

SITE NAME: RUSSEL GARDENS PH 4 BUILDER: GREENPARK HOMES		WOB TYPE: GRANDVILLE 9		OFA: 5181		DATE: Apr-21 LOW 90569		WINTER NATURAL AIR CHANGE RATE 0.365 SUMMER NATURAL AIR CHANGE RATE 0.130		HEAT LOSS AT °F. 71 HEAT GAIN AT °F. 13		CSA-F280-12 SB-12 PACKAGE A1	
ROOM USE		MBR	ENS	WIC	BED-2	BED-3	BED-4	ENS-2	ENS-3	ENS-4	ENS-5	LAUN	BED-5
EXP. WALL		35	20	7	15	32	28	0	6	5	6	8	15
CLG. HT.		9	9	9	9	9	9	9	9	9	9	9	9
GRS.WALL AREA	FACTORS	316	180	63	135	288	262	0	54	45	54	72	135
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	0 0 0	0 0 0	16 316 256	0 0 0	0 0 0	0 0 0	8 158 128	0 0 0	0 0 0	0 0 0	0 0 0
EAST	19.8 41.6	0 0 0	0 0 0	0 0 0	0 0 0	63 1245 2618	48 949 1994	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
SOUTH	19.8 24.9	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	16 297 373	0 0 0	0 0 0	7 138 174	7 138 174	7 138 174	16 316 398
WEST	19.8 41.6	32 633 1330	22 435 914	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
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	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	283 1173 213	158 655 119	63 261 47	119 493 89	225 933 169	189 784 142	0 0 0	46 191 35	38 158 29	47 195 35	65 269 49	119 493 89
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	0 0 0	0 0 0
EXPOSED CLG	1.2 0.6	357 426 210	220 262 129	140 167 82	278 331 163	175 209 103	226 269 133	81 97 48	84 100 49	101 120 59	90 107 53	157 187 92	338 403 199
NO ATTIC EXPOSED CLG	2.6 1.3	0 0 0	0 0 0	0 0 0	0 0 0	23 59 29	22 56 28	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	198 469 85	0 0 0	23 54 10	63 149 27	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		2231	1352	428	1141	2615	2355	161	598	416	441	595	1213
SUB TOTAL HT GAIN		1752	1162	130	508	3004	2671	57	239	262	263	315	686
LEVEL FACTOR / MULTIPLIER	0.20 0.37		0.20 0.37	0.20 0.37	0.20 0.37	0.20 0.37	0.20 0.37	0.20 0.37	0.20 0.37	0.20 0.37	0.20 0.37	0.20 0.37	0.20 0.37
AIR CHANGE HEAT LOSS		821	498	155	420	1072	865	56	220	163	162	219	446
AIR CHANGE HEAT GAIN		158	105	12	48	271	241	5	22	24	24	28	62
DUCT LOSS		0	0	0	0	399	0	21	82	0	0	0	0
DUCT GAIN		0	0	0	0	450	0	6	28	0	0	0	0
HEAT GAIN PEOPLE	240	2	480	0	1	240	1	240	0	0	0	0	1
HEAT GAIN APPLIANCES/LIGHTS		982	0	0	982	982	982	0	0	0	0	982	240
TOTAL HT LOSS BTU/H		3052	1850	586	1561	4386	3221	227	900	570	603	814	1659
TOTAL HT GAIN x 1.3 BTU/H		4384	1647	184	2310	6430	5374	90	372	372	372	1724	2562

