HVAC DESIGNS LTD.

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Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

SITE NAME: LAMBERT'S LANE PH.2
BUILDER: GREENPARK HOMES
TYPE: PRESTON 2
GFA: 2835
DATE: Feb-19
LO# 81349
WINTER NATURAL AIR CHANGE RATE 0.242
SUMMER NATURAL AIR CHANGE RATE 0.079
HEAT LOSS ΔT °F. 74
HEAT GAIN ΔT °F. 11
CSA-F280-12
ENERGYSTAR

| ROOM USE | | | MBR | | | ENS | | | WIC | | | BED-2 | | | BED-3 | | | BED-4 | | | BATH | | | ENS-2 | | | LIBR | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EXP. WALL | | | 33 | | | 24 | | | 6 | | | 13 | | | 29 | | | 17 | | | 7 | | | 10 | | | 10 | | |
| CLG. HT. | | | 8 | | | 8 | | | 8 | | | 8 | | | 8 | | | 8 | | | 8 | | | 8 | | | 10 | | |
| | FACTORS | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRS.WALL AREA | LOSS | GAIN | 267 | | | 194 | | | 48 | | | 105 | | | 234 | | | 137 | | | 57 | | | 81 | | | 100 | | |
| GLAZING | | | LOSS | GAIN | | LOSS | GAIN | | LOSS | GAIN | | LOSS | GAIN | | LOSS | GAIN | | LOSS | GAIN | | LOSS | GAIN | | LOSS | GAIN | | LOSS | GAIN | |
| NORTH | 18.6 | 15.1 | 0 | 0 | 0 | 8 | 148 | 121 | 0 | 0 | 0 | 16 | 297 | 242 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 130 | 106 | 0 | 0 | 0 | 0 | 0 | 0 |
| EAST | 18.6 | 40.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 557 | 1222 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SOUTH | 18.6 | 24.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 445 | 578 | 0 | 0 | 0 | 7 | 130 | 168 | 14 | 260 | 337 |
| WEST | 18.6 | 40.7 | 32 | 594 | 1303 | 14 | 260 | 570 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SKYLT. | 31.2 | 99.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DOORS | 24.7 | 3.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NET EXPOSED WALL | 3.5 | 0.5 | 235 | 825 | 122 | 172 | 605 | 90 | 48 | 171 | 25 | 89 | 313 | 46 | 204 | 719 | 107 | 113 | 399 | 59 | 50 | 174 | 26 | 74 | 260 | 38 | 86 | 302 | 45 |
| NET EXPOSED BSMT WALL ABOVE GR | 3.5 | 0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EXPOSED CLG | 1.3 | 0.6 | 272 | 341 | 182 | 144 | 180 | 80 | 72 | 90 | 40 | 169 | 212 | 94 | 204 | 256 | 114 | 240 | 301 | 134 | 59 | 74 | 33 | 160 | 201 | 89 | 0 | 0 | 0 |
| NO ATTIC EXPOSED CLG | 2.7 | 1.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 86 | 38 | 0 | 0 | 0 | 0 | 0 | 0 |
| EXPOSED FLOOR | 2.5 | 0.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 204 | 508 | 75 | 0 | 0 | 0 | 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 | | | 1760 | | | 1193 | | | 261 | | | 822 | | | 2039 | | | 1145 | | | 464 | | | 590 | | | 562 | | |
| SUB TOTAL HT GAIN | | | | | 1577 | | | 861 | | | 55 | | | 383 | | | 1517 | | | 770 | | | 203 | | | 296 | | | 382 |
| LEVEL FACTOR / MULTIPLIER | | | 0.20 | 0.23 | | 0.20 | 0.23 | | 0.20 | 0.23 | | 0.20 | 0.23 | | 0.20 | 0.23 | | 0.20 | 0.23 | | 0.20 | 0.23 | | 0.20 | 0.23 | | 0.30 | 0.37 | |
| AIR CHANGE HEAT LOSS | | | 409 | | | 278 | | | 61 | | | 191 | | | 474 | | | 266 | | | 108 | | | 137 | | | 207 | | |
| AIR CHANGE HEAT GAIN | | | | | 88 | | | 48 | | | 4 | | | 21 | | | 85 | | | 43 | | | 11 | | | 17 | | | 21 |
| DUCT LOSS | | | 0 | | | 0 | | | 0 | | | 0 | | | 251 | | | 0 | | | 0 | | | 0 | | | 0 | | |
| DUCT GAIN | | | | | 0 | | | 0 | | | 0 | | | 0 | | | 238 | | | 0 | | | 0 | | | 0 | | | 0 |
| HEAT GAIN PEOPLE | 240 | | 2 | | 480 | 0 | | 0 | 0 | | 0 | 1 | | 240 | 1 | | 240 | 1 | | 240 | 0 | | 0 | | | 0 | | | 0 |
| HEAT GAIN APPLIANCES/LIGHTS | | | | | 541 | | | 0 | | | 0 | | | 541 | | | 541 | | | 541 | | | 0 | 0 | | 0 | 0 | | 0 |
| TOTAL HT LOSS BTU/H | | | 2169 | | | 1471 | | | 321 | | | 1013 | | | 2764 | | | 1411 | | | 572 | | | 727 | | | 770 | | |
| TOTAL HT GAIN x 1.3 BTU/H | | | | 3491 | | | 1182 | | | 90 | | | 1540 | | | 3407 | | | 2072 | | | 278 | | | 1109 | | | 1227 |

