

ROOM USE	FAM	L/D	K/B	L/R	LND	W/R	FOY	MUD	BAS
EXP. WALL	36	30	37	19	12	18	18	30	180
CLG. HT.	11	11	11	11	9	11	11	12	8
GRS.WALL AREA	396	330	407	209	108	198	198	360	990
GLAZING	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	0 0 0	0 0 0	0 0 0	0 0 0	7 138 106	3 59 45
EAST	19.8 39.0	0 0 0	0 0 0	0 0 0	0 0 0	22 435 858	6 119 234	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	0 0 0	0 0 0	6 119 141
WEST	19.8 39.0	40 791 1561	0 0 0	63 1245 2458	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
SKYLT.	34.6 104.5	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
DOORS	23.5 4.3	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	40 938 179	0 0 0	20 459 85
NET EXPOSED WALL	4.1 0.8	356 1476 266	290 1202 218	344 1426 259	196 813 147	101 419 76	176 730 132	152 630 114	353 1463 265
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
EXPOSED CLG	1.2 0.6	0 0 0	0 0 0	0 0 0	0 0 0	180 215 106	0 0 0	0 0 0	450 1504 273
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
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
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		2267	1993	2571	1070	772	1166	1687	1602
SUB TOTAL HT GAIN		1828	1157	2717	453	346	991	518	371
LEVEL FACTOR / MULTIPLIER	0.30 0.42	0.30 0.42	0.30 0.42	0.30 0.42	0.20 0.25	0.30 0.42	0.30 0.42	0.30 0.42	0.50 1.12
AIR CHANGE HEAT LOSS	959	843	1130	452	192	493	713	677	8778
AIR CHANGE HEAT GAIN		137	87	204	34	26	74	39	26
DUCT LOSS	0	0	0	0	0	0	0	0	0
DUCT GAIN	0	0	0	0	0	0	0	0	0
HEAT GAIN PEOPLE	240	0	0	0	0	0	0	0	0
HEAT GAIN APPLIANCES/LIGHTS		603	603	603	603	603	603	603	603
TOTAL HT LOSS BTU/H	3226	2836	3801	1522	964	1657	2400	2279	10643
TOTAL HT GAIN x 1.3 BTU/H	3339	2401	4581	1417	1268	1384	725	519	1545

TOTAL HEAT GAIN BTU/H:	36570	TONS: 3.06	LOSS DUE TO VENTILATION LOAD BTU/H: 1515	STRUCTURAL HEAT LOSS: 52586	TOTAL COMBINED HEAT LOSS BTU/H: 54102
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Michael Krumbe

SITE NAME: RUSSEL GARDENS PHASE 3
BUILDER: GREENPARK HOMES

LOT 317
TYPE: MOUNTAINASH 5

DATE: Oct-20

GFA: 3298

LO# 87982

HEATING CFM 1131 COOLING CFM 1131
TOTAL HEAT LOSS 52,586 TOTAL HEAT GAIN 36,396
AIR FLOW RATE CFM 21.51 AIR FLOW RATE CFM 31.08

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

AFUE = 96 %
INPUT (BTU/H) = 60,000
OUTPUT (BTU/H) = 57,600

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	15	8	4
R/A	0	0	6	2	1

plenum pressure s/a 0.18
max s/a diff 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

FAN SPEED LOW
MEDLOW
MEDIUM 928
MEDIUM HIGH 1017
HIGH 1131

DESIGN CFM = 1131
CFM @ .6" E.S.P.