ROOM USE		FAM	DN/LV	KIT	LB/OFF	GUEST	FOY	MUD	FLEX	WIC-2	WOB	BAS
EXP. WALL		41	29	47	28	13	40	29	26	25	56	170
CLG. HT.		10	10	10	10	10	11	12	10	9	9	9
GRS.WALL AREA	FACTORS	410	290	470	280	130	440	348	260	225	504	1020
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	18 356 288	0 0 0	8 188 128	19 376 304	0 0 0	0 0 0	5 99 80
EAST	19.8 41.6	0 0 0	0 0 0	0 0 0	48 949 1994	0 0 0	16 316 686	0 0 0	56 1107 2327	0 0 0	0 0 0	0 0 0
SOUTH	19.8 24.9	0 0 0	43 850 1071	14 277 349	16 316 398	0 0 0	0 0 0	0 0 0	7 138 174	0 0 0	0 0 0	10 198 249
WEST	19.8 41.6	40 791 1662	0 0 0	67 1324 2784	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	76 1502 3158	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	0 0 0
DOORS	23.5 4.3	0 0 0	0 0 0	15 352 64	0 0 0	0 0 0	30 704 128	20 469 86	0 0 0	0 0 0	20 469 85	20 469 85
NET EXPOSED WALL	4.1 0.8	370 1634 278	247 1024 185	374 1550 201	216 895 102	112 464 84	394 1633 296	320 1327 241	185 767 139	218 904 164	408 1691 307	0 0 0
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	0 0 0
EXPOSED CLG	1.2 0.6	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	288 343 169	128 150 74	0 0 0	0 0 0
NO ATTIC EXPOSED CLG	2.6 1.3	10 26 13	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	60 128 63	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	0 0 0
BASEMENT/CRAWL HEAT LOSS		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
SUBTOTAL HT LOSS		2350	1874	3503	2161	820	2553	1954	2721	1192	4496	2976
SUB TOTAL HT GAIN		1953	1256	3477	2555	820	2553	1059	3002	412	3590	723
LEVEL FACTOR / MULTIPLIER	0.30 0.64		0.30 0.64	0.30 0.64	0.30 0.64	0.30 0.64	0.30 0.64	0.30 0.64	0.20 0.37	0.20 0.37	0.30 1.64	0.30 1.64
AIR CHANGE HEAT LOSS		1503	1199	2241	313	230	1001	1260	41	37	0	0
AIR CHANGE HEAT GAIN		176	113	313	0	0	0	0	0	0	0	0
DUCT LOSS		0	0	0	0	0	0	0	0	0	0	0
DUCT GAIN		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
HEAT GAIN APPLIANCES/LIGHTS		982	982	982	982	982	982	982	982	982	982	982
TOTAL HT LOSS BTU/H		3853	3073	5744	3643	4898	4360	3204	3722	1631	4496	21773
TOTAL HT GAIN x 1.3 BTU/H		4044	3058	6205	4898	2116	1543	642	5531	584	4615	1440

TOTAL HEAT GAIN BTU/H:

61071

TONS: 5.09

LOSS DUE TO VENTILATION LOAD BTU/H: 3170

STRUCTURAL HEAT LOSS: 76160

TOTAL COMBINED HEAT LOSS BTU/H: 79330

Michael O'Rourke

INDIVIDUAL BCN: 19669

MICHAEL O'ROURKE

SITE NAME: RUSSEL GARDENS PH 4
BUILDER: GREENPARK HOMES

WOB
TYPE: GRANDVILLE 9

DATE: Apr-21

GFA: 5181 LO# 90569

HEATING CFM 1818 COOLING CFM 1818
TOTAL HEAT LOSS 76,160 TOTAL HEAT GAIN 60,496
AIR FLOW RATE CFM 23.87 AIR FLOW RATE CFM 30.05

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

~GOODMAN

AFUE = 96 %
INPUT (BTU/H) = 100,000
OUTPUT (BTU/H) = 96,000

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	20	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.

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

FAN SPEED 1360
LOW 1360
MEDLOW 1818
MEDIUM 1870
MEDIUM HIGH 1910
HIGH 1957

DESIGN CFM = 1818
CFM @ .6 "E.S.P.

TEMPERATURE RISE 49 °F

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	ENS-4	MBR	ENS-5	FAM	DN/LV	KIT	KIT	LB/OFF	GUEST	LB/OFF	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH	1.53	0.92	0.59	1.56	1.46	1.61	0.23	0.90	0.57	1.53	0.60	1.93	1.54	1.91	1.91	1.77	1.34	1.77	4.35	3.20	3.75	3.75	3.75	3.75
CFM PER RUN HEAT	36	22	14	37	35	38	5	21	14	36	14	46	37	46	46	42	32	42	104	76	90	90	90	90
RM GAIN MBH	2.19	0.82	0.18	2.31	2.14	2.69	0.09	0.37	0.37	2.19	0.37	2.02	1.53	2.07	2.07	2.45	2.12	2.45	1.54	0.64	0.86	0.86	0.86	0.86
CFM PER RUN COOLING	66	25	6	89	64	81	3	11	11	66	11	61	46	62	62	74	64	74	46	19	26	26	26	26
ADJUSTED PRESSURE	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	0.17	0.16	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH	62	42	46	75	88	67	67	85	59	74	48	51	13	37	43	49	50	49	54	63	45	55	75	47
EQUIVALENT LENGTH	160	150	170	160	160	160	170	160	190	170	200	160	210	120	110	140	130	140	160	180	150	110	150	140
TOTAL EFFECTIVE LENGTH	222	192	216	235	248	227	237	245	249	244	248	211	223	157	153	189	180	189	214	243	195	165	225	187
ADJUSTED PRESSURE	0.08	0.09	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.11	0.11	0.09	0.1	0.09	0.08	0.07	0.08	0.1	0.07	0.08
ROUND DUCT SIZE	5	5	5	6	6	6	5	5	5	6	5	5	5	5	5	5	5	5	6	6	6	6	6	6
HEATING VELOCITY (ft/min)	264	162	103	189	178	194	37	154	103	184	103	338	272	338	338	308	235	308	530	388	459	459	459	459
COOLING VELOCITY (ft/min)	485	184	44	352	326	413	22	81	81	337	81	448	338	455	455	543	470	543	235	97	133	133	133	133
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	4X10	4X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10	4X10	4X10
TRUNK	B	C	B	A	B	D	B	A	D	A	D	F	H	G	G	H	F	H	H	F	G	G	F	F

