

SITE NAME: MINNISALE HOMES CORP

LOT 32

DATE: Oct-18

WINTER NATURAL AIR CHANGE RATE 0.325

HEAT LOSS ΔT °F. 74

CSA-F280-12

BUILDER: GREENPARK HOMES

TYPE: MILLWOOD 2

GFA: 2654

LO# 80394

SUMMER NATURAL AIR CHANGE RATE 0.106

HEAT GAIN ΔT °F. 11

SB-12 PACKAGE A1

ROOM USE	MBR	ENS	WIC	BED-2	BED-3	BED-4	BATH	WIC-2	ENS-2
EXP. WALL	34	22	10	26	33	11	10	0	10
CLG. HT.	10	9	9	9	10	9	9	9	9
FACTORS									
GRS. WALL AREA	340	198	90	234	330	90	90	0	90
GLAZING	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN
NORTH	20.8 15.5	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
EAST	20.8 41.0	0 0 0	0 0 0	0 0 0	20 416 821	30 623 1231	0 0 0	0 0 0	0 0 0
SOUTH	20.8 24.4	0 0 0	10 208 244	0 0 0	0 0 0	0 0 0	12 249 293	8 166 195	0 0 0
WEST	20.8 41.0	32 665 1314	12 249 493	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
SKYLT.	36.4 100.7	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
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
NET EXPOSED WALL	4.4 0.6	308 1342 199	176 767 114	90 392 58	214 932 138	300 1307 194	87 379 56	82 357 53	0 0 0
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
EXPOSED CLG	1.3 0.6	280 351 156	120 150 67	120 150 67	165 207 92	155 194 86	220 276 123	176 221 98	60 75 33
NO ATTIC EXPOSED CLG	2.7 1.2	0 0 0	0 0 0	0 0 0	0 0 0	40 107 48	0 0 0	0 0 0	0 0 0
EXPOSED FLOOR	2.5 0.4	0 0 0	0 0 0	0 0 0	165 411 61	0 0 0	0 0 0	0 0 0	60 149 22
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	2358	1374	542	1965	2232	904	744	225	823
SUB TOTAL HT GAIN	1669	917	125	1112	1559	472	346	56	322
LEVEL FACTOR / MULTIPLIER	0.20 0.25	0.20 0.25	0.20 0.25	0.20 0.25	0.20 0.25	0.20 0.25	0.20 0.25	0.20 0.25	0.20 0.25
AIR CHANGE HEAT LOSS	583	346	136	494	561	227	187	56	207
AIR CHANGE HEAT GAIN	117	65	9	78	110	33	24	4	23
DUCT LOSS	0	0	0	246	0	0	0	28	103
DUCT GAIN	0	0	0	221	0	0	0	6	34
HEAT GAIN PEOPLE	240	2	480	0	1	240	1	240	0
HEAT GAIN APPLIANCES/LIGHTS	784	0	0	784	0	784	0	0	0
TOTAL HT LOSS BTU/H	2950	1720	679	2706	2793	1131	931	309	1133
TOTAL HT GAIN x 1.3 BTU/H	3965	1276	174	3167	3501	1988	482	85	493

CITY OF BRAMPTON
BUILDING DIVISION
REVIEWED BY: S. HANNA
NOV 26 2018
ATTACHED NOTES ARE PART
OF REVIEWED DRAWINGS
ALL WORK MUST COMPLY WITH OBC

ROOM USE	LIV	KT/PM	LAWN	WIR	FOY	MUD	WUB	BAS
EXP. WALL	38	78	8	12	27	17	25	129
CLG. HT.	10	10	9	11	10	11	9	9
FACTORS								
GRS. WALL AREA	380	780	72	132	279	187	225	774
GLAZING	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN
NORTH	20.8 15.5	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
EAST	20.8 41.0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
SOUTH	20.8 24.4	40 831 976	0 0 0	10 208 244	0 0 0	0 0 0	0 0 0	10 208 244
WEST	20.8 41.0	0 0 0	72 1496 2955	0 0 0	0 0 0	0 0 0	5 104 205	0 0 0
SKYLT.	36.4 100.7	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	20 493 73	0 0 0	40 986 146	20 493 73	10 247 37	20 493 73
NET EXPOSED WALL	4.4 0.6	340 1481 220	688 2998 444	62 270 40	122 532 79	224 976 145	167 728 108	210 915 136
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	387 1360 202
EXPOSED CLG	1.3 0.6	0 0 0	0 0 0	128 160 71	0 0 0	0 0 0	0 0 0	0 0 0
NO ATTIC EXPOSED CLG	2.7 1.2	0 0 0	36 97 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	128 319 47	0 0 0	0 0 0	0 0 0	0 0 0
BASEMENT/CRAWL HEAT LOSS	0	0	0	0	0	0	0	4357
SLAB ON GRADE HEAT LOSS	0	0	0	0	0	0	0	0
SUBTOTAL HT LOSS	2312	5083	957	739	2087	1221	1492	6417
SUB TOTAL HT GAIN	1195	3516	569	323	537	181	377	519
LEVEL FACTOR / MULTIPLIER	0.30 0.40	0.30 0.40	0.20 0.25	0.30 0.40	0.30 0.40	0.30 0.40	0.50 0.96	0.50 0.96
AIR CHANGE HEAT LOSS	924	2032	241	295	834	488	7622	63
AIR CHANGE HEAT GAIN	84	247	40	23	38	13	0	0
DUCT LOSS	0	0	120	0	0	0	0	0
DUCT GAIN	0	0	139	0	0	0	0	0
HEAT GAIN PEOPLE	240	0	0	0	0	0	0	0
HEAT GAIN APPLIANCES/LIGHTS	784	784	784	0	0	0	0	784
TOTAL HT LOSS BTU/H	3237	7115	1317	1035	2921	1708	1492	14039
TOTAL HT GAIN x 1.3 BTU/H	2683	5912	1992	449	747	252	491	1776

