


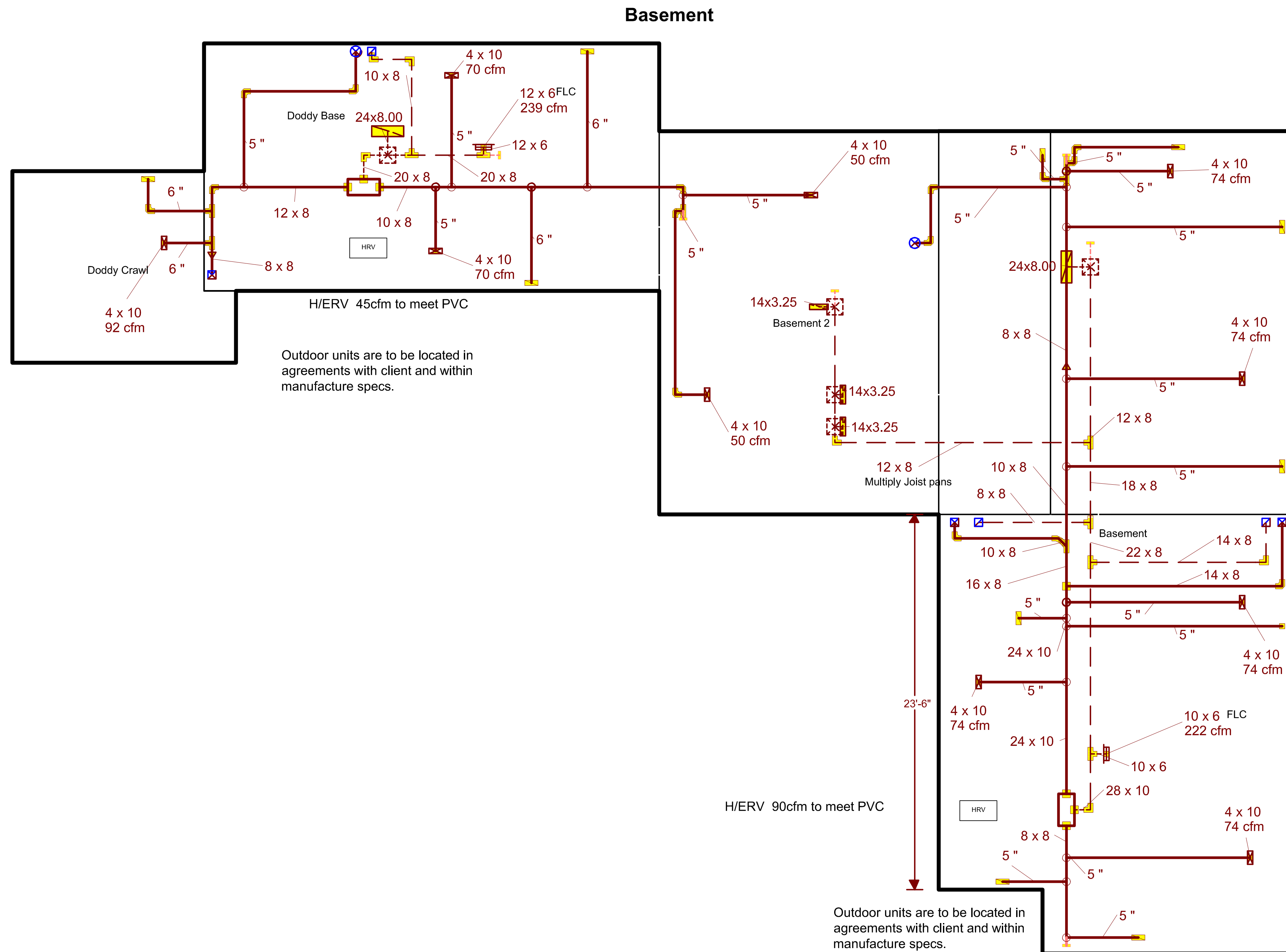
Schedule 1: Designer Information

Use one form for each individual who reviews and takes responsibility for design activities with respect to the project.

| A. Project Information | | | |
|--|--|---|----------|
| Building number, street name | | Unit no. | Lot/con. |
| Municipality | Postal code | Plan number/ other description | |
| B. Individual who reviews and takes responsibility for design activities | | | |
| Name | | Firm | |
| Street address | | Unit no. | Lot/con. |
| Municipality | Postal code | Province | E-mail |
| Telephone number () | Fax number () | Cell number () | |
| C. Design activities undertaken by individual identified in Section B. [Building Code Table 3.5.2.1. of Division C] | | | |
| <input type="checkbox"/> House | <input type="checkbox"/> HVAC – House | <input type="checkbox"/> Building Structural | |
| <input type="checkbox"/> Small Buildings | <input type="checkbox"/> Building Services | <input type="checkbox"/> Plumbing – House | |
| <input type="checkbox"/> Large Buildings | <input type="checkbox"/> Detection, Lighting and Power | <input type="checkbox"/> Plumbing – All Buildings | |
| <input type="checkbox"/> Complex Buildings | <input type="checkbox"/> Fire Protection | <input type="checkbox"/> On-site Sewage Systems | |
| Description of designer's work | | | |
| D. Declaration of Designer | | | |
| I _____ declare that (choose one as appropriate): | | | |
| (print name) | | | |
| <input type="checkbox"/> I review and take responsibility for the design work on behalf of a firm registered under subsection 3.2.4. of Division C, of the Building Code. I am qualified, and the firm is registered, in the appropriate classes/categories. | | | |
| Individual BCIN: _____ | | | |
| Firm BCIN: _____ | | | |
| <input type="checkbox"/> I review and take responsibility for the design and am qualified in the appropriate category as an "other designer" under subsection 3.2.5. of Division C, of the Building Code. | | | |
| Individual BCIN: _____ | | | |
| Basis for exemption from registration: _____ | | | |
| <input type="checkbox"/> The design work is exempt from the registration and qualification requirements of the Building Code. | | | |
| Basis for exemption from registration and qualification: _____ | | | |
| I certify that: | | | |
| 1. The information contained in this schedule is true to the best of my knowledge. | | | |
| 2. I have submitted this application with the knowledge and consent of the firm. | | | |
| _____ |  _____ | | |
| Date | Signature of Designer | | |

NOTE:

1. For the purposes of this form, "individual" means the "person" referred to in Clause 3.2.4.7(1) d) of Division C, Article 3.2.5.1. of Division C, and all other persons who are exempt from qualification under Subsections 3.2.4. and 3.2.5. of Division C.
2. Schedule 1 is not required to be completed by a holder of a license, temporary license, or a certificate of authorization, issued by the Ontario Association of Architects. Schedule 1 is also not required to be completed by a holder of a license to practise, a limited license to practise, or a certificate of authorization, issued by the Association of Professional Engineers of Ontario.



| LEGEND | |
|--------|--|
| | Furnace |
| | Return Grille |
| | Supply Register |
| | Supply Boot |
| | Wall Supply Register |
| | Return Air Outlet |
| | Supply Riser Round |
| | Supply Duct Single Line |
| | Round Branch Notation |
| | 12 x 4 00 cfm Register Notation, size and Air Flow |
| | Trunk Filing |
| | Return Boot |
| | Double Wall Return Grille |
| | Single Wall Return Grille |
| | Top Takeoff |
| | Single Line Reducer |
| | Supply Riser Square/Rectangular |
| | Return Duct Single Line |
| | 14x3.25 Return stud Cavity Notation |
| | 8 x 8 Trunk Size Notation |

General Notes

- This Drawing shall be used only for the purpose indicated in the latest issued column below.
- All drawings and specifications are the property of the designer and may not be reproduced without written permission. Drawings must not be scaled. Contractor shall check and verify all dimensions on site and report errors and omissions to Firehouse HVAC Designs Inc. This drawing shall not be used for construction unless countersigned by the designer.
- Designer to be notified of all & any changes to the structure and/or system design before installation begins.
- Installation to comply with the latest version of the Ontario Building Code (OBC).
- Installation to comply with the latest version of the HRAI manuals and SMACNA using good engineering piping practices and procedures.
- Volume control dampers are to be installed as required to S/A branch outlets, main trunks as needed, main take-offs & "Y" fittings and as per good engineering piping practices.
- All duct works in unconditioned spaces are to be sealed to a minimum of Class A seal level (All transverse joints, longitudinal seams, and all wall penetrations,) and insulated to a minimum of R-12.
- Where a supply duct is located in a conditioned spaces, the ductwork shall be sealed to a Class C seal level, (All transverse joints only.) Recommend all transverse joints of both the S/A & R/A be done to reduce air duct leakage by approved duct sealer.
- Recommend all habitable finished rooms in a basement have low wall supply registers and return air grills be installed to within 6" of the floor level as a means of conditioning the coldest area of the room. Unless the conditions of the HRAI manual 2.9 but not limited to and referred to such as thermostatically controlled supplemental heat with a capacity of at least 20% of the load for the space such as: HYDRONIC in-floor heating system, electric resistance baseboard heating.
- All kitchen exhaust and bath fans are to be vented directly to the outdoors as per the OBC 9.32....
- Undercut all doors in rooms without return air grills, transfer grills or wall transfer grills.
- Thermostats shall be central located for best results and should be approx 52 to 60" above the floor to reflect the conditions commonly experienced by occupants.
- All HRV/ERV's are to be installed as per the OBC and F326 and as per 9.32 Ventilation and Part 6.
- All S/A to be 4"x10"x 5"Ø unless noted.

The undersigned has reviewed and taken responsibility for this design, and has the qualifications and meets the requirements set out in the Ontario Building Code to be a designer.

