PRMU20240402

| Project Information |
|---|
| East Town Crossing Unit 101 |
| Building E |
| Pioneer & Shaw, Puyallup |

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

City of Puyallup Building REVIEWED FOR COMPLIANCE bsnowden 03/03/2025 10:36:15 AM

**Messages / Results ***

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

UA Reduction = 2.6, Proposed UA is better than baseline by 1%

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 -- 1150 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 | 158 | 47.3 | 0.300 | 158 | 47.3 |
| Flat/Vaulted Ceilings U = | 0.027 | 0 | 0.0 | | 0 | 0.0 |
| Wall (above grade) U = | 0.056 | 1,299 | 72.8 | 0.054 | 1,299 | 70.2 |
| Floors over Crawlspace U = | 0.029 | 0 | 0.0 | | 0 | 0.0 |
| Slab on Grade F = | 0.540 | 148 | 80.0 | 0.540 | 148 | 80.0 |
| 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** | 212.0 | **Proposed UA Total** | 209.4 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 1.2% |
| | | **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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

## 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** | 1,150 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 | 5 | 0 | 90.0 | 27.00 |
| 2 | 2 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 2 | 3 | 0 | 5 | 0 | 30.0 | 9.00 |
| 3 | 4 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 6 | 0 | 5 | 0 | 30.0 | 9.00 |
| 4 | 5 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 2 | 6 | 3 | 0 | 7.5 | 2.25 |
| | | | | | | | | **Sum of Area and UA** | | **157.5** | **47.3** |
| | | | | | | | | **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 | 1,299 | 70 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | **Sum of Area and UA** | **1,299** | **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 | | 148 | 80 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Sum of Perimeter and FP | 148 | 80 |

**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 | 1,150 | ft2 |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 9,775 | ft3 |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 209 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 10,682 | Btu / Hour |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 5,384 | Btu / Hour |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 16,066 | Btu / Hour |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 16,066 | Btu / Hour |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 20,082 | Btu / Hour |

| Project Information |
|---|
| East Town Crossing Unit 102 |
| Building E |
| 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 1%

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 -- 1075 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 | 135 | 40.5 | 0.300 | 135 | 40.5 |
| Flat/Vaulted Ceilings U = | 0.027 | 0 | 0.0 | | 0 | 0.0 |
| Wall (above grade) U = | 0.056 | 1,364 | 76.4 | 0.054 | 1,364 | 73.6 |
| Floors over Crawlspace U = | 0.029 | 0 | 0.0 | | 0 | 0.0 |
| Slab on Grade F = | 0.540 | 152 | 82.3 | 0.540 | 152 | 82.3 |
| 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** | 211.1 | **Proposed UA Total** | 208.4 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 1.3% |
| | | **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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,075 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 |
| **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 |
| | | | | | | | | **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 | 3 | 6 | 0 | 5 | 0 | 90.0 | 27.00 |
| 2 | 2 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 3 | 0 | 5 | 0 | 15.0 | 4.50 |
| 3 | 4 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 6 | 0 | 5 | 0 | 30.0 | 9.00 |
| | | | | | | | | | **Sum of Area and UA** | **135.0** | **40.5** |
| | | | | | | | | | **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 | 1,364 | 74 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | **Sum of Area and UA** | **1,364** | **74** |

## 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 | | 152 | 82 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Sum of Perimeter and FP | 152 | 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 | 1,075 ft2 | |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 9,138 ft3 | |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 208 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 10,628 | Btu / Hour |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 5,033 | Btu / Hour |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 15,661 | Btu / Hour |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 15,661 | Btu / Hour |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 19,576 | Btu / Hour |

| Project Information |
|---|
| East Town Crossing Unit 103 |
| Building E |
| Pioneer & Shaw, Puyallup |

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

**Messages / Results ***

UA Reduction = 2.58, Proposed UA is better than baseline by 1%

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 -- 1055 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 | 90 | 27.0 | 0.300 | 90 | 27.0 |
| Flat/Vaulted Ceilings U = | 0.027 | 0 | 0.0 | | 0 | 0.0 |
| Wall (above grade) U = | 0.056 | 1,291 | 72.3 | 0.054 | 1,291 | 69.7 |
| Floors over Crawlspace U = | 0.029 | 0 | 0.0 | | 0 | 0.0 |
| Slab on Grade F = | 0.540 | 141 | 76.0 | 0.540 | 141 | 76.0 |
| 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** | 187.2 | **Proposed UA Total** | 184.7 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 1.4% |
| | | **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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,055 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 |
| 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 | 5 | 0 | 60.0 | 18.00 |
| 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** | **90.0** | **27.0** |
| | | | | | | | | | **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 | 1,291 | 70 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | **Sum of Area and UA** | **1,291** | **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 | | 141 | 76 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Sum of Perimeter and FP | 141 | 76 |