RUN #	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
ROOM NAME	BAS	BAS	BAS	ENS	BED-3	BED-3	BED-4	LAUN	FLEX	FLEX	WIC-2	FAM	DN/LV	KIT	
RM LOSS MBH	3.75	3.75	3.75	0.92	1.46	1.46	1.61	0.81	1.66	1.86	1.86	1.83	1.93	1.54	1.91
CFM PER RUN HEAT	90	90	90	22	35	35	38	19	40	44	44	39	46	37	46
RM GAIN MBH	0.86	0.86	0.86	0.82	2.14	2.14	2.69	1.72	2.56	2.77	0.58	2.02	1.53	2.07	
CFM PER RUN COOLING	26	26	26	25	64	64	81	52	77	83	18	61	46	62	
ADJUSTED PRESSURE	0.16	0.16	0.16	0.17	0.17	0.17	0.16	0.17	0.17	0.16	0.17	0.17	0.17	0.17	
ACTUAL DUCT LGH	28	45	44	47	93	98	56	17	69	80	71	30	64	34	18
EQUIVALENT LENGTH	170	150	150	140	130	160	140	160	150	180	190	180	130	160	160
TOTAL EFFECTIVE LENGTH	198	195	194	187	223	258	196	177	219	260	261	210	194	194	178
ADJUSTED PRESSURE	0.08	0.08	0.08	0.09	0.08	0.07	0.08	0.1	0.08	0.06	0.06	0.08	0.09	0.09	0.1
ROUND DUCT SIZE	6	6	6	6	6	6	6	5	6	6	6	5	4	4	5
HEATING VELOCITY (ft/min)	459	459	459	162	178	178	194	140	204	224	224	286	338	424	338
COOLING VELOCITY (ft/min)	133	133	133	184	326	326	413	382	393	423	423	132	448	528	455
OUTLET GRILL SIZE	4X10	4X10	4X10	3X10	4X10	4X10	4X10	3X10	4X10	4X10	4X10	3X10	3X10	3X10	3X10
TRUNK	H	H	H	C	B	A	D	C	C	D	D	C	F	H	G

SUPPLY AIR TRUNK SIZE

TRUNK	STATIC PRESS.	ROUND DUCT	RECT DUCT	VELOCITY (ft/min)			TRUNK	STATIC PRESS.	ROUND DUCT	RECT DUCT	VELOCITY (ft/min)			
290	0.07	9	10	x	8	504	TRUNK G	722	0.07	12.8	20	x	8	650
453	0.07	10.8	16	x	8	510	TRUNK H	551	0.08	11.2	14	x	8	700
858	0.07	13.7	22	x	8	702	TRUNK I	0	0.00	0	0	x	8	0
416	0.06	10.9	14	x	8	535	TRUNK J	0	0.00	0	0	x	8	0
1273	0.06	16.5	26	x	10	705	TRUNK K	0	0.00	0	0	x	8	0
395	0.07	10.2	12	x	8	593	TRUNK L	0	0.00	0	0	x	8	0

RETURN AIR TRUNK SIZE

	TRUNK	STATIC	ROUND	RECT			VELOCITY
	CFM	PRESS.	DUCT	DUCT			(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	445	0.05	11.6	16	x	8	501
TRUNK V	635	0.05	13.3	20	x	8	572
TRUNK W	895	0.05	15.1	26	x	8	620
TRUNK X	1818	0.05	19.7	32	x	12	682
TRUNK Y	495	0.06	11.6	16	x	8	557
TRUNK Z	215	0.05	8.9	10	x	8	387
DROP	1818	0.05	19.7	24	x	16	682

RETURN AIR #	1	2	3	4	5	6	7	8	9	10	BR
AIR VOLUME	115	115	115	85	105	260	330	175	75	130	313
PLENUM PRESSURE	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	65	74	96	72	52	61	25	72	51	1	14
EQUIVALENT LENGTH	235	205	215	185	145	195	180	185	245	190	135
TOTAL EFFECTIVE LH	300	279	311	257	197	258	241	210	317	241	149
ADJUSTED PRESSURE	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.07	0.05	0.06	0.10
ROUND DUCT SIZE	7	7	7	6	6	9.1	9.9	7.5	6	7	8.6
INLET GRILL SIZE	8	8	8	8	8	8	8	8	8	8	8
INLET GRILL SIZE	X	X	X	X	X	X	X	X	X	X	X
INLET GRILL SIZE	14	14	14	14	14	30	30	14	14	14	30