QUALIFICATION INFORMATION (Required unless the design is exempt under OBC Div 9.3.2.4.1 and 9.3.2.1.1)

NAME: Scott Ellis SIGNATURE: *S. Ellis* BCIN: 43964

REGISTRATION INFORMATION (Required unless the design is exempt under OBC Div 9.3.2.4.1 and 9.3.2.1.1)

FIRM NAME: Firehouse HVAC Designs Inc. BCIN: 126211

| No. | Revision/Issue | Date |
|-----|----------------|------|
| | | |

Firm Name and Address

Firehouse HVAC Designs Inc.
 30 New York Ave.
 Wasaga Beach, ON L9Z 3A8
 705-241-7189
 email: info@fhdesigns.ca

Project Name and Address

PARKS CANADA
 7501 Steeles Ave.
 Scarborough, ON

| | | | |
|---------|------------|-------|----|
| Project | 23-1518 | Sheet | M1 |
| Date | 01-02-2023 | | |
| Scale | 1' = 1/4" | | |

EQUIPMENT SPECS

Total Loss 29,035 BTUH
 Total Gain 10,800 BTUH
 Equipment Manu Generic 2.5 ton Cold Climate ASHP
 Model # 2.5 Ton CC ASHP w 8.0 kw heater kit
 AC or Heat Pump CC ASHP 18 SEER HSPF 7.1 IV
 CFM H/C 744cfm @ 0.5 inwc

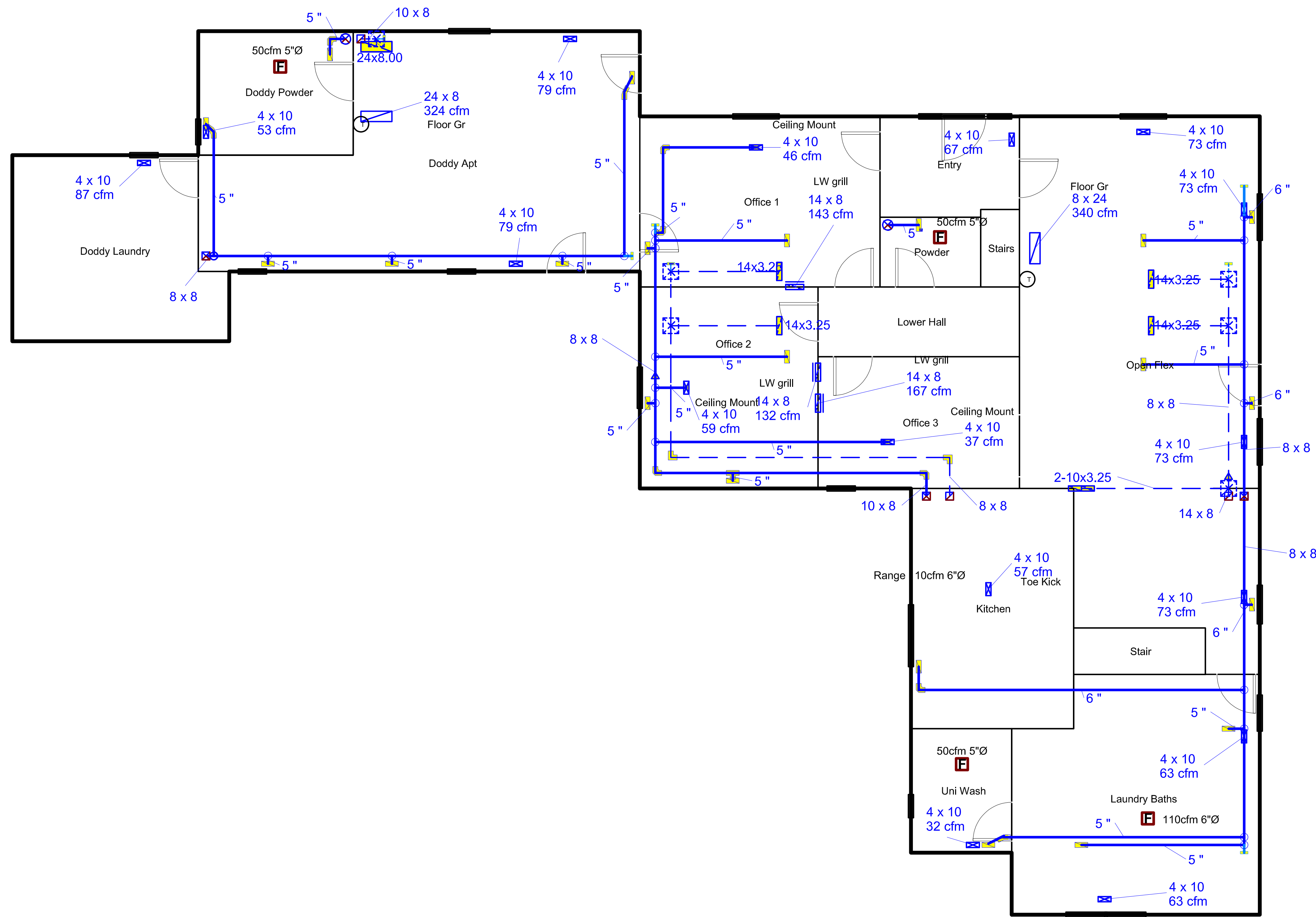
EQUIPMENT SPECS

Total Loss 41,516 BTUH
 Total Gain 32,400 BTUH
 Equipment Manu Generic 3.5 ton Cold Climate ASHP
 Model # 3.5 Ton CC ASHP w 15.0 kw heater kit
 AC or Heat Pump CC ASHP SEER 18 HSPF 7.1 IV
 CFM H/C 1485cfm @ 0.8 inwc

DODDY SIDE AH-2

MAIN SIDE AH-1

Main Floor



General Notes

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5. Installation to comply with the latest version of the HRAI manuals and SMACNA using good engineering piping practices and procedures.
6. Volume control dampers are to be installed as required to S/A branch outlets, main trunks as needed, main take-offs & "Y" fittings and as per good engineering piping practices.
7. All duct works in unconditioned spaces are to be sealed to a minimum of Class A seal level (All transverse joints, longitudinal seams, and all wall penetrations,) and insulated to a minimum of R-12.
8. Where a supply duct is located in a conditioned spaces, the ductwork shall be sealed to a Class C seal level (All transverse joints only). Recommend all transverse joints of both the S/A & R/A to be done to reduce air duct leakage by approved duct sealer.
9. Recommend all habitable finished rooms in a basement have low wall supply registers and return air grills be installed to within 6" of the floor level as a means of conditioning the coldest area of the room. Unless the conditions of the HRAI manual 2.9 but not limited to and referred to such as thermostatically controlled supplemental heat with a capacity of at least 20% of the load for the space such as: HYDRONIC in-floor heating system, electric resistance baseboard heating.
10. All kitchen exhaust and bath fans are to be vented directly to the outdoors as per the OBC 9.32...
11. Undercut all doors in rooms without return air grills, transfer grills or wall transfer grills.
12. Thermostats shall be central located for best results and should be approx 52 to 60" above the floor to reflect the conditions commonly experienced by occupants.
13. All HRV/ERV's are to be installed as per the OBC and F326 and as per 9.32 Ventilation and Part 6.
14. The Designer is not responsible for the accuracy of the survey, architectural, structural and electrical etc.
15. All S/A to be 4"x10"x 5"Ø unless noted.

The undersigned has reviewed and taken responsibility for this design, and has the qualifications and meets the requirements set out in the Ontario Building Code to be a designer.

QUALIFICATION INFORMATION (Required unless the design is exempt under OBC Div C-3.2.4.1 or 3.2.5.1.1)
 NAME, SCOP, EIR: _____ SIGNATURE: *S. The* BCIN 40964

REGISTRATION INFORMATION (Required unless the design is exempt under OBC Div C-3.2.4.1 or 3.2.5.1.1)
 FIRM NAME: Firehouse HVAC Designs Inc. BCIN 126211

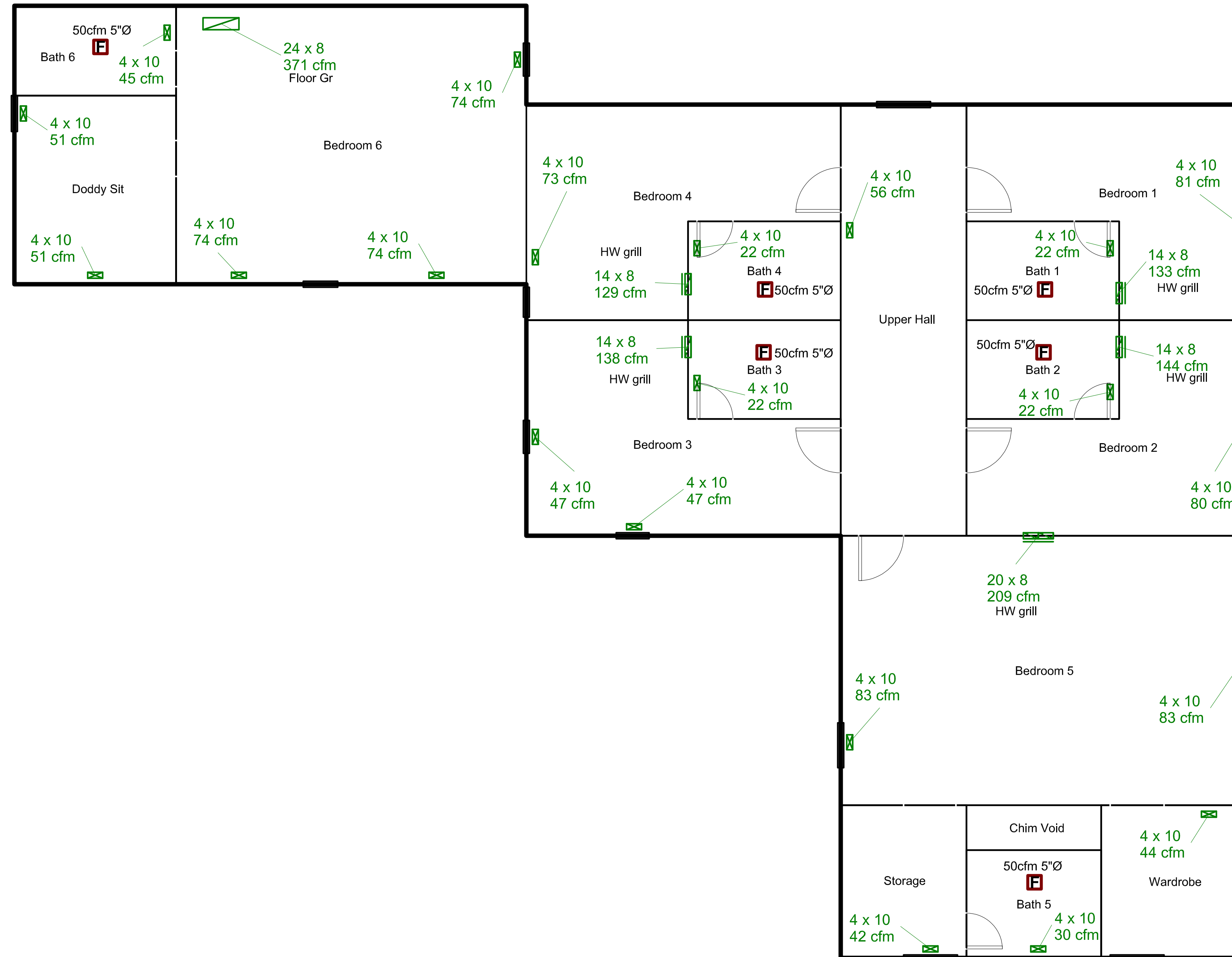
| No. | Revision/Issue | Date |
|-----|----------------|------|
| | | |

Firm Name and Address
Firehouse HVAC Designs Inc.
 30 New York Ave.
 Wasaga Beach, ON L9Z 3A8
 705-241-7189
 email: info@fthdesigns.ca

Project Name and Address
 PARKS CANADA
 7501 Steeles Ave.
 Scarborough ON

| | |
|--------------------|-------------|
| Project 23-1518 | Sheet M2 |
| Date 01-02-2023 | |
| Scale 1' = 1/4" | |

Second Floor



General Notes

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- Installation to comply with the latest version of the Ontario Build Code (OBC).
- Installation to comply with the latest version of the HRAI manuals and SMACNA using good engineering piping practices and procedures.
- Volume control dampers are to be installed as required to S/A branch outlets, main trunks as needed, main take-offs & "Y" fittings and as per good engineering piping practices.
- All duct works in unconditioned spaces are to be sealed to a minimum of Class A seal level (All transverse joints, longitudinal seams, and all wall penetrations,) and insulated to a minimum of R-12.
- Where a supply duct is located in a conditioned spaces, the ductwork shall be sealed to a Class C seal level. (All transverse joints only.) Recommend all transverse joints of both the S/A & R/A be done to reduce air duct leakage by approved duct sealer.
- Recommend all habitable finished rooms in a basement have low wall supply registers and return air grills be installed to within 6" of the floor level as a means of conditioning the coldest area of the room. Unless the conditions of the HRAI manual 2.9 but not limited to and referred to such as thermostatically controlled supplemental heat with a capacity of at least 20% of the load for the space such as: HYDRONIC in-floor heating system, electric resistance baseboard heating.
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- All HRV/ERV's are to be installed as per the OBC and F326 and as per 9.32 Ventilation and Part 6.
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- All S/A to be 4"x10"x 5"Ø unless noted.

