

SITE NAME: RUSSEL GARDENS PH. 4
 BUILDER: GREENPARK HOMES

TYPE: GRANDVILLE 3

GFA: 4609

 DATE: Apr-21
 LO#: 90145

 WINTER NATURAL AIR CHANGE RATE 0.338
 SUMMER NATURAL AIR CHANGE RATE 0.121

 HEAT LOSS AT °F. 71
 HEAT GAIN AT °F. 13

 CSA-F280-12
 SB-12 PACKAGE A1

ROOM USE	EXP. WALL	CLG. HT.	MBR	ENS	WIC	BED-2	BED-3	BED-4	ENS-2	ENS-3	BED-5	ENS-4	LB/OF	GUEST
			42	29	8	16	34	26	0	18	16	8	26	12
			9	9	9	9	9	9	9	9	9	9	11	10
GRS.WALL AREA	FACTORS		378	261	72	144	306	234	0	162	144	81	275	120
GLAZING	LOSS GAIN		LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN
NORTH	19.8 16.0	0 0 0	7 138 112	0 0 0	0 0 0	16 316 266	0 0 0	0 0 0	0 0 0	14 277 224	0 0 0	0 0 0	0 0 0	18 386 288
EAST	19.8 41.6	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	72 1423 2992	60 1186 2493	0 0 0	46 909 1911	0 0 0	0 0 0	52 1028 2161	0 0 0
SOUTH	19.8 24.9	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	16 316 398	7 138 174	0 0 0	0 0 0
WEST	19.8 41.6	32 533 1330	26 484 1039	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	0 0 0
SKYL.T.	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	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	0 0 0	0 0 0	0 0 0
NET EXPOSED WALL	4.1 0.8	346 1434 260	229 949 172	72 298 54	128 531 96	234 970 176	174 721 131	0 0 0	102 423 77	128 531 96	74 307 58	223 924 168	102 423 77	0 0 0
NET EXPOSED BSMT WALL ABOVE GR	3.3 0.8	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	0 0 0	0 0 0	0 0 0
EXPOSED CLG	1.2 0.6	492 587 289	215 256 128	130 166 76	230 274 135	232 277 138	120 143 71	85 101 50	160 179 88	228 272 134	72 86 42	0 0 0	0 0 0	0 0 0
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	125 319 157	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	232 550 100	0 0 0	15 36 6	28 59 11	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	0	0	0
SLAB ON GRADE HEAT LOSS		0	0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL HT LOSS		2654	1838	453	1198	3220	2379	137	1847	1119	531	1952	779	364
SUB TOTAL HT GAIN		1879	1449	131	626	3404	2852	263	58	2311	629	272	2326	364
LEVEL FACTOR / MULTIPLIER	0.20 0.33		0.20 0.33	0.20 0.33	0.20 0.33	0.20 0.33	0.20 0.33	0.20 0.33	0.20 0.33	0.20 0.33	0.20 0.33	0.20 0.33	0.30 0.58	0.30 0.58
AIR CHANGE HEAT LOSS		878	608	160	386	1066	784	45	611	370	176	1140	455	32
AIR CHANGE HEAT GAIN		167	129	12	47	302	253	18	5	206	56	24	207	0
DUCT LOSS		0	0	0	0	0	0	0	0	0	0	0	0	0
DUCT GAIN		0	0	0	0	0	0	0	0	0	0	0	0	0
HEAT GAIN PEOPLE	240	2	480	0	0	1	240	1	240	0	1	240	0	1
HEAT GAIN APPLIANCES/LIGHTS		568	568	568	568	568	568	568	568	568	568	568	568	568
TOTAL HT LOSS BTU/H		3531	2448	604	1594	4713	3154	200	2704	1489	707	3093	1233	1561
TOTAL HT GAIN x 1.3 BTU/H		4017	2785	919	1789	6450	5082	88	3598	1936	385	4029	1561	1561

