Project Information

STRAND RESIDENCE
6950 MAKER STREET
MERCER ISLAND, WA 98040

Contact Information

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Messages / Results *

Review required for custom entries: - Doors
UA Reduction = 44.7, Proposed UA is better than baseline by 7%
UA-reduction meets selected Option 1.3

Whole House Mechanical Ventilation Airflow Rate: 270 CFM with Run Time Percent of 50%, Unbalanced, Not Distributed

* Results assume your inputs are complete and correct. Results do not constitute an approval. Analysis should be reviewed by your AHJ.

ANALYSIS SET UP

What code compliance pathway are you using?	**Table R406.3 UA Trade Off**
Project Building Type?	**New Construction**
Occupancy Type?	**R3 Single family homes and duplexes**
Code Version?	**WSEC 2018**
Classification:	Medium Dwelling Unit – 4351 sq. ft.
Baseline Description:	Code Baseline - Baseline and proposed window areas are equal.
About Your Selection:	Up to 15 sf exempt window and 24 sf exempt door allowable

RESULTS - Comparison of Baseline and Proposed Design

Component Performance, R occupancies	Baseline U	Baseline Area	Baseline UA	Proposed Design U	Proposed Design Area	Proposed Design UA
Doors U =	0.300	430	128.9	0.280	430	120.3
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	460	137.9	0.280	460	128.7
Flat/Vaulted Ceilings U =	0.027	1,673	45.2	0.031	1,673	52.2
Wall (above grade) U =	0.056	3,325	186.2	0.054	3,325	179.6
Floors over Crawlspace U =	0.029	616	17.9	0.040	616	24.6
Slab on Grade F =	0.540	0	0.0		0	0.0
Below Grade Wall U =	0.042	661	27.8	0.055	661	36.4
Below Grade Slab F =	0.570	154	87.8	0.293	154	45.1

Baseline UA Total	631.5	**Proposed UA Total**	586.8
Required Credits	6.0	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	7.1%
		UA Reduction	44.7

If the Proposed UA ≤ the Target UA, and the Proposed Credits from Table 406 are ≥ those required in Section R406, then the home meets the WSEC.

Table R406.2 Fuel Normalization Credits

System No.	Full Description	Select System Type	Fuel Normalization Credits (406.2)	Energy Credits (406.3)	Total Credits (406.2 & 406.3)
2	For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020).	**Heat Pump, air-to-air or air to water**	1.0	5.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope			**Option 1.3**	0.5	U 0.28 Windows / R-38 floors or R-10 Fully insulated slab. Or 5% reduction in UA
2	Air Leakage Control and Efficient Ventilation				0.0	
3	High Efficiency HVAC			**Option 3.2**	1.0	Heat Pump: Air Source with min HSPF of 9.5
4	High Efficiency HVAC Distribution System			**Option 4.2**	1.0	Ducts/distribution system in conditioned space per R403.3.7
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.3**	1.0	Gas or propane water heater with min UEF of 0.91 OR Solar supplemental OR GSHP
6	Renewable Electric Energy	1,200	kWh	**Option 6.1**	1.0	On-site wind or solar electric energy
7	Appliance Package			**Option 7.1**	0.5	Appliance Package
				Energy Credits	**5.0**	

***Refer to WSEC 2018 Table R406.3 for complete option descriptions and requirements**

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	4,351 sq. ft
Classification	Medium Dwelling Unit
Notes	

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA	
Exempt	MARVIN .28 DBL GLZ, LOW-E	Custom	0.28	1	3	0	7	0	21	5.9	Refer to WSEC R402.1.5
SIDELITE	MARVIN .28 DBL GLZ, LOW-E	Custom	0.28	1	2	0	7	0	14	3.9	Refer to WSEC R402.1.5
005C	MARVIN .28 DBL GLZ, LOW-E	Custom	0.28	1	9	0	7	0	63	17.6	Refer to WSEC R402.1.5
102B	MARVIN .28 DBL GLZ, LOW-E	Custom	0.28	1	9	0	8	0	72	20.2	Refer to WSEC R402.1.5
111B	MARVIN .28 DBL GLZ, LOW-E	Custom	0.28	1	6	0	8	0	48	13.4	Refer to WSEC R402.1.5
202A	MARVIN .28 DBL GLZ, LOW-E	Custom	0.28	1	12	0	8	0	96	26.9	Refer to WSEC R402.1.5
204A	MARVIN .28 DBL GLZ, LOW-E	Custom	0.28	1	17	1	8	0	137	38.3	Refer to WSEC R402.1.5
									0	0.0	
									0	0.0	
									0	0.0	
									0	0.0	
								Sum of Area and UA (excluding exempt door)	430	120.3	
								Exterior Doors Area Weighted U		0.280	