The undersigned has reviewed and taken responsibility for this design, and has the qualifications and meets the requirements set out in the Ontario Building Code to be a designer.

QUALIFICATION INFORMATION (Required unless the design is exempt under OBC Div C.3.2.4.1 or 3.2.5.1.)
 NAME: Scott Ellis SIGNATURE: *S. Ellis* BCIN 69964

REGISTRATION INFORMATION (Required unless the design is exempt under OBC Div C.3.2.4.1 or 3.2.5.1.)
 FIRM NAME: Firehouse HVAC Designs Inc. BCIN 126211

| No. | Revision/Issue | Date |
|-----|----------------|------|
| | | |

Firm Name and Address

Firehouse HVAC Designs Inc.
 30 New York Ave.
 Wasaga Beach, ON L9Z 3A8
 705-241-7189
 email: info@fthdesigns.ca

Project Name and Address

PARKS CANADA
 7501 Steeles Ave.
 Scarborough, ON

| | | | |
|---------|------------|-------|----|
| Project | 23-1518 | Sheet | M3 |
| Date | 01-02-2023 | | |
| Scale | 1' = 1/4" | | |

F280-12 Basement/Slab Heat Loss For BCIN_1

Firehouse HVAC Designs Inc

Job: 23-1518
Date: Dec 28, 2022
By: Scott Ellis BCIN 45964

Cert.#: 13396(RHLG, RASD)

30 New York Ave, Wasaga Beach, ON L4Z 3A8 Phone: 705-241-7189 Email: info@fhd designs.ca License: BCIN 45964 Firm BCIN 126211

Project Information

For: Parks Canada Butternut Farm
7501 Steeles Ave, Scarborough, ON

Weather Station

| | |
|--------------------|---------------|
| Province Region | ON Markham |
|--------------------|---------------|

Foundation Dimensions

| | |
|--------------------------------|-------|
| Floor length (ft) | 124.8 |
| Floor width (ft) | 17.2 |
| Exposed perimeter (ft) | 284.0 |
| Wall height (ft) | 2.0 |
| Depth below grade (ft) | 1.0 |
| Window area (ft ²) | 0 |
| Door area (ft ²) | 0 |

Radiant Slab

| | |
|-----------------|---|
| Heated fraction | 0 |
|-----------------|---|

Design Months

| | |
|---------------|---|
| Heating month | 1 |
|---------------|---|

Foundation Loads

| | |
|---------------------|------|
| Heating load (Btuh) | 1328 |
|---------------------|------|

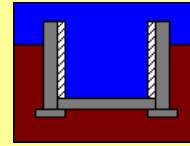
Site

| | |
|----------------------------------|---|
| Soil conductivity Water table | Normal - dry sand, loam, clay Shallow (16-23 ft) |
|----------------------------------|---|

Insulation Configuration

| | |
|---------------|--------|
| Configuration | BCIN_1 |
|---------------|--------|

| | |
|---|-------|
| Int wall insul (ft ² -°F/Btuh) | 12.00 |
|---|-------|



- concrete walls and floor
- interior surface of wall insulated over full-height
- any first storey construction type

Load Allocation

| Room | Exposed perimeter (ft) | Heating load (Btuh) |
|-------------|------------------------|---------------------|
| Doddy Crawl | 42.5 | 1328 |

F280-12 Basement/Slab Heat Loss For BCIN_1

Firehouse HVAC Designs Inc

Job: 23-1518
Date: Dec 28, 2022
By: Scott Ellis BCIN 45964

Cert.#: 13396(RHLG, RASD)

30 New York Ave, Wasaga Beach, ON L4Z 3A8 Phone: 705-241-7189 Email: info@fhd designs.ca License: BCIN 45964 Firm BCIN 126211

Project Information

For: Parks Canada Butternut Farm
7501 Steeles Ave, Scarborough, ON

Weather Station

| | |
|--------------------|---------------|
| Province Region | ON Markham |
|--------------------|---------------|

Foundation Dimensions

| | |
|--------------------------------|-------|
| Floor length (ft) | 124.8 |
| Floor width (ft) | 17.2 |
| Exposed perimeter (ft) | 284.0 |
| Wall height (ft) | 6.0 |
| Depth below grade (ft) | 5.0 |
| Window area (ft ²) | 0 |
| Door area (ft ²) | 0 |

Radiant Slab

| | |
|-----------------|---|
| Heated fraction | 0 |
|-----------------|---|

Design Months

| | |
|---------------|---|
| Heating month | 1 |
|---------------|---|

Foundation Loads

| | |
|---------------------|------|
| Heating load (Btuh) | 7082 |
|---------------------|------|

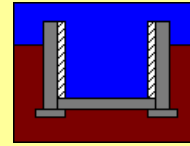
Site

| | |
|----------------------------------|---|
| Soil conductivity Water table | Normal - dry sand, loam, clay Shallow (16-23 ft) |
|----------------------------------|---|

Insulation Configuration

| | |
|---------------|--------|
| Configuration | BCIN_1 |
|---------------|--------|

| | |
|---|-------|
| Int wall insul (ft ² -°F/Btuh) | 12.00 |
|---|-------|



- concrete walls and floor
- interior surface of wall insulated over full-height
- any first storey construction type

Load Allocation

| Room | Exposed perimeter (ft) | Heating load (Btuh) |
|------------|------------------------|---------------------|
| Basement | 124.0 | 3636 |
| Doddy Base | 68.5 | 2009 |
| Basement 2 | 49.0 | 1437 |

Load Short Form

Doddy ASHP

Firehouse HVAC Designs Inc

Job: 23-1518
 Date: Dec 28, 2022
 By: Scott Ellis BCIN 45964

Cert.#: 13396(RHLG, RASD)
 30 New York Ave, Wasaga Beach, ON L4Z 3A8 Phone: 705-241-7189 Email: info@frhdesigns.ca License: BCIN 45964 Firm BCIN 126211

Project Information

For: Parks Canada Butternut Farm
 7501 Steeles Ave, Scarborough, ON

Design Information

| | Htg | Clg | | Infiltration |
|-----------------------------|-----|-----|-------------------|----------------------------|
| Outside db (°F) | -6 | 88 | Method | F280-12 |
| Inside db (°F) | 72 | 75 | Expos. categ | Light local shielding |
| Design TD (°F) | 78 | 13 | Const. categ | Present (1961-) (ACH=3.57) |
| Daily range | - | M | Number of stories | 2.0 |
| Inside humidity (%) | 30 | 50 | | |
| Moisture difference (gr/lb) | 32 | 47 | | |

HEATING EQUIPMENT

Make Generic 2.5 ton CCASHP
 Trade
 Model SEER 18.0, HSPF 7.1
 AHRI ref
 Efficiency 9.1 HSPF
 Heating input
 Heating output 10474 Btuh @ 47°F
 Temperature rise 13 °F
 Actual air flow 744 cfm
 Air flow factor 0.027 cfm/Btuh
 Static pressure 0.50 in H2O
 Space thermostat
 Capacity balance point = 38 °F

COOLING EQUIPMENT

Make Generic 2.5 ton CCASHP
 Trade
 Cond SEER 18.0, HSPF 7.1
 Coil
 AHRI ref
 Efficiency 14.7 EER, 18 SEER
 Sensible cooling 7368 Btuh
 Latent cooling 3158 Btuh
 Total cooling 10526 Btuh
 Actual air flow 744 cfm
 Air flow factor 0.105 cfm/Btuh
 Static pressure 0.50 in H2O
 Load sensible heat ratio 0.77

Backup:
 Input = 9 kW, Output = 29808 Btuh, 100 AFUE

| ROOM NAME | Area (ft²) | Htg load (Btuh) | Clg load (Btuh) | Htg AVF (cfm) | Clg AVF (cfm) |
|---------------|------------|-----------------|-----------------|---------------|---------------|
| Doddy Base | 442 | 5129 | 247 | 140 | 26 |
| Doddy Apt | 362 | 4238 | 1512 | 115 | 159 |
| Doddy Powder | 80 | 1102 | 501 | 30 | 53 |
| Doddy Laundry | 153 | 3216 | 818 | 87 | 86 |
| Bedroom 6 | 302 | 4118 | 2122 | 112 | 223 |
| Bath 6 | 45 | 832 | 431 | 23 | 45 |
| Doddy Sit | 95 | 1681 | 980 | 46 | 103 |
| Doddy Crawl | 153 | 3369 | 240 | 92 | 25 |
| Basement 2 | 420 | 3669 | 241 | 100 | 25 |

| | | | | | | |
|-------------------|---|------|-------|------|-----|-----|
| Doddy ASHP | d | 2051 | 27355 | 7092 | 744 | 744 |
| Other equip loads | | | 1680 | 276 | | |
| Equip. @ 1.00 RSM | | | | 7368 | | |
| Latent cooling | | | | 2211 | | |
| TOTALS | | 2051 | 29035 | 9579 | 744 | 744 |

Load Short Form

Main ASHP

Firehouse HVAC Designs Inc

Job: 23-1518
 Date: Dec 28, 2022
 By: Scott Ellis BCIN 45964

Cert.#: 13396(RHLG, RASD)
 30 New York Ave, Wasaga Beach, ON L4Z 3A8 Phone: 705-241-7189 Email: info@fhdhdesigns.ca License: BCIN 45964 Firm BCIN 126211

Project Information

For: Parks Canada Butternut Farm
 7501 Steeles Ave, Scarborough, ON

Design Information

| | Htg | Clg | | Infiltration |
|-----------------------------|-----|-----|-------------------|----------------------------|
| Outside db (°F) | -6 | 88 | Method | F280-12 |
| Inside db (°F) | 72 | 75 | Expos. categ | Light local shielding |
| Design TD (°F) | 78 | 13 | Const. categ | Present (1961-) (ACH=3.57) |
| Daily range | - | M | Number of stories | 2.0 |
| Inside humidity (%) | 30 | 50 | | |
| Moisture difference (gr/lb) | 32 | 47 | | |

