

LOT 5

SITE NAME: MINNISALE HOMES CORP

BUILDER: GREENPARK HOMES

TYPE: MILLWOOD 1

GFA: 2194

DATE: Aug-18

LO# 79583

WINTER NATURAL AIR CHANGE RATE 0.354

SUMMER NATURAL AIR CHANGE RATE 0.115

HEAT LOSS  $\Delta T$  °F. 74

HEAT GAIN  $\Delta T$  °F. 11

CSA-F280-12

SB-12 PACKAGE A1

| ROOM USE                         | EXP. WALL | CLG. HT. | MBR  | ENS  | WIC  | BED-2 | BED-3 | BATH |      |      |      |  |  |
|----------------------------------|-----------|----------|------|------|------|-------|-------|------|------|------|------|--|--|
| EXP. WALL                        | 29        |          | 22   | 7    |      | 26    | 26    | 10   |      |      |      |  |  |
| CLG. HT.                         | 10        |          | 9    | 9    |      | 9     | 10    | 9    |      |      |      |  |  |
| FACTORS                          |           |          |      |      |      |       |       |      |      |      |      |  |  |
| GRS.WALL AREA                    | LOSS      | GAIN     | 290  | 198  | 63   | 234   | 260   | 90   |      |      |      |  |  |
| GLAZING                          | LOSS      | GAIN     |      |      |      | LOSS  | GAIN  | LOSS | GAIN |      |      |  |  |
| NORTH                            | 20.8      | 15.5     | 0    | 0    | 0    | 0     | 0     | 0    | 0    |      |      |  |  |
| EAST                             | 20.8      | 41.0     | 32   | 665  | 1314 | 16    | 332   | 657  | 0    | 0    | 0    |  |  |
| SOUTH                            | 20.8      | 24.4     | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0    | 0    |  |  |
| WEST                             | 20.8      | 41.0     | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0    | 0    |  |  |
| SKYLT.                           | 36.4      | 106.7    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0    | 0    |  |  |
| DOORS                            | 24.7      | 3.7      | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0    | 0    |  |  |
| NET EXPOSED WALL                 | 4.4       | 0.6      | 258  | 1124 | 167  | 182   | 793   | 118  | 63   | 274  | 41   |  |  |
| NET EXPOSED BMT WALL ABOVE GR    | 3.5       | 0.5      | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0    | 0    |  |  |
| EXPOSED CLG                      | 1.3       | 0.6      | 285  | 357  | 159  | 120   | 150   | 67   | 84   | 105  | 47   |  |  |
| NO ATTIC EXPOSED CLG             | 2.7       | 1.2      | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0    | 0    |  |  |
| EXPOSED FLOOR                    | 2.5       | 0.4      | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0    | 0    |  |  |
| BASEMENT/CRAWL HEAT LOSS         |           |          | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0    | 0    |  |  |
| SLAB ON GRADE HEAT LOSS          |           |          | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0    | 0    |  |  |
| SUBTOTAL HT LOSS                 |           |          | 2146 |      | 1276 |       | 380   |      |      |      |      |  |  |
| SUB TOTAL HT GAIN                |           |          |      | 1639 |      | 841   |       |      |      |      |      |  |  |
| LEVEL FACTOR / MULTIPLIER        | 0.20      | 0.29     |      | 0.20 | 0.29 |       | 0.20  | 0.29 |      | 0.20 | 0.29 |  |  |
| AIR CHANGE HEAT LOSS             |           |          | 612  |      | 364  |       | 108   |      |      | 281  |      |  |  |
| AIR CHANGE HEAT GAIN             |           |          |      | 163  |      | 53    |       | 6    |      |      | 36   |  |  |
| DUCT LOSS                        |           |          | 0    |      | 0    |       | 0     |      |      | 127  |      |  |  |
| DUCT GAIN                        |           |          | 0    |      | 0    |       | 0     |      |      |      | 61   |  |  |
| HEAT GAIN PEOPLE                 | 240       |          | 2    | 480  | 0    | 0     | 0     | 0    |      |      | 0    |  |  |
| HEAT GAIN APPLIANCES/LIGHTS      |           |          |      | 1035 |      | 0     |       | 0    |      |      | 1035 |  |  |
| TOTAL HT LOSS BTU/H              |           |          | 2758 |      | 1640 |       | 488   |      |      |      | 1392 |  |  |
| TOTAL HT GAIN $\times 1.3$ BTU/H |           |          | 4235 |      | 1162 |       | 121   |      |      |      | 866  |  |  |

| ROOM USE                         | EXP. WALL | CLG. HT. | LVION | KT/PM | LAUN | WIR  | FOY  | WOO  | BAS  |
|----------------------------------|-----------|----------|-------|-------|------|------|------|------|------|
| EXP. WALL                        | 37        |          | 37    | 68    | 7    | 29   | 20   | 36   | 152  |
| CLG. HT.                         | 10        |          | 10    | 10    | 9    | 11   | 11   | 9    | 9    |
| FACTORS                          |           |          |       |       |      |      |      |      |      |
| GRS.WALL AREA                    | LOSS      | GAIN     | 370   | 680   | 63   | 319  | 220  | 324  | 1128 |
| GLAZING                          | LOSS      | GAIN     |       |       | LOSS | GAIN | LOSS | GAIN |      |
| NORTH                            | 20.8      | 15.5     | 0     | 0     | 0    | 0    | 0    | 0    | 0    |
| EAST                             | 20.8      | 41.0     | 0     | 0     | 0    | 0    | 0    | 0    | 0    |
| SOUTH                            | 20.8      | 24.4     | 0     | 0     | 0    | 0    | 0    | 0    | 0    |
| WEST                             | 20.8      | 41.0     | 27    | 561   | 1108 | 0    | 0    | 0    | 0    |
| SKYLT.                           | 36.4      | 106.7    | 0     | 0     | 0    | 0    | 0    | 0    | 0    |
| DOORS                            | 24.7      | 3.7      | 0     | 0     | 0    | 0    | 0    | 0    | 0    |
| NET EXPOSED WALL                 | 4.4       | 0.6      | 343   | 1494  | 222  | 600  | 2614 | 388  |      |
| NET EXPOSED BMT WALL ABOVE GR    | 3.5       | 0.5      | 0     | 0     | 0    | 0    | 0    | 0    |      |
| EXPOSED CLG                      | 1.3       | 0.6      | 0     | 0     | 0    | 0    | 0    | 0    |      |
| NO ATTIC EXPOSED CLG             | 2.7       | 1.2      | 0     | 0     | 0    | 0    | 0    | 0    |      |
| EXPOSED FLOOR                    | 2.5       | 0.4      | 0     | 0     | 0    | 0    | 0    | 0    |      |
| BASEMENT/CRAWL HEAT LOSS         |           |          | 0     | 0     | 0    | 0    | 0    | 0    |      |
| SLAB ON GRADE HEAT LOSS          |           |          | 0     | 0     | 0    | 0    | 0    | 0    |      |
| SUBTOTAL HT LOSS                 |           |          | 2065  |       | 4303 |      | 441  |      |      |
| SUB TOTAL HT GAIN                |           |          |       | 1330  |      | 3683 |      |      |      |
| LEVEL FACTOR / MULTIPLIER        | 0.30      | 0.41     |       | 0.30  | 0.41 |      | 0.30 | 0.41 |      |
| AIR CHANGE HEAT LOSS             |           |          | 836   |       | 1751 |      | 125  |      |      |
| AIR CHANGE HEAT GAIN             |           |          |       | 84    |      | 232  |      |      |      |
| DUCT LOSS                        |           |          | 0     |       | 0    |      | 0    |      |      |
| DUCT GAIN                        |           |          | 0     |       | 0    |      | 0    |      |      |
| HEAT GAIN PEOPLE                 | 240       |          | 0     |       | 0    |      | 0    |      |      |
| HEAT GAIN APPLIANCES/LIGHTS      |           |          |       | 1035  |      | 1035 |      |      |      |
| TOTAL HT LOSS BTU/H              |           |          | 2892  |       | 6054 |      | 567  |      |      |
| TOTAL HT GAIN $\times 1.3$ BTU/H |           |          | 3184  |       | 6436 |      | 1005 |      |      |