**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 | 1,055 ft2 | |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 8,968 ft3 | |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 185 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 9,417 | Btu / Hour |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 4,939 | Btu / Hour |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 14,357 | Btu / Hour |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 14,357 | Btu / Hour |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 17,946 | Btu / Hour |

| Project Information |
|---|
| East Town Crossing Unit 104 |
| Building E |
| Pioneer & Shaw, Puyallup |

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

**Messages / Results ***

UA Reduction = 2.44, Proposed UA is better than baseline by 1%

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 -- 986 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 | 180 | 54.0 | 0.300 | 180 | 54.0 |
| Flat/Vaulted Ceilings U = | 0.027 | 0 | 0.0 | | 0 | 0.0 |
| Wall (above grade) U = | 0.056 | 1,222 | 68.4 | 0.054 | 1,222 | 66.0 |
| Floors over Crawlspace U = | 0.029 | 0 | 0.0 | | 0 | 0.0 |
| Slab on Grade F = | 0.540 | 143 | 77.1 | 0.540 | 143 | 77.1 |
| 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** | 211.6 | **Proposed UA Total** | 209.1 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 1.2% |
| | | **UA Reduction** | 2.4 |

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

**Table R406.2 Fuel Normalization Credits**

| System No. | Full Description | Select System Type | Fuel Normalization Credits (406.2) | Energy Credits (406.3) | Total Credits (406.2 & 406.3) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 986 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 |
| **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 |
| | | | | | | | | **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 | 5 | 0 | 30.0 | 9.00 |
| 2 | 2 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 2 | 3 | 0 | 5 | 0 | 30.0 | 9.00 |
| 3 | 4 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 4 | 6 | 0 | 5 | 0 | 120.0 | 36.00 |
| | | | | | | | | | **Sum of Area and UA** | **180.0** | **54.0** |
| | | | | | | | | | **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 | 1,222 | 66 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | **Sum of Area and UA** | **1,222** | **66** |

## 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 | | 143 | 77 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Sum of Perimeter and FP | 143 | 77 |

**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 | 986 ft2 | |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 8,381 ft3 | |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 209 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 10,665 Btu / Hour | |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 4,616 Btu / Hour | |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 15,281 Btu / Hour | |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 15,281 Btu / Hour | |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 19,101 Btu / Hour | |

| Project Information |
|---|
| East Town Crossing Unit 105 |
| Building E |
| Pioneer & Shaw, Puyallup |

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

**Messages / Results ***

UA Reduction = 2.58, Proposed UA is better than baseline by 1%

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 -- 1055 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 | 90 | 27.0 | 0.300 | 90 | 27.0 |
| Flat/Vaulted Ceilings U = | 0.027 | 0 | 0.0 | | 0 | 0.0 |
| Wall (above grade) U = | 0.056 | 1,291 | 72.3 | 0.054 | 1,291 | 69.7 |
| Floors over Crawlspace U = | 0.029 | 0 | 0.0 | | 0 | 0.0 |
| Slab on Grade F = | 0.540 | 141 | 76.0 | 0.540 | 141 | 76.0 |
| 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** | 187.2 | **Proposed UA Total** | 184.7 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 1.4% |
| | | **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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,055 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 |
| 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 | 5 | 0 | 60.0 | 18.00 |
| 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** | **90.0** | **27.0** |
| | | | | | | | | | **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 | 1,291 | 70 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | **Sum of Area and UA** | **1,291** | **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 | | 141 | 76 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Sum of Perimeter and FP | 141 | 76 |

**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 | 1,055 ft2 | |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 8,968 ft3 | |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 185 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 9,417 | Btu / Hour |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 4,939 | Btu / Hour |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 14,357 | Btu / Hour |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 14,357 | Btu / Hour |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 17,946 | Btu / Hour |

| Project Information |
|---|
| East Town Crossing Unit 106 |
| Building E |
| Pioneer & Shaw, Puyallup |