HEATING EQUIPMENT

Make Generic 3.5 ton CCASHP
 Trade
 Model SEER 18.0, HSPF 7.1
 AHRI ref
 Efficiency 9.1 HSPF
 Heating input
 Heating output 32256 Btuh @ 47°F
 Temperature rise 20 °F
 Actual air flow 1485 cfm
 Air flow factor 0.040 cfm/Btuh
 Static pressure 0.80 in H2O
 Space thermostat
 Capacity balance point = 13 °F

COOLING EQUIPMENT

Make Generic 3.5 ton CCASHP
 Trade
 Cond SEER 18.0, HSPF 7.1
 Coil
 AHRI ref
 Efficiency 14.7 EER, 18 SEER
 Sensible cooling 22692 Btuh
 Latent cooling 9725 Btuh
 Total cooling 32417 Btuh
 Actual air flow 1485 cfm
 Air flow factor 0.067 cfm/Btuh
 Static pressure 0.80 in H2O
 Load sensible heat ratio 0.77

Backup: Generic 15 kW AFUE 100
 Input = 15 kW, Output = 51182 Btuh, 100 AFUE

| ROOM NAME | Area (ft²) | Htg load (Btuh) | Clg load (Btuh) | Htg AVF (cfm) | Clg AVF (cfm) |
|---------------|------------|-----------------|-----------------|---------------|---------------|
| Basement | 1133 | 9285 | 290 | 370 | 20 |
| Open Flex | 491 | 4367 | 4342 | 174 | 293 |
| Office 3 | 111 | 492 | 545 | 20 | 37 |
| Office 2 | 150 | 1393 | 873 | 55 | 59 |
| Office 1 | 171 | 1157 | 647 | 46 | 44 |
| Lower Hall | 59 | 0 | 0 | 0 | 0 |
| Powder | 29 | 0 | 0 | 0 | 0 |
| Stairs | 13 | 0 | 0 | 0 | 0 |
| Entry | 57 | 1687 | 968 | 67 | 65 |
| Kitchen | 163 | 1014 | 848 | 40 | 57 |
| Stair | 26 | 0 | 0 | 0 | 0 |
| Laundry Baths | 234 | 2655 | 1856 | 106 | 125 |
| Uni Wash | 52 | 752 | 475 | 30 | 32 |
| Storage | 60 | 982 | 622 | 39 | 42 |

| | | | | | | |
|-------------------|---|------|-------|-------|------|------|
| Wardrobe | | 68 | 1066 | 645 | 42 | 44 |
| Bath 5 | | 45 | 556 | 444 | 22 | 30 |
| Chim Void | | 19 | 0 | 0 | 0 | 0 |
| Bedroom 5 | | 338 | 2923 | 2455 | 116 | 166 |
| Upper Hall | | 168 | 1361 | 828 | 54 | 56 |
| Bath 2 | | 47 | 246 | 324 | 10 | 22 |
| Bath 1 | | 47 | 246 | 324 | 10 | 22 |
| Bath 3 | | 47 | 320 | 332 | 13 | 22 |
| Bath 4 | | 47 | 320 | 332 | 13 | 22 |
| Bedroom 1 | | 139 | 1534 | 1205 | 61 | 81 |
| Bedroom 2 | | 139 | 1209 | 1185 | 48 | 80 |
| Bedroom 4 | | 163 | 1669 | 1079 | 66 | 73 |
| Bedroom 3 | | 163 | 2078 | 1381 | 83 | 93 |
| Main ASHP | d | 4174 | 37314 | 22001 | 1485 | 1485 |
| Other equip loads | | | 4201 | 691 | | |
| Equip. @ 1.00 RSM | | | | 22692 | | |
| Latent cooling | | | | 6808 | | |
| TOTALS | | 4174 | 41516 | 29500 | 1485 | 1485 |

Building Analysis

Doddy ASHP

Firehouse HVAC Designs Inc

Job: 23-1518
 Date: Dec 28, 2022
 By: Scott Ellis BCIN 45964

Cert.#: 13396(RHLG, RASD)
 30 New York Ave, Wasaga Beach, ON L4Z 3A8 Phone: 705-241-7189 Email: info@fhd designs.ca License: BCIN 45964 Firm BCIN 126211

Project Information

For: Parks Canada Butternut Farm
 7501 Steeles Ave, Scarborough, ON

Design Conditions

Location:

Markham, ON, CA
 Elevation: 0 ft
 Latitude: 44°N

Outdoor:

Dry bulb (°F)
 Daily range (°F)
 Wet bulb (°F)
 Wind speed (mph)

Heating

-6
 -
 -
 9.3

Cooling

88
 20 (M)
 75
 6.8

Indoor:

Indoor temperature (°F)
 Design TD (°F)
 Relative humidity (%)
 Moisture difference (gr/lb)

Heating

72
 78
 30
 31.7

Cooling

75
 13
 50
 47.1

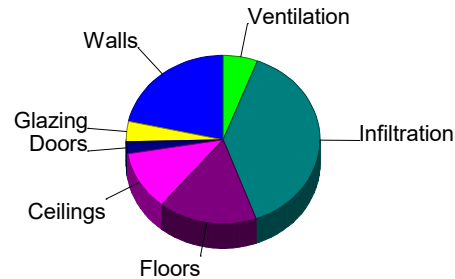
Infiltration:

Method
 Expos. categ
 Const. categ
 Number of stories

F280-12
 Light local shielding
 Present (1961-) (ACH=3.57)
 2.0

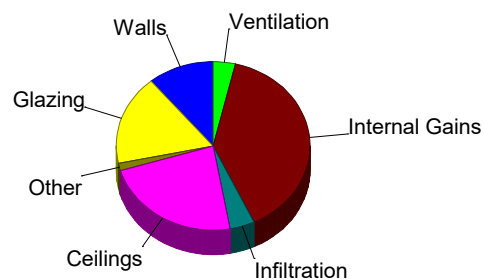
Heating

| Component | Btuh/ft² | Btuh | % of load |
|----------------|----------|--------------|--------------|
| Walls | 1.0 | 6237 | 21.5 |
| Glazing | 21.8 | 1136 | 3.9 |
| Doors | 19.0 | 665 | 2.3 |
| Ceilings | 4.2 | 3323 | 11.4 |
| Floors | 4.7 | 4773 | 16.4 |
| Infiltration | 128.8 | 11221 | 38.6 |
| Ducts | | 0 | 0 |
| Hydronic | | 0 | 0 |
| Humidification | | 0 | 0 |
| Ventilation | | 1680 | 5.8 |
| Adjustments | | 0 | 0 |
| Total | | 29035 | 100.0 |



Cooling

| Component | Btuh/ft² | Btuh | % of load |
|----------------|----------|-------------|--------------|
| Walls | 0.1 | 812 | 11.0 |
| Glazing | 24.5 | 1275 | 17.3 |
| Doors | 3.0 | 106 | 1.4 |
| Ceilings | 2.2 | 1700 | 23.1 |
| Floors | 0 | 0 | 0 |
| Infiltration | 3.5 | 305 | 4.1 |
| Ducts | | 0 | 0 |
| Ventilation | | 276 | 3.8 |
| Internal gains | | 2893 | 39.3 |
| Blower | | 0 | 0 |
| Adjustments | | 0 | 0 |
| Total | | 7368 | 100.0 |



Latent Cooling Load = 2211 Btuh
 Overall U-value = 0.064 Btuh/ft²-°F

WARNING: window to floor area ratio = 2.5% - less than 5%.

Building Analysis Main ASHP

Firehouse HVAC Designs Inc

Job: 23-1518
Date: Dec 28, 2022
By: Scott Ellis BCIN 45964

Cert.#: 13396(RHLG, RASD)
30 New York Ave, Wasaga Beach, ON L4Z 3A8 Phone: 705-241-7189 Email: info@fhd designs.ca License: BCIN 45964 Firm BCIN 126211

Project Information

For: Parks Canada Butternut Farm
7501 Steeles Ave, Scarborough, ON

Design Conditions

Location:

Markham, ON, CA
Elevation: 0 ft
Latitude: 44°N

Outdoor:

Dry bulb (°F)
Daily range (°F)
Wet bulb (°F)
Wind speed (mph)

Heating

-6
-
-
9.3

Cooling

88
20 (M)
75
6.8

Indoor:

Indoor temperature (°F)
Design TD (°F)
Relative humidity (%)
Moisture difference (gr/lb)

Heating

72
78
30
31.7

Cooling

75
13
50
47.1

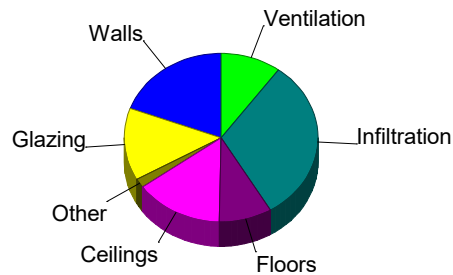
Infiltration:

Method
Expos. categ
Const. categ
Number of stories

F280-12
Light local shielding
Present (1961-) (ACH=3.57)
2.0

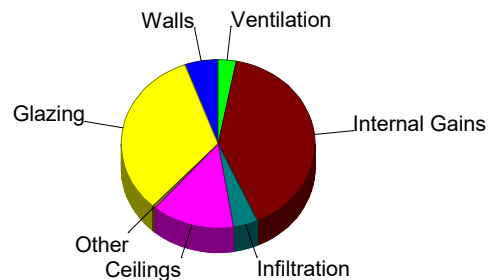
Heating

| Component | Btuh/ft² | Btuh | % of load |
|----------------|----------|--------------|--------------|
| Walls | 1.0 | 8042 | 19.4 |
| Glazing | 21.8 | 5739 | 13.8 |
| Doors | 19.0 | 731 | 1.8 |
| Ceilings | 3.3 | 6130 | 14.8 |
| Floors | 3.2 | 3636 | 8.8 |
| Infiltration | 43.2 | 13035 | 31.4 |
| Ducts | | 0 | 0 |
| Hydronic | | 0 | 0 |
| Humidification | | 0 | 0 |
| Ventilation | | 4201 | 10.1 |
| Adjustments | | 0 | 0 |
| Total | | 41516 | 100.0 |



Cooling

| Component | Btuh/ft² | Btuh | % of load |
|----------------|----------|--------------|--------------|
| Walls | 0.2 | 1260 | 5.6 |
| Glazing | 28.2 | 7428 | 32.7 |
| Doors | 2.6 | 101 | 0.4 |
| Ceilings | 1.7 | 3136 | 13.8 |
| Floors | 0 | 0 | 0 |
| Infiltration | 3.1 | 936 | 4.1 |
| Ducts | | 0 | 0 |
| Ventilation | | 691 | 3.0 |
| Internal gains | | 9140 | 40.3 |
| Blower | | 0 | 0 |
| Adjustments | | 0 | 0 |
| Total | | 22692 | 100.0 |



Latent Cooling Load = 6808 Btuh
Overall U-value = 0.058 Btuh/ft²-°F

Data entries checked.