TEMPERATURE RISE 47 °F

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	ENS-2	FLEX	WIC-3	MBR	S-ENS	FAM	L/D	K/B	K/B	L/H	LND	W/R	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH	1.30	1.14	0.53	1.96	1.68	1.14	0.79	1.49	0.65	1.30	0.52	3.23	2.84	1.90	1.90	1.52	0.96	1.66	2.40	2.28	4.16	4.16	4.16	4.16
CFM PER RUN HEAT	28	24	12	42	36	25	17	32	14	28	11	69	61	41	41	33	21	36	52	49	89	89	89	89
RM GAIN MBH	1.83	0.75	0.18	2.50	2.50	1.87	0.32	0.71	0.64	1.83	0.34	3.34	2.40	2.29	2.29	1.42	1.27	1.38	0.72	0.52	0.39	0.39	0.39	0.39
CFM PER RUN COOLING	57	23	6	78	78	58	10	22	20	57	11	104	75	71	71	44	39	43	23	16	12	12	12	12
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	56	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	160	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	216	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	0.08	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	4	4	6	6	6	4	4	4	5	4	6	5	5	5	4	4	4	4	5	6	6	6	6
HEATING VELOCITY (ft/min)	206	275	138	214	184	127	195	367	161	206	126	352	448	301	301	379	241	413	597	360	454	454	454	454
COOLING VELOCITY (ft/min)	419	264	69	398	398	296	115	252	229	419	126	530	551	521	521	505	447	493	264	117	61	61	61	61
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	4X10	4X10	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	27
ROOM NAME	BED-2	BED-3	ENS
RM LOSS MBH	1.96	1.68	1.14
CFM PER RUN HEAT	42	36	24
RM GAIN MBH	2.50	2.50	0.75
CFM PER RUN COOLING	78	78	23
ADJUSTED PRESSURE	0.17	0.17	0.17
ACTUAL DUCT LGH	52	48	52
EQUIVALENT LENGTH	120	170	130
TOTAL EFFECTIVE LENGTH	172	218	182
ADJUSTED PRESSURE	0.1	0.08	0.09
ROUND DUCT SIZE	6	6	4
HEATING VELOCITY (ft/min)	214	184	275
COOLING VELOCITY (ft/min)	398	398	264
OUTLET GRILL SIZE	4X10	4X10	3X10
TRUNK	D	C	A