| ROOM USE | | | LIV | | | DIN | | | KIT | | | FAM | | | LAUN | | | W/R | | | FOY | | | MUD | | | WOD | | | BAS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EXP. WALL | | | 11 | | | 12 | | | 34 | | | 35 | | | 42 | | | 12 | | | 34 | | | 23 | | | 40 | | | 176 | | |
| CLG. HT. | | | 10 | | | 10 | | | 10 | | | 10 | | | 8 | | | 10 | | | 10 | | | 10 | | | 9 | | | 9 | | |
| | FACTORS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRS.WALL AREA | LOSS | GAIN | 110 | | | 120 | | | 340 | | | 350 | | | 339 | | | 120 | | | 340 | | | 230 | | | 360 | | | 1176 | | |
| GLAZING | | | LOSS | GAIN | | LOSS | GAIN | | LOSS | GAIN | | LOSS | GAIN | | LOSS | GAIN | | LOSS | GAIN | | LOSS | GAIN | | LOSS | GAIN | | LOSS | GAIN | | LOSS | GAIN | |
| NORTH | 18.6 | 15.1 | 20 | 371 | 303 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EAST | 18.6 | 40.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 557 | 1222 | 0 | 0 | 0 | 6 | 111 | 244 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SOUTH | 18.6 | 24.1 | 0 | 0 | 0 | 20 | 371 | 481 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 148 | 193 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 167 | 217 |
| WEST | 18.6 | 40.7 | 0 | 0 | 0 | 0 | 0 | 0 | 56 | 1039 | 2280 | 34 | 631 | 1384 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 223 | 489 | 0 | 0 | 0 |
| SKYLT. | 31.2 | 99.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DOORS | 24.7 | 3.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NET EXPOSED WALL | 3.5 | 0.5 | 90 | 316 | 47 | 100 | 352 | 52 | 284 | 999 | 148 | 316 | 1111 | 165 | 308 | 1088 | 161 | 112 | 394 | 58 | 294 | 1034 | 153 | 210 | 738 | 109 | 0 | 0 | 0 | 20 | 493 | 73 |
| NET EXPOSED BSMT WALL ABOVE GR | 3.5 | 0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EXPOSED CLG | 1.3 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 185 | 232 | 103 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 | 801 | 113 | 408 | 1433 | 213 |
| NO ATTIC EXPOSED CLG | 2.7 | 1.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 27 | 12 | 36 | 96 | 43 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EXPOSED FLOOR | 2.5 | 0.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BASEMENT/CRAWL HEAT LOSS | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | | | | | | |
| SLAB ON GRADE HEAT LOSS | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | | | | | | |
| SUBTOTAL HT LOSS | | | 587 | | | 723 | | | 2038 | | | 1769 | | | 1973 | | | 542 | | | 2131 | | | 1232 | | | | | | 6094 | | |
| SUB TOTAL HT GAIN | | | | | 350 | | | 533 | | | 2428 | | | 1561 | | | 1529 | | | 251 | | | 544 | | | 1024 | | | 8188 | | |
| LEVEL FACTOR / MULTIPLIER | | | 0.30 | 0.37 | | 0.30 | 0.37 | | 0.30 | 0.37 | | 0.30 | 0.37 | | 0.20 | 0.23 | | 0.30 | 0.37 | | 0.30 | 0.37 | | 0.30 | 0.37 | | | | 607 | | | 502 |
| AIR CHANGE HEAT LOSS | | | 254 | | | 267 | | | 752 | | | 653 | | | 459 | | | 200 | | | 787 | | | 455 | | | | | | 0.50 | 0.65 | |
| AIR CHANGE HEAT GAIN | | | | | 19 | | | 30 | | | 135 | | | 87 | | | 85 | | | 14 | | | 30 | | | | | | | 5957 | |
| DUCT LOSS | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | | | | | | 62 |
| DUCT GAIN | | | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | | | | | | |
| HEAT GAIN PEOPLE | 240 | | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | | 0 | | | | | | 0 |
| HEAT GAIN APPLIANCES/LIGHTS | | | | | 541 | | | 541 | | | 541 | | | 541 | | | 541 | | | 0 | | | 541 | | | | | | | | | 541 |
| TOTAL HT LOSS BTU/H | | | 941 | | | 989 | | | 2790 | | | 2422 | | | 2432 | | | 742 | | | 2918 | | | 1686 | | | 1024 | | | 14145 | | |
| TOTAL HT GAIN x 1.3 BTU/H | | | | 1183 | | | 1435 | | | 4036 | | | 2845 | | | 2801 | | | 344 | | | 746 | | | 954 | | | 790 | | | 1436 |

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TOTAL HEAT GAIN BTU/H: 31203
TONS: 2.60
LOSS DUE TO VENTILATION LOAD BTU/H: 1593
STRUCTURAL HEAT LOSS: 41308
TOTAL COMBINED HEAT LOSS BTU/H: 42901

THIS STRUCTURE MUST BE CONSTRUCTED TO MEET OR EXCEED THE PROVISIONS OF THE ONTARIO BUILDING CODE

I REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED IN THE APPROPRIATE CATEGORY AS AN "OTHER DESIGNER" UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke

INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

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SITE NAME: LAMBERT'S LANE PH.2
BUILDER: GREENPARK HOMES

TYPE: PRESTON 2 DATE: Feb-19 GFA: 2835 LO# 81349

| | | | |
|---|---|---|---|
| HEATING CFM | 1131 | COOLING CFM | 1131 |
| TOTAL HEAT LOSS | 41,308 | TOTAL HEAT GAIN | 30,967 |
| AIR FLOW RATE CFM | 27.38 | AIR FLOW RATE CFM | 36.52 |

| | | | | | |
|---|---|---|---|---|---|
| furnace pressure | 0.6 | | | | |
| furnace filter | 0.05 | | | | |
| a/c coil pressure | 0.2 | | | | |
| available pressure for s/a & r/a | 0.35 | | | | |
| plenum pressure s/a | 0.18 | r/a pressure | 0.17 | | |
| max s/a dif press. loss | 0.02 | r/a grille press. Loss | 0.02 | | |
| min adjusted pressure s/a | 0.16 | adjusted pressure r/a | 0.15 | | |

#GOODMAN
GMEC960603BNA 60
FAN SPEED
LOW
MEDLOW
MEDIUM
MEDIUM HIGH
HIGH 1131

AFUE = 96 %
INPUT (BTU/H) = 60,000
OUTPUT (BTU/H) = 57,600
DESIGN CFM = 1131 CFM @ .6 " E.S.P.
TEMPERATURE RISE 47 °F

| RUN COUNT | 4th | 3rd | 2nd | 1st | Bas |
|---|---|---|---|---|---|
| S/A | 0 | 0 | 11 | 10 | 4 |
| R/A | 0 | 0 | 4 | 3 | 1 |

