HVAC DESIGNS LTD.

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SITE NAME: RUSSEL GARDENS PHASE 3 | LOT 258 | DATE: Oct-20 | WINTER NATURAL AIR CHANGE RATE 0.347 | HEAT LOSS ΔT °F. 71 | CSA-F280-12

BUILDER: GREENPARK HOMES | TYPE: MOUNTAINASH 5 | GFA: 3288 | LO# 87759 | SUMMER NATURAL AIR CHANGE RATE 0.124 | HEAT GAIN ΔT °F. 13 | SB-12 PACKAGE A1

ROOM USE				MBR			ENS			WIC			BED-3			BED-4	
EXP. WALL				33			30			7			27			37	
CLG. HT.				9			9			9			9			9	
	FACTORS																
GRS.WALL AREA	LOSS	GAIN		297			270			63			243			333	
GLAZING				LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN
NORTH	19.8	15.1	0	0	0	7	138	106	0	0	0	13	257	197	0	0	0
EAST	19.8	39.0	0	0	0	0	0	0	0	0	0	48	949	1873	62	1226	2419
SOUTH	19.8	23.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WEST	19.8	39.0	32	633	1249	14	277	546	0	0	0	0	0	0	0	0	0
SKYLT.	34.6	101.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DOORS	23.5	4.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NET EXPOSED WALL	4.1	0.8	265	1099	199	249	1032	187	63	261	47	182	755	137	271	1123	204
NET EXPOSED BSMT WALL ABOVE GR	3.3	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EXPOSED CLG	1.2	0.6	287	342	169	221	263	130	140	167	82	236	281	139	183	218	108
NO ATTIC EXPOSED CLG	2.6	1.3	0	0	0	0	0	0	0	0	0	16	41	20	45	115	57
EXPOSED FLOOR	2.4	0.4	0	0	0	0	0	0	0	0	0	241	571	104	0	0	0
BASEMENT/CRAWL HEAT LOSS				0			0			0			0			0	
SLAB ON GRADE HEAT LOSS				0			0			0			0			0	
SUBTOTAL HT LOSS				2073			1711			428			2854			2682	
SUB TOTAL HT GAIN					1616			969			130			2469			2787
LEVEL FACTOR / MULTIPLIER			0.20	0.28		0.20	0.28		0.20	0.28		0.20	0.28		0.20	0.28	
AIR CHANGE HEAT LOSS				573			473			118			789			742	
AIR CHANGE HEAT GAIN					139			83			11			212			239
DUCT LOSS				0			0			0			364			0	
DUCT GAIN					0			0			0			347			0
HEAT GAIN PEOPLE	240		2		480	0		0	0		0	1		240	1		240
HEAT GAIN APPLIANCES/LIGHTS					547			0			0			547			547
TOTAL HT LOSS BTU/H				2647			2164			546			4007			3424	
TOTAL HT GAIN x 1.3 BTU/H					3617			1368			183			4960			4958

ROOM USE		BED-5			ENS-3			BED-2			WIC-4			ENS-2	
EXP. WALL		12			6			11			5			6	
CLG. HT.		9			9			9			9			9	
GRS.WALL AREA		108			54			99			45			54	
GLAZING		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN
NORTH	0	0	0	7	138	106	16	316	242	0	0	0	0	0	0
EAST	0	0	0	0	0	0	0	0	0	5	178	351	0	0	0
SOUTH	16	316	376	0	0	0	0	0	0	0	0	0	7	138	164
WEST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKYLT.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DOORS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NET EXPOSED WALL	92	381	69	47	195	35	83	344	62	36	149	27	47	195	35
NET EXPOSED BSMT WALL ABOVE GR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EXPOSED CLG	180	215	106	66	79	39	220	262	129	40	48	24	72	86	42
NO ATTIC EXPOSED CLG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EXPOSED FLOOR	0	0	0	68	161	29	69	163	30	40	95	17	0	0	0
BASEMENT/CRAWL HEAT LOSS		0			0			0			0			0	
SLAB ON GRADE HEAT LOSS		0			0			0			0			0	
SUBTOTAL HT LOSS		912			573			1086			470			419	
SUB TOTAL HT GAIN			551			209			464			419			242
LEVEL FACTOR / MULTIPLIER	0.20	0.28		0.20	0.28		0.20	0.28		0.20	0.28		0.20	0.28	
AIR CHANGE HEAT LOSS		252			158			300			130			116	
AIR CHANGE HEAT GAIN			47			18			40			36			21
DUCT LOSS		0			73			139			60			0	
DUCT GAIN			0			23			129			45			0
HEAT GAIN PEOPLE	1		240	0		0	1		240	0		0	0		0
HEAT GAIN APPLIANCES/LIGHTS			547			0			547			0			0
TOTAL HT LOSS BTU/H		1165			805			1525			659			535	
TOTAL HT GAIN x 1.3 BTU/H			1800			325			1846			651			342

