HVAC DESIGNS LTD.

375 Finley Ave. Suite 202 Ajax, ON L1S 2E2
Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

SITE NAME: RUSSEL GARDENS PHASE 3 — LOT 7 — DATE: Aug-20 — WINTER NATURAL AIR CHANGE RATE 0.356 — HEAT LOSS AT °F. 71 — CSA-F280-12
BUILDER: GREENPARK HOMES — TYPE: MOUNTAINASH 6 — GFA: 3401 — LOt# 57170 — SUMMER NATURAL AIR CHANGE RATE 0.127 — HEAT GAIN AT °F. 13 — SB-12 PACKAGE A1

ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4			S-ENS			FLEX			WIC-3			ENS-3		
EXP. WALL			34			29			8			34			33			26			0			11			8			6		
CLG. HT.			9			9			9			9			9			9			9			9			9			9		
	FACTORS																															
GRS.WALL AREA	LOSS	GAIN	306			261			72			306			297			234			0			99			72			54		
GLAZING			LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN
NORTH	19.8	15.1	0	0	0	14	277	212	0	0	0	0	0	0	14	277	212	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EAST	19.8	39.0	0	0	0	0	0	0	0	0	0	46	890	1756	64	1265	2497	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SOUTH	19.8	23.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	217	258	0	0	0	11	217	258	0	0	0	7	138	164
WEST	19.8	39.0	32	633	1249	21	415	819	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NET EXPOSED WALL	4.1	0.8	274	1136	206	226	937	170	72	298	54	261	1082	196	219	908	165	223	924	168	0	0	0	88	365	66	40	166	30	47	195	35
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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EXPOSED CLG	1.2	0.6	285	340	167	204	243	120	139	165	76	272	324	160	198	236	116	180	215	106	123	147	72	209	249	123	46	55	27	102	122	60
NO ATTIC EXPOSED CLG	2.6	1.3	0	0	0	0	0	0	0	0	0	0	0	0	30	77	38	0	0	0	0	0	0	0	0	0	10	26	13	0	0	0
EXPOSED FLOOR	2.4	0.4	0	0	0	0	0	0	0	0	0	286	678	123	30	71	13	0	0	0	123	291	53	0	0	0	56	133	24	0	0	0
BASEMENT/CRAWL HEAT LOSS			0			0			0			0			0			0			0			0			0			0		
SLAB ON GRADE HEAT LOSS			0			0			0			0			0			0			0			0			0			0		
SUBTOTAL HT LOSS			2108			1572			453			2973			2834			1357			438			831			1011			455		
SUB TOTAL HT GAIN					1622			1321			131			2235			3641			532		125			447			1342			260
LEVEL FACTOR / MULTIPLIER			0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27	
AIR CHANGE HEAT LOSS			561			418			121			792			754			361			117			221			289			121		
AIR CHANGE HEAT GAIN					111			90			9			153			268			36		9			31			92			18
DUCT LOSS			0			0			0			377			359			0			85			0			128			0		
DUCT GAIN					0			0			0			299			385			0		50			0			180			0
HEAT GAIN PEOPLE	240		2		480	0		0	0		0	1		240	1		240	1		240	0		0	0		0	0		0	0		0
HEAT GAIN APPLIANCES/LIGHTS					365			365			365			365			365			365		365			365			365			365
TOTAL HT LOSS BTU/H			2670			2370			574			4142			3947			1718			610			1053			1409			576		
TOTAL HT GAIN x 1.3 BTU/H					3351			2310			656			4279			5611			1525		713			1096			2573			835