All S/A diffusers 4"x10" unless noted otherwise on layout.
All S/A runs 5"Ø unless noted otherwise on layout.

| RUN # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ROOM NAME | MBR | ENS | WIC | BED-2 | BED-3 | BED-4 | BATH | BED-3 | MBR | ENS-2 | LIV | DIN | KIT | KIT | FAM | LAUN | W/R | FOY | MUD | BAS | BAS | BAS | BAS |
| RM LOSS MBH. | 1.08 | 1.47 | 0.32 | 1.01 | 1.38 | 1.41 | 0.57 | 1.38 | 1.08 | 0.73 | 0.94 | 0.99 | 1.39 | 1.39 | 1.21 | 2.43 | 0.74 | 2.92 | 1.69 | 3.79 | 3.79 | 3.79 | 3.79 |
| CFM PER RUN HEAT | 30 | 40 | 9 | 28 | 38 | 39 | 16 | 38 | 30 | 20 | 26 | 27 | 38 | 38 | 33 | 67 | 20 | 80 | 46 | 104 | 104 | 104 | 104 |
| RM GAIN MBH. | 1.75 | 1.18 | 0.09 | 1.54 | 1.70 | 2.07 | 0.28 | 1.70 | 1.75 | 1.11 | 1.18 | 1.44 | 2.02 | 2.02 | 1.42 | 2.80 | 0.34 | 0.75 | 0.95 | 0.56 | 0.56 | 0.56 | 0.56 |
| CFM PER RUN COOLING | 64 | 43 | 3 | 56 | 62 | 76 | 10 | 62 | 64 | 41 | 43 | 52 | 74 | 74 | 52 | 102 | 13 | 27 | 35 | 20 | 20 | 20 | 20 |
| ADJUSTED PRESSURE | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.16 | 0.17 | 0.17 | 0.17 | 0.16 | 0.16 | 0.16 | 0.16 |
| ACTUAL DUCT LGH. | 52 | 59 | 38 | 46 | 55 | 46 | 46 | 64 | 45 | 49 | 34 | 27 | 39 | 29 | 34 | 51 | 60 | 53 | 31 | 39 | 32 | 25 | 54 |
| EQUIVALENT LENGTH | 150 | 160 | 160 | 210 | 190 | 190 | 190 | 190 | 190 | 190 | 210 | 190 | 170 | 140 | 190 | 190 | 190 | 190 | 170 | 150 | 210 | 220 | 210 |
| TOTAL EFFECTIVE LENGTH | 202 | 219 | 198 | 256 | 245 | 236 | 236 | 254 | 235 | 239 | 244 | 217 | 209 | 169 | 224 | 241 | 250 | 243 | 201 | 189 | 242 | 245 | 264 |
| ADJUSTED PRESSURE | 0.09 | 0.08 | 0.09 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.08 | 0.08 | 0.1 | 0.08 | 0.07 | 0.07 | 0.07 | 0.09 | 0.09 | 0.07 | 0.07 | 0.06 |
| ROUND DUCT SIZE | 5 | 5 | 4 | 5 | 6 | 6 | 4 | 6 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 4 | 6 | 4 | 6 | 6 | 6 | 6 |
| HEATING VELOCITY (ft/min) | 220 | 294 | 103 | 206 | 194 | 199 | 184 | 194 | 220 | 147 | 191 | 198 | 279 | 279 | 242 | 342 | 229 | 408 | 528 | 530 | 530 | 530 | 530 |
| COOLING VELOCITY (ft/min) | 470 | 316 | 34 | 411 | 316 | 388 | 115 | 316 | 470 | 301 | 316 | 382 | 543 | 543 | 382 | 520 | 149 | 138 | 402 | 102 | 102 | 102 | 102 |
| OUTLET GRILL SIZE | 3X10 | 3X10 | 3X10 | 3X10 | 4X10 | 4X10 | 3X10 | 4X10 | 3X10 | 3X10 | 3X10 | 3X10 | 3X10 | 3X10 | 3X10 | 4X10 | 3X10 | 4X10 | 3X10 | 4X10 | 4X10 | 4X10 | 4X10 |
| TRUNK | D | C | D | B | B | B | B | B | C | D | B | B | C | C | C | A | A | A | B | D | C | B | A |

| RUN # | 26 | 27 |
|---|---|---|
| ROOM NAME | FAM | LIBR |
| RM LOSS MBH. | 1.21 | 0.77 |
| CFM PER RUN HEAT | 33 | 21 |
| RM GAIN MBH. | 1.42 | 1.23 |
| CFM PER RUN COOLING | 52 | 45 |
| ADJUSTED PRESSURE | 0.17 | 0.17 |
| ACTUAL DUCT LGH. | 44 | 39 |
| EQUIVALENT LENGTH | 160 | 190 |
| TOTAL EFFECTIVE LENGTH | 204 | 229 |
| ADJUSTED PRESSURE | 0.08 | 0.08 |
| ROUND DUCT SIZE | 5 | 5 |
| HEATING VELOCITY (ft/min) | 242 | 154 |
| COOLING VELOCITY (ft/min) | 382 | 330 |
| OUTLET GRILL SIZE | 3X10 | 3X10 |
| TRUNK | C | B |

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FILE NO

SUPPLY AIR TRUNK SIZE

| | TRUNK CFM | STATIC PRESS. | ROUND DUCT | RECT DUCT | | | VELOCITY (ft/min) | | TRUNK CFM | STATIC PRESS. | ROUND DUCT | RECT DUCT | | | VELOCITY (ft/min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TRUNK A | 271 | 0.06 | 9.2 | 10 | x | 8 | 488 | TRUNK G | 0 | 0.00 | 0 | 0 | x | 8 | 0 |
| TRUNK B | 654 | 0.06 | 12.9 | 20 | x | 8 | 589 | TRUNK H | 0 | 0.00 | 0 | 0 | x | 8 | 0 |
| TRUNK C | 316 | 0.07 | 9.4 | 12 | x | 8 | 474 | TRUNK I | 0 | 0.00 | 0 | 0 | x | 8 | 0 |
| TRUNK D | 479 | 0.07 | 11 | 14 | x | 8 | 616 | TRUNK J | 0 | 0.00 | 0 | 0 | x | 8 | 0 |
| TRUNK E | 1133 | 0.06 | 15.8 | 28 | x | 8 | 728 | TRUNK K | 0 | 0.00 | 0 | 0 | x | 8 | 0 |
| TRUNK F | 0 | 0.00 | 0 | 0 | x | 8 | 0 | TRUNK L | 0 | 0.00 | 0 | 0 | x | 8 | 0 |