ROOM USE				FAM			L/D			K/B			L/H			LND	
EXP. WALL				36			30			37			19			12	
CLG. HT.				11			11			11			11			9	
	FACTORS																
GRS.WALL AREA	LOSS	GAIN		396			330			407			209			108	
GLAZING				LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN
NORTH	19.8	15.1	0	0	0	0	0	0	40	791	606	0	0	0	0	0	0
EAST	19.8	39.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SOUTH	19.8	23.5	0	0	0	40	791	939	0	0	0	13	257	305	7	138	164
WEST	19.8	39.0	40	791	1561	0	0	0	23	455	897	0	0	0	0	0	0
SKYLT.	34.6	101.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DOORS	23.5	4.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NET EXPOSED WALL	4.1	0.8	356	1476	268	290	1202	218	344	1426	259	196	813	147	101	419	76
NET EXPOSED BSMT WALL ABOVE GR	3.3	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EXPOSED CLG	1.2	0.6	0	0	0	0	0	0	0	0	0	0	0	0	180	216	106
NO ATTIC EXPOSED CLG	2.6	1.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EXPOSED FLOOR	2.4	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BASEMENT/CRAWL HEAT LOSS				0			0			0			0			0	
SLAB ON GRADE HEAT LOSS				0			0			0			0			0	
SUBTOTAL HT LOSS				2267			1993			2671			1070			772	
SUB TOTAL HT GAIN					1828			1157			1762			453			346
LEVEL FACTOR / MULTIPLIER			0.30	0.46		0.30	0.45		0.30	0.46		0.30	0.46		0.20	0.28	
AIR CHANGE HEAT LOSS				1049			922			1236			495			213	
AIR CHANGE HEAT GAIN					157			99			151			39			30
DUCT LOSS				0			0			0			0			0	
DUCT GAIN					0			0			0			0			0
HEAT GAIN PEOPLE	240		0		0	0		0	0		0	0		0	0		0
HEAT GAIN APPLIANCES/LIGHTS					547			547			547			547			547
TOTAL HT LOSS BTU/H				3316			2915			3908			1565			985	
TOTAL HT GAIN x 1.3 BTU/H					3292			2345			3199			1350			1200

ROOM USE		W/R			FOY			MUD			WOD			BAS	
EXP. WALL		18			18			30			46			182	
CLG. HT.		11			12			12			8			8	
GRS.WALL AREA		198			216			360			368			1116	
GLAZING		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN
NORTH	0	0	0	0	0	0	7	138	106	0	0	0	0	0	0
EAST	22	435	858	6	119	234	0	0	0	0	0	0	0	0	0
SOUTH	0	0	0	0	0	0	0	0	0	0	0	0	10	198	235
WEST	0	0	0	0	0	0	0	0	0	12	237	468	0	0	0
SKYLT.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DOORS	0	0	0	40	938	170	0	0	0	0	0	0	20	469	85
NET EXPOSED WALL	176	730	132	170	705	128	353	1463	265	0	0	0	0	0	0
NET EXPOSED BSMT WALL ABOVE GR	0	0	0	0	0	0	0	0	0	264	883	160	340	1137	206
EXPOSED CLG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NO ATTIC EXPOSED CLG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EXPOSED FLOOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BASEMENT/CRAWL HEAT LOSS		0			0			0						5736	
SLAB ON GRADE HEAT LOSS		0			0			0			0				
SUBTOTAL HT LOSS		1165			1762			1602			1120			7540	
SUB TOTAL HT GAIN			991			532			371			628			526
LEVEL FACTOR / MULTIPLIER	0.30	0.46		0.30	0.45		0.30	0.46					0.50	1.12	
AIR CHANGE HEAT LOSS		539			815			741						9664	
AIR CHANGE HEAT GAIN			85			46			32						99
DUCT LOSS		0			0			0						0	
DUCT GAIN			0			0			0						0
HEAT GAIN PEOPLE	0		0	0		0	0		0	0		0	0		0
HEAT GAIN APPLIANCES/LIGHTS			0			0			0			0			547
TOTAL HT LOSS BTU/H		1703			2577			2343			1120			17203	
TOTAL HT GAIN x 1.3 BTU/H			1399			751			524			817			1524