TOTAL HEAT GAIN BTU/H:

29668

TONS: 2.47

LOSS DUE TO VENTILATION LOAD BTU/H: 1593

STRUCTURAL HEAT LOSS: 47216

TOTAL COMBINED HEAT LOSS BTU/H: 48809

Michael O'Rourke

SITE NAME: MINNISALE HOMES CORP
BUILDER: GREENPARK HOMES

LOT 32
TYPE: MILLWOOD 2

DATE: Oct-18

GFA: 2654 LO# 80394

HEATING CFM 1131 COOLING CFM 1131
TOTAL HEAT LOSS 47,216 TOTAL HEAT GAIN 29,432
AIR FLOW RATE CFM 23.95 AIR FLOW RATE CFM 38.43

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

#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 @ 8" E.S.P.

TEMPERATURE RISE 47 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	13	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"Ø unless noted otherwise on layout.

plenum pressure s/a 0.18
max s/a dif press. loss 0.02
min adjusted pressure s/a 0.15
r/a pressure 0.17
r/a grille press. Loss 0.02
adjusted pressure r/a 0.15

RUN #	1	2	3	4	5	6	7	8	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-2	BED-3	MBR	ENS-2	LIV	WIC-2	KT/FM	KT/FM	KT/FM	LAUN	W/R	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH	1.48	1.72	0.68	1.35	1.40	1.13	0.93	1.35	1.40	1.48	1.13	3.24	0.31	2.37	2.37	2.37	1.32	1.03	2.92	1.71	3.88	3.88	3.88	3.88
CFM PER RUN HEAT	35	41	16	32	33	27	22	32	33	35	27	78	7	57	57	57	32	25	70	41	93	93	93	93
RM GAIN MBH	1.98	1.28	0.17	1.58	1.75	1.99	0.48	1.58	1.75	1.98	0.49	2.68	0.09	1.97	1.97	1.97	1.99	0.45	0.75	0.25	0.57	0.57	0.57	0.57
CFM PER RUN COOLING	76	49	7	61	67	76	19	61	67	76	19	103	3	76	76	76	77	17	29	10	22	22	22	22
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH	55	54	40	46	33	15	37	47	47	45	38	15	30	48	44	49	39	39	29	32	39	39	20	10
EQUIVALENT LENGTH	190	170	130	140	180	160	110	140	190	150	140	120	170	130	110	140	130	150	140	170	150	170	110	160
TOTAL EFFECTIVE LENGTH	245	224	170	186	213	175	147	187	237	195	178	135	200	178	154	189	169	189	169	202	189	209	130	170
ADJUSTED PRESSURE	0.07	0.08	0.1	0.09	0.08	0.1	0.12	0.09	0.07	0.09	0.1	0.12	0.09	0.1	0.11	0.09	0.1	0.09	0.1	0.09	0.09	0.08	0.12	0.1
ROUND DUCT SIZE	5	5	4	5	5	5	4	5	5	5	4	6	4	5	5	5	5	4	5	4	6	6	6	6
HEATING VELOCITY (ft/min)	257	301	184	235	242	198	252	235	242	257	310	398	80	419	419	419	235	287	514	470	474	474	474	474
COOLING VELOCITY (ft/min)	558	360	80	448	492	558	213	448	492	558	218	525	34	558	558	558	565	195	213	115	112	112	112	112
OUTLET GRILL SIZE	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	A	B	B	D	C	B	D	D	C	A	D	C	D	A	A	A	D	B	C	B	A	A	C	B