ROOM USE	EXP. WALL	CLG. HT.	DIN	FAM	KT/BR	LIV	LAUN	G-ENS	FOY	MUD	FLEX	WOD	BAS
			15	54	32	22	0	17	23	10	9	62	214
			10	10	10	10	9	10	11	11	9	9	9
GRS.WALL AREA	FACTORS		160	540	320	220	0	170	253	110	81	468	1440
GLAZING	LOSS GAIN		LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN
NORTH	19.8 16.0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	7 138 112	0 0 0	0 0 0	0 0 0	0 0 0	8 158 128
EAST	19.8 41.6	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	6 119 249	0 0 0	0 0 0	0 0 0	0 0 0
SOUTH	19.8 24.9	22 436 548	0 0 0	0 0 0	0 0 0	21 416 523	0 0 0	0 0 0	0 0 0	0 0 0	16 316 398	0 0 0	8 158 199
WEST	19.8 41.6	0 0 0	40 791 1662	73 1443 3033	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	10 198 416	0 0 0
SKYL.T.	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	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	0 0 0	0 0 0
NET EXPOSED WALL	4.1 0.8	128 531 96	500 2073 376	247 1024 186	199 826 150	0 0 0	163 678 123	207 888 166	40 938 170	20 469 85	0 0 0	0 0 0	20 469 85
NET EXPOSED BSMT WALL ABOVE GR	3.3 0.8	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	0 0 0	0 0 0
EXPOSED CLG	1.2 0.6	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	126 149 73	0 0 0	0 0 0	0 0 0	126 149 73	302 1010 163	486 1625 295
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	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	16 36 6	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	0	0
SLAB ON GRADE HEAT LOSS		0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL HT LOSS		966	2864	2487	1240	185	814	1915	675	842	735	1207	7303
SUB TOTAL HT GAIN		644	2038	3219	672	80	234	575	163	621	821	589	9713
LEVEL FACTOR / MULTIPLIER	0.30 0.58		0.30 0.58	0.30 0.58	0.30 0.58	0.20 0.33	0.30 0.58	0.30 0.58	0.30 0.58	0.30 0.58	0.20 0.33	0.50 1.23	0.50 1.23
AIR CHANGE HEAT LOSS		584	1672	1441	724	61	475	1118	492	243	46	13471	116
AIR CHANGE HEAT GAIN		57	181	286	60	7	21	51	14	46	0	0	0
DUCT LOSS		0	0	0	0	0	0	0	0	0	0	0	0
DUCT GAIN		0	0	0	0	0	0	0	0	0	0	0	0
HEAT GAIN PEOPLE	240	0	0	0	0	0	0	0	0	0	0	0	0
HEAT GAIN APPLIANCES/LIGHTS		568	568	568	568	568	568	568	568	568	568	568	568
TOTAL HT LOSS BTU/H		1529	4536	3908	1964	270	1290	3033	1334	978	778	23184	1803
TOTAL HT GAIN x 1.3 BTU/H		1645	3818	6290	1685	932	332	1548	850	1471	1471	1471	1471

TOTAL HEAT GAIN BTU/H: 53219

TONS: 4.43

LOSS DUE TO VENTILATION LOAD BTU/H: 2010

STRUCTURAL HEAT LOSS: 68703

TOTAL COMBINED HEAT LOSS BTU/H: 71613

SITE NAME: RUSSEL GARDENS PH. 4
 BUILDER: GREENPARK HOMES

TYPE: GRANDVILLE 3

DATE: Apr-21

GFA: 4809 LO# 90146

 HEATING CFM 1818 COOLING CFM 1818
 TOTAL HEAT LOSS 68,703 TOTAL HEAT GAIN 52,691
 AIR FLOW RATE CFM 26.46 AIR FLOW RATE CFM 34.5

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

 ~GOODMAN
 GMVC981005CNA 100
 FAN SPEED
 LOW 1360
 MEDLOW 1818
 MEDIUM 1870
 MEDIUM HIGH 1910
 HIGH 1957

 AFUE = 96 %
 INPUT (BTU/H) = 100,000
 OUTPUT (BTU/H) = 96,000
 DESIGN CFM = 1818
 CFM @ .8" E.S.P.

