

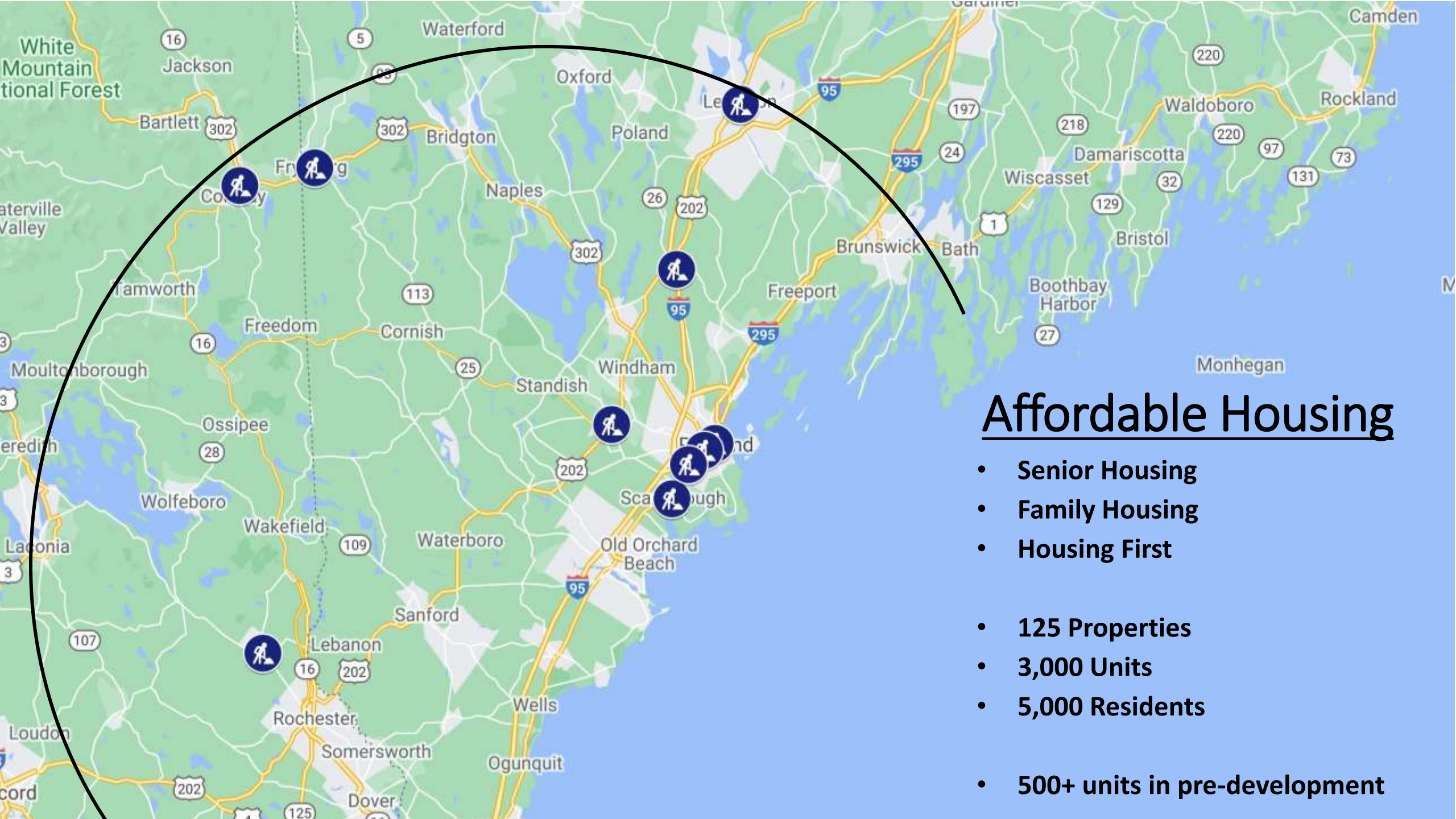


AVESTA

H O U S I N G

Advocacy, Development, Maintenance, Management

Humanity



Affordable Housing

- **Senior Housing**
- **Family Housing**
- **Housing First**

- **125 Properties**
- **3,000 Units**
- **5,000 Residents**

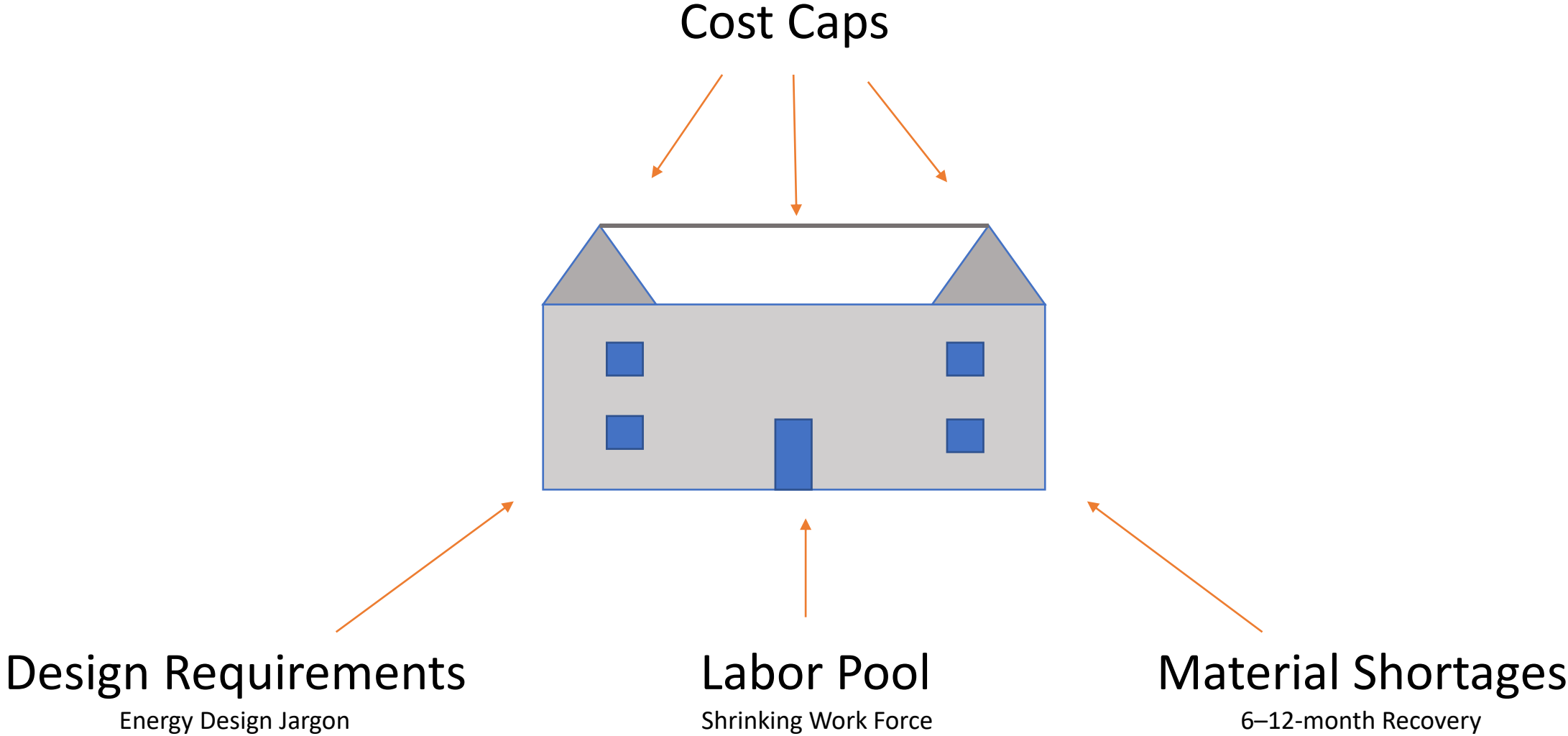
- **500+ units in pre-development**

The Societal Importance of Equitable Housing



20,000 – 25,000 Affordable Housing units are needed to meet current demand

Opposing Challenges Effecting Production



Energy Jargon

- Passive House
- Net Zero
- LEED
- Living Building Challenge
- Enterprise Green
- Energy Star
- Carbon Neutral
- PV & EV Ready
- Sustainable
- Energy Efficient
- MUBEC or Stretch Code
- Source vs Site Energy



Stonecrest II 2013

25 Garden Style Units

- Hydronic Heat Distribution
- LPG Fuel Source
- High Performance Boilers
- Programmable Thermostats
- Digital Controlled Mechanicals
- Solar Pre-Heat Water System



\$10K per year for fuel & \$10K per year in service calls

Property	sc2
Row Labels	Sum of Debit
Apt #32 & #24 No Heat	470
Bldg 4 no heat in two apts	550
Bldg 5 SVC call no heat circ	1,517
bldg#2 - no heat in apts 17,23, and 28. found relay not working properly. Disconnected the relay. Client to monitor and call us if needed.	430
BMF LOWES 02629*	640
Boiler #1 - Replaced Ignitor	679
boiler#1 replaced gas valve and communication board	1,431
building #1 Boiler #1 - repaired broken connector on flue limit switch. return visit found flue switch mount broken. client declined repairs	430
building #3 - service call for boiler room transformer making noise - replaced transformer - all ok	290
building #3 service call no heat or hot water - found boiler #1 off on flame failure - replaced gas valve. boiler #2 off on high return. replaced board and flue connector	1,907
building 2 - gasket leaking on boiler #1 - replaced exhaust assembly and vent pipe clamp - all ok	355
building 3 service call no heat or hot water found boiler 1 off on flame failure replaced gas valve. boiler 2 off on high return. replaced board and flue connector recl to fixed assets	0
Building 4 Apt 9 Service call for no heat	195
CapitalizeBoiler1GasValveAAA	0
CapitalizeSealKitReplacementAAA	0
Community Room service call for no A/C	355
JG THE HOME DEPOT 2412 * new ac for community room. mini split has failed	249
S/C for no heat	275
Service call for boiler #1&2 no hot water	230
service call for boiler #2 alarm. Found Boiler in alarm for flue temp sensor. Connector between sensor and harness had disconnected and reconnected. all ok	235
Service call for circ pump alarm on control board	275
Service call for no heat	275
service call for no HEAT - Found boiler #2 with failed board - replaced board with board from boiler#1 that needs a gas valve. quoted repairs to boiler #1	275
contract	3,030
Consolidated Internet	510
GasValve,ControlBoards,Harness,Parts	4,314
Sensor,CircPump,Glycol, labor.	2,861
Svc Boiler 1 and 2 not running	5,881
Unit 22 no hot water	211
Svc call apts 28/33/34/37	308
unit 37 heating during summer	347
GACO invoice	1,495
Lost Cabin Community room leak	68
Grand Total	30,086