ROOM USE			L/D			FAM			K/B			L/H			LND			F-WIC			FOY			MUD						WOB			BAS		
EXP. WALL			50			35			44			10			7			12			16			24						56			126		
CLG. HT.			10			10			10			10			9			10			10			11						8			8		
	FACTORS																																		
GRS.WALL AREA	LOSS	GAIN	500			350			440			100			63			120			160			264						448			630		
GLAZING			LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN				LOSS		GAIN	LOSS		GAIN
NORTH	19.8	15.1	0	0	0	0	0	0	8	158	121	18	358	273	7	138	106	0	0	0	14	277	212	0	0	0				9	178	136	0	0	0
EAST	19.8	39.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	297	585	20	395	780	0	0	0				0	0	0	0	0	0
SOUTH	19.8	23.5	36	712	845	0	0	0	16	316	376	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				9	178	211	10	198	235
WEST	19.8	39.0	0	0	0	46	909	1795	33	652	1288	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				62	1225	2419	0	0	0
SKYLT.	34.6	101.5	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
DOORS	23.5	4.3	0	0	0	0	0	0	20	469	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0
NET EXPOSED WALL	4.1	0.8	464	1924	349	304	1260	228	363	1505	273	82	340	62	56	232	42	105	435	79	40	938	170	20	469	85				20	469	85	20	469	85
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	0	0	0	0	0	0	0	0	0				348	1443	262	0	0	0
EXPOSED CLG	1.2	0.6	0	0	0	0	0	0	29	35	17	0	0	0	126	150	74	0	0	0	0	0	0	0	0	0				0	0	0	378	1264	229
NO ATTIC EXPOSED CLG	2.6	1.3	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 FLOOR	2.4	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						0			0		
SLAB ON GRADE HEAT LOSS			0			0			0			0			0			0			0			0						0			2532		
SUBTOTAL HT LOSS			2635			2170			3135			696			621			732			1967			1481						880					
SUB TOTAL HT GAIN					1194			2023			2169			334			222			564		1227			268					4293			4462		
LEVEL FACTOR / MULTIPLIER			0.30	0.45		0.30	0.45		0.30	0.45		0.30	0.45		0.20	0.27		0.30	0.45		0.30	0.45		0.30	0.45						3114			549
AIR CHANGE HEAT LOSS			1220			1004			1451			322			139			338			910			685									0.50	1.13	
AIR CHANGE HEAT GAIN					82			138			147			23			15			45		84			18									9886	
DUCT LOSS			0			0			0			0			0			0			0			0											250
DUCT GAIN					0			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		0	0		0
HEAT GAIN APPLIANCES/LIGHTS					365			365			365			365			365			0		365			365					0		0		0	365
TOTAL HT LOSS BTU/H			3855			3174			4587			1018			659			1071			2877			2166						4293			14348		
TOTAL HT GAIN x 1.3 BTU/H					2133			3285			3474			939			783			922		1704			847						4048			1513	

TOTAL HEAT GAIN BTU/H: 42772 — TONS: 3.56 — LOSS DUE TO VENTILATION LOAD BTU/H: 1515 — STRUCTURAL HEAT LOSS: 57115 — TOTAL COMBINED HEAT LOSS BTU/H: 58630

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: 19569 MICHAEL O'ROURKE

CITY OF HAMILTON
BUILDING DIVISION
Planning & Development Department
FEB 05 2021
REC'D BY _____ DATE _____
REF'D TO _____ DATE _____

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SITE NAME: RUSSEL GARDENS PHASE 3 — LOT 7 — DATE: Aug-20 — GFA: 3401 — LO# 87170
BUILDER: GREENPARK HOMES — TYPE: MOUNTAINASH 6

HEATING CFM	1504	COOLING CFM	1504
TOTAL HEAT LOSS	57,115	TOTAL HEAT GAIN	42,497
AIR FLOW RATE CFM	26.33	AIR FLOW RATE CFM	35.39

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
max s/a dif press. loss	0.02
min adjusted pressure s/a	0.16
r/a pressure	0.17
r/a grille press. Loss	0.02
adjusted pressure r/a	0.15