RUN #	1	2	3	4	5	6	7	8	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-2	BED-3	MBR	ENS-2	LIV	WIC-2	KT/FM	KT/FM	KT/FM	LAUN	W/R	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH	1.48	1.72	0.68	1.35	1.40	1.13	0.93	1.35	1.40	1.48	1.13	3.24	0.31	2.37	2.37	2.37	1.32	1.03	2.92	1.71	3.88	3.88	3.88	3.88
CFM PER RUN HEAT	35	41	16	32	33	27	22	32	33	35	27	78	7	57	57	57	32	25	70	41	93	93	93	93
RM GAIN MBH	1.98	1.28	0.17	1.58	1.75	1.99	0.48	1.58	1.75	1.98	0.49	2.68	0.09	1.97	1.97	1.97	1.99	0.45	0.75	0.25	0.57	0.57	0.57	0.57
CFM PER RUN COOLING	76	49	7	61	67	76	19	61	67	76	19	103	3	76	76	76	77	17	29	10	22	22	22	22
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH	55	54	40	46	33	15	37	47	47	45	38	15	30	48	44	49	39	39	29	32	39	39	20	10
EQUIVALENT LENGTH	190	170	130	140	180	160	110	140	190	150	140	120	170	130	110	140	130	150	140	170	150	170	110	160
TOTAL EFFECTIVE LENGTH	245	224	170	186	213	175	147	187	237	195	178	135	200	178	154	189	169	189	169	202	189	209	130	170
ADJUSTED PRESSURE	0.07	0.08	0.1	0.09	0.08	0.1	0.12	0.09	0.07	0.09	0.1	0.12	0.09	0.1	0.11	0.09	0.1	0.09	0.1	0.09	0.09	0.08	0.12	0.1
ROUND DUCT SIZE	5	5	4	5	5	5	4	5	5	5	4	6	4	5	5	5	5	4	5	4	6	6	6	6
HEATING VELOCITY (ft/min)	257	301	184	235	242	198	252	235	242	257	310	398	80	419	419	419	235	287	514	470	474	474	474	474
COOLING VELOCITY (ft/min)	558	360	80	448	492	558	213	448	492	558	218	525	34	558	558	558	565	195	213	115	112	112	112	112
OUTLET GRILL SIZE	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	A	B	B	D	C	B	D	D	C	A	D	C	D	A	A	A	D	B	C	B	A	A	C	B

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SUPPLY AIR TRUNK SIZE

TRUNK	CFM	STATIC PRESS	ROUND DUCT	RECT DUCT	VELOCITY (ft/min)
TRUNK A	427	0.07	10.5	14	x 8 549
TRUNK B	670	0.07	12.5	18	x 8 670
TRUNK C	307	0.07	9.3	10	x 8 553
TRUNK D	459	0.07	10.8	16	x 8 516
TRUNK E	0	0.00	0	0	x 8 0
TRUNK F	0	0.00	0	0	x 8 0

TRUNK	CFM	STATIC PRESS	ROUND DUCT	RECT DUCT	VELOCITY (ft/min)
TRUNK G	0	0.00	0	0	x 8 0
TRUNK H	0	0.00	0	0	x 8 0
TRUNK I	0	0.00	0	0	x 8 0
TRUNK J	0	0.00	0	0	x 8 0
TRUNK K	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	0.07	0	0	x 8 0
TRUNK P	0	0.07	0	0	x 8 0
TRUNK Q	0	0.07	0	0	x 8 0
TRUNK R	0	0.07	0	0	x 8 0
TRUNK S	0	0.07	0	0	x 8 0
TRUNK T	0	0.07	0	0	x 8 0
TRUNK U	0	0.07	0	0	x 8 0
TRUNK V	0	0.07	0	0	x 8 0
TRUNK W	0	0.07	0	0	x 8 0
TRUNK X	1131	0.07	15.2	30	x 8 679
TRUNK Y	300	0.07	9.2	10	x 8 540
TRUNK Z	0	0.07	0	0	x 8 0
DROP	1131	0.07	15.2	24	x 10 679

RETURN AIR

RUN #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
AIR VOLUME	145	155	95	95	155	310	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	0.15	0.15
ACTUAL DUCT LGH	58	43	42	48	38	15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EQUIVALENT LENGTH	150	135	175	175	145	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL EFFECTIVE LH	208	178	217	223	183	150	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ADJUSTED PRESSURE	0.07	0.08	0.07	0.07	0.08	0.10	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	14.80	14.80	14.80
ROUND DUCT SIZE	7	7	6	6	7	8.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INLET GRILL SIZE	8	8	8	8	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INLET GRILL SIZE	X	X	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	14	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TYPE: MILLWOOD 2
SITE NAME: MINNISALE HOMES CORP

