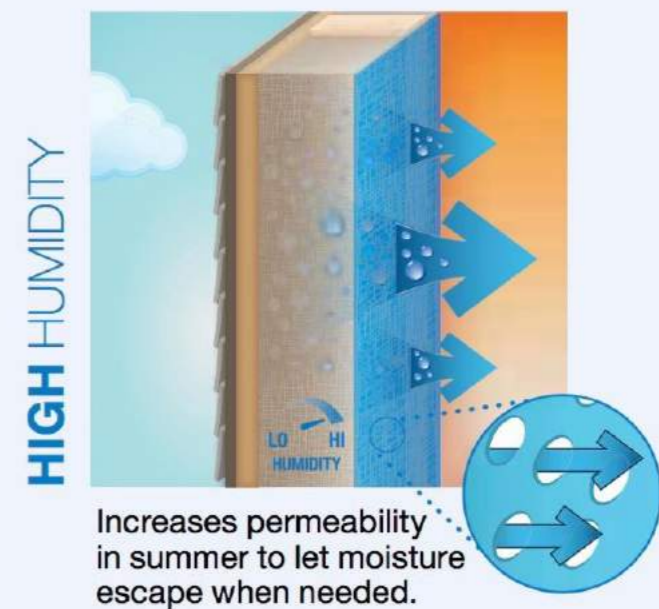


CDX PLYWOOD



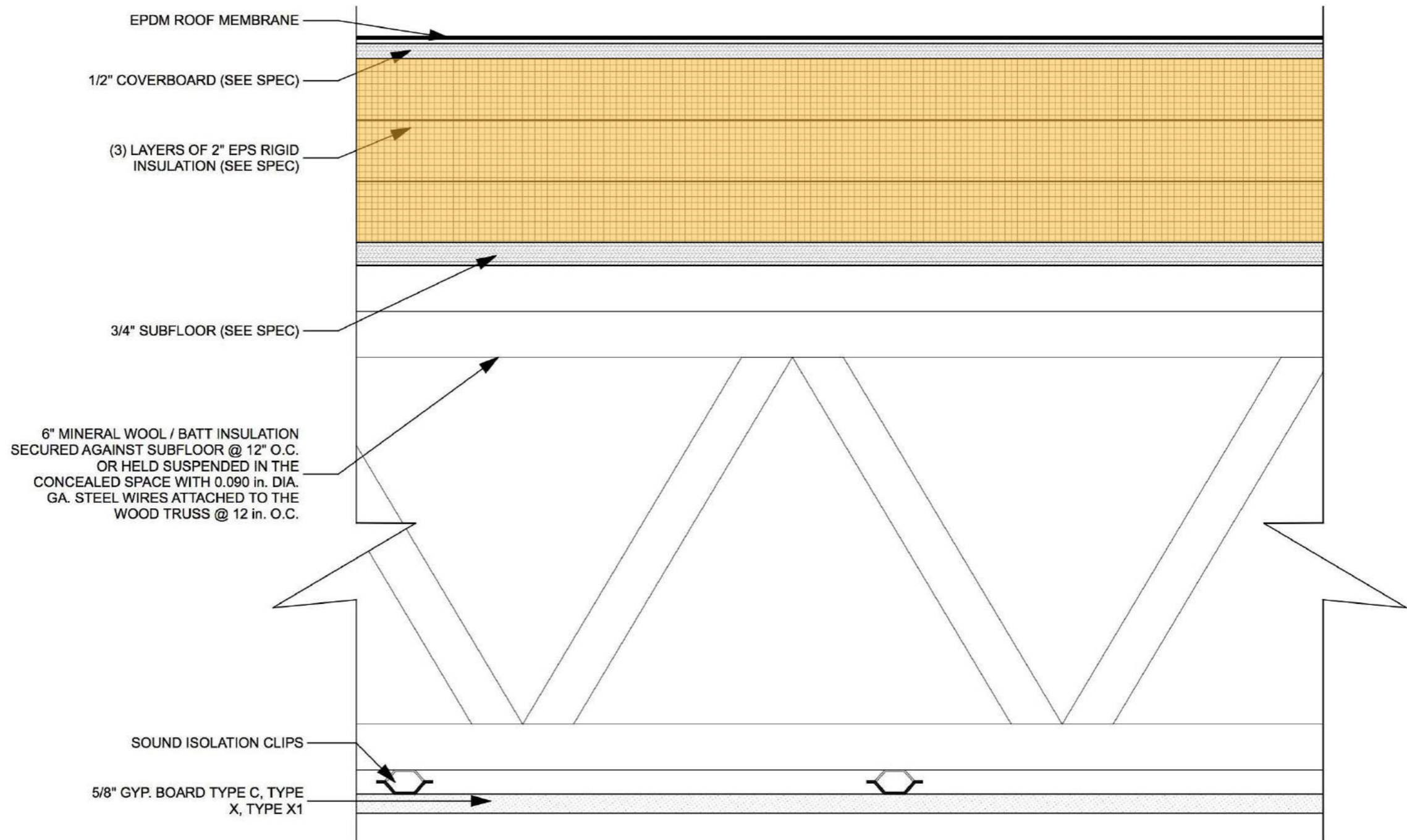
VAPOR RETARDER

MEMBRAIN™
Continuous Air Barrier & Smart Vapor Retarder



8" POLY-ISO OVER TRUSS

R - 50







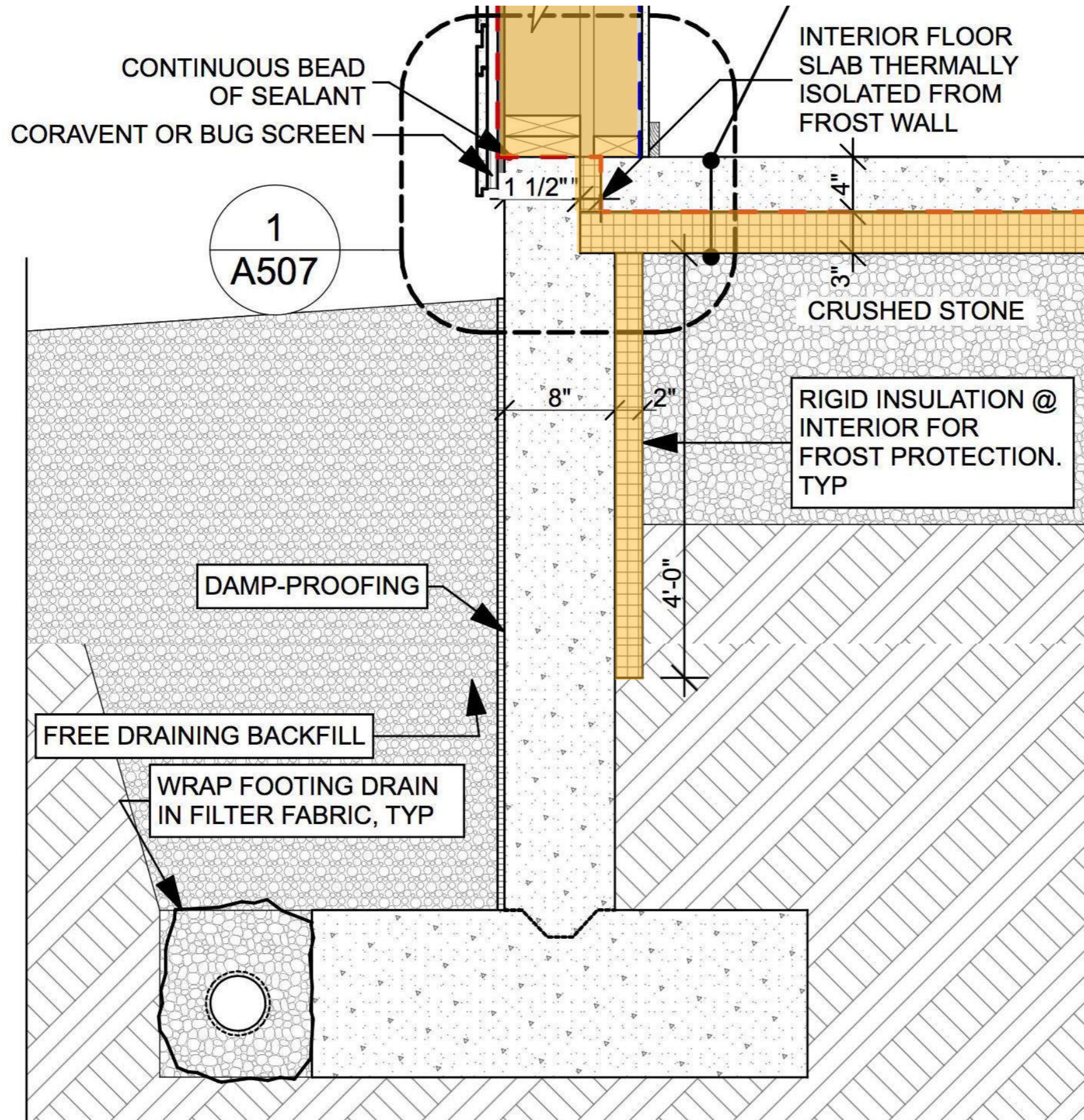
U Frame 0.25

U COG 0.13

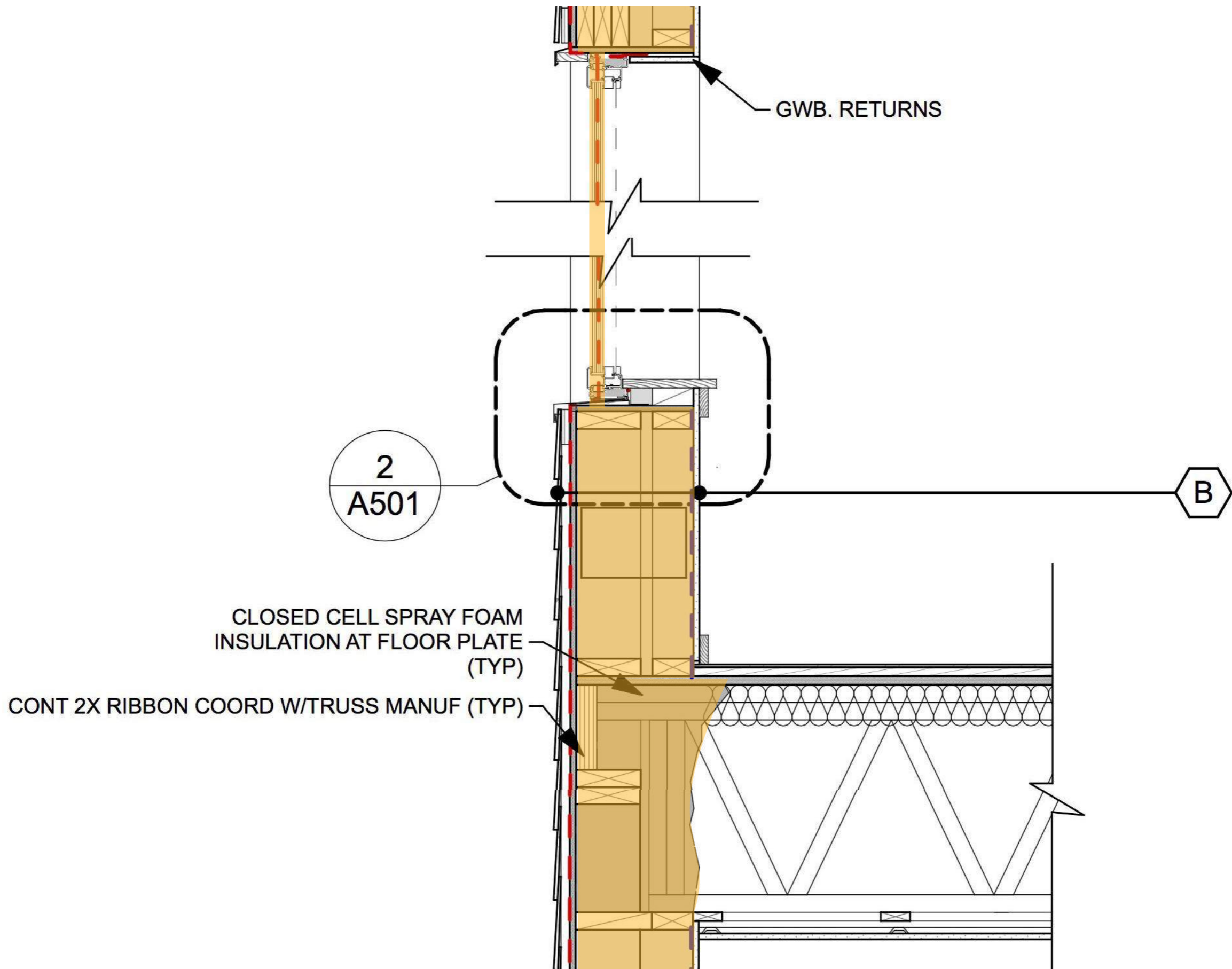
SHGC 45%

**GUARDIAN
Climaguard 8070**

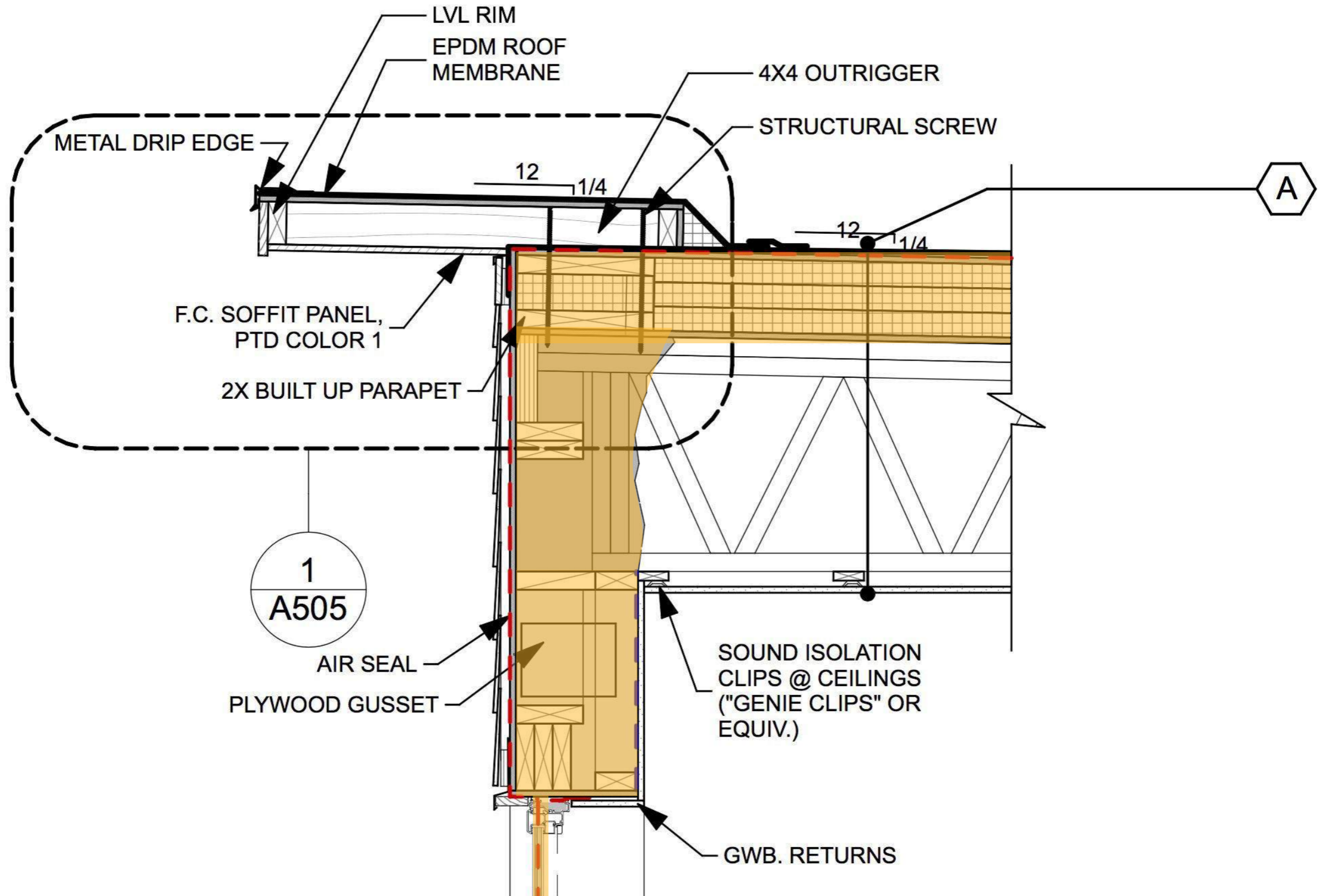
FOUNDATION

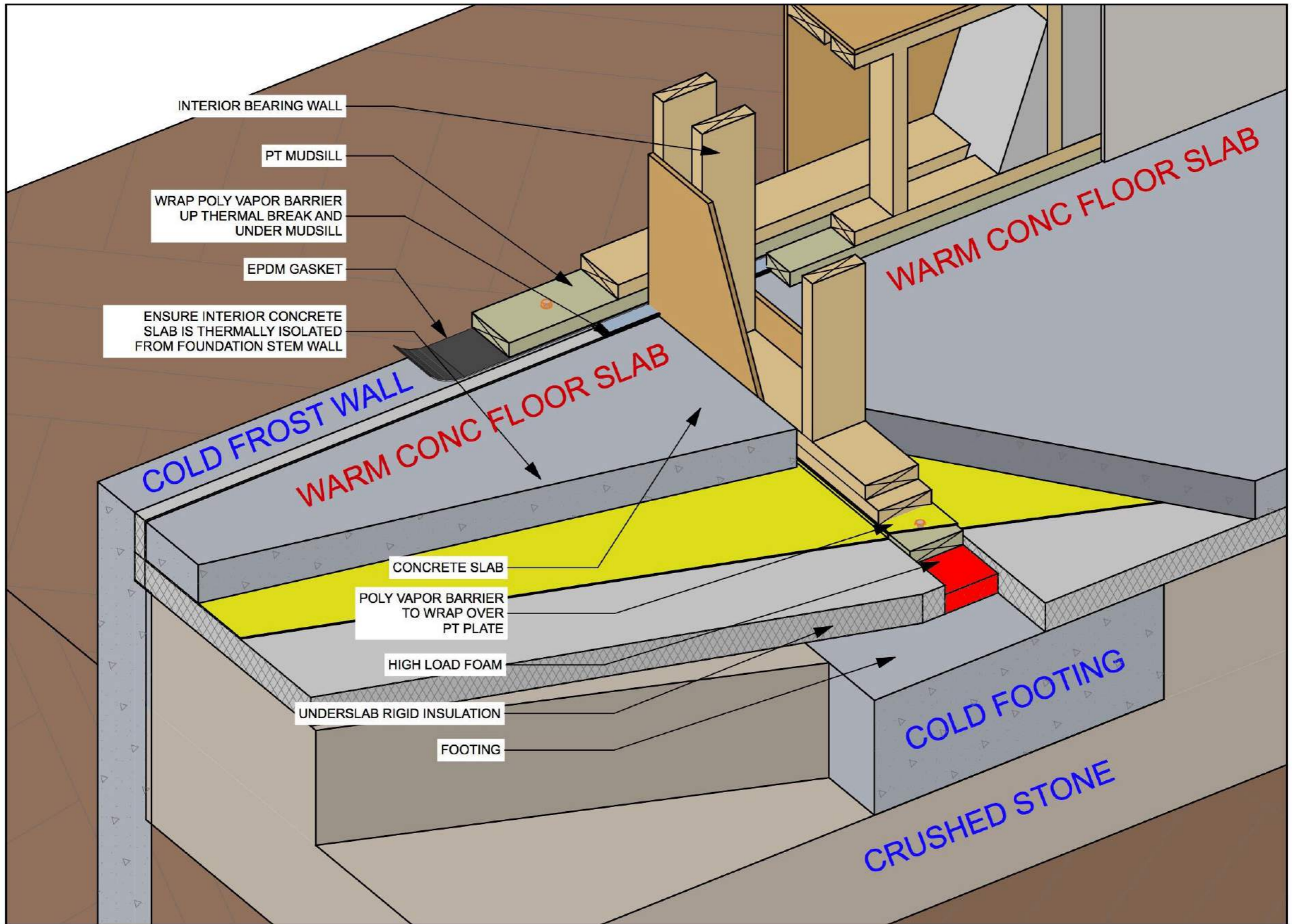


WALL



ROOF

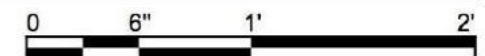


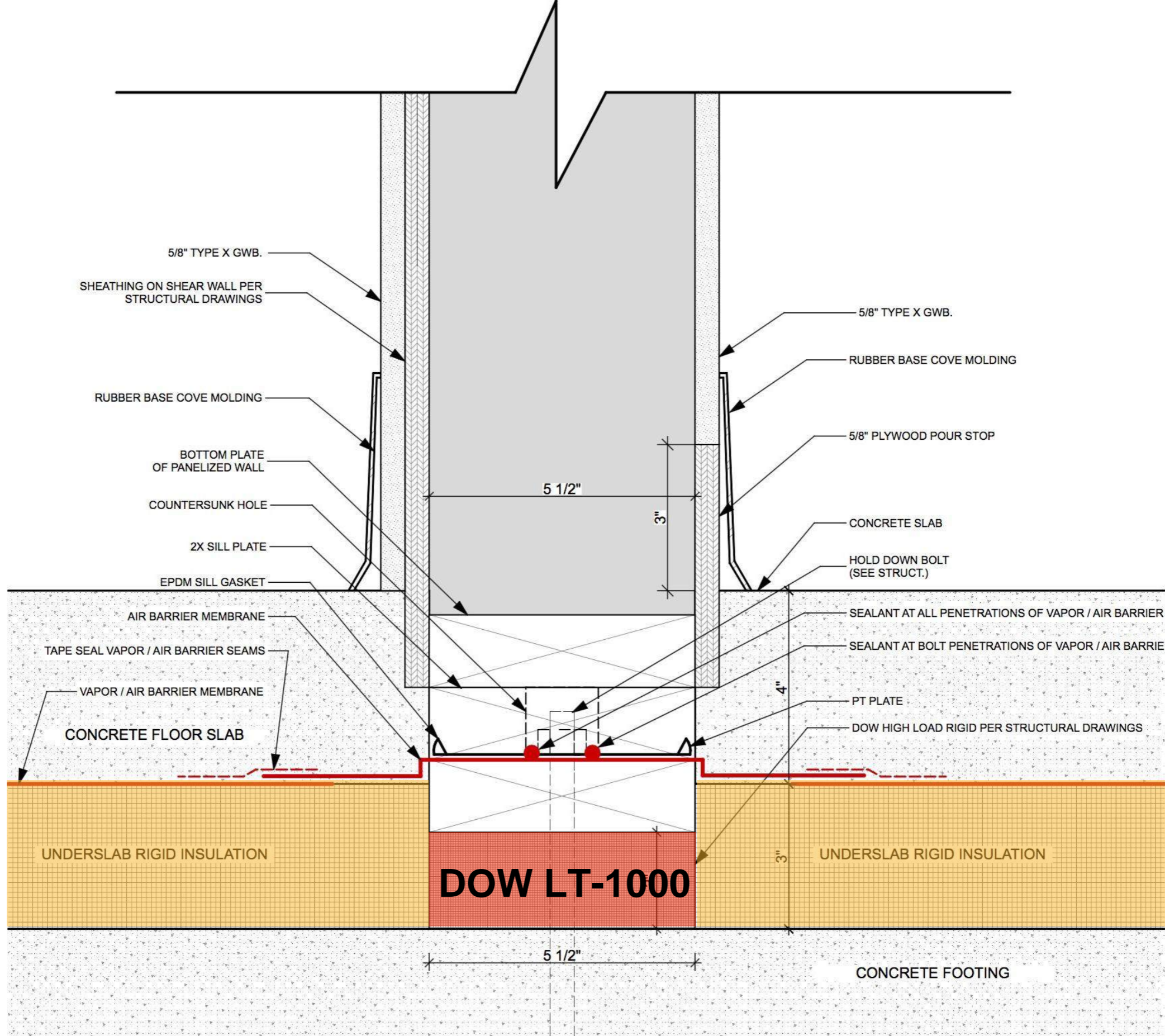


3

FOUNDATION DETAIL - 3D

SCALE: 1" = 1'-0"

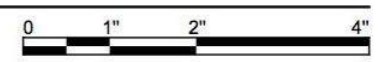




2

INTERIOR FOUNDATION DETAIL

SCALE: 6" = 1'-0"



STYROFOAM™ BRAND LT SERIES COLUMN-BEARING BLOCKS

Supplied cut-to-size, STYROFOAM™ Brand LT Series Column-Bearing Blocks are made of high-density, rigid polyurethane foam designed to support heavy structural loads while providing a thermal break between the building interior and the supporting soils below, reducing thermal bridging through the column and increasing energy efficiency of the building. Blocks are resistant to moisture and will not rot, dissolve or absorb water.