#'GOODMAN
GMEC960804CNA 80

FAN SPEED	
LOW	868
MEDLOW	978
MEDIUM	1112
MEDIUM HIGH	1504
HIGH	1615

AFUE = 96 %
INPUT (BTU/H) = 80,000
OUTPUT (BTU/H) = 76,800
DESIGN CFM = 1504
CFM @ .6 " E.S.P.
TEMPERATURE RISE 47 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	17	10	5
R/A	0	0	6	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	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	S-ENS	FLEX	WIC-3	MBR	ENS-3	L/D	FAM	K/B	K/B	L/H	LND	F-WIC	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.33	1.19	0.57	2.07	1.32	1.72	0.31	1.05	1.41	1.33	0.58	1.93	1.59	2.29	2.29	1.02	0.66	1.07	2.88	2.17	3.73	3.73	3.73	3.73
CFM PER RUN HEAT	35	31	15	55	35	45	8	28	37	35	15	51	42	60	60	27	17	28	76	57	98	98	98	98
RM GAIN MBH.	1.68	1.15	0.66	2.14	1.84	1.52	0.36	1.10	2.57	1.68	0.84	1.07	1.64	1.74	1.74	0.94	0.78	0.92	1.70	0.85	1.11	1.11	1.11	1.11
CFM PER RUN COOLING	59	41	23	76	65	54	13	39	91	59	30	38	58	61	61	33	28	33	60	30	39	39	39	39
ADJUSTED PRESSURE	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	0.17	0.17	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH.	37	35	22	65	67	49	44	34	56	26	45	35	26	31	24	19	49	53	46	23	38	40	33	33
EQUIVALENT LENGTH	120	150	160	150	200	190	170	150	160	140	180	120	110	140	130	100	180	140	130	120	150	160	120	180
TOTAL EFFECTIVE LENGTH	157	185	182	215	267	239	214	184	216	166	225	155	136	171	154	119	229	193	176	143	188	200	153	213
ADJUSTED PRESSURE	0.11	0.09	0.09	0.08	0.06	0.07	0.08	0.09	0.08	0.1	0.08	0.11	0.13	0.1	0.11	0.14	0.08	0.09	0.1	0.12	0.09	0.08	0.11	0.08
ROUND DUCT SIZE	5	4	4	6	6	5	4	4	6	5	4	4	4	5	5	4	4	4	5	5	6	6	6	6
HEATING VELOCITY (ft/min)	257	356	172	280	178	330	92	321	189	257	172	585	482	441	441	310	195	321	558	419	500	500	500	500
COOLING VELOCITY (ft/min)	433	470	264	388	331	396	149	447	464	433	344	436	665	448	448	379	321	379	441	220	199	199	199	199
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	4X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	D	F	F	C	A	C	B	C	B	D	C	B	F	D	D	F	C	A	A	F	F	D	C	A

RUN #	25	26	27	28	29	30	31	32
ROOM NAME	BED-2	BED-3	ENS	S-ENS	FAM	L/D	BAS	BED-3
RM LOSS MBH.	2.07	1.32	1.19	0.31	1.59	1.93	3.73	1.32
CFM PER RUN HEAT	55	35	31	8	42	51	98	35
RM GAIN MBH.	2.14	1.84	1.15	0.36	1.64	1.07	1.11	1.84
CFM PER RUN COOLING	76	65	41	13	58	38	39	65
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.17
ACTUAL DUCT LGH.	60	74	30	40	14	49	46	70
EQUIVALENT LENGTH	180	200	120	180	150	170	160	200
TOTAL EFFECTIVE LENGTH	240	274	150	220	164	219	206	270
ADJUSTED PRESSURE	0.07	0.06	0.11	0.08	0.1	0.08	0.08	0.06
ROUND DUCT SIZE	6	6	4	4	5	5	6	6
HEATING VELOCITY (ft/min)	280	178	356	92	308	374	500	178
COOLING VELOCITY (ft/min)	388	331	470	149	426	279	199	331
OUTLET GRILL SIZE	4X10	4X10	3X10	3X10	3X10	3X10	4X10	4X10
TRUNK	B	A	F	B	F	A	A	A

CITY OF HAMILTON
BUILDING DIVISION
Planning & Development Department
FEB 05 2021
REC'D BY ____ DATE ____
REV'D TO ____ DATE ____

SUPPLY AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)
TRUNK A	456	0.06	11.2	14	x	8	586
TRUNK B	615	0.06	12.6	18	x	8	615
TRUNK C	873	0.06	14.3	24	x	8	655
TRUNK D	288	0.08	8.8	10	x	8	518
TRUNK E	1161	0.06	15.9	30	x	8	697
TRUNK F	343	0.09	9.1	10	x	8	617

	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	0.05	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	585	0.05	12.9	20	x	8	527
TRUNK W	150	0.05	7.8	8	x	8	338
TRUNK X	919	0.05	15.3	28	x	8	591
TRUNK Y	685	0.05	13.7	22	x	8	560
TRUNK Z	535	0.05	12.5	18	x	8	535
DROP	1504	0.05	18.4	24	x	14	645

