PRMU20240139

Project Information
East Town Crossing, Unit # 101
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.61, Proposed UA is better than baseline by 1%

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Whole House Mechanical Ventilation Airflow Rate: 70 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 1109 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	128	38.3	0.300	128	38.3
Flat/Vaulted Ceilings U =	0.027	0	0.0		0	0.0
Wall (above grade) U =	0.056	1,307	73.2	0.054	1,307	70.6
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	146	78.8	0.540	146	78.8
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	202.3	**Proposed UA Total**	199.7
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	1.3%
		UA Reduction	2.6

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	1,109 sq. ft
Classification	Small Dwelling Unit
Notes	

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
101A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
101B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
								Sum of Area and UA	**40**	**12.0**
								Exterior Doors Area Weighted U		**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 4

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	1	U=0.30 (Code Baseline)	Table 406.2	0.30	3	6	0	4	0	72.0	21.60
2	4	U=0.30 (Code Baseline)	Table 406.2	0.30	1	6	0	6	0	36.0	10.80
3	5	U=0.30 (Code Baseline)	Table 406.2	0.30	1	2	6	3	0	7.5	2.25
4	6	U=0.30 (Code Baseline)	Table 406.2	0.30	1	6	0	2	0	12.0	3.60
									Sum of Area and UA	**127.5**	**38.3**
									Vertical Glazing Area Weighted U		**0.300**
									Vertical Glazing and Doors Area Weighted U		**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	No ceiling/roof in thermal envelope	NA	-		0.0
			Sum of Area and UA	**0**	**0.0**

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	1,307	71
			Sum of Area and UA	**1,307**	**71**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
			Sum of Area and UA	**0**	**0**

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	R10 2' vertical (Code Baseline)	10-2	0.540		146	79
				Sum of Perimeter and FP	146	79

Below Grade Walls and Slabs

Plan ID	Component Description	Ref.	Wall U	Wall Area	Wall UA	Slab F	Slab Perim	Slab UA
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	3	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	70 CFM	

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

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

Is Duct Testing Required? No

Links to Download Forms, Checklists and Other Resources

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	

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

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70	F
Outdoor Design Temperature	19	F
Design Temperature Difference (ΔT)	51	F
Conditioned Floor Area, Proposed Design	1,109	ft2
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	9,427	ft3
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	200	
Envelope Heat Load Sum of UA X ΔT	10,183	Btu / Hour
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	5,192	Btu / Hour
Building Design Heat Load Air Leakage + Envelope Heat Loss	15,375	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	15,375	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	21,526	Btu / Hour

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East Town Crossing, Unit #102
Building B
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Messages / Results *

UA Reduction = 2.79, Proposed UA is better than baseline by 1%

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ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Whole House Mechanical Ventilation Airflow Rate: 70 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 1061 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	91	27.4	0.300	91	27.4
Flat/Vaulted Ceilings U =	0.027	0	0.0		0	0.0
Wall (above grade) U =	0.056	1,397	78.2	0.054	1,397	75.4
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	151	81.7	0.540	151	81.7
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	199.3	**Proposed UA Total**	196.5
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	1.4%
		UA Reduction	2.8

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	1,061	sq. ft
Classification	Small Dwelling Unit	
Notes		

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
102A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
102B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
							Sum of Area and UA		**40**	**12.0**
							Exterior Doors Area Weighted U			**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 3

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	2	U=0.30 (Code Baseline)	Table 406.2	0.30	3	4	6	3	6	47.3	14.18
2	3	U=0.30 (Code Baseline)	Table 406.2	0.30	1	5	0	6	0	30.0	9.00
3	7	U=0.30 (Code Baseline)	Table 406.2	0.30	1	7	0	2	0	14.0	4.20
								Sum of Area and UA		**91.3**	**27.4**
								Vertical Glazing Area Weighted U			**0.300**
								Vertical Glazing and Doors Area Weighted U			**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	No ceiling/roof in thermal envelope	NA	-		0.0
			Sum of Area and UA	**0**	**0.0**

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	1,397	75
			Sum of Area and UA	**1,397**	**75**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
			Sum of Area and UA	**0**	**0**

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	R10 2' vertical (Code Baseline)	10-2	0.540		151	82
				Sum of Perimeter and FP	151	82

Below Grade Walls and Slabs

Plan ID	Component Description	Ref.	Wall U	Wall Area	Wall UA	Slab F	Slab Perim	Slab UA
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	3	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	70 CFM	

HVAC Thermal Distribution System

Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20_

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

Is Duct Testing Required? No

Links to Download Forms, Checklists and Other Resources

	Link	
Compliance Certificate	Compliance Certificate	Instructions
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Alterations (Remodel) Worksheet	Worksheet	

Heating System Sizing - Proposed Design

Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70 F	
Outdoor Design Temperature	19 F	
Design Temperature Difference (ΔT)	51 F	
Conditioned Floor Area, Proposed Design	1,061 ft2	
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	9,019 ft3	
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	197	
Envelope Heat Load Sum of UA X ΔT	10,022 Btu / Hour	
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	4,967 Btu / Hour	
Building Design Heat Load Air Leakage + Envelope Heat Loss	14,989 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	14,989 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	20,985 Btu / Hour	

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Whole House Mechanical Ventilation Airflow Rate: 70 CFM with Run Time Percent of 100%, Balanced, Distributed

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About Your Selection:	Up to 15 sf exempt window and 24 sf exempt door allowable

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Component Performance, R occupancies	Baseline U	Baseline Area	Baseline UA	Proposed Design U	Proposed Design Area	Proposed Design UA
Doors U =	0.300	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	78	23.4	0.300	78	23.4
Flat/Vaulted Ceilings U =	0.027	0	0.0		0	0.0
Wall (above grade) U =	0.056	1,271	71.2	0.054	1,271	68.6
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	138	74.3	0.540	138	74.3
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	180.8	**Proposed UA Total**	178.3
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	1.4%
		UA Reduction	2.5

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	1,008 sq. ft
Classification	Small Dwelling Unit
Notes	

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
103A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
103B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
							Sum of Area and UA		**40**	**12.0**
							Exterior Doors Area Weighted U			**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 2

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	1	U=0.30 (Code Baseline)	Table 406.2	0.30	2	6	0	4	0	48.0	14.40
2	3	U=0.30 (Code Baseline)	Table 406.2	0.30	1	5	0	6	0	30.0	9.00
								Sum of Area and UA		**78.0**	**23.4**
								Vertical Glazing Area Weighted U			**0.300**
								Vertical Glazing and Doors Area Weighted U			**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	No ceiling/roof in thermal envelope	NA	-		0.0
			Sum of Area and UA	**0**	**0.0**

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	1,271	69
			Sum of Area and UA	**1,271**	**69**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
			Sum of Area and UA	**0**	**0**

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	R10 2' vertical (Code Baseline)	10-2	0.540		138	74
				Sum of Perimeter and FP	138	74

Below Grade Walls and Slabs

Plan ID	Component Description	Ref.	Wall U	Wall Area	Wall UA	Slab F	Slab Perim	Slab UA
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	2	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	70 CFM	

HVAC Thermal Distribution System

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

Is Duct Testing Required? No

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New Construction	Affidavit, New	
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Alterations (Remodel) Worksheet	Worksheet	