TYPE: GRANDVILLE 9
 SITE NAME: RUSSEL GARDENS PH 4

 LO # 90569
 WOB

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	<u>2</u> @ 21.2 cfm <u>42.4</u> cfm	
Other Bedrooms	<u>5</u> @ 10.6 cfm <u>53</u> cfm	
Kitchen & Bathrooms	<u>8</u> @ 10.6 cfm <u>84.8</u> cfm	
Other Rooms	<u>8</u> @ 10.6 cfm <u>84.8</u> cfm	
Table 9.32.3.A.	TOTAL <u>265.0</u> cfm	

PRINCIPAL VENTILATION CAPACITY REQUIRED		9.32.3.4.(1)
6 Bedrooms		
As Per Ashrea 62.2 Dwelling- Unit Ventilation		
4.1.1 Total Ventilation Rate		
$Q_{tot} = 0.03A_{floor} + 7.5(N_{br} + 1)$		
TOTAL		<u>207.9</u> cfm

SUPPLEMENTAL VENTILATION CAPACITY		9.32.3.5.
Total Ventilation Capacity	<u>265</u>	cfm
Less Principal Ventil. Capacity	<u>207.9</u>	cfm
Required Supplemental Capacity	<u>57.1</u>	cfm

PRINCIPAL EXHAUST FAN CAPACITY	
Model:	VANEE G2400H ECM
Location:	BSMT
<u>207.9</u> cfm	☒ HVI Approved

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

SUPPLEMENTAL FANS		BY INSTALLING CONTRACTOR		
Location	Model	cfm	HVI	Scores
ENS	BY INSTALLING CONTRACTOR	50	☒	3.5
ENS-2	BY INSTALLING CONTRACTOR	50	☒	3.5
ENS-3	BY INSTALLING CONTRACTOR	50	☒	3.5
ENS-4	BY INSTALLING CONTRACTOR	50	☒	3.5

HEAT RECOVERY VENTILATOR		9.32.3.11.
Model:	VANEE G2400H ECM	
<u>210</u>	cfm high <u>50</u> cfm low	
<u>80</u>	% 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#: 90569

Model: GRANDVILLE 9

Builder: GREENPARK HOMES

Date: 4/30/2021

Volume Calculation
Air Change & Delta T Data
House Volume

Level	Floor Area (ft ²)	Floor Height (ft)	Volume (ft ³)
Bsmt	2425	9	21825
First	2425	10	24250
Second	2756	9	24804
Third	0	9	0
Fourth	0	9	0
Total:			70,879.0 ft ³
Total:			2007.1 m ³

WINTER NATURAL AIR CHANGE RATE	0.365
SUMMER NATURAL AIR CHANGE RATE	0.130

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
6.2.6 Sensible Gain due to Air Leakage

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

0.365 x 557.52 x 39 °C x 1.2 = 9570 W

= 32652 Btu/h

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

= 0.130 x 557.52 x 7 °C x 1.2 = 621 W

= 2118 Btu/h

5.2.3.2 Heat Loss due to Mechanical Ventilation
6.2.7 Sensible heat Gain due to Ventilation

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

208 CFM x 71 °F x 1.08 x 0.20 = 3170 Btu/h

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

208 CFM x 13 °F x 1.08 x 0.20 = 575 Btu/h

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

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

Level	Level Factor (LF)	HLairbv Air Leakage + Ventilation Heat Loss (Btu/h)	Level Conductive Heat Loss: (HL _{level})	Air Leakage Heat Loss Multiplier (LF x HLairbv / HLlevel)
1	0.5	32,652	9,942	1.642
2	0.3		15,316	0.640
3	0.2		17,748	0.368
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 HLairv = 0

HEAT LOSS AND GAIN SUMMARY SHEET**MODEL:** GRANDVILLE 9**WOB****BUILDER:** GREENPARK HOMES**SFQT:** 5181**LO#** 90569**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 (ft ³):	70879.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	7
INTERIOR LIGHTING LOAD (Btu/h/ft ²):	1.55	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	6.0 ft
LENGTH: 67.0 ft	WIDTH: 46.0 ft	EXPOSED PERIMETER:	170.0 ft
WOB INSULATION CONFIGURATION	SCB_9	WOB EXPOSED PERIMETER	56.0 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	96%	-
HRV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	0.8	-

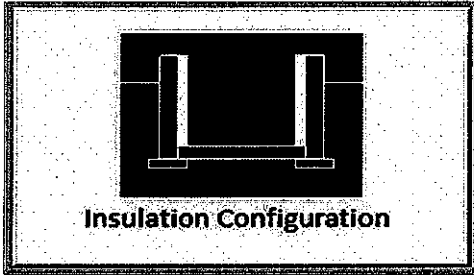
INDIVIDUAL BCIN: 19669

MICHAEL O'ROURKE



Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

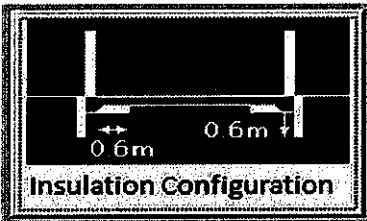
Weather Station Description		
Province:	Ontario	
Region:	Hamilton	
Site Description		
Soil Conductivity:	Normal conductivity: dry sand, loam, clay	
Water Table:	Normal (7-10 m, 23-33 ft)	
Foundation Dimensions		
Floor Length (m):	4.6	 Insulation Configuration
Floor Width (m):	14.0	
Exposed Perimeter (m):	51.8	
Wall Height (m):	2.7	
Depth Below Grade (m):	1.59	
Window Area (m ²):	1.4	
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):		872