TOTAL HEAT GAIN BTU/H: 36778 TONS: 3.06 LOSS DUE TO VENTILATION LOAD BTU/H: 1819 STRUCTURAL HEAT LOSS: 55131 TOTAL COMBINED HEAT LOSS BTU/H: 56949

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

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SITE NAME: RUSSEL GARDENS PHASE 3 — LOT 258
BUILDER: GREENPARK HOMES — TYPE: MOUNTAINASH 5 — DATE: Oct-20 — GFA: 3288 — LO# 87759

HEATING CFM	1131	COOLING CFM	1131
TOTAL HEAT LOSS	55,131	TOTAL HEAT GAIN	36,449
AIR FLOW RATE CFM	20.51	AIR FLOW RATE CFM	31.03

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 — AFUE = 96 %
GMEC960803BNA 60 — INPUT (BTU/H) = 60,000
FAN SPEED — OUTPUT (BTU/H) = 57,600
LOW
MEDLOW — DESIGN CFM = 1131
MEDIUM 928 — CFM @ .6 " E.S.P.
MEDIUM HIGH 1017
HIGH 1131 — TEMPERATURE RISE 47 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	14	8	4
R/A	0	0	6	2	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	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
ROOM NAME	MBR	ENS	WIC	BED-3	BED-4	BED-5	ENS-3	BED-2	WIC-4	MBR	ENS-2	FAM	L/D	K/B	K/B	L/H	LND	W/R	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.32	2.18	0.55	2.00	1.71	1.16	0.80	1.53	0.66	1.32	0.53	3.32	2.92	1.95	1.95	1.56	0.99	1.70	2.58	2.34	4.58	4.58	4.58	4.58
CFM PER RUN HEAT	27	45	11	41	35	24	17	31	14	27	11	68	60	40	40	32	20	35	53	48	94	94	94	94
RM GAIN MBH.	1.81	1.37	0.18	2.48	2.48	1.80	0.33	1.85	0.65	1.81	0.34	3.29	2.34	1.60	1.60	1.35	1.20	1.40	0.75	0.52	0.59	0.59	0.59	0.59
CFM PER RUN COOLING	56	42	6	77	77	56	10	57	20	56	11	102	73	50	50	42	37	43	23	16	18	18	18	18
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.	37	54	39	59	56	34	34	51	45	39	39	22	10	40	31	27	20	33	41	44	38	19	5	31
EQUIVALENT LENGTH	190	130	150	130	170	200	220	160	110	130	150	140	130	150	160	140	180	110	90	140	140	120	140	130
TOTAL EFFECTIVE LENGTH	227	184	189	189	226	234	254	211	155	169	189	162	140	190	191	167	200	143	131	184	178	139	145	161
ADJUSTED PRESSURE	0.08	0.09	0.09	0.09	0.08	0.07	0.07	0.08	0.11	0.1	0.09	0.1	0.12	0.09	0.09	0.1	0.09	0.12	0.13	0.09	0.09	0.12	0.11	0.1
ROUND DUCT SIZE	5	5	4	6	6	5	4	5	4	5	4	6	5	5	5	4	4	4	5	5	6	6	6	6
HEATING VELOCITY (ft/min)	198	330	126	209	178	176	195	228	161	198	126	347	441	294	294	367	229	402	389	352	479	479	479	479
COOLING VELOCITY (ft/min)	411	308	69	393	393	411	115	419	229	411	126	520	536	367	367	482	424	493	169	117	92	92	92	92
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	B	A	B	D	C	C	C	A	D	B	D	B	D	A	A	C	B	C	C	A	A	B	D	C