Heating System Sizing - Proposed Design

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Nearest Weather Station	Puyallup	
Indoor Design Temperature	70 F	
Outdoor Design Temperature	19 F	
Design Temperature Difference (ΔT)	51 F	
Conditioned Floor Area, Proposed Design	1,008 ft2	
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	8,568 ft3	
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	178	
Envelope Heat Load Sum of UA X ΔT	9,092 Btu / Hour	
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	4,719 Btu / Hour	
Building Design Heat Load Air Leakage + Envelope Heat Loss	13,811 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	13,811 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	19,335 Btu / Hour	

Project Information
East Town Crossing, Unit # 104
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.7, Proposed UA is better than baseline by 1%

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Whole House Mechanical Ventilation Airflow Rate: 55 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 976 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	70	20.9	0.300	70	20.9
Flat/Vaulted Ceilings U =	0.027	0	0.0		0	0.0
Wall (above grade) U =	0.056	1,352	75.7	0.054	1,352	73.0
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	145	78.1	0.540	145	78.1
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	186.8	**Proposed UA Total**	184.1
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	1.4%
		UA Reduction	2.7

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	976 sq. ft
Classification	Small Dwelling Unit
Notes	

City of Puyallup
Development & Permitting Services
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Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
104A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
104B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
								Sum of Area and UA	**40**	**12.0**
								Exterior Doors Area Weighted U		**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 3

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	1	U=0.30 (Code Baseline)	Table 406.2	0.30	1	6	0	4	0	24.0	7.20
2	2	U=0.30 (Code Baseline)	Table 406.2	0.30	1	4	6	3	6	15.8	4.73
3	3	U=0.30 (Code Baseline)	Table 406.2	0.30	1	5	0	6	0	30.0	9.00
									Sum of Area and UA	**69.8**	**20.9**
									Vertical Glazing Area Weighted U		**0.300**
									Vertical Glazing and Doors Area Weighted U		**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	No ceiling/roof in thermal envelope	NA	-		0.0
			Sum of Area and UA	**0**	**0.0**

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	1,352	73
			Sum of Area and UA	**1,352**	**73**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
			Sum of Area and UA	**0**	**0**

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	R10 2' vertical (Code Baseline)	10-2	0.540		145	78
				Sum of Perimeter and FP	145	78

Below Grade Walls and Slabs

Plan ID	Component Description	Ref.	Wall U	Wall Area	Wall UA	Slab F	Slab Perim	Slab UA
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	2	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	55 CFM	

HVAC Thermal Distribution System

Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20_

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

Is Duct Testing Required? No

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	

Heating System Sizing - Proposed Design

Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70 F	
Outdoor Design Temperature	19 F	
Design Temperature Difference (ΔT)	51 F	
Conditioned Floor Area, Proposed Design	976 ft2	
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	8,296 ft3	
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	184	
Envelope Heat Load Sum of UA X ΔT	9,387 Btu / Hour	
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	4,569 Btu / Hour	
Building Design Heat Load Air Leakage + Envelope Heat Loss	13,956 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	13,956 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	19,539 Btu / Hour	

Project Information
East Town Crossing, Unit # 105
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.54, Proposed UA is better than baseline by 1%

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Whole House Mechanical Ventilation Airflow Rate: 70 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 1008 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	78	23.4	0.300	78	23.4
Flat/Vaulted Ceilings U =	0.027	0	0.0		0	0.0
Wall (above grade) U =	0.056	1,271	71.2	0.054	1,271	68.6
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	138	74.3	0.540	138	74.3
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	180.8	**Proposed UA Total**	178.3
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	1.4%
		UA Reduction	2.5

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	1,008 sq. ft
Classification	Small Dwelling Unit
Notes	

City of Puyallup
Development & Permitting Services
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Building | Planning | Engineering | Public Works | Fire | Traffic

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
105A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
105B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
								Sum of Area and UA	**40**	**12.0**
								Exterior Doors Area Weighted U		**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 2

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	1	U=0.30 (Code Baseline)	Table 406.2	0.30	2	6	0	4	0	48.0	14.40
2	3	U=0.30 (Code Baseline)	Table 406.2	0.30	1	5	0	6	0	30.0	9.00
									Sum of Area and UA	**78.0**	**23.4**
									Vertical Glazing Area Weighted U		**0.300**
									Vertical Glazing and Doors Area Weighted U		**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	No ceiling/roof in thermal envelope	NA	-		0.0
			Sum of Area and UA	**0**	**0.0**

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	1,271	69
			Sum of Area and UA	**1,271**	**69**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
			Sum of Area and UA	**0**	**0**

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	R10 2' vertical (Code Baseline)	10-2	0.540		138	74
				Sum of Perimeter and FP	138	74

Below Grade Walls and Slabs

Plan ID	Component Description	Ref.	Wall U	Wall Area	Wall UA	Slab F	Slab Perim	Slab UA
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	2	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	70 CFM	

HVAC Thermal Distribution System

Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20

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

Is Duct Testing Required? No

Links to Download Forms, Checklists and Other Resources

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	

Heating System Sizing - Proposed Design

Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70 F	
Outdoor Design Temperature	19 F	
Design Temperature Difference (ΔT)	51 F	
Conditioned Floor Area, Proposed Design	1,008 ft2	
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	8,568 ft3	
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	178	
Envelope Heat Load Sum of UA X ΔT	9,092 Btu / Hour	
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	4,719 Btu / Hour	
Building Design Heat Load Air Leakage + Envelope Heat Loss	13,811 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	13,811 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	19,335 Btu / Hour	

Project Information
East Town Crossing, Unit # 106
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.7, Proposed UA is better than baseline by 1%

City of Puyallup
Development & Permitting Services
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Building | Planning | Engineering | Public Works | Fire | Traffic

Whole House Mechanical Ventilation Airflow Rate: 55 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 976 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	70	20.9	0.300	70	20.9
Flat/Vaulted Ceilings U =	0.027	0	0.0		0	0.0
Wall (above grade) U =	0.056	1,352	75.7	0.054	1,352	73.0
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	145	78.1	0.540	145	78.1
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	186.8	**Proposed UA Total**	184.1
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	1.4%
		UA Reduction	2.7

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	976 sq. ft
Classification	Small Dwelling Unit
Notes	

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
106A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
106B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
								Sum of Area and UA	**40**	**12.0**
								Exterior Doors Area Weighted U		**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 3

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	1	U=0.30 (Code Baseline)	Table 406.2	0.30	1	6	0	4	0	24.0	7.20
2	2	U=0.30 (Code Baseline)	Table 406.2	0.30	1	4	6	3	6	15.8	4.73
3	3	U=0.30 (Code Baseline)	Table 406.2	0.30	1	5	0	6	0	30.0	9.00
									Sum of Area and UA	**69.8**	**20.9**
									Vertical Glazing Area Weighted U		**0.300**
									Vertical Glazing and Doors Area Weighted U		**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	No ceiling/roof in thermal envelope	NA	-		0.0
			Sum of Area and UA	**0**	**0.0**

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	1,352	73
			Sum of Area and UA	**1,352**	**73**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
			Sum of Area and UA	**0**	**0**

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	R10 2' vertical (Code Baseline)	10-2	0.540		145	78
				Sum of Perimeter and FP	145	78

Below Grade Walls and Slabs

Plan ID	Component Description	Ref.	Wall U	Wall Area	Wall UA	Slab F	Slab Perim	Slab UA
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	2	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	55 CFM	

HVAC Thermal Distribution System

Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20_

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

Is Duct Testing Required? No

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	

Heating System Sizing - Proposed Design

Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70 F	
Outdoor Design Temperature	19 F	
Design Temperature Difference (ΔT)	51 F	
Conditioned Floor Area, Proposed Design	976 ft2	
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	8,296 ft3	
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	184	
Envelope Heat Load Sum of UA X ΔT	9,387 Btu / Hour	
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	4,569 Btu / Hour	
Building Design Heat Load Air Leakage + Envelope Heat Loss	13,956 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	13,956 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	19,539 Btu / Hour	