LO #: 80394
LOT 32

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	5	@ 10.6 cfm	53	cfm
Other Rooms	5	@ 10.6 cfm	53.0	cfm
Table 9.32.3.A.			TOTAL	180.2 / 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	180.2	cfm
Less Principal Ventil. Capacity	79.5 /	cfm
Required Supplemental Capacity	100.7	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
ENS-2	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 ☒ HVI Approved
@ 32 deg F (0 deg C)

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 #:
CITY OF BRAMPTON
BUILDING DIVISION
REVIEWED BY: S. HANNA
NOV 26 2018
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: October-18

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

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

LOW: 80394

Model: MILLWOOD 2

Builder: GREENPARK HOMES

Date: 10/19/2018

Volume Calculation
House Volume

Level	Floor Area (ft ²)	Floor Height (ft)	Volume (ft ³)
Bsmt	1148	9	10332
First	1148	10	11480
Second	1506	9	13554
Third	0	9	0
Fourth	0	9	0
Total:			35,366.0 ft ³
Total:			1001.5 m ³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.325
SUMMER NATURAL AIR CHANGE RATE	0.106

Design Temperature Difference

	T _{in} °C	T _{out} °C	ΔT °C	ΔT °F
Winter DTD _h	22	-19	41	74
Summer DTD _c	24	30	6	11

5.2.3.1 Heat Loss due to Air Leakage

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

0.325 x 278.18 x 41 °C x 1.2 = 4468 W

= 15244 Btu/h

6.2.6 Sensible Gain due to Air Leakage

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

0.106 x 278.18 x 6 °C x 1.2 = 215 W

= 734 Btu/h

5.2.3.2 Heat Loss due to Mechanical Ventilation

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

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

6.2.7 Sensible heat Gain due to Ventilation

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

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)

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

Level	Level Factor (LF)	HL _{airbv} Air Leakage + Ventilation Heat Loss (Btu/h)	Level Conductive Heat Loss: (HL _{level})	Air Leakage Heat Loss Multiplier (LF x HL _{airbv} / HL _{level})
1	0.5	15,244	7,909	0.964
2	0.3		11,442	0.400
3	0.2		12,124	0.251
4	0		0	0.000
5	0		0	0.000

*HL_{airbv} = Air leakage heat loss + ventilation heat loss

*For a balanced or supply only ventilation system HL_{airv} = 0

CITY OF BRAMPTON
BUILDING DIVISION
REVIEWED BY: S. HANNA
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HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: MILLWOOD 2	LOT 32	BUILDER: GREENPARK HOMES
SFQT: 2654	LO# 80394	SITE: MINNISALE 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:	SOUTH	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):	35366.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD (Btu/h/ft²):	1.65	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	6.0 ft
LENGTH: 46.0 ft	WIDTH: 31.0 ft	EXPOSED PERIMETER:	129.0 ft

2012 OBC - COMPLIANCE PACKAGE
Component

Ceiling with Attic Space Minimum RSI (R)-Value
Ceiling Without Attic Space Minimum RSI (R)-Value
Exposed Floor Minimum RSI (R)-Value
Walls Above Grade Minimum RSI (R)-Value
Basement Walls Minimum RSI (R)-Value
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
Heated Slab or Slab ≤ 600 mm below grade Minimum RSI (R)-Value
Windows and Sliding Glass Doors Maximum U-Value
Skylights Maximum U-Value
Space Heating Equipment Minimum AFUE
HRV Minimum Efficiency
Domestic Hot Water Heater Minimum EF

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Compliance Package
A1

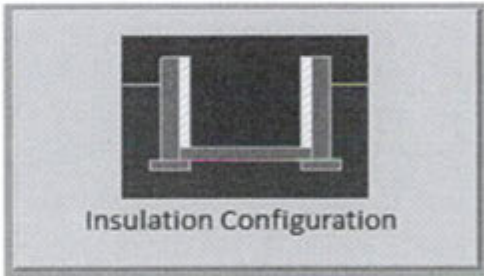
Nominal	Min. Eff.
60	59.22
31	27.65
31	29.80
22	17.03
20 ci	21.12
-	-
10	10
10	11.13
0.28	-
0.49	-
0.96	-
75%	-
0.8	-

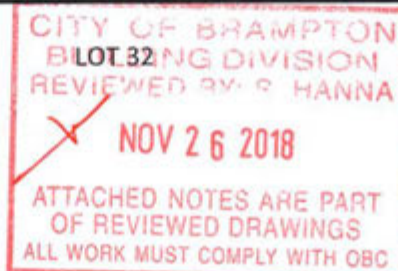
INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