Tyvek House wrap



Henry Blue Skin



Liquid Barrier



Huber Zip Wall



Air Barriers

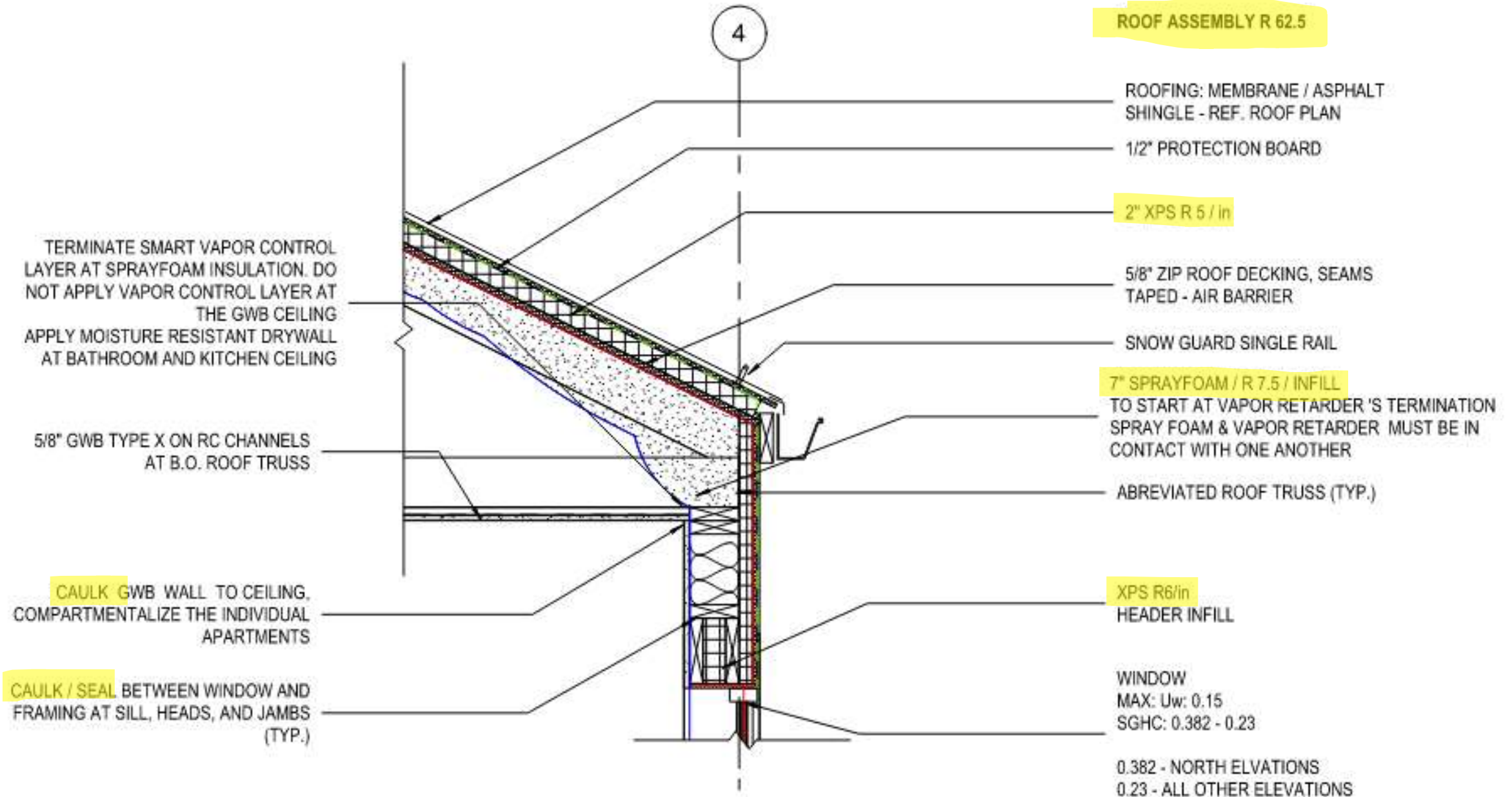


Huber Zip R-12

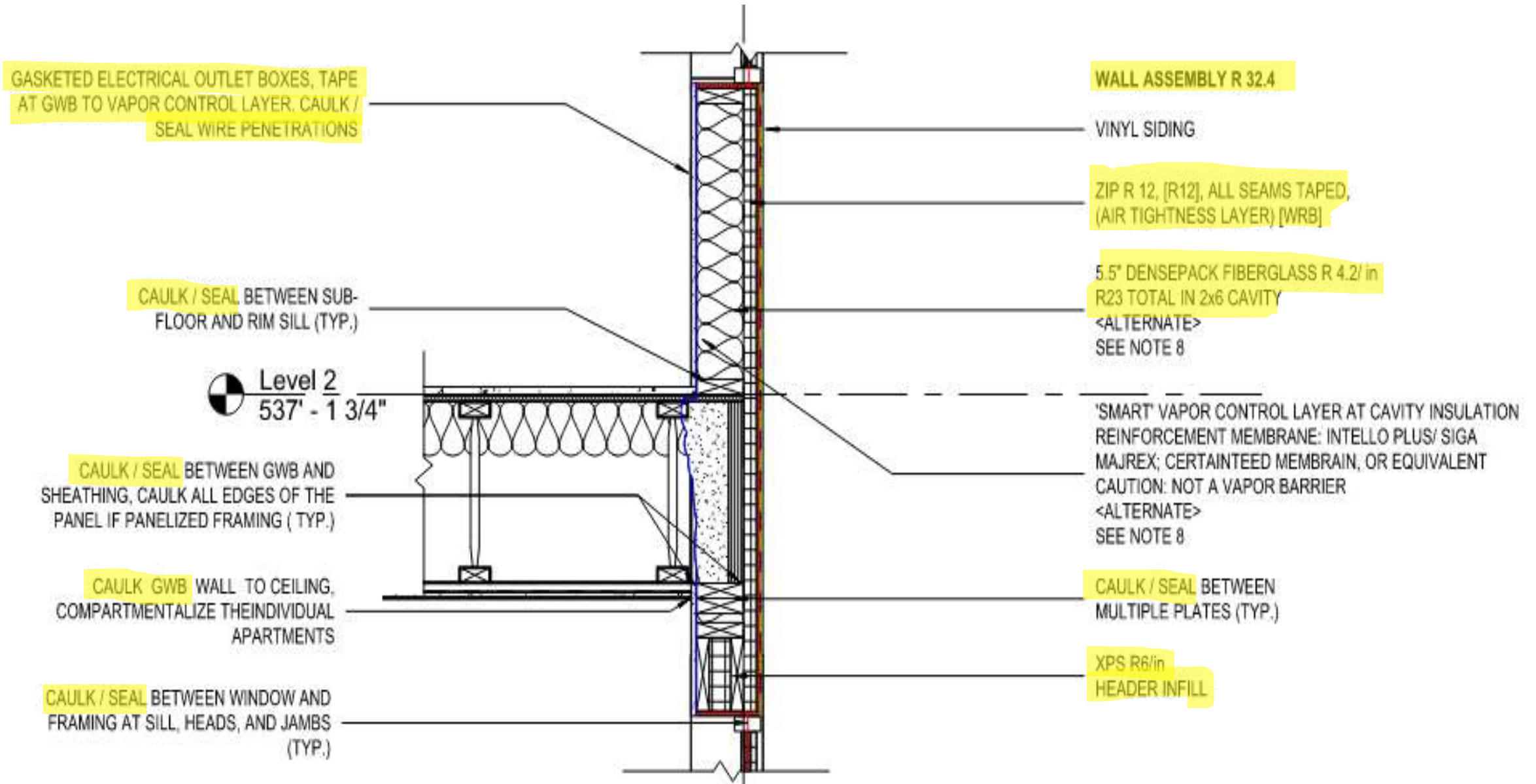
WHAT'S BEHIND THE WALL



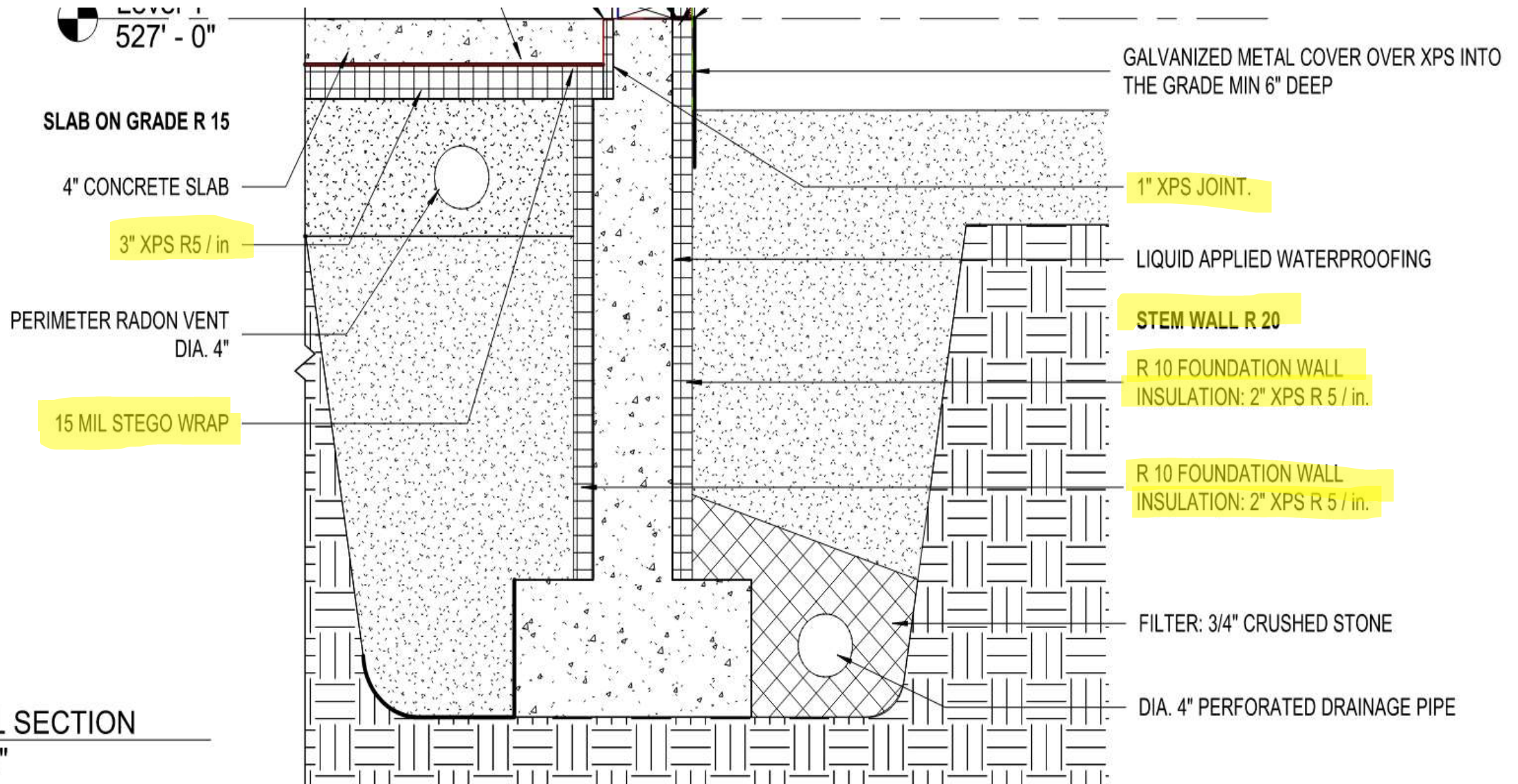
Envelope Roof



Envelope Wall



Envelope Foundation



② TYP WALL SECTION
3/4" = 1'-0"