Project Information
East Town Crossing, Unit # 107
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.61, Proposed UA is better than baseline by 1%

City of Puyallup
Development & Permitting Services
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Fire | Traffic

Whole House Mechanical Ventilation Airflow Rate: 70 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 1108 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	130	38.9	0.300	130	38.9
Flat/Vaulted Ceilings U =	0.027	0	0.0		0	0.0
Wall (above grade) U =	0.056	1,305	73.1	0.054	1,305	70.5
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	146	78.8	0.540	146	78.8
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	202.8	**Proposed UA Total**	200.2
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	1.3%
		UA Reduction	2.6

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	1,108 sq. ft
Classification	Small Dwelling Unit
Notes	

City of Puyallup
Development & Permitting Services
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Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
107A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
107B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
								Sum of Area and UA	**40**	**12.0**
								Exterior Doors Area Weighted U		**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 4

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	1	U=0.30 (Code Baseline)	Table 406.2	0.30	3	6	0	4	0	72.0	21.60
2	4	U=0.30 (Code Baseline)	Table 406.2	0.30	1	6	0	6	0	36.0	10.80
3	5	U=0.30 (Code Baseline)	Table 406.2	0.30	1	2	6	3	0	7.5	2.25
4	7	U=0.30 (Code Baseline)	Table 406.2	0.30	1	7	0	2	0	14.0	4.20
									Sum of Area and UA	**129.5**	**38.9**
									Vertical Glazing Area Weighted U		**0.300**
									Vertical Glazing and Doors Area Weighted U		**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	No ceiling/roof in thermal envelope	NA	-		0.0
			Sum of Area and UA	**0**	**0.0**

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	1,305	70
			Sum of Area and UA	**1,305**	**70**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
			Sum of Area and UA	**0**	**0**

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	R10 2' vertical (Code Baseline)	10-2	0.540		146	79
				Sum of Perimeter and FP	146	79

Below Grade Walls and Slabs

Plan ID	Component Description	Ref.	Wall U	Wall Area	Wall UA	Slab F	Slab Perim	Slab UA
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	3	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	70	CFM

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

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

Is Duct Testing Required? No

Links to Download Forms, Checklists and Other Resources

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	

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

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70	F
Outdoor Design Temperature	19	F
Design Temperature Difference (ΔT)	51	F
Conditioned Floor Area, Proposed Design	1,108	ft2
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	9,418	ft3
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	200	
Envelope Heat Load Sum of UA X ΔT	10,208	Btu / Hour
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	5,187	Btu / Hour
Building Design Heat Load Air Leakage + Envelope Heat Loss	15,396	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	15,396	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	21,554	Btu / Hour

Project Information
East Town Crossing, Unit #108
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.77, Proposed UA is better than baseline by 1%

City of Puyallup
Development & Permitting Services
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Whole House Mechanical Ventilation Airflow Rate: 70 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 1061 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	101	30.4	0.300	101	30.4
Flat/Vaulted Ceilings U =	0.027	0	0.0		0	0.0
Wall (above grade) U =	0.056	1,387	77.7	0.054	1,387	74.9
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	151	81.7	0.540	151	81.7
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	201.7	**Proposed UA Total**	199.0
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	1.4%
		UA Reduction	2.8

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	1,061	sq. ft
Classification	Small Dwelling Unit	
Notes		

City of Puyallup
Development & Permitting Services
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Engineering | Public Works
Fire | Traffic

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
108A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
108B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
								Sum of Area and UA	**40**	**12.0**
								Exterior Doors Area Weighted U		**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 3

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	2	U=0.30 (Code Baseline)	Table 406.2	0.30	3	4	6	3	6	47.3	14.18
2	3	U=0.30 (Code Baseline)	Table 406.2	0.30	1	5	0	6	0	30.0	9.00
3	1	U=0.30 (Code Baseline)	Table 406.2	0.30	1	6	0	4	0	24.0	7.20
									Sum of Area and UA	**101.3**	**30.4**
									Vertical Glazing Area Weighted U		**0.300**
									Vertical Glazing and Doors Area Weighted U		**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	No ceiling/roof in thermal envelope	NA	-		0.0
			Sum of Area and UA	**0**	**0.0**

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	1,387	75
			Sum of Area and UA	**1,387**	**75**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
			Sum of Area and UA	**0**	**0**

City of Puyallup
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Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	R10 2' vertical (Code Baseline)	10-2	0.540		151	82
				Sum of Perimeter and FP	151	82

Below Grade Walls and Slabs

Plan ID	Component Description	Ref.	Wall U	Wall Area	Wall UA	Slab F	Slab Perim	Slab UA
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	3	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	70 CFM	

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

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

Is Duct Testing Required? No

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	

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

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70 F	
Outdoor Design Temperature	19 F	
Design Temperature Difference (ΔT)	51 F	
Conditioned Floor Area, Proposed Design	1,061 ft2	
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	9,019 ft3	
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	199	
Envelope Heat Load Sum of UA X ΔT	10,147 Btu / Hour	
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	4,967 Btu / Hour	
Building Design Heat Load Air Leakage + Envelope Heat Loss	15,115 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	15,115 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	21,161 Btu / Hour	

Project Information
East Town Crossing, Unit # 201
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.64, Proposed UA is better than baseline by 2%

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Whole House Mechanical Ventilation Airflow Rate: 70 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 1106 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	128	38.3	0.300	128	38.3
Flat/Vaulted Ceilings U =	0.027	0	0.0		0	0.0
Wall (above grade) U =	0.056	1,322	74.0	0.054	1,322	71.4
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	0	0.0		0	0.0
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	124.3	**Proposed UA Total**	121.6
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	2.1%
		UA Reduction	2.6

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	1,106 sq. ft
Classification	Small Dwelling Unit
Notes	

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
201A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
201B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
								Sum of Area and UA	**40**	**12.0**
								Exterior Doors Area Weighted U		**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 4

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	1	U=0.30 (Code Baseline)	Table 406.2	0.30	3	6	0	4	0	72.0	21.60
2	4	U=0.30 (Code Baseline)	Table 406.2	0.30	1	6	0	6	0	36.0	10.80
3	5	U=0.30 (Code Baseline)	Table 406.2	0.30	1	2	6	3	0	7.5	2.25
4	6	U=0.30 (Code Baseline)	Table 406.2	0.30	1	6	0	2	0	12.0	3.60
									Sum of Area and UA	**127.5**	**38.3**
									Vertical Glazing Area Weighted U		**0.300**
									Vertical Glazing and Doors Area Weighted U		**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	No ceiling/roof in thermal envelope	NA	-		0.0
			Sum of Area and UA	**0**	**0.0**

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	1,322	71
			Sum of Area and UA	**1,322**	**71**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
	No floors in thermal envelope	NA	-		0
			Sum of Area and UA	**0**	**0**

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Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	No slab on grade	NA	-			0
				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
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	3	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	70 CFM	

HVAC Thermal Distribution System

Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20_

Is this a hydronic heating system?	No
Location of Ducts	Unducted
Location of Air Handler	Unconditioned Space
Is Duct Testing Required?	No

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	

Heating System Sizing - Proposed Design

Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70	F
Outdoor Design Temperature	19	F
Design Temperature Difference (ΔT)	51	F
Conditioned Floor Area, Proposed Design	1,106	ft2
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	9,401	ft3
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	122	
Envelope Heat Load Sum of UA X ΔT	6,203	Btu / Hour
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	5,178	Btu / Hour
Building Design Heat Load Air Leakage + Envelope Heat Loss	11,381	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	11,381	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	15,933	Btu / Hour