RUN #	25	26
ROOM NAME	BED-3	BED-4
RM LOSS MBH.	2.00	1.71
CFM PER RUN HEAT	41	35
RM GAIN MBH.	2.48	2.48
CFM PER RUN COOLING	77	77
ADJUSTED PRESSURE	0.17	0.17
ACTUAL DUCT LGH.	52	48
EQUIVALENT LENGTH	120	170
TOTAL EFFECTIVE LENGTH	172	218
ADJUSTED PRESSURE	0.1	0.08
ROUND DUCT SIZE	6	6
HEATING VELOCITY (ft/min)	209	178
COOLING VELOCITY (ft/min)	393	393
OUTLET GRILL SIZE	4X10	4X10
TRUNK	D	C

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	298	0.08	8.9	10	x	8	536	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	545	0.08	11.2	14	x	8	701	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	325	0.07	9.5	12	x	8	488	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	586	0.07	11.9	18	x	8	586	TRUNK J	0	0.00	0	0	x	8	0
TRUNK E	0	0.00	0	0	x	8	0	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	1041	0.05	16	30	x	8	625
TRUNK Y	695	0.05	13.8	22	x	8	569
TRUNK Z	445	0.05	11.6	16	x	8	501
DROP	1131	0.05	16.5	24	x	10	679

RETURN AIR #	1	2	3	4	5	6	7	8								BR
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	90	85	90	90	85	75	360	85	0	0	0	0	0	0	0	171
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.	41	52	53	58	53	59	45	41	1	1	1	1	1	1	1	15
EQUIVALENT LENGTH	185	195	165	165	215	265	165	190	0	0	0	0	0	0	0	150
TOTAL EFFECTIVE LH	226	247	218	223	268	324	210	231	1	1	1	1	1	1	1	165
ADJUSTED PRESSURE	0.07	0.06	0.07	0.07	0.06	0.05	0.07	0.06	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.09
ROUND DUCT SIZE	5.9	6	5.9	5.9	6	6	9.9	6	0	0	0	0	0	0	0	7
INLET GRILL SIZE	8	8	8	8	8	8	8	8	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	30	14	0	0	0	0	0	0	0	14

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: MOUNTAINASH 5 LO # 87759
SITE NAME: RUSSEL GARDENS PHASE 3 LOT 258

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	4	@ 10.6 cfm	42.4	cfm
Kitchen & Bathrooms	5	@ 10.6 cfm	53	cfm
Other Rooms	7	@ 10.6 cfm	74.2	cfm
Table 9.32.3.A.		TOTAL	212.0	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	95.4	cfm

SUPPLEMENTAL VENTILATION CAPACITY — 9.32.3.5.

Total Ventilation Capacity	212	cfm
Less Principal Ventil. Capacity	95.4	cfm
Required Supplemental Capacity	116.6	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE 65H Location: BSMT

95.4 cfm 3.0 sones [✓] HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM		ΔT °F		FACTOR		% LOSS
95.4 CFM	X	71 F	X	1.08	X	0.25

SUPPLEMENTAL FANS — PANASONIC

Location	Model	cfm	HVI	Sones
ENS	FV-05-11VK1	50	✓	0.3
ENS-3	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 @ 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: October-20

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.

HVAC DESIGNS ltd.

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

CSA F280-12 Residential Heat Loss and Heat Gain Calculations

Formula Sheet (For Air Leakage / Ventilation Calculation)

LO#: 87759 | Model: MOUNTAINASH 5 | Builder: GREENPARK HOMES | Date: 05/10/2020

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1451	8	11608
First	1451	11	15961
Second	1837	9	16533
Third	0	9	0
Fourth	0	9	0
		Total:	44,102.0 ft³
		Total:	1248.8 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.347
SUMMER NATURAL AIR CHANGE RATE	0.124