Made of high-density, rigid polyurethane foam designed to support heavy structural loads while providing a thermal break between building interior and supporting soils below to increase the building's energy efficiency.

1,000 PSI

Used In

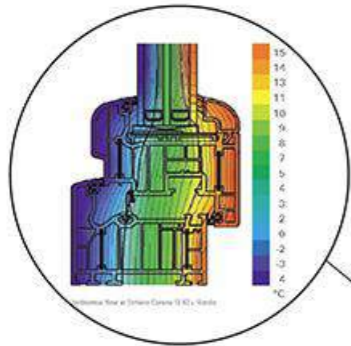
- Columns in commercial buildings

Product Advantages

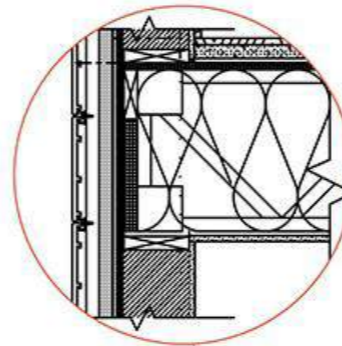
- Contains an average of 20% pre-consumer recycled content certified by UL Environment Inc.
- Reduces thermal bridging through building column and increases energy efficiency;
- Resistant to moisture;
- Will not rot, dissolve or absorb water

AIR BARRIERS

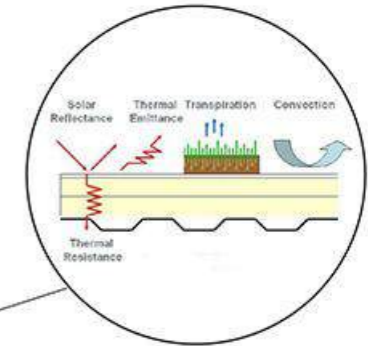
THE DISTILLERY



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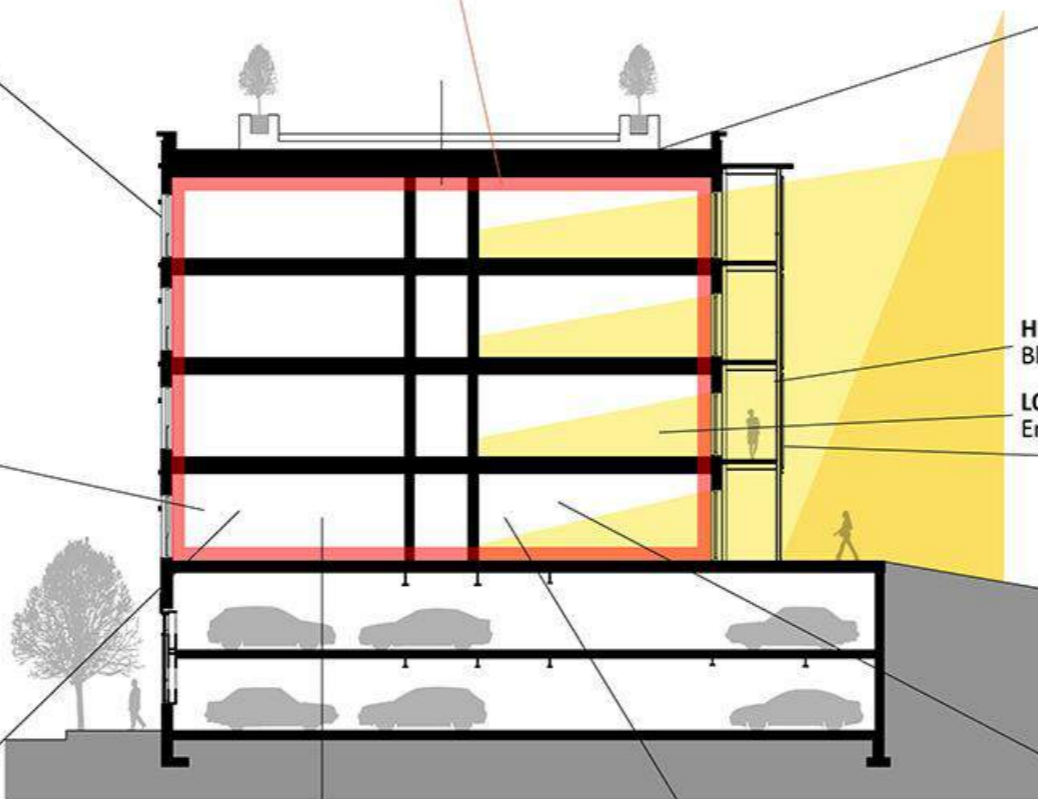
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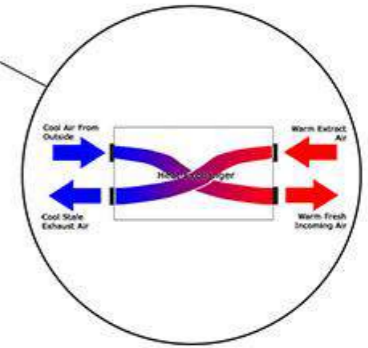
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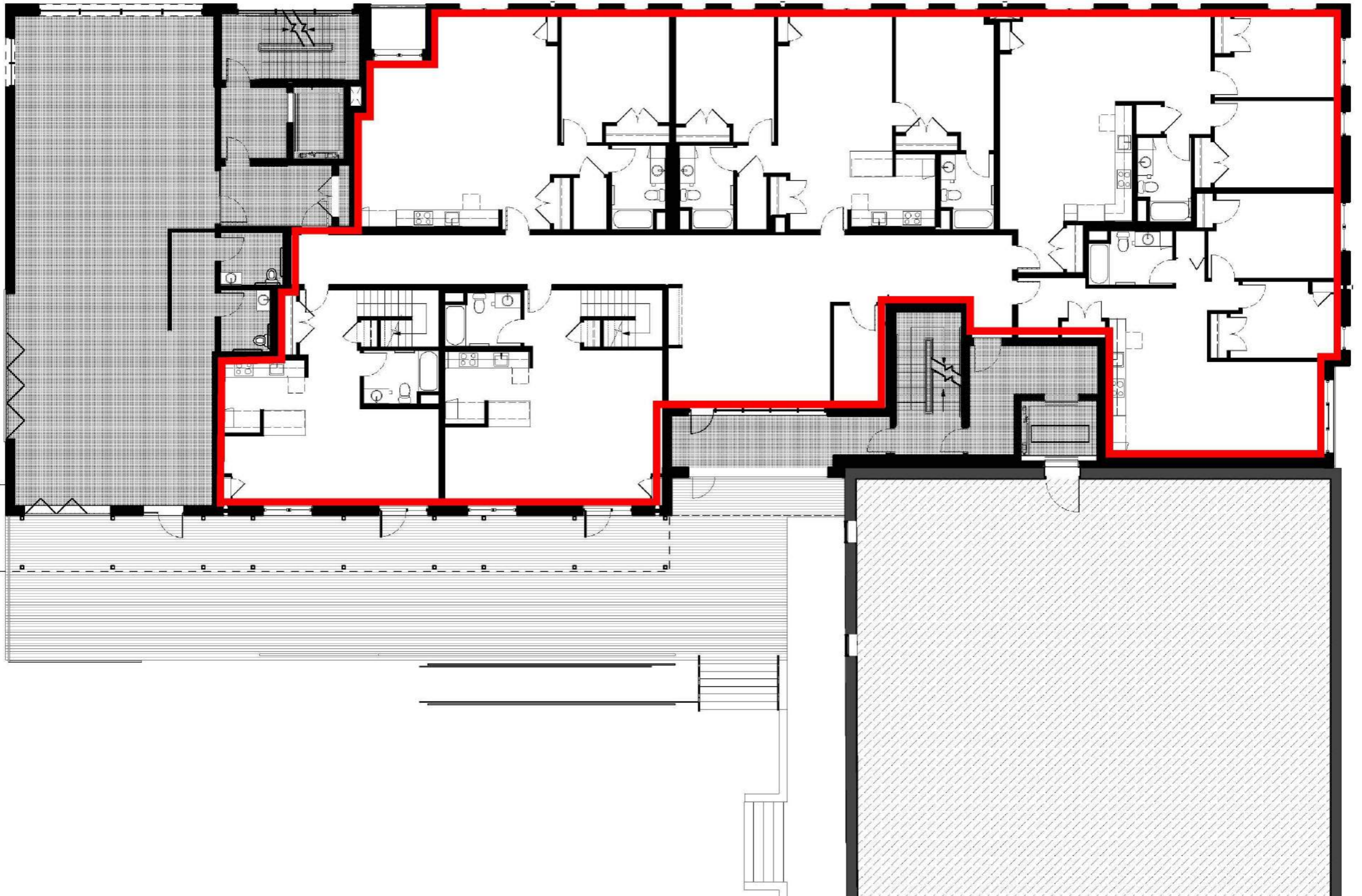
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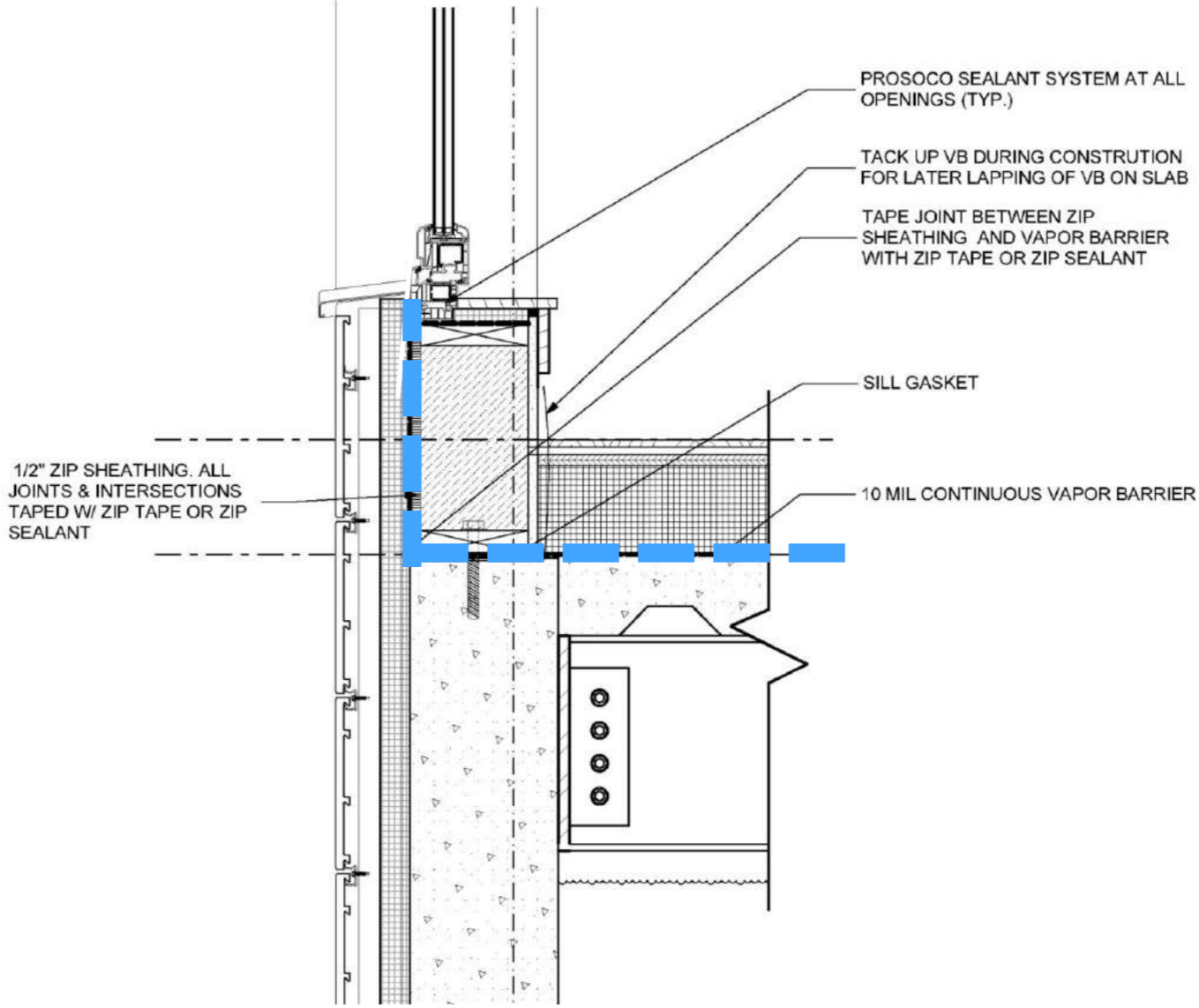