CITY OF BRAMPTON  
BUILDING DIVISION  
REVIEWED  
NOV 26 2018  
HVAC BY  
MONICA CRISAN

TOTAL HEAT GAIN BTU/H: 28879

TONS: 2.41

LOSS DUE TO VENTILATION LOAD BTU/H: 1274

STRUCTURAL HEAT LOSS: 41892

TOTAL COMBINED HEAT LOSS BTU/H: 43166

*Michael O'Rourke*



SITE NAME: MINNISSALE HOMES CORP  
BUILDER: GREENPARK HOMES

TYPE: MILLWOOD 1

DATE: Aug-18

GFA: 2194

LO# 79583

HEATING CFM 1131 COOLING CFM 1131  
TOTAL HEAT LOSS 41,892 TOTAL HEAT GAIN 28,690  
AIR FLOW RATE CFM 27 AIR FLOW RATE CFM 39.42

furnace pressure 0.6  
furnace filter 0.05  
a/c coil pressure 0.2  
available pressure for s/a & r/a 0.35

#GOODMAN

AFUE = 96 %

GMCC960603BNA 60

INPUT (BTU/H) = 60,000

OUTPUT (BTU/H) = 57,600

FAN SPEED

LOW

MEDLOW

MEDIUM

MEDIUM HIGH

HIGH

DESIGN CFM = 1131  
CFM @ 0.5" E.S.P.

TEMPERATURE RISE 47 °F

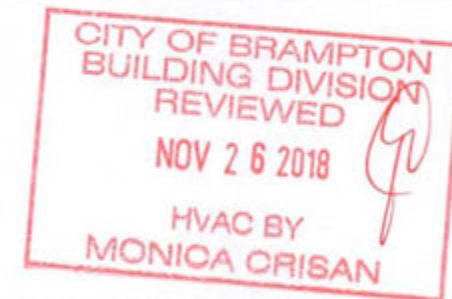
| RUN COUNT | 4th | 3rd | 2nd | 1st | Bas |
|-----------|-----|-----|-----|-----|-----|
| S/A       | 0   | 0   | 11  | 7   | 4   |
| R/A       | 0   | 0   | 4   | 2   | 1   |

All S/A diffusers 4"x10" unless noted otherwise on layout.

All S/A runs 5" unless noted otherwise on layout.

| RUN #                     | 1    | 2    | 3    | 4     | 5     | 6     | 7    | 9     | 10   | 11   | 12    | 13    | 14    | 15    | 16    | 17   | 18   | 19   | 21   | 22   | 23   | 24   |
|---------------------------|------|------|------|-------|-------|-------|------|-------|------|------|-------|-------|-------|-------|-------|------|------|------|------|------|------|------|
| ROOM NAME                 | MBR  | ENS  | WIC  | BED-2 | BED-3 | BED-2 | BATH | BED-3 | MBR  | LAUN | LV/DN | LV/DN | KT/FM | KT/FM | KT/FM | LAUN | W/R  | FOY  | BAS  | BAS  | BAS  | BAS  |
| RM LOSS MBH               | 1.38 | 1.64 | 0.49 | 1.63  | 1.45  | 1.63  | 1.39 | 1.45  | 1.38 | 0.28 | 1.45  | 1.45  | 2.02  | 2.02  | 2.02  | 0.28 | 2.71 | 2.82 | 3.61 | 3.61 | 3.61 | 3.61 |
| CFM PER RUN HEAT          | 37   | 44   | 13   | 44    | 39    | 44    | 38   | 39    | 37   | 8    | 39    | 39    | 54    | 54    | 54    | 8    | 73   | 76   | 97   | 97   | 97   | 97   |
| RM GAIN MBH               | 2.12 | 1.16 | 0.12 | 2.10  | 2.34  | 2.10  | 0.87 | 2.34  | 2.12 | 0.75 | 1.59  | 1.59  | 2.15  | 2.15  | 2.15  | 0.75 | 0.63 | 0.78 | 0.22 | 0.22 | 0.22 | 0.22 |
| CFM PER RUN COOLING       | 83   | 46   | 5    | 83    | 92    | 83    | 34   | 92    | 83   | 30   | 63    | 63    | 85    | 85    | 85    | 30   | 25   | 31   | 9    | 9    | 9    | 9    |
| ADJUSTED PRESSURE         | 0.16 | 0.17 | 0.17 | 0.16  | 0.16  | 0.16  | 0.17 | 0.16  | 0.16 | 0.17 | 0.17  | 0.17  | 0.16  | 0.16  | 0.16  | 0.17 | 0.17 | 0.17 | 0.16 | 0.16 | 0.16 | 0.16 |
| ACTUAL DUCT LGH           | 36   | 35   | 34   | 29    | 42    | 37    | 31   | 38    | 51   | 21   | 20    | 23    | 19    | 28    | 31    | 31   | 31   | 25   | 30   | 26   | 10   | 17   |
| EQUIVALENT LENGTH         | 150  | 150  | 190  | 130   | 170   | 140   | 150  | 140   | 130  | 160  | 150   | 160   | 130   | 120   | 140   | 190  | 130  | 120  | 140  | 140  | 140  | 170  |
| TOTAL EFFECTIVE LENGTH    | 186  | 185  | 224  | 159   | 212   | 177   | 181  | 178   | 181  | 181  | 170   | 183   | 149   | 148   | 171   | 221  | 161  | 145  | 170  | 166  | 150  | 187  |
| ADJUSTED PRESSURE         | 0.09 | 0.09 | 0.08 | 0.1   | 0.08  | 0.09  | 0.1  | 0.09  | 0.09 | 0.1  | 0.1   | 0.09  | 0.11  | 0.11  | 0.09  | 0.08 | 0.11 | 0.12 | 0.1  | 0.1  | 0.11 | 0.09 |
| ROUND DUCT SIZE           | 6    | 4    | 4    | 6     | 6     | 6     | 4    | 6     | 6    | 4    | 5     | 5     | 6     | 6     | 6     | 4    | 5    | 5    | 6    | 6    | 6    | 6    |
| HEATING VELOCITY (ft/min) | 189  | 505  | 149  | 224   | 199   | 224   | 436  | 199   | 189  | 92   | 286   | 286   | 275   | 275   | 275   | 92   | 536  | 558  | 495  | 495  | 495  | 495  |
| COOLING VELOCITY (ft/min) | 423  | 528  | 57   | 423   | 469   | 423   | 390  | 469   | 423  | 344  | 463   | 463   | 433   | 433   | 433   | 344  | 184  | 228  | 46   | 46   | 46   | 46   |
| OUTLET GRILL SIZE         | 4X10 | 3X10 | 3X10 | 4X10  | 4X10  | 4X10  | 3X10 | 4X10  | 4X10 | 3X10 | 3X10  | 3X10  | 4X10  | 4X10  | 4X10  | 3X10 | 3X10 | 3X10 | 4X10 | 4X10 | 4X10 | 4X10 |
| TRUNK                     | A    | A    | A    | C     | B     | C     | B    | B     | D    | C    | C     | B     | D     | D     | A     | A    | D    | B    | D    | A    | C    | B    |

|                           |  |
|---------------------------|--|
| RUN #                     |  |
| ROOM NAME                 |  |
| RM LOSS MBH               |  |
| CFM PER RUN HEAT          |  |
| RM GAIN MBH               |  |
| CFM PER RUN COOLING       |  |
| ADJUSTED PRESSURE         |  |
| ACTUAL DUCT LGH           |  |
| EQUIVALENT LENGTH         |  |
| TOTAL EFFECTIVE LENGTH    |  |
| ADJUSTED PRESSURE         |  |
| ROUND DUCT SIZE           |  |
| HEATING VELOCITY (ft/min) |  |
| COOLING VELOCITY (ft/min) |  |
| OUTLET GRILL SIZE         |  |
| TRUNK                     |  |