TYPE: GRANDVILLE 9
LO# 90569

WOB

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):	1.5	 Insulation Configuration
Width (m):	14.0	
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):		244

TYPE: GRANDVILLE 9
LO# 90569

WOB

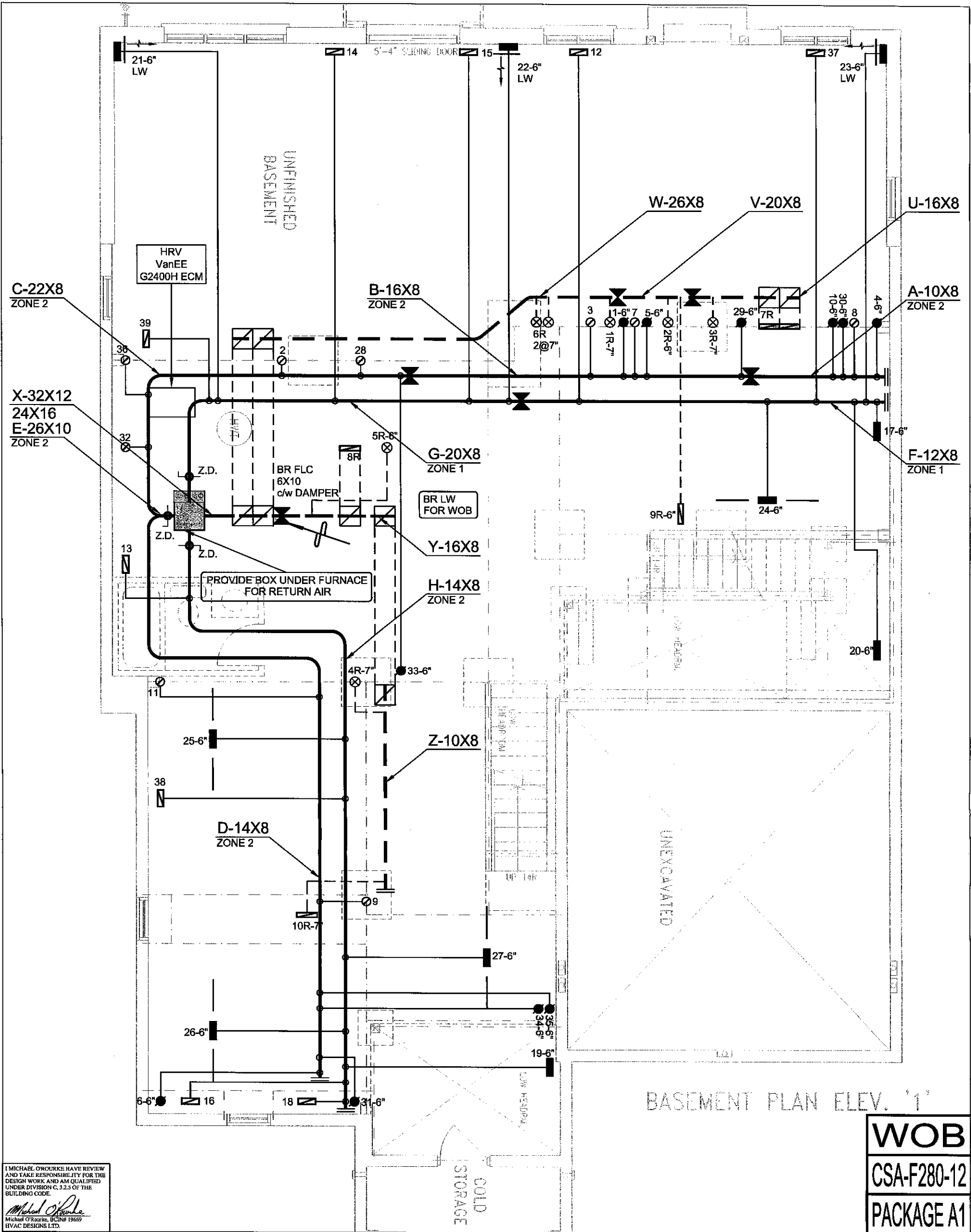
Air Infiltration Residential Load Calculator