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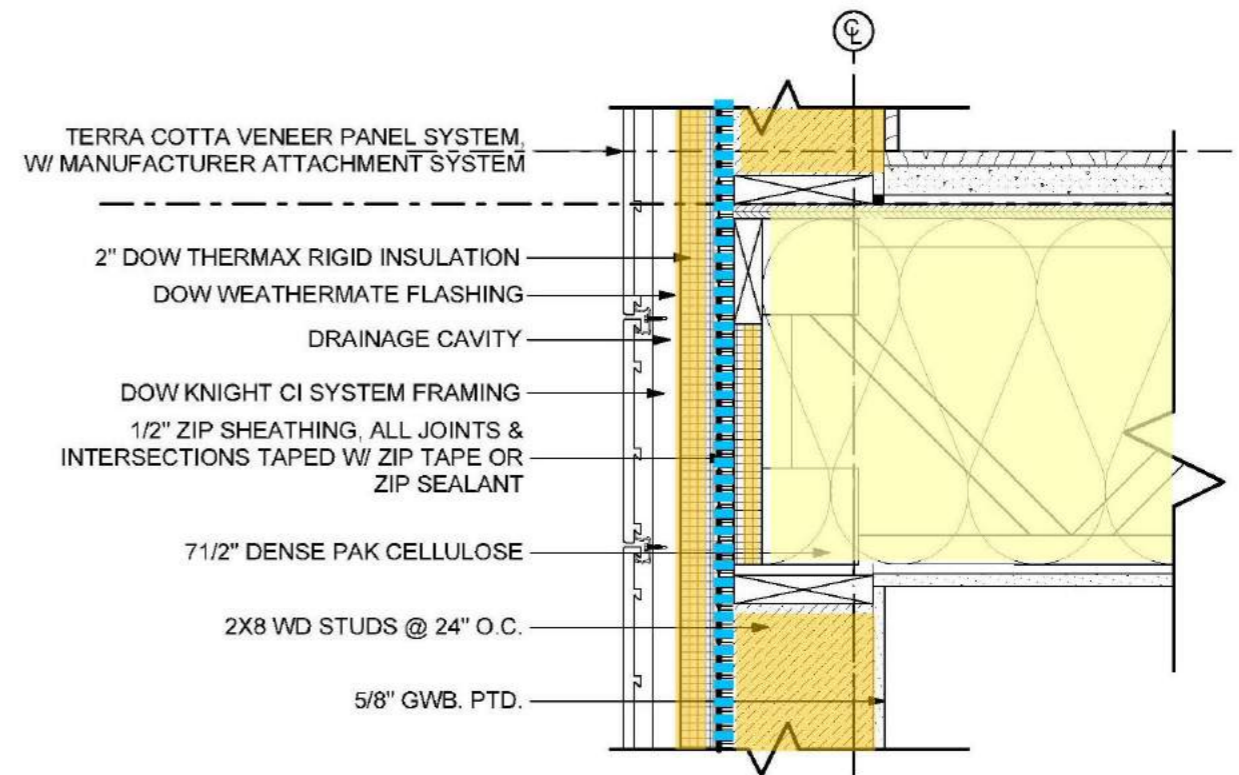
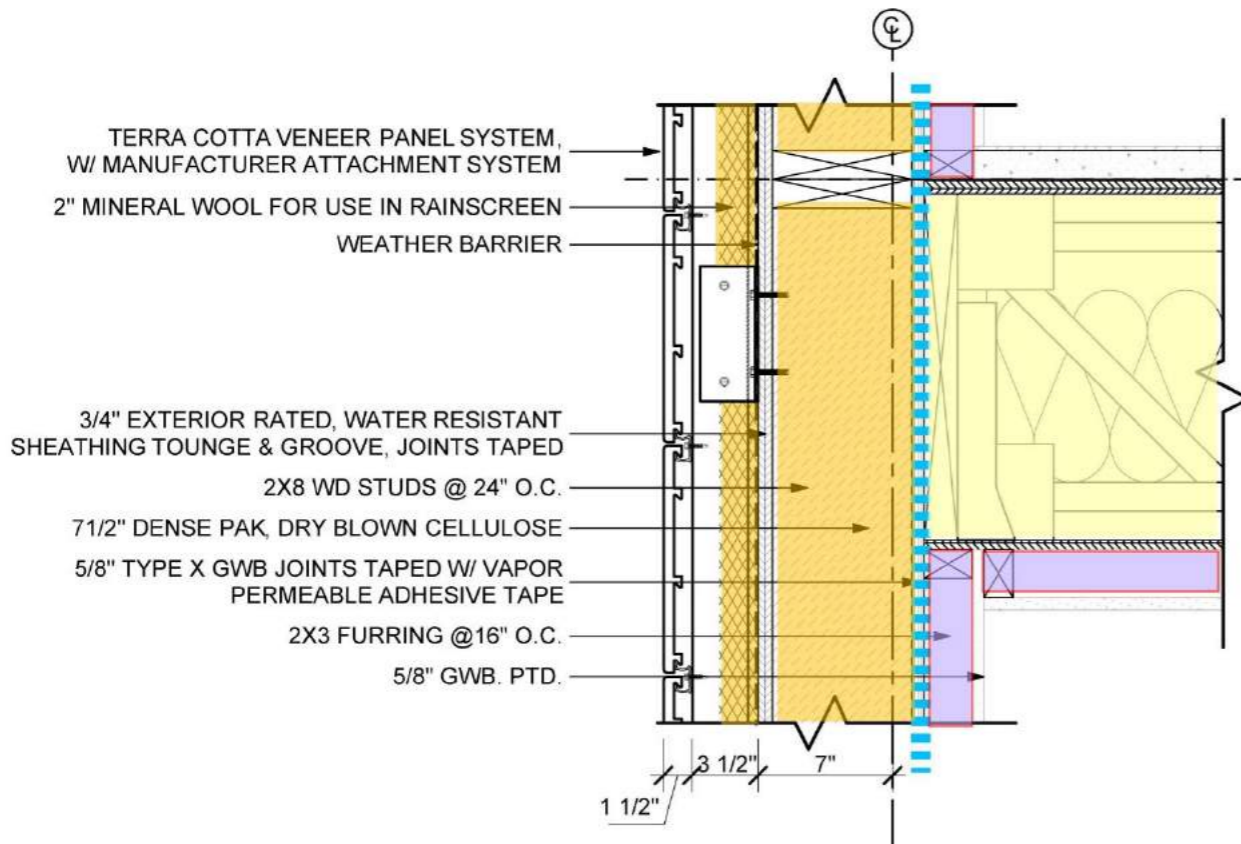