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

**Messages / Results ***

UA Reduction = 2.62, Proposed UA is better than baseline by 1%

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 -- 986 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 | 90 | 27.0 | 0.300 | 90 | 27.0 |
| Flat/Vaulted Ceilings U = | 0.027 | 0 | 0.0 | | 0 | 0.0 |
| Wall (above grade) U = | 0.056 | 1,312 | 73.5 | 0.054 | 1,312 | 70.9 |
| Floors over Crawlspace U = | 0.029 | 0 | 0.0 | | 0 | 0.0 |
| Slab on Grade F = | 0.540 | 143 | 77.1 | 0.540 | 143 | 77.1 |
| 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** | 189.6 | **Proposed UA Total** | 187.0 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 1.4% |
| | | **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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 986 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 |
| 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 | 5 | 0 | 30.0 | 9.00 |
| 2 | 2 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 2 | 3 | 0 | 5 | 0 | 30.0 | 9.00 |
| 3 | 4 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 6 | 0 | 5 | 0 | 30.0 | 9.00 |
| | | | | | Sum of Area and UA | | | | | 90.0 | 27.0 |
| | | | | | 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 | 1,312 | 71 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | Sum of Area and UA | 1,312 | 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 | | 143 | 77 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Sum of Perimeter and FP | 143 | 77 |

**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 | 986 ft2 | |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 8,381 ft3 | |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 187 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 9,536 Btu / Hour | |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 4,616 Btu / Hour | |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 14,152 Btu / Hour | |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 14,152 Btu / Hour | |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 17,690 Btu / Hour | |

| Project Information |
|---|
| East Town Crossing Unit 107 |
| Building E |
| 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%

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 -- 1193 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 | 1,350 | 75.6 | 0.054 | 1,350 | 72.9 |
| Floors over Crawlspace U = | 0.029 | 0 | 0.0 | | 0 | 0.0 |
| Slab on Grade F = | 0.540 | 150 | 81.1 | 0.540 | 150 | 81.1 |
| 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** | 206.9 | **Proposed UA Total** | 204.2 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 1.3% |
| | | **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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,193 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 |
| **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 | 2 | 6 | 0 | 5 | 0 | 60.0 | 18.00 |
| 2 | 2 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 2 | 3 | 0 | 5 | 0 | 30.0 | 9.00 |
| 3 | 4 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 6 | 0 | 5 | 0 | 30.0 | 9.00 |
| 4 | 6 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 2 | 6 | 3 | 0 | 7.5 | 2.25 |
| | | | | | | | | | **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 | 1,350 | 73 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | **Sum of Area and UA** | **1,350** | **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 | | 150 | 81 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Sum of Perimeter and FP | 150 | 81 |

**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 | 1,193 | ft2 |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 10,141 | ft3 |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 204 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 10,416 | Btu / Hour |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 5,585 | Btu / Hour |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 16,001 | Btu / Hour |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 16,001 | Btu / Hour |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 20,002 | Btu / Hour |

| Project Information |
|---|
| East Town Crossing Unit 108 |
| Building E |
| Pioneer & Shaw, Puyallup |

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

**Messages / Results ***

UA Reduction = 2.6, Proposed UA is better than baseline by 1%

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 -- 1095 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 | 240 | 72.0 | 0.300 | 240 | 72.0 |
| Flat/Vaulted Ceilings U = | 0.027 | 0 | 0.0 | | 0 | 0.0 |
| Wall (above grade) U = | 0.056 | 1,299 | 72.7 | 0.054 | 1,299 | 70.1 |
| Floors over Crawlspace U = | 0.029 | 0 | 0.0 | | 0 | 0.0 |
| Slab on Grade F = | 0.540 | 156 | 84.4 | 0.540 | 156 | 84.4 |
| 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** | 241.2 | **Proposed UA Total** | 238.6 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 1.1% |
| | | **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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,095 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 |
| 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: 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 | 4 | 6 | 0 | 5 | 0 | 120.0 | 36.00 |
| 2 | 4 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 4 | 6 | 0 | 5 | 0 | 120.0 | 36.00 |
| | | | | | | | | | **Sum of Area and UA** | **240.0** | **72.0** |
| | | | | | | | | | **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 | 1,299 | 70 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | **Sum of Area and UA** | **1,299** | **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 | | 156 | 84 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Sum of Perimeter and FP | 156 | 84 |

**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 | 1,095 ft2 | |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 9,308 ft3 | |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 239 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 12,167 | Btu / Hour |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 5,127 | Btu / Hour |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 17,293 | Btu / Hour |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 17,293 | Btu / Hour |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 21,616 | Btu / Hour |

| Project Information |
|---|
| East Town Crossing Unit 201 |
| Building E |
| Pioneer & Shaw, Puyallup |