## SUPPLY AIR TRUNK SIZE

| TRUNK   | STATIC | ROUND | RECT | VELOCITY |
|---------|--------|-------|------|----------|
| CFM     | PRESS. | DUCT  | DUCT | (ft/min) |
| TRUNK A | 253    | 0.08  | 8.4  | 8        |
| TRUNK B | 328    | 0.08  | 9.2  | 10       |
| TRUNK C | 560    | 0.08  | 11.3 | 16       |
| TRUNK D | 315    | 0.09  | 8.8  | 10       |
| TRUNK E | 813    | 0.08  | 13   | 20       |
| TRUNK F | 0      | 0.00  | 0    | 0        |

## RETURN AIR TRUNK SIZE

| TRUNK   | STATIC | ROUND | RECT | VELOCITY |
|---------|--------|-------|------|----------|
| CFM     | PRESS. | DUCT  | DUCT | (ft/min) |
| TRUNK G | 0      | 0.00  | 0    | 0        |
| TRUNK H | 0      | 0.00  | 0    | 0        |
| TRUNK I | 0      | 0.00  | 0    | 0        |
| TRUNK J | 0      | 0.00  | 0    | 0        |
| TRUNK K | 0      | 0.00  | 0    | 0        |
| TRUNK L | 0      | 0.00  | 0    | 0        |
| TRUNK O | 0      | 0.06  | 0    | 0        |
| TRUNK P | 0      | 0.06  | 0    | 0        |
| TRUNK Q | 0      | 0.06  | 0    | 0        |
| TRUNK R | 0      | 0.06  | 0    | 0        |
| TRUNK S | 0      | 0.06  | 0    | 0        |
| TRUNK T | 0      | 0.06  | 0    | 0        |
| TRUNK U | 0      | 0.06  | 0    | 0        |
| TRUNK V | 0      | 0.06  | 0    | 0        |
| TRUNK W | 0      | 0.06  | 0    | 0        |
| TRUNK X | 1131   | 0.06  | 15.8 | 30       |
| TRUNK Y | 795    | 0.06  | 13.8 | 22       |
| TRUNK Z | 0      | 0.06  | 0    | 0        |
| DROP    | 1131   | 0.06  | 15.8 | 24       |

## RETURN AIR #

|                    |      |      |      |      |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |
|--------------------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
|                    | 1    | 3    | 2    | 4    | 5    | 6    | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0    |
| AIR VOLUME         | 145  | 95   | 130  | 85   | 310  | 175  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 191  |
| PLENUM PRESSURE    | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15  | 0.15 |
| ACTUAL DUCT LGH    | 43   | 58   | 47   | 57   | 25   | 24   | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 14   |
| EQUIVALENT LENGTH  | 175  | 160  | 190  | 185  | 190  | 185  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 135  |
| TOTAL EFFECTIVE LH | 218  | 218  | 237  | 242  | 215  | 209  | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 149  |
| ADJUSTED PRESSURE  | 0.07 | 0.07 | 0.06 | 0.06 | 0.07 | 0.07 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 0.10 |
| ROUND DUCT SIZE    | 7    | 6    | 7    | 6    | 9.4  | 7.5  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 7.5  |
| INLET GRILL SIZE   | 8    | 8    | 8    | 8    | 8    | 8    | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 8    |
|                    | X    | X    | X    | X    | X    | X    | X     | X     | X     | X     | X     | X     | X     | X     | X     | X     | X     | X     | X     | X     | X     | X    |
| INLET GRILL SIZE   | 14   | 14   | 14   | 14   | 30   | 14   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 14   |

TYPE: MILLWOOD 1  
SITE NAME: MINNISSALE HOMES CORP

LO # 79583

**RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY**
**COMBUSTION APPLIANCES** 9.32.3.1(1)  
a) ☐ Direct vent (sealed combustion) only  
b) ☐ Positive venting induced draft (except fireplaces)  
c) ☐ Natural draft, B-vent or induced draft gas fireplace  
d) ☐ Solid Fuel (including fireplaces)  
e) ☐ No Combustion Appliances

**HEATING SYSTEM**  
☒ Forced Air ☐ Non Forced Air  
☐ Electric Space Heat

**HOUSE TYPE** 9.32.1(2)  
☐ I Type a) or b) appliance only, no solid fuel  
☐ II Type I except with solid fuel (including fireplaces)  
☐ III Any Type c) appliance  
☐ IV Type I, or II with electric space heat  
☐ Other: Type I, II or IV no forced air

**SYSTEM DESIGN OPTIONS** O.N.H.W.P.  
☐ 1 Exhaust only/Forced Air System  
☐ 2 HRV with Ducting/Forced Air System  
☒ 3 HRV Simplified/connected to forced air system  
☐ 4 HRV with Ducting/non forced air system  
☐ Part 6 Design

**TOTAL VENTILATION CAPACITY** 9.32.3.3(1)  

|                           |   |            |              |                  |
|---------------------------|---|------------|--------------|------------------|
| Basement + Master Bedroom | 2 | @ 21.2 cfm | 42.4         | cfm              |
| Other Bedrooms            | 2 | @ 10.6 cfm | 21.2         | cfm              |
| Kitchen & Bathrooms       | 4 | @ 10.6 cfm | 42.4         | cfm              |
| Other Rooms               | 5 | @ 10.6 cfm | 42.4         | cfm              |
| Table 9.32.3.A.           |   |            | <b>TOTAL</b> | <b>148.4</b> cfm |

**PRINCIPAL VENTILATION CAPACITY REQUIRED** 9.32.3.4(1)  

|              |             |            |
|--------------|-------------|------------|
| 1 Bedroom    | 31.8        | cfm        |
| 2 Bedroom    | 47.7        | cfm        |
| 3 Bedroom    | 63.6        | cfm        |
| 4 Bedroom    | 79.5        | cfm        |
| 5 Bedroom    | 95.4        | cfm        |
| <b>TOTAL</b> | <b>63.6</b> | <b>cfm</b> |

**SUPPLEMENTAL VENTILATION CAPACITY** 9.32.3.6.  

|                                 |       |     |
|---------------------------------|-------|-----|
| Total Ventilation Capacity      | 148.4 | cfm |
| Less Principal Ventil. Capacity | 63.6  | cfm |
| Required Supplemental Capacity  | 84.8  | cfm |

**PRINCIPAL EXHAUST FAN CAPACITY**  
Model: VANEE 65H Location: BSMT  
63.6 cfm 3.0 sones ☒ HVI Approved

**PRINCIPAL EXHAUST HEAT LOSS CALCULATION**  

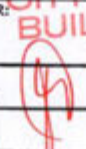
| CFM      | $\Delta T$ °F | FACTOR | % LOSS |
|----------|---------------|--------|--------|
| 63.6 CFM | 74 F          | 1.08   | 0.25   |

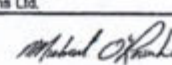
**SUPPLEMENTAL FANS** PANASONIC  

| Location | Model       | cfm | HVI | Sones |
|----------|-------------|-----|-----|-------|
| ENS      | FV-05-11VK1 | 50  | ✓   | 0.3   |
| BATH     | FV-05-11VK1 | 50  | ✓   | 0.3   |
| W/R      | FV-05-11VK1 | 50  | ✓   | 0.3   |