RETURN AIR TRUNK SIZE

| | TRUNK CFM | STATIC PRESS. | ROUND DUCT | RECT DUCT | | | VELOCITY (ft/min) |
|---|---|---|---|---|---|---|---|
| TRUNK O | 0 | 0.05 | 0 | 0 | x | 8 | 0 |
| TRUNK P | 0 | 0.05 | 0 | 0 | x | 8 | 0 |
| TRUNK Q | 0 | 0.05 | 0 | 0 | x | 8 | 0 |
| TRUNK R | 0 | 0.05 | 0 | 0 | x | 8 | 0 |
| TRUNK S | 0 | 0.05 | 0 | 0 | x | 8 | 0 |
| TRUNK T | 0 | 0.05 | 0 | 0 | x | 8 | 0 |
| TRUNK U | 0 | 0.05 | 0 | 0 | x | 8 | 0 |
| TRUNK V | 0 | 0.05 | 0 | 0 | x | 8 | 0 |
| TRUNK W | 0 | 0.05 | 0 | 0 | x | 8 | 0 |
| TRUNK X | 1131 | 0.05 | 16.5 | 32 | x | 8 | 636 |
| TRUNK Y | 440 | 0.05 | 11.6 | 16 | x | 8 | 495 |
| TRUNK Z | 0 | 0.05 | 0 | 0 | x | 8 | 0 |
| DROP | 1131 | 0.05 | 16.5 | 24 | x | 10 | 679 |

| RETURN AIR # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | BR |
| AIR VOLUME | 155 | 155 | 85 | 85 | 135 | 135 | 175 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 206 |
| 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 |
| ACTUAL DUCT LGH. | 45 | 42 | 66 | 69 | 60 | 39 | 39 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 14 |
| EQUIVALENT LENGTH | 180 | 175 | 185 | 185 | 265 | 145 | 145 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 175 |
| TOTAL EFFECTIVE LH | 225 | 217 | 251 | 254 | 325 | 184 | 184 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 189 |
| ADJUSTED PRESSURE | 0.07 | 0.07 | 0.06 | 0.06 | 0.05 | 0.08 | 0.08 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 14.80 | 0.08 |
| ROUND DUCT SIZE | 7.2 | 7.2 | 6 | 6 | 7.5 | 6.6 | 7.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7.8 |
| INLET GRILL SIZE | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 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 |
| INLET GRILL SIZE | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 |

I REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED IN THE APPROPRIATE CATEGORY AS AN "OTHER DESIGNER" UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

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TYPE: PRESTON 2
SITE NAME: LAMBERT'S LANE PH.2

LO # 81349

# 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 | 3 | @ 10.6 cfm | 31.8 | cfm |
| Kitchen & Bathrooms | 4 | @ 10.6 cfm | 42.4 | cfm |
| Other Rooms | 8 | @ 10.6 cfm | 84.8 | cfm |
| Table 9.32.3.A. | | TOTAL | 201.4 | 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 |
| | TOTAL | 79.5 | cfm |

**SUPPLEMENTAL VENTILATION CAPACITY** 9.32.3.5.

| | | |
|---|---|---|
| Total Ventilation Capacity | 201.4 | cfm |
| Less Principal Ventil. Capacity | 79.5 | cfm |
| Required Supplemental Capacity | 121.9 | cfm |

**PRINCIPAL EXHAUST FAN CAPACITY**

Model: VANEE 65H Location: BSMT

79.5 cfm 3.0 sones [✓] HVI Approved

**PRINCIPAL EXHAUST HEAT LOSS CALCULATION**

| CFM | | ΔT °F | | FACTOR | | % LOSS |
|---|---|---|---|---|---|---|
| 79.5 CFM | X | 74 F | X | 1.08 | X | 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:

City:

Telephone #: Fax #:

**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: Michael O'Rourke

HRAI # 001820

Date: June 6/19

I REVIEW AND TAKE RESPONIBILITY FOR THE DESIGN WORK AND AM QUALIFIED IN THE APPROPRIATE CATEGORY AS AN "OTHER DESIGNER" UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

INDIVIDUAL BCIN: 19669 Michael O'Rourke MICHAEL O'ROURKE

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HVAC DESIGNS LTD.

375 Finley Ave. Suite 202 Ajax, ON L1S 2E2
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# CSA F280-12 Residential Heat Loss and Heat Gain Calculations

## Formula Sheet (For Air Leakage / Ventilation Calculation)

LO#: 81349 Model: PRESTON 2 Builder: GREENPARK HOMES Date: 2/4/2019

### Volume Calculation

House Volume

| Level | Floor Area ($ft^2$) | Floor Height (ft) | Volume ($ft^3$) |
|---|---|---|---|
| Bsmt | 1300 | 9 | 11700 |
| First | 1300 | 10 | 13000 |
| Second | 1535 | 8 | 12407.405 |
| Third | 0 | 9 | 0 |
| Fourth | 0 | 9 | 0 |
| | | Total: | 37,107.4 $ft^3$ |
| | | Total: | 1050.8 $m^3$ |

### Air Change & Delta T Data

| | |
|---|---|
| WINTER NATURAL AIR CHANGE RATE | 0.242 |
| SUMMER NATURAL AIR CHANGE RATE | 0.079 |

| 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

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

0.242 x 291.88 x 41 °C x 1.2 = 3492 W

= 11915 Btu/h

### 6.2.6 Sensible Gain due to Air Leakage

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

= 0.079 x 291.88 x 6 °C x 1.2 = 168 W

= 574 Btu/h

### 5.2.3.2 Heat Loss due to Mechanical Ventilation

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

80 CFM x 74 °F x 1.08 x 0.25 = 1593 Btu/h

### 6.2.7 Sensible heat Gain due to Ventilation

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

80 CFM x 11 °F x 1.08 x 0.25 = 236 Btu/h

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

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

| Level | Level Factor (LF) | HLairve Air Leakage + Ventilation Heat Loss (Btu/h) | Level Conductive Heat Loss: ($HL_{clevel}$) | Air Leakage Heat Loss Multiplier (LF x HLairbv / HLlevel) |
|---|---|---|---|---|
| 1 | 0.5 | 11,915 | 9,211 | 0.647 |
| 2 | 0.3 | | 9,684 | 0.369 |
| 3 | 0.2 | | 10,247 | 0.233 |
| 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 HLairve = 0