CONNECTING THE WALL TO THE FOUNDATION





ZIP system

30 YEAR SYSTEM
LIMITED WARRANTY

FROM THE
ADVANTAGE OF
ZIP SYSTEM

ZIP system

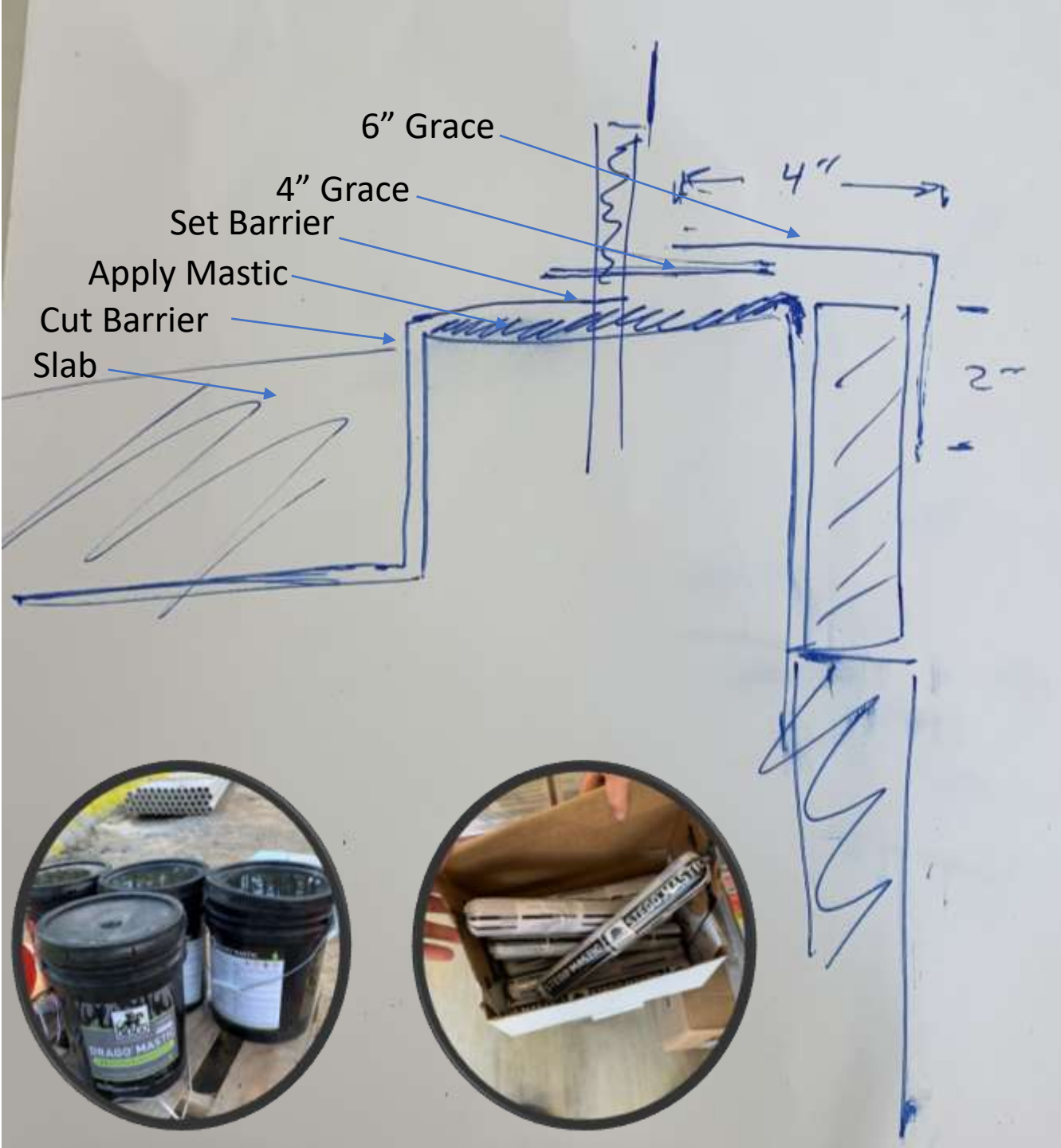
30 YEAR SYSTEM
LIMITED WARRANTY

FROM THE
ADVANTAGE OF
ZIP SYSTEM

ZIP system

ZIP system

ZIP system



1. Cut barrier $\frac{1}{2}$ - $\frac{3}{4}$
2. Apply mastic top
3. Set barrier
4. Apply 4" Grace
5. Apply 6" Grace





ZIPsystem

ZIPsystem

WATER-RESISTIVE & AIR BARRIER PROTECTION
INSULATED R-SHEATHING

ZIPsystem

ZIPsystem

ZIPsystem

WATER-RESISTIVE & AIR BARRIER PROTECTION
INSULATED R-SHEATHING

ZIP

INSULATED R-SHEATHING

ZIPsystem

ZIPsystem

30
YEAR SYSTEM

Join the revolution.
@zipsystem

ZIPsystem

ZIPsystem

30
YEAR SYSTEM

Join the revolution.
@zipsystem

MEASURING THE ENVELOPE



409 - 2015
0.12 [CFM@50/SF.ENV](#)



Maine Building Code
Blower Door Requirement
0.30 [CFM@50/SF.ENV](#)

Ridgewood -2016
0.08 [CFM@50/SF.ENV](#)



Bayside Anchor -2016
0.06 [CFM@50/SF.ENV](#)



Young St -2015
0.07 [CFM@50/SF.ENV](#)



Bartlett - 2017
0.10 [CFM@50/SF.ENV](#)





Deering Place – 2020
0.11 [CFM@50/SF.ENV](#)



West End 1 - 2020
0.11 [CFM@50/SF.ENV](#)



Wessex - 2020
0.09 [CFM@50/SF.ENV](#)



GVP - 2021
0.13 [CFM@/SF.ENV](#)



Hillside - 2022
0.09 [CFM@50/SF.ENV](#)



West End 2 - 2023
0.09 [CFM@50/SF.ENV](#)

BUILDING MECHANICALS



DUCTED HP



PTHP



DOAS & DUCT



VRF



RESISTANCE



HEAT PUMP



DECENTRALIZED ERV



HPDHW



GAS DHW BOILERS

MEASURING UTILITY PERFORMANCE

FIVE YEAR REVIEW



SENIOR & HOUSING FIRST

VS

FAMILY PROPERTIES



Senior & Housing First

Property	C.O. Year	Resident Type	Number Units	Gross Floor Area	Operating Cost/Unit (5 Year Avg)	MMBTU/Unit	MMBTU/Sq. Ft.	Total Metric Tonnes CO2/Unit	Building Design
Wessex Woods	2021	Senior	40	31,950	\$ 755	22	0.028	3.79	High Performance
Meadows 2 & 3	2019	Senior	48	43,344	\$ 649	16	0.018	3.28	Passive
Blackstone II	2018	Senior	19	14,607	\$ 945	30	0.039	4.79	High Performance
Bartlett Woods	2017	Senior	28	24,147	\$ 685	34	0.039	3.35	High Performance
Meadows 1	2017	Senior	24	21,672	\$ 1,002	37	0.041	5.31	Code Compliance
Huston Commons	2016	Housing First	30	21,375	\$ 1,105	46	0.065	5.46	Code Compliance
Ridgewood II	2015	Senior	24	23,026	\$ 647	25	0.026	3.21	LEED
Thomas Heights	2015	Housing First	18	13,452	\$ 1,123	50	0.067	5.53	Code Compliance
Young Street	2015	Senior	28	25,594	\$ 1,173	35	0.038	5.73	High Performance
Cascade Brook	2012	Senior	30	29,278	\$ 1,292	45	0.046	6.12	Code Compliance
Florence House	2010	Housing First	25	31,345	\$ 2,476	100	0.079	12.26	Code Compliance
Little Falls Landing	2006	Senior	24	20,805	\$ 1,275	70	0.081	6.20	Code Compliance
Logan Place	2005	Housing First	30	18,407	\$ 1,098	60	0.098	5.34	Code Compliance
Unity Gardens	2005	Senior	24	28,653	\$ 2,424	102	0.086	11.15	Code Compliance

Family Properties

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Carleton Street	2017	Family	37	26,986	\$ 615	40	0.054	2.95	High Performance
Meeting Place 1	2015	Family	39	35,780	\$ 347	24	0.026	1.65	High Performance
409 Cumberland	2015	Family	57	56,286	\$ 829	40	0.041	4.06	High Performance
Pearl Street II	2013	Family	54	56,764	\$ 1,056	64	0.061	5.09	Code Compliance
Oak Street Lofts	2012	Family	37	29,563	\$ 671	38	0.047	3.25	LEED
Pearl Place	2007	Family	60	65,279	\$ 845	56	0.052	4.04	LEED
Fore River Apartments	2006	Family	20	20,189	\$ 1,055	65	0.064	5.08	Code Compliance

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THE COST OF HIGH PERFORMANCE