Design Temperature Difference

	Tin °C	Tout °C	ΔT °C	ΔT °F
Winter DTDh	22	-17	39	71
Summer DTDc	24	31	7	13

5.2.3.1 Heat Loss due to Air Leakage

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

0.347 x 346.90 x 39 °C x 1.2 = 5665 W

= 19327 Btu/h

6.2.6 Sensible Gain due to Air Leakage

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

= 0.124 x 346.90 x 7 °C x 1.2 = 368 W

= 1255 Btu/h

5.2.3.2 Heat Loss due to Mechanical Ventilation

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

95 CFM x 71 °F x 1.08 x 0.25 = 1819 Btu/h

6.2.7 Sensible heat Gain due to Ventilation

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

95 CFM x 13 °F x 1.08 x 0.25 = 330 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	19,327	8,659	1.116
2	0.3		12,528	0.463
3	0.2		13,980	0.277
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

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HEAT LOSS AND GAIN SUMMARY SHEET

MODEL:	MOUNTAINASH 5		LOT 258	**BUILDER:**	GREENPARK HOMES
SFQT:	3288	**LO#**	87759	**SITE:**	RUSSEL GARDENS PHASE 3

DESIGN ASSUMPTIONS

HEATING	°F	COOLING	°F
OUTDOOR DESIGN TEMP.	1	OUTDOOR DESIGN TEMP.	88
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 (ft^3):	44102.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	6
INTERIOR LIGHTING LOAD ($Btu/h/ft^2$):	1.27	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	5.5 ft
LENGTH: 54.0 ft	WIDTH: 37.0 ft	EXPOSED PERIMETER:	182.0 ft

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

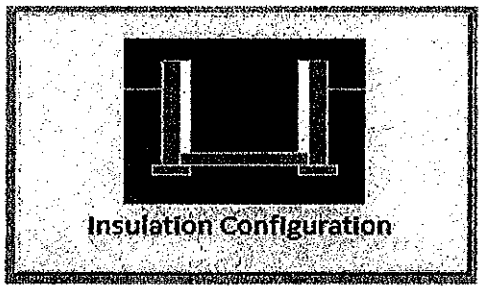
HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description	
Province:	Ontario
Region:	Hamilton
Site Description	
Soil Conductivity:	Normal conductivity: dry sand, loam, clay
Water Table:	Normal (7-10 m, 23-33 ft)

Foundation Dimensions		
Floor Length (m):	16.5	
Floor Width (m):	11.3	
Exposed Perimeter (m):	0.0	
Wall Height (m):	2.4	
Depth Below Grade (m):	1.68	
Window Area (m^2):	2.0	
Door Area (m^2):	1.9	


Insulation Configuration

Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Foundation Loads		
Heating Load (Watts):	**1681**	