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):	8.53			
Building Configuration				
Type:	Detached			
Number of Stories:	Two			
Foundation:	Full			
House Volume (m ³):	2007.1			
Air Leakage/Ventilation				
Air Tightness Type:	Present (1961-) (3.57 ACH)			
Custom BDT Data:	ELA @ 10 Pa.	2675.5 cm ²		
	3.57	ACH @ 50 Pa		
Mechanical Ventilation (L/s):	Total Supply	Total Exhaust		
	98.1	98.1		
Flue Size				
Flue #:	#1	#2	#3	#4
Diameter (mm):	0	0	0	0
Natural Infiltration Rates				
Heating Air Leakage Rate (ACH/H):	0.365			
Cooling Air Leakage Rate (ACH/H):	0.130			

TYPE: GRANDVILLE 9
LO# 90569

WOB



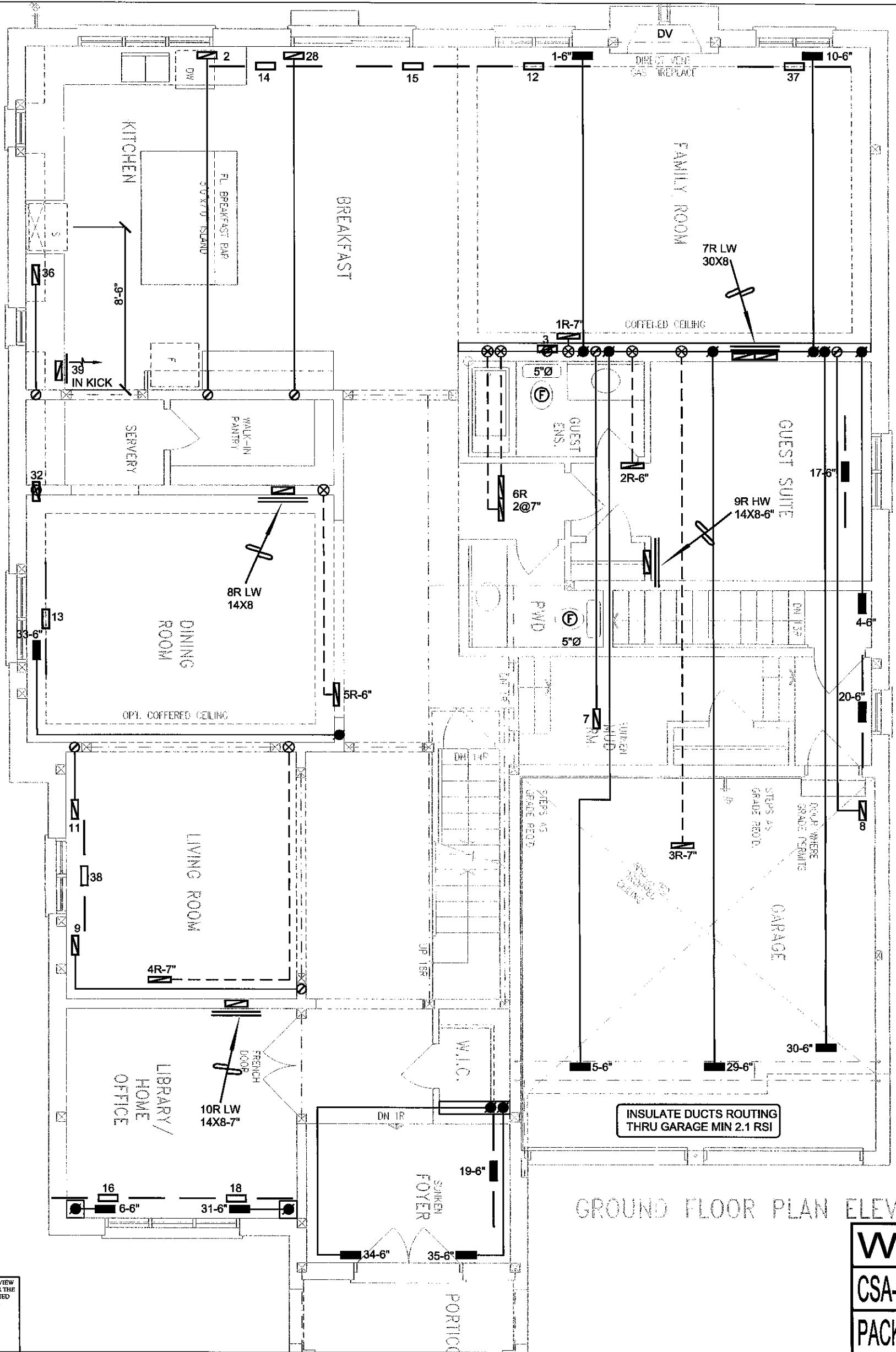
I MICHAEL O'ROURKE HAVE REVIEWED AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