	Edgewater 50%		20,398		Meadowview 90%		21,994		Scarborough		23,750		Hillside		22,991		Snow		21,582		Conway		36,502		Valley		72,130	
	Cost	Per Sq Ft	Cost	Per Sq Ft	Cost	Per Sq Ft	Cost	Per Sq Ft	Cost	Per Sq Ft	Cost	Per Sq Ft	Cost	Per Sq Ft	Cost	Per Sq Ft	Cost	Per Sq Ft	Cost	Per Sq Ft	Cost	Per Sq Ft	Cost	Per Sq Ft	Cost	Per Sq Ft	Cost	Per Sq Ft
General Conditions	\$ 407,500	\$ 19.98	\$ 403,083	\$ 18.33	\$ 571,796	\$ 24.08	\$ 329,567	\$ 14.33	\$ 400,385	\$ 18.55	\$ 549,450	\$ 15.05	\$ 1,033,630	\$ 14.33														
Site Work & Site Improvements	\$ 900,000	\$ 44.12	\$ 747,130	\$ 33.97	\$ 429,687	\$ 18.09	\$ 453,488	\$ 19.72	\$ 924,329	\$ 42.83	\$ 1,795,755	\$ 49.20	\$ 655,445	\$ 9.09														
Existing Conditions & Demolition	\$ -	\$ -	\$ 24,560	\$ 1.12	\$ 121,365	\$ 5.11	\$ 34,685	\$ 1.51	\$ 184,000	\$ 8.53	\$ -	\$ -	\$ 20,800	\$ 0.29														
Concrete	\$ 231,505	\$ 11.35	\$ 283,328	\$ 12.88	\$ 218,081	\$ 9.18	\$ 201,166	\$ 8.75	\$ 222,630	\$ 10.32	\$ 168,881	\$ 4.63	\$ 794,665	\$ 11.02														
Masonry	\$ -	\$ -	\$ 36,800	\$ 1.67	\$ -	\$ -	\$ -	\$ -	\$ 47,383	\$ 2.20	\$ 32,000	\$ 0.88	\$ 79,000	\$ 1.10														
Metals	\$ 2,480	\$ 0.12	\$ 19,337	\$ 0.88	\$ 54,924	\$ 2.31	\$ 27,300	\$ 1.19	\$ 3,000	\$ 0.14	\$ 23,000	\$ 0.63	\$ 1,045,000	\$ 14.49														
Rough Carpentry	\$ 869,768	\$ 42.64	\$ 834,066	\$ 37.92	\$ 1,016,614	\$ 42.80	\$ 792,197	\$ 34.46	\$ 720,768	\$ 33.40	\$ 1,300,299	\$ 35.62	\$ 1,856,319	\$ 25.74														
Finish Carpentry	\$ 213,372	\$ 10.46	\$ 256,175	\$ 11.65	\$ 417,327	\$ 17.57	\$ 218,430	\$ 9.50	\$ 290,941	\$ 13.48	\$ 281,278	\$ 7.71	\$ 362,746	\$ 5.03														
Thermal & Moisture	\$ 387,953	\$ 19.02	\$ 354,309	\$ 16.11	\$ 840,347	\$ 35.38	\$ 480,397	\$ 20.90	\$ 359,845	\$ 16.67	\$ 817,889	\$ 22.41	\$ 1,230,272	\$ 17.06														
Doors & Frames	\$ 223,262	\$ 10.95	\$ 224,372	\$ 10.20	\$ 409,139	\$ 17.23	\$ 210,611	\$ 9.16	\$ 357,383	\$ 16.56	\$ 439,750	\$ 12.05	\$ 670,074	\$ 9.29														
Windows	\$ 60,714	\$ 2.98	\$ 65,905	\$ 3.00																								
Drywall	\$ 476,250	\$ 23.35	\$ 318,292	\$ 14.47	\$ 484,613	\$ 20.40	\$ 340,780	\$ 14.82	\$ 599,089	\$ 27.76	\$ 391,852	\$ 10.74	\$ 1,218,000	\$ 16.89														
Ceilings	\$ 15,250	\$ 0.75	\$ 17,250	\$ 0.78	\$ 20,490	\$ 0.86	\$ 14,900	\$ 0.65	\$ 24,400	\$ 1.13	\$ 16,600	\$ 0.45	\$ 25,700	\$ 0.36														
Flooring	\$ 81,600	\$ 4.00	\$ 160,323	\$ 7.29	\$ 176,709	\$ 7.44	\$ 213,970	\$ 9.31	\$ 153,681	\$ 7.12	\$ 218,837	\$ 6.00	\$ 351,725	\$ 4.88														
Painting	\$ 89,000	\$ 4.36	\$ 70,000	\$ 3.18	\$ 136,100	\$ 5.73	\$ 79,000	\$ 3.44	\$ 65,000	\$ 3.01	\$ 149,000	\$ 4.08	\$ 210,965	\$ 2.92														
Specialties	\$ 40,825	\$ 2.00	\$ 42,168	\$ 1.92	\$ 61,810	\$ 2.60	\$ 51,132	\$ 2.22	\$ 64,182	\$ 2.97	\$ 36,116	\$ 0.99	\$ 100,851	\$ 1.40														
Equipment	\$ 47,500	\$ 2.33	\$ 37,987	\$ 1.73	\$ 68,768	\$ 2.90	\$ 51,300	\$ 2.23	\$ 50,200	\$ 2.33	\$ 50,184	\$ 1.37	\$ 101,402	\$ 1.41														
Furnishings (Shades)	\$ 17,050	\$ 0.84	\$ 14,100	\$ 0.64	\$ 19,221	\$ 0.81	\$ 12,403	\$ 0.54	\$ 5,709	\$ 0.26	\$ 12,544	\$ 0.34	\$ 25,870	\$ 0.36														
Conveying Systems	\$ 91,000	\$ 4.46	\$ 105,500	\$ 4.80	\$ 130,124	\$ 5.48	\$ 120,590	\$ 5.25	\$ 79,900	\$ 3.70	\$ 101,300	\$ 2.78	\$ 167,500	\$ 2.32														
Fire Suppression	\$ 75,000	\$ 3.68	\$ 60,000	\$ 2.73	\$ 136,115	\$ 5.73	\$ 93,800	\$ 4.08	\$ 135,600	\$ 6.28	\$ 86,700	\$ 2.38	\$ 285,600	\$ 3.96														
Plumbing	\$ 553,880	\$ 27.15	\$ 651,400	\$ 29.62																								
HVAC	\$ 378,000	\$ 18.53	\$ 558,775	\$ 25.41	\$ 1,032,082	\$ 43.46	\$ 978,500	\$ 42.56	\$ 964,000	\$ 44.67	\$ 1,381,000	\$ 37.83	\$ 2,848,525	\$ 39.49														
Electrical	\$ 545,000	\$ 26.72	\$ 586,140	\$ 26.65	\$ 488,084	\$ 20.55	\$ 374,600	\$ 16.29	\$ 568,800	\$ 26.36	\$ 652,600	\$ 17.88	\$ 1,161,320	\$ 16.10														
Exterior Improvements	\$ 20,000	\$ 0.98	\$ 34,207	\$ 1.56	\$ 13,821	\$ 0.58	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,000	\$ 0.04														
Allowances	\$ -	\$ -	\$ 78,000	\$ 3.55																								
Sales Tax	\$ -	\$ -	\$ -	\$ -	\$ 69,562	\$ 2.93	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 103,264	\$ 1.43														
P&P Bond & Insurance	\$ 56,000	\$ 2.75	\$ 122,750	\$ 5.58	\$ 37,087	\$ 1.56	\$ 49,887	\$ 2.17	\$ 123,595	\$ 5.73	\$ 68,044	\$ 1.86	\$ 147,428	\$ 2.04														
Contractor Contingency	\$ 114,718	\$ 5.62	\$ 181,311	\$ 8.24	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 211,376	\$ 5.79	\$ 356,210	\$ 4.94														
OH&P	\$ 265,798	\$ 13.03	\$ 251,490	\$ 11.43	\$ 202,088	\$ 8.51	\$ 205,148	\$ 8.92	\$ 198,779	\$ 9.21	\$ 257,192	\$ 7.05	\$ 435,000	\$ 6.03														
Total	\$ 6,163,425	\$ 302.16	\$ 6,538,758	\$ 297.30	\$ 7,155,954	\$ 301.30	\$ 5,333,851	\$ 232.00	\$ 6,543,600	\$ 303.20	\$ 9,041,647	\$ 247.70	\$ 15,290,311	\$ 211.98														

Project	Units	Sq. Ft.	GMP/Sq Ft	GMP/Ur	HVAC & Plumb	Electrical
Edgewater 50%	25	20,398	\$ 302	\$ 246,537	\$ 45.68	\$ 26.72
Meadowview 90%	26	21,994	\$ 297	\$ 251,491	\$ 55.02	\$ 26.65
Scarborough	31	23,750	\$ 301	\$ 230,837	\$ 43.46	\$ 20.55
Snow	28	21,582	\$ 303	\$ 233,700	\$ 44.67	\$ 26.36
Tech Village	40	36,502	\$ 248	\$ 226,041	\$ 37.83	\$ 17.88
Valley	60	72,130	\$ 212	\$ 254,839	\$ 39.49	\$ 16.10
Hillside	27	22,991	\$ 232	\$ 197,550	\$ 42.56	\$ 16.29
West End II	52	43,025	\$ 229	\$ 189,823	\$ 31.05	\$ 15.44
GVP	35	40,432	\$ 151	\$ 174,432	\$ 27.10	\$ 11.90
West End I	64	58,460	\$ 185	\$ 169,167	\$ 26.08	\$ 16.64
Wessex	40	31,590	\$ 209	\$ 164,703	\$ 28.11	\$ 11.31
Meadows II	48	43,344	\$ 179	\$ 161,510	\$ 26.12	\$ 18.73

Project	Units	Sq. Ft.	GMP/Sq	GMP/Unit	HVAC & Plu	Electrical	DWH	Unit H&C	Com H&C	Ventilation
Edgewater 50%	25	20,398	\$ 302	\$ 246,537	\$ 45.68	\$ 26.72	Propane	PTHP	VRF HP	ERV No DX
Meadowview 90%	26	21,994	\$ 297	\$ 251,491	\$ 55.02	\$ 26.65	Propane	PTHP	VRF HP	ERV No DX
Scarborough	31	23,750	\$ 301	\$ 230,837	\$ 43.46	\$ 20.55	N. Gas	E Base	Mini Spit	DOAS & DX
Snow	28	21,582	\$ 303	\$ 233,700	\$ 44.67	\$ 26.36	Propane	E Base	VRF HP	ERV & DX
Tech Village	40	36,502	\$ 248	\$ 226,041	\$ 37.83	\$ 17.88	Propane	PTHP	Mini Spit	ERV No DX
Valley	60	72,130	\$ 212	\$ 254,839	\$ 39.49	\$ 16.10	N. Gas	PTHP	Mini Spit	DOAS & DX
Hillside	27	22,991	\$ 232	\$ 197,550	\$ 42.56	\$ 16.29	N. Gas	Hydro	VRF HP	DOAS & DX
West End II	52	43,025	\$ 229	\$ 189,823	\$ 31.05	\$ 15.44	N. Gas	E Base	Mini Spit	ERV No DX
GVP	35	40,432	\$ 151	\$ 174,432	\$ 27.10	\$ 11.90	N. Gas	E Base	Mini Spit	ERV & DX
West End I	64	58,460	\$ 185	\$ 169,167	\$ 26.08	\$ 16.64	N. Gas	E Base	Mini Spit	ERV No DX
Wessex	40	31,590	\$ 209	\$ 164,703	\$ 28.11	\$ 11.31	N. Gas	E Base	VRF HP	ERV & DX
Meadows II	48	43,344	\$ 179	\$ 161,510	\$ 26.12	\$ 18.73	HPWH	VRF	VRF HP	ERV No DX

High Performance-to-Passive



PORTER STATION
210 Valley Street
Portland, ME

60 Units
57,000 SF



TT's Passive house TEAM



Prudence
Ferreira
Vice President
Portland, ME
-1.207.558.8777



Michael
Pulaski
Vice President &
Portland Office
Director
Portland, ME
-1.207.245.6054



Rheannon
DeMond
Associate
Portland, ME
-1.207.245.6068



Nicole
Peterson
Associate
Portland, ME
-1.207.245.6068



Phius Tech Committee -
Creating PH Standards for
over a decade

PH Consultant Instructor
Training professionals for
almost 15 years

Collective experience
consulting on more than 75
Passive House projects – and
counting