Michael O'Rourke

Residential Foundation Thermal Load Calculator

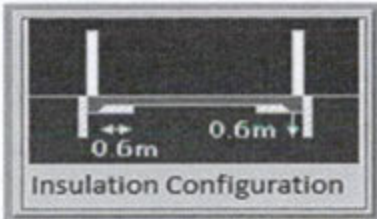
Supplemental tool for CAN/CSA-F280

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):	14.0	 Insulation Configuration
Floor Width (m):	9.4	
Exposed Perimeter (m):	39.3	
Wall Height (m):	2.7	
Depth Below Grade (m):	1.83	
Window Area (m ²):	1.4	
Door Area (m ²):	2.8	
Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Foundation Loads		
Heating Load (Watts):	1277 ✓	

TYPE: MILLWOOD 2
LO# 80394

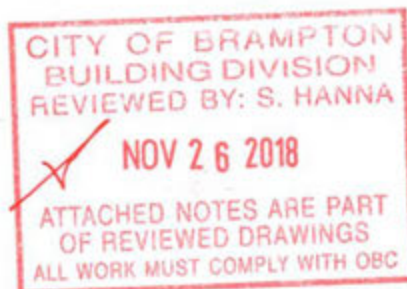
Residential Foundation Thermal Load Calculator

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		
Length (m):	1.5	 Insulation Configuration
Width (m):	4.6	
Exposed Perimeter (m):	7.6	
Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Results		
Heating Load (Watts):	66 ✓	