Project Summary
Doddy ASHP
Firehouse HVAC Designs Inc

Job: 23-1518
 Date: Dec 28, 2022
 By: Scott Ellis BCIN 45964

Cert.#: 13396(RHLG, RASD)
 30 New York Ave, Wasaga Beach, ON L4Z 3A8 Phone: 705-241-7189 Email: info@fhdesigns.ca License: BCIN 45964 Firm BCIN 126211

Project Information

For: Parks Canada Butternut Farm
 7501 Steeles Ave, Scarborough, ON

Notes: Designed to CSA F280-12 & SB-12 requirements and information supplied by the customer and designer.

Design Information

Weather: Markham, ON, CA

Winter Design Conditions

Outside db -6 °F
 Inside db 72 °F
 Design TD 78 °F

Summer Design Conditions

Outside db 88 °F
 Inside db 75 °F
 Design TD 13 °F
 Daily range M
 Relative humidity 50 %
 Moisture difference 47 gr/lb

Heating Summary

Structure 27355 Btuh
 Ducts 0 Btuh
 Central vent (SER=75% 80 cfm) 1680 Btuh
 Heat recovery
 Humidification 0 Btuh
 Piping 0 Btuh
 Equipment load 29035 Btuh

Sensible Cooling Equipment Load Sizing

Structure 7092 Btuh
 Ducts 0 Btuh
 Central vent (SER=75% 80 cfm) 276 Btuh
 Heat recovery
 Blower 0 Btuh
 Use manufacturer's data y
 Rate/swing multiplier 1.00
 Equipment sensible load 7368 Btuh

Infiltration

Method F280-12
 Expos. categ Light local shielding
 Const. categ Present (1961-) (ACH=3.57)
 Number of stories 2.0

| | Heating | Cooling |
|---------------------------|---------|---------|
| Area (ft ²) | 2051 | 2051 |
| Volume (ft ³) | 14584 | 14584 |
| Air changes/hour | 0.55 | 0.09 |
| Equiv. AVF (cfm) | 134 | 22 |

Latent Cooling Equipment Load Sizing

Structure 819 Btuh
 Ducts 0 Btuh
 Central vent (80 cfm) 1391 Btuh
 Heat recovery
 Equipment latent load 2211 Btuh

Equipment Total Load (Sen+Lat) 9579 Btuh
 Req. total capacity at 0.70 SHR 0.9 ton

Heating Equipment Summary

Make Generic 2.5 ton CC ASHP
 Trade
 Model SEER 18.0, HSPF 7.1
 AHRI ref
 Efficiency 9.1 HSPF
 Heating input
 Heating output 10474 Btuh @ 47°F
 Temperature rise 13 °F
 Actual air flow 744 cfm
 Air flow factor 0.027 cfm/Btuh
 Static pressure 0.50 in H2O
 Space thermostat
 Capacity balance point = 38 °F

Cooling Equipment Summary

Make Generic 2.5 ton CC ASHP
 Trade
 Cond SEER 18.0, HSPF 7.1
 Coil
 AHRI ref
 Efficiency 14.7 EER, 18 SEER
 Sensible cooling 7368 Btuh
 Latent cooling 3158 Btuh
 Total cooling 10526 Btuh
 Actual air flow 744 cfm
 Air flow factor 0.105 cfm/Btuh
 Static pressure 0.50 in H2O
 Load sensible heat ratio 0.77

Backup:
 Input = 9 kW, Output = 29808 Btuh, 100 AFUE

Project Summary
Main ASHP
Firehouse HVAC Designs Inc

Job: 23-1518
 Date: Dec 28, 2022
 By: Scott Ellis BCIN 45964

Cert.#: 13396(RHLG, RASD)
 30 New York Ave, Wasaga Beach, ON L4Z 3A8 Phone: 705-241-7189 Email: info@fhdesigns.ca License: BCIN 45964 Firm BCIN 126211

Project Information

For: Parks Canada Butternut Farm
 7501 Steeles Ave, Scarborough, ON

Notes: Designed to CSA F280-12 & SB-12 requirements and information supplied by the customer and designer.

Design Information

Weather: Markham, ON, CA

Winter Design Conditions

Outside db -6 °F
 Inside db 72 °F
 Design TD 78 °F

Summer Design Conditions

Outside db 88 °F
 Inside db 75 °F
 Design TD 13 °F
 Daily range M
 Relative humidity 50 %
 Moisture difference 47 gr/lb

Heating Summary

Structure 37314 Btuh
 Ducts 0 Btuh
 Central vent (SER=75% 200 cfm) 4201 Btuh
 Heat recovery
 Humidification 0 Btuh
 Piping 0 Btuh
 Equipment load 41516 Btuh

Sensible Cooling Equipment Load Sizing

Structure 22001 Btuh
 Ducts 0 Btuh
 Central vent (SER=75% 200 cfm) 691 Btuh
 Heat recovery
 Blower 0 Btuh
 Use manufacturer's data y
 Rate/swing multiplier 1.00
 Equipment sensible load 22692 Btuh

Infiltration

Method F280-12
 Expos. categ Light local shielding
 Const. categ Present (1961-) (ACH=3.57)
 Number of stories 2.0

| | Heating | Cooling |
|---------------------------|---------|---------|
| Area (ft ²) | 4174 | 4174 |
| Volume (ft ³) | 34287 | 34287 |
| Air changes/hour | 0.27 | 0.12 |
| Equiv. AVF (cfm) | 155 | 68 |

Latent Cooling Equipment Load Sizing

Structure 2974 Btuh
 Ducts 0 Btuh
 Central vent (200 cfm) 3833 Btuh
 Heat recovery
 Equipment latent load 6808 Btuh

Equipment Total Load (Sen+Lat) 29500 Btuh
 Req. total capacity at 0.70 SHR 2.7 ton

Heating Equipment Summary

Make Generic 3.5 ton CC ASHP
 Trade
 Model SEER 18.0, HSPF 7.1
 AHRI ref
 Efficiency 9.1 HSPF
 Heating input
 Heating output 32256 Btuh @ 47°F
 Temperature rise 20 °F
 Actual air flow 1485 cfm
 Air flow factor 0.040 cfm/Btuh
 Static pressure 0.80 in H2O
 Space thermostat
 Capacity balance point = 13 °F
 Backup: Generic 15 kW AFUE 100
 Input = 15 kW, Output = 51182 Btuh, 100 AFUE

Cooling Equipment Summary

Make Generic 3.5 ton CC ASHP
 Trade
 Cond SEER 18.0, HSPF 7.1
 Coil
 AHRI ref
 Efficiency 14.7 EER, 18 SEER
 Sensible cooling 22692 Btuh
 Latent cooling 9725 Btuh
 Total cooling 32417 Btuh
 Actual air flow 1485 cfm
 Air flow factor 0.067 cfm/Btuh
 Static pressure 0.80 in H2O
 Load sensible heat ratio 0.77

F280 Infiltration Report

Doddy ASHP

Firehouse HVAC Designs Inc

Job: 23-1518
 Date: Dec 28, 2022
 By: Scott Ellis BCIN 45964

Cert.#: 13396(RHLG, RASD)
 30 New York Ave, Wasaga Beach, ON L4Z 3A8 Phone: 705-241-7189 Email: info@frhdesigns.ca License: BCIN 45964 Firm BCIN 126211

Project Information

For: Parks Canada Butternut Farm
 7501 Steeles Ave, Scarborough, ON

Design Conditions

| | |
|-----------------------------|--------------------|
| House type | Detached |
| Site | Suburban, forest |
| Wall shielding | No local shielding |
| Storeys | 2.0 (w/o basement) |
| Highest ceiling height (ft) | 24.0 |
| Foundation | Full |

Air Leakage

Air tightness Present (1961-) (ACH=3.57)

Flues

| | | | | |
|---------------|-----------------|----|----|----|
| Shielding | Heavy shielding | | | |
| | #1 | #2 | #3 | #4 |
| Diameter (in) | 0 | 0 | 0 | 0 |

Summary

Heating

| | |
|----------------------------|-----------------------|
| Infiltration area | 2051 ft ² |
| Infiltration volume | 14584 ft ³ |
| Unadjusted air change rate | 0.549 ach |
| Unadjusted AVF | 134 cfm |
| Vent adjustment | 0 cfm |
| Net AVF | 134 cfm |
| Net air change rate | 0 ach |

Cooling

| | |
|----------------------------|-----------------------|
| Infiltration area | 2051 ft ² |
| Infiltration volume | 14584 ft ³ |
| Unadjusted air change rate | 0.091 ach |
| Unadjusted AVF | 22 cfm |
| Vent adjustment | 0 cfm |
| Net AVF | 22 cfm |
| Net air change rate | 0 ach |

F280-12 Room Infiltration
Doddy ASHP
Firehouse HVAC Designs Inc

Job: 23-1518
 Date: Dec 28, 2022
 By: Scott Ellis BCIN 45964

Cert.#: 13396(RHLG, RASD)

30 New York Ave, Wasaga Beach, ON L4Z 3A8 Phone: 705-241-7189 Email: info@frhdesigns.ca License: BCIN 45964 Firm BCIN 126211

| Room Name | Level Factor | Htg load (Btuh) | Clg load (Btuh) | Htg AVF (cfm) | Clg AVF (cfm) |
|---------------|--------------|-----------------|-----------------|---------------|---------------|
| Doddy Base | 0.50 | 2900 | 2 | 35 | 0 |
| Doddy Apt | 0.30 | 1397 | 61 | 17 | 4 |
| Doddy Powder | 0.30 | 363 | 20 | 4 | 1 |
| Doddy Laundry | 0.30 | 1060 | 44 | 13 | 3 |
| Bedroom 6 | 0.20 | 945 | 105 | 11 | 8 |
| Bath 6 | 0.20 | 191 | 15 | 2 | 1 |
| Doddy Sit | 0.20 | 386 | 55 | 5 | 4 |
| Doddy Crawl | 0.50 | 1905 | 1 | 23 | 0 |
| Basement 2 | 0.50 | 2074 | 2 | 25 | 0 |
| Doddy ASHP | 0 | 11221 | 305 | 134 | 22 |

F280 Infiltration Report

Main ASHP

Firehouse HVAC Designs Inc

Job: 23-1518
 Date: Dec 28, 2022
 By: Scott Ellis BCIN 45964

Cert.#: 13396(RHLG, RASD)
 30 New York Ave, Wasaga Beach, ON L4Z 3A8 Phone: 705-241-7189 Email: info@fhd designs.ca License: BCIN 45964 Firm BCIN 126211

Project Information

For: Parks Canada Butternut Farm
 7501 Steeles Ave, Scarborough, ON

Design Conditions

| | |
|-----------------------------|--------------------|
| House type | Detached |
| Site | Suburban, forest |
| Wall shielding | No local shielding |
| Storeys | 2.0 (w/o basement) |
| Highest ceiling height (ft) | 24.0 |
| Foundation | Full |

Air Leakage

Air tightness Present (1961-) (ACH=3.57)

Flues

| | | | | |
|---------------|-----------------|----|----|----|
| Shielding | Heavy shielding | | | |
| Diameter (in) | #1 | #2 | #3 | #4 |
| | 0 | 0 | 0 | 0 |