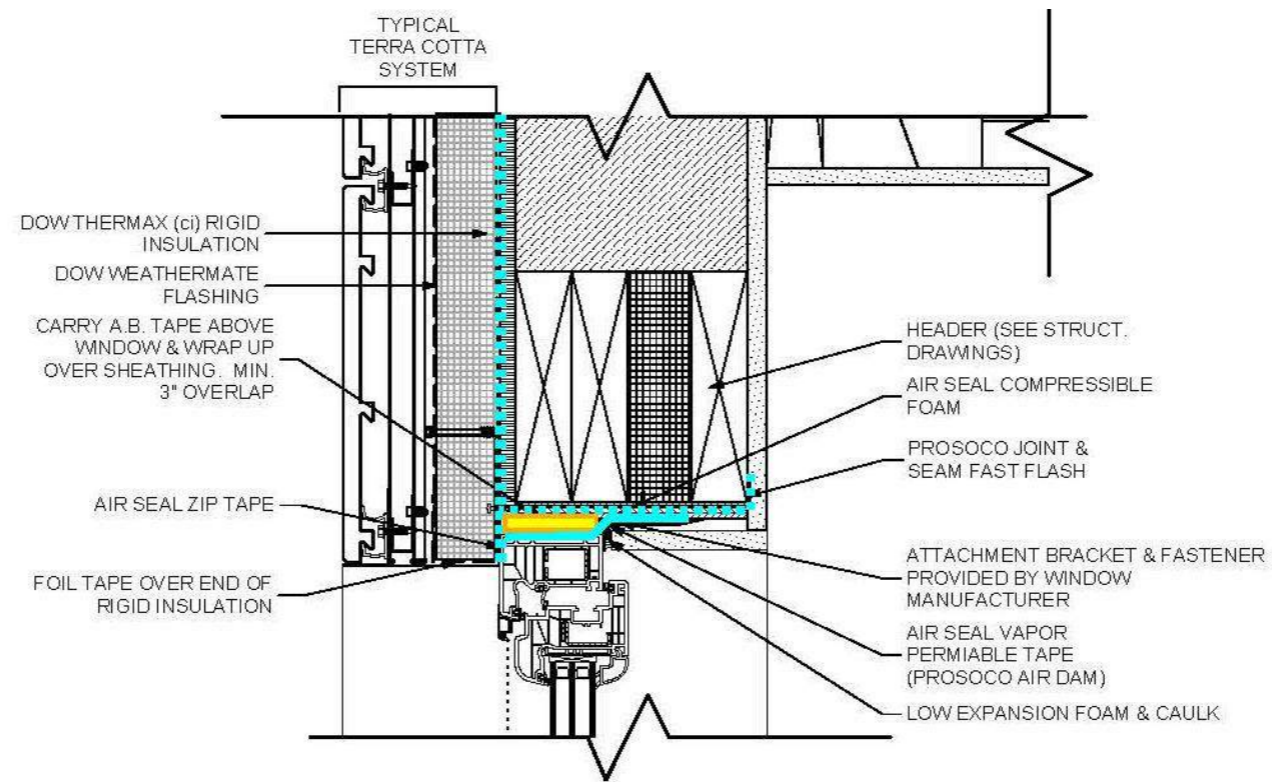
SLAB



SECTION EVOLUTION

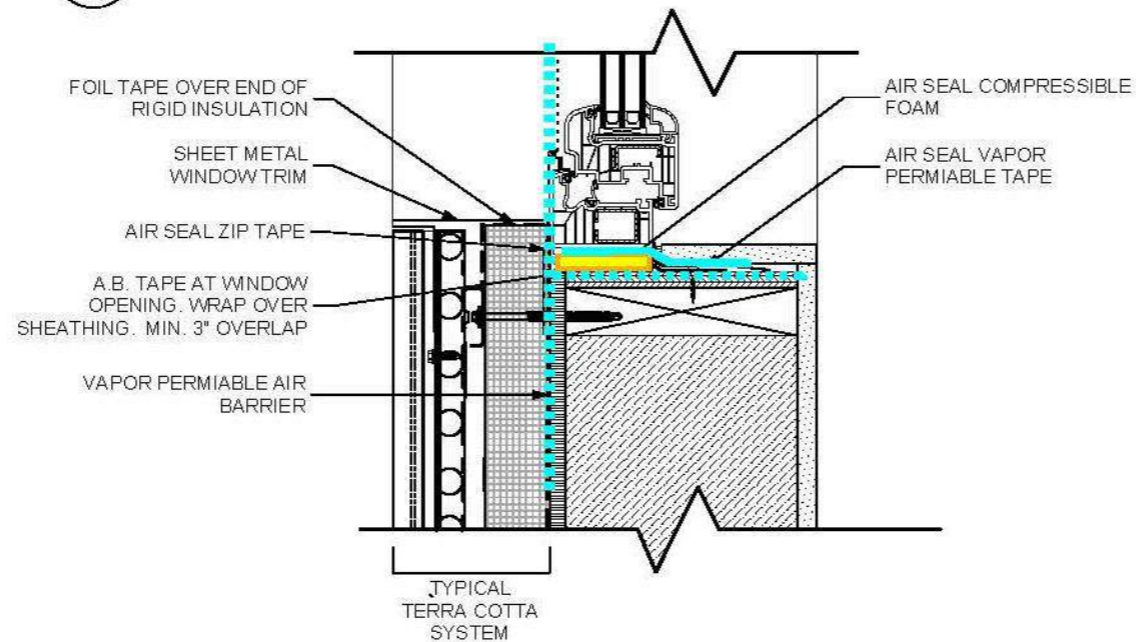


WINDOWS



3 TYP. HEAD @ TERRA COTTA

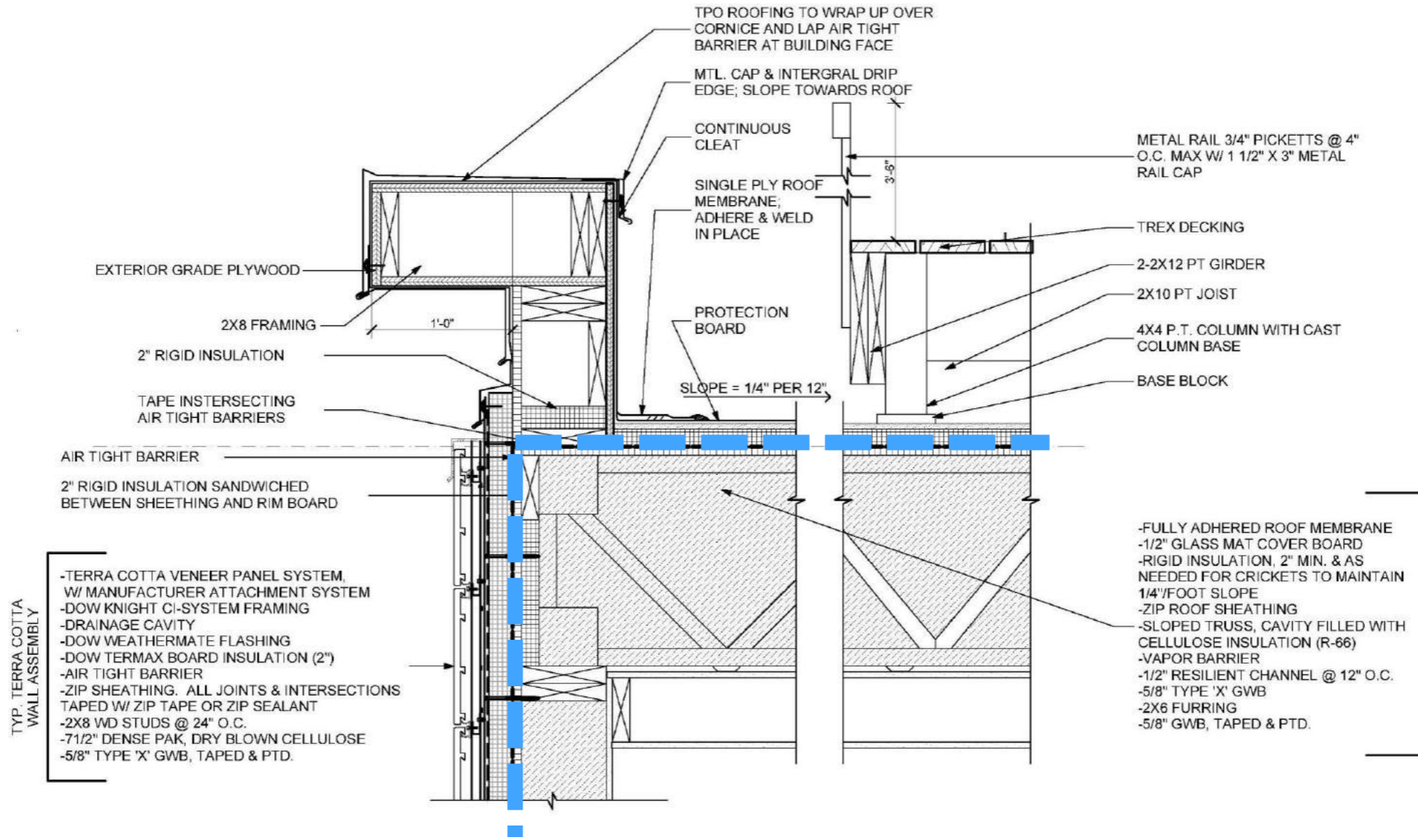
SCALE: 3" = 1'-0"



2 TYP JAMB @ TERRA COTTA

SCALE: 3" = 1'-0"

CORNICE










- TYP. TERRA COTTA WALL ASSEMBLY
- TERRA COTTA VENEER PANEL SYSTEM, W/ MANUFACTURER ATTACHMENT SYSTEM
 - DOW KNIGHT CI-SYSTEM FRAMING
 - DRAINAGE CAVITY
 - DOW WEATHERMATE FLASHING
 - DOW TERMAX BOARD INSULATION (2")
 - AIR TIGHT BARRIER
 - ZIP SHEATHING. ALL JOINTS & INTERSECTIONS TAPED W/ ZIP TAPE OR ZIP SEALANT
 - 2X8 WD STUDS @ 24" O.C.
 - 7 1/2" DENSE PAK, DRY BLOWN CELLULOSE
 - 5/8" TYPE 'X' GWB, TAPED & PTD.

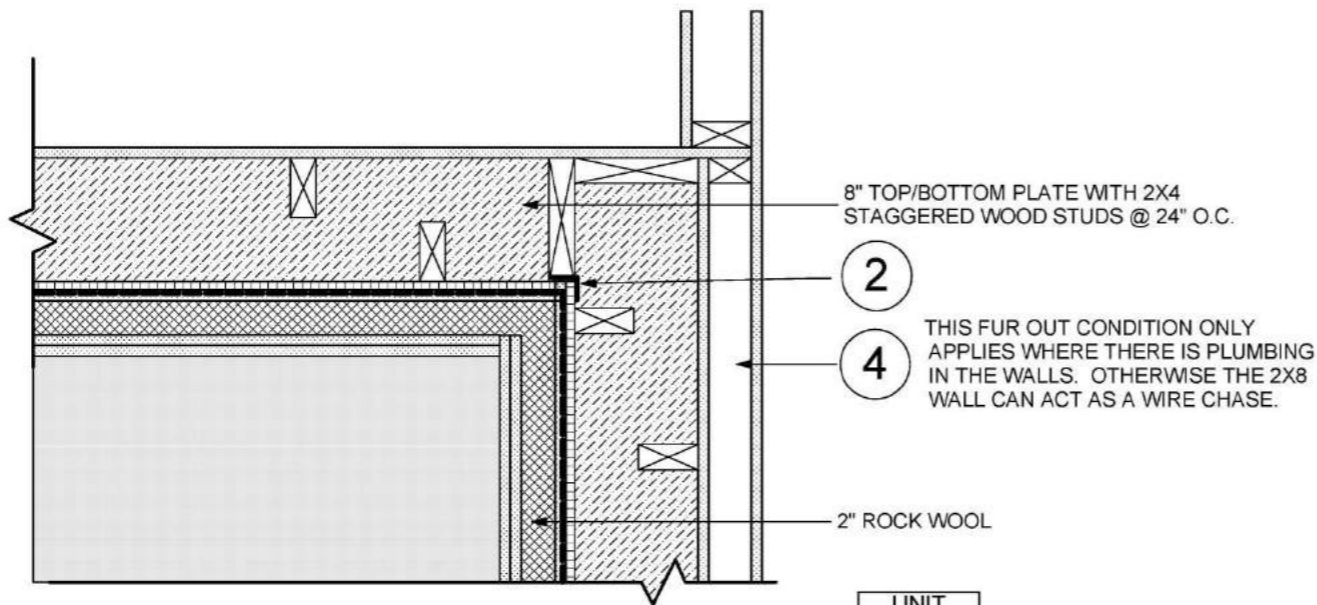
- FULLY ADHERED ROOF MEMBRANE
- 1/2" GLASS MAT COVER BOARD
- RIGID INSULATION, 2" MIN. & AS NEEDED FOR CRICKETS TO MAINTAIN 1/4"/FOOT SLOPE
- ZIP ROOF SHEATHING
- SLOPED TRUSS, CAVITY FILLED WITH CELLULOSE INSULATION (R-66)
- VAPOR BARRIER
- 1/2" RESILIENT CHANNEL @ 12" O.C.
- 5/8" TYPE 'X' GWB
- 2X6 FURRING
- 5/8" GWB, TAPED & PTD.

TESTING

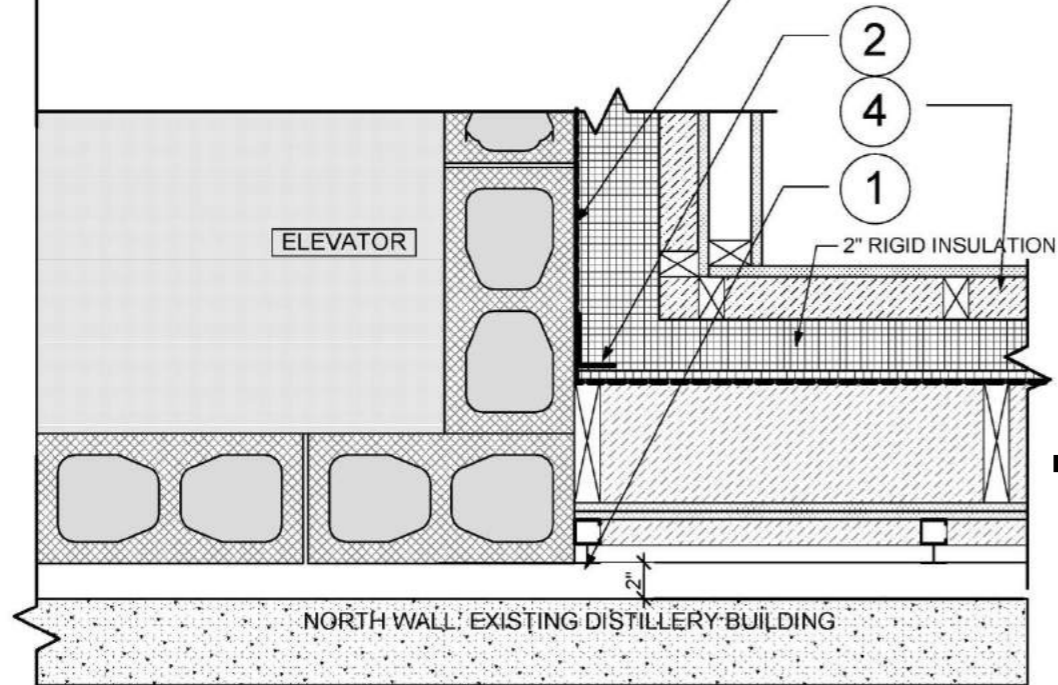
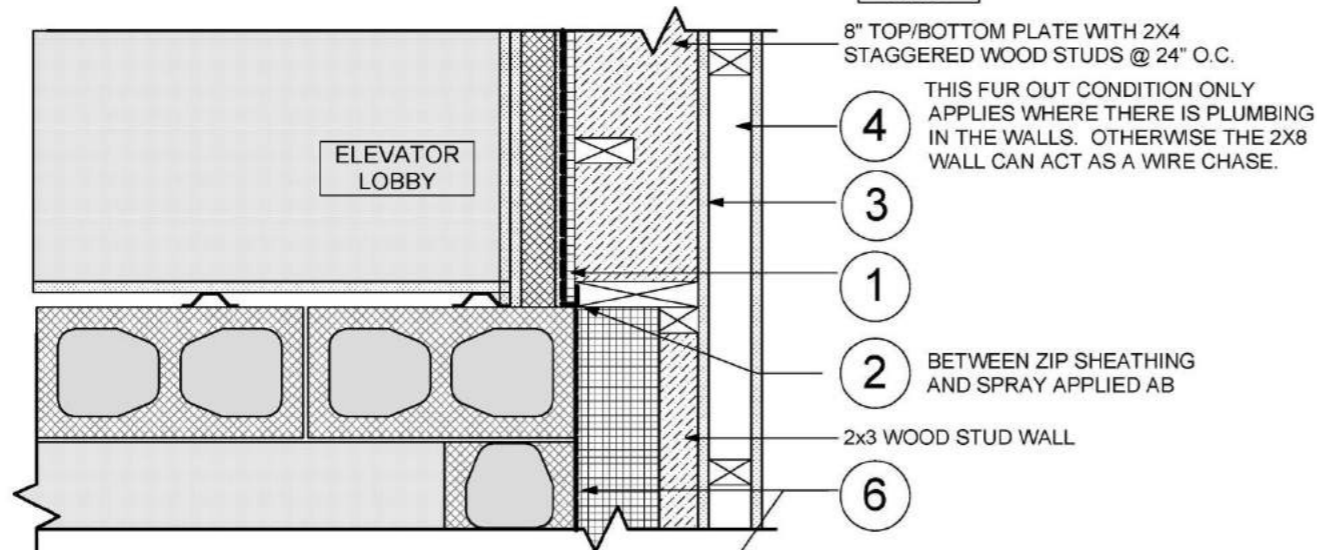


LEGEND

-  DENOTES LOCATION OF CONTINUOUS AIR TIGHT BARRIER
-  1/2" ZIP SHEATHING. ALL JOINTS & INTERSECTIONS TAPED W/ ZIP TAPE OR ZIP SEALANT.
-  TAPE JOINT WITH ZIP TAPE OR ZIP SEALANT
-  5/8" TYPE X GWB., TAPED & PAINTED
-  2X3 FURRING AT 16" O.C.
-  10 MIL CONTINUOUS VAPOR BARRIER
-  LIQUID APPLIED AIR BARRIER

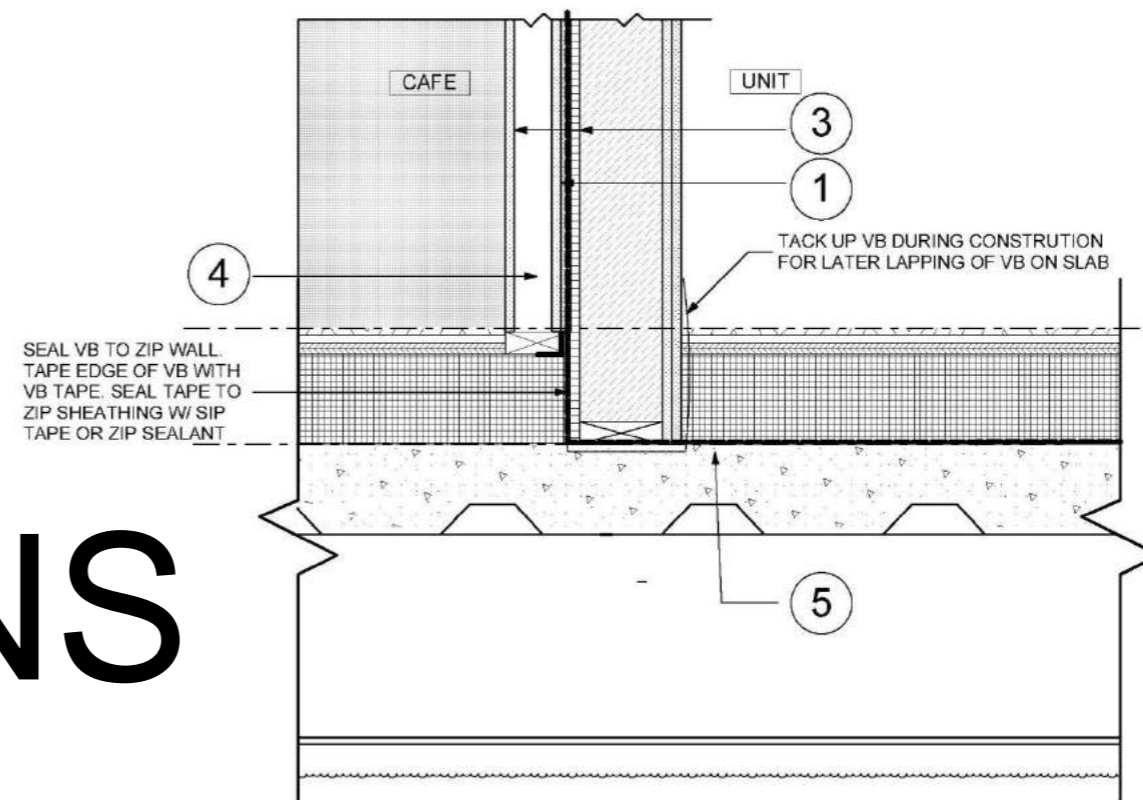
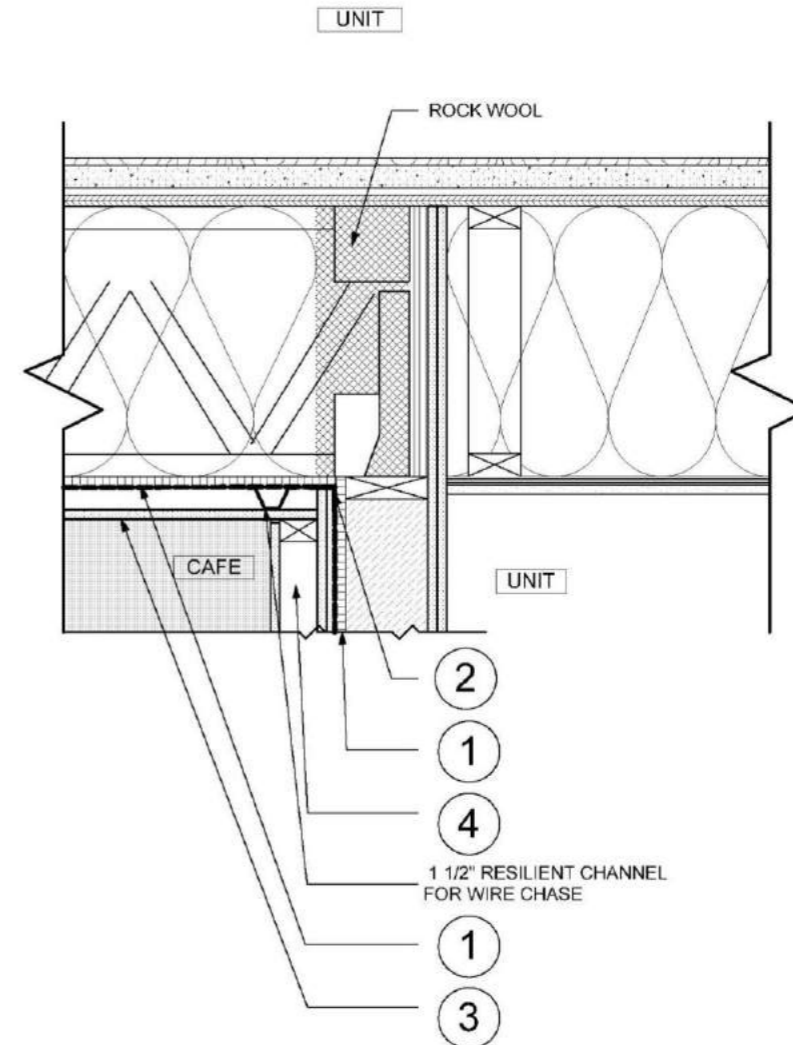
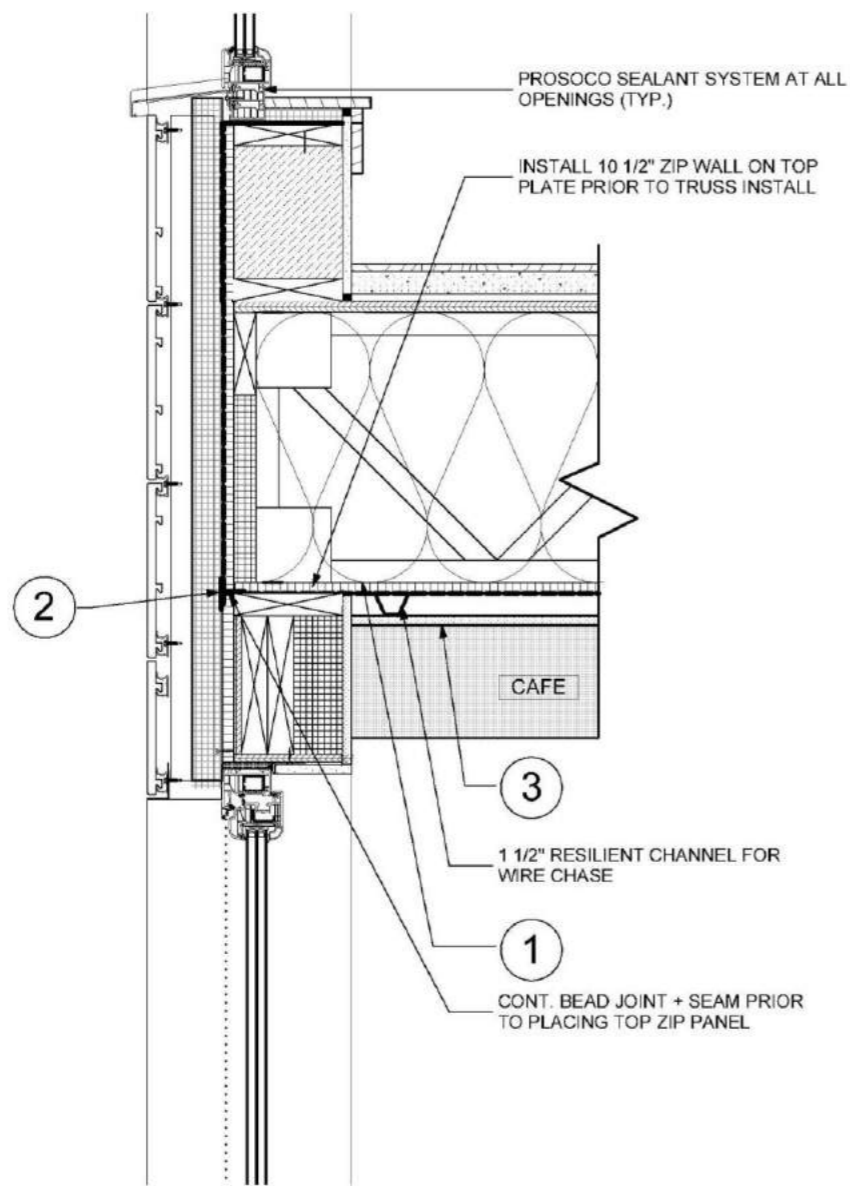