Project Information
East Town Crossing, Unit # 202
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.83, Proposed UA is better than baseline by 2%

City of Puyallup
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Whole House Mechanical Ventilation Airflow Rate: 70 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 1061 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	89	26.8	0.300	89	26.8
Flat/Vaulted Ceilings U =	0.027	0	0.0		0	0.0
Wall (above grade) U =	0.056	1,413	79.1	0.054	1,413	76.3
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	0	0.0		0	0.0
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	117.9	**Proposed UA Total**	115.1
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	2.4%
		UA Reduction	2.8

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	1,061 sq. ft
Classification	Small Dwelling Unit
Notes	

City of Puyallup
Development & Permitting Services
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Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
202A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
202B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
								Sum of Area and UA	**40**	**12.0**
								Exterior Doors Area Weighted U		**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 3

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	2	U=0.30 (Code Baseline)	Table 406.2	0.30	3	4	6	3	6	47.3	14.18
2	3	U=0.30 (Code Baseline)	Table 406.2	0.30	1	5	0	6	0	30.0	9.00
3	6	U=0.30 (Code Baseline)	Table 406.2	0.30	1	6	0	2	0	12.0	3.60
									Sum of Area and UA	**89.3**	**26.8**
									Vertical Glazing Area Weighted U		**0.300**
									Vertical Glazing and Doors Area Weighted U		**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	No ceiling/roof in thermal envelope	NA	-		0.0
			Sum of Area and UA	**0**	**0.0**

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	1,413	76
			Sum of Area and UA	**1,413**	**76**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
	No floors in thermal envelope	NA	-		0
			Sum of Area and UA	**0**	**0**

City of Puyallup
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Fire | Traffic

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	No slab on grade	NA	-			0
				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
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	3	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	70 CFM	

HVAC Thermal Distribution System

Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20_

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

Is Duct Testing Required? No

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	

Heating System Sizing - Proposed Design

Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70 F	
Outdoor Design Temperature	19 F	
Design Temperature Difference (ΔT)	51 F	
Conditioned Floor Area, Proposed Design	1,061 ft2	
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	9,019 ft3	
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	115	
Envelope Heat Load Sum of UA X ΔT	5,869 Btu / Hour	
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	4,967 Btu / Hour	
Building Design Heat Load Air Leakage + Envelope Heat Loss	10,836 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	10,836 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	15,171 Btu / Hour	

Project Information
East Town Crossing, Unit # 203
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.57, Proposed UA is better than baseline by 2%

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
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Whole House Mechanical Ventilation Airflow Rate: 70 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 1008 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	78	23.4	0.300	78	23.4
Flat/Vaulted Ceilings U =	0.027	0	0.0		0	0.0
Wall (above grade) U =	0.056	1,285	71.9	0.054	1,285	69.4
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	0	0.0		0	0.0
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	107.3	**Proposed UA Total**	104.8
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	2.4%
		UA Reduction	2.6

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	1,008 sq. ft
Classification	Small Dwelling Unit
Notes	

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
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Engineering | Public Works
Fire | Traffic

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
203A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
203B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
				Sum of Area and UA					40	12.0
				Exterior Doors Area Weighted U						0.300

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 2

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	1	U=0.30 (Code Baseline)	Table 406.2	0.30	2	6	0	4	0	48.0	14.40
2	3	U=0.30 (Code Baseline)	Table 406.2	0.30	1	5	0	6	0	30.0	9.00
					Sum of Area and UA					78.0	23.4
					Vertical Glazing Area Weighted U						0.300
					Vertical Glazing and Doors Area Weighted U						0.300

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	No ceiling/roof in thermal envelope	NA	-		0.0
			Sum of Area and UA	0	0.0

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	1,285	69
			Sum of Area and UA	1,285	69

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
	No floors in thermal envelope	NA	-		0
			Sum of Area and UA	0	0

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	No slab on grade	NA	-			0
				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
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	2	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	70	CFM

HVAC Thermal Distribution System

Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20

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

Is Duct Testing Required? No

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	

Heating System Sizing - Proposed Design

Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70	F
Outdoor Design Temperature	19	F
Design Temperature Difference (ΔT)	51	F
Conditioned Floor Area, Proposed Design	1,008	ft2
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	8,568	ft3
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	105	
Envelope Heat Load Sum of UA X ΔT	5,343	Btu / Hour
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	4,719	Btu / Hour
Building Design Heat Load Air Leakage + Envelope Heat Loss	10,062	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	10,062	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	14,087	Btu / Hour

Project Information
East Town Crossing, Unit # 204
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.73, Proposed UA is better than baseline by 2%

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Whole House Mechanical Ventilation Airflow Rate: 55 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 976 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	70	20.9	0.300	70	20.9
Flat/Vaulted Ceilings U =	0.027	0	0.0		0	0.0
Wall (above grade) U =	0.056	1,366	76.5	0.054	1,366	73.8
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	0	0.0		0	0.0
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	109.4	**Proposed UA Total**	106.7
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	2.5%
		UA Reduction	2.7

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	976	sq. ft
Classification	Small Dwelling Unit	
Notes		

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
204A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
204B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
								Sum of Area and UA	**40**	**12.0**
								Exterior Doors Area Weighted U		**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 3

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	1	U=0.30 (Code Baseline)	Table 406.2	0.30	1	6	0	4	0	24.0	7.20
2	2	U=0.30 (Code Baseline)	Table 406.2	0.30	1	4	6	3	6	15.8	4.73
3	3	U=0.30 (Code Baseline)	Table 406.2	0.30	1	5	0	6	0	30.0	9.00
									Sum of Area and UA	**69.8**	**20.9**
									Vertical Glazing Area Weighted U		**0.300**
									Vertical Glazing and Doors Area Weighted U		**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	No ceiling/roof in thermal envelope	NA	-		0.0
			Sum of Area and UA	**0**	**0.0**

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	1,366	74
			Sum of Area and UA	**1,366**	**74**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
	No floors in thermal envelope	NA	-		0
			Sum of Area and UA	**0**	**0**

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	No slab on grade	NA	-			0
				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
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	2	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	55 CFM	

HVAC Thermal Distribution System

Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20_

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

Is Duct Testing Required? No

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	

Heating System Sizing - Proposed Design

Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70 F	
Outdoor Design Temperature	19 F	
Design Temperature Difference (ΔT)	51 F	
Conditioned Floor Area, Proposed Design	976 ft2	
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	8,296 ft3	
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	107	
Envelope Heat Load Sum of UA X ΔT	5,442 Btu / Hour	
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	4,569 Btu / Hour	
Building Design Heat Load Air Leakage + Envelope Heat Loss	10,011 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	10,011 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	14,016 Btu / Hour	

Project Information
East Town Crossing, Unit # 205
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.57, Proposed UA is better than baseline by 2%

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Whole House Mechanical Ventilation Airflow Rate: 70 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 1008 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	78	23.4	0.300	78	23.4
Flat/Vaulted Ceilings U =	0.027	0	0.0		0	0.0
Wall (above grade) U =	0.056	1,285	71.9	0.054	1,285	69.4
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	0	0.0		0	0.0
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	107.3	**Proposed UA Total**	104.8
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	2.4%
		UA Reduction	2.6

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	1,008	sq. ft
Classification	Small Dwelling Unit	
Notes		