Summary

| Heating | | Cooling | |
|----------------------------|-----------------------|----------------------------|-----------------------|
| Infiltration area | 4174 ft ² | Infiltration area | 4174 ft ² |
| Infiltration volume | 34287 ft ³ | Infiltration volume | 34287 ft ³ |
| Unadjusted air change rate | 0.271 ach | Unadjusted air change rate | 0.118 ach |
| Unadjusted AVF | 155 cfm | Unadjusted AVF | 68 cfm |
| Vent adjustment | 0 cfm | Vent adjustment | 0 cfm |
| Net AVF | 155 cfm | Net AVF | 68 cfm |
| Net air change rate | 0 ach | Net air change rate | 0 ach |

F280-12 Room Infiltration

Main ASHP

Firehouse HVAC Designs Inc

Job: 23-1518

Date: Dec 28, 2022

By: Scott Ellis BCIN 45964

Cert.#: 13396(RHLG, RASD)

30 New York Ave, Wasaga Beach, ON L4Z 3A8 Phone: 705-241-7189 Email: info@fhdhdesigns.ca License: BCIN 45964 Firm BCIN 126211

| Room Name | Level Factor | Htg load (Btuh) | Clg load (Btuh) | Htg AVF (cfm) | Clg AVF (cfm) |
|---------------|--------------|-----------------|-----------------|---------------|---------------|
| Basement | 0.50 | 5249 | 5 | 62 | 0 |
| Open Flex | 0.30 | 1440 | 179 | 17 | 13 |
| Office 3 | 0.30 | 162 | 16 | 2 | 1 |
| Office 2 | 0.30 | 459 | 45 | 5 | 3 |
| Office 1 | 0.30 | 382 | 22 | 5 | 2 |
| Lower Hall | 0.30 | 0 | 0 | 0 | 0 |
| Powder | 0.30 | 0 | 0 | 0 | 0 |
| Stairs | 0.30 | 0 | 0 | 0 | 0 |
| Entry | 0.30 | 556 | 39 | 7 | 3 |
| Kitchen | 0.30 | 334 | 44 | 4 | 3 |
| Stair | 0.30 | 0 | 0 | 0 | 0 |
| Laundry Baths | 0.30 | 875 | 80 | 10 | 6 |
| Uni Wash | 0.30 | 248 | 19 | 3 | 1 |
| Storage | 0.20 | 222 | 27 | 3 | 2 |
| Wardrobe | 0.20 | 242 | 29 | 3 | 2 |
| Bath 5 | 0.20 | 119 | 9 | 1 | 1 |
| Chim Void | 0.20 | 23 | 3 | 0 | 0 |
| Bedroom 5 | 0.20 | 662 | 122 | 8 | 9 |
| Upper Hall | 0.20 | 312 | 44 | 4 | 3 |
| Bath 2 | 0.20 | 57 | 8 | 1 | 1 |
| Bath 1 | 0.20 | 57 | 8 | 1 | 1 |
| Bath 3 | 0.20 | 74 | 8 | 1 | 1 |
| Bath 4 | 0.20 | 74 | 8 | 1 | 1 |
| Bedroom 1 | 0.20 | 352 | 55 | 4 | 4 |
| Bedroom 2 | 0.20 | 278 | 53 | 3 | 4 |
| Bedroom 4 | 0.20 | 383 | 46 | 5 | 3 |
| Bedroom 3 | 0.20 | 477 | 68 | 6 | 5 |
| Main ASHP | 0 | 13035 | 936 | 155 | 68 |

Load Multizone Summary Report

Job: 23-1518
 Date: Dec 28, 2022
 By: Scott Ellis BCIN 45964

Firehouse HVAC Designs Inc

Cert.#: 13396(RHLG, RASD)

30 New York Ave, Wasaga Beach, ON L4Z 3A8 Phone: 705-241-7189 Email: info@frhdesigns.ca License: BCIN 45964 Firm BCIN 126211

Infiltration Summary

| ZONE NAME | Heating | | | | Cooling | | | |
|--------------|---------------|------|------------|-----------------|---------------|------|------------|-----------------|
| | Volume ft³ | ACH | AVF cfm | HTM Btuh/ft² | Volume ft³ | ACH | AVF cfm | HTM Btuh/ft² |
| Main ASHP | 34287 | 0.27 | 155 | 0 | 34287 | 0.12 | 68 | 0 |
| Doddy ASHP | 14584 | 0.55 | 134 | 0 | 14584 | 0.09 | 22 | 0 |
| Entire House | 48871 | 0.35 | 289 | 62.3 | 48871 | 0.11 | 90 | 3.2 |

Load and AVF Summary

| ROOM NAME | Area ft² | Htg load Btuh | Clg load Btuh | Htg AVF cfm | Clg AVF cfm |
|---------------|-------------|------------------|------------------|----------------|----------------|
| Basement | 1133 | 9285 | 290 | 370 | 20 |
| Open Flex | 491 | 4367 | 4342 | 174 | 293 |
| Office 3 | 111 | 492 | 545 | 20 | 37 |
| Office 2 | 150 | 1393 | 873 | 55 | 59 |
| Office 1 | 171 | 1157 | 647 | 46 | 44 |
| Lower Hall | 59 | 0 | 0 | 0 | 0 |
| Powder | 29 | 0 | 0 | 0 | 0 |
| Stairs | 13 | 0 | 0 | 0 | 0 |
| Entry | 57 | 1687 | 968 | 67 | 65 |
| Kitchen | 163 | 1014 | 848 | 40 | 57 |
| Stair | 26 | 0 | 0 | 0 | 0 |
| Laundry Baths | 234 | 2655 | 1856 | 106 | 125 |
| Uni Wash | 52 | 752 | 475 | 30 | 32 |
| Storage | 60 | 982 | 622 | 39 | 42 |
| Wardrobe | 68 | 1066 | 645 | 42 | 44 |
| Bath 5 | 45 | 556 | 444 | 22 | 30 |
| Chim Void | 19 | 0 | 0 | 0 | 0 |
| Bedroom 5 | 338 | 2923 | 2455 | 116 | 166 |
| Upper Hall | 168 | 1361 | 828 | 54 | 56 |
| Bath 2 | 47 | 246 | 324 | 10 | 22 |
| Bath 1 | 47 | 246 | 324 | 10 | 22 |
| Bath 3 | 47 | 320 | 332 | 13 | 22 |
| Bath 4 | 47 | 320 | 332 | 13 | 22 |
| Bedroom 1 | 139 | 1534 | 1205 | 61 | 81 |
| Bedroom 2 | 139 | 1209 | 1185 | 48 | 80 |
| Bedroom 4 | 163 | 1669 | 1079 | 66 | 73 |
| Bedroom 3 | 163 | 2078 | 1381 | 83 | 93 |
| Main ASHP | 4174 | 37314 | 22001 | 1485 | 1485 |
| Doddy Base | 442 | 5129 | 247 | 140 | 26 |
| Doddy Apt | 362 | 4238 | 1512 | 115 | 159 |
| Doddy Powder | 80 | 1102 | 501 | 30 | 53 |
| Doddy Laundry | 153 | 3216 | 818 | 87 | 86 |
| Bedroom 6 | 302 | 4118 | 2122 | 112 | 223 |
| Bath 6 | 45 | 832 | 431 | 23 | 45 |
| Doddy Sit | 95 | 1681 | 980 | 46 | 103 |

| | | | | | |
|--------------|------|-------|-------|------|------|
| Doddy Crawl | 153 | 3369 | 240 | 92 | 25 |
| Basement 2 | 420 | 3669 | 241 | 100 | 25 |
| Doddy ASHP | 2051 | 27355 | 7092 | 744 | 744 |
| Entire House | 6226 | 64669 | 29093 | 2229 | 2229 |

Duct System Summary

Doddy ASHP

Firehouse HVAC Designs Inc

Job: 23-1518
 Date: Dec 28, 2022
 By: Scott Ellis BCIN 45964

Cert.#: 13396(RHLG, RASD)
 30 New York Ave, Wasaga Beach, ON L4Z 3A8 Phone: 705-241-7189 Email: info@fhdhdesigns.ca License: BCIN 45964 Firm BCIN 126211

Project Information

For: Parks Canada Butternut Farm
 7501 Steeles Ave, Scarborough, ON

| | Heating | Cooling |
|------------------------------------|----------------------|----------------------|
| External static pressure | 0.50 in H2O | 0.50 in H2O |
| Pressure losses | 0 in H2O | 0 in H2O |
| Available static pressure | 0.50 in H2O | 0.50 in H2O |
| Supply / return available pressure | 0.197 / 0.303 in H2O | 0.197 / 0.303 in H2O |
| Lowest friction rate | 0.100 in/100ft | 0.100 in/100ft |
| Actual air flow | 744 cfm | 744 cfm |
| Total effective length (TEL) | | 436 ft |

Supply Branch Detail Table

| Name | Design (Btuh) | Htg (cfm) | Clg (cfm) | Design FR | Diam (in) | H x W (in) | Duct Matl | Actual Ln (ft) | Ftg.Eqv Ln (ft) | Trunk |
|---------------|---------------|-----------|-----------|-----------|-----------|------------|-----------|----------------|-----------------|-------|
| Basement 2 | h 1835 | 50 | 13 | 0.100 | 5.0 | 0x0 | ShMt | 34.5 | 85.0 | st1 |
| Basement 2-A | h 1835 | 50 | 13 | 0.100 | 5.0 | 0x0 | ShMt | 27.5 | 75.0 | st1 |
| Bath 6 | c 431 | 23 | 45 | 0.100 | 5.0 | 0x0 | ShMt | 33.0 | 115.0 | st2 |
| Bedroom 6-A | c 707 | 37 | 74 | 0.100 | 5.0 | 0x0 | ShMt | 61.6 | 100.0 | st2A |
| Bedroom 6-B | c 707 | 37 | 74 | 0.100 | 5.0 | 0x0 | ShMt | 46.5 | 100.0 | st2A |
| Bedroom 6-C | c 707 | 37 | 74 | 0.100 | 5.0 | 0x0 | ShMt | 35.5 | 110.0 | st2A |
| Doddy Apt | c 756 | 58 | 79 | 0.100 | 6.0 | 0x0 | ShMt | 21.5 | 65.0 | st1 |
| Doddy Apt-A | c 756 | 58 | 79 | 0.100 | 6.0 | 0x0 | ShMt | 15.5 | 75.0 | st1 |
| Doddy Base | h 2565 | 70 | 13 | 0.100 | 5.0 | 0x0 | ShMt | 7.5 | 95.0 | st1 |
| Doddy Base-A | h 2565 | 70 | 13 | 0.100 | 5.0 | 0x0 | ShMt | 11.5 | 85.0 | st1 |
| Doddy Crawl-A | h 3369 | 92 | 25 | 0.100 | 6.0 | 0x0 | ShMt | 15.0 | 55.0 | st2 |
| Doddy Laundry | h 3216 | 87 | 86 | 0.100 | 6.0 | 0x0 | ShMt | 16.0 | 85.0 | st2 |
| Doddy Powder | c 501 | 30 | 53 | 0.100 | 5.0 | 0x0 | ShMt | 0 | 0 | |
| Doddy Sit | c 490 | 23 | 51 | 0.100 | 5.0 | 0x0 | ShMt | 32.2 | 140.0 | st2A |
| Doddy Sit-A | c 490 | 23 | 51 | 0.100 | 5.0 | 0x0 | ShMt | 27.5 | 120.0 | st2A |