TEMPERATURE RISE 49 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	18	12	7
R/A	0	0	6	4	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	ENS-2	ENS-3	BED-5	MBR	ENS-4	DIN	FAM	KT/BR	KT/BR	LIV	LAUN	G-ENS	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH	1.77	1.22	0.60	1.59	1.57	1.58	0.20	1.35	1.49	1.77	0.71	1.53	2.27	1.95	1.95	1.96	0.27	1.29	3.03	1.33	3.48	3.48	3.48	3.48
CFM PER RUN HEAT	47	32	16	42	42	42	5	36	39	47	19	40	60	52	52	52	7	34	80	35	92	92	92	92
RM GAIN MBH	2.01	1.39	0.92	1.79	2.15	2.54	0.09	1.80	1.84	2.01	0.39	1.65	1.81	2.65	2.65	1.69	0.93	0.33	1.55	0.95	0.37	0.37	0.37	0.37
CFM PER RUN COOLING	69	48	32	62	74	88	3	62	67	69	13	57	62	91	91	58	32	11	53	33	13	13	13	13
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.17	0.18	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH	68	47	28	32	40	65	36	87	62	51	60	51	31	44	37	47	41	50	48	19	41	35	28	46
EQUIVALENT LENGTH	160	180	180	130	130	180	160	190	170	140	150	130	150	120	140	120	190	110	170	170	110	130	130	100
TOTAL EFFECTIVE LENGTH	226	227	206	162	170	245	196	257	232	191	210	181	181	164	177	167	231	160	218	189	151	165	158	146
ADJUSTED PRESSURE	0.08	0.08	0.08	0.11	0.1	0.07	0.09	0.07	0.07	0.09	0.08	0.1	0.1	0.1	0.09	0.1	0.07	0.11	0.08	0.09	0.11	0.1	0.1	0.11
ROUND DUCT SIZE	6	5	4	6	5	6	4	6	6	5	4	5	5	6	6	5	4	4	6	4	6	6	6	6
HEATING VELOCITY (ft/min)	240	235	184	214	308	214	57	184	199	345	218	294	441	265	265	382	80	390	408	402	469	469	469	469
COOLING VELOCITY (ft/min)	352	352	367	316	543	449	34	316	342	507	149	419	455	464	464	426	367	126	270	379	66	66	66	66
OUTLET GRILL SIZE	4X10	3X10	3X10	4X10	3X10	4X10	3X10	4X10	4X10	3X10	3X10	3X10	3X10	4X10	4X10	3X10	3X10	3X10	4X10	3X10	4X10	4X10	4X10	4X10
TRUNK	B	B	B	E	E	H	E	H	B	B	H	G	A	A	A	G	B	D	G	G	A	A	D	A

RUN #	25	26	27	28	29	30	31	32	33	34	35	36	37
ROOM NAME	BAS	BAS	BAS	LB/OF	GUEST	FLEX	LB/OF	BED-3	BED-3	BED-4	ENS	ENS-3	FAM
RM LOSS MBH	3.48	3.48	3.48	1.55	1.23	0.98	1.55	1.57	1.57	1.58	1.22	1.35	2.27
CFM PER RUN HEAT	92	92	92	41	33	26	41	42	42	42	32	36	60
RM GAIN MBH	0.37	0.37	0.37	2.01	1.56	1.47	2.01	2.15	2.15	2.54	1.39	1.80	1.81
CFM PER RUN COOLING	13	13	13	70	54	51	70	74	74	88	48	62	62
ADJUSTED PRESSURE	0.16	0.16	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.17
ACTUAL DUCT LGH	17	48	45	55	13	49	62	39	46	72	32	51	32
EQUIVALENT LENGTH	120	140	180	150	110	140	130	150	170	160	130	180	120
TOTAL EFFECTIVE LENGTH	137	188	205	205	123	189	192	189	216	232	162	231	152
ADJUSTED PRESSURE	0.12	0.09	0.08	0.08	0.14	0.09	0.09	0.09	0.08	0.07	0.11	0.07	0.11
ROUND DUCT SIZE	6	6	6	6	5	5	6	5	5	6	4	6	5
HEATING VELOCITY (ft/min)	469	469	489	209	242	191	209	308	308	214	367	184	441
COOLING VELOCITY (ft/min)	66	66	66	357	396	374	357	543	543	449	551	316	455
OUTLET GRILL SIZE	4X10	4X10	4X10	4X10	3X10	3X10	4X10	3X10	3X10	4X10	3X10	4X10	3X10
TRUNK	D	G	G	G	D	B	G	E	E	H	E	E	D

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	440	0.09	10	12	X	8	660	473	0.08	10.6	14	X	8	TRUNK O	0	0.05	0	0	8
TRUNK B	214	0.07	8.1	10	X	8	385	139	0.07	6.9	8	X	8	TRUNK P	0	0.05	0	0	8
TRUNK C	654	0.07	12.4	18	X	8	654	812	0.07	12.1	18	X	8	TRUNK Q	0	0.05	0	0	8
TRUNK D	311	0.10	8.8	8	X	8	700	0	0.00	0	0	X	8	TRUNK R	0	0.05	0	0	8
TRUNK E	241	0.07	8.5	8	X	8	542	0	0.00	0	0	X	8	TRUNK S	0	0.05	0	0	8
TRUNK F	552	0.07	11.6	16	X	8	621	0	0.00	0	0	X	8	TRUNK T	0	0.05	0	0	8
														TRUNK U	0	0.05	0	0	8
														TRUNK V	0	0.05	0	0	8
														TRUNK W	0	0.05	0	0	8
														TRUNK X	1818	0.05	19.7	32	882
														TRUNK Y	450	0.05	11.7	16	506
														TRUNK Z	0	0.05	0	0	8
														DROP	1818	0.05	19.7	24	682