TYPE: MILLWOOD 2
LO# 80394

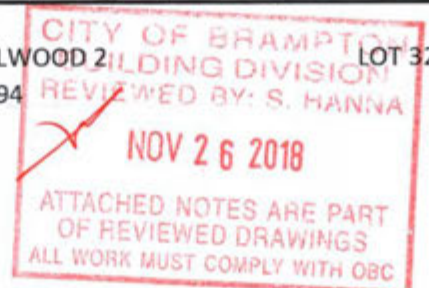
LOT 32

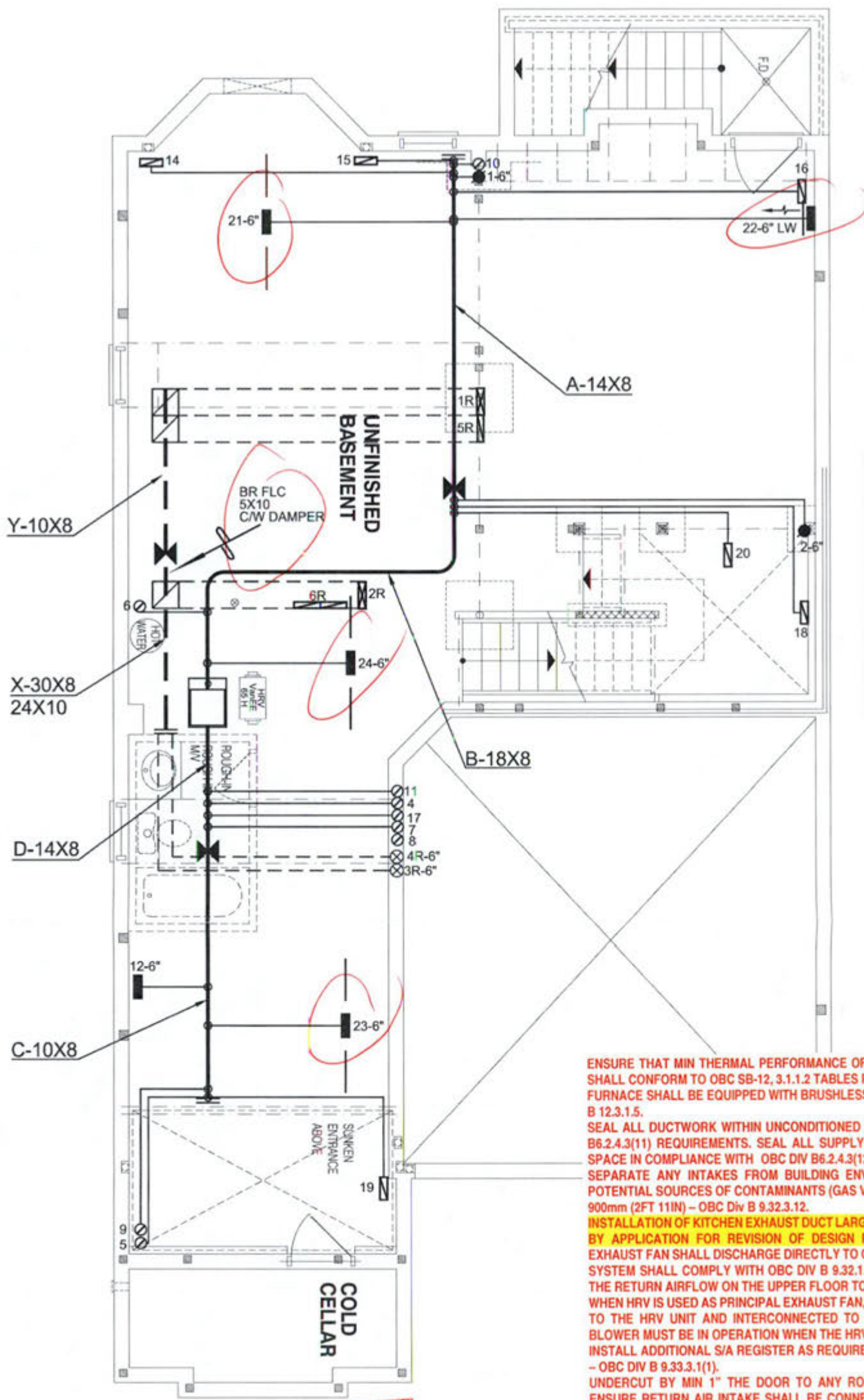


Air Infiltration Residential Load Calculator

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):	6.71		
Building Configuration			
Type:	Detached		
Number of Stories:	Two		
Foundation:	Full		
House Volume (m ³):	1001.5		
Air Leakage/Ventilation			
Air Tightness Type:	Present (1961-) (3.57 ACH)		
Custom BDT Data:	ELA @ 10 Pa.	1335.0 cm ²	
	3.57	ACH @ 50 Pa	
Mechanical Ventilation (L/s):	Total Supply	Total Exhaust	
	37.5	37.5	
Flue Size			
Flue #:	#1	#2	#3
Diameter (mm):	0	0	0
Natural Infiltration Rates			
Heating Air Leakage Rate (ACH/H):	0.325 ✓		
Cooling Air Leakage Rate (ACH/H):	0.106		

TYPE: MILLWOOD 2 LOT 32
LO# 80394



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.

CITY OF BRAMPTON
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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. 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).