SUPPLY AIR TRUNK SIZE														RETURN 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 CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)						
TRUNK A	300	0.08	8.9	10	x	8	540	TRUNK G	0	0.00	0	0	x	8	0	TRUNK O	0	0.05	0	0	x	8	0						
TRUNK B	547	0.08	11.2	14	x	8	703	TRUNK H	0	0.00	0	0	x	8	0	TRUNK P	0	0.05	0	0	x	8	0						
TRUNK C	324	0.07	9.5	10	x	8	583	TRUNK I	0	0.00	0	0	x	8	0	TRUNK Q	0	0.05	0	0	x	8	0						
TRUNK D	583	0.07	11.8	16	x	8	656	TRUNK J	0	0.00	0	0	x	8	0	TRUNK R	0	0.05	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 S	0	0.05	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	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
														TRUNK Q	0	0.05	0	0	x	8	0	TRUNK R	1131	0.05	16.5	24	x	10	679
														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	0	0.05	0	0	x	8	0
														TRUNK Y	0	0.05	0	0	x	8	0	TRUNK Z	0	0.05	0	0	x	8	0
														TRUNK Z	0	0.05	0	0	x	8	0	TRUNK A	0	0.05	0	0	x	8	0
														TRUNK A	0	0.05	0	0	x	8	0	TRUNK B	0	0.05	0	0	x	8	0
														TRUNK B	0	0.05	0	0	x	8	0	TRUNK C	0	0.05	0	0	x	8	0
														TRUNK C	0	0.05	0	0	x	8	0	TRUNK D	0	0.05	0	0	x	8	0
														TRUNK D	0	0.05	0	0	x	8	0	TRUNK E	0	0.05	0	0	x	8	0
														TRUNK E	0	0.05	0	0	x	8	0	TRUNK F	0	0.05	0	0	x	8	0
														TRUNK F	0	0.05	0	0	x	8	0	TRUNK G	0	0.05	0	0	x	8	0
														TRUNK G	0	0.05	0	0	x	8	0	TRUNK H	0	0.05	0	0	x	8	0
														TRUNK H	0	0.05	0	0	x	8	0	TRUNK I	0	0.05	0	0	x	8	0
														TRUNK I	0	0.05	0	0	x	8	0	TRUNK J	0	0.05	0	0	x	8	0
														TRUNK J	0	0.05	0	0	x	8	0	TRUNK K	0	0.05	0	0	x	8	0
														TRUNK K	0	0.05	0	0	x	8	0	TRUNK L	0	0.05	0	0	x	8	0
														TRUNK L	0	0.05	0	0	x	8	0	TRUNK M	0	0.05	0	0	x	8	0
														TRUNK M	0	0.05	0	0	x	8	0	TRUNK N	0	0.05	0	0	x	8	0
														TRUNK N	0	0.05	0	0	x	8	0	TRUNK O	0	0.05	0	0	x	8	0
														TRUNK O	0	0.05	0	0	x	8	0	TRUNK P	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 Q	0	0.05	0	0	x	8	0	TRUNK R	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 S	0	0.05	0	0	x	8	0	TRUNK T	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 U	0	0.05	0	0	x	8	0	TRUNK V	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 W	0	0.05	0	0	x	8	0	TRUNK X	0	0.05	0	0	x	8	0
														TRUNK X	0	0.05	0	0	x	8	0	TRUNK Y	0	0.05	0	0	x	8	0
														TRUNK Y	0	0.05	0	0	x	8	0	TRUNK Z	0	0.05	0	0	x	8	0
														TRUNK Z	0	0.05	0	0	x	8	0	TRUNK A	0	0.05	0	0	x	8	0
														TRUNK A	0	0.05	0	0	x	8	0	TRUNK B	0	0.05	0	0	x	8	0
														TRUNK B	0	0.05	0	0	x	8	0	TRUNK C	0	0.05	0	0	x	8	0
														TRUNK C	0	0.05	0	0	x	8	0	TRUNK D	0	0.05	0	0	x	8	0
														TRUNK D	0	0.05	0	0	x	8	0	TRUNK E	0	0.05	0	0	x	8	0
														TRUNK E	0	0.05	0	0	x	8	0	TRUNK F	0	0.05	0	0	x	8	0
														TRUNK F	0	0.05	0	0	x	8	0	TRUNK G	0	0.05	0	0	x	8	0
														TRUNK G	0	0.05	0	0	x	8	0	TRUNK H	0	0.05	0	0	x	8	0
														TRUNK H	0	0.05	0	0	x	8	0	TRUNK I	0	0.05	0	0	x	8	0
														TRUNK I	0	0.05	0	0	x	8	0	TRUNK J	0	0.05	0	0	x	8	0