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
205A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
205B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
								Sum of Area and UA	**40**	**12.0**
								Exterior Doors Area Weighted U		**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 2

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	1	U=0.30 (Code Baseline)	Table 406.2	0.30	2	6	0	4	0	48.0	14.40
2	3	U=0.30 (Code Baseline)	Table 406.2	0.30	1	5	0	6	0	30.0	9.00
									Sum of Area and UA	**78.0**	**23.4**
									Vertical Glazing Area Weighted U		**0.300**
									Vertical Glazing and Doors Area Weighted U		**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	No ceiling/roof in thermal envelope	NA	-		0.0
			Sum of Area and UA	**0**	**0.0**

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	1,285	69
			Sum of Area and UA	**1,285**	**69**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
	No floors in thermal envelope	NA	-		0
			Sum of Area and UA	**0**	**0**

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	No slab on grade	NA	-			0
				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
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	2	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	70 CFM	

HVAC Thermal Distribution System

Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20

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

Is Duct Testing Required? No

Links to Download Forms, Checklists and Other Resources

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	

Heating System Sizing - Proposed Design

Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70 F	
Outdoor Design Temperature	19 F	
Design Temperature Difference (ΔT)	51 F	
Conditioned Floor Area, Proposed Design	1,008 ft2	
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	8,568 ft3	
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	105	
Envelope Heat Load Sum of UA X ΔT	5,343 Btu / Hour	
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	4,719 Btu / Hour	
Building Design Heat Load Air Leakage + Envelope Heat Loss	10,062 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	10,062 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	14,087 Btu / Hour	

Project Information
East Town Crossing, Unit # 206
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.73, Proposed UA is better than baseline by 2%

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Whole House Mechanical Ventilation Airflow Rate: 55 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 976 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	70	20.9	0.300	70	20.9
Flat/Vaulted Ceilings U =	0.027	0	0.0		0	0.0
Wall (above grade) U =	0.056	1,366	76.5	0.054	1,366	73.8
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	0	0.0		0	0.0
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	109.4	**Proposed UA Total**	106.7
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	2.5%
		UA Reduction	2.7

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	976 sq. ft
Classification	Small Dwelling Unit
Notes	

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
206A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
206B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
								Sum of Area and UA	**40**	**12.0**
								Exterior Doors Area Weighted U		**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 3

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	1	U=0.30 (Code Baseline)	Table 406.2	0.30	1	6	0	4	0	24.0	7.20
2	2	U=0.30 (Code Baseline)	Table 406.2	0.30	1	4	6	3	6	15.8	4.73
3	3	U=0.30 (Code Baseline)	Table 406.2	0.30	1	5	0	6	0	30.0	9.00
									Sum of Area and UA	**69.8**	**20.9**
									Vertical Glazing Area Weighted U		**0.300**
									Vertical Glazing and Doors Area Weighted U		**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	No ceiling/roof in thermal envelope	NA	-		0.0
			Sum of Area and UA	**0**	**0.0**

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	1,366	74
			Sum of Area and UA	**1,366**	**74**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
	No floors in thermal envelope	NA	-		0
			Sum of Area and UA	**0**	**0**

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	No slab on grade	NA	-			0
				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
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	2	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	55 CFM	

HVAC Thermal Distribution System

Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20_

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

Is Duct Testing Required? No

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	

Heating System Sizing - Proposed Design

Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70 F	
Outdoor Design Temperature	19 F	
Design Temperature Difference (ΔT)	51 F	
Conditioned Floor Area, Proposed Design	976 ft2	
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	8,296 ft3	
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	107	
Envelope Heat Load Sum of UA X ΔT	5,442 Btu / Hour	
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	4,569 Btu / Hour	
Building Design Heat Load Air Leakage + Envelope Heat Loss	10,011 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	10,011 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	14,016 Btu / Hour	

Project Information
East Town Crossing, Unit # 207
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.64, Proposed UA is better than baseline by 2%

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Whole House Mechanical Ventilation Airflow Rate: 70 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 1105 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	130	38.9	0.300	130	38.9
Flat/Vaulted Ceilings U =	0.027	0	0.0		0	0.0
Wall (above grade) U =	0.056	1,320	73.9	0.054	1,320	71.3
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	0	0.0		0	0.0
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	124.8	**Proposed UA Total**	122.1
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	2.1%
		UA Reduction	2.6

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	1,105 sq. ft
Classification	Small Dwelling Unit
Notes	

City of Puyallup Development & Permitting Services ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
207A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
207B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
								Sum of Area and UA	**40**	**12.0**
								Exterior Doors Area Weighted U		**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 4

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	1	U=0.30 (Code Baseline)	Table 406.2	0.30	3	6	0	4	0	72.0	21.60
2	4	U=0.30 (Code Baseline)	Table 406.2	0.30	1	6	0	6	0	36.0	10.80
3	5	U=0.30 (Code Baseline)	Table 406.2	0.30	1	2	6	3	0	7.5	2.25
4	7	U=0.30 (Code Baseline)	Table 406.2	0.30	1	7	0	2	0	14.0	4.20
									Sum of Area and UA	**129.5**	**38.9**
									Vertical Glazing Area Weighted U		**0.300**
									Vertical Glazing and Doors Area Weighted U		**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	No ceiling/roof in thermal envelope	NA	-		0.0
			Sum of Area and UA	**0**	**0.0**

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	1,320	71
			Sum of Area and UA	**1,320**	**71**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
	No floors in thermal envelope	NA	-		0
			Sum of Area and UA	**0**	**0**

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	No slab on grade	NA	-			0
				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
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	3	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	70 CFM	

HVAC Thermal Distribution System

Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20_

Is this a hydronic heating system?	No
Location of Ducts	Unducted
Location of Air Handler	Unconditioned Space
Is Duct Testing Required?	No

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	

Heating System Sizing - Proposed Design

Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70	F
Outdoor Design Temperature	19	F
Design Temperature Difference (ΔT)	51	F
Conditioned Floor Area, Proposed Design	1,105	ft2
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	9,393	ft3
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	122	
Envelope Heat Load Sum of UA X ΔT	6,228	Btu / Hour
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	5,173	Btu / Hour
Building Design Heat Load Air Leakage + Envelope Heat Loss	11,401	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	11,401	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	15,962	Btu / Hour

Project Information
East Town Crossing, Unit # 208
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.8, Proposed UA is better than baseline by 2%

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Whole House Mechanical Ventilation Airflow Rate: 70 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 1061 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	101	30.4	0.300	101	30.4
Flat/Vaulted Ceilings U =	0.027	0	0.0		0	0.0
Wall (above grade) U =	0.056	1,401	78.5	0.054	1,401	75.7
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	0	0.0		0	0.0
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	120.8	**Proposed UA Total**	118.0
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	2.3%
		UA Reduction	2.8

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	1,061	sq. ft
Classification	Small Dwelling Unit	
Notes		

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
208A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
208B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
				Sum of Area and UA					40	12.0
				Exterior Doors Area Weighted U						0.300

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 3

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	2	U=0.30 (Code Baseline)	Table 406.2	0.30	3	4	6	3	6	47.3	14.18
2	3	U=0.30 (Code Baseline)	Table 406.2	0.30	1	5	0	6	0	30.0	9.00
3	1	U=0.30 (Code Baseline)	Table 406.2	0.30	1	6	0	4	0	24.0	7.20
								Sum of Area and UA		101.3	30.4
								Vertical Glazing Area Weighted U			0.300
								Vertical Glazing and Doors Area Weighted U			0.300