TYPE: MOUNTAINASH 5 LOT 258
LO# 87759

HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

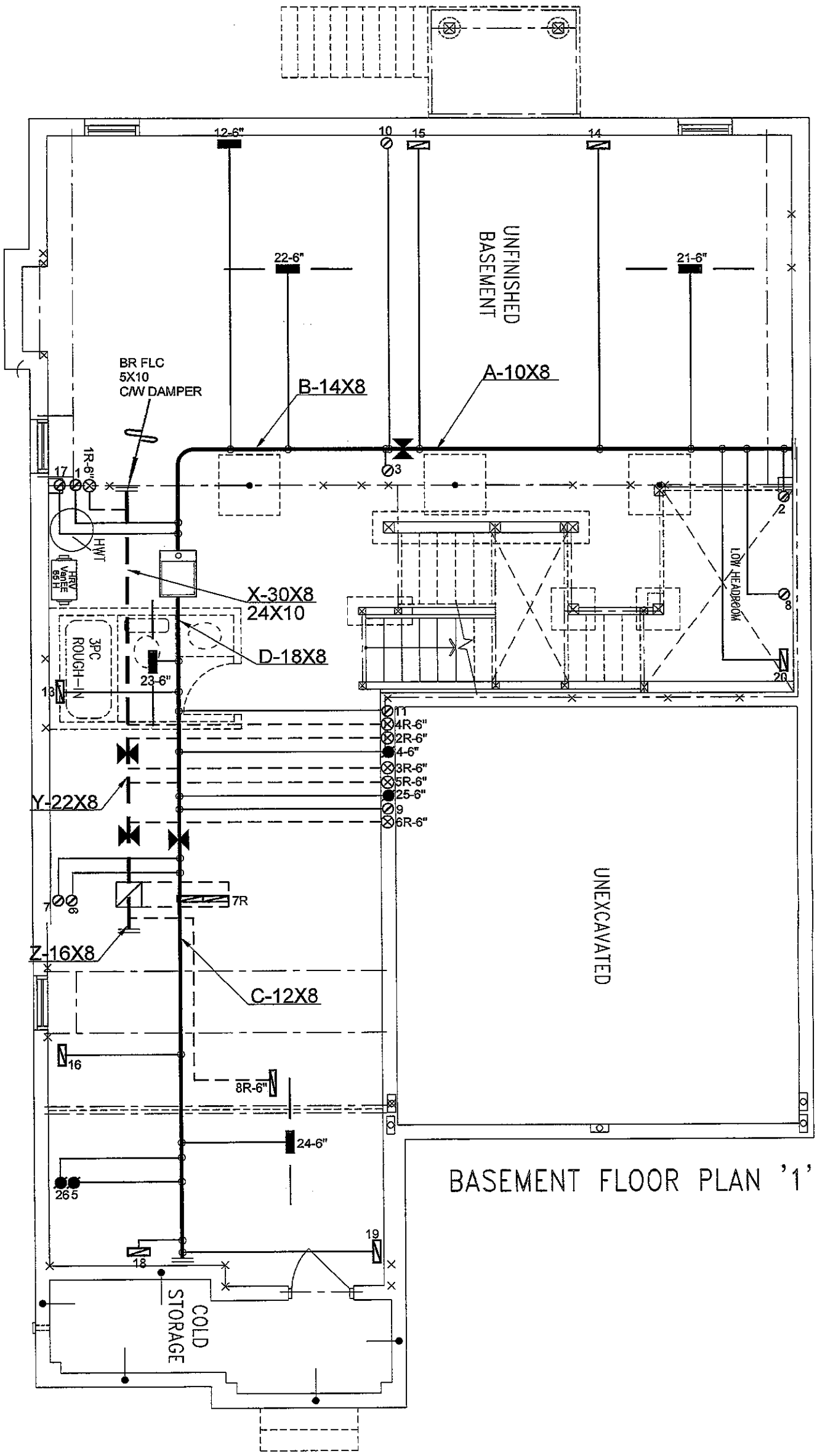
Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description		
Province:	Ontario	
Region:	Hamilton	
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):	7.92	
Building Configuration		
Type:	Detached	
Number of Stories:	Two	
Foundation:	Full	
House Volume (m^3):	1248.8	
Air Leakage/Ventilation		
Air Tightness Type:	Present (1961-) (3.57 ACH)	
Custom BDT Data:	ELA @ 10 Pa.	1664.7 cm^2
	3.57	ACH @ 50 Pa
Mechanical Ventilation (L/s):	Total Supply	Total Exhaust
	45.0	45.0
Flue Size		
Flue #:	#1 #2 #3 #4	
Diameter (mm):	0 0 0 0	
Natural Infiltration Rates		
Heating Air Leakage Rate (ACH/H):	**0.347**	
Cooling Air Leakage Rate (ACH/H):	**0.124**	

TYPE: MOUNTAINASH 5 LOT 258

LO# 87759



BASEMENT FLOOR PLAN '1'

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.

LOT 258
CSA-F280-12
PACKAGE A1

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
RUSSEL GARDENS PHASE 3
HAMILTON, ONTARIO

LOT 258
MOUNTAINASH 5 3288 sqft

HVAC DESIGNS LTD.
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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.