UNIT



TRANSITIONS





TRANSITIONS



KNAACK

ROOF
Keep

EAST COAST

KNAACK

STORAGE MASTER CHEST

ZIPsystem
30 YEAR SYSTEM
LIMITED WARRANTY
FROM THE CREATORS OF
AdvanTech Flooring

ZIPsystem

ZIPsystem

ZIPsystem

ZIPsystem

ZIPsystem

ZIPsystem
FLASHING TAPE

ZIPsystem
FLASHING TAPE

ZIPsystem
FLASHING TAPE

ZIPsystem
FLASHING TAPE

ZIPsystem
FLASHING TAPE

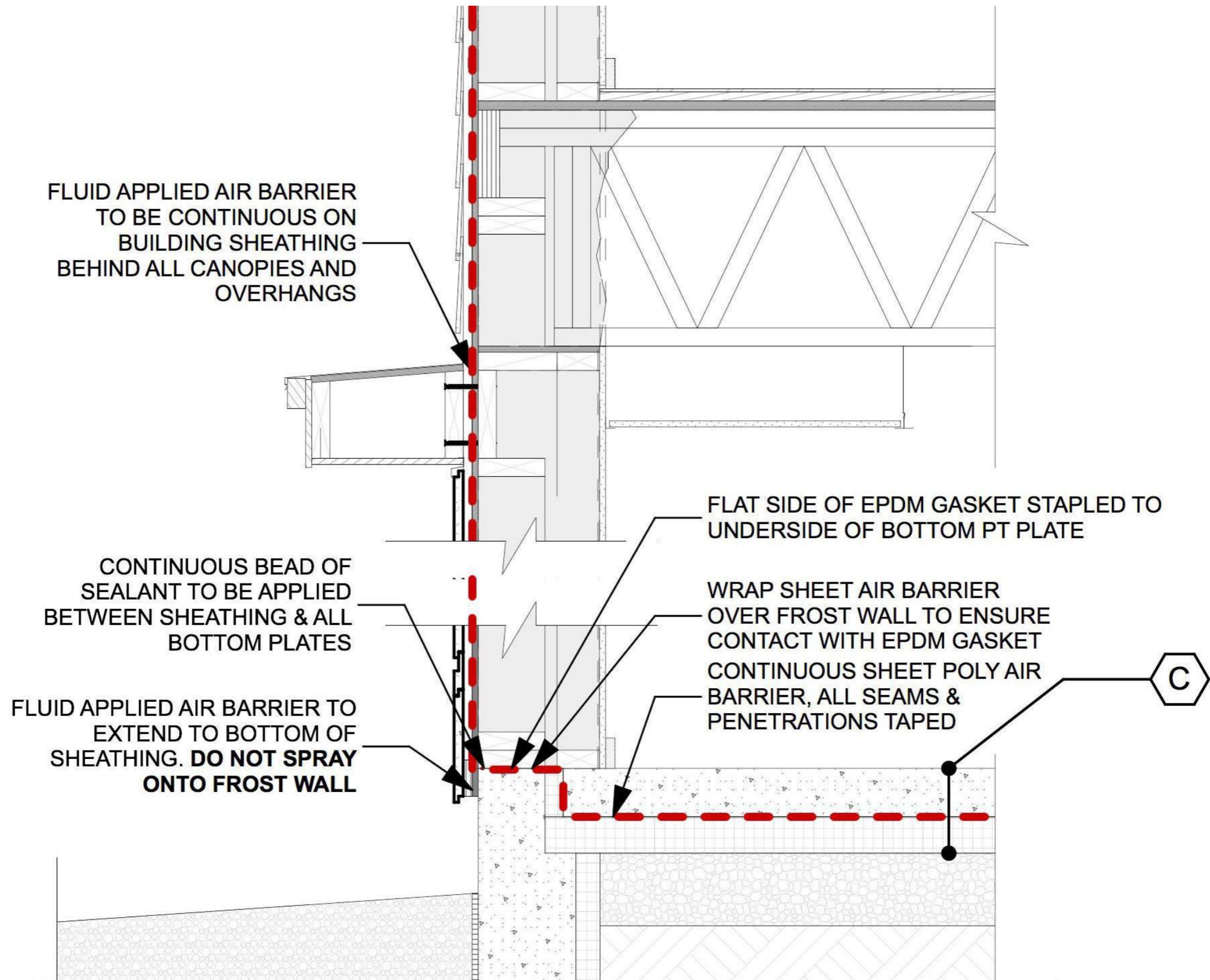
ZIPsystem
FLASHING TAPE

ZIPsystem
FLASHING TAPE



BAYSIDE
ANCHOR

AIR BARRIER



AIR BARRIER

Dow Corning[®] DefendAir 200





Advantech

ESR-1785 LIFETIME PERFORMANCE

Advantech

ESR-1785 LIFETIME PERFORMANCE

ESR-1785 LIFETIME PERFORMANCE

Advantech

STRUCTURAL 1

Advantech

ESR-1785 LIFETIME PERFORMANCE