THIS STRUCTURE MUST BE CONSTRUCTED TO MEET OR EXCEED THE PROVISIONS OF THE ONTARIO BUILDING CODE

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# HEAT LOSS AND GAIN SUMMARY SHEET

**MODEL:** PRESTON 2
**SFQT:** 2835 **LO#** 81349
**BUILDER:** GREENPARK HOMES
**SITE:** LAMBERT'S LANE PH.2

## 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: | 2.50 | ASSUMED (Y/N): | Y |
| AIR TIGHTNESS CATEGORY: | TIGHT | ASSUMED (Y/N): | Y |
| WIND EXPOSURE: | SHELTERED | ASSUMED (Y/N): | Y |
| HOUSE VOLUME ($ft^3$): | 37107.4 | ASSUMED (Y/N): | Y |
| INTERNAL SHADING: | BLINDS/CURTAINS | ASSUMED OCCUPANTS: | 5 |
| INTERIOR LIGHTING LOAD ($Btu/h/ft^2$): | 1.70 | DC BRUSHLESS MOTOR (Y/N): | Y |
| FOUNDATION CONFIGURATION | BCIN_1 | DEPTH BELOW GRADE: | 6.0 ft |
| LENGTH: 57.0 ft | WIDTH: 31.0 ft | EXPOSED PERIMETER: | 176.0 ft |

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| 2012 OBC - COMPLIANCE PACKAGE | Compliance Package ENERGYSTAR | |
|---|---|---|
| **Component** | **Nominal** | **Min. Eff.** |
| Ceiling with Attic Space Minimum RSI (R)-Value | 60 | 59.20 |
| Ceiling Without Attic Space Minimum RSI (R)-Value | 31 | 27.70 |
| Exposed Floor Minimum RSI (R)-Value | 31 | 29.80 |
| Walls Above Grade Minimum RSI (R)-Value | R22+R5 | 21.10 |
| Basement Walls Minimum RSI (R)-Value | 20 | 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 | ZONE 2 | - |
| Skylights Maximum U-Value | ZONE 2 | - |
| Space Heating Equipment Minimum AFUE | 0.96 | - |
| HRV Minimum Efficiency | 75% | - |
| Domestic Hot Water Heater Minimum EF | 0.9 | - |

INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

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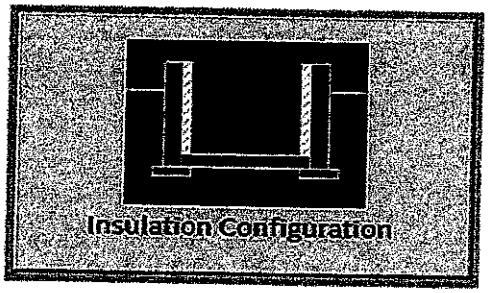
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300



# 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): | 17.4 |  Insulation Configuration |
| Floor Width (m): | 9.4 | |
| Exposed Perimeter (m): | 0.0 | |
| Wall Height (m): | 2.7 | |
| Depth Below Grade (m): | 1.83 | |
| Window Area ($m^2$): | 2.0 | |
| Door Area ($m^2$): | 1.9 | |
| **Radiant Slab** | | |
| Heated Fraction of the Slab: | 0 | |
| Fluid Temperature (°C): | 33 | |
| **Design Months** | | |
| Heating Month | 1 | |
| **Foundation Loads** | | |
| **Heating Load (Watts):** | **1786** | |

**TYPE:** PRESTON 2
**LO#** 81349

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375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

THIS STRUCTURE MUST BE CONSTRUCTED TO MEET OR EXCEED THE PROVISIONS OF THE ONTARIO BUILDING CODE

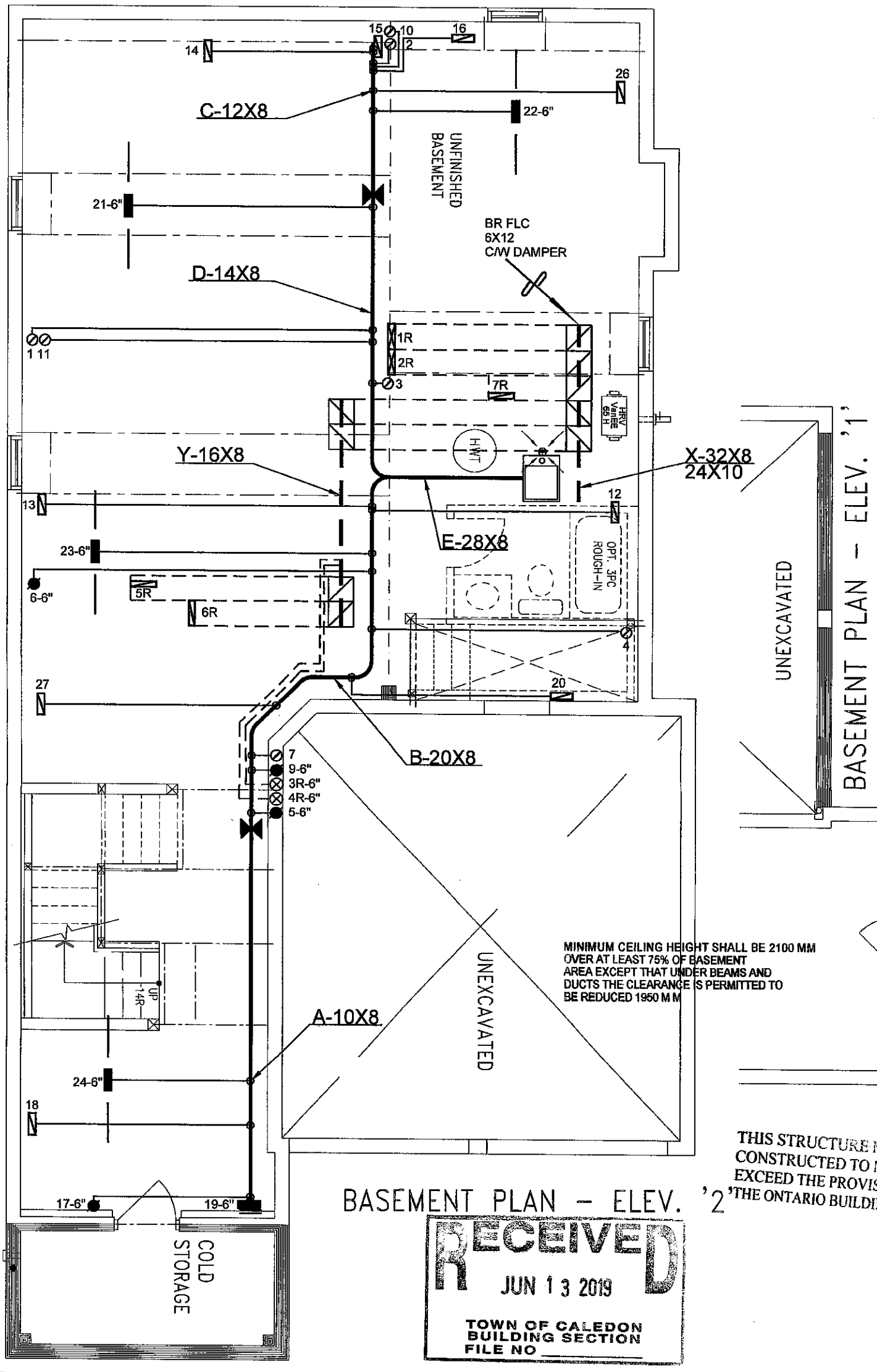
# Air Infiltration Residential Load Calculator