RETURN AIR #	1	2	3	4	5	6	7	8	9	10											BR			
AIR VOLUME	240	115	85	75	75	115	370	280	105	75	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.	49	54	53	69	80	65	23	54	15	57	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EQUIVALENT LENGTH	195	270	195	255	205	245	135	230	155	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL EFFECTIVE LH	244	324	248	324	285	310	158	284	170	312	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ADJUSTED PRESSURE	0.06	0.05	0.06	0.05	0.05	0.05	0.09	0.05	0.09	0.05	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	8.8	7	6	6	6	7	9.4	9.5	5.9	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INLET GRILL SIZE	8	8	8	8	8	8	8	8	8	8	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	30	14	14	14	14	14	30	30	14	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TRUNK V	0	0.05	0	0	x	8	0
TRUNK W	0	0.05	0	0	x	8	0
TRUNK X	1818	0.05	19.7	32	x	12	682
TRUNK Y	450	0.05	11.7	16	x	8	506
TRUNK Z	0	0.05	0	0	x	8	0
DROP	1818	0.05	19.7	24	x	16	682

TYPE: GRANDVILLE 3
 SITE NAME: RUSSEL GARDENS PH. 4

LO # 90146

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	5 @ 10.6 cfm 53 cfm
Kitchen & Bathrooms	9 @ 10.6 cfm 95.4 cfm
Other Rooms	6 @ 10.6 cfm 63.6 cfm
Table 9.32.3.A.	TOTAL 254.4 cfm

PRINCIPAL VENTILATION CAPACITY REQUIRED	9.32.3.4(1)
6 Bedrooms As Per Ashree 62.2 Dwelling- Unit Ventilation 4.1.1 Total Ventilation Rate $Q_{tot} = 0.03A_{floor} + 7.5(N_{br} + 1)$ TOTAL 190.8 cfm	

SUPPLEMENTAL VENTILATION CAPACITY	9.32.3.5
Total Ventilation Capacity	254.4 cfm
Less Principal Ventil. Capacity	190.8 cfm
Required Supplemental Capacity	63.6 cfm

PRINCIPAL EXHAUST FAN CAPACITY
Model: VANEE G2400H ECM Location: BSMT
190.8 cfm ☒ HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION
CFM ΔT °F FACTOR % LOSS 190.8 CFM X 71 F X 1.08 X 0.20

SUPPLEMENTAL FANS	BY INSTALLING CONTRACTOR			
Location	Model	cfm	HVI	Sones
ENS	BY INSTALLING CONTRACTOR	50	✓	3.5
ENS-2	BY INSTALLING CONTRACTOR	50	✓	3.5
ENS-4	BY INSTALLING CONTRACTOR	50	✓	3.5
G-ENS	BY INSTALLING CONTRACTOR	50	✓	3.5

HEAT RECOVERY VENTILATOR	9.32.3.11
Model: VANEE G2400H ECM	
210 cfm high 50 cfm low	
80 % 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 #:

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: April-21

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

LO#: 90146

Model: GRANDVILLE 3

Builder: GREENPARK HOMES

Date: 4/8/2021

Volume Calculation

House Volume			
Level	Floor Area (ft ²)	Floor Height (ft)	Volume (ft ³)
Bsmt	2165	9	19485
First	2165	10	21650
Second	2444	9	21996
Third	0	9	0
Fourth	0	9	0
Total:			63,131.0 ft ³
Total:			1787.7 m ³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.338
SUMMER NATURAL AIR CHANGE RATE	0.121

Design Temperature Difference				
	T _{in} °C	T _{out} °C	ΔT °C	ΔT °F
Winter DTD _h	22	-17	39	71
Summer DTD _c	24	31	7	13