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	HEAT LOSS 79330 BTU/H UNIT DATA		# OF RUNS S/A R/A FANS				Sheet Title BASEMENT HEATING LAYOUT	
Project Name RUSSELL GARDENS PH 4 HAMILTON, ONTARIO			MAKE GOODMAN	3RD FLOOR					Date APR/2021	Scale 3/16" = 1'-0"
			MODEL GMVC961005CNA	2ND FLOOR		20	6	6		
			INPUT 100 MBTU/H	1ST FLOOR		12	4	3		
WOB GRANDVILLE 9 5181 sqft		OUTPUT 96 MBTU/H	BASEMENT		7	1	0	BCIN# 19669		
		COOLING 5.0 (2 STAGE) 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							
		FAN SPEED 1818 cfm @ 0.6" w.g.	LO# 90569							



GROUND FLOOR PLAN ELEV. '1'

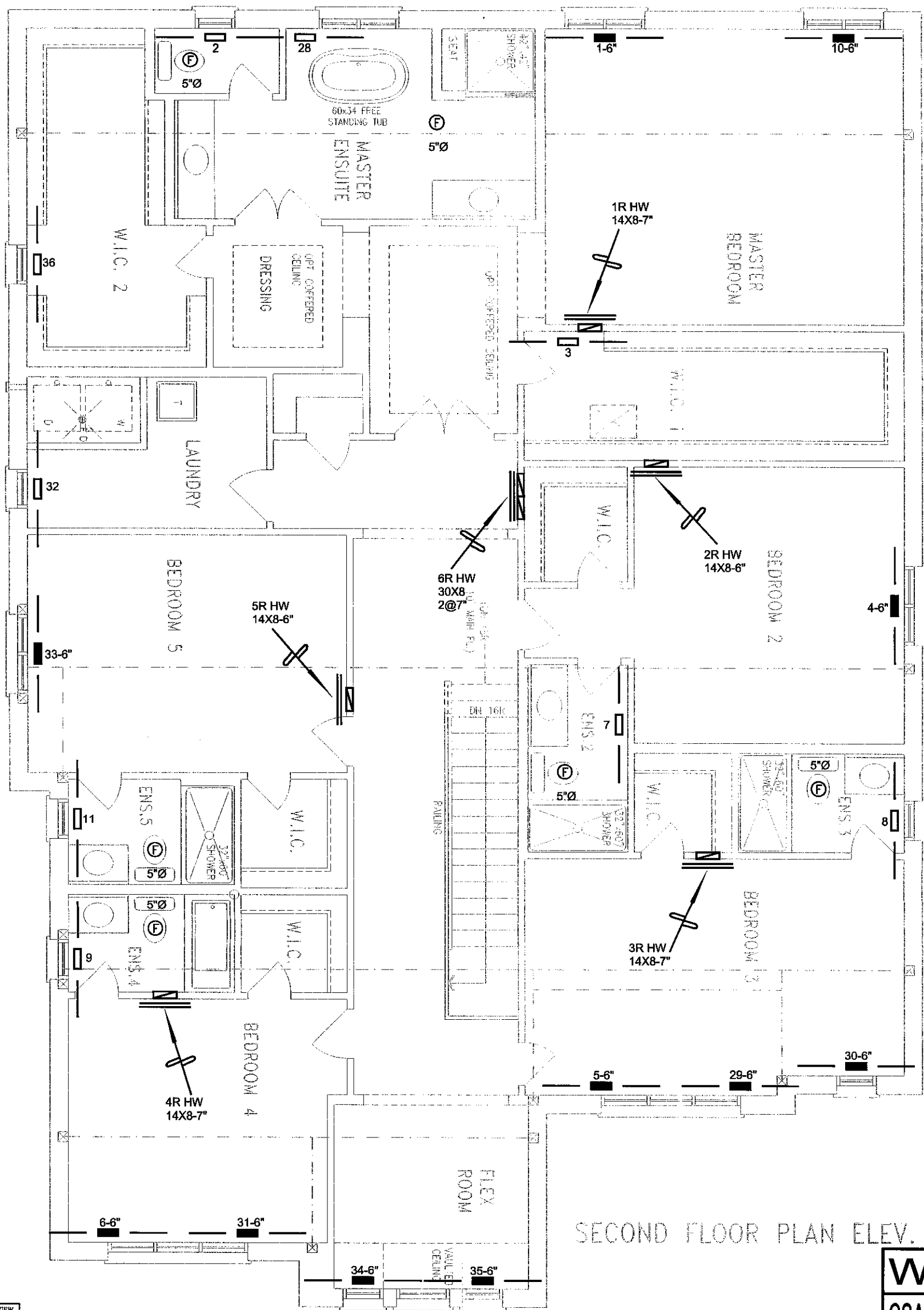
WOB
CSA-F280-12
PACKAGE A1

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

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

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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 RUSSELL GARDENS PH 4 HAMILTON, ONTARIO			Date APR/2021	
WOB GRANDVILLE 9 5181 sqft			Scale 3/16" = 1'-0"	
			BCIN# 19669	
			LO#	90569