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

**Messages / Results ***

UA Reduction = 2.6, 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 -- 1150 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 | 158 | 47.3 | 0.300 | 158 | 47.3 |
| Flat/Vaulted Ceilings U = | 0.027 | 0 | 0.0 | | 0 | 0.0 |
| Wall (above grade) U = | 0.056 | 1,299 | 72.8 | 0.054 | 1,299 | 70.2 |
| 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** | 132.0 | **Proposed UA Total** | 129.4 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 2.0% |
| | | **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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,150 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 |
| 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 | 5 | 0 | 90.0 | 27.00 |
| 2 | 2 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 2 | 3 | 0 | 5 | 0 | 30.0 | 9.00 |
| 3 | 4 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 6 | 0 | 5 | 0 | 30.0 | 9.00 |
| 4 | 5 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 2 | 6 | 3 | 0 | 7.5 | 2.25 |
| | | | | | | | | **Sum of Area and UA** | | **157.5** | **47.3** |
| | | | | | | | | **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 | 1,299 | 70 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | **Sum of Area and UA** | **1,299** | **70** |

## 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 | 1,150 | ft2 |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 9,775 | ft3 |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 129 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 6,600 | Btu / Hour |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 5,384 | Btu / Hour |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 11,984 | Btu / Hour |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 11,984 | Btu / Hour |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 14,980 | Btu / Hour |

| Project Information |
|---|
| East Town Crossing Unit 202 |
| Building E |
| Pioneer & Shaw, Puyallup |

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

**Messages / Results ***

UA Reduction = 2.79, 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 -- 1075 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 | 105 | 31.5 | 0.300 | 105 | 31.5 |
| Flat/Vaulted Ceilings U = | 0.027 | 0 | 0.0 | | 0 | 0.0 |
| Wall (above grade) U = | 0.056 | 1,394 | 78.0 | 0.054 | 1,394 | 75.3 |
| 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** | 121.5 | **Proposed UA Total** | 118.8 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,075 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 |
| 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 | 1 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 2 | 6 | 0 | 5 | 0 | 60.0 | 18.00 |
| 2 | 2 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 3 | 0 | 5 | 0 | 15.0 | 4.50 |
| 3 | 4 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 6 | 0 | 5 | 0 | 30.0 | 9.00 |
| | | | | | Sum of Area and UA | | | | | 105.0 | 31.5 |
| | | | | | 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 | 1,394 | 75 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | Sum of Area and UA | 1,394 | 75 |

## 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 | 1,075 ft2 | |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 9,138 ft3 | |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 119 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 6,056 | Btu / Hour |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 5,033 | Btu / Hour |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 11,089 | Btu / Hour |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 11,089 | Btu / Hour |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 13,862 | Btu / Hour |

| Project Information |
|---|
| East Town Crossing Unit 203 |
| Building E |
| Pioneer & Shaw, Puyallup |

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

**Messages / Results ***

UA Reduction = 2.58, 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 -- 1055 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 | 90 | 27.0 | 0.300 | 90 | 27.0 |
| Flat/Vaulted Ceilings U = | 0.027 | 0 | 0.0 | | 0 | 0.0 |
| Wall (above grade) U = | 0.056 | 1,291 | 72.3 | 0.054 | 1,291 | 69.7 |
| 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** | 111.3 | **Proposed UA Total** | 108.7 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 2.3% |
| | | **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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,055 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 |
| 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 |
| | | | | | | | | **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 | 5 | 0 | 60.0 | 18.00 |
| 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** | **90.0** | **27.0** |
| | | | | | | | | | **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 | 1,291 | 70 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | **Sum of Area and UA** | **1,291** | **70** |

## 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 | 1,055 ft2 | |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 8,968 ft3 | |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 109 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 5,545 Btu / Hour | |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 4,939 Btu / Hour | |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 10,484 Btu / Hour | |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 10,484 Btu / Hour | |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 13,105 Btu / Hour | |

| Project Information |
|---|
| East Town Crossing Unit 204 |
| Building E |
| Pioneer & Shaw, Puyallup |

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

**Messages / Results ***

UA Reduction = 2.53, 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 -- 1005 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 | 180 | 54.0 | 0.300 | 180 | 54.0 |
| Flat/Vaulted Ceilings U = | 0.027 | 0 | 0.0 | | 0 | 0.0 |
| Wall (above grade) U = | 0.056 | 1,263 | 70.7 | 0.054 | 1,263 | 68.2 |
| 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** | 136.7 | **Proposed UA Total** | 134.2 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 1.8% |
| | | **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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,005 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 |
| 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 | 5 | 0 | 30.0 | 9.00 |
| 2 | 2 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 2 | 3 | 0 | 5 | 0 | 30.0 | 9.00 |
| 3 | 4 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 4 | 6 | 0 | 5 | 0 | 120.0 | 36.00 |
| | | | | | | | | | Sum of Area and UA | 180.0 | 54.0 |
| | | | | | | | | | 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 | 1,263 | 68 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | Sum of Area and UA | 1,263 | 68 |