**HEAT RECOVERY VENTILATOR** 9.32.3.11.  
Model: VANEE 65H  
155 cfm high 64 cfm low  
75 % Sensible Efficiency @ 32 deg F ( 0 deg C) ☒ HVI Approved

**LOCATION OF INSTALLATION**  
Lot: Concession  
Township: Plan:  
Address:  
Roll # Building Permit #

**BUILDER:** GREENPARK HOMES  
Name:   
Address: **NOV 26 2018**  
City: **HVAC BY**  
Telephone #: **MONICA CRISAFULLI**
**INSTALLING CONTRACTOR**  
Name:  
Address:  
City:  
Telephone #: Fax #:

**DESIGNER CERTIFICATION**  
I hereby certify that this ventilation system has been designed in accordance with the Ontario Building Code.  
Name: HVAC Designs Ltd.  
Signature:   
HRAJ # 001820  
Date: August-18



**CSA F280-12 Residential Heat Loss and Heat Gain Calculations**
**Formula Sheet (For Air Leakage / Ventilation Calculation)**

LO#: 79583

Model: MILLWOOD 1

Builder: GREENPARK HOMES

Date: 8/8/2018

**Volume Calculation**
**House Volume**

| Level  | Floor Area (ft <sup>2</sup> ) | Floor Height (ft) | Volume (ft <sup>3</sup> ) |
|--------|-------------------------------|-------------------|---------------------------|
| Bsmt   | 992                           | 9                 | 8928                      |
| First  | 992                           | 10                | 9920                      |
| Second | 1202                          | 9                 | 10818                     |
| Third  | 0                             | 9                 | 0                         |
| Fourth | 0                             | 9                 | 0                         |
| Total: |                               |                   | 29,666.0 ft <sup>3</sup>  |
| Total: |                               |                   | 840.0 m <sup>3</sup>      |

**Air Change & Delta T Data**

|                                |       |
|--------------------------------|-------|
| WINTER NATURAL AIR CHANGE RATE | 0.354 |
| SUMMER NATURAL AIR CHANGE RATE | 0.115 |

**Design Temperature Difference**

|             | Tin °C | Tout °C | ΔT °C | ΔT °F |
|-------------|--------|---------|-------|-------|
| Winter DTDh | 22     | -19     | 41    | 74    |
| Summer DTDc | 24     | 30      | 6     | 11    |

**5.2.3.1 Heat Loss due to Air Leakage**

$$HL_{airb} = LR_{airh} \times \frac{V_b}{3.6} \times DTD_h \times 1.2$$

$$0.354 \times 233.35 \times 41^\circ\text{C} \times 1.2 = 4089 \text{ W}$$

$$= 13952 \text{ Btu/h}$$

**6.2.6 Sensible Gain due to Air Leakage**

$$HG_{salb} = LR_{airc} \times \frac{V_b}{3.6} \times DTD_c \times 1.2$$

$$0.115 \times 233.35 \times 6^\circ\text{C} \times 1.2 = 197 \text{ W}$$

$$= 672 \text{ Btu/h}$$

**5.2.3.2 Heat Loss due to Mechanical Ventilation**

$$HL_{vaib} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

$$64 \text{ CFM} \times 74^\circ\text{F} \times 1.08 \times 0.25 = 1274 \text{ Btu/h}$$

**6.2.7 Sensible heat Gain due to Ventilation**

$$HL_{vaib} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

$$64 \text{ CFM} \times 11^\circ\text{F} \times 1.08 \times 0.25 = 189 \text{ Btu/h}$$

**5.2.3.3 Calculation of Air Change Heat Loss for Each Room (Floor Multiplier Section)**

$$HL_{airr} = \text{Level Factor} \times HL_{airbv} \times \{ (HL_{agcr} + HL_{bgcr}) \div (HL_{agclevel} + HL_{bgclevel}) \}$$

| Level | Level Factor (LF) | HLairbv Air Leakage + Ventilation Heat Loss (Btu/h) | Level Conductive Heat Loss: (HL <sub>level</sub> ) | Air Leakage Heat Loss Multiplier (LF x HLairbv / HL <sub>level</sub> ) |
|-------|-------------------|-----------------------------------------------------|----------------------------------------------------|------------------------------------------------------------------------|
| 1     | 0.5               | 13,952                                              | 7,449                                              | 0.937                                                                  |
| 2     | 0.3               |                                                     | 10,289                                             | 0.407                                                                  |
| 3     | 0.2               |                                                     | 9,780                                              | 0.285                                                                  |
| 4     | 0                 |                                                     | 0                                                  | 0.000                                                                  |
| 5     | 0                 |                                                     | 0                                                  | 0.000                                                                  |

\*HLairbv = Air leakage heat loss + ventilation heat loss

\*For a balanced or supply only ventilation system HLairv = 0

CITY OF BRAMPTON  
BUILDING DIVISION  
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NOV 26 2018

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MONICA CRISAN

**HEAT LOSS AND GAIN SUMMARY SHEET****MODEL:** MILLWOOD 1**SFQT:** 2194**LO#** 79583**BUILDER:** GREENPARK HOMES**SITE:** MINNISSALE HOMES CORP**DESIGN ASSUMPTIONS**

|                      |    |                                |    |
|----------------------|----|--------------------------------|----|
| HEATING              | °F | COOLING                        | °F |
| OUTDOOR DESIGN TEMP. | -2 | OUTDOOR DESIGN TEMP.           | 86 |
| INDOOR DESIGN TEMP.  | 72 | INDOOR DESIGN TEMP. (MAX 75°F) | 75 |

**BUILDING DATA**

|                                     |                 |                           |          |
|-------------------------------------|-----------------|---------------------------|----------|
| ATTACHMENT:                         | DETACHED        | # OF STORIES (+BASEMENT): | 3        |
| FRONT FACES:                        | EAST            | ASSUMED (Y/N):            | Y        |
| AIR CHANGES PER HOUR:               | 3.57            | ASSUMED (Y/N):            | Y        |
| AIR TIGHTNESS CATEGORY:             | AVERAGE         | ASSUMED (Y/N):            | Y        |
| WIND EXPOSURE:                      | SHELTERED       | ASSUMED (Y/N):            | Y        |
| HOUSE VOLUME (ft³):                 | 29666.0         | ASSUMED (Y/N):            | Y        |
| INTERNAL SHADING:                   | BLINDS/CURTAINS | ASSUMED OCCUPANTS:        | 4        |
| INTERIOR LIGHTING LOAD (Btu/h/ft²): | 1.95            | DC BRUSHLESS MOTOR (Y/N): | Y        |
| FOUNDATION CONFIGURATION            | BCIN_1          | DEPTH BELOW GRADE:        | 6.0 ft   |
| LENGTH: 44.0 ft                     | WIDTH: 32.0 ft  | EXPOSED PERIMETER:        | 152.0 ft |

CITY OF BRAMPTON  
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MONICA CRISAN**2012 OBC - COMPLIANCE PACKAGE****Component****Compliance Package  
A1**

|                                                                            | Nominal | Min. Eff. |
|----------------------------------------------------------------------------|---------|-----------|
| Ceiling with Attic Space Minimum RSI (R)-Value                             | 60      | 59.22     |
| Ceiling Without Attic Space Minimum RSI (R)-Value                          | 31      | 27.65     |
| Exposed Floor Minimum RSI (R)-Value                                        | 31      | 29.80     |
| Walls Above Grade Minimum RSI (R)-Value                                    | 22      | 17.03     |
| Basement Walls Minimum RSI (R)-Value                                       | 20 ci   | 21.12     |
| Below Grade Slab Entire surface > 600 mm below grade Minimum RSI (R)-Value | -       | -         |
| Edge of Below Grade Slab ≤ 600 mm Below Grade Minimum RSI (R)-Value        | 10      | 10        |
| Heated Slab or Slab ≤ 600 mm below grade Minimum RSI (R)-Value             | 10      | 11.13     |
| Windows and Sliding Glass Doors Maximum U-Value                            | 0.28    | -         |
| Skylights Maximum U-Value                                                  | 0.49    | -         |
| Space Heating Equipment Minimum AFUE                                       | 0.96    | -         |
| HRV Minimum Efficiency                                                     | 75%     | -         |
| Domestic Hot Water Heater Minimum EF                                       | 0.8     | -         |