Supply Trunk Detail Table

| Name | Trunk Type | Htg (cfm) | Clg (cfm) | Design FR | Veloc (fpm) | Diam (in) | H x W (in) | Duct Material | Trunk |
|------|------------|-----------|-----------|-----------|-------------|-----------|------------|---------------|-------|
| st1 | Peak AVF | 355 | 210 | 0.100 | 638 | 9.3 | 8 x 10 | ShtMetl | |
| st2 | Peak AVF | 359 | 482 | 0.100 | 723 | 10.5 | 8 x 12 | ShtMetl | |
| st2A | Peak AVF | 158 | 326 | 0.100 | 732 | 9.1 | 8 x 8 | ShtMetl | st2 |

Return Branch Detail Table

| Name | Grille Size (in) | Htg (cfm) | Clg (cfm) | TEL (ft) | Design FR | Veloc (fpm) | Diam (in) | H x W (in) | Stud/Joist Opening (in) | Duct Matl | Trunk |
|------|------------------|-----------|-----------|----------|-----------|-------------|-----------|------------|-------------------------|-----------|-------|
| rb4 | 0x0 | 239 | 51 | 209.5 | 0.144 | 479 | 7.5 | 6x 12 | | ShMt | rt3 |
| rb5 | 24x6 | 324 | 322 | 124.5 | 0.243 | 243 | 7.6 | 8.00x24 | 10x38 | SJSp | rt1 |
| rb6 | 24x7 | 180 | 371 | 264.0 | 0.115 | 278 | 9.2 | 8.00x24 | 10x38 | SJSp | rt4 |

Return Trunk Detail Table

| Name | Trunk Type | Htg (cfm) | Clg (cfm) | Design FR | Veloc (fpm) | Diam (in) | H x W (in) | Duct Material | Trunk |
|------|------------|-----------|-----------|-----------|-------------|-----------|------------|---------------|-------|
| rt3 | Peak AVF | 239 | 51 | 0.144 | 215 | 7.5 | 8 x 20 | ShtMetl | rt1 |
| rt1 | Peak AVF | 744 | 744 | 0.115 | 670 | 12.0 | 8 x 20 | ShtMetl | |
| rt4 | Peak AVF | 180 | 371 | 0.115 | 667 | 9.2 | 8 x 10 | ShtMetl | rt1 |

Duct System Summary

Main ASHP

Firehouse HVAC Designs Inc

Job: 23-1518

Date: Dec 28, 2022

By: Scott Ellis BCIN 45964

Cert.#: 13396(RHLG, RASD)

30 New York Ave, Wasaga Beach, ON L4Z 3A8 Phone: 705-241-7189 Email: info@frhdesigns.ca License: BCIN 45964 Firm BCIN 126211

Project Information

For: Parks Canada Butternut Farm
7501 Steeles Ave, Scarborough, ON

| | Heating | Cooling |
|------------------------------------|----------------------|----------------------|
| External static pressure | 0.80 in H2O | 0.80 in H2O |
| Pressure losses | 0 in H2O | 0 in H2O |
| Available static pressure | 0.80 in H2O | 0.80 in H2O |
| Supply / return available pressure | 0.340 / 0.460 in H2O | 0.340 / 0.460 in H2O |
| Lowest friction rate | 0.100 in/100ft | 0.100 in/100ft |
| Actual air flow | 1485 cfm | 1485 cfm |
| Total effective length (TEL) | | 556 ft |

Supply Branch Detail Table

| Name | Design (Btuh) | Htg (cfm) | Clg (cfm) | Design FR | Diam (in) | H x W (in) | Duct Matl | Actual Ln (ft) | Ftg.Eqv Ln (ft) | Trunk | |
|-----------------|---------------|-----------|-----------|-----------|-----------|------------|-----------|----------------|-----------------|-------|-------|
| Basement | h | 1857 | 74 | 4 | 0.100 | 5.0 | 0x0 | ShMt | 13.5 | 75.0 | st4 |
| Basement-A | h | 1857 | 74 | 4 | 0.100 | 5.0 | 0x0 | ShMt | 45.5 | 75.0 | st29A |
| Basement-B | h | 1857 | 74 | 4 | 0.100 | 5.0 | 0x0 | ShMt | 37.0 | 60.0 | st29 |
| Basement-C | h | 1857 | 74 | 4 | 0.100 | 5.0 | 0x0 | ShMt | 12.5 | 125.0 | st3 |
| Basement-D | h | 1857 | 74 | 4 | 0.100 | 5.0 | 0x0 | ShMt | 23.0 | 95.0 | st33 |
| Bath 1 | c | 324 | 10 | 22 | 0.100 | 5.0 | 0x0 | ShMt | 62.5 | 170.0 | st20 |
| Bath 2 | c | 324 | 10 | 22 | 0.100 | 5.0 | 0x0 | ShMt | 54.5 | 180.0 | st20 |
| Bath 3 | c | 332 | 13 | 22 | 0.100 | 5.0 | 0x0 | ShMt | 67.7 | 160.0 | st30A |
| Bath 4 | c | 332 | 13 | 22 | 0.100 | 5.0 | 0x0 | ShMt | 75.2 | 140.0 | st30A |
| Bath 5 | c | 444 | 22 | 30 | 0.100 | 5.0 | 0x0 | ShMt | 72.5 | 110.0 | st19 |
| Bedroom 1 | c | 1205 | 61 | 81 | 0.100 | 6.0 | 0x0 | ShMt | 58.0 | 160.0 | st20 |
| Bedroom 2 | c | 1185 | 48 | 80 | 0.100 | 6.0 | 0x0 | ShMt | 46.0 | 190.0 | st20 |
| Bedroom 3 | c | 691 | 41 | 47 | 0.100 | 5.0 | 0x0 | ShMt | 56.7 | 135.0 | st30 |
| Bedroom 3-A | c | 691 | 41 | 47 | 0.100 | 5.0 | 0x0 | ShMt | 47.2 | 115.0 | st30 |
| Bedroom 4 | c | 1079 | 66 | 73 | 0.100 | 5.0 | 0x0 | ShMt | 66.7 | 150.0 | st30A |
| Bedroom 5 | c | 1228 | 58 | 83 | 0.100 | 6.0 | 0x0 | ShMt | 74.5 | 160.0 | st19 |
| Bedroom 5-A | c | 1228 | 58 | 83 | 0.100 | 6.0 | 0x0 | ShMt | 47.0 | 160.0 | st19 |
| Entry | h | 1687 | 67 | 65 | 0.100 | 5.0 | 0x0 | ShMt | 41.5 | 95.0 | st29A |
| Kitchen | c | 848 | 40 | 57 | 0.100 | 5.0 | 0x0 | ShMt | 14.0 | 105.0 | st33 |
| Laundry Baths | c | 928 | 53 | 63 | 0.100 | 5.0 | 0x0 | ShMt | 46.0 | 65.0 | st19 |
| Laundry Baths-A | c | 928 | 53 | 63 | 0.100 | 5.0 | 0x0 | ShMt | 11.5 | 55.0 | st4 |
| Office 1 | h | 1157 | 46 | 44 | 0.100 | 5.0 | 0x0 | ShMt | 79.2 | 150.0 | st30A |
| Office 2 | c | 873 | 55 | 59 | 0.100 | 5.0 | 0x0 | ShMt | 59.2 | 125.0 | st30 |
| Office 3 | c | 545 | 20 | 37 | 0.100 | 5.0 | 0x0 | ShMt | 68.7 | 145.0 | st30 |
| Open Flex | c | 1085 | 43 | 73 | 0.100 | 5.0 | 0x0 | ShMt | 49.0 | 105.0 | st29A |
| Open Flex-A | c | 1085 | 43 | 73 | 0.100 | 5.0 | 0x0 | ShMt | 34.0 | 70.0 | st29 |
| Open Flex-B | c | 1085 | 43 | 73 | 0.100 | 5.0 | 0x0 | ShMt | 47.5 | 75.0 | st29A |
| Open Flex-C | c | 1085 | 43 | 73 | 0.100 | 5.0 | 0x0 | ShMt | 24.0 | 55.0 | st34 |
| Storage | c | 622 | 39 | 42 | 0.100 | 5.0 | 0x0 | ShMt | 78.1 | 130.0 | st19 |
| Uri Wash | c | 475 | 30 | 32 | 0.100 | 5.0 | 0x0 | ShMt | 7.5 | 65.0 | st4 |
| Upper Hall | c | 828 | 54 | 56 | 0.100 | 5.0 | 0x0 | ShMt | 62.0 | 135.0 | st29A |
| Wardrobe | c | 645 | 42 | 44 | 0.100 | 5.0 | 0x0 | ShMt | 55.5 | 140.0 | st19 |

Supply Trunk Detail Table

| Name | Trunk Type | Htg (cfm) | Clg (cfm) | Design FR | Veloc (fpm) | Diam (in) | H x W (in) | Duct Material | Trunk |
|-------|------------|-----------|-----------|-----------|-------------|-----------|------------|---------------|-------|
| st33 | Peak AVF | 1211 | 1309 | 0.100 | 786 | 15.2 | 10 x 24 | ShtMetl | st3 |
| st3 | Peak AVF | 1328 | 1386 | 0.100 | 832 | 15.6 | 10 x 24 | ShtMetl | |
| st19 | Peak AVF | 273 | 344 | 0.100 | 774 | 9.2 | 8 x 8 | ShtMetl | st21 |
| st34 | Peak AVF | 43 | 73 | 0.100 | 537 | 5.0 | 0 x 0 | ShtMetl | st3 |
| st29A | Peak AVF | 282 | 272 | 0.100 | 635 | 8.6 | 8 x 8 | ShtMetl | st29 |
| st29 | Peak AVF | 399 | 349 | 0.100 | 719 | 9.8 | 8 x 10 | ShtMetl | st22 |
| st4 | Peak AVF | 157 | 99 | 0.100 | 353 | 6.9 | 8 x 8 | ShtMetl | |
| st20 | Peak AVF | 129 | 205 | 0.100 | 461 | 7.6 | 8 x 8 | ShtMetl | st21 |
| st30A | Peak AVF | 138 | 161 | 0.100 | 363 | 7.0 | 8 x 8 | ShtMetl | st30 |
| st30 | Peak AVF | 296 | 350 | 0.100 | 630 | 9.3 | 8 x 10 | ShtMetl | st22 |
| st21 | Peak AVF | 402 | 549 | 0.100 | 706 | 11.0 | 8 x 14 | ShtMetl | st33 |
| st22 | Peak AVF | 695 | 699 | 0.100 | 786 | 12.0 | 8 x 16 | ShtMetl | st33 |