RETURN AIR #	1	2	3	4	5	6	7	8	9							BR
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	75	75	135	115	75	75	185	400	135	0	0	0	0	0	0	234
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.	68	68	57	74	67	69	21	23	38	1	1	1	1	1	1	17
EQUIVALENT LENGTH	245	235	215	235	220	215	155	160	285	0	0	0	0	0	0	145
TOTAL EFFECTIVE LH	313	303	272	309	287	284	176	183	323	1	1	1	1	1	1	162
ADJUSTED PRESSURE	0.05	0.05	0.05	0.05	0.05	0.05	0.08	0.08	0.05	14.80	14.80	14.80	14.80	14.80	14.80	0.09
ROUND DUCT SIZE	6	6	7.5	7	6	6	7.5	9.9	7.5	0	0	0	0	0	0	7.9
INLET GRILL SIZE	8	8	8	8	8	8	8	8	8	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	30	14	0	0	0	0	0	0	24

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

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TYPE: MOUNTAINASH 6 LO # 87170
SITE NAME: RUSSEL GARDENS PHASE 3 LOT 7

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	6	@ 10.6 cfm	63.6	cfm
Other Rooms	9	@ 10.6 cfm	95.4	cfm
Table 9.32.3.A.		TOTAL	233.2	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	79.6	cfm
5	Bedroom	95.4	cfm
	TOTAL	79.5	cfm

SUPPLEMENTAL VENTILATION CAPACITY 9.32.3.5.

Total Ventilation Capacity	233.2	cfm
Less Principal Ventil. Capacity	79.5	cfm
Required Supplemental Capacity	153.7	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	71 F	X	1.08	X	0.25

SUPPLEMENTAL FANS PANASONIC

Location	Model	cfm	HVI	Sones
ENS	FV-05-11VK1	50	✓	0.3
S-ENS	FV-05-11VK1	50	✓	0.3
ENS-3	FV-05-11VK1	50	✓	0.3
F-WIC	FV-05-11VK1	50	✓	0.3

HEAT RECOVERY VENTILATOR 9.32.3.11.

Model: VANEE 65H

155 cfm high 64 cfm low

76 % 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 #:

CITY OF HAMILTON
BUILDING DIVISION
Planning & Development Department
FEB 05 2021
REC'D BY DATE
REF'D TO DATE

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: August-20

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

HVAC DESIGNS LTD.

375 Finley Ave. Suite 202 Ajax, ON L1S 2E2
Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

CSA F280-12 Residential Heat Loss and Heat Gain Calculations

Formula Sheet (For Air Leakage / Ventiliation Calculation)

LO#: 87170 Model: MOUNTAINASH 6 Builder: GREENPARK HOMES Date: 8/11/2020

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1486	8	11888
First	1486	10	14860
Second	1915	9	17235
Third	0	9	0
Fourth	0	9	0
		Total:	43,983.0 ft³
		Total:	1245.5 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.356
SUMMER NATURAL AIR CHANGE RATE	0.127

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

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

0.356 x 345.96 x 39 °C x 1.2 = 5795 W

= 19772 Btu/h

6.2.6 Sensible Gain due to Air Leakage

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

= 0.127 x 345.96 x 7 °C x 1.2 = 376 W

= 1283 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 71 °F x 1.08 x 0.25 = 1515 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 13 °F x 1.08 x 0.25 = 275 Btu/h

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

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

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	19,772	8,755	1.129
2	0.3		12,815	0.463
3	0.2		14,854	0.266
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

CITY OF HAMILTON
BUILDING DIVISION
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HVAC DESIGNS LTD.
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Tel: 905.619.2300 Fax: 905.619.2375
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HEAT LOSS AND GAIN SUMMARY SHEET

MODEL:	MOUNTAINASH 6		LOT 7	**BUILDER:**	GREENPARK HOMES
SFQT:	3401	**LO#**	87170	**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):	43983.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD ($Btu/h/ft^2$):	1.27	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	5.0 ft
LENGTH: 55.0 ft	WIDTH: 36.0 ft	EXPOSED PERIMETER:	126.0 ft
WOB INSULATION CONFIGURATION	SCB_9	WOB EXPOSED PERIMETER	56.0 ft