														TRUNK J	0	0.05	0	0	x	8	0	TRUNK K	0	0.05	0	0	x	8	0
														TRUNK K	0	0.05	0	0	x	8	0	TRUNK L	0	0.05	0	0	x	8	0
														TRUNK L	0	0.05	0	0	x	8	0	TRUNK M	0	0.05	0	0	x	8	0
														TRUNK M	0	0.05	0	0	x	8	0	TRUNK N	0	0.05	0	0	x	8	0
														TRUNK N	0	0.05	0	0	x	8	0	TRUNK O	0	0.05	0	0	x	8	0
														TRUNK O	0	0.05	0	0	x	8	0	TRUNK P	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 Q	0	0.05	0	0	x	8	0	TRUNK R	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 S	0	0.05	0	0	x	8	0	TRUNK T	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 U	0	0.05	0	0	x	8	0	TRUNK V	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 W	0	0.05	0	0	x	8	0	TRUNK X	0	0.05	0	0	x	8	0
														TRUNK X	0	0.05	0	0	x	8	0	TRUNK Y	0	0.05	0	0	x	8	0
														TRUNK Y	0	0.05	0	0	x	8	0	TRUNK Z	0	0.05	0	0	x	8	0
														TRUNK Z	0	0.05	0	0	x	8	0	TRUNK A	0	0.05	0	0	x	8	0
														TRUNK A	0	0.05	0	0	x	8	0	TRUNK B	0	0.05	0	0	x	8	0
														TRUNK B	0	0.05	0	0	x	8	0	TRUNK C	0	0.05	0	0	x	8	0
														TRUNK C	0	0.05	0	0	x	8	0	TRUNK D	0	0.05	0	0	x	8	0
														TRUNK D	0	0.05	0	0	x	8	0	TRUNK E	0	0.05	0	0	x	8	0
														TRUNK E	0	0.05	0	0	x	8	0	TRUNK F	0	0.05	0	0	x	8	0
														TRUNK F	0	0.05	0	0	x	8	0	TRUNK G	0	0.05	0	0	x	8	0
														TRUNK G	0	0.05	0	0	x	8	0	TRUNK H	0	0.05	0	0	x	8	0
														TRUNK H	0	0.05	0	0	x	8	0	TRUNK I	0	0.05	0	0	x	8	0
														TRUNK I	0	0.05	0	0	x	8	0	TRUNK J	0	0.05	0	0	x	8	0
														TRUNK J	0	0.05	0	0	x	8	0	TRUNK K	0	0.05	0	0	x	8	0
														TRUNK K	0	0.05	0	0	x	8	0	TRUNK L	0	0.05	0	0	x	8	0
														TRUNK L	0	0.05	0	0	x	8	0	TRUNK M	0	0.05	0	0	x	8	0
														TRUNK M	0	0.05	0	0	x	8	0	TRUNK N	0	0.05	0	0	x	8	0
														TRUNK N	0	0.05	0	0	x	8	0	TRUNK O	0	0.05	0	0	x	8	0
														TRUNK O	0	0.05	0	0	x	8	0	TRUNK P	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 Q	0	0.05	0	0	x	8	0	TRUNK R	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 S	0	0.05	0	0	x	8	0	TRUNK T	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 U	0	0.05	0	0	x	8	0	TRUNK V	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 W	0	0.05	0	0	x	8	0	TRUNK X	0	0.05	0	0	x	8	0
														TRUNK X	0	0.05	0	0	x	8	0	TRUNK Y	0	0.05	0	0	x	8	0
														TRUNK Y	0	0.05	0	0	x	8	0	TRUNK Z	0	0.05	0	0	x	8	0
														TRUNK Z	0	0.05	0	0	x	8	0	TRUNK A	0	0.05	0	0	x	8	0
														TRUNK A	0	0.05	0	0	x	8	0	TRUNK B	0	0.05	0	0	x	8	0
														TRUNK B	0	0.05	0	0	x	8	0	TRUNK C	0	0.05	0	0	x	8	0
														TRUNK C	0	0.05	0	0	x	8	0	TRUNK D	0	0.05	0	0	x	8	0
														TRUNK D	0	0.05	0	0	x	8	0	TRUNK E	0	0.05	0	0	x	8	0
														TRUNK E	0	0.05	0	0	x	8	0	TRUNK F	0	0.05	0	0	x	8	0
														TRUNK F	0	0.05	0	0	x	8	0	TRUNK G	0	0.05	0	0	x	8	0
														TRUNK G	0	0.05	0	0	x	8	0	TRUNK H	0	0.05	0	0	x	8	0
														TRUNK H	0	0.05	0	0	x	8	0	TRUNK I	0	0.05	0	0	x	8	0
														TRUNK I	0	0.05	0	0	x	8	0	TRUNK J	0	0.05	0	0	x	8	0