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): | 7.34 |
| **Building Configuration** | |
| Type: | Detached |
| Number of Stories: | Two |
| Foundation: | Full |
| House Volume ($m^3$): | 1050.8 |
| **Air Leakage/Ventilation** | |
| Air Tightness Type: | Energy Star Detached (2.5 ACH) |
| Custom BDT Data: | ELA @ 10 Pa. 980.9 $cm^2$ |
| | 2.50 ACH @ 50 Pa |
| Mechanical Ventilation (L/s): | Total Supply 37.5 / Total Exhaust 37.5 |
| **Flue Size** | |
| Flue #: | #1 #2 #3 #4 |
| Diameter (mm): | 0 0 0 0 |
| **Natural Infiltration Rates** | |
| **Heating Air Leakage Rate (ACH/H):** | **0.242** |
| **Cooling Air Leakage Rate (ACH/H):** | **0.079** |

**TYPE:** PRESTON 2
**LO#** 81349

PARTIAL BASEMENT PLAN - DECK CONDITION




MINIMUM CEILING HEIGHT SHALL BE 2100 MM OVER AT LEAST 75% OF BASEMENT AREA EXCEPT THAT UNDER BEAMS AND DUCTS THE CLEARANCE IS PERMITTED TO BE REDUCED 1950 M M

BASEMENT PLAN - ELEV. '2'

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I MICHAEL O'ROURKE HAVE REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C. 3.2.5 OF THE BUILDING CODE.
Michael O'Rourke, BCIN# 19669
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BUILDING SECTION
FILE NO

CSA-F280-12

ENERGY STAR

HVAC LEGEND

| SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | SUPPLY AIR GRILLE | | 6" SUPPLY AIR BOOT ABOVE | | 14"x8" RETURN AIR GRILLE | | RETURN AIR STACK ABOVE |
| | SUPPLY AIR GRILLE 6" BOOT | | SUPPLY AIR STACK FROM 2nd FLOOR | | 30"x8" RETURN AIR GRILLE | | RETURN AIR STACK 2nd FLOOR |
| | SUPPLY AIR BOOT ABOVE | | 6" SUPPLY AIR STACK 2nd FLOOR | | FRA- FLOOR RETURN AIR GRILLE | | REDUCER |

| No. | Description | Date |
|---|---|---|
| 3. | | |
| 2. | | |
| 1. | | |

REVISIONS



Client
GREENPARK HOMES

Project Name
LAMBERTS LANE HOME CORP PH 2
CALEDON, ONTARIO

PRESTON 2 2835 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@hvacdesigns.ca
Web: www.hvacdesigns.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.