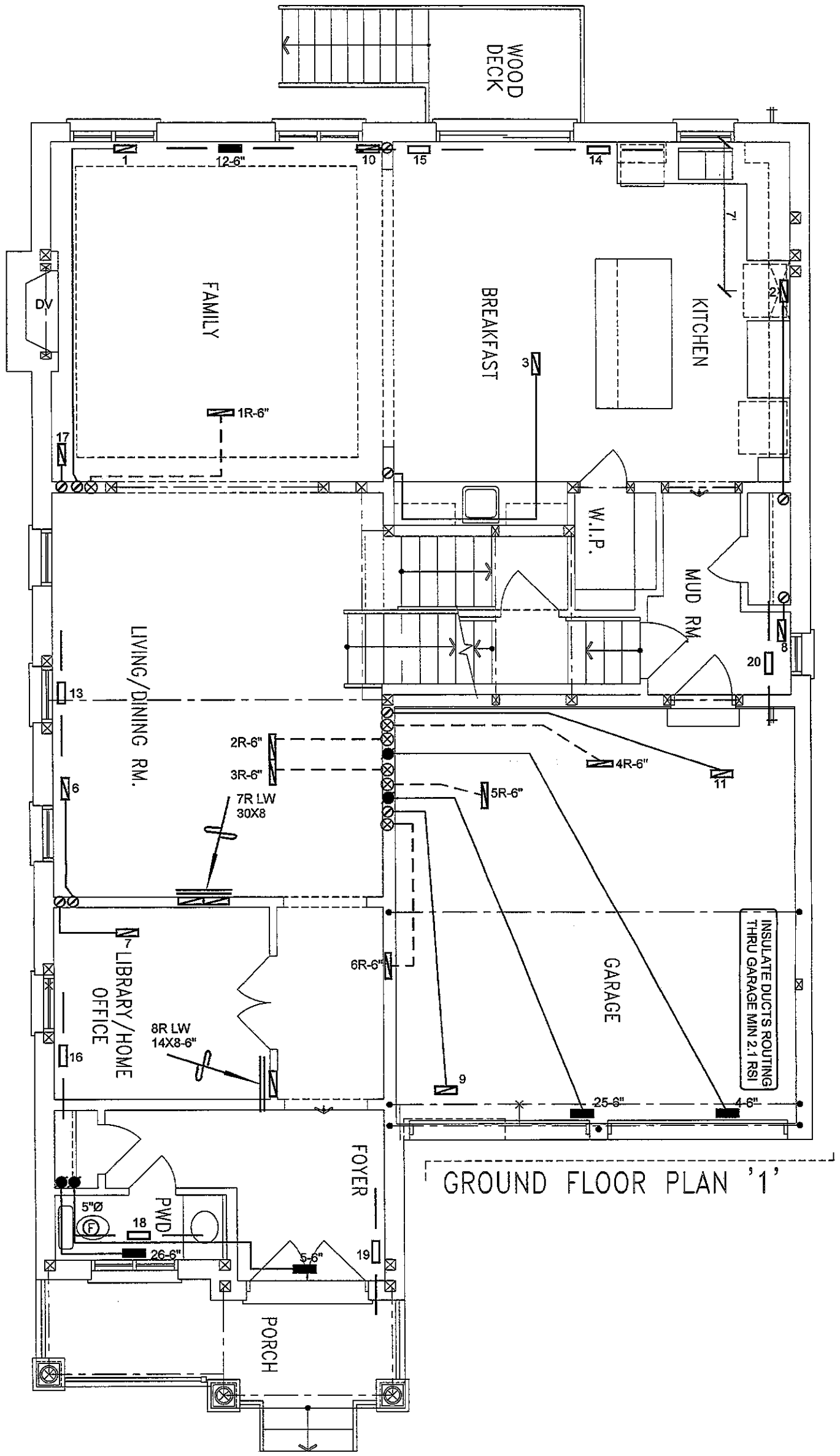
HEAT LOSS	56949 BTU/H
UNIT DATA	
MAKE	GOODMAN
MODEL	GMEC960603BNA
INPUT	60 MBTU/H
OUTPUT	57.6 MBTU/H
COOLING	3.0 TONS
FAN SPEED	1131 cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	14	6	3
1ST FLOOR	8	2	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 OCT/2020
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 87759



GROUND FLOOR PLAN '1'

LOT 258
CSA-F280-12
PACKAGE A1

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

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.		
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1.		