SECOND FLOOR PLAN ELEV. '1'

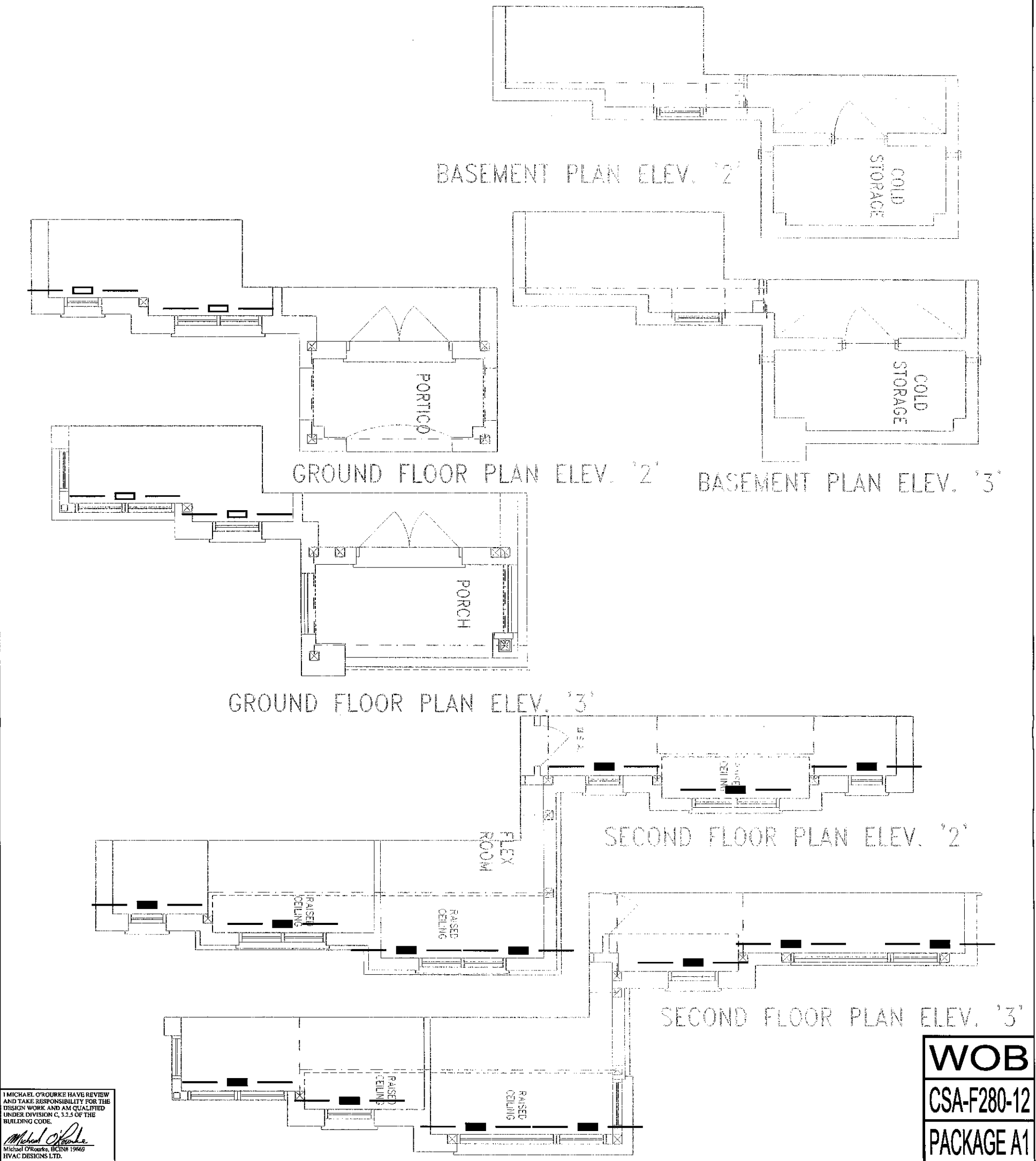
WOB
CSA-F280-12
PACKAGE A1

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

HVAC LEGEND						3.		
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	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		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER	No. Description Date

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Project Name RUSSELL GARDENS PH 4 HAMILTON, ONTARIO			Date APR/2021	
WOB GRANDVILLE 9 5181 sqft			Scale 3/16" = 1'-0"	
			BCIN# 19669	
			LO# 90569	



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

WOB
CSA-F280-12
PACKAGE A1

HVAC LEGEND						3.		
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	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER	No.
REVISIONS								Date

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Project Name RUSSELL GARDENS PH 4 HAMILTON, ONTARIO			Date APR/2021	
WOB GRANDVILLE 9 5181 sqft		Scale 3/16" = 1'-0"		
		BCIN# 19669		
		LO#	90569	