FEATURED PROJECT

100 Flatbush



FEATURED PROJECT

Waynflete Campus, Lower
School Addition



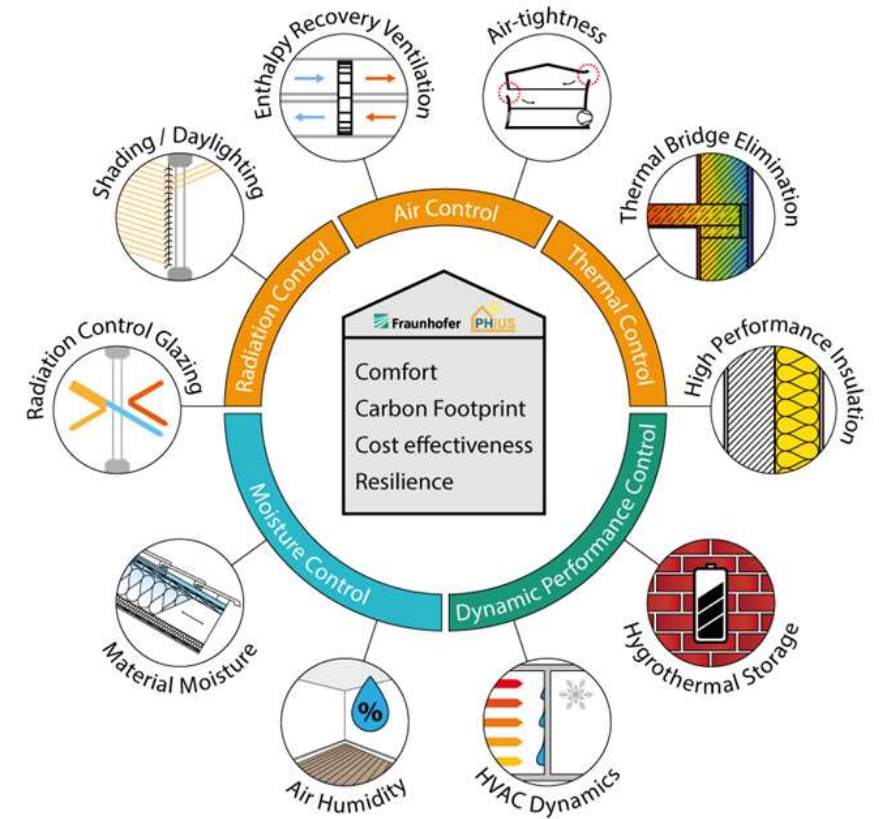
FEATURED PROJECT

Pine Hall, Wheaton
College



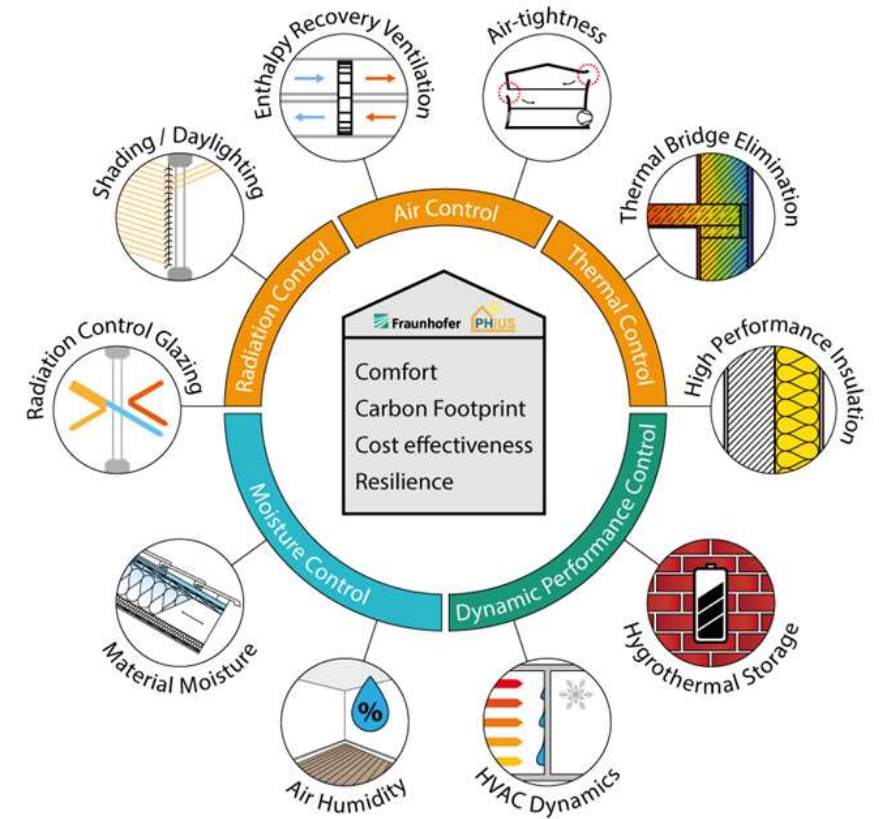
5 Principles of Passive House

- High quality insulation.
- Heat control and robust windows.
- Airtight construction.
- Heat recovery ventilation.
- Thermal bridge free design

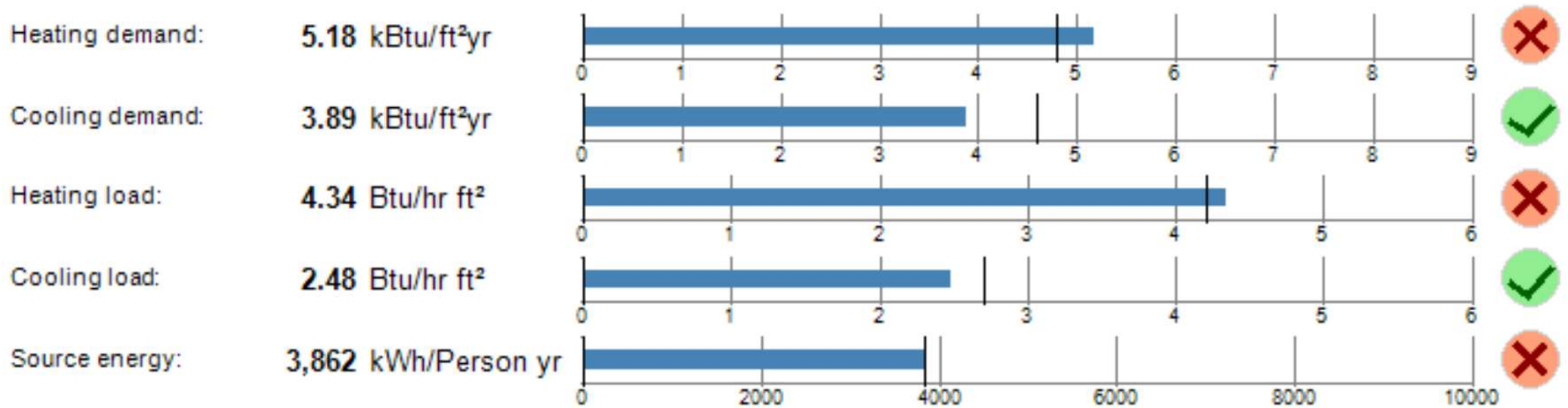


5 Principles of Passive House

- High quality insulation.
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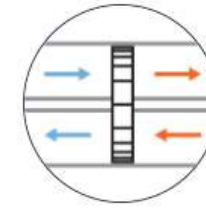
Modeled PERFORMANCE



Cause and Effect – VENTILATION DESIGN

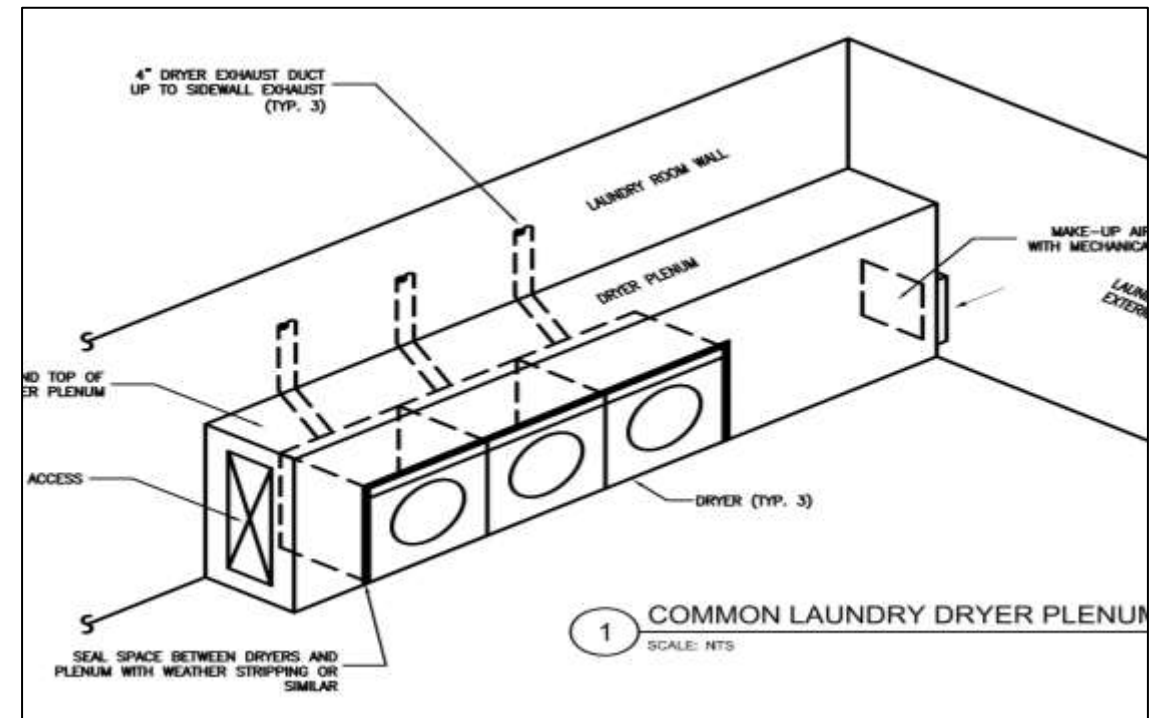
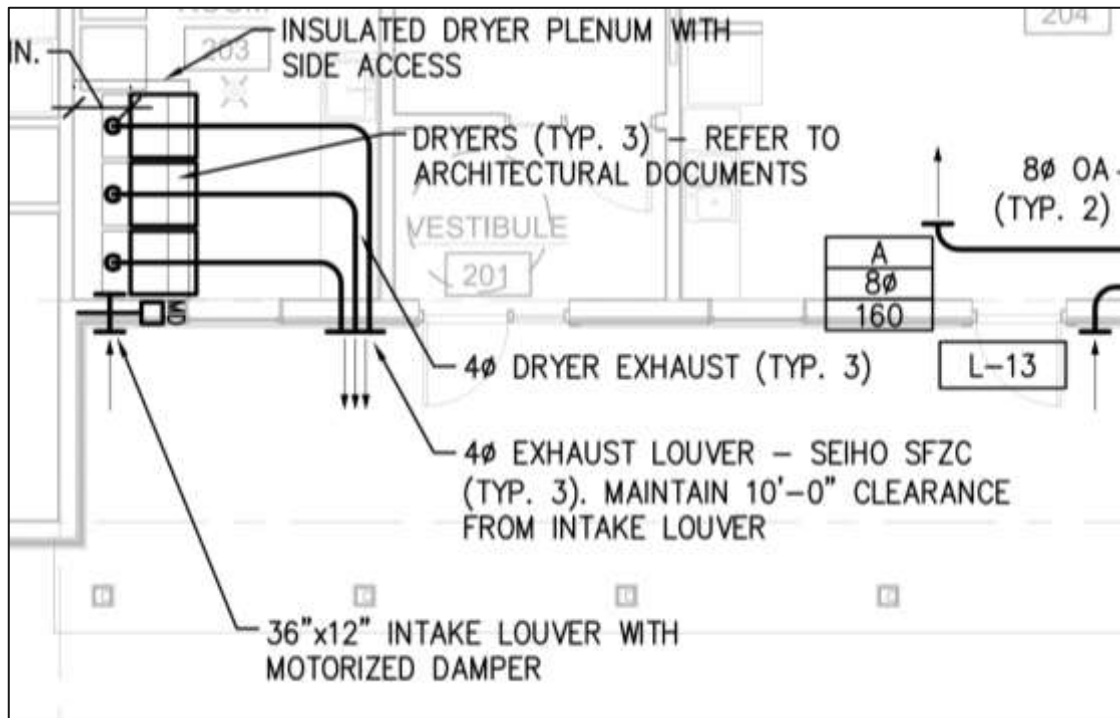
- Laundry MUA System
- Trash Room Energy demand
- Exposed ERV Duct