5.2.3.1 Heat Loss due to Air Leakage

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

0.338 x 496.58 x 39 °C x 1.2 = 7896 W
 = 26942 Btu/h

6.2.6 Sensible Gain due to Air Leakage

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

0.121 x 496.58 x 7 °C x 1.2 = 513 W
 = 1749 Btu/h

5.2.3.2 Heat Loss due to Mechanical Ventilation

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

191 CFM x 71 °F x 1.08 x 0.20 = 2910 Btu/h

6.2.7 Sensible heat Gain due to Ventilation

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

191 CFM x 13 °F x 1.08 x 0.20 = 528 Btu/h

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

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

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	26,942	10,921	1.234
2	0.3		13,839	0.584
3	0.2		16,285	0.331
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

HEAT LOSS AND GAIN SUMMARY SHEET**MODEL:** GRANDVILLE 3**BUILDER:** GREENPARK HOMES**SFQT:** 4609**LO#** 90146**SITE:** RUSSEL GARDENS PH. 4**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

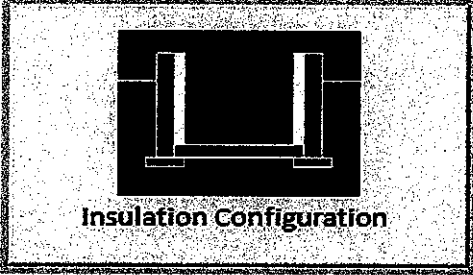
ATTACHMENT:	DETACHED	# OF STORIES (+BASEMENT):	3
FRONT FACES:	EAST	ASSUMED (Y/N):	Y
AIR CHANGES PER HOUR:	3.57	ASSUMED (Y/N):	Y
AIR TIGHTNESS CATEGORY:	AVERAGE	ASSUMED (Y/N):	Y
WIND EXPOSURE:	SHELTERED	ASSUMED (Y/N):	Y
HOUSE VOLUME (ft³):	63131.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	7
INTERIOR LIGHTING LOAD (Btu/h/ft²):	1.50	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	6.0 ft
LENGTH: 65.0 ft	WIDTH: 42.0 ft	EXPOSED PERIMETER:	214.0 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		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):	19.8	 Insulation Configuration
Floor Width (m):	12.8	
Exposed Perimeter (m):	0.0	
Wall Height (m):	2.7	
Depth Below Grade (m):	1.83	
Window Area (m ²):	2.4	
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):		2140