TYPE: MOUNTAINASH 5
SITE NAME: RUSSEL GARDENS PHASE 3

LO # 87982
LOT 317

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	7 @ 10.6 cfm	74.2 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	71 F	1.08	0.25

SUPPLEMENTAL FANS		PANASONIC
Location	Model	cfm HVI Sones
ENS	FV-05-11VK1	50 ✓ 0.3
ENS-2	FV-05-11VK1	50 ✓ 0.3
S-ENS	FV-05-11VK1	50 ✓ 0.3
WR	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:	<i>Michael O'Rourke</i>
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

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

LO#: 87982

Model: MOUNTAINASH 5

Builder: GREENPARK HOMES

Date: 28/10/2020

Volume Calculation
House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1452	8	11616
First	1452	11	15972
Second	1846	9	16614
Third	0	9	0
Fourth	0	9	0
Total:			44,202.0 ft³
Total:			1251.7 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.314
SUMMER NATURAL AIR CHANGE RATE	0.113

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

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

$$0.314 \times 347.68 \times 39^\circ\text{C} \times 1.2 = 5146 \text{ W}$$

$$= 17557 \text{ Btu/h}$$

6.2.6 Sensible Gain due to Air Leakage

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

$$= 0.113 \times 347.68 \times 7^\circ\text{C} \times 1.2 = 334 \text{ W}$$

$$= 1140 \text{ Btu/h}$$

5.2.3.2 Heat Loss due to Mechanical Ventilation

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

$$80 \text{ CFM} \times 71^\circ\text{F} \times 1.08 \times 0.25 = 1515 \text{ Btu/h}$$

6.2.7 Sensible heat Gain due to Ventilation

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

$$80 \text{ CFM} \times 13^\circ\text{F} \times 1.08 \times 0.25 = 275 \text{ Btu/h}$$

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

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

Level	Level Factor (LF)	HLairve Air Leakage + Ventilation Heat Loss (Btu/h)	Level Conductive Heat Loss: (HL _{level})	Air Leakage Heat Loss Multiplier (LF x HLairbv / HL _{level})
1	0.5	17,557	7,864	1.116
2	0.3		12,454	0.423
3	0.2		14,089	0.249
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

HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: MOUNTAINASH 5	LOT 317	BUILDER: GREENPARK HOMES
SFQT: 3298	LO# 87982	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 (ft³):	44202.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD (Btu/h/ft²):	1.27	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	5.5 ft
LENGTH: 54.0 ft	WIDTH: 36.0 ft	EXPOSED PERIMETER:	180.0 ft

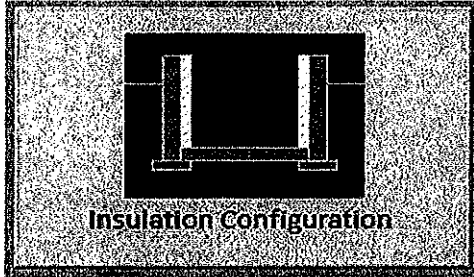
2012 OBC - COMPLIANCE PACKAGE		Compliance Package A1	
Component		Nominal	Min. Eff.
Ceiling with Attic Space Minimum RSI (R)-Value		60	59.22
Ceiling Without Attic Space Minimum RSI (R)-Value		31	27.65
Exposed Floor Minimum RSI (R)-Value		31	29.80
Walls Above Grade Minimum RSI (R)-Value		22	17.03
Basement 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



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	 Insulation Configuration
Floor Width (m):	11.0	
Exposed Perimeter (m):	0.0	
Wall Height (m):	2.4	
Depth Below Grade (m):	1.68	
Window Area (m ²):	0.8	
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):	1674	