AIR CONTROL – MUA PLENIM



**Balanced Ventilation
with Heat & Moisture Recovery**

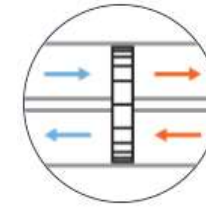
Eliminate the MAU to reduce heating demand & source energy



Passive principles: AIR CONTROL



Passive principles: AIR CONTROL



**Balanced Ventilation
with Heat & Moisture Recovery**

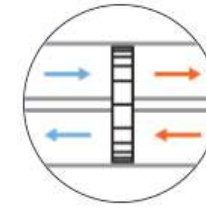


Exhaust Vent

Intake Louvers

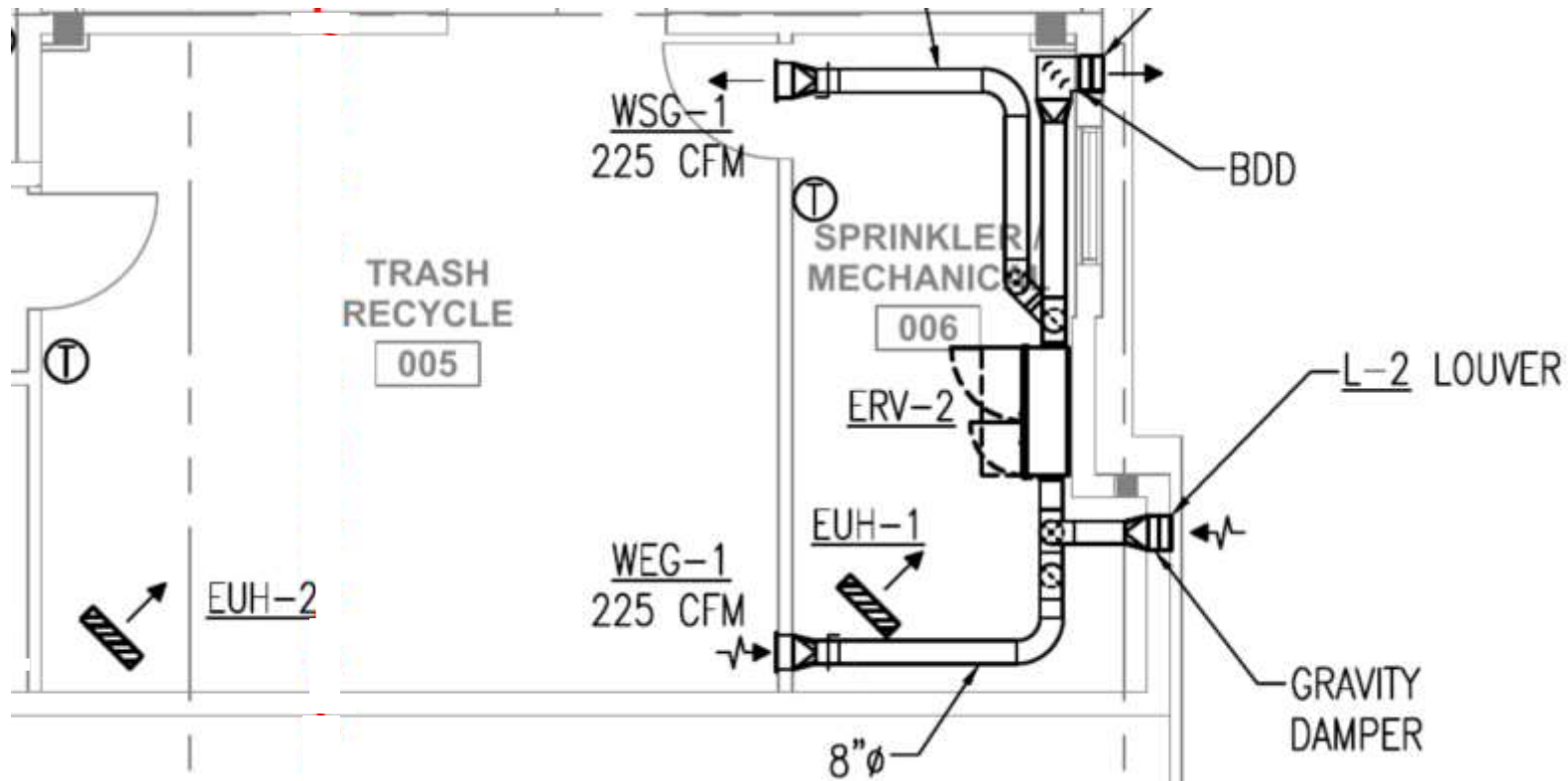


AIR CONTROL – ERV



**Balanced Ventilation
with Heat & Moisture Recovery**

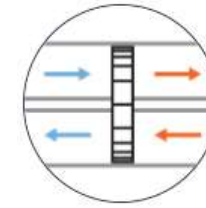
Separate the Trash Room from the Central ERV to reduce heating load