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	No ceiling/roof in thermal envelope	NA	-		0.0
			Sum of Area and UA	0	0.0

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	1,401	76
			Sum of Area and UA	1,401	76

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
	No floors in thermal envelope	NA	-		0
			Sum of Area and UA	0	0

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	No slab on grade	NA	-			0
				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
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	3	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	70 CFM	

HVAC Thermal Distribution System

Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20_

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

Is Duct Testing Required? No

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	

Heating System Sizing - Proposed Design

Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70 F	
Outdoor Design Temperature	19 F	
Design Temperature Difference (ΔT)	51 F	
Conditioned Floor Area, Proposed Design	1,061 ft2	
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	9,019 ft3	
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	118	
Envelope Heat Load Sum of UA X ΔT	6,019 Btu / Hour	
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	4,967 Btu / Hour	
Building Design Heat Load Air Leakage + Envelope Heat Loss	10,987 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	10,987 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	15,382 Btu / Hour	

Project Information
East Town Crossing, Unit # 301
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.64, Proposed UA is better than baseline by 2%

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Whole House Mechanical Ventilation Airflow Rate: 70 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 1106 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	128	38.3	0.300	128	38.3
Flat/Vaulted Ceilings U =	0.027	1,106	29.9	0.027	1,106	29.9
Wall (above grade) U =	0.056	1,322	74.0	0.054	1,322	71.4
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	0	0.0		0	0.0
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	154.1	**Proposed UA Total**	151.5
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	1.7%
		UA Reduction	2.6

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	1,106 sq. ft
Classification	Small Dwelling Unit
Notes	

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
301A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
301B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
								Sum of Area and UA	**40**	**12.0**
								Exterior Doors Area Weighted U		**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 4

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	1	U=0.30 (Code Baseline)	Table 406.2	0.30	3	6	0	4	0	72.0	21.60
2	4	U=0.30 (Code Baseline)	Table 406.2	0.30	1	6	0	6	0	36.0	10.80
3	5	U=0.30 (Code Baseline)	Table 406.2	0.30	1	2	6	3	0	7.5	2.25
4	6	U=0.30 (Code Baseline)	Table 406.2	0.30	1	6	0	2	0	12.0	3.60
									Sum of Area and UA	**127.5**	**38.3**
									Vertical Glazing Area Weighted U		**0.300**
									Vertical Glazing and Doors Area Weighted U		**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	R49 blown Attic STD baffled (Code Baseline, Option 1.1-1.4)	10-7	0.027	1,106	29.9
				Sum of Area and UA	**1,106**	**29.9**

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	1,322	71
				Sum of Area and UA	**1,322**	**71**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
	No floors in thermal envelope	NA	-		0
				Sum of Area and UA	**0**	**0**

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	No slab on grade	NA	-			0
				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
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	3	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	70	CFM

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

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

Is Duct Testing Required? No

Links to Download Forms, Checklists and Other Resources

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	

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

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70	F
Outdoor Design Temperature	19	F
Design Temperature Difference (ΔT)	51	F
Conditioned Floor Area, Proposed Design	1,106	ft2
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	9,401	ft3
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	151	
Envelope Heat Load Sum of UA X ΔT	7,726	Btu / Hour
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	5,178	Btu / Hour
Building Design Heat Load Air Leakage + Envelope Heat Loss	12,904	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	12,904	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	18,065	Btu / Hour

Project Information
East Town Crossing, Unit # 302
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.83, Proposed UA is better than baseline by 2%

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Whole House Mechanical Ventilation Airflow Rate: 70 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 1061 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	89	26.8	0.300	89	26.8
Flat/Vaulted Ceilings U =	0.027	1,061	28.6	0.027	1,061	28.6
Wall (above grade) U =	0.056	1,413	79.1	0.054	1,413	76.3
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	0	0.0		0	0.0
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	146.5	**Proposed UA Total**	143.7
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	1.9%
		UA Reduction	2.8

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	1,061	sq. ft
Classification	Small Dwelling Unit	
Notes		

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
302A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
302B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
							Sum of Area and UA		**40**	**12.0**
							Exterior Doors Area Weighted U			**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 3

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	2	U=0.30 (Code Baseline)	Table 406.2	0.30	3	4	6	3	6	47.3	14.18
2	3	U=0.30 (Code Baseline)	Table 406.2	0.30	1	5	0	6	0	30.0	9.00
3	6	U=0.30 (Code Baseline)	Table 406.2	0.30	1	6	0	2	0	12.0	3.60
								Sum of Area and UA		**89.3**	**26.8**
								Vertical Glazing Area Weighted U			**0.300**
								Vertical Glazing and Doors Area Weighted U			**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	R49 blown Attic STD baffled (Code Baseline, Option 1.1-1.4)	10-7	0.027	1,061	28.6
			Sum of Area and UA	**1,061**	**28.6**

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	1,413	76
			Sum of Area and UA	**1,413**	**76**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
	No floors in thermal envelope	NA	-		0
			Sum of Area and UA	**0**	**0**

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	No slab on grade	NA	-			0
				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
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	3	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	70 CFM	

HVAC Thermal Distribution System

Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20_

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

Is Duct Testing Required? No

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	

Heating System Sizing - Proposed Design

Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70 F	
Outdoor Design Temperature	19 F	
Design Temperature Difference (ΔT)	51 F	
Conditioned Floor Area, Proposed Design	1,061 ft2	
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	9,019 ft3	
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	144	
Envelope Heat Load Sum of UA X ΔT	7,330 Btu / Hour	
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	4,967 Btu / Hour	
Building Design Heat Load Air Leakage + Envelope Heat Loss	12,297 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	12,297 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	17,216 Btu / Hour	

Project Information
East Town Crossing, Unit # 303
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.57, Proposed UA is better than baseline by 2%

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Whole House Mechanical Ventilation Airflow Rate: 70 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 1007 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	78	23.4	0.300	78	23.4
Flat/Vaulted Ceilings U =	0.027	1,007	27.2	0.027	1,007	27.2
Wall (above grade) U =	0.056	1,285	71.9	0.054	1,285	69.4
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	0	0.0		0	0.0
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	134.5	**Proposed UA Total**	132.0
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	1.9%
		UA Reduction	2.6

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	1,007 sq. ft
Classification	Small Dwelling Unit
Notes	

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
303A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
303B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
							Sum of Area and UA		**40**	**12.0**
							Exterior Doors Area Weighted U			**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 2

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	1	U=0.30 (Code Baseline)	Table 406.2	0.30	2	6	0	4	0	48.0	14.40
2	3	U=0.30 (Code Baseline)	Table 406.2	0.30	1	5	0	6	0	30.0	9.00
								Sum of Area and UA		**78.0**	**23.4**
								Vertical Glazing Area Weighted U			**0.300**
								Vertical Glazing and Doors Area Weighted U			**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	R49 blown Attic STD baffled (Code Baseline, Option 1.1-1.4)	10-7	0.027	1,007	27.2
			Sum of Area and UA	**1,007**	**27.2**

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	1,285	69
			Sum of Area and UA	**1,285**	**69**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
	No floors in thermal envelope	NA	-		0
			Sum of Area and UA	**0**	**0**

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	No slab on grade	NA	-			0
				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
				Sum of Area, Length and UA	0	0.0	0	0

Ventilation Requirements

Number of Bedrooms	2	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	70 CFM	