TYPE: MOUNTAINASH 5
LO# 87982

LOT 317

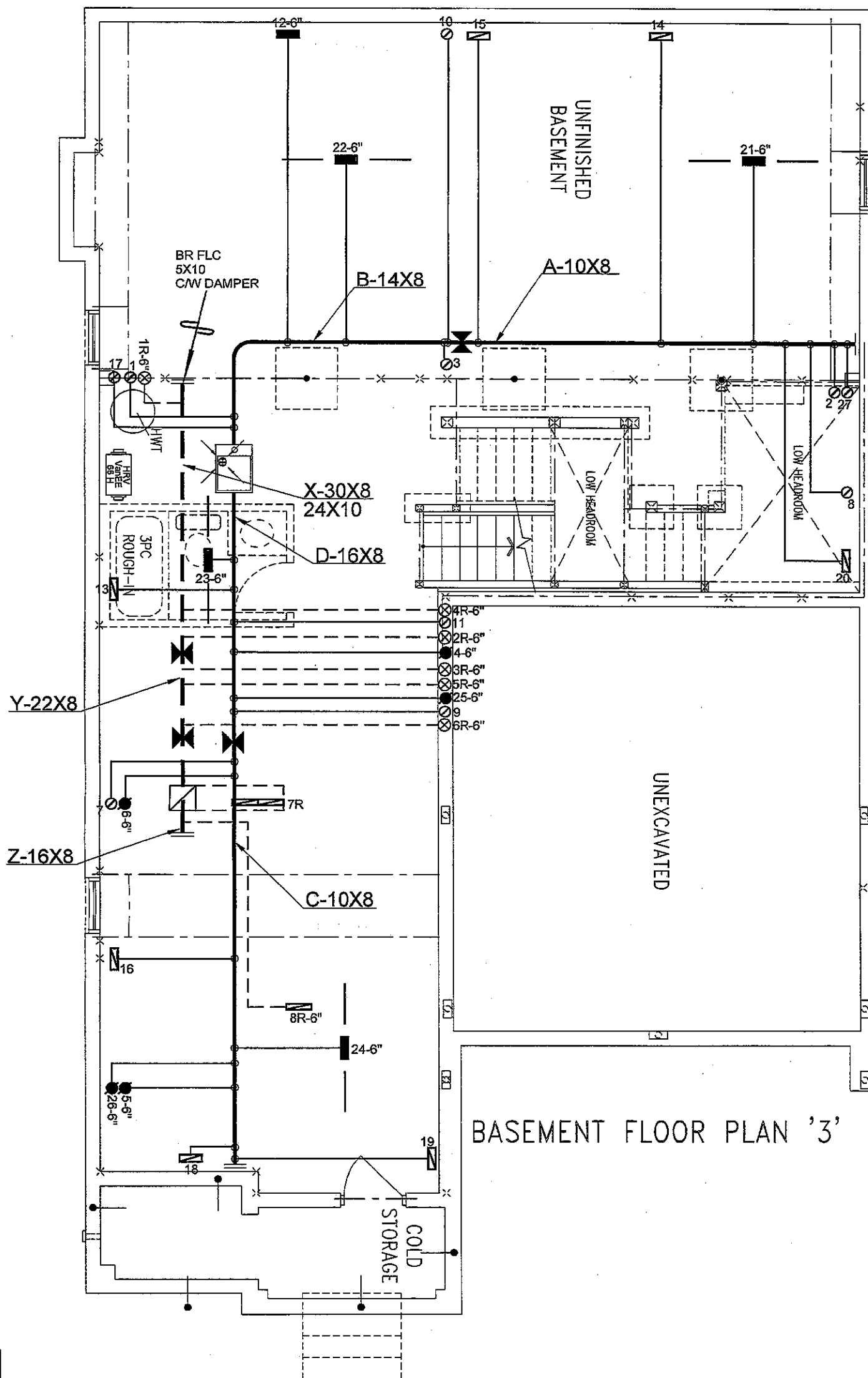
Air Infiltration Residential Load Calculator

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):	6.86			
Building Configuration				
Type:	Detached			
Number of Stories:	Two			
Foundation:	Full			
House Volume (m ³):	1251.7			
Air Leakage/Ventilation				
Air Tightness Type:	Present (1961-) (3.57 ACH)			
Custom BDT Data:	ELA @ 10 Pa. 3.57	1668.5 cm ² 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):	0.314			
Cooling Air Leakage Rate (ACH/H):	0.113			