## 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 | 1,005 ft2 | |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 8,543 ft3 | |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 134 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 6,843 | Btu / Hour |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 4,705 | Btu / Hour |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 11,549 | Btu / Hour |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 11,549 | Btu / Hour |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 14,436 | Btu / Hour |

| Project Information |
|---|
| East Town Crossing Unit 205 |
| Building E |
| Pioneer & Shaw, Puyallup |

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

**Messages / Results ***

UA Reduction = 2.69, 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 -- 1055 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 | 90 | 27.0 | 0.300 | 90 | 27.0 |
| Flat/Vaulted Ceilings U = | 0.027 | 0 | 0.0 | | 0 | 0.0 |
| Wall (above grade) U = | 0.056 | 1,347 | 75.5 | 0.054 | 1,347 | 72.8 |
| 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** | 114.5 | **Proposed UA Total** | 111.8 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 2.4% |
| | | **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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,055 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 |
| 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 | 5 | 0 | 60.0 | 18.00 |
| 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** | **90.0** | **27.0** |
| | | | | | | | | | **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 | 1,347 | 73 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | **Sum of Area and UA** | **1,347** | **73** |

## 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 | 1,055 ft2 | |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 8,968 ft3 | |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 112 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 5,700 Btu / Hour | |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 4,939 Btu / Hour | |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 10,639 Btu / Hour | |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 10,639 Btu / Hour | |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 13,299 Btu / Hour | |

| Project Information |
|---|
| East Town Crossing Unit 206 |
| Building E |
| Pioneer & Shaw, Puyallup |

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

**Messages / Results ***

UA Reduction = 2.71, 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 -- 1005 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 | 90 | 27.0 | 0.300 | 90 | 27.0 |
| Flat/Vaulted Ceilings U = | 0.027 | 0 | 0.0 | | 0 | 0.0 |
| Wall (above grade) U = | 0.056 | 1,353 | 75.8 | 0.054 | 1,353 | 73.0 |
| 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** | 114.8 | **Proposed UA Total** | 112.0 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 2.4% |
| | | **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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,005 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 |
| 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 | 5 | 0 | 30.0 | 9.00 |
| 2 | 2 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 2 | 3 | 0 | 5 | 0 | 30.0 | 9.00 |
| 3 | 4 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 6 | 0 | 5 | 0 | 30.0 | 9.00 |
| | | | | | | | | Sum of Area and UA | | 90.0 | 27.0 |
| | | | | | | | | 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 | 1,353 | 73 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | Sum of Area and UA | 1,353 | 73 |

## 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 | 1,005 ft2 | |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 8,543 ft3 | |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 112 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 5,714 | Btu / Hour |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 4,705 | Btu / Hour |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 10,419 | Btu / Hour |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 10,419 | Btu / Hour |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 13,024 | Btu / Hour |

| Project Information |
|---|
| East Town Crossing Unit 207 |
| Building E |
| 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 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 -- 1193 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 | 1,350 | 75.6 | 0.054 | 1,350 | 72.9 |
| 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** | 125.8 | **Proposed UA Total** | 123.1 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 2.1% |
| | | **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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,193 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 |
| 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 | 2 | 6 | 0 | 5 | 0 | 60.0 | 18.00 |
| 2 | 2 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 2 | 3 | 0 | 5 | 0 | 30.0 | 9.00 |
| 3 | 4 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 6 | 0 | 5 | 0 | 30.0 | 9.00 |
| 4 | 5 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 2 | 6 | 3 | 0 | 7.5 | 2.25 |
| | | | | | | | | 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 | 1,350 | 73 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | Sum of Area and UA | 1,350 | 73 |

## 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 | 1,193 | ft2 |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 10,141 | ft3 |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 123 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 6,279 | Btu / Hour |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 5,585 | Btu / Hour |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 11,865 | Btu / Hour |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 11,865 | Btu / Hour |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 14,831 | Btu / Hour |

| Project Information |
|---|
| East Town Crossing Unit 208 |
| Building E |
| Pioneer & Shaw, Puyallup |

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

**Messages / Results ***

UA Reduction = 2.86, 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 -- 1124 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 | 150 | 45.0 | 0.300 | 150 | 45.0 |
| Flat/Vaulted Ceilings U = | 0.027 | 0 | 0.0 | | 0 | 0.0 |
| Wall (above grade) U = | 0.056 | 1,430 | 80.1 | 0.054 | 1,430 | 77.2 |
| 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** | 137.1 | **Proposed UA Total** | 134.2 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 2.1% |
| | | **UA Reduction** | 2.9 |