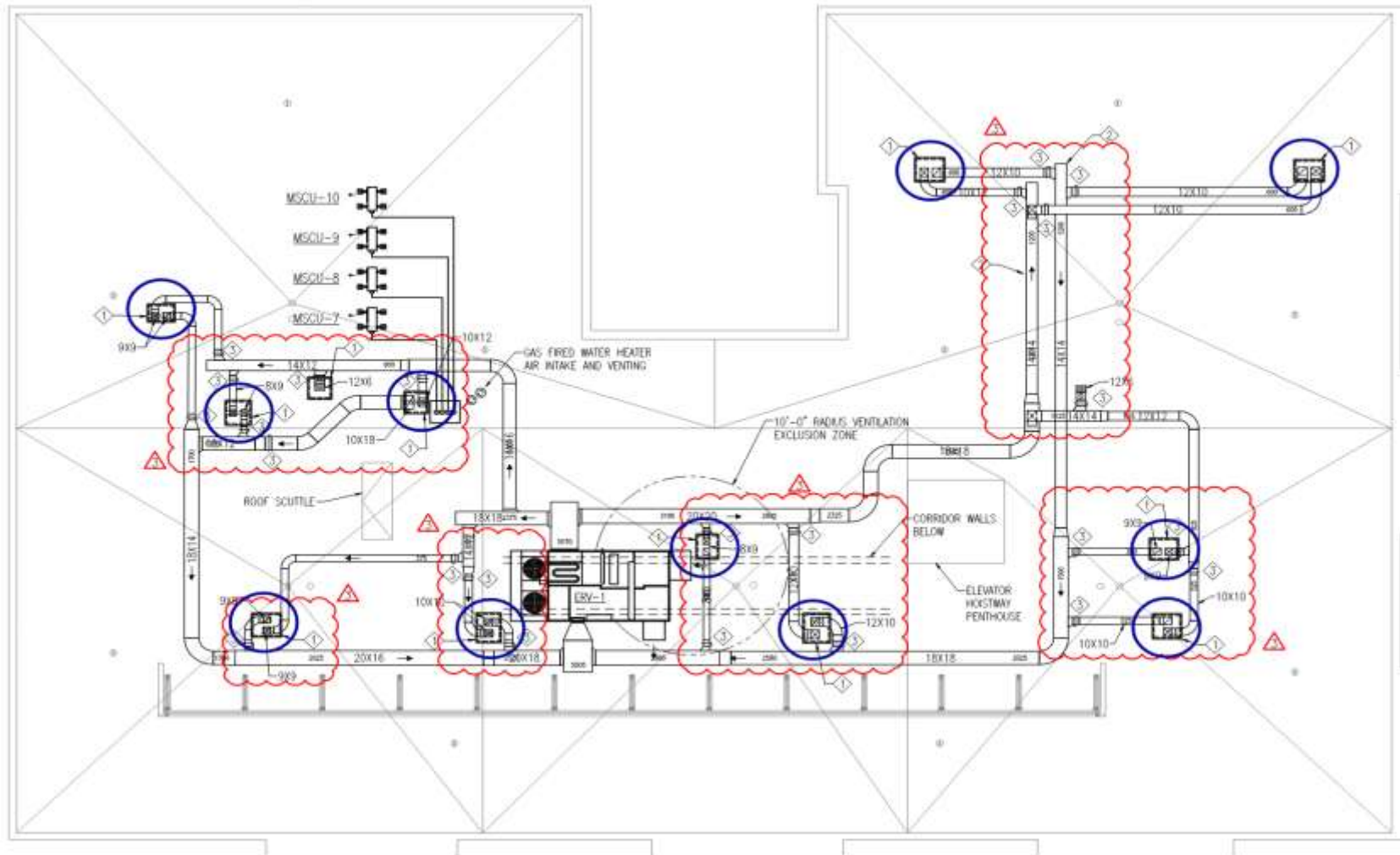


AIR CONTROL – Exposed Duct



**Balanced Ventilation
with Heat & Moisture Recovery**

Insulate the rooftop duct to reduce heating demand & source energy



AIR CONTROL

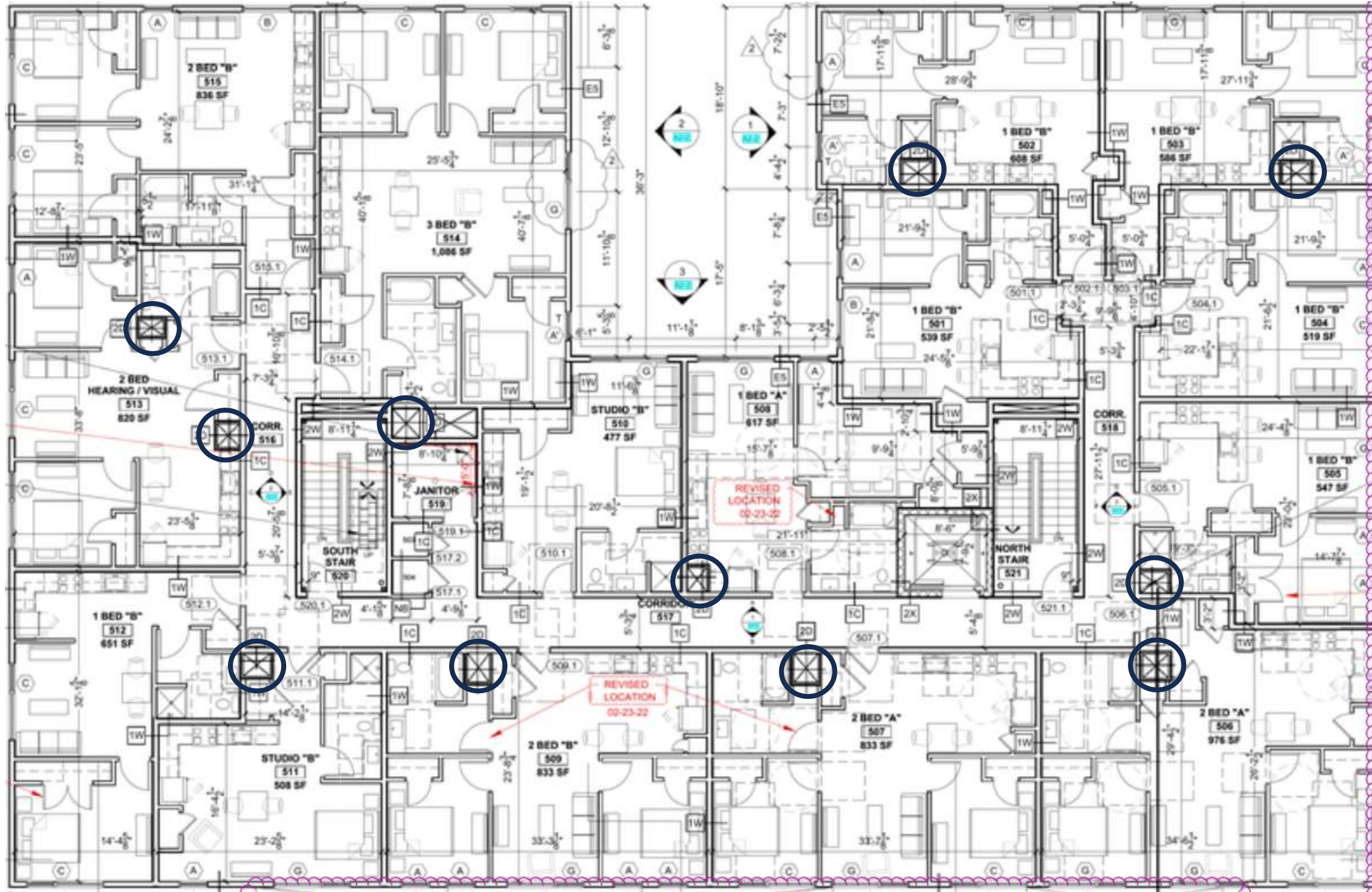
Roof Plan

11 Duct Shafts



THE COST OF EXPOSED DUCTWORK

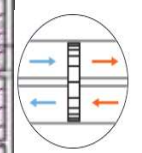




AIR CONTROL

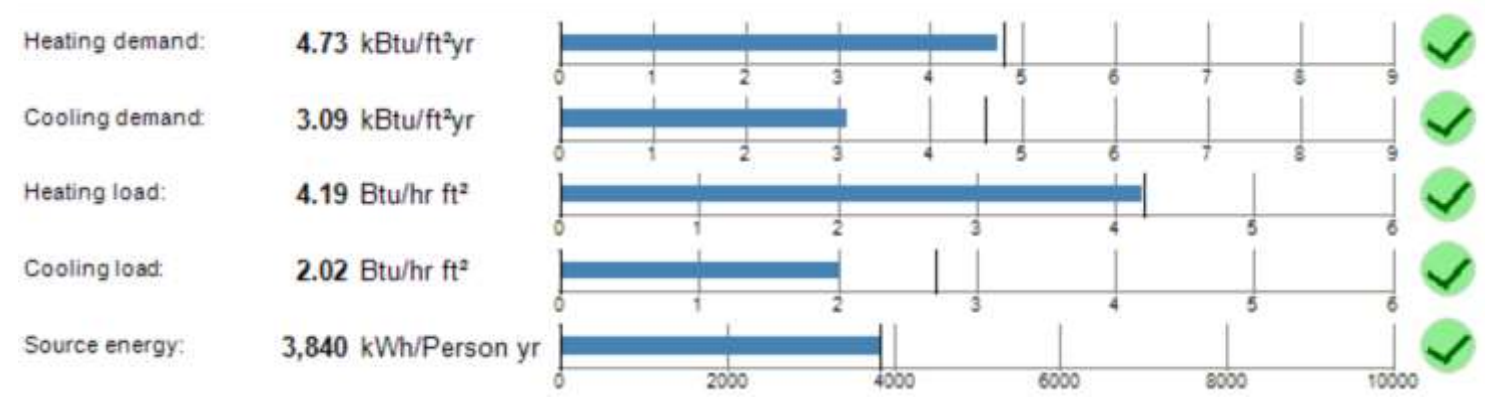
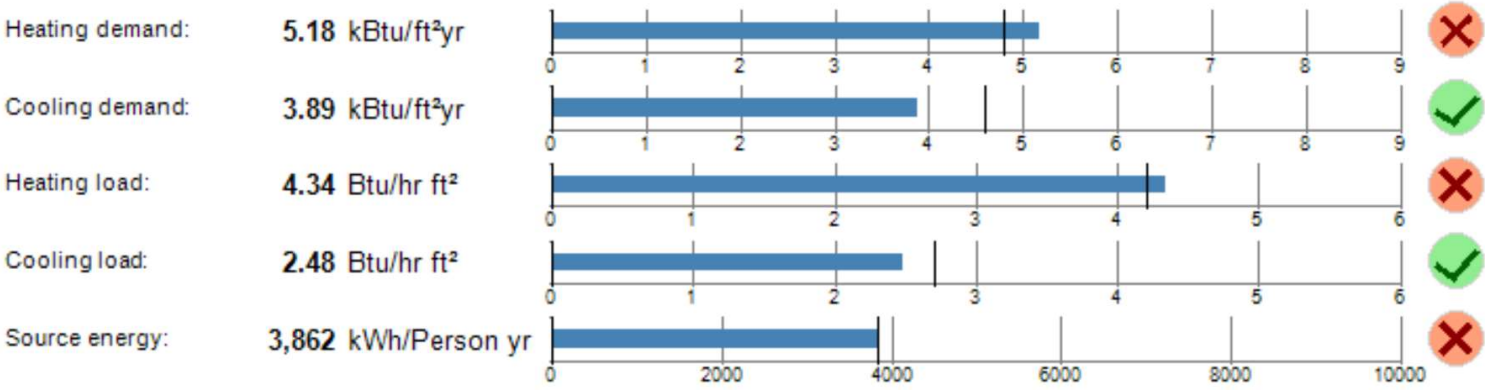
Roof Plan

15 Fire Dampers
per floor



Balanced Ventilation
with Heat & Moisture Recovery

Modeled PERFORMANCE VS PASSIVE



LESSONS LEARNED

Air Control

- Put ERV's indoors – Affects heat demand
 - Reduce shaft & fire damper approach
- ERV in Trash room reduced heat demand
- Laundry Plenum reduced kBtu load 7 demand
- Incorporate air leakage from PTHP units



Beneficial use for the Roof







THE IMPACT OF SOLAR

Property			KWH Site Usage & Solar Production (5 Yr Avg)				MMBTU CALCs					
	Units	Gross Floor Area	KWH Site Usage (Source)	KWH Solar Production (Renewable)	Total KWH (Site)	Total KWH/Sq. Ft. (Site)	1 KWH = 3,413 BTU	MMBTU Total	MMBTU Source Total	% of Total	MMBTU Renewable Total	% of Total
Meeting Place 1	39	35,780	27,374	77,845	105,219	2.94	359,111,082	359	93	26%	266	74%
Ridgewood II	24	23,026	87,192	60,000	147,192	6.39	502,366,296	502	298	59%	205	41%
Meeting Place 3	43	38,680	148,648	71,830	220,478	5.70	752,491,414	752	507	67%	245	33%
Bartlet Woods	28	24,147	131,880	41,500	173,380	7.18	591,745,940	592	450	76%	142	24%
Young Street	28	25,594	191,617	40,000	231,617	9.05	790,508,821	791	654	83%	137	17%
Meadows 1	24	21,672	131,880	25,000	156,880	7.24	535,431,440	535	450	84%	85	16%