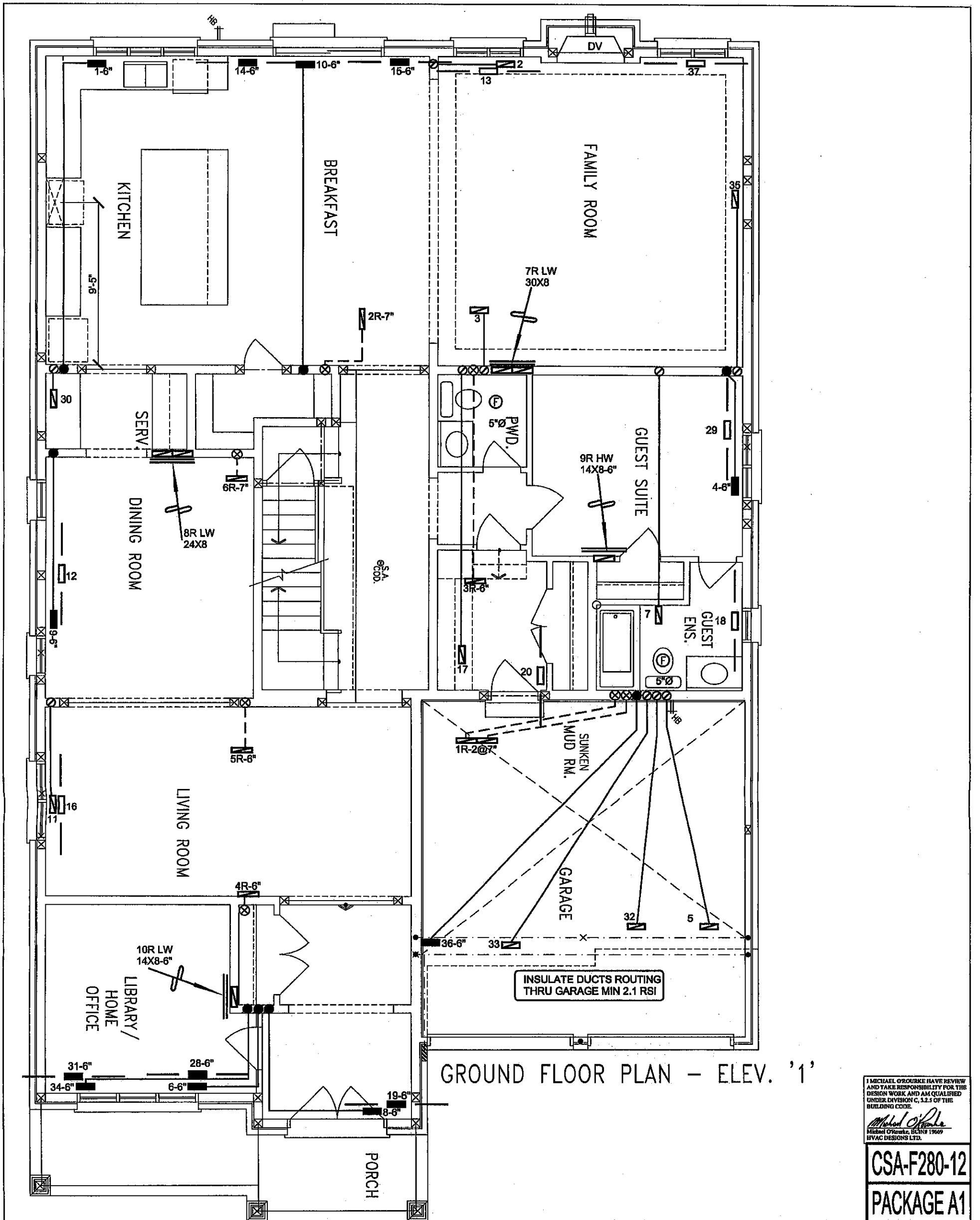
TYPE: GRANDVILLE 3
LO# 90146

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):	7.62		
Building Configuration			
Type:	Detached		
Number of Stories:	Two		
Foundation:	Full		
House Volume (m ³):	1787.7		
Air Leakage/Ventilation			
Air Tightness Type:	Present (1961-) (3.57 ACH)		
Custom BDT Data:	ELA @ 10 Pa.	2383.0 cm ²	
	3.57	ACH @ 50 Pa	
Mechanical Ventilation (L/s):	Total Supply	Total Exhaust	
	90.0	90.0	
Flue Size			
Flue #:	#1	#2	#3 #4
Diameter (mm):	0	0	0 0
Natural Infiltration Rates			
Heating Air Leakage Rate (ACH/H):	0.338		
Cooling Air Leakage Rate (ACH/H):	0.121		

TYPE: GRANDVILLE 3
LO# 90146



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.