CITY OF HAMILTON
BUILDING DIVISION
Planning & Development Department
FEB 05 2021
REC'D BY _____ DATE _____
REF'D TO _____ DATE _____

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

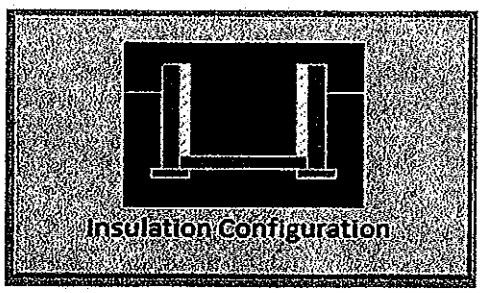
Michael O'Rourke

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):	6.1	 Insulation Configuration
Floor Width (m):	11.0	
Exposed Perimeter (m):	38.4	
Wall Height (m):	2.4	
Depth Below Grade (m):	1.32	
Window Area (m^2):	0.9	
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):	**742**	

TYPE: MOUNTAINASH 6
LO# 87170

LOT 7

CITY OF HAMILTON
BUILDING DIVISION
Planning & Development Department

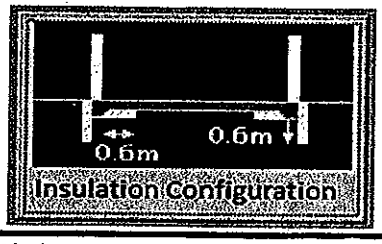
FEB 05 2021

REC'D BY _____ DATE _____
REF'D TO _____ DATE _____

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

Residential Slab on Grade 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		
Length (m):	3.0	
Width (m):	11.0	
Exposed Perimeter (m):	17.1	
Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Results		
Heating Load (Watts):	**234**	

TYPE: MOUNTAINASH 6
LO# 87170

LOT 7

CITY OF HAMILTON
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Planning & Development Department
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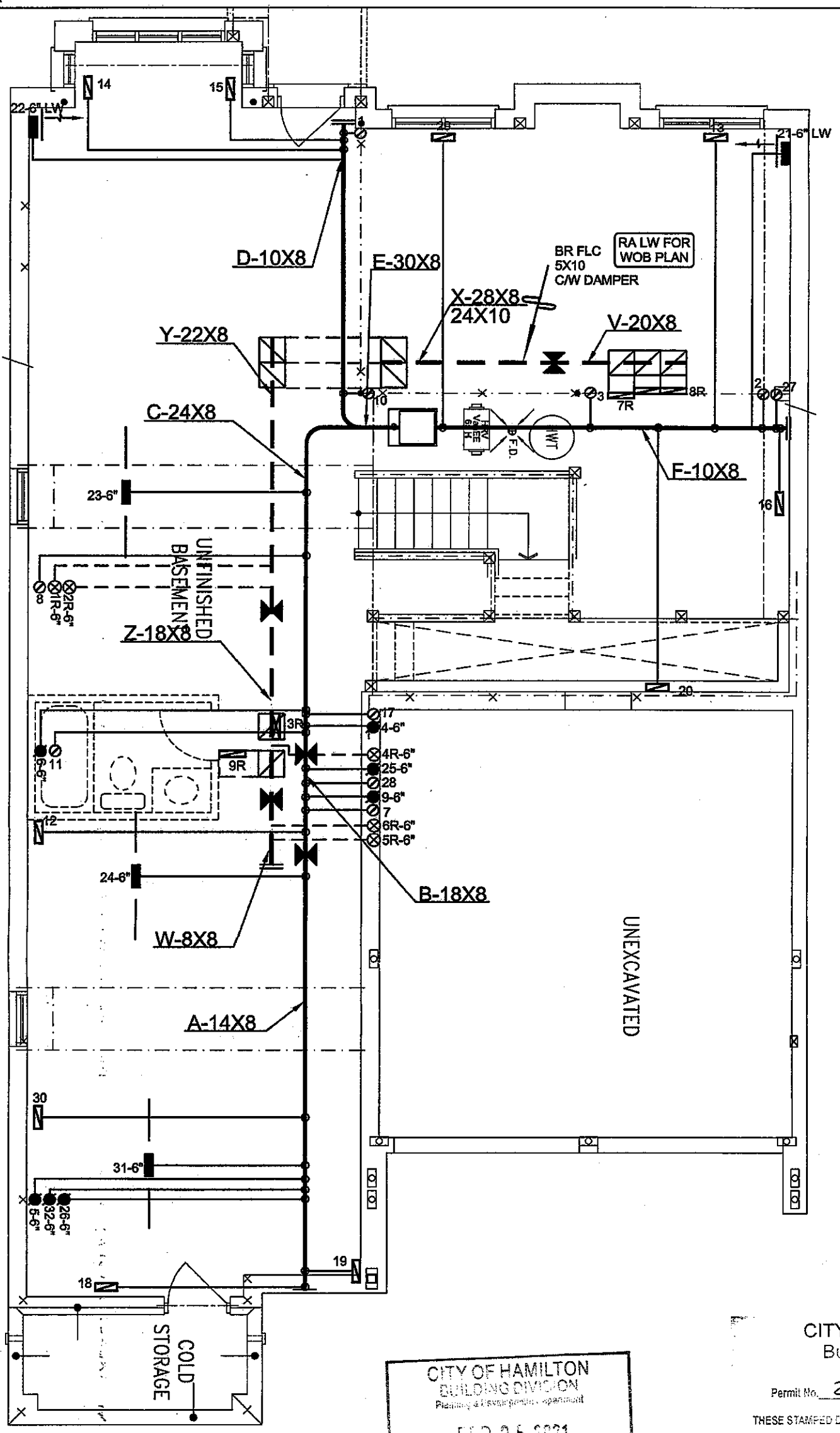
HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