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Advantech

ESR-1785 LIFETIME PERFORMANCE

Advantech

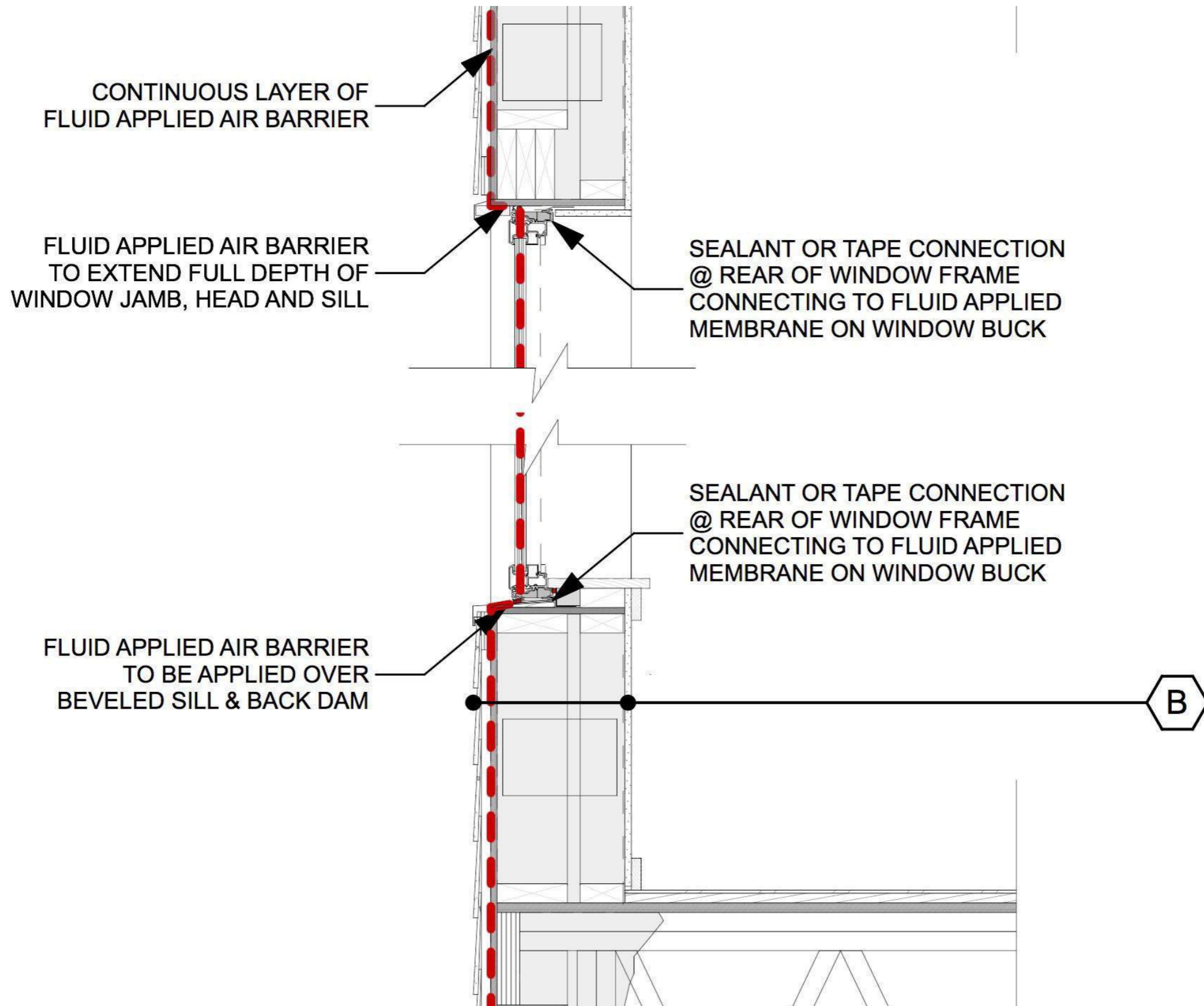
ESR-1785 LIFETIME PERFORMANCE

Advantech

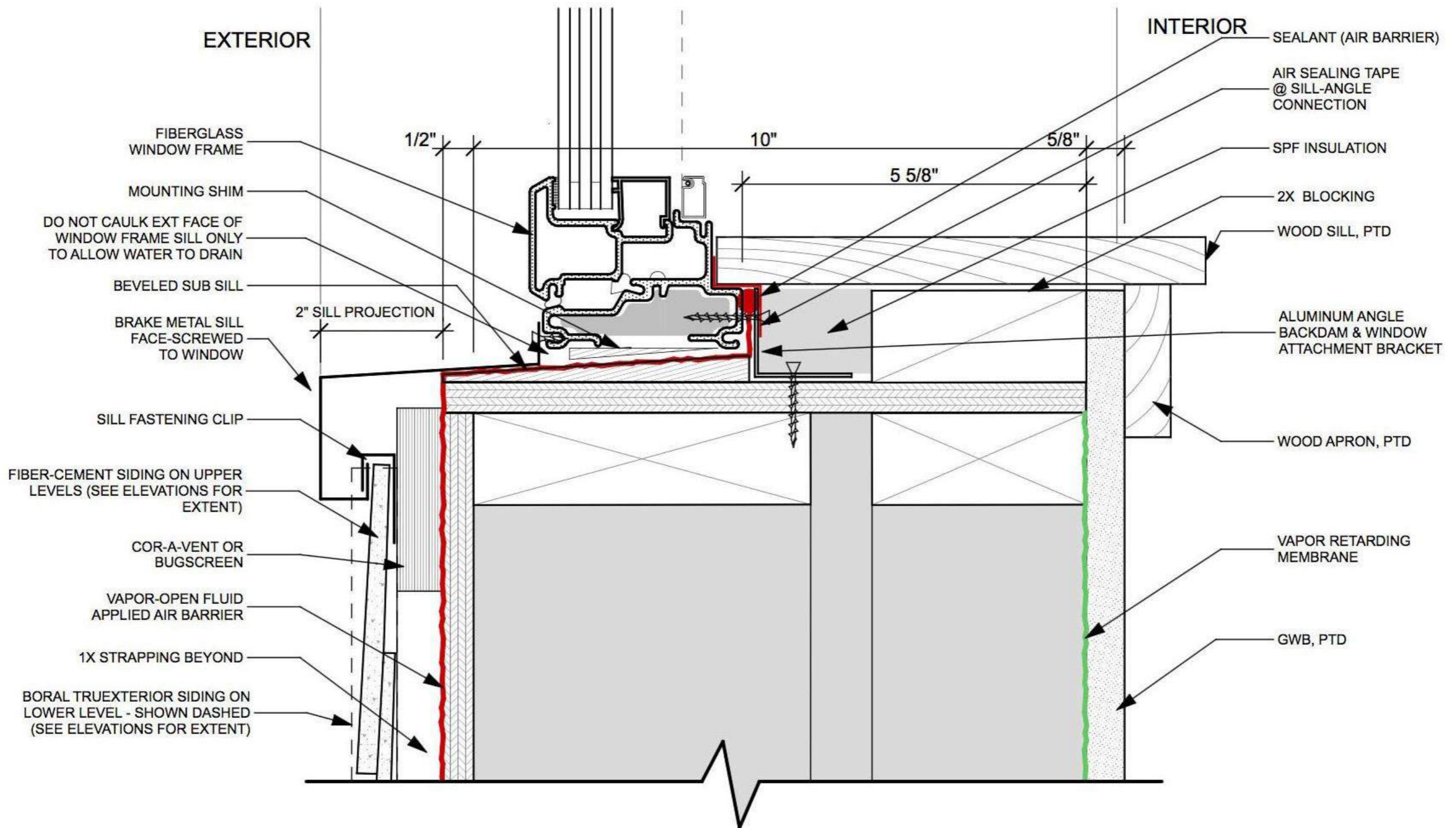
GAFURTE CCW-705 Air & Vapor Barrier



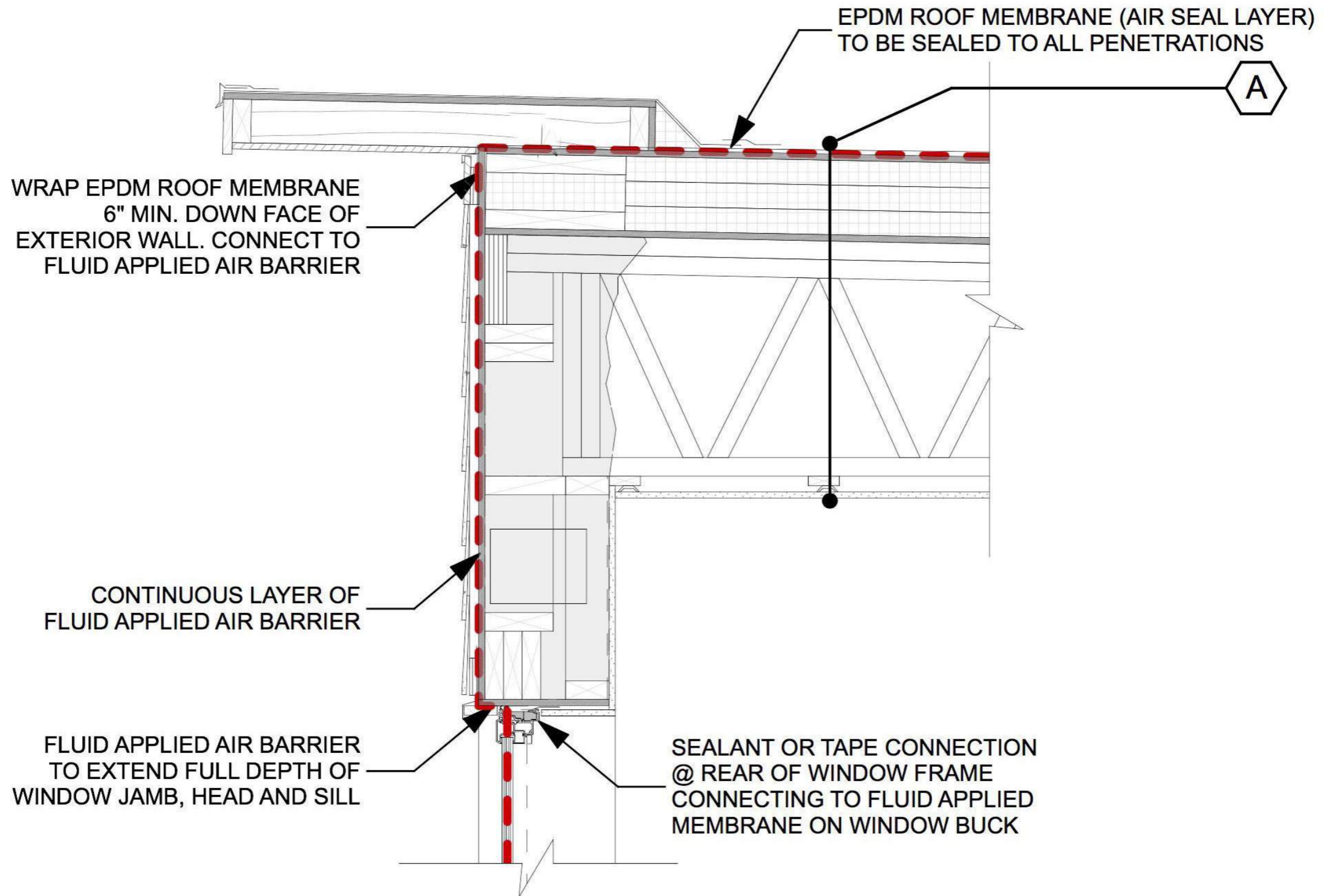
AIR BARRIER



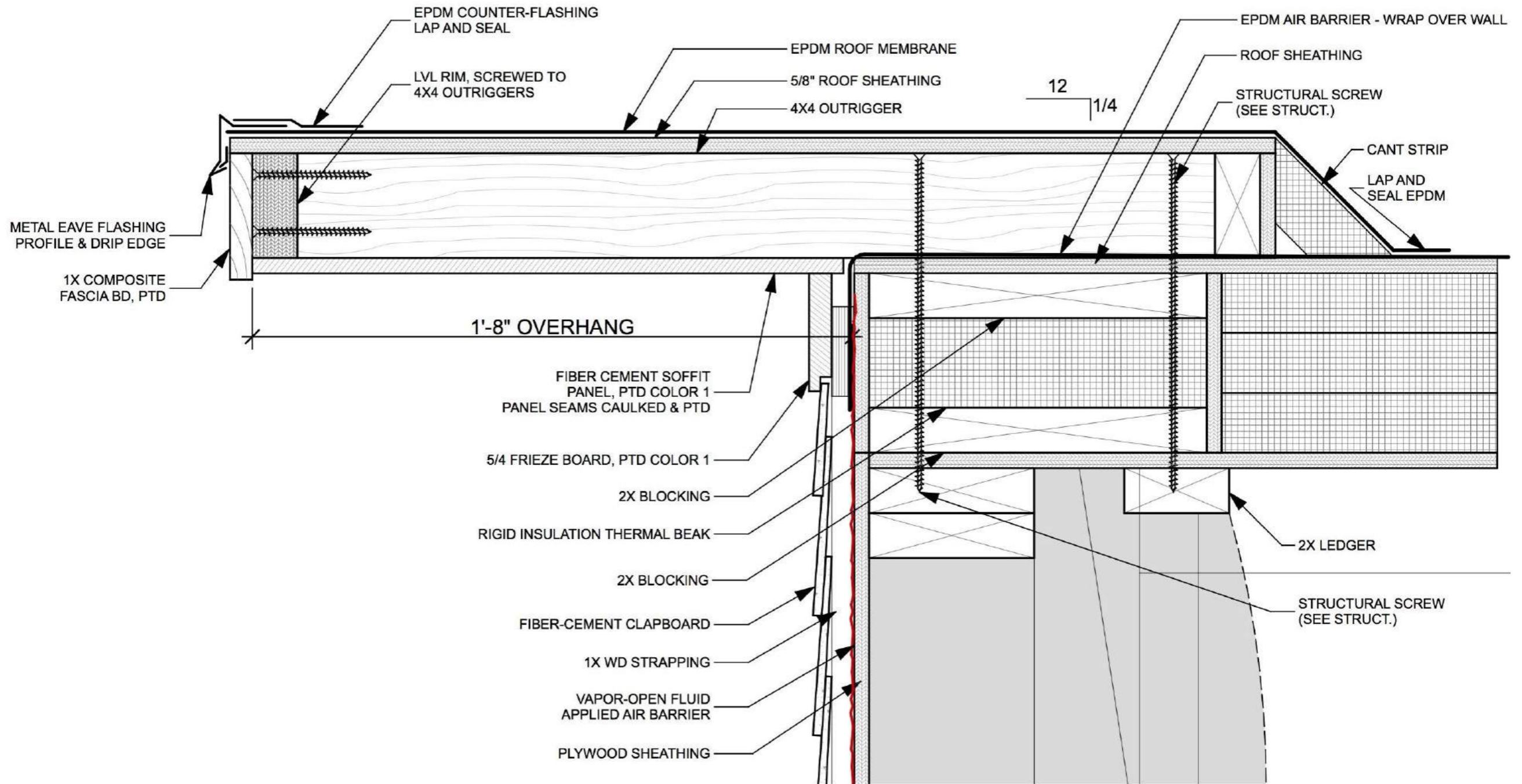
WINDOW SILL



AIR BARRIER



CORNICE



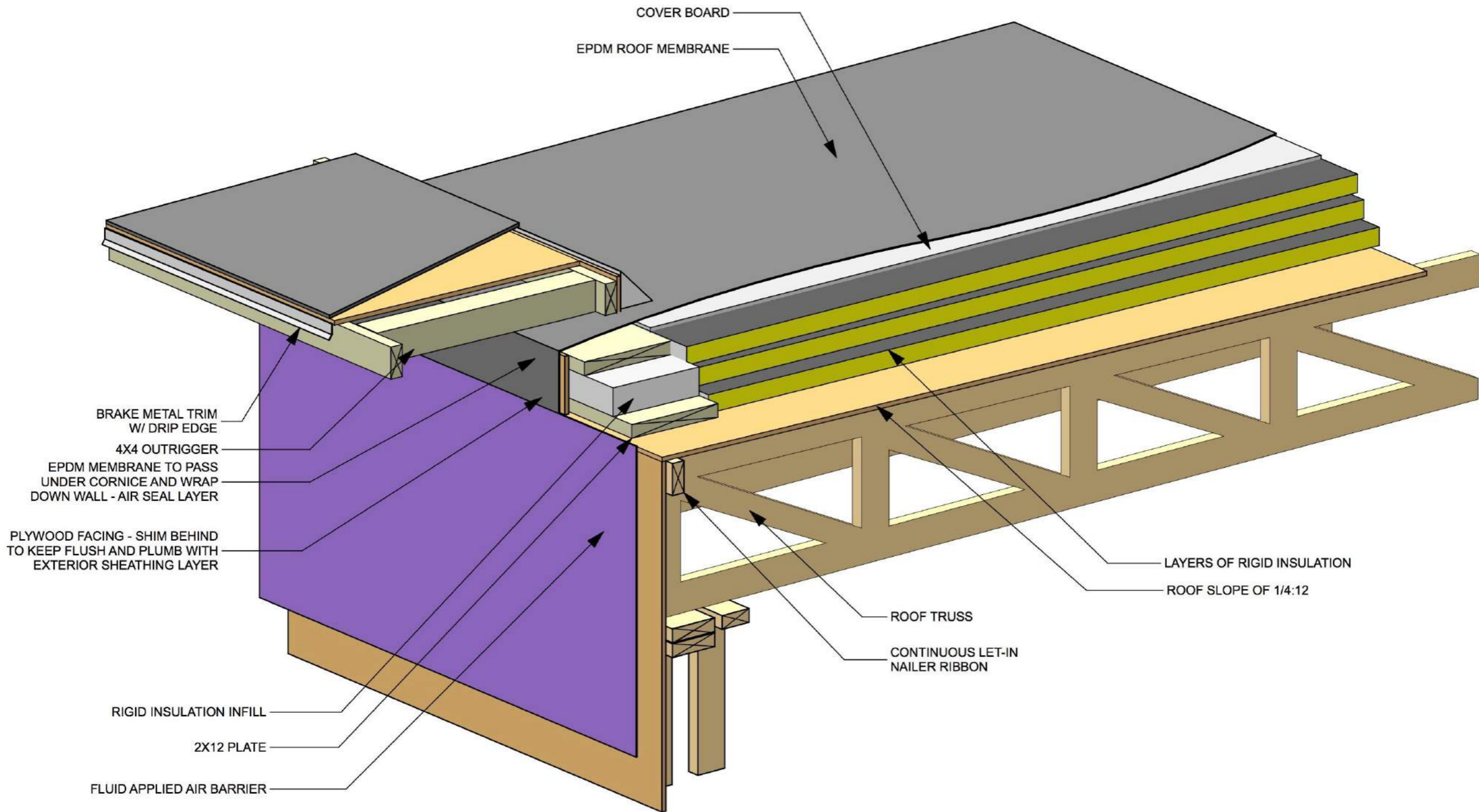
1

CORNICE DETAIL

SCALE: 3" = 1'-0"



CORNICE

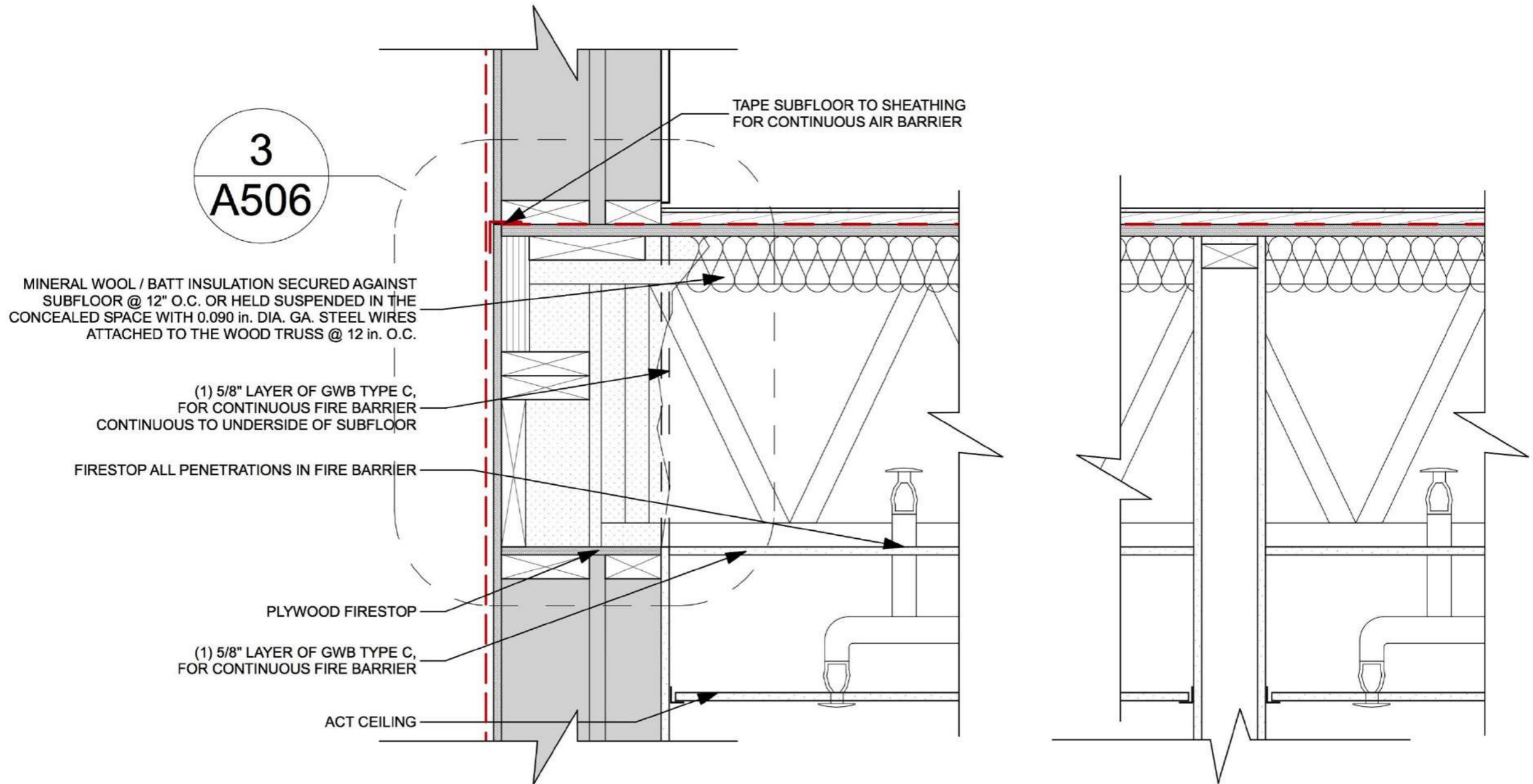


5

CORNICE/ROOF DETAIL

NOT TO SCALE

OFFICE TO RESIDENTIAL



4 WALL SECTION: FIRE/AIR BARRIER

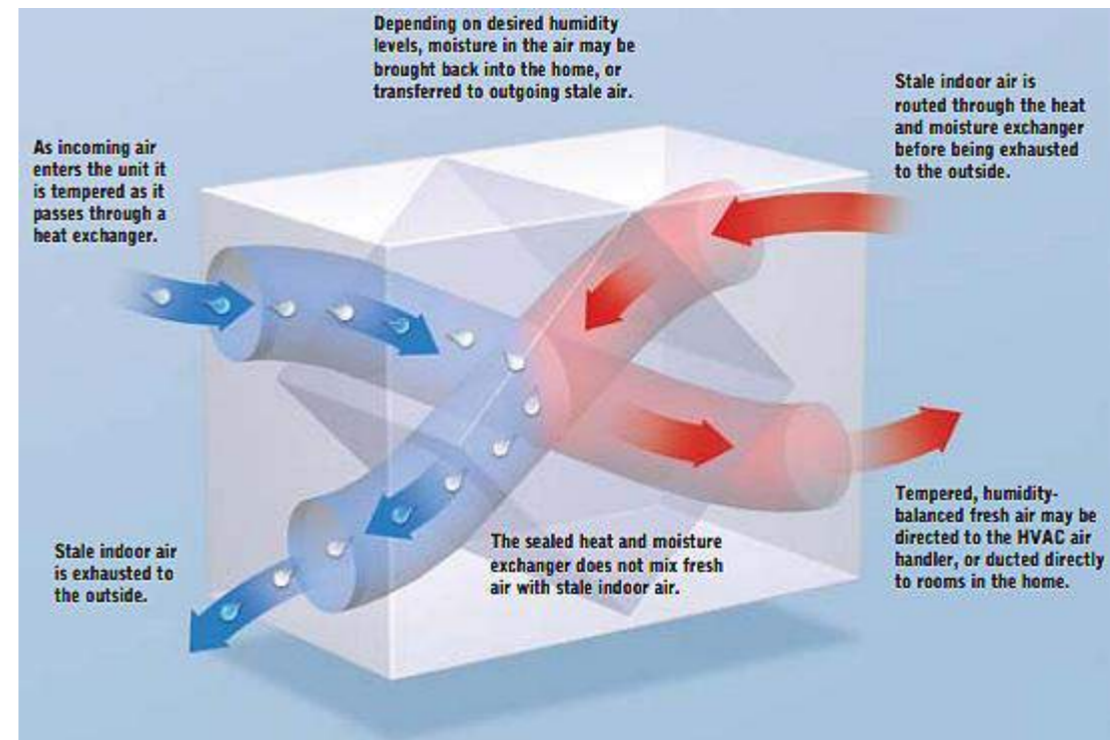
SCALE: 1 1/2" = 1'-0"