INDIVIDUAL BCIN: 19669

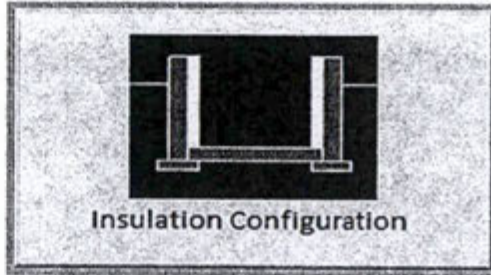
MICHAEL O'ROURKE

*Michael O'Rourke*



## Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

| Weather Station Description    |                                           |                                                                                                                 |
|--------------------------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Province:                      | Ontario                                   |                                                                                                                 |
| Region:                        | Brampton                                  |                                                                                                                 |
| Site Description               |                                           |                                                                                                                 |
| Soil Conductivity:             | Normal conductivity: dry sand, loam, clay |                                                                                                                 |
| Water Table:                   | Normal (7-10 m, 23-33 ft)                 |                                                                                                                 |
| Foundation Dimensions          |                                           |                                                                                                                 |
| Floor Length (m):              | 13.4                                      | <br>Insulation Configuration |
| Floor Width (m):               | 9.8                                       |                                                                                                                 |
| Exposed Perimeter (m):         | 0.0                                       |                                                                                                                 |
| Wall Height (m):               | 2.7                                       |                                                                                                                 |
| Depth Below Grade (m):         | 1.83                                      |                                                                                                                 |
| Window Area (m <sup>2</sup> ): | 0.9                                       |                                                                                                                 |
| Door Area (m <sup>2</sup> ):   | 1.9                                       |                                                                                                                 |
| Radiant Slab                   |                                           |                                                                                                                 |
| Heated Fraction of the Slab:   | 0                                         |                                                                                                                 |
| Fluid Temperature (°C):        | 33                                        |                                                                                                                 |
| Design Months                  |                                           |                                                                                                                 |
| Heating Month                  | 1                                         |                                                                                                                 |
| Foundation Loads               |                                           |                                                                                                                 |
| Heating Load (Watts):          | 1518                                      |                                                                                                                 |

TYPE: MILLWOOD 1  
LO# 79583CITY OF BRAMPTON  
BUILDING DIVISION  
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NOV 26 2018  
HVAC BY  
MONICA CRISAN

## Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

| Weather Station Description       |                            |                        |    |
|-----------------------------------|----------------------------|------------------------|----|
| Province:                         | Ontario                    |                        |    |
| Region:                           | Brampton                   |                        |    |
| Weather Station Location:         | Open flat terrain, grass   |                        |    |
| Anemometer height (m):            | 10                         |                        |    |
| Local Shielding                   |                            |                        |    |
| Building Site:                    | Suburban, forest           |                        |    |
| Walls:                            | Heavy                      |                        |    |
| Flue:                             | Heavy                      |                        |    |
| Highest Ceiling Height (m):       | 7.62                       |                        |    |
| Building Configuration            |                            |                        |    |
| Type:                             | Detached                   |                        |    |
| Number of Stories:                | Two                        |                        |    |
| Foundation:                       | Full                       |                        |    |
| House Volume (m <sup>3</sup> ):   | 840.0                      |                        |    |
| Air Leakage/Ventilation           |                            |                        |    |
| Air Tightness Type:               | Present (1961-) (3.57 ACH) |                        |    |
| Custom BDT Data:                  | ELA @ 10 Pa.               | 1119.8 cm <sup>2</sup> |    |
|                                   | 3.57                       | ACH @ 50 Pa            |    |
| Mechanical Ventilation (L/s):     | Total Supply               | Total Exhaust          |    |
|                                   | 30.0                       | 30.0                   |    |
| Flue Size                         |                            |                        |    |
| Flue #:                           | #1                         | #2                     | #3 |
| Diameter (mm):                    | 0                          | 0                      | 0  |
|                                   |                            |                        |    |
| Natural Infiltration Rates        |                            |                        |    |
| Heating Air Leakage Rate (ACH/H): | 0.354                      |                        |    |
| Cooling Air Leakage Rate (ACH/H): | 0.115                      |                        |    |