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):	8.23	
Building Configuration		
Type:	Detached	
Number of Stories:	Two	
Foundation:	Full	
House Volume (m^3):	1245.5	
Air Leakage/Ventilation		
Air Tightness Type:	Present (1961-) (3.57 ACH)	
Custom BDT Data:	ELA @ 10 Pa.	1660.2 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 #4	
Diameter (mm):	0 0 0 0	
Natural Infiltration Rates		
Heating Air Leakage Rate (ACH/H):	**0.356**	
Cooling Air Leakage Rate (ACH/H):	**0.127**	

TYPE: MOUNTAINASH 6 LOT 7
LO# 87170



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BUILDING DIVISION
Planning & Development Department
FEB 05 2021
REC'D BY _____ DATE _____
REF'D TO _____ DATE _____

CITY OF HAMILTON
Building Division
Permit No. 21-102430
THESE STAMPED DRAWINGS SHALL BE AVAILABLE ON SITE
THE OWNER AND/OR CONTRACTOR SHALL COMPLY WITH THE ONTARIO BUILDING CODE AND ALL OTHER APPLICABLE LAW
These drawings and/or specifications have been reviewed by
Ken Smith Feb 24, 2021
FOR CHIEF BUILDING OFFICIAL DATE

WOB
LOT 7
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
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.		
2.		
1.		

REVISIONS

Client
GREENPARK HOMES

Project Name
RUSSEL GARDENS PHASE 3
HAMILTON, ONTARIO

LOT 7
MOUNTAINASH 6 3401 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
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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.