Return Branch Detail Table

| Name | Grille Size (in) | Htg (cfm) | Clg (cfm) | TEL (ft) | Design FR | Veloc (fpm) | Diam (in) | H x W (in) | Stud/Joist Opening (in) | Duct Matl | Trunk |
|------|------------------|-----------|-----------|----------|-----------|-------------|-----------|------------|-------------------------|-----------|-------|
| rb1 | 0x0 | 222 | 12 | 125.5 | 0.367 | 532 | 6.2 | 6x 10 | | ShMt | rt2 |
| rb7 | 14x5 | 143 | 141 | 319.5 | 0.144 | 453 | 6.2 | 3.25x14 | 10x9 | SJSp | rt6 |
| rb9 | 14x4 | 99 | 132 | 258.5 | 0.178 | 418 | 5.8 | 3.25x14 | 10x9 | SJSp | rt6 |
| rb8 | 14x6 | 103 | 167 | 216.5 | 0.213 | 529 | 6.1 | 3.25x14 | 10x9 | SJSp | rt6 |
| rb2 | 24x7 | 340 | 280 | 316.5 | 0.145 | 255 | 8.5 | 8.00x24 | 10x38 | SJSp | rt5 |
| rb3 | 20x5 | 159 | 209 | 259.0 | 0.178 | 464 | 6.8 | 2-3.25x10 | 2-10x13 | SJSp | rt10 |
| rb10 | 14x4 | 93 | 133 | 308.0 | 0.149 | 422 | 6.0 | 3.25x14 | 10x9 | SJSp | rt10A |
| rb12 | 14x5 | 97 | 144 | 265.0 | 0.174 | 455 | 6.0 | 3.25x14 | 10x9 | SJSp | rt10A |
| rb13 | 14x5 | 108 | 138 | 276.0 | 0.167 | 437 | 5.9 | 3.25x14 | 10x9 | SJSp | rt8 |
| rb11 | 14x4 | 121 | 129 | 319.5 | 0.144 | 407 | 5.9 | 3.25x14 | 10x9 | SJSp | rt8 |

Return Trunk Detail Table

| Name | Trunk Type | Htg (cfm) | Clg (cfm) | Design FR | Veloc (fpm) | Diam (in) | H x W (in) | Duct Material | Trunk |
|-------|------------|-----------|-----------|-----------|-------------|-----------|------------|---------------|-------|
| rt2 | Peak AVF | 1485 | 1485 | 0.144 | 764 | 15.2 | 10 x 28 | ShtMetl | |
| rt6 | Peak AVF | 345 | 441 | 0.144 | 661 | 9.4 | 8 x 12 | ShtMetl | rt7 |
| rt7 | Peak AVF | 686 | 720 | 0.144 | 720 | 11.4 | 8 x 18 | ShtMetl | rt9 |
| rt5 | Peak AVF | 340 | 280 | 0.145 | 511 | 8.6 | 8 x 12 | ShtMetl | rt7 |
| rt10 | Peak AVF | 349 | 486 | 0.149 | 625 | 9.7 | 8 x 14 | ShtMetl | rt2 |
| rt10A | Peak AVF | 190 | 277 | 0.149 | 623 | 7.9 | 8 x 8 | ShtMetl | rt10 |
| rt8 | Peak AVF | 229 | 267 | 0.144 | 600 | 7.8 | 8 x 8 | ShtMetl | rt9 |
| rt9 | Peak AVF | 915 | 987 | 0.144 | 807 | 12.8 | 8 x 22 | ShtMetl | rt2 |

RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY
for design and performance of residential ventilation systems to OBC 2012 Div. B 9.32

| | | | |
|---|---|---|------------------------------------|
| LOCATION | 1. Location Township: _____ Civic Address: _____ | | TVC SYSTEM |
| BUILDER | 2. Builder Name: _____ Address: _____ City: _____ Postal Code: _____ Ph: _____ Fax: _____ | 8. TVC System <input type="checkbox"/> HRV <input type="checkbox"/> Central Exhaust <input type="checkbox"/> Multiple Fans | |
| DESIGNER | 3. Designer Name: _____ Address: _____ Postal Code: _____ City: _____ Ph: _____ Fax: _____ Firm BCIN: _____ Designer BCIN: _____ HRAI#: _____ | | |
| HEATING SYSTEM | 4. a) Heating Systems Forced air Non Forced Air Gas Propane Other Oil Electricity | 4. b) House Style One Dwelling Unit House with two dwelling units Dedicated Shared | PRINCIPAL EXH. FAN CAPACITY |
| HEATING SYSTEM COMBUSTION APPLIANCES | 5. Combustion Appliances 9.32.3.1.(1) a) Direct Vent b) Induced Draft c) Natural Draft d) Solid Fuel Appliances e) No combustion appliances | 9. Principal Exhaust Fan Capacity (PEF) Master Bedroom _____ @ 30 CFM(15L/S) _____ Other Bedrooms _____ @ 15 CFM(7.5L/S) _____ Total _____ | |
| HOUSE TYPE | 6. Type of House 9.32.3.1.(2) <input type="checkbox"/> Type 1 a) or b) type appliances only <input type="checkbox"/> Type 2 a) or b) type appliances with a d) type appliance <input type="checkbox"/> Type 3 any type c) appliance = part 6 design <input type="checkbox"/> Type 4 electric space heat | 10. Principal Exhaust Fan Location _____ HVI rated Manufacturer _____ Model _____ Design Airflow High _____ Low _____ Sones _____ If Using HRV/ERV: _____ % Sensible Efficiency @ 0°C _____ _____ % Sensible Efficiency @ -25°C _____ | |
| SYSTEM DESIGN OPTION | 7. System Design Option Exhaust only forced air system/coupled HRV with extended exhaust or simplified coupled HRV full ducting/not coupled to forced air Part 6 design | 11. Supplemental Exhaust Fan Capacity (SEF) Total Ventilation Capacity _____ Less Principal Ventilation Capacity _____ Required Supplemental Ventilation Capacity _____ | |
| TOTAL VENTILATION CAPACITY (TVC) | 8. TVC Capacity OBC 9.32.3.3 Bsmt & Master bedroom _____ @ 20 CFM (10 L/S) _____ Other Bedrooms _____ @ 10 CFM (5 L/S) _____ Bathrooms & Kitchen _____ @ 10 CFM (5 L/S) _____ Other Habitable Rooms _____ @ 10 CFM (5 L/S) _____ Total Ventilation Capacity (TVC) _____ | 12. Additional Equipment Fan 2 Location _____ Sones _____ Manufacturer/Model _____ <input type="checkbox"/> TVC Design airflow _____ Fan 3 Location _____ Sones _____ Manufacturer/Model _____ <input type="checkbox"/> TVC Design airflow _____ Fan 4 Location _____ Sones _____ Manufacturer/Model _____ <input type="checkbox"/> TVC Design airflow _____ | |
| | | 13. Designer Consent I, _____ have reviewed and take responsibility for the design work described in this document and I am qualified in the appropriate categories. Date: / / Signature: <i>S Ellis</i> | |

Conversion Note: 1 L/S = 2 CFM (For hard conversion, use 1 L/S = 2.118 CFM)



RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY
for design and performance of residential ventilation systems to OBC 2012 Div. B 9.32

| | | | |
|---|---|---|--------------------------------------|
| LOCATION | 1. Location Township: _____ Civic Address: _____ | | TVC SYSTEM |
| BUILDER | 2. Builder Name: _____ Address: _____ City: _____ Postal Code: _____ Ph: _____ Fax: _____ | 8. TVC System <input type="checkbox"/> HRV <input type="checkbox"/> Central Exhaust <input type="checkbox"/> Multiple Fans | PRINCIPAL EXH. FAN CAPACITY |
| DESIGNER | 3. Designer Name: _____ Address: _____ Postal Code: _____ City: _____ Ph: _____ Fax: _____ Firm BCIN: _____ Designer BCIN: _____ HRAI#: _____ | 9. Principal Exhaust Fan Capacity (PEF) Master Bedroom _____ @ 30 CFM(15L/S) _____ Other Bedrooms _____ @ 15 CFM(7.5L/S) _____ Total _____ | PRINCIPAL EXHAUST FAN |
| HEATING SYSTEM | 4. a) Heating Systems Forced air Non Forced Air Gas Propane Other Oil Electricity | 4. b) House Style One Dwelling Unit House with two dwelling units Dedicated Shared | SUPPLEMENTAL EXHAUST CAPACITY |
| HEATING SYSTEM COMBUSTION APPLIANCES | 5. Combustion Appliances 9.32.3.1.(1) a) Direct Vent b) Induced Draft c) Natural Draft d) Solid Fuel Appliances e) No combustion appliances | 10. Principal Exhaust Fan Location _____ HVI rated Manufacturer _____ Model _____ Design Airflow High _____ Low _____ Sones _____ If Using HRV/ERV: _____ % Sensible Efficiency @ 0°C _____ _____ % Sensible Efficiency @ -25°C _____ | ADDITIONAL EXHAUST EQUIPMENT |
| HOUSE TYPE | 6. Type of House 9.32.3.1.(2) <input type="checkbox"/> Type 1 a) or b) type appliances only <input type="checkbox"/> Type 2 a) or b) type appliances with a d) type appliance <input type="checkbox"/> Type 3 any type c) appliance = part 6 design <input type="checkbox"/> Type 4 electric space heat | 11. Supplemental Exhaust Fan Capacity (SEF) Total Ventilation Capacity _____ Less Principal Ventilation Capacity _____ Required Supplemental Ventilation Capacity _____ | DESIGNER CONSENT |
| SYSTEM DESIGN OPTION | 7. System Design Option Exhaust only forced air system/coupled HRV with extended exhaust or simplified coupled HRV full ducting/not coupled to forced air Part 6 design | 12. Additional Equipment Fan 2 Location _____ Sones _____ Manufacturer/Model _____ <input type="checkbox"/> TVC Design airflow _____ Fan 3 Location _____ Sones _____ Manufacturer/Model _____ <input type="checkbox"/> TVC Design airflow _____ Fan 4 Location _____ Sones _____ Manufacturer/Model _____ <input type="checkbox"/> TVC Design airflow _____ | |
| TOTAL VENTILATION CAPACITY (TVC) | 8. TVC Capacity OBC 9.32.3.3 Bsmt & Master bedroom _____ @ 20 CFM (10 L/S) _____ Other Bedrooms _____ @ 10 CFM (5 L/S) _____ Bathrooms & Kitchen _____ @ 10 CFM (5 L/S) _____ Other Habitable Rooms _____ @ 10 CFM (5 L/S) _____ Total Ventilation Capacity (TVC) _____ | 13. Designer Consent I, _____ have reviewed and take responsibility for the design work described in this document and I am qualified in the appropriate categories. Date: / / Signature: <i>S Ellis</i> | |

Conversion Note: 1 L/S = 2 CFM (For hard conversion, use 1 L/S = 2.118 CFM)