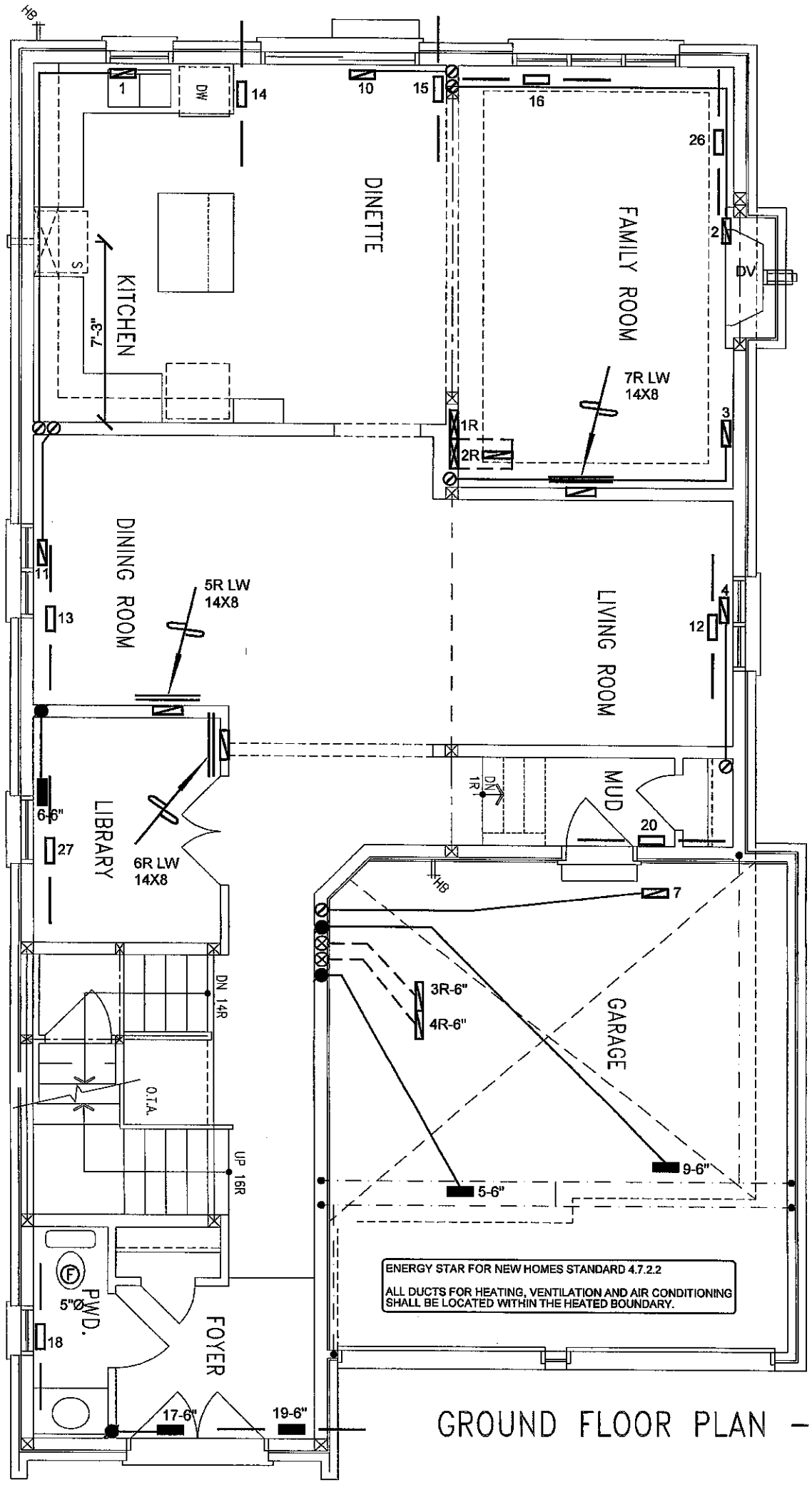
| HEAT LOSS 42901 BTU/H | |
|---|---|
| UNIT DATA | |
| MAKE | GOODMAN |
| MODEL | GMEC960603BNA-60 |
| INPUT | 60 MBTU/H |
| OUTPUT | 57.6 MBTU/H |
| COOLING | 2.5 TONS |
| FAN SPEED | 1131 cfm @ 0.6" w.c. |

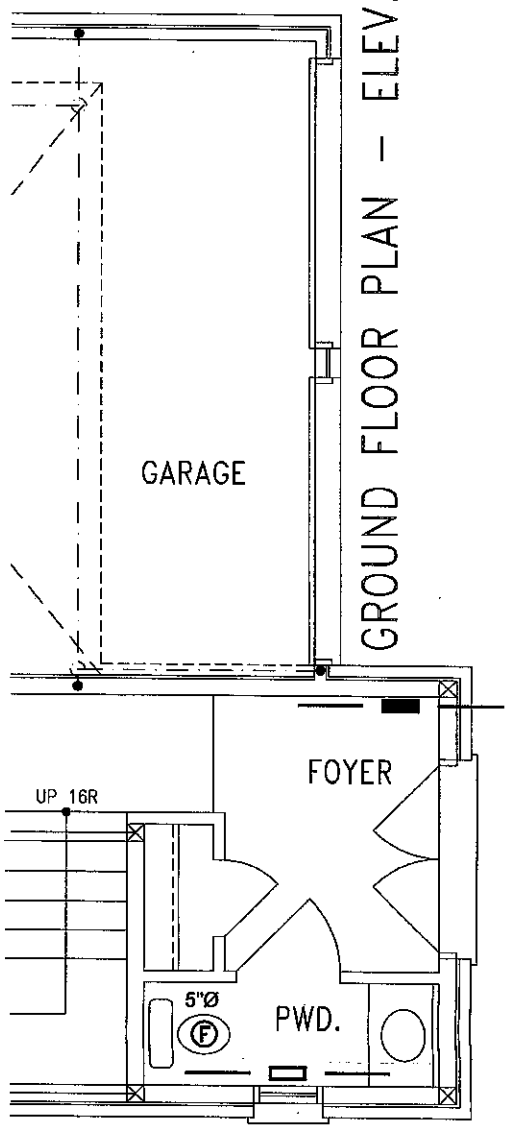
| # OF RUNS | S/A | R/A | FANS |
|---|---|---|---|
| 3RD FLOOR | | | |
| 2ND FLOOR | 11 | 4 | 3 |
| 1ST FLOOR | 10 | 3 | 2 |
| BASEMENT | 4 | 1 | 0 |

ALL S/A DIFFUSERS 4 "x10" UNLESS NOTED OTHERWISE ON LAYOUT. ALL S/A RUNS 5"Ø UNLESS NOTED OTHERWISE ON LAYOUT. UNDERCUT DOORS 1" min. FOR R/A

Sheet Title
BASEMENT HEATING LAYOUT

Date FEB/2019
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 81349




# GROUND FLOOR PLAN - ELEV. '2'

I MICHAEL O'ROURKE HAVE REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

THIS [illegible] SUBSTANTIALLY COMPLY WITH THE PROVISIONS OF THE ONTARIO BUILDING CODE

DUCTS LOCATED IN UNCONDITIONED SPACES SHALL BE SEALED TO A CLASS A SEAL LEVEL IN ACCORDANCE WITH THE SMACNA MANUAL

CSA-F280-12

ENERGY STAR

## HVAC LEGEND

| SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | SUPPLY AIR GRILLE | | 6" SUPPLY AIR BOOT ABOVE | | 14"x8" RETURN AIR GRILLE | | RETURN AIR STACK ABOVE |
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| No. | Description | Date |
|---|---|---|
| 3. | | |
| 2. | | |
| 1. | | |