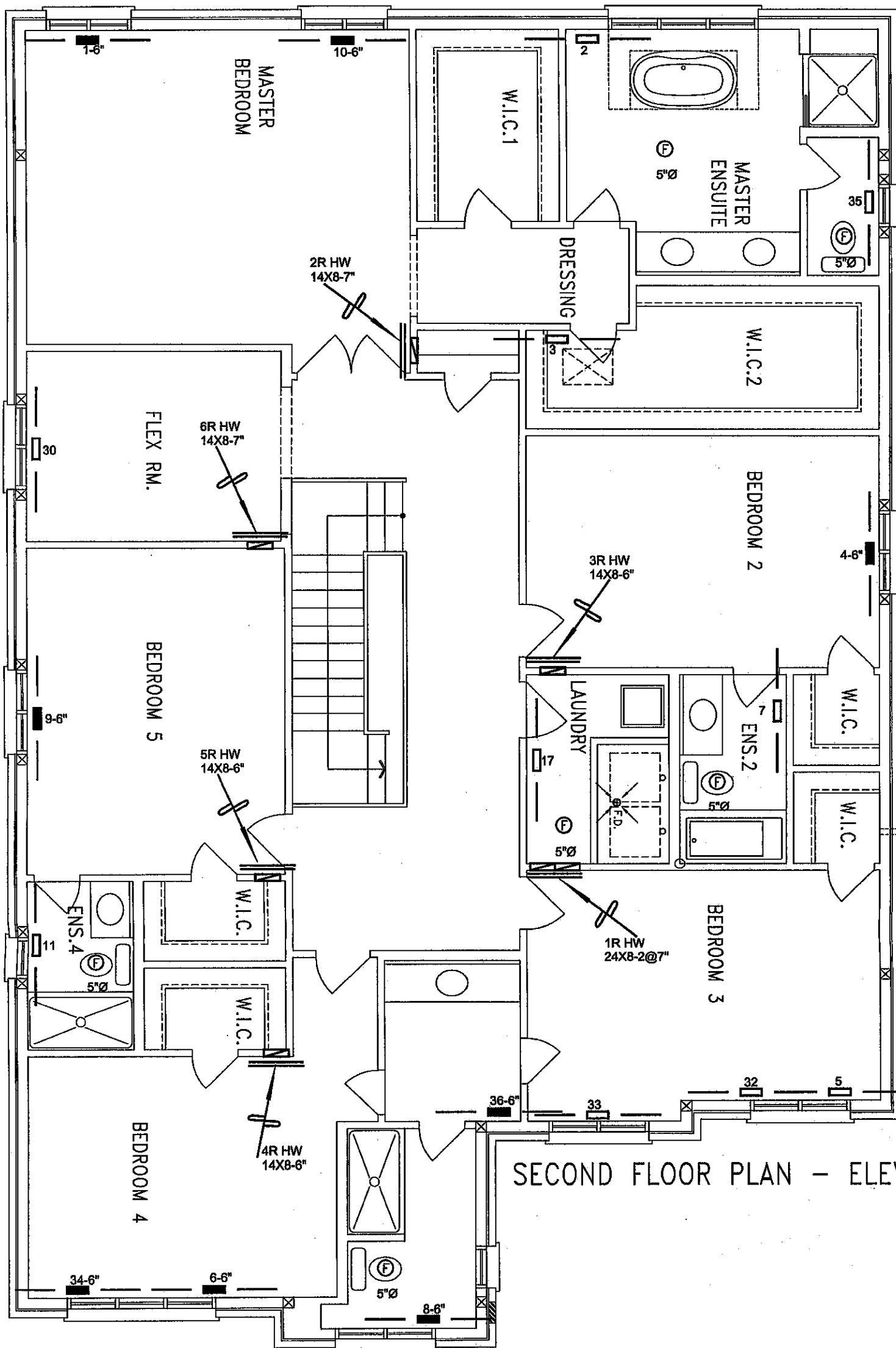
Michael O'Rourke
Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

CSA-F280-12
PACKAGE A1

HVAC LEGEND						3.	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		8" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
	SUPPLY AIR GRILLE 8" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR
	SUPPLY AIR BOOT ABOVE		8" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER
						No.	Description
							Date
						REVISIONS	

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Client GREENPARK HOMES		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@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 FIRST FLOOR HEATING LAYOUT
Project Name RUSSELL GARDENS PH. 4 HAMILTON, ONTARIO	GRANDVILLE 3 4609 sqft		
			Date APR/2021
			Scale 3/16" = 1'-0"
			BCIN# 19669
			LO# 90146



SECOND FLOOR PLAN - ELEV. '1'

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

CSA-F280-12
PACKAGE A1

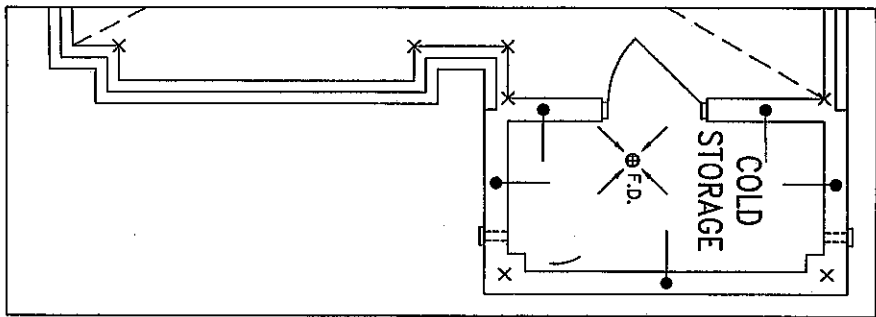
HVAC LEGEND								3.		
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	2.		
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE	1.		
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR 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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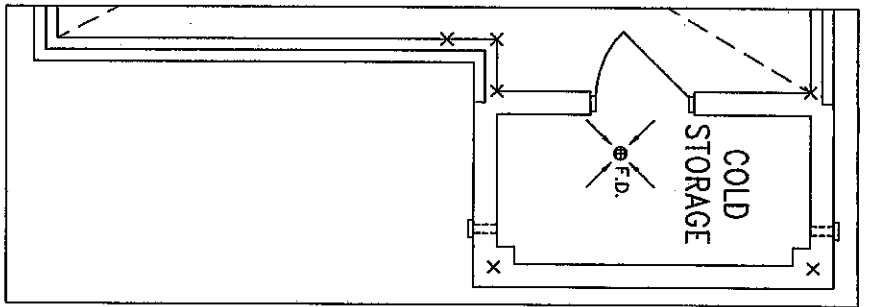
Client
GREENPARK HOMES
Project Name
**RUSSELL GARDENS PH. 4
HAMILTON, ONTARIO**
GRANDVILLE 3 4609 sqft