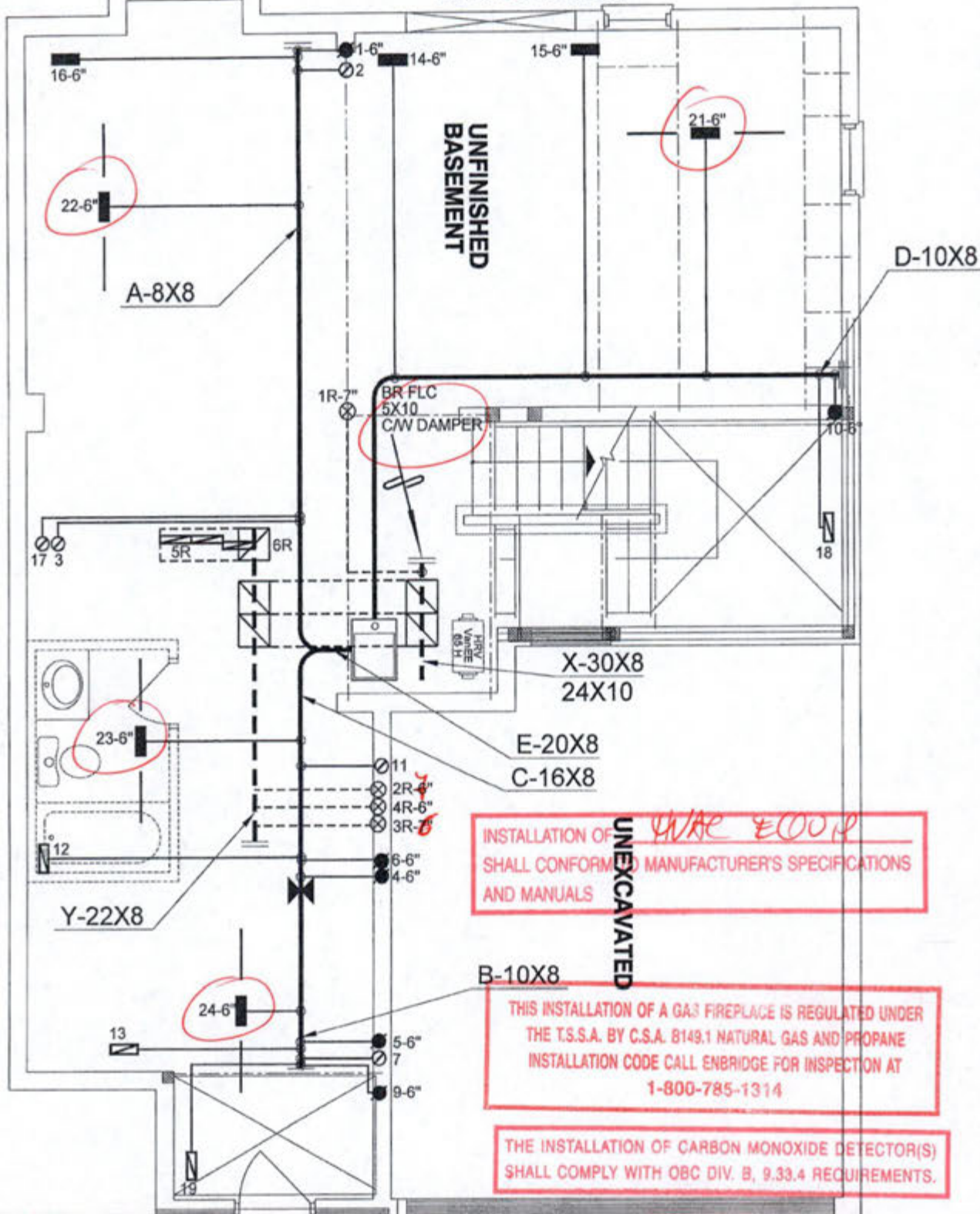
TYPE: MILLWOOD 1  
LO# 79583CITY OF BRAMPTON  
BUILDING DIVISION  
REVIEWED

NOV 26 2018

HVAC BY  
MONICA CRISAN



# WOD CONDITION



ENSURE THAT MIN THERMAL PERFORMANCE OF BLDG ENVELOPE AND EQUIPMENT SHALL CONFORM TO OBC SB-12, 3.1.1.2 TABLES REQUIREMENTS. FURNACE SHALL BE EQUIPPED WITH BRUSHLESS DIRECT CURRENT MOTOR OBC DIV B 12.3.1.5.

SEAL ALL DUCTWORK WITHIN UNCONDITIONED SPACE or OUTDOORS PER OBC DIV B6.2.4.3(11) REQUIREMENTS. SEAL ALL SUPPLY DUCTS LOCATED IN CONDITIONED SPACE IN COMPLIANCE WITH OBC DIV B6.2.4.3(12) REQUIREMENTS.

SEPARATE ANY INTAKES FROM BUILDING ENVELOPE PENETRATIONS THAT ARE POTENTIAL SOURCES OF CONTAMINANTS (GAS VENTS, OIL FILL PIPES, etc. BY MIN 900mm (2FT 11IN) - OBC Div B 9.32.3.12.

INSTALLATION OF KITCHEN EXHAUST DUCT LARGER THAN 6" dia SHALL BE PRECEDED BY APPLICATION FOR REVISION OF DESIGN PER OBC PART 6 REQUIREMENTS. EXHAUST FAN SHALL DISCHARGE DIRECTLY TO OUTSIDE. CLOTHES DRYER EXHAUST SYSTEM SHALL COMPLY WITH OBC DIV B 9.32.1.2, 9.32.1.3 & 9.32.3 REQ'S. BALANCE THE RETURN AIRFLOW ON THE UPPER FLOOR TO MATCH THE SUPPLY.

## ELEVATION 1-2

MECHANICAL VENTILATION SHALL BE PROVIDED IN CONFORMANCE WITH OBC DIV. B, 9.32.3 REQUIREMENT

WHEN HRV IS USED AS PRINCIPAL EXHAUST FAN, THE CONTROLLER SHALL BE WIRED TO THE HRV UNIT AND INTERCONNECTED TO THE FURNACE FAN. THE FURNACE BLOWER MUST BE IN OPERATION WHEN THE HRV IS IN OPERATION.

INSTALL ADDITIONAL S/A REGISTER AS REQUIRED IN ORDER TO ENSURE MIN 72degF - OBC DIV B 9.33.3.1(1).

UNDERCUT BY MIN 1" THE DOOR TO ANY ROOM WITHOUT RETURN AIR GRILLE. ENSURE RETURN AIR INTAKE SHALL BE CONNECTED TO THE MAIN R/A DUCT AT A HORIZONTAL DISTANCE OF MIN 6FT FROM THE CASING OF THE UNIT (HRAI DIGEST).

PROVIDE ADEQUATE VENTILATION AND COMBUSTION AIR FOR THE OPTIMUM OPERATION OF THE FURNACE PER MANUFACTURER'S RECOMMENDATIONS.

CITY OF BRAMPTON  
BUILDING DIVISION  
REVIEWED  
NOV 26 2018  
HVAC BY  
MONICA CRISAN

CSA-F280-12  
PACKAGE A1

1. I, MICHAEL CRISAN, HAVE REVIEWED AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM NOT PROVIDING UNDER DIVISION C, 3.3.3 OF THE BUILDING CODE.  
Michael Crisan, P.Eng. (2018)  
HVAC DESIGNER LTD.

| HVAC LEGEND |                                 |        |                                 |        |                             |        |                            |
|-------------|---------------------------------|--------|---------------------------------|--------|-----------------------------|--------|----------------------------|
| SYMBOL      | DESCRIPTION                     | SYMBOL | DESCRIPTION                     | SYMBOL | DESCRIPTION                 | SYMBOL | DESCRIPTION                |
|             | FLOOR SUPPLY AIR GRILLE         |        | 8" SUPPLY AIR BOOT ABOVE        |        | 14" RETURN AIR GRILLE       |        | RETURN AIR STACK ABOVE     |
|             | FLOOR SUPPLY AIR GRILLE 8" BOOT |        | SUPPLY AIR STACK FROM 2ND FLOOR |        | 30" RETURN AIR GRILLE       |        | RETURN AIR STACK 2ND FLOOR |
|             | SUPPLY AIR BOOT ABOVE           |        | 8" SUPPLY AIR STACK 2ND FLOOR   |        | FRA-FLOOR RETURN AIR GRILLE |        | REDUCER                    |

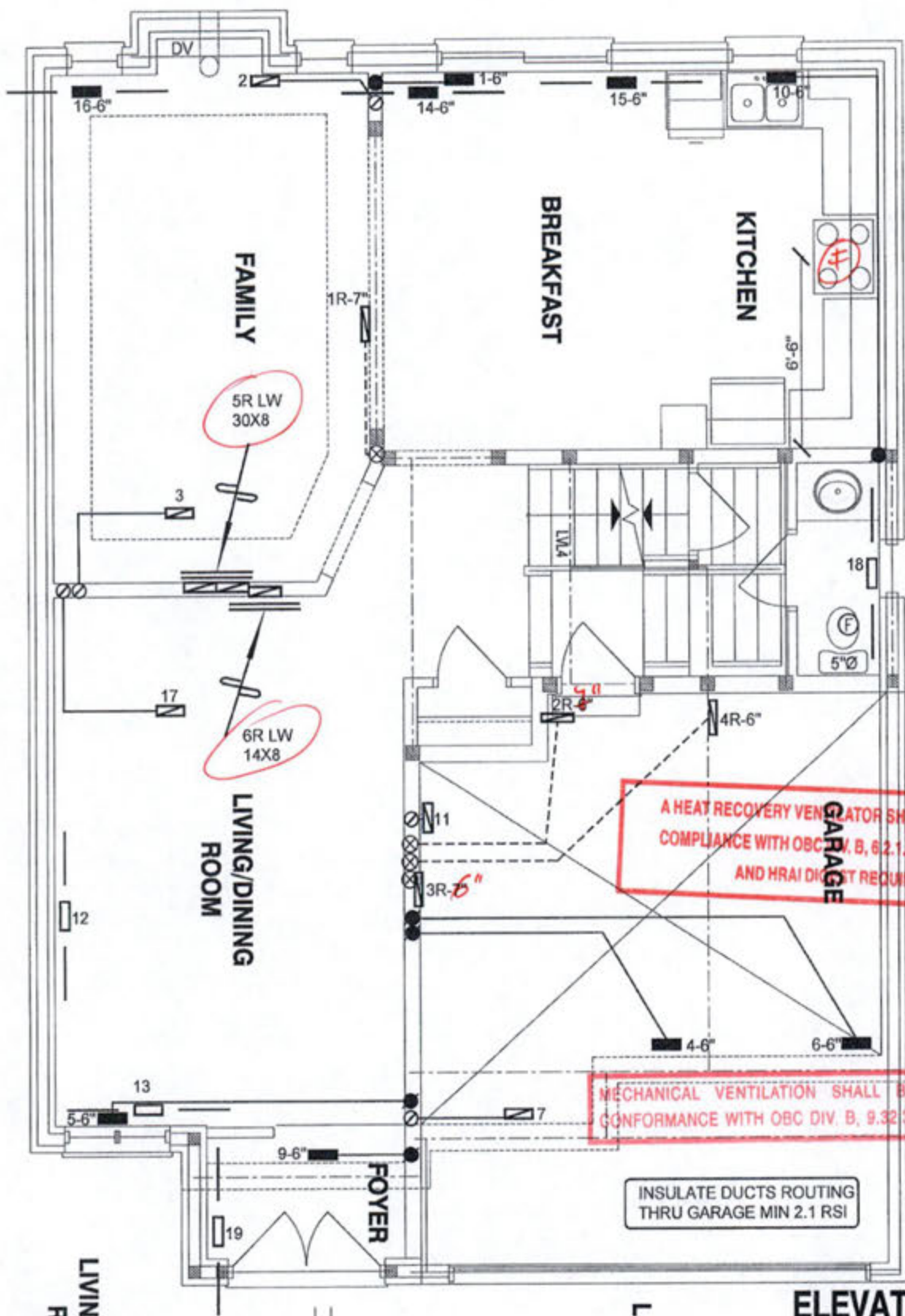
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Client  
**GREENPARK HOMES**  
Project Name  
**MINNISALE HOMES CORP.**  
**BRAMPTON, ONTARIO**  
**LOT 5**  
**MILLWOOD 1** 2194 sqft