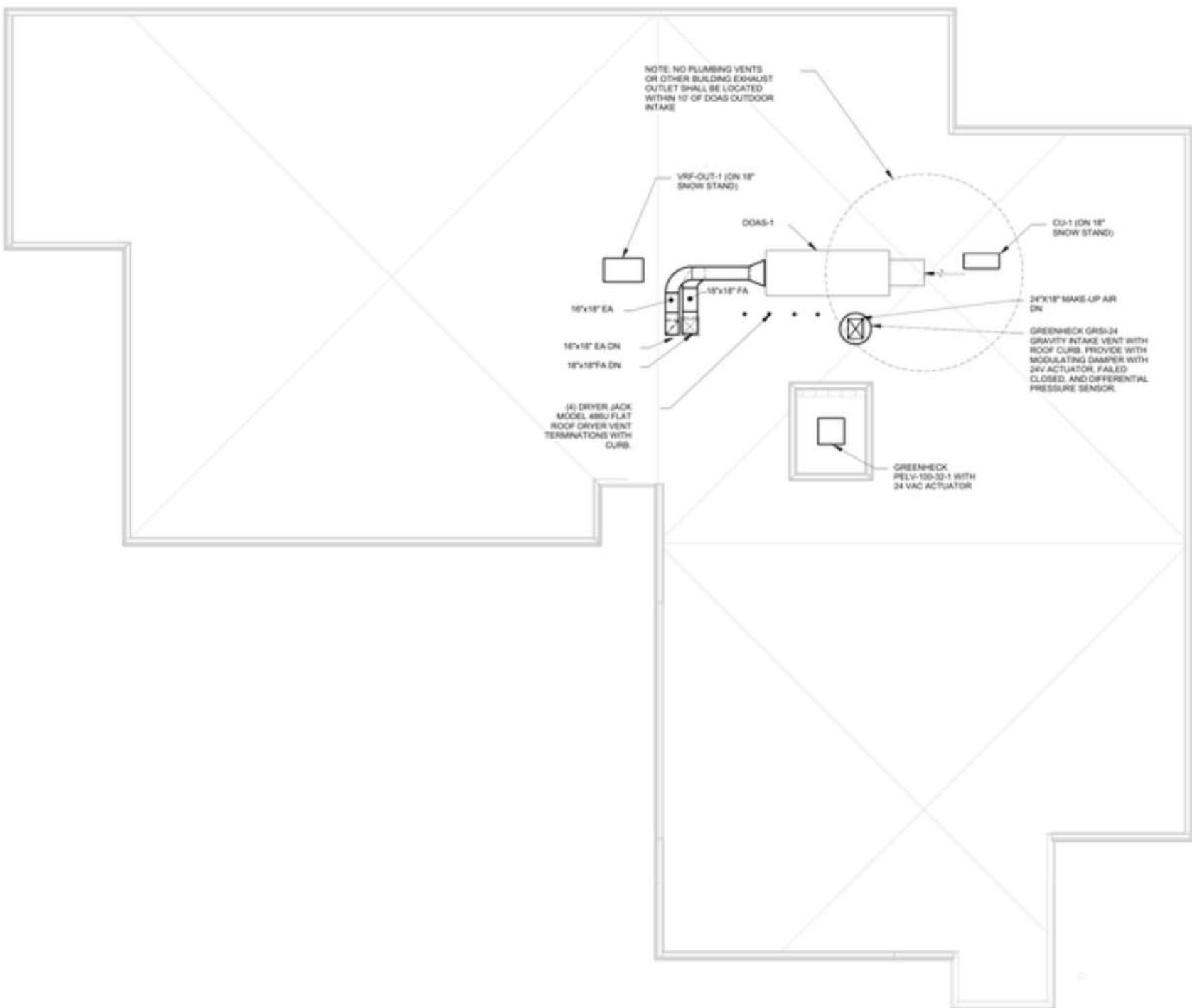
Learned Lessons Installed



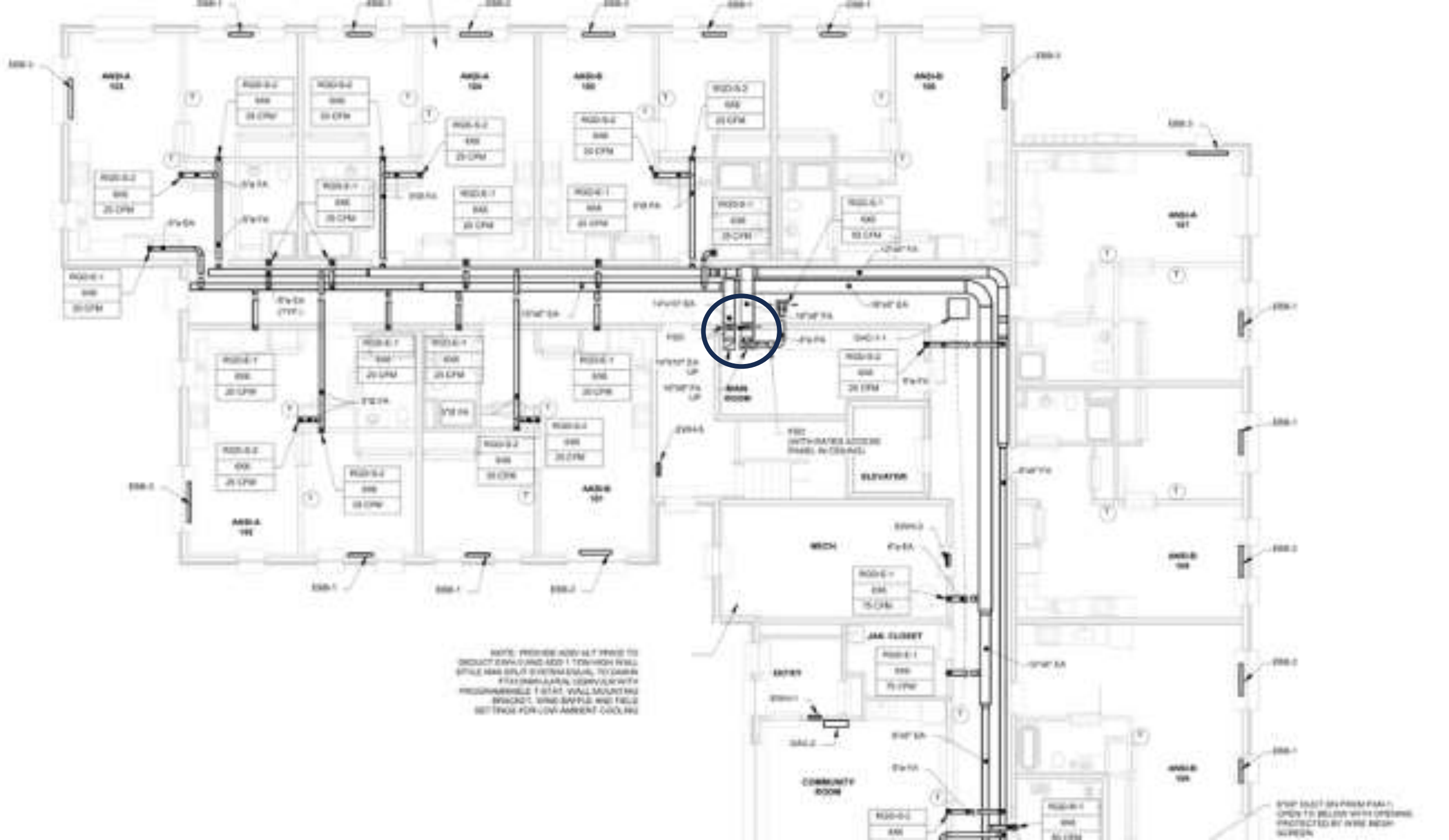
VILLAGE COMMONS
46 US Route One
Scarborough, ME

31 Units
23,750 SF



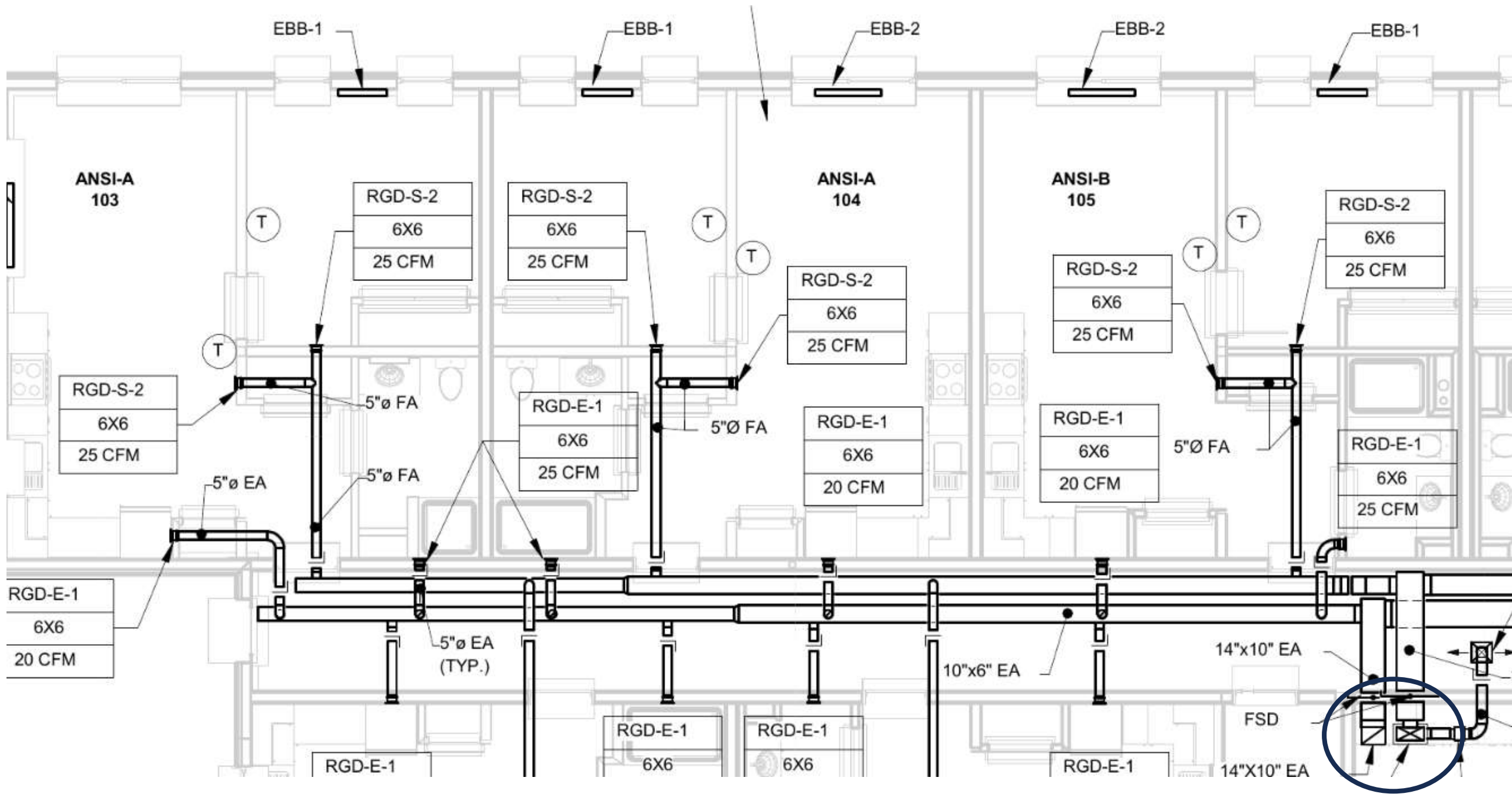






NOTE: PROVIDE ACCESS TO
 DUCTS 20" HIGH AND 1' TALL WALL
 SPACE HAS SPLIT SYSTEMS, TRY DAMP
 FIRE DAMPERS, SERVICE WITH
 HIGHWAYABLE T-SHIRT WALL MOUNTING
 BRACKETS, AND SAFETY AND FIELD
 SETTINGS FOR LOW AMBIENT COOLING

STOP SIGN ON FROM PAUL
 OPEN TO ALLOW WITH OTHERS
 PROTECTED BY WIRE MESH
 SCREEN









LESSONS LEARNED

Air Control

- ERV's indoors –
 - Single Shaft
 - Minimal Fire Dampers
 - Accelerated duct installation
- Separate / Exterior Trash room
 - Exhaust fan to move smells
- Rooftop preserved for solar



FINAL REMARKS

Building Envelop Design

- Air Tightness level of .10 is achievable with some effort
 - The result lowers operating costs by 40%-50% from 2005 levels
- Air Tightness below .10 requires diligence & training
 - Modeling is recommended to prevent mold & condensation

Ventilation Design

- Exterior ducts & multiple shafts affect design & operations
- Consider rooftop space for current or future solar
- Penetrating shafts in corridors to minimize fire dampers
 - Can also improve construction sequencing schedule
- Design preference is to bring supply to bedroom & living plus exhaust bathroom & kitchen
- Decentralized ERV's reduces duct sizing & fire damper requirements
- Separate / Exterior Trash room from central ERV

Thank You