INSTALLATION OF HVAC EQUIPMENT SHALL CONFORM TO MANUFACTURER'S SPECIFICATIONS AND MANUALS

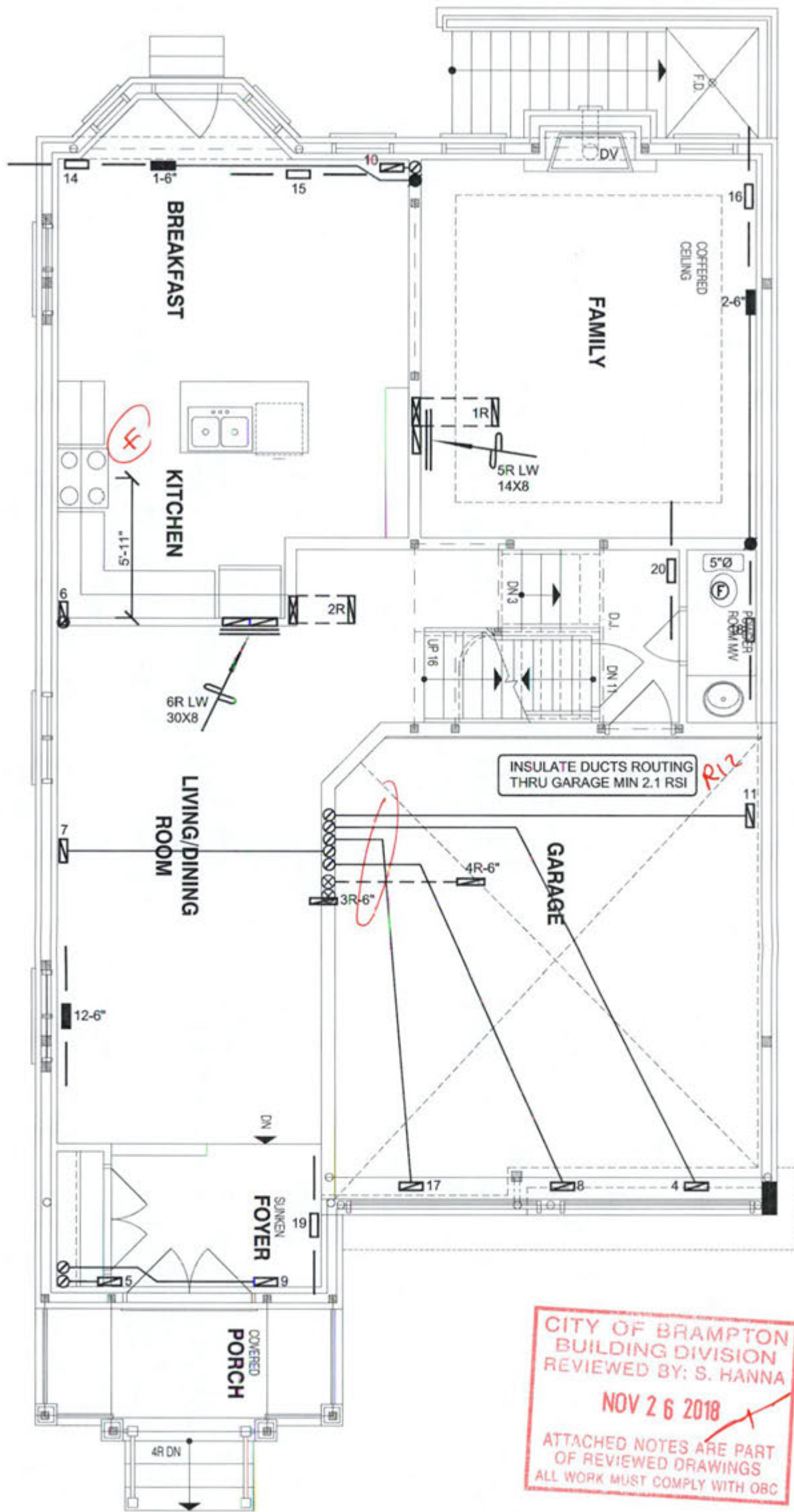
CSA-F280-12
PACKAGE A1

I MICHAEL O'DRISCOLL HAVE REVIEWED AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.
Michael O'Driscoll, BCMA 19669
HVAC DESIGNS LTD.

HVAC LEGEND								3.	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	2.	
	FLOOR SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE	1.	
	FLOOR SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR	No.	Description
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER	Date	

ALL DRAWINGS, CALCULATIONS AND SPECIFICATIONS ARE THE PROPERTY OF HVAC DESIGNS LTD. AND MAY NOT BE REPRODUCED, MODIFIED OR ALTERED WITHOUT EXPRESSED WRITTEN CONSENT. THE DRAWINGS ARE DATED AND USE OF THESE DRAWINGS AFTER ONE YEAR FROM THE DATED NOTED IS NOT AUTHORIZED. CONTRACTOR SHALL CHECK ALL CONDITIONS BEFORE PROCEEDING WITH WORK. LATEST MUNICIPAL APPROVED DRAWINGS ONLY TO BE USED DURING INSTALLATION OF HEATING SYSTEM. HVAC DESIGNS LTD. IS NOT LIABLE FOR ANY CLAIMS ARISING FROM UNAUTHORIZED USE OF THE DRAWINGS OR FROM ANY CHANGES TO ACCEPTED STANDARDS AND/OR THE ONTARIO BUILDING CODE.

Client	HVACDESIGNS 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 49698 BTU/H UNIT DATA		# OF RUNS S/A R/A FANS				Sheet Title			
GREENPARK HOMES		MAKE GOODMAN	MODEL GMEC960603BNA-60		3RD FLOOR				BASEMENT HEATING LAYOUT		
Project Name MINNISALE HOMES CORP. BRAMPTON, ONTARIO		INPUT 60 MBTUH	OUTPUT 57.6 MBTUH		2ND FLOOR	11	4	3	Date OCT/2018		
LOT 32 MILLWOOD 2		COOLING 2.5 TONS	FAN SPEED 1131 cfm @ 0.6" w.c.		1ST FLOOR	7	2	2	Scale 3/16" = 1'-0"		
2654 sqft						BASEMENT	4	1	0	BCIN# 19669	
						ALL S/A DIFFUSERS 4"x10" UNLESS NOTED OTHERWISE ON LAYOUT. ALL S/A RUNS 5" UNLESS NOTED OTHERWISE ON LAYOUT. UNDERCUT DOORS 1" min. FOR R/A				LO# 80394	



THIS INSTALLATION OF A GAS FIREPLACE IS REGULATED UNDER THE T.S.S.A. BY C.S.A. B149.1 NATURAL GAS AND PROPANE INSTALLATION CODE CALL ENBRIDGE FOR INSPECTION AT 1-800-785-1314

CITY OF BRAMPTON
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CSA-F280-12
PACKAGE A1

I MICHAEL O'Rourke HAVE REVIEWED AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.
Michael O'Rourke
Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

HVAC LEGEND								3.	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	2.	
	FLOOR SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE	1.	
	FLOOR SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR	No.	Description
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER	Date	

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Client
GREENPARK HOMES
Project Name
**MINNISALE HOMES CORP.
BRAMPTON, ONTARIO**