HVAC Thermal Distribution System

Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20

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

Is Duct Testing Required? No

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	

Heating System Sizing - Proposed Design

Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70 F	
Outdoor Design Temperature	19 F	
Design Temperature Difference (ΔT)	51 F	
Conditioned Floor Area, Proposed Design	1,007 ft2	
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	8,560 ft3	
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	132	
Envelope Heat Load Sum of UA X ΔT	6,730 Btu / Hour	
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	4,715 Btu / Hour	
Building Design Heat Load Air Leakage + Envelope Heat Loss	11,444 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	11,444 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	16,022 Btu / Hour	

Project Information
East Town Crossing, Unit # 304
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.73, Proposed UA is better than baseline by 2%

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Whole House Mechanical Ventilation Airflow Rate: 55 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 976 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	70	20.9	0.300	70	20.9
Flat/Vaulted Ceilings U =	0.027	976	26.4	0.027	976	26.4
Wall (above grade) U =	0.056	1,366	76.5	0.054	1,366	73.8
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	0	0.0		0	0.0
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	135.8	**Proposed UA Total**	133.1
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	2.0%
		UA Reduction	2.7

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	976 sq. ft
Classification	Small Dwelling Unit
Notes	

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
304A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
304B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
								Sum of Area and UA	**40**	**12.0**
								Exterior Doors Area Weighted U		**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 3

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	1	U=0.30 (Code Baseline)	Table 406.2	0.30	1	6	0	4	0	24.0	7.20
2	2	U=0.30 (Code Baseline)	Table 406.2	0.30	1	4	6	3	6	15.8	4.73
3	3	U=0.30 (Code Baseline)	Table 406.2	0.30	1	5	0	6	0	30.0	9.00
									Sum of Area and UA	**69.8**	**20.9**
									Vertical Glazing Area Weighted U		**0.300**
									Vertical Glazing and Doors Area Weighted U		**0.300**

Flat/Vaulted Ceilings

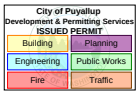
Plan ID	Component Description	Ref.	Attic U	Area	UA
	R49 blown Attic STD baffled (Code Baseline, Option 1.1-1.4)	10-7	0.027	976	26.4
			Sum of Area and UA	**976**	**26.4**

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	1,366	74
			Sum of Area and UA	**1,366**	**74**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
	No floors in thermal envelope	NA	-		0
			Sum of Area and UA	**0**	**0**



Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	No slab on grade	NA	-			0
				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
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	2	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	55 CFM	

HVAC Thermal Distribution System

Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20_

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

Is Duct Testing Required? No

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	

Heating System Sizing - Proposed Design

Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70 F	
Outdoor Design Temperature	19 F	
Design Temperature Difference (ΔT)	51 F	
Conditioned Floor Area, Proposed Design	976 ft2	
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	8,296 ft3	
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	133	
Envelope Heat Load Sum of UA X ΔT	6,786 Btu / Hour	
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	4,569 Btu / Hour	
Building Design Heat Load Air Leakage + Envelope Heat Loss	11,355 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	11,355 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	15,897 Btu / Hour	

Project Information
East Town Crossing, Unit # 305
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.57, Proposed UA is better than baseline by 2%

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Whole House Mechanical Ventilation Airflow Rate: 70 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 1007 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	78	23.4	0.300	78	23.4
Flat/Vaulted Ceilings U =	0.027	1,007	27.2	0.027	1,007	27.2
Wall (above grade) U =	0.056	1,285	71.9	0.054	1,285	69.4
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	0	0.0		0	0.0
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	134.5	**Proposed UA Total**	132.0
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	1.9%
		UA Reduction	2.6

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	1,007 sq. ft
Classification	Small Dwelling Unit
Notes	

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
305A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
305B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
							Sum of Area and UA		**40**	**12.0**
							Exterior Doors Area Weighted U			**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 2

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	1	U=0.30 (Code Baseline)	Table 406.2	0.30	2	6	0	4	0	48.0	14.40
2	3	U=0.30 (Code Baseline)	Table 406.2	0.30	1	5	0	6	0	30.0	9.00
								Sum of Area and UA		**78.0**	**23.4**
								Vertical Glazing Area Weighted U			**0.300**
								Vertical Glazing and Doors Area Weighted U			**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	R49 blown Attic STD baffled (Code Baseline, Option 1.1-1.4)	10-7	0.027	1,007	27.2
			Sum of Area and UA	**1,007**	**27.2**

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	1,285	69
			Sum of Area and UA	**1,285**	**69**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
	No floors in thermal envelope	NA	-		0
			Sum of Area and UA	**0**	**0**

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	No slab on grade	NA	-			0
				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
				Sum of Area, Length and UA	0	0.0	0	0

Ventilation Requirements

Number of Bedrooms	2	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	70 CFM	

HVAC Thermal Distribution System

Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20

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

Is Duct Testing Required? No

Links to Download Forms, Checklists and Other Resources

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	

Heating System Sizing - Proposed Design

Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70 F	
Outdoor Design Temperature	19 F	
Design Temperature Difference (ΔT)	51 F	
Conditioned Floor Area, Proposed Design	1,007 ft2	
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	8,560 ft3	
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	132	
Envelope Heat Load Sum of UA X ΔT	6,730 Btu / Hour	
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	4,715 Btu / Hour	
Building Design Heat Load Air Leakage + Envelope Heat Loss	11,444 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	11,444 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	16,022 Btu / Hour	

Project Information
East Town Crossing, Unit # 306
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.73, Proposed UA is better than baseline by 2%

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

Whole House Mechanical Ventilation Airflow Rate: 55 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 976 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	70	20.9	0.300	70	20.9
Flat/Vaulted Ceilings U =	0.027	976	26.4	0.027	976	26.4
Wall (above grade) U =	0.056	1,366	76.5	0.054	1,366	73.8
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	0	0.0		0	0.0
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	135.8	**Proposed UA Total**	133.1
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	2.0%
		UA Reduction	2.7

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	976 sq. ft
Classification	Small Dwelling Unit
Notes	

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
306A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
306B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
								Sum of Area and UA	**40**	**12.0**
								Exterior Doors Area Weighted U		**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 3

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	1	U=0.30 (Code Baseline)	Table 406.2	0.30	1	6	0	4	0	24.0	7.20
2	2	U=0.30 (Code Baseline)	Table 406.2	0.30	1	4	6	3	6	15.8	4.73
3	3	U=0.30 (Code Baseline)	Table 406.2	0.30	1	5	0	6	0	30.0	9.00
									Sum of Area and UA	**69.8**	**20.9**
									Vertical Glazing Area Weighted U		**0.300**
									Vertical Glazing and Doors Area Weighted U		**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	R49 blown Attic STD baffled (Code Baseline, Option 1.1-1.4)	10-7	0.027	976	26.4
				Sum of Area and UA	**976**	**26.4**

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	1,366	74
				Sum of Area and UA	**1,366**	**74**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
	No floors in thermal envelope	NA	-		0
				Sum of Area and UA	**0**	**0**

City of Puyallup
Development & Permitting Services
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Engineering | Public Works
Fire | Traffic

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	No slab on grade	NA	-			0
				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
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	2	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	55 CFM	

HVAC Thermal Distribution System

Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20_

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

Is Duct Testing Required? No

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	

Heating System Sizing - Proposed Design

Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70 F	
Outdoor Design Temperature	19 F	
Design Temperature Difference (ΔT)	51 F	
Conditioned Floor Area, Proposed Design	976 ft2	
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	8,296 ft3	
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	133	
Envelope Heat Load Sum of UA X ΔT	6,786	Btu / Hour
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	4,569	Btu / Hour
Building Design Heat Load Air Leakage + Envelope Heat Loss	11,355	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	11,355	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	15,897	Btu / Hour