TYPE: MOUNTAINASH 5
LO# 87982

LOT 317



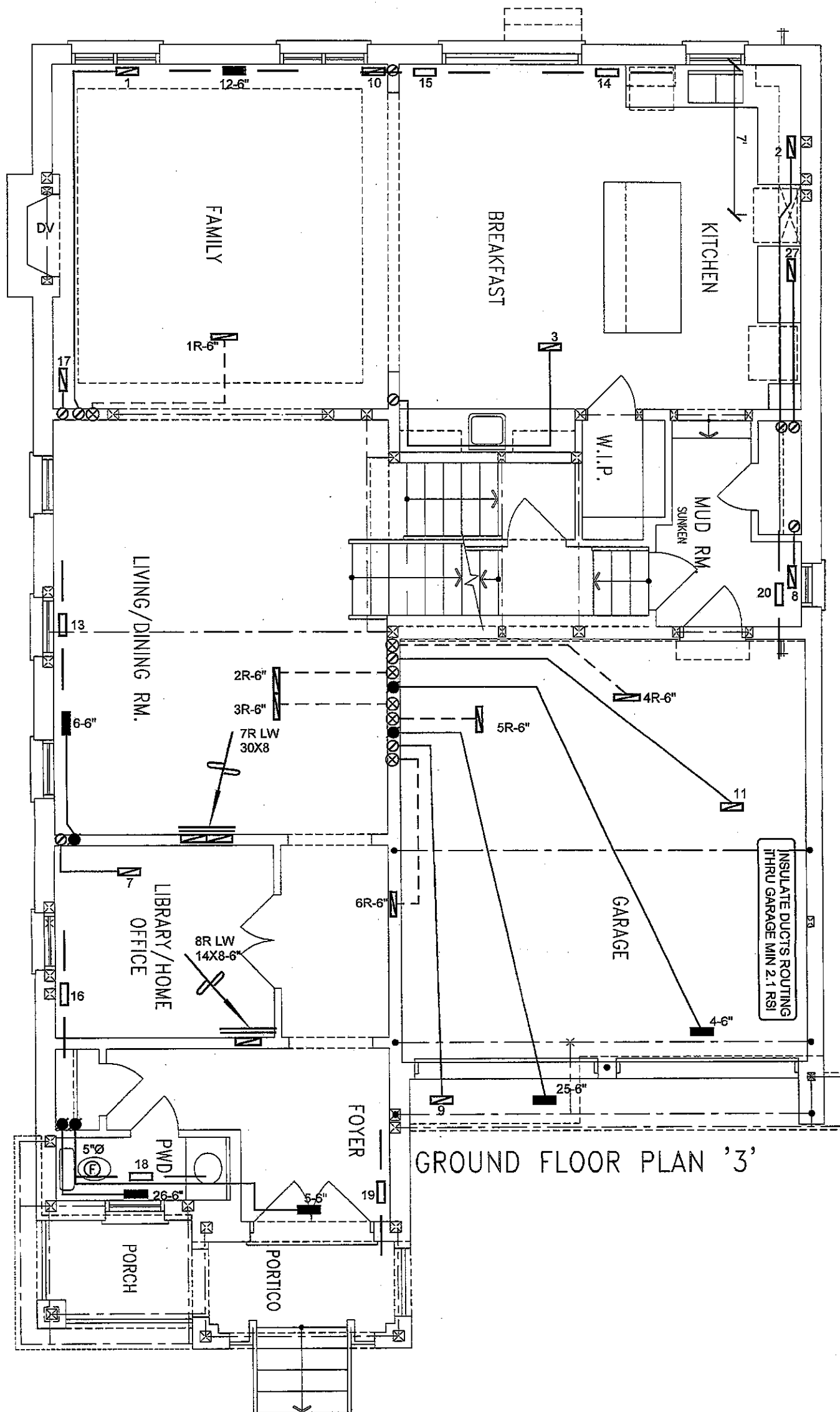
I MICHAEL O'ROURKE HAVE REVIEWED AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C.3.2.5 OF THE BUILDING CODE.
Michael O'Rourke
Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

LOT 317
CSA-F280-12
PACKAGE A1

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

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Client		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 54102 BTU/H UNIT DATA		# OF RUNS S/A R/A FANS				Sheet Title	
GREENPARK HOMES			MAKE GOODMAN	3RD FLOOR					BASEMENT HEATING LAYOUT	
Project Name RUSSEL GARDENS PHASE 3 HAMILTON, ONTARIO			MODEL GMEC960603BNA	2ND FLOOR		15	6	4		
			INPUT 60 MBTU/H	1ST FLOOR		8	2	3		
			OUTPUT 57.6 MBTU/H	BASEMENT		4	1	0	Date OCT/2020	
		COOLING 3.0 TONS	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		Scale 3/16" = 1'-0"				BCIN# 19669	
LOT 317 MOUNTAINASH 5 3298 sqft		FAN SPEED 1131 cfm @ 0.5" w.c.					LO#		87982	



GROUND FLOOR PLAN '3'