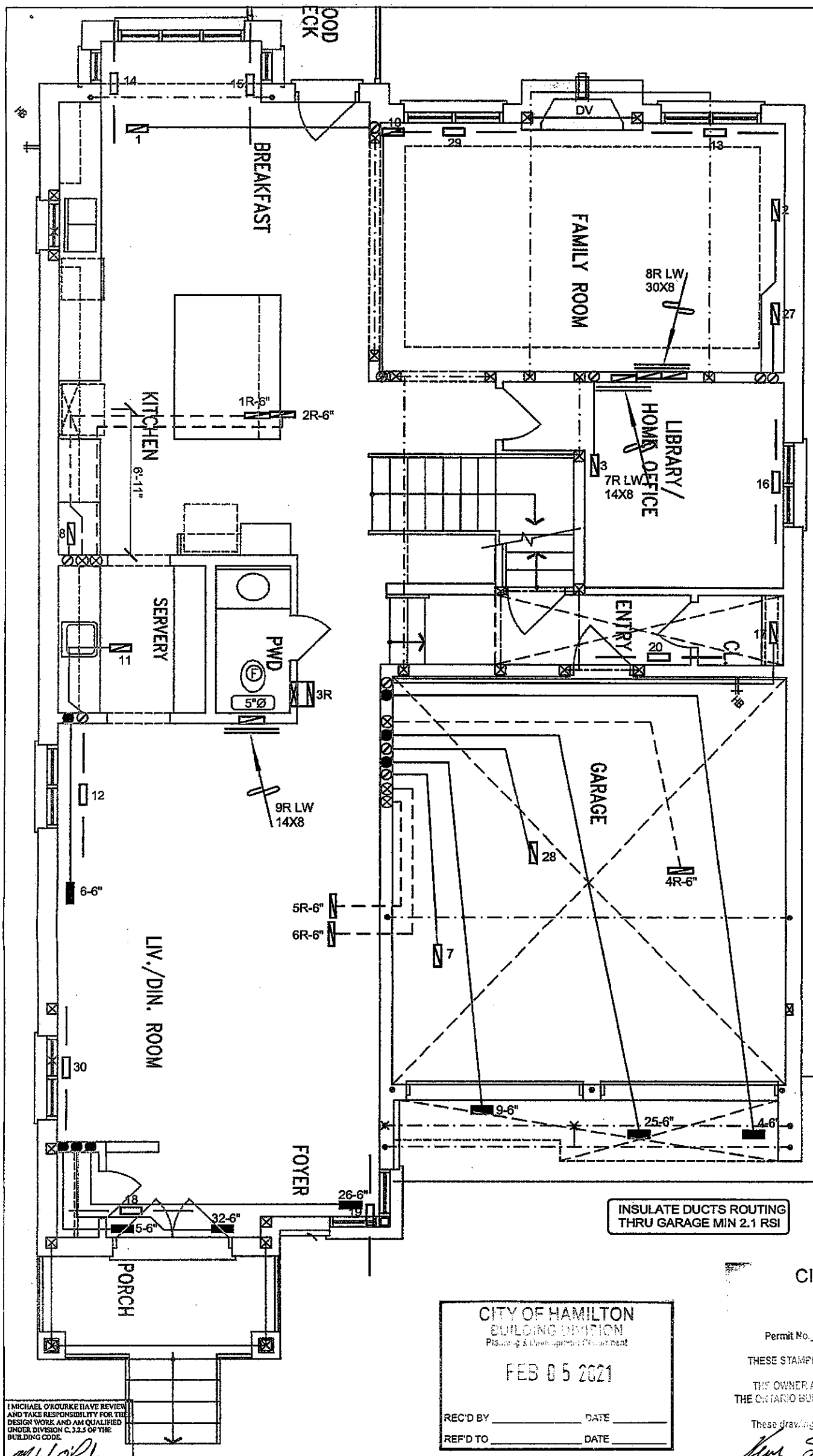
HEAT LOSS 58630 BTU/H	
UNIT DATA	
MAKE	GOODMAN
MODEL	GMEC960804CNA
INPUT	80 MBTU/H
OUTPUT	76.8 MBTU/H
COOLING	3.5 TONS
FAN SPEED	1504 cfm @ 0.5" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	17	6	4
1ST FLOOR	10	3	2
BASEMENT	5	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 APRIL/2020
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 87170



INSULATE DUCTS ROUTING THRU GARAGE MIN 2.1 RSI

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

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

CITY OF HAMILTON
BUILDING DIVISION
Planning & Development Department
FEB 05 2021
REC'D BY _____ DATE _____
REF'D TO _____ DATE _____

CITY OF HAMILTON
Building Division
Permit No. 21-102430
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These drawings and/or specifications have been reviewed by
FOR CHIEF BUILDING OFFICIAL — DATE Feb 24, 2021

WOB
LOT 7
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 7
MOUNTAINASH 6 3401 sqft