Project Information
East Town Crossing, Unit #307
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.64, Proposed UA is better than baseline by 2%

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

Whole House Mechanical Ventilation Airflow Rate: 70 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 1105 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	130	38.9	0.300	130	38.9
Flat/Vaulted Ceilings U =	0.027	1,105	29.8	0.027	1,105	29.8
Wall (above grade) U =	0.056	1,320	73.9	0.054	1,320	71.3
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	0	0.0		0	0.0
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	154.6	**Proposed UA Total**	151.9
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	1.7%
		UA Reduction	2.6

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	1,105 sq. ft
Classification	Small Dwelling Unit
Notes	

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
307A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
307B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
								Sum of Area and UA	**40**	**12.0**
								Exterior Doors Area Weighted U		**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 4

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	1	U=0.30 (Code Baseline)	Table 406.2	0.30	3	6	0	4	0	72.0	21.60
2	4	U=0.30 (Code Baseline)	Table 406.2	0.30	1	6	0	6	0	36.0	10.80
3	5	U=0.30 (Code Baseline)	Table 406.2	0.30	1	2	6	3	0	7.5	2.25
4	7	U=0.30 (Code Baseline)	Table 406.2	0.30	1	7	0	2	0	14.0	4.20
									Sum of Area and UA	**129.5**	**38.9**
									Vertical Glazing Area Weighted U		**0.300**
									Vertical Glazing and Doors Area Weighted U		**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	R49 blown Attic STD baffled (Code Baseline, Option 1.1-1.4)	10-7	0.027	1,105	29.8
				Sum of Area and UA	**1,105**	**29.8**

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	1,320	71
				Sum of Area and UA	**1,320**	**71**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
	No floors in thermal envelope	NA	-		0
				Sum of Area and UA	**0**	**0**

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	No slab on grade	NA	-			0
				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
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	3	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	70 CFM	

HVAC Thermal Distribution System

Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20_

Is this a hydronic heating system?	No
Location of Ducts	Unducted
Location of Air Handler	Unconditioned Space
Is Duct Testing Required?	No

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	

Heating System Sizing - Proposed Design

Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70	F
Outdoor Design Temperature	19	F
Design Temperature Difference (ΔT)	51	F
Conditioned Floor Area, Proposed Design	1,105	ft2
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	9,393	ft3
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	152	
Envelope Heat Load Sum of UA X ΔT	7,749	Btu / Hour
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	5,173	Btu / Hour
Building Design Heat Load Air Leakage + Envelope Heat Loss	12,923	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	12,923	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	18,092	Btu / Hour

Project Information
East Town Crossing, Unit # 308
Building B
Pioneer & Shaw, Puyallup

Contact Information
Synthesis 9, LLC
Brett Lindsay
blindsay@synthesis9.com
253-468-4117

Messages / Results *

UA Reduction = 2.8, Proposed UA is better than baseline by 2%

Whole House Mechanical Ventilation Airflow Rate: 70 CFM with Run Time Percent of 100%, Balanced, 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?	**Prescriptive Path Compliance with Option 1 (preferred)**
Project Building Type?	**New Construction**
Occupancy Type?	**R2 Multifamily**
Code Version?	**WSEC 2018**
Classification:	Small Dwelling Unit -- 1061 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	40	12.0	0.300	40	12.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	101	30.4	0.300	101	30.4
Flat/Vaulted Ceilings U =	0.027	1,061	28.6	0.027	1,061	28.6
Wall (above grade) U =	0.056	1,401	78.5	0.054	1,401	75.7
Floors over Crawlspace U =	0.029	0	0.0		0	0.0
Slab on Grade F =	0.540	0	0.0		0	0.0
Below Grade Wall U =	0.042	0	0.0		0	0.0
Below Grade Slab F =	0.570	0	0.0		0	0.0

Baseline UA Total	149.5	**Proposed UA Total**	146.7
Required Credits	4.5	**Proposed Credits**	6.0 from Tables 406.2 and 406.3
		UA Percent Reduction	1.9%
		UA Reduction	2.8

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)
4	For heating system based on electric resistance with a ductless mini-split heat pump system in accordance with Section R403.7.1 including the exception	**Electric Resistance with Ductless Heat Pump**	N/A for R2	6.0	6.0

Table R406.3 Energy Credits

Option No.	Category			Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope				0.0	
2	Air Leakage Control and Efficient Ventilation			**Option 2.2**	1.5	2.0 ACH50 / Heat Recovery Ventilation min eff 65% / For R2, 0.25 cfm per ft2 at 50 Pa / HRV with min SHR eff of 0.65
3	High Efficiency HVAC			**Option 3.4**	2.0	Ductless Split System, Zonal Control. Min HSPF of 10.
4	High Efficiency HVAC Distribution System				NA	
5.1	Efficient Water Heating				0.0	
5.2-5.6	Efficient Water Heating			**Option 5.5**	2.5	NEEA Tier 3 heat pump water heater
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package				0.0	
				Energy Credits	**6.0**	

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

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	1,061 sq. ft
Classification	Small Dwelling Unit
Notes	

City of Puyallup
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Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									0	0.0
308A	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
308B	Code Baseline, U=0.30	-	0.30	1	3	0	6	8	20	6.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
								Sum of Area and UA	**40**	**12.0**
								Exterior Doors Area Weighted U		**0.300**

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 3

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1	2	U=0.30 (Code Baseline)	Table 406.2	0.30	3	4	6	3	6	47.3	14.18
2	3	U=0.30 (Code Baseline)	Table 406.2	0.30	1	5	0	6	0	30.0	9.00
3	1	U=0.30 (Code Baseline)	Table 406.2	0.30	1	6	0	4	0	24.0	7.20
									Sum of Area and UA	**101.3**	**30.4**
									Vertical Glazing Area Weighted U		**0.300**
									Vertical Glazing and Doors Area Weighted U		**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA
	R49 blown Attic STD baffled (Code Baseline, Option 1.1-1.4)	10-7	0.027	1,061	28.6
			Sum of Area and UA	**1,061**	**28.6**

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	1,401	76
			Sum of Area and UA	**1,401**	**76**

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U	Area	UA
	No floors in thermal envelope	NA	-		0
			Sum of Area and UA	**0**	**0**

Slab on Grade (less than 2 feet below grade)

Plan ID	Component Description	Ref.	Slab F		Slab Perim	FP
	No slab on grade	NA	-			0
				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
			Sum of Area, Length and UA	0	0.0		0	0

Ventilation Requirements

Number of Bedrooms	3	
Run-Time Percent in Each 4-Hour Segment	100%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Distributed	Verify system meets definition of 'Distributed Whole-House Ventilation'
Ventilation Code Section	IMC, Section 403	
Whole House Mechanical Ventilation Airflow Rate	70 CFM	

HVAC Thermal Distribution System

Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20_

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

Is Duct Testing Required? No

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	

Heating System Sizing - Proposed Design

Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool

Nearest Weather Station	Puyallup	
Indoor Design Temperature	70 F	
Outdoor Design Temperature	19 F	
Design Temperature Difference (ΔT)	51 F	
Conditioned Floor Area, Proposed Design	1,061 ft2	
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	9,019 ft3	
HVAC System Type	All Other Systems (not heat pump)	
Location of HVAC Distribution System	Unducted	
Sum of UA, including exempt door and window	147	
Envelope Heat Load Sum of UA X ΔT	7,480 Btu / Hour	
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	4,967 Btu / Hour	
Building Design Heat Load Air Leakage + Envelope Heat Loss	12,448 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	12,448 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	17,427 Btu / Hour	