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

**Table R406.2 Fuel Normalization Credits**

| System No. | Full Description | Select System Type | Fuel Normalization Credits (406.2) | Energy Credits (406.3) | Total Credits (406.2 & 406.3) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,124 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 |
| 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: 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 | 4 | 6 | 0 | 5 | 0 | 120.0 | 36.00 |
| 2 | 4 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 6 | 0 | 5 | 0 | 30.0 | 9.00 |
| | | | | | | | | Sum of Area and UA | | 150.0 | 45.0 |
| | | | | | | | | 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 | 1,430 | 77 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | Sum of Area and UA | 1,430 | 77 |

## 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 | 1,124 | ft2 |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 9,554 | ft3 |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 134 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 6,845 | Btu / Hour |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 5,262 | Btu / Hour |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 12,108 | Btu / Hour |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 12,108 | Btu / Hour |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 15,135 | Btu / Hour |

| Project Information |
|---|
| East Town Crossing Unit 301 |
| Building E |
| Pioneer & Shaw, Puyallup |

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

**Messages / Results ***

UA Reduction = 2.6, 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 -- 1151 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 | 158 | 47.3 | 0.300 | 158 | 47.3 |
| Flat/Vaulted Ceilings U = | 0.027 | 1,151 | 31.1 | 0.027 | 1,151 | 31.1 |
| Wall (above grade) U = | 0.056 | 1,300 | 72.8 | 0.054 | 1,300 | 70.2 |
| 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** | 163.1 | **Proposed UA Total** | 160.5 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 1.6% |
| | | **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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,151 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 |
| **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 |
| | | | | | | | | **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 | 5 | 0 | 90.0 | 27.00 |
| 2 | 2 | **U=0.30 (Code Baseline)** | Table 406.2 | 0.30 | 2 | 3 | 0 | 5 | 0 | 30.0 | 9.00 |
| 3 | 4 | **U=0.30 (Code Baseline)** | Table 406.2 | 0.30 | 1 | 6 | 0 | 5 | 0 | 30.0 | 9.00 |
| 4 | 5 | **U=0.30 (Code Baseline)** | Table 406.2 | 0.30 | 1 | 2 | 6 | 3 | 0 | 7.5 | 2.25 |
| | | | | | | | | | **Sum of Area and UA** | **157.5** | **47.3** |
| | | | | | | | | | **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 | 1,151 | 31.1 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | **Sum of Area and UA** | **1,151** | **31.1** |

## 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 | 1,300 | 70 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | **Sum of Area and UA** | **1,300** | **70** |

## 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 | 1,151 | ft2 |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 9,784 | ft3 |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 161 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 8,188 | Btu / Hour |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 5,389 | Btu / Hour |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 13,577 | Btu / Hour |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 13,577 | Btu / Hour |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 16,971 | Btu / Hour |

| Project Information |
|---|
| East Town Crossing Unit 302 |
| Building E |
| 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%

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 -- 1075 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 | 135 | 40.5 | 0.300 | 135 | 40.5 |
| Flat/Vaulted Ceilings U = | 0.027 | 1,075 | 29.0 | 0.027 | 1,075 | 29.0 |
| Wall (above grade) U = | 0.056 | 1,364 | 76.4 | 0.054 | 1,364 | 73.6 |
| 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** | 157.9 | **Proposed UA Total** | 155.2 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 1.7% |
| | | **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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,075 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 | 1 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 3 | 6 | 0 | 5 | 0 | 90.0 | 27.00 |
| 2 | 2 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 3 | 0 | 5 | 0 | 15.0 | 4.50 |
| 3 | 4 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 6 | 0 | 5 | 0 | 30.0 | 9.00 |
| | | | | | | | | **Sum of Area and UA** | | **135.0** | **40.5** |
| | | | | | | | | **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 | 1,075 | 29.0 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | **Sum of Area and UA** | **1,075** | **29.0** |

## 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 | 1,364 | 74 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | **Sum of Area and UA** | **1,364** | **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 | 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 | 1,075 ft2 | |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 9,138 ft3 | |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 155 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 7,913 | Btu / Hour |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 5,033 | Btu / Hour |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 12,946 | Btu / Hour |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 12,946 | Btu / Hour |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 16,182 | Btu / Hour |

| Project Information |
|---|
| East Town Crossing Unit 303 |
| Building E |
| Pioneer & Shaw, Puyallup |