VENTILATION

THE DISTILLERY

ENERGY RECOVERY VENTILATOR

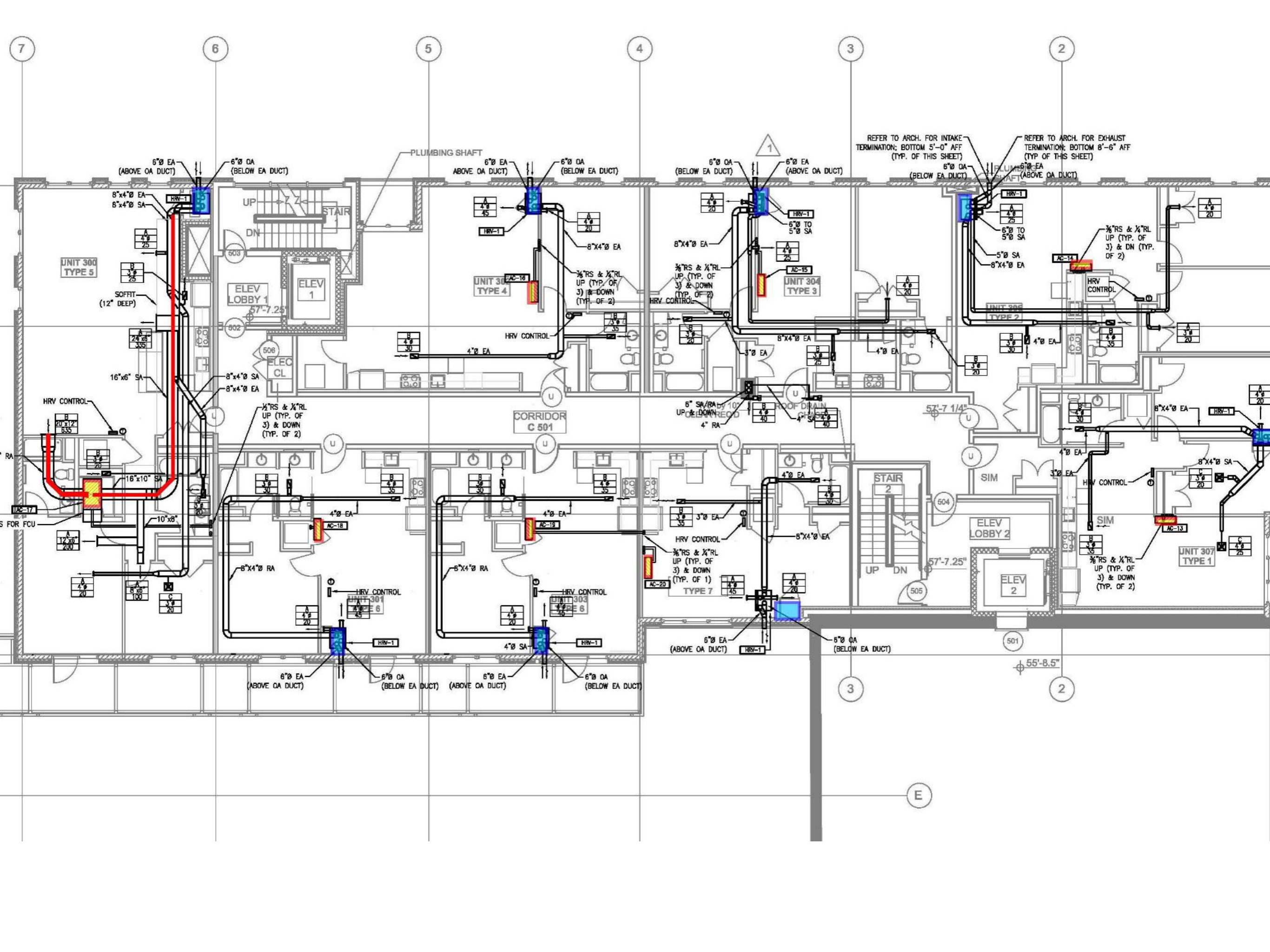


ZEHNDER: COMFOAIR

HEAT PUMPS



mitsubishi



BAYSIDE
ANCHOR

ELECTRIC BASEBOARD

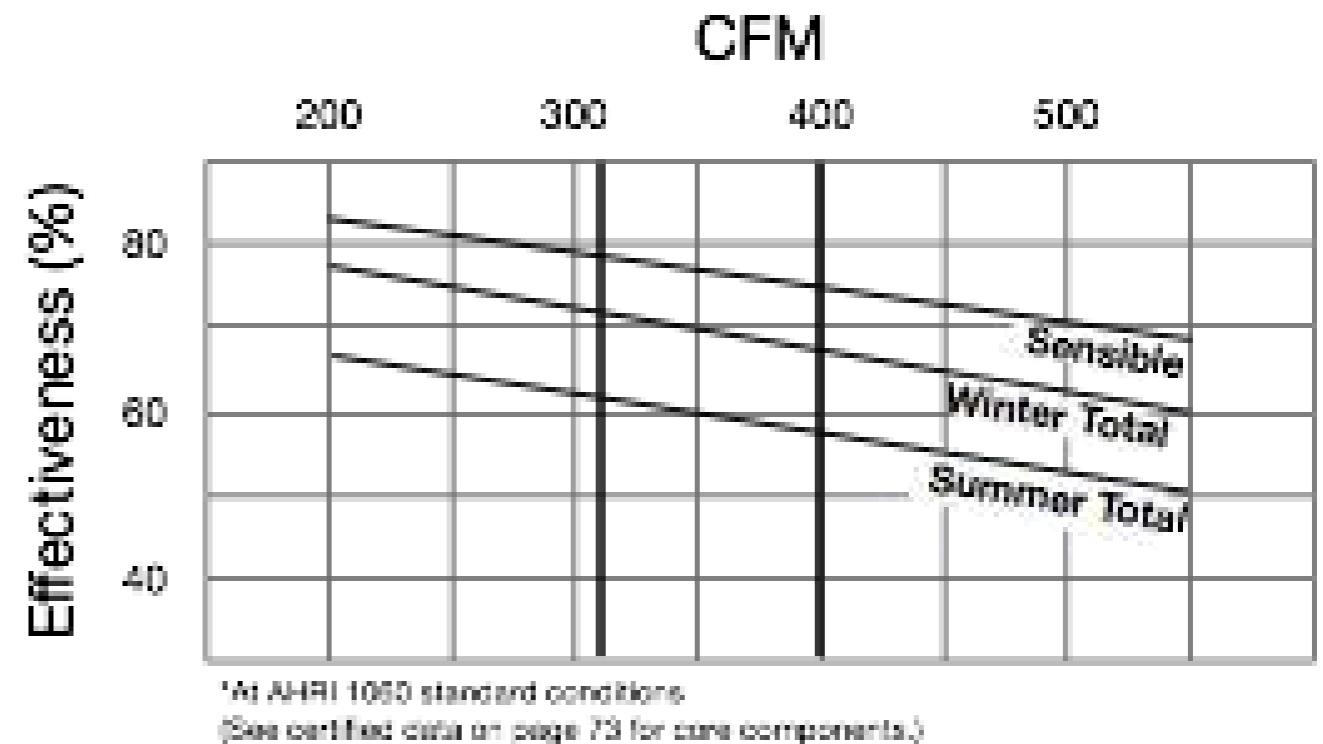


\$50

VENTILATION

RENEWAIRE EV450IN ECM

Indoor Unit with ECM Motor Option



.78 W/CFM

75%

HORIZONTAL DUCTED ERV

NO 2 HOUR SHAFTS

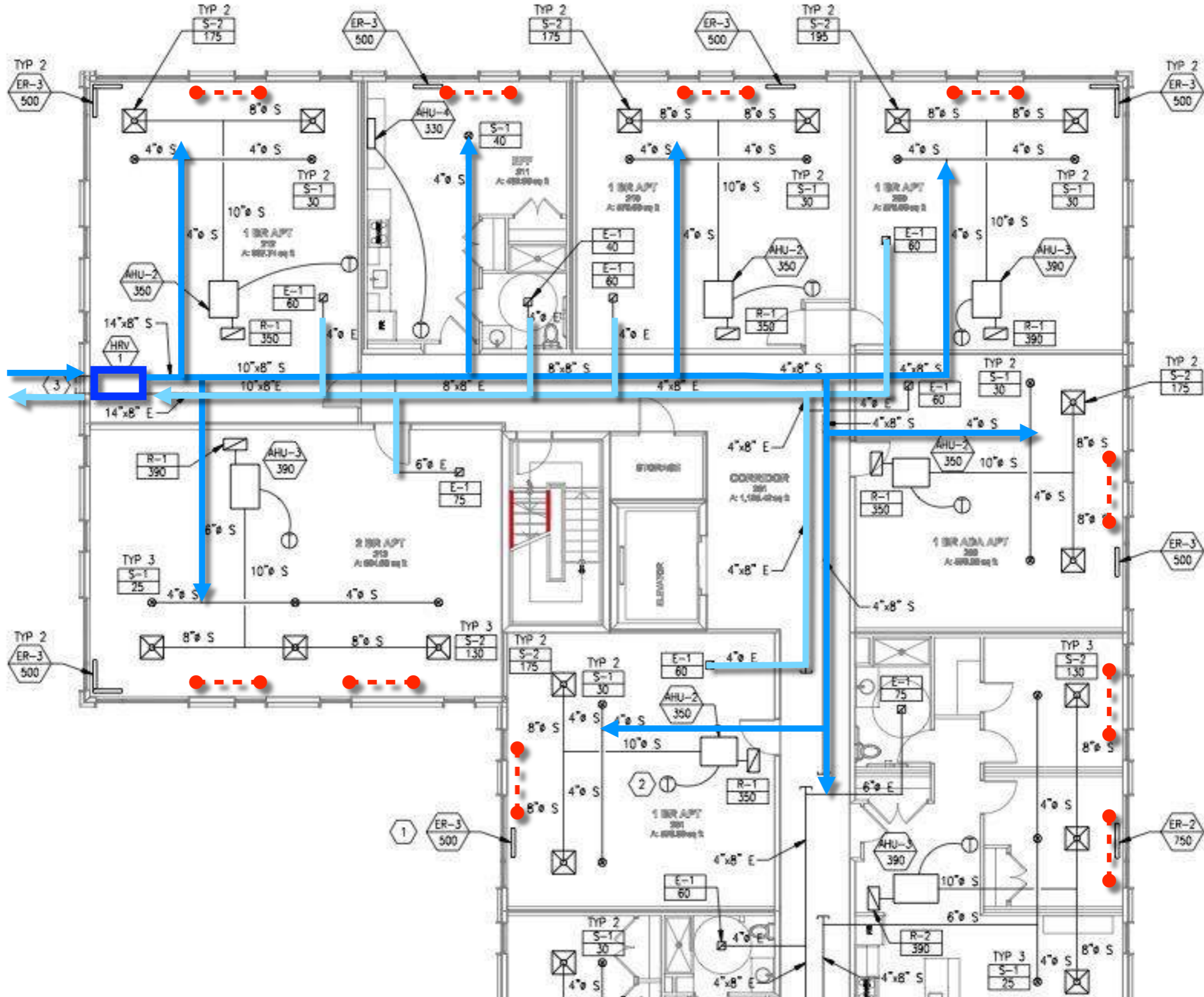
NO FIRE DAMPERS

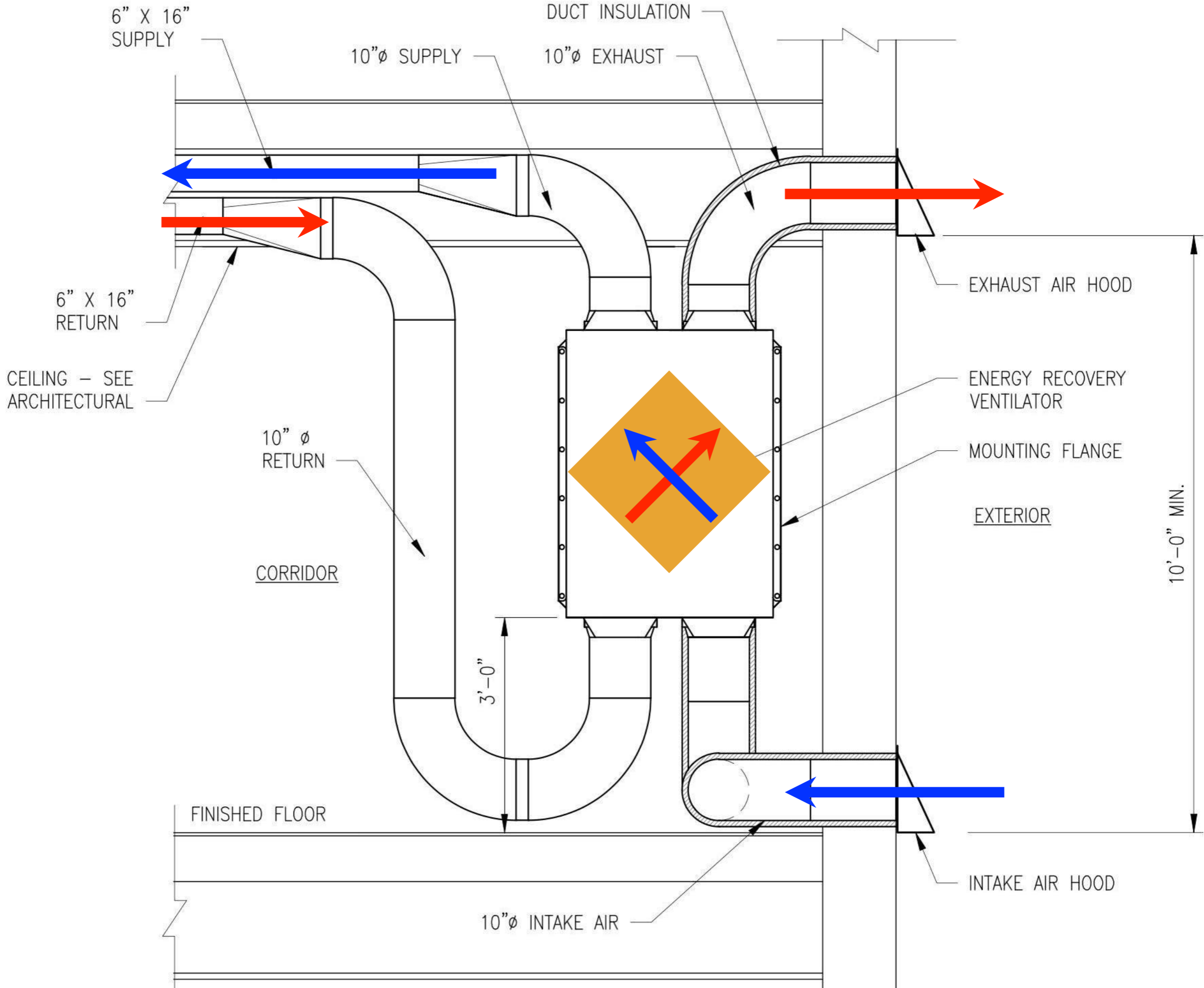
45 MINUTE CORRIDOR RATING

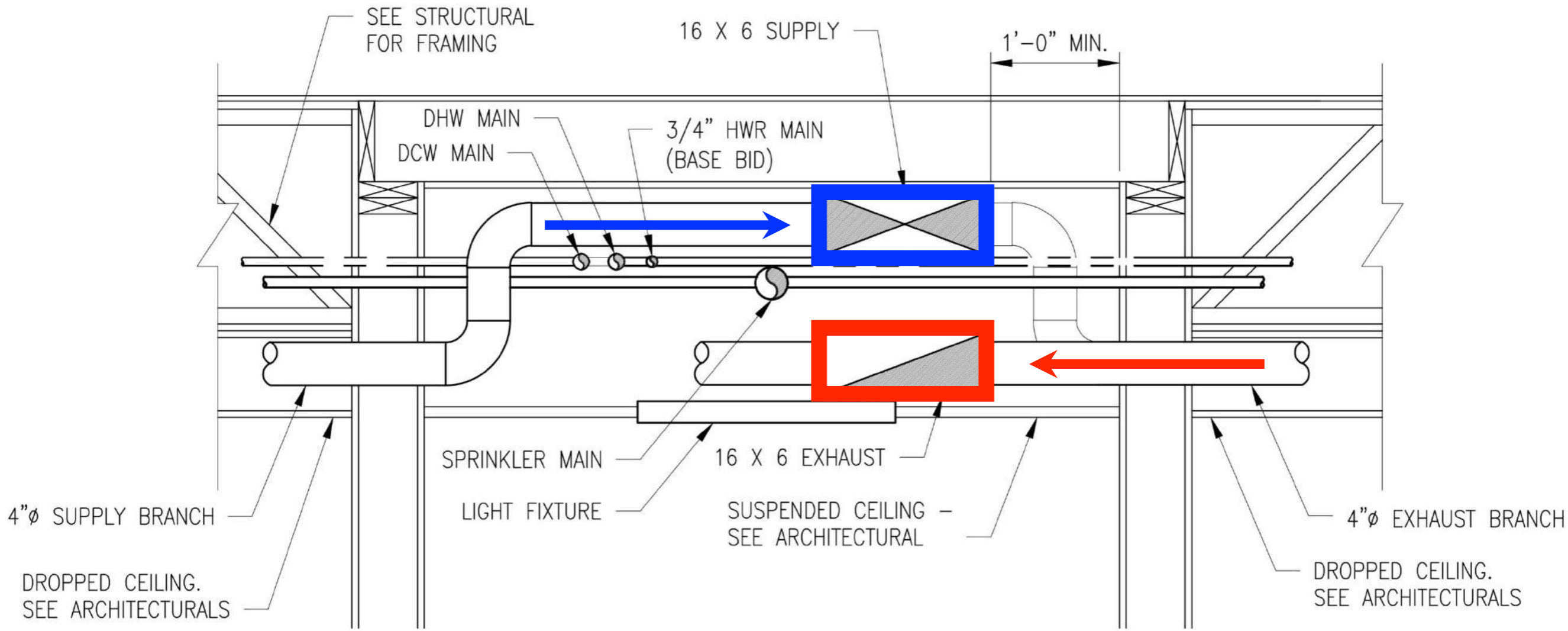
1 ERV PER 6 UNITS

SIDEWALL INTAKE & EXHAUST

HVAC DESIGN: UPPER FLOORS







6
M500

SERVICE DETAIL AT CORRIDOR CEILINGS

SCALE: 3/4" = 1'-0"

PASSIVE
HOUSE
&
PHIUS+

HEATING DEMAND

PASSIVE HOUSE

4.75 kBTU / SF / YEAR

PHIUS+ (*PORTLAND, ME*)

6.6 kBTU / SF / YEAR (+ 39%)

COOLING DEMAND

PASSIVE HOUSE

4.75 kBTU / SF / YEAR

PHIUS+ *(PORTLAND, ME)*

1.4 kBTU / SF / YEAR *(- 71%)*

PRIMARY ENERGY

PASSIVE HOUSE

38 kBTU / SF / YEAR

2.6 SOURCE ENERGY FACTOR

PHIUS+

OCCUPANCY x 6,200 kWh / YEAR

3.16 SOURCE ENERGY FACTOR

AIR TIGHTNESS

PASSIVE HOUSE

0.60 ACH50

PHIUS+

0.05 CFM50 / SF / ENCLOSURE

PEAK HEATING LOAD

PASSIVE HOUSE

3.17 BTU / SF / HOUR

PHIUS+ (*PORTLAND, ME*)

4.0 BTU / SF / HOUR

AREA MEASUREMENTS

GROSS AREA

37,815 SF

PASSIVE HOUSE: TFA

32,384 SF (- 15%)

PHIUS+: iCFA

34,925 SF (- 8%)

ENCLOSURE & VOLUME

THERMAL ENCLOSURE

35,659 SF

INTERIOR VOLUME

279,196 CU FT

MAX HEATING DEMAND

PASSIVE HOUSE

153,824 kBTU / YEAR

PHIUS+

230,505 kBTU / YEAR (+ 50%)

MAX COOLING DEMAND

PASSIVE HOUSE

153,824 kBTU / YEAR

PHIUS+

48,895 kBTU / YEAR (- 68%)

MAX PRIMARY DEMAND

PASSIVE HOUSE

1,230,592 kBTU / YEAR

PHIUS+

1,925,130 kBTU / YEAR (+ 56%)

MAX PRIMARY DEMAND

PASSIVE HOUSE

1,230,592 kBTU / YEAR

PHIUS+ *(4,200 kWh / PERSON)*

1,304,121 kBTU / YEAR (+ 6%)

PV TO BE NET ZERO

PASSIVE HOUSE

107 kW

PHIUS+

137 kW (+ 30%)

CFM50 AT BLOWER DOOR

PASSIVE HOUSE

2,792 CFM50

PHIUS+

1,783 CFM50 (- 36%)

EUI

PASSIVE HOUSE

12.5 EUI

PHIUS+

16.1 EUI (+ 30%)

ARCH 2030: 2015 TARGET

18.2 EUI