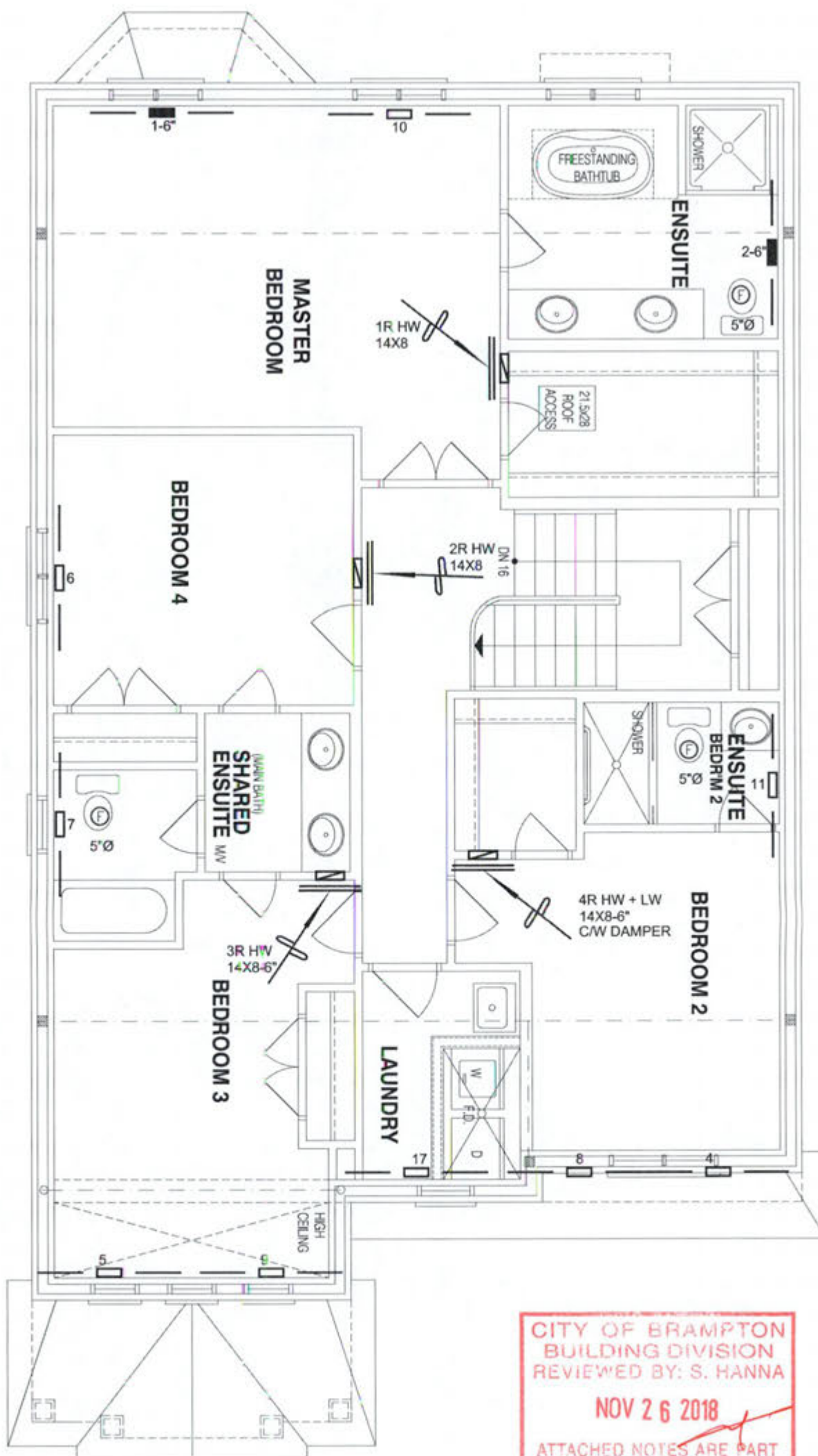
**LOT 32
MILLWOOD 2 2654 sqft**

HVACDESIGNS 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.

Sheet Title
**FIRST FLOOR
HEATING
LAYOUT**
Date
OCT/2018
Scale
3/16" = 1'-0"
BCIN# 19669
LO# 80394

REVISIONS

No.	Description	Date



CITY OF BRAMPTON
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CSA-F280-12
PACKAGE A1

I MICHAEL OROURKE HAVE REVIEWED
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.

HVAC LEGEND								3.	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	2.	
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	FLOOR SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR	No.	Description Date
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Client GREENPARK HOMES	 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.	Sheet Title SECOND FLOOR HEATING LAYOUT
Project Name MINNISALE HOMES CORP. BRAMPTON, ONTARIO		Date OCT/2018
LOT 32 MILLWOOD 2 2654 sqft		Scale 3/16" = 1'-0"
		BCIN# 19669
		LO# 80394