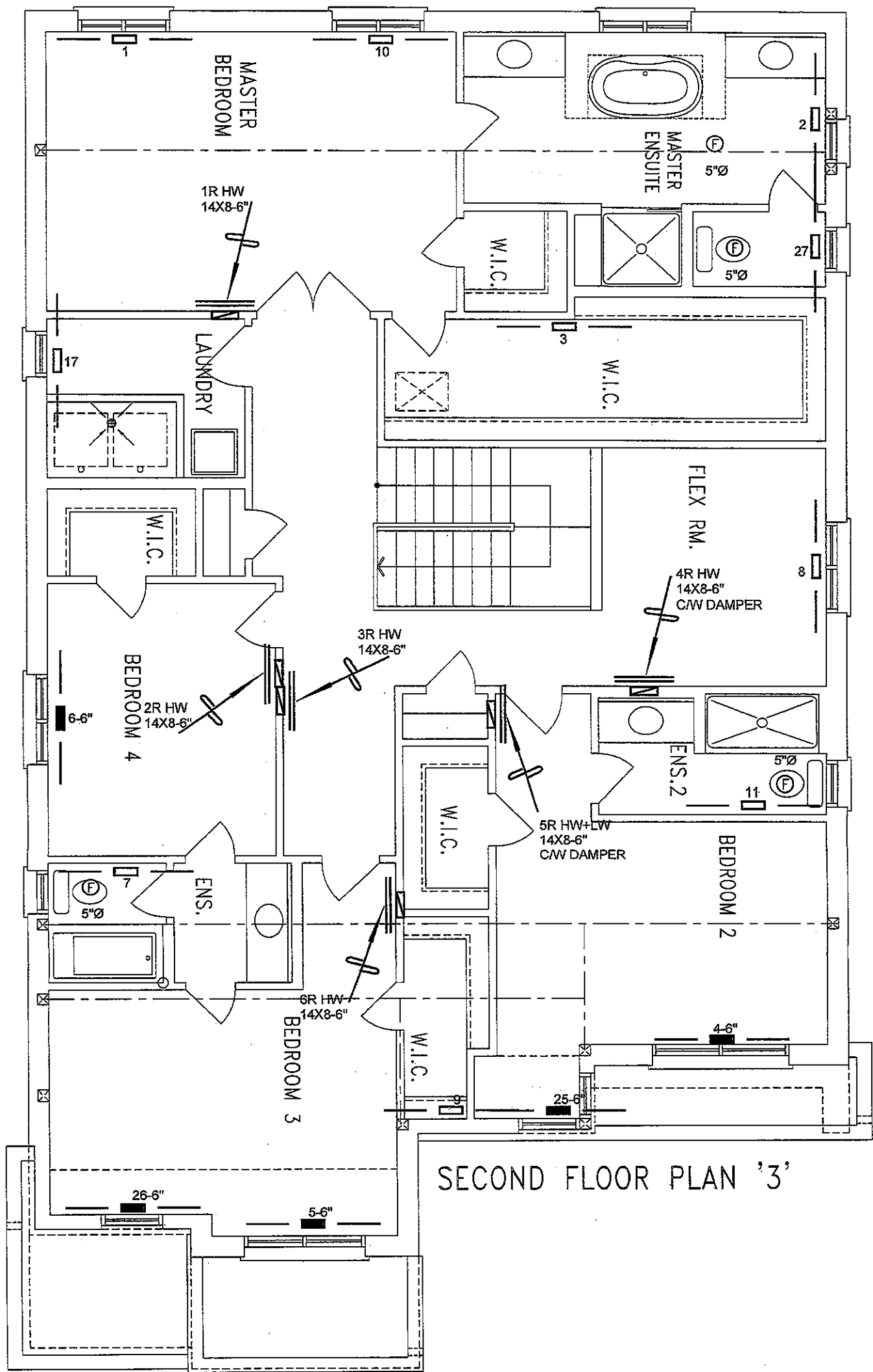
LOT 317
CSA-F280-12
PACKAGE A1

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

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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@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	
Project Name RUSSEL GARDENS PHASE 3 HAMILTON, ONTARIO			Date OCT/2020	
LOT 317 MOUNTAINASH 5 3298 sqft			Scale 3/16" = 1'-0"	
			BCIN# 19669	
			LO#	87982



SECOND FLOOR PLAN '3'

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.

LOT 317
CSA-F280-12
PACKAGE A1

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

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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@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 SECOND FLOOR HEATING LAYOUT	
Project Name RUSSEL GARDENS PHASE 3 HAMILTON, ONTARIO			Date OCT/2020	
LOT 317 MOUNTAINASH 5 3298 sqft			Scale 3/16" = 1'-0"	
			BCIN# 19669	
			LO#	87982