REVISIONS

Client
GREENPARK HOMES

Project Name
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HAMILTON, ONTARIO

LOT 258
MOUNTAINASH 5 3288 sqft

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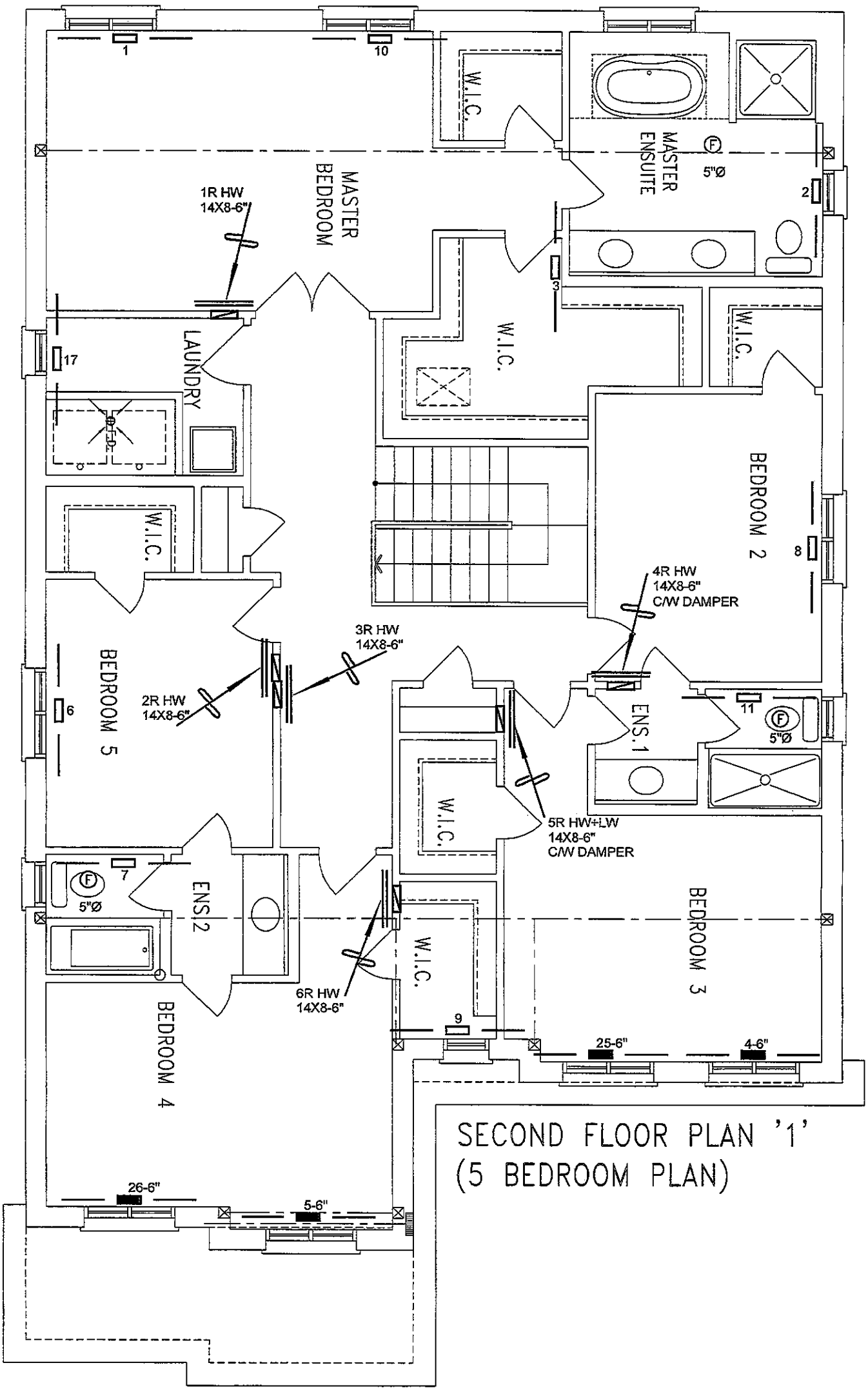
Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

Sheet Title
FIRST FLOOR HEATING LAYOUT

Date OCT/2020
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 87759



SECOND FLOOR PLAN '1'
(5 BEDROOM PLAN)

LOT 258
CSA-F280-12
PACKAGE A1

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.

HVAC LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x6" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x6" 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
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HAMILTON, ONTARIO

LOT 258
MOUNTAINASH 5 3288 sqft

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Sheet Title
SECOND FLOOR HEATING LAYOUT

Date OCT/2020
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 87759