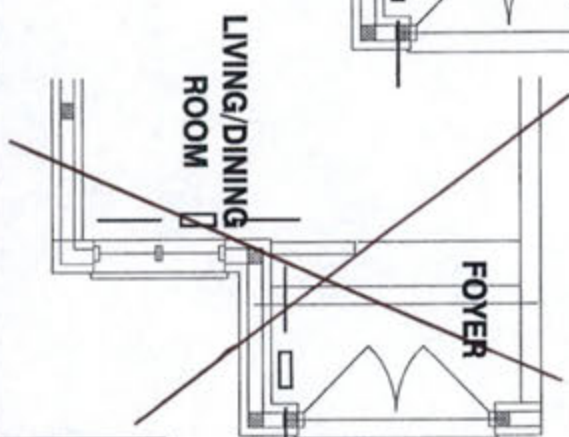
**HVAC DESIGNS LTD.**  
375 Finley Ave. Suite 202 - Ajax, Ontario  
L1S 2E2 Tel: 905.619.2300 - 905.420.5300 Fax 905.619.2375  
Email: info@hvacdsgns.ca  
Web: www.hvacdsgns.ca  
Specializing in Residential Mechanical Design Services  
Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

|                                |               |          |                                |
|--------------------------------|---------------|----------|--------------------------------|
| HEAT LOSS 43166 BTUH           | # OF RUNS S/A | R/A FANS | Sheet Title                    |
| UNIT DATA                      | 3RD FLOOR     |          | <b>BASEMENT HEATING LAYOUT</b> |
| MAKE GOODMAN                   | 2ND FLOOR     | 11 4 3   | Date AUG/2018                  |
| MODEL GMEC960603BNA            | 1ST FLOOR     | 7 2 2    | Scale 3/16" = 1'-0"            |
| INPUT 60 MBTUH                 | BASEMENT      | 4 1 0    | BCIN# 19669                    |
| OUTPUT 57.6 MBTUH              |               |          | LO# 79583                      |
| COOLING 2.5 TONS               |               |          |                                |
| FAN SPEED 1131 rpm @ 0.8" w.c. |               |          |                                |

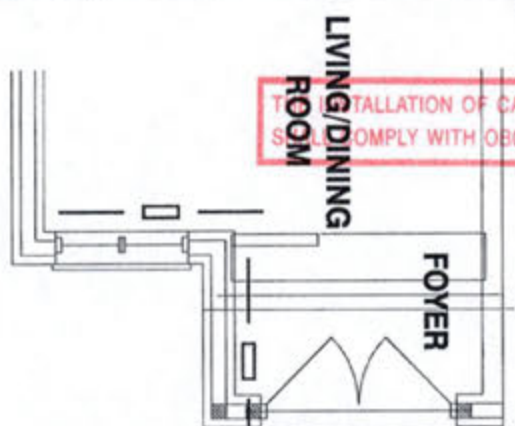




**ELEVATION 1**



**ELEVATION 2**



**ELEVATION 3**

**CSA-F280-12  
PACKAGE A1**

ENVIRONMENTAL ENGINEERING HAS REVIEWED  
AND TAKES RESPONSIBILITY FOR THE  
DESIGN WORK AND ANY OMISSIONS  
UNDER DIVISION C, 9.3.5 OF THE  
BUILDING CODE.  
*Michael Orsini, P.Eng. (2007)*  
HVAC DESIGN LTD.

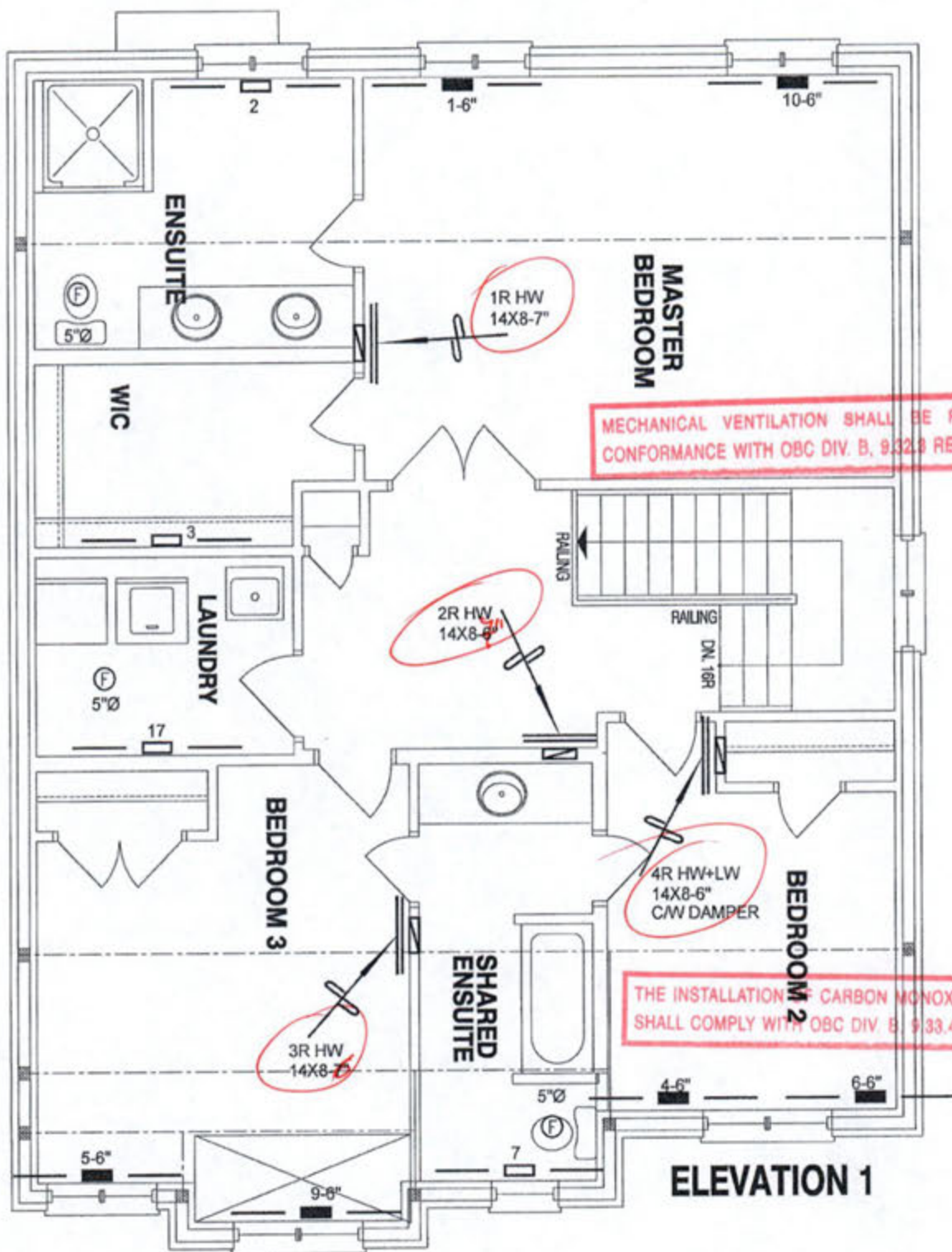
| HVAC LEGEND |                                 |        |                               |        |                             | REVISIONS |             |      |
|-------------|---------------------------------|--------|-------------------------------|--------|-----------------------------|-----------|-------------|------|
| SYMBOL      | DESCRIPTION                     | SYMBOL | DESCRIPTION                   | SYMBOL | DESCRIPTION                 | No.       | Description | Date |
| —           | FLOOR SUPPLY AIR GRILLE         | —      | 8" SUPPLY AIR BOOT ABOVE      | —      | 14" RETURN AIR GRILLE       | 3.        |             |      |
| —           | FLOOR SUPPLY AIR GRILLE 6" BOOT | —      | SUPPLY AIR STACK 2nd FLOOR    | —      | 30" RETURN AIR GRILLE       | 2.        |             |      |
| —           | SUPPLY AIR BOOT ABOVE           | —      | 6" SUPPLY AIR STACK 3rd FLOOR | —      | FRA-FLOOR RETURN AIR GRILLE | 1.        |             |      |
|             |                                 |        |                               |        |                             |           |             |      |