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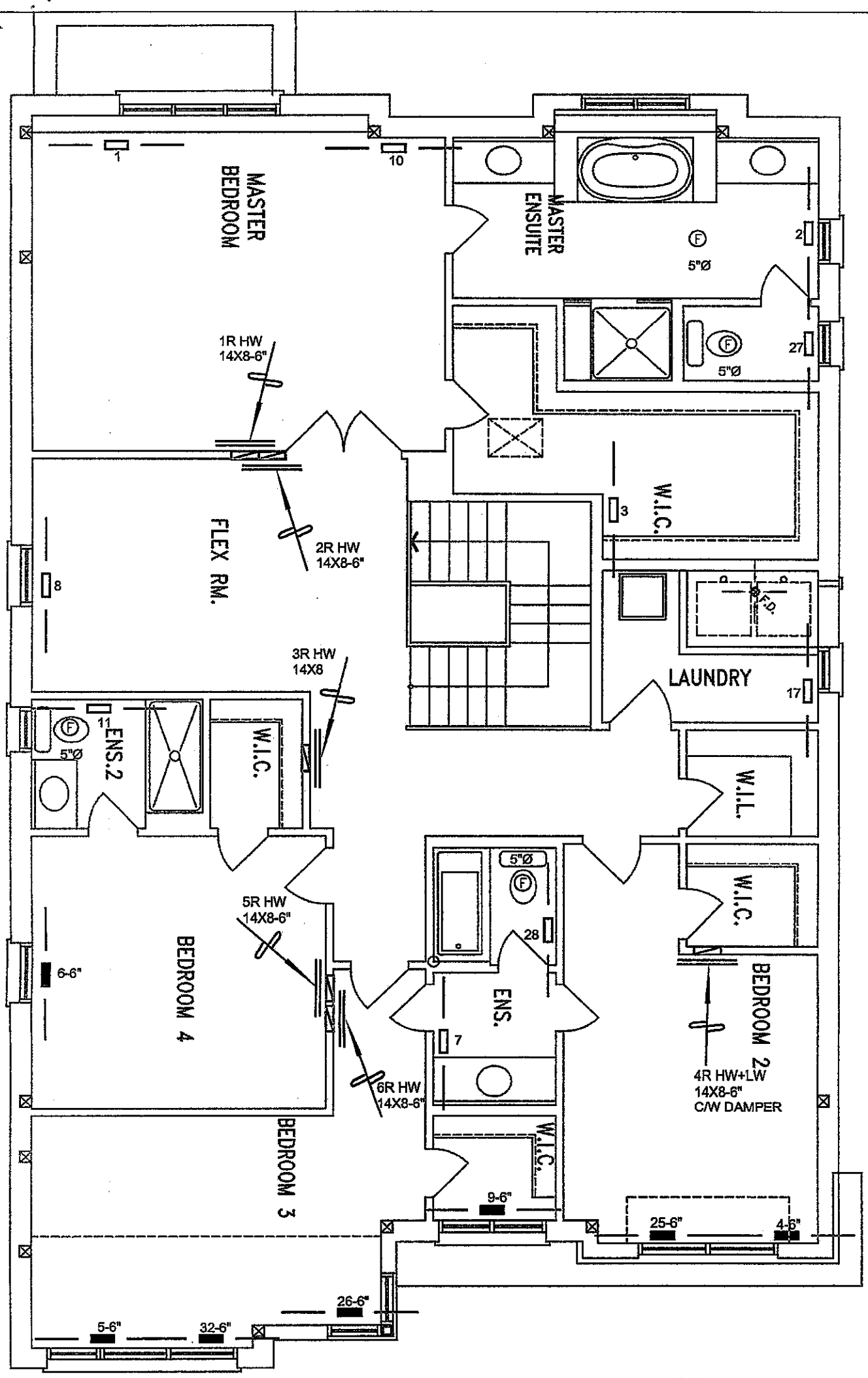
Specializing in Residential Mechanical Design Services

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 APRIL/2020
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 87170



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

CITY OF HAMILTON
BUILDING DIVISION
PLANS EXAMINATION
FEB 05 2021
REC'D BY _____ DATE _____
REF'D TO _____ DATE _____

CITY OF HAMILTON
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Ken Scott Feb 24, 2021
FOR CHIEF BUILDING OFFICIAL DATE

WOB
LOT 7
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
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REVISIONS

Client
GREENPARK HOMES

Project Name
RUSSEL GARDENS PHASE 3
HAMILTON, ONTARIO

LOT 7
MOUNTAINASH 6 3401 sqft

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Sheet Title
SECOND FLOOR HEATING LAYOUT

Date APRIL/2020
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 87170