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

**Messages / Results ***

UA Reduction = 2.58, 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 -- 1055 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 | 90 | 27.0 | 0.300 | 90 | 27.0 |
| Flat/Vaulted Ceilings U = | 0.027 | 1,055 | 28.5 | 0.027 | 1,055 | 28.5 |
| Wall (above grade) U = | 0.056 | 1,291 | 72.3 | 0.054 | 1,291 | 69.7 |
| 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** | 139.8 | **Proposed UA Total** | 137.2 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 1.8% |
| | | **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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,055 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 | 5 | 0 | 60.0 | 18.00 |
| 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 | | | | | 90.0 | 27.0 |
| | | | | | 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 | 1,055 | 28.5 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | Sum of Area and UA | 1,055 | 28.5 |

## 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 | 1,291 | 70 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | Sum of Area and UA | 1,291 | 70 |

## 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 | 1,055 ft2 | |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 8,968 ft3 | |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 137 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 6,997 Btu / Hour | |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 4,939 Btu / Hour | |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 11,937 Btu / Hour | |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 11,937 Btu / Hour | |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 14,921 Btu / Hour | |

| Project Information |
|---|
| East Town Crossing Unit 304 |
| Building E |
| Pioneer & Shaw, Puyallup |

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

**Messages / Results ***

UA Reduction = 2.71, 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 -- 1005 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 | 90 | 27.0 | 0.300 | 90 | 27.0 |
| Flat/Vaulted Ceilings U = | 0.027 | 1,005 | 27.1 | 0.027 | 1,005 | 27.1 |
| Wall (above grade) U = | 0.056 | 1,353 | 75.8 | 0.054 | 1,353 | 73.0 |
| 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** | 141.9 | **Proposed UA Total** | 139.2 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 1.9% |
| | | **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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,005 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 |
| 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 | 5 | 0 | 30.0 | 9.00 |
| 2 | 2 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 2 | 3 | 0 | 5 | 0 | 30.0 | 9.00 |
| 3 | 4 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 6 | 0 | 5 | 0 | 30.0 | 9.00 |
| | | | | | | | | **Sum of Area and UA** | | **90.0** | **27.0** |
| | | | | | | | | **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 | 1,005 | 27.1 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | **Sum of Area and UA** | **1,005** | **27.1** |

## 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 | 1,353 | 73 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | **Sum of Area and UA** | **1,353** | **73** |

## 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 | 1,005 ft2 | |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 8,543 ft3 | |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 139 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 7,098 | Btu / Hour |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 4,705 | Btu / Hour |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 11,803 | Btu / Hour |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 11,803 | Btu / Hour |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 14,754 | Btu / Hour |

| Project Information |
|---|
| East Town Crossing Unit 305 |
| Building E |
| Pioneer & Shaw, Puyallup |

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

**Messages / Results ***

UA Reduction = 2.58, 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 -- 1055 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 | 90 | 27.0 | 0.300 | 90 | 27.0 |
| Flat/Vaulted Ceilings U = | 0.027 | 1,055 | 28.5 | 0.027 | 1,055 | 28.5 |
| Wall (above grade) U = | 0.056 | 1,291 | 72.3 | 0.054 | 1,291 | 69.7 |
| 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** | 139.8 | **Proposed UA Total** | 137.2 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 1.8% |
| | | **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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,055 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 |
| 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 | 5 | 0 | 60.0 | 18.00 |
| 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** | | **90.0** | **27.0** |
| | | | | | | | | **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 | 1,055 | 28.5 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | **Sum of Area and UA** | **1,055** | **28.5** |

## 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 | 1,291 | 70 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | **Sum of Area and UA** | **1,291** | **70** |

## 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 | 1,055 ft2 | |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 8,968 ft3 | |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 137 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 6,996 Btu / Hour | |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 4,939 Btu / Hour | |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 11,936 Btu / Hour | |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 11,936 Btu / Hour | |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 14,919 Btu / Hour | |

| Project Information |
|---|
| East Town Crossing Unit 306 |
| Building E |
| Pioneer & Shaw, Puyallup |

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

**Messages / Results ***

UA Reduction = 2.71, 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 -- 1005 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 | 90 | 27.0 | 0.300 | 90 | 27.0 |
| Flat/Vaulted Ceilings U = | 0.027 | 1,005 | 27.1 | 0.027 | 1,005 | 27.1 |
| Wall (above grade) U = | 0.056 | 1,353 | 75.8 | 0.054 | 1,353 | 73.0 |
| 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** | 141.9 | **Proposed UA Total** | 139.2 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 1.9% |
| | | **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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,005 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 |
| 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 | 5 | 0 | 30.0 | 9.00 |
| 2 | 2 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 2 | 3 | 0 | 5 | 0 | 30.0 | 9.00 |
| 3 | 4 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 6 | 0 | 5 | 0 | 30.0 | 9.00 |
| | | | | | | | | **Sum of Area and UA** | | **90.0** | **27.0** |
| | | | | | | | | **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 | 1,005 | 27.1 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | **Sum of Area and UA** | **1,005** | **27.1** |