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|                                                                                                                   |  |                                                                                                                                                                                                                                                         |                                                                                                    |                                                                                       |                                                          |
|-------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------|
| Client<br><b>GREENPARK HOMES</b>                                                                                  |  | <b>HVACDESIGNS LTD.</b><br>375 Finley Ave. Suite 202 - Ajax, Ontario<br>L1G 2E2 Tel: 905.619.2300 - 905.420.5300 Fax 905.619.2375<br>Email: info@hvacdesigns.ca<br>Web: www.hvacdesigns.ca<br>Specializing in Residential Mechanical Design Services    | <b>CITY OF BRAMPTON<br/>BUILDING DIVISION<br/>REVIEWED</b><br><b>NOV 26 2018</b><br><b>HVAC BY</b> |  | Sheet Title<br><b>FIRST FLOOR<br/>HEATING<br/>LAYOUT</b> |
| Project Name<br><b>MINNISALE HOMES CORP.<br/>BRAMPTON, ONTARIO</b><br><b>LOT 5</b><br><b>MILLWOOD 1</b> 2194 sqft |  |                                                                                                                                                                                                                                                         |                                                                                                    |                                                                                       | Date<br><b>AUG/2018</b>                                  |
|                                                                                                                   |  | Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed. | Scale<br><b>3/16" = 1'-0"</b>                                                                      | BCIN# 19669                                                                           |                                                          |
|                                                                                                                   |  |                                                                                                                                                                                                                                                         |                                                                                                    | LO# 79583                                                                             |                                                          |

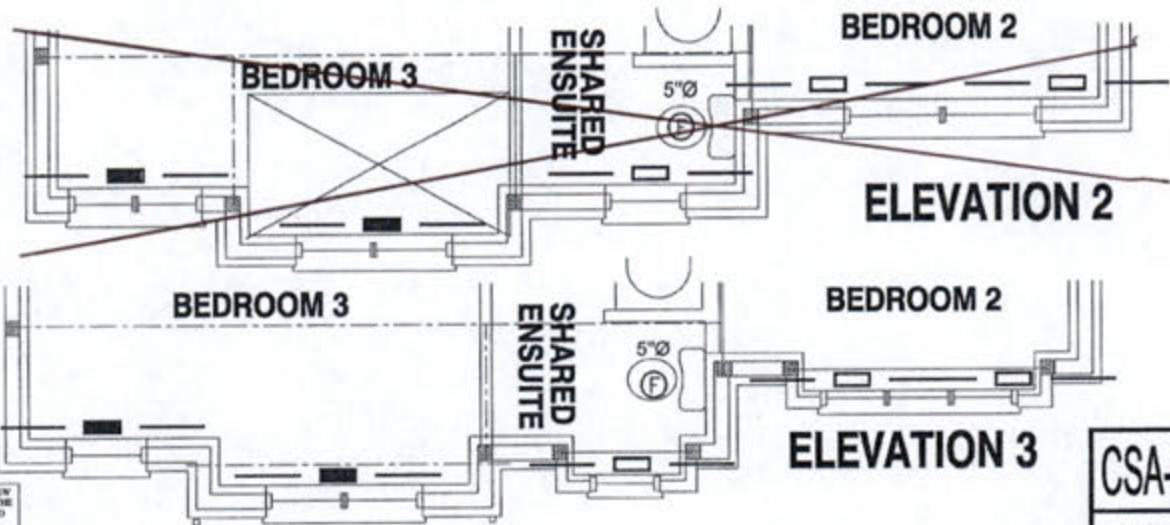
2194 sqft





MECHANICAL VENTILATION SHALL BE PROVIDED IN CONFORMANCE WITH OBC DIV. B, 9.32.3 REQUIREMENTS.

THE INSTALLATION OF CARBON MONOXIDE DETECTOR(S) SHALL COMPLY WITH OBC DIV. B, 9.33.4 REQUIREMENTS.



I HEREBY CERTIFY THAT I HAVE REVIEWED AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.1.1 OF THE BUILDING CODE.  
Michael O'Sullivan, 2019 1009  
HVAC DESIGNS LTD.

CSA-F280-12  
PACKAGE A1

| HVAC LEGEND |                            |        |                                    |        |                              | REVISIONS |             |      |
|-------------|----------------------------|--------|------------------------------------|--------|------------------------------|-----------|-------------|------|
| SYMBOL      | DESCRIPTION                | SYMBOL | DESCRIPTION                        | SYMBOL | DESCRIPTION                  | No.       | Description | Date |
|             | FLOOR SUPPLY AIR GRILLE 6" |        | 6" SUPPLY AIR STACK ABOVE          |        | 14"x8" RETURN AIR GRILLE     | 3.        |             |      |
|             | FLOOR SUPPLY AIR GRILLE 6" |        | 6" SUPPLY AIR STACK FROM 2nd FLOOR |        | 20"x8" RETURN AIR GRILLE     | 2.        |             |      |
|             | 6" SUPPLY AIR STACK ABOVE  |        | 6" SUPPLY AIR STACK 2nd FLOOR      |        | FRA- FLOOR RETURN AIR GRILLE | 1.        |             |      |
|             |                            |        |                                    |        | REDUCER                      | No.       |             |      |

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Client  
**GREENPARK HOMES**  
Project Name  
**MINNISALE HOMES CORP.**  
**BRAMPTON, ONTARIO**  
**LOT 5**  
**MILLWOOD 1** 2194 sqft

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**CITY OF BRAMPTON**  
**BUILDING DIVISION**  
**REVIEWED**  
**NOV 26 2018**  
**HVAC BY**  
**MONICA CRISAN**

Sheet Title  
**SECOND FLOOR**  
**HEATING**  
**LAYOUT**  
Date  
**AUG/2018**  
Scale  
**3/16" = 1'-0"**  
BCIN# 19669  
LO# 79583