HVAC DESIGNS LTD.
375 Finley Ave, Suite 202 - Ajax, Ontario
L1S 2E2 Tel. 905.619.2300 - 905.420.6300 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.

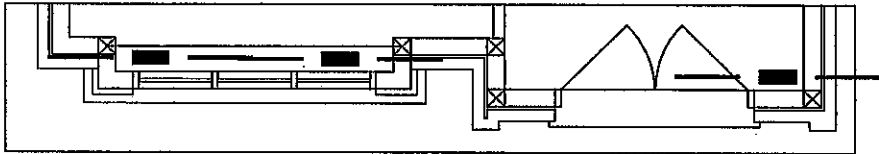
Sheet Title
**SECOND FLOOR
HEATING
LAYOUT**
Date
APR/2021
Scale
3/16" = 1'-0"
BCIN# 19669
LO# 90146



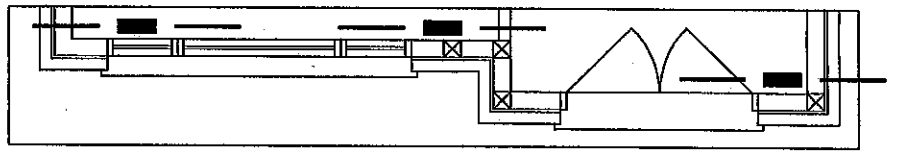
BASEMENT PLAN - ELEV. '2'



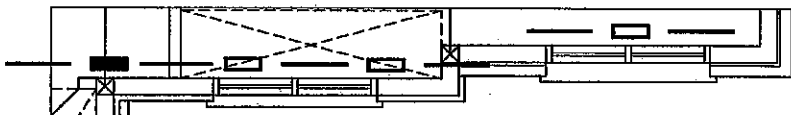
BASEMENT PLAN - ELEV. '3'



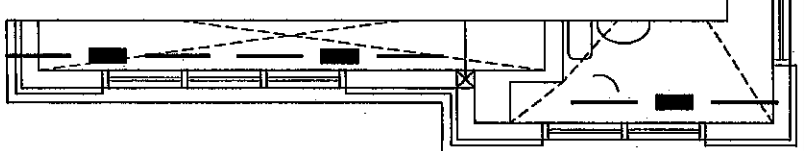
GROUND FLOOR PLAN - ELEV. '2'



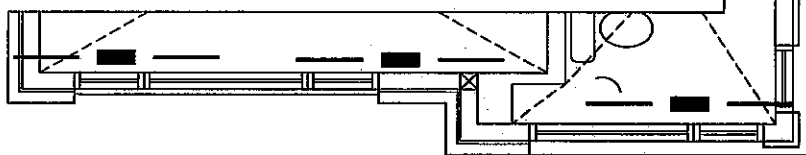
GROUND FLOOR PLAN - ELEV. '3'



SECOND FLOOR PLAN - ELEV. '2'



SECOND FLOOR PLAN - ELEV. '3'



I MICHAEL O'Rourke HAVE REVIEWED AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.3 OF THE BUILDING CODE.
Michael O'Rourke
Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

CSA-F280-12

PACKAGE A1

HVAC LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	3.	
	SUPPLY AIR GRILLE		8" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE	2.	
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR	1.	
	SUPPLY AIR BOOT ABOVE		8" SUPPLY AIR STACK 2nd FLOOR		FRA - FLOOR RETURN AIR GRILLE		REDUCER	No.	Description Date
								REVISIONS	

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Client
GREENPARK HOMES
Project Name
**RUSSELL GARDENS PH. 4
HAMILTON, ONTARIO**
GRANDVILLE 3 4609 sqft

HVAC DESIGNS LTD.
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Sheet Title
**THIRD FLOOR
HEATING
LAYOUT**
Date
APR/2021
Scale
3/16" = 1'-0"
BCIN# 19669
LO# 90146