## 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 | 1,353 | 73 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | **Sum of Area and UA** | **1,353** | **73** |

## 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 | 1,005 ft2 | |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 8,543 ft3 | |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 139 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 7,098 | Btu / Hour |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 4,705 | Btu / Hour |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 11,803 | Btu / Hour |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 11,803 | Btu / Hour |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 14,754 | Btu / Hour |

| Project Information |
|---|
| East Town Crossing Unit 307 |
| Building E |
| 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 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 -- 1193 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 | 1,193 | 32.2 | 0.027 | 1,193 | 32.2 |
| Wall (above grade) U = | 0.056 | 1,350 | 75.6 | 0.054 | 1,350 | 72.9 |
| 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** | 158.0 | **Proposed UA Total** | 155.3 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 1.7% |
| | | **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) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,193 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 |
| 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 | 2 | 6 | 0 | 5 | 0 | 60.0 | 18.00 |
| 2 | 2 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 2 | 3 | 0 | 5 | 0 | 30.0 | 9.00 |
| 3 | 4 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 6 | 0 | 5 | 0 | 30.0 | 9.00 |
| 4 | 5 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 2 | 6 | 3 | 0 | 7.5 | 2.25 |
| | | | | | | | | | **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 | 1,193 | 32.2 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | **Sum of Area and UA** | **1,193** | **32.2** |

## 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 | 1,350 | 73 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | **Sum of Area and UA** | **1,350** | **73** |

## 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 | 1,193 | ft2 |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 10,141 | ft3 |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 155 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 7,922 | Btu / Hour |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 5,585 | Btu / Hour |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 13,507 | Btu / Hour |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 13,507 | Btu / Hour |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 16,884 | Btu / Hour |

| Project Information |
|---|
| East Town Crossing Unit 308 |
| Building E |
| Pioneer & Shaw, Puyallup |

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

**Messages / Results ***

UA Reduction = 2.86, 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 -- 1123 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 | 150 | 45.0 | 0.300 | 150 | 45.0 |
| Flat/Vaulted Ceilings U = | 0.027 | 1,123 | 30.3 | 0.027 | 1,123 | 30.3 |
| Wall (above grade) U = | 0.056 | 1,429 | 80.0 | 0.054 | 1,429 | 77.2 |
| 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** | 167.4 | **Proposed UA Total** | 164.5 |
| **Required Credits** | 4.5 | **Proposed Credits** | 7.0 from Tables 406.2 and 406.3 |
| | | **UA Percent Reduction** | 1.7% |
| | | **UA Reduction** | 2.9 |

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

**Table R406.2 Fuel Normalization Credits**

| System No. | Full Description | Select System Type | Fuel Normalization Credits (406.2) | Energy Credits (406.3) | Total Credits (406.2 & 406.3) |
|---|---|---|---|---|---|
| 2 | For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020). | **Heat Pump, air-to-air or air to water** | 1.0 | 6.0 | 7.0 |

**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** | 1,123 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 |
| 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: 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 | 4 | 6 | 0 | 5 | 0 | 120.0 | 36.00 |
| 2 | 4 | U=0.30 (Code Baseline) | Table 406.2 | 0.30 | 1 | 6 | 0 | 5 | 0 | 30.0 | 9.00 |
| | | | | | | | | **Sum of Area and UA** | | **150.0** | **45.0** |
| | | | | | | | | **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 | 1,123 | 30.3 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | **Sum of Area and UA** | **1,123** | **30.3** |

## 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 | 1,429 | 77 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | **Sum of Area and UA** | **1,429** | **77** |

## 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 | 1,123 ft2 | |
| Conditioned Volume<br>Leave blank to use default of 8.5 ft. ceiling height | 9,546 ft3 | |
| HVAC System Type | Heat Pump | |
| Location of HVAC Distribution System | Unducted | |
| Sum of UA, including exempt door and window | 165 | |
| Envelope Heat Load<br>Sum of UA X ΔT | 8,390 Btu / Hour | |
| Air Leakage Heat Load<br>((Volume X 0.6) X ΔT) X .018)) | 5,258 Btu / Hour | |
| Building Design Heat Load<br>Air Leakage + Envelope Heat Loss | 13,647 Btu / Hour | |
| Building and Duct Heat Load<br>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1<br>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1 | 13,647 Btu / Hour | |
| Maximum Heat Equipment Output<br>Building and Duct Heat Loss X 1.25 for heat pumps<br>Building and Duct Heat Loss X 1.40 for all other systems | 17,059 Btu / Hour | |