Overhead Glazing

Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
									-	
									-	
									-	
									-	
									-	
								Sum of Area and UA	0.0	0
								Overhead Glazing Area Weighted U		

Vertical Glazing Schedule

Rows to Show: 16

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	2	0	6	0	12.0	3.36
1	103A	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	3	0	6	0	18.0	5.04
2	103B	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	6	0	6	0	36.0	10.08
3	103C	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	3	0	6	0	18.0	5.04
4	105A	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	9	0	6	0	54.0	15.12
5	106A	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	6	0	6	0	36.0	10.08
6	108A	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	2	0	6	0	12.0	3.36
7	109A	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	6	0	6	0	36.0	10.08
8	111A	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	6	0	6	0	36.0	10.08
9	202A	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	3	0	6	0	18.0	5.04
10	202B	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	6	0	6	0	36.0	10.08
11	203A	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	9	0	6	0	54.0	15.12
12	203B	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	9	7	6	0	57.5	16.10
13	205A	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	6	0	6	0	36.0	10.08
14	206A	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	2	0	6	0	12.0	3.36
15										-	-
16										-	-
								Sum of Area and UA (excluding exempt window)		459.5	128.7
								Vertical Glazing Area Weighted U			0.280
								Vertical Glazing and Doors Area Weighted U			0.280

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	St Truss R49 cavity R3 Sheath 34' Span	10-7A	0.031	1,673	52.2
			Sum of Area and UA	1,673	52.2

Walls (Above Grade)

Plan ID	Component Description	Ref.	Wall U	Net Area	UA
	R21 cavity+R0 foam INT 2X6W Lap (Code Baseline)	10-5	0.054	3,325	180
			Sum of Area and UA	3,325	180

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
	R38 Wood Joist Exposed	10-4A	0.040	616	25
			Sum of Area and UA	616	25

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
				Sum of Perimeter and FP	0	0

Below Grade Walls and Slabs

Plan ID	Component Description	Ref.	Wall U	Wall Area	Wall UA	Slab F	Slab Perim	Slab UA
	R10 Perimeter 7' depth w/TB, R10 Full Underslab (Option 1a-1c)	Baylon & Ker	0.055	661	36.4	0.293	154	45
			Sum of Area, Length and UA	661	36.4		154	45

Ventilation Requirements

Number of Bedrooms	5	
Run-Time Percent in Each 4-Hour Segment	50%	
Is the system Balanced?	Unbalanced	
Is the system Distributed?	Not Distributed	
Ventilation Code Section	IRC, Chapter 15	
Whole House Mechanical Ventilation Airflow Rate	270	CFM

HVAC Thermal Distribution System — Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20_20

Is this a hydronic heating system?	No
Location of Ducts	Conditioned Space
Location of Air Handler	Conditioned Space

Is Duct Testing Required? No

Option 4.2: A maximum of 10 feet of return ducts and 5 feet of supply ducts are allowed to be located outside of the building thermal envelope, if insulated and sealed per R403.3.7.

Links to Download Forms, Checklists and Other Resources

	Link	
Compliance Certificate	Compliance Certificate	Instructions
Insulation Certificate for Residential New Construction	Insulation Certificate	
Duct Testing Affadavits		
Existing Construction	Affidavit, Existing	
New Construction	Affidavit, New	
Prescriptive Checklist for 2018 WSEC	Prescriptive Checklist	
Alterations (Remodel) Worksheet	Worksheet	

Show Heating System Sizing? Show

Heating System Sizing - Proposed Design — Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool

Nearest Weather Station	Seattle: Sea-Tac AP	
Indoor Design Temperature	70	F
Outdoor Design Temperature	24	F
Design Temperature Difference (ΔT)	46	F
Conditioned Floor Area, Proposed Design	4,351	ft2
Conditioned Volume (Leave blank to use default of 8.5 ft. ceiling height)	36,984	ft3
HVAC System Type	Heat Pump	
Location of HVAC Distribution System	Conditioned Space	
Sum of UA, including exempt door and window	596	
Envelope Heat Load (Sum of UA X ΔT)	27,419	Btu / Hour
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	18,373	Btu / Hour
Building Design Heat Load (Air Leakage + Envelope Heat Loss)	45,793	Btu / Hour
Building and Duct Heat Load (For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1; For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1)	45,793	Btu / Hour
Maximum Heat Equipment Output (Building and Duct Heat Loss X 1.25 for heat pumps; Building and Duct Heat Loss X 1.40 for all other systems	57,241	Btu / Hour