COST TO OPERATE

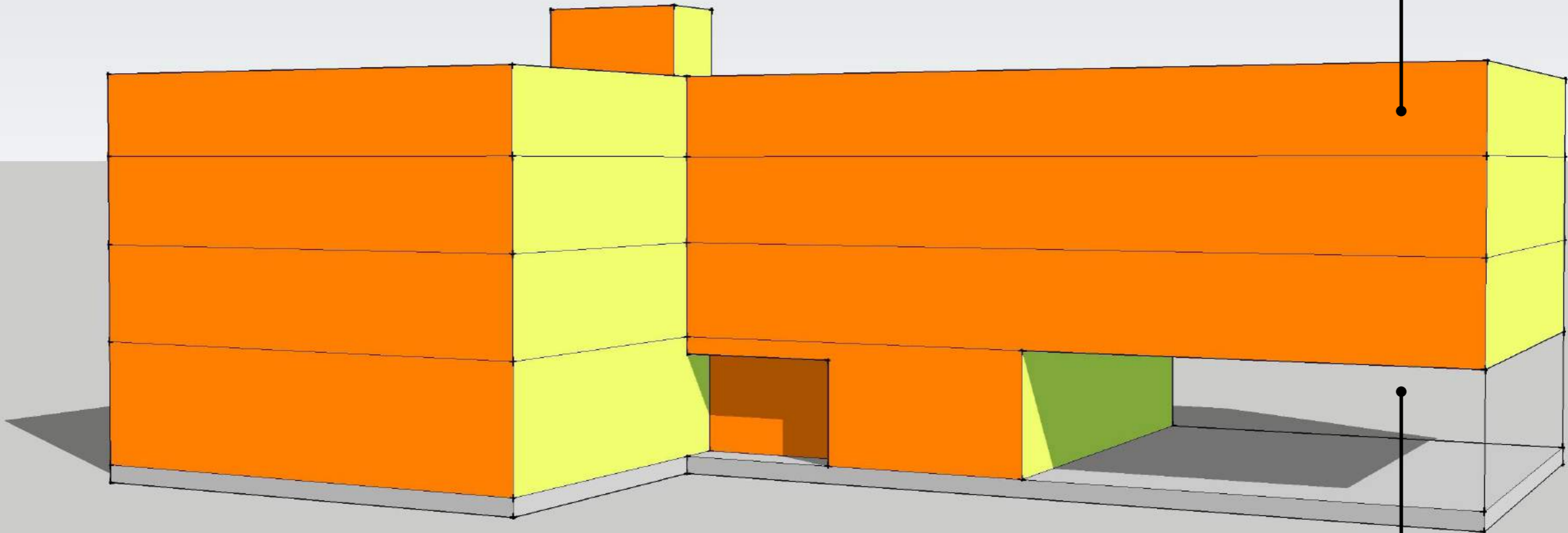
PASSIVE HOUSE

\$20,806 / YEAR

PHIUS+

\$26,781 / YEAR

APARTMENTS
CERTIFIED ENCLOSURE



HEAD START & OFFICES
NOT IN CERTIFIED ENCLOSURE

PHIUS+ METRICS

BAYSIDE ANCHOR

PHIUS+ SCENARIO

PEAK LOAD 130,156 BTU / HOUR

ANNUAL HEATING 3.80 kBTU / SF / YEAR

PRIMARY ENERGY 53.94 kBTU / SF / YEAR

ANNUAL COOLING kBTU / SF / YEAR

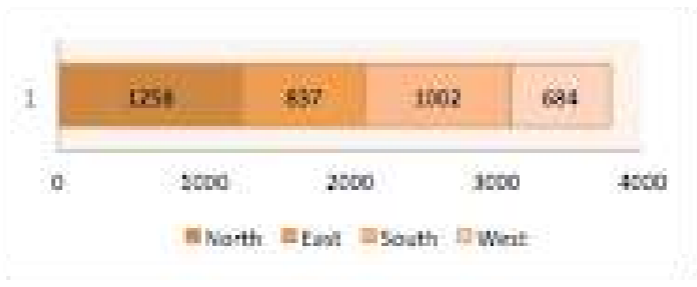
VENTILATION 76% % EFFICIENT

R- VALUES
 33 WALLS
 50 ROOF
 57 SUSPENDED FLOORS
 NA BASEMENT WALLS
 16 SLABS

WINDOWS & DOORS
 0.45 SHGC
 0.13 GLAZING U-VALUE
 0.25 FRAME U-VALUE
 0.21 TOTAL U-VALUE

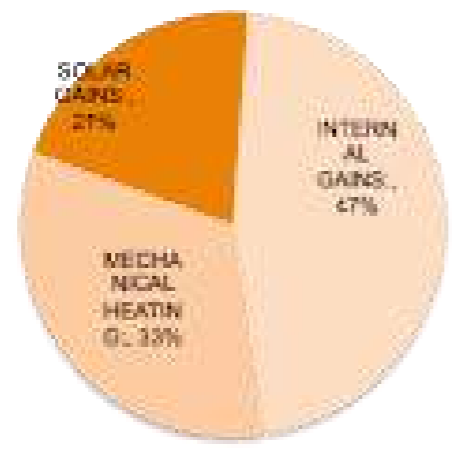
AIR TIGHTNESS
 0.05 CFM50 / SF / SHELL
 0.35 ACH50

GLAZING % OF TFA

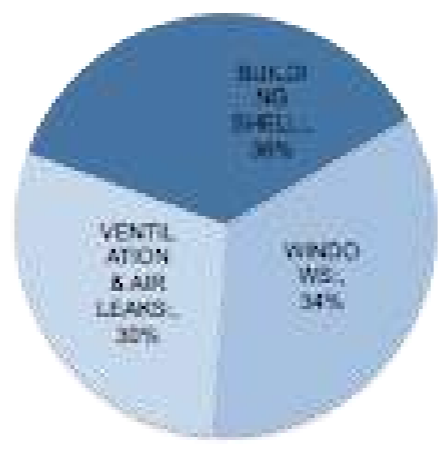


WINDOW ENERGY -53,905 kBTU / YEAR

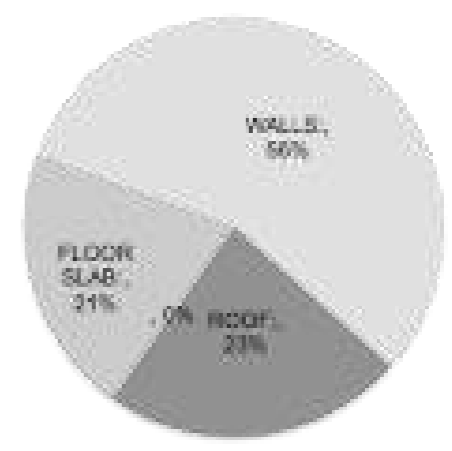
HEAT GAINS



HEAT LOSS



SHELL LOSSES



PASSIVE HOUSE METRICS

BAYSIDE ANCHOR
PASSIVE HOUSE SCENARIO

PEAK LOAD 131,810 BTU / HOUR

PRIMARY ENERGY 42.46 kBTU / SF / YEAR

ANNUAL HEATING 6.97 kBTU / SF / YEAR

ANNUAL COOLING kBTU / SF / YEAR

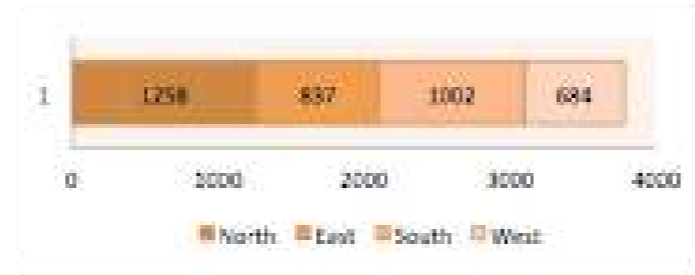
VENTILATION
76% % EFFICIENT

AIR TIGHTNESS
0.05 CFM50 / SF / SHELL
0.35 ACH50

R- VALUES
33 WALLS
50 ROOF
57 SUSPENDED FLOORS
NA BASEMENT WALLS
16 SLABS

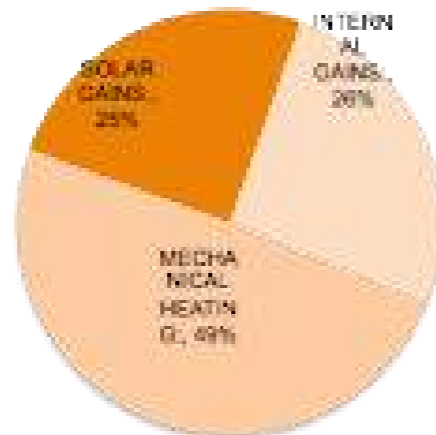
WINDOWS & DOORS
0.45 SHGC
0.13 GLAZING U-VALUE
0.25 FRAME U-VALUE
0.21 TOTAL U-VALUE

GLAZING % OF TFA

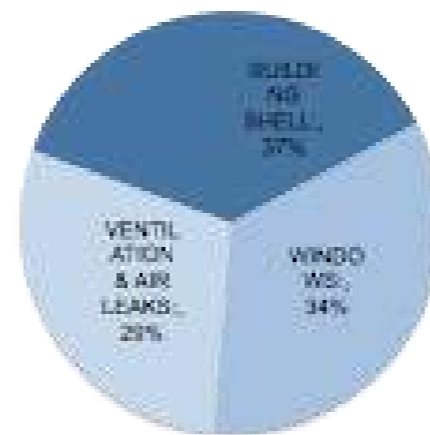


WINDOW ENERGY -53,905 kBTU / YEAR

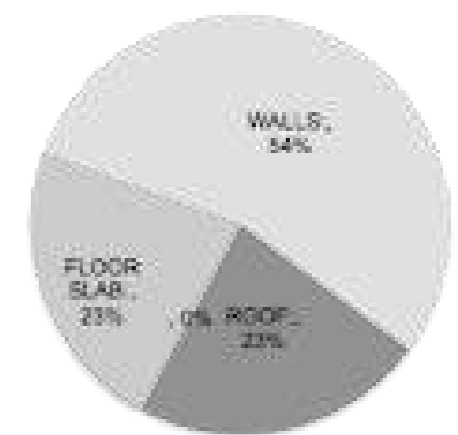
HEAT GAINS



HEAT LOSS



SHELL LOSSES



PHIUS+ CERTIFICATION

ANNUAL HEATING

3.80 kBTU / SF / YEAR

PHIUS+ HEATING LIMIT

6.40 kBTU / SF / YEAR

HEATING LOAD

3.65 kBTU / SF / YEAR

PHIUS+ LOAD LIMIT

4.00 kBTU / SF / YEAR

PRIMARY ENERGY

53.9 BTU / HOUR

PHIUS+ PRIMARY LIMIT

54.01 kBTU / SF / YEAR

COOLING DEMAND

BTU / HOUR

PHIUS+ COOLING LIMIT

3.80 kBTU / SF / YEAR

THE
DISTILLERY
&
BAYSIDE
ANCHOR



NESEA™

NORTHEAST SUSTAINABLE ENERGY ASSOCIATION



PASSIVEhouse
NEW ENGLAND



passivhaus
MAINE