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Client
GREENPARK HOMES

Project Name
LAMBERTS LANE HOME CORP PH 2
CALEDON, ONTARIO

PRESTON 2 2835 sqft

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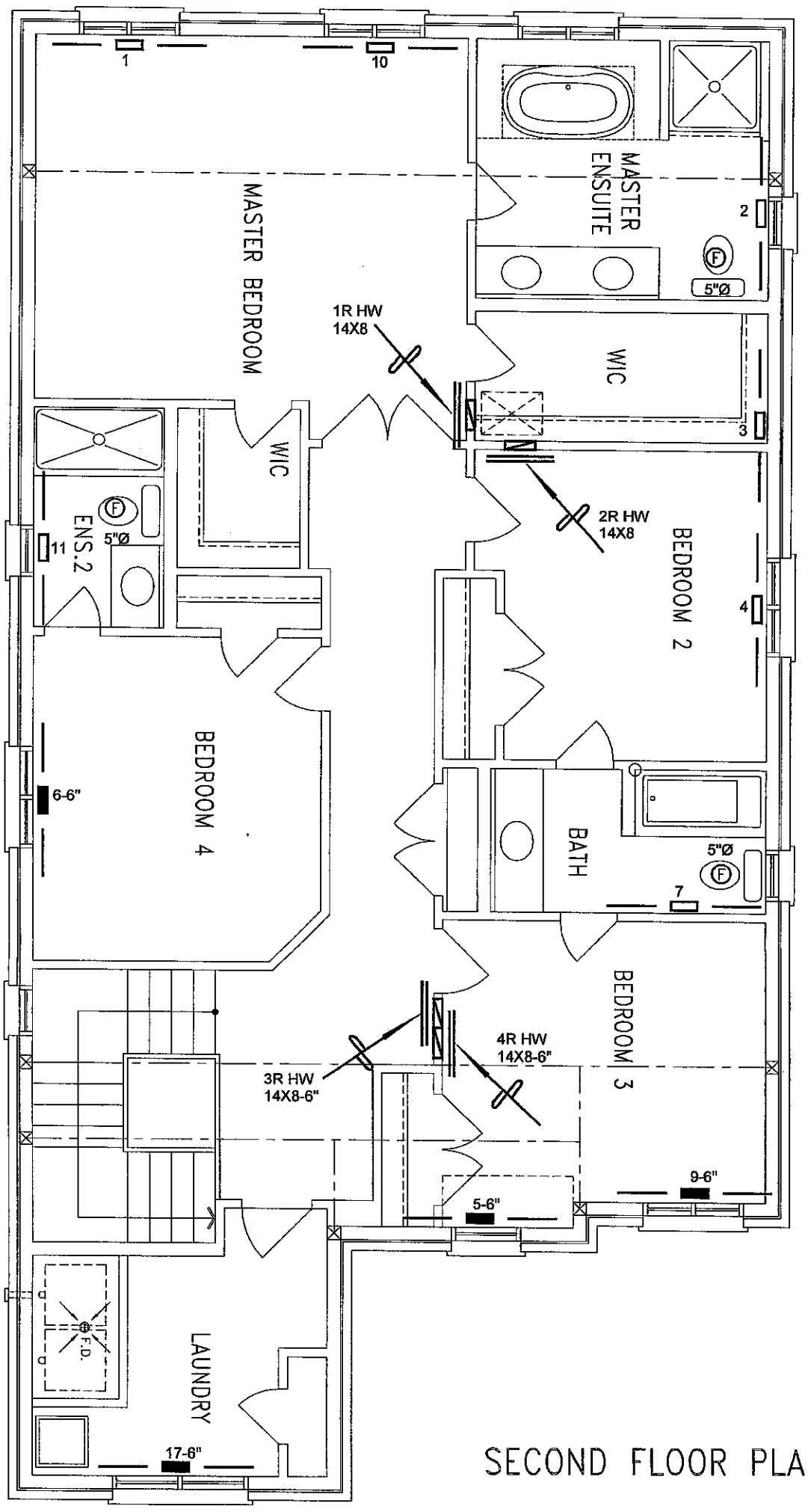
Specializing in Residential Mechanical Design Services

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.

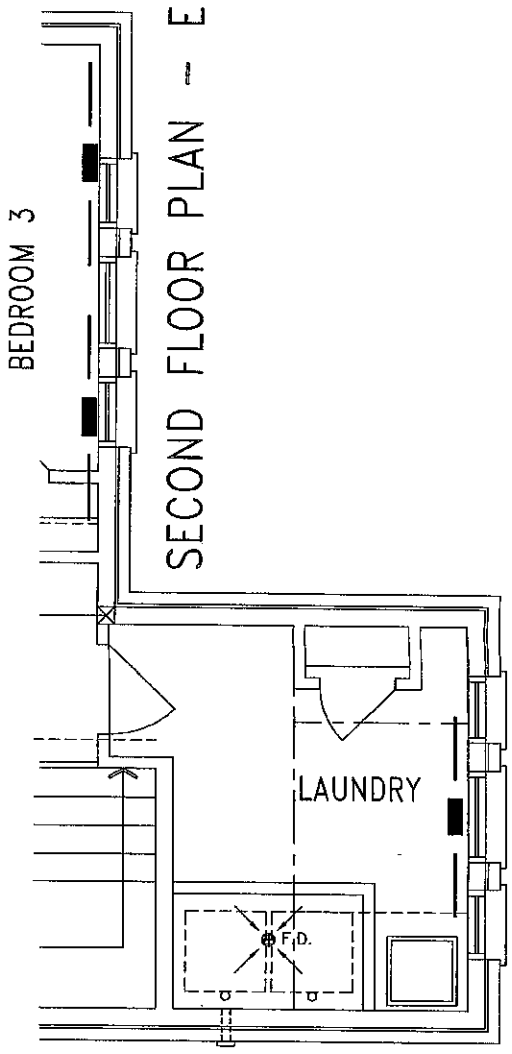


Sheet Title
FIRST FLOOR HEATING LAYOUT

Date FEB/2019
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 81349




SECOND FLOOR PLAN - ELEV. '2'




SECOND FLOOR PLAN - ELEV. '1'

CSA-F280-12

ENERGY STAR

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HVAC LEGEND

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