

SITE NAME: RUSSEL GARDENS PH 4
BUILDER: GREENPARK HOMES

WOB
TYPE: SPRINGFIELD 1S

GFA: 3382

DATE: Jul-21
LO# 91949

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			TYPE: SPRINGFIELD 1S		GFA: 3382		LO# 91949		WINTER NATURAL AIR CHANGE RATE 0.365		HEAT LOSS AT °F. 71		CSA-F280-12												
EXP. WALL			MBR		ENS		WIC		BED-2		BED-3		BED-4		ENS-2		FLEX		SUMMER NATURAL AIR CHANGE RATE 0.130		HEAT GAIN AT °F. 13		SB-12 PACKAGE A1		
CLG. HT.			9		29		12		11		30		33		6		11				ENS-3		LIV		
FACTORS			333		261		108		99		270		297		54		99				10		22		
GRS.WALL AREA			LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN				9		11		
GLAZING			LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN				80		242		
NORTH			19.8	16.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
EAST			19.8	41.6	32	633	1330	14	277	582	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SOUTH			19.8	24.9	0	0	0	7	138	174	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
WEST			19.8	41.6	0	0	0	0	0	0	16	316	398	0	0	0	7	138	174	16	316	398	0	0	
SKYLT.			34.6	101.5	0	0	0	0	0	0	0	0	0	49	969	2036	42	830	1745	0	0	0	0	0	
DOORS			23.6	4.3	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	301	1248	226	240	995	180	108	448	81	83	344	62	221	918	166	255	1067	192	47	195	35
NET EXPOSED BSMT WALL ABOVE GR			3.3	0.6	0	0	0	0	0	0	0	0	0	83	344	62	221	918	166	255	1067	192	47	195	35
EXPOSED CLG			1.2	0.6	355	423	209	193	230	113	80	95	47	234	279	136	191	228	112	252	300	148	70	93	41
NO ATTIC EXPOSED CLG			2.6	1.3	0	0	0	0	0	0	0	0	0	40	102	50	0	0	0	0	0	0	0	0	0
EXPOSED FLOOR			2.4	0.4	0	0	0	0	0	0	234	564	101	231	547	99	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	0	0	0	0	0	0	
SLAB ON GRADE HEAT LOSS					0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SUBTOTAL HT LOSS					2304		1640	543	1484	2762	2188	2085	417	821	1020	1446	1696								
SUB TOTAL HT GAIN					1766		1050	128	699	2464	2188	2085	417	821	1020	1446	1696								
LEVEL FACTOR / MULTIPLIER			0.20	0.32		0.20	0.32	0.20	0.32	0.20	0.32	0.20	0.32	0.20	0.32	0.20	0.32	0.20	0.32	0.20	0.32	0.20	0.32	0.20	0.32
AIR CHANGE HEAT LOSS					728		517	171	471	870	689	131	259	37	321	99	130								
AIR CHANGE HEAT GAIN					121		72	9	48	169	383	143	17	37	321	99	130								
DUCT LOSS					0		0	0	196	383	143	17	37	321	99	130									
DUCT GAIN					0		0	0	196	383	143	17	37	321	99	130									
HEAT GAIN PEOPLE			240	2	480	0	0	0	1	240	1	240	1	240	0	27	0	0	0	0	0	0	0	0	0
HEAT GAIN APPLIANCES/LIGHTS					516		0	0	0	516		516		516	0	0	0	0	0	0	0	0	0	0	
TOTAL HT LOSS BTU/H					3029		2157	714	2161	3995	2877	603	1080	1342	2009	2582	3305								
TOTAL HT GAIN x 1.3 BTU/H					3747		1469	178	2160	4847	3880	383	1080	1422	2009	2582	3305								
ROOM USE																									

ROOM USE			DIN		FAM		KT/BR		LB/OF		LAUN		FOY		MUD		WOB		BAS			
EXP. WALL			26		35		37		10		0		21		13		20		162			
CLG. HT.			10		10		10		10		9		11		11		9		9			
FACTORS																						
GRS.WALL AREA			260		350		370		100		0		231		143		180		972			
GLAZING			LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN			
NORTH			19.8	16.0	21	416	335	0	0	0	0	0	0	0	0	0	0	0	0	3	59	48
EAST			19.8	41.6	0	0	0	40	791	1662	73	1443	3033	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	0	0	0
WEST			19.8	41.6	0	0	0	0	0	0	0	0	16	316	398	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
DOORS			23.6	4.3	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	239	891	180	310	1285	233	297	1231	223	84	348	63	0	0	0	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
EXPOSED CLG			1.2	0.6	0	0	0	0	0	0	0	0	0	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	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
BASEMENT/CRAWL HEAT LOSS			0	0	0	0	0	0	0	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	0	0	0	0	0	0	0
SUBTOTAL HT LOSS			1406	815	2076	2674	665	90	1824	558	1014	544	142	3143	577	2400	16633	1753	4085	16833	1753	
SUB TOTAL HT GAIN			0.30	0.56	0.30	0.56	0.30	0.56	0.30	0.56	0.20	0.32	0.30	0.56	0.30	0.56	0.50	1.22	0.50	1.22	0.50	1.22
LEVEL FACTOR / MULTIPLIER			782	36	130	224	32	3	38	12	0	0	0	0	0	0	0	0	0	0	0	0
AIR CHANGE HEAT LOSS			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AIR CHANGE HEAT GAIN			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DUCT LOSS			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DUCT GAIN			240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HEAT GAIN PEOPLE			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HEAT GAIN APPLIANCES/LIGHTS			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL HT LOSS BTU/H			2188	3230	4161	1034	1312	130	2638	776	1523	247	2400	16633	1753	4085	16833	1753	4085	16833	1753	1753
TOTAL HT GAIN x 1.3 BTU/H			2838	4161	5369	1334	1706	169	3429	1009	1980	320	3120	4885	6165	3120	4161	5369	6165	7764	9724	12336
TOTAL HEAT GAIN BTU/H:			42464	64161	86059	21334	28126	269	5457	1785	3703	420	4085	6165	7764	9724	12336	15419	19504	24360	30432	38016
TONS: 3.64			122.1	182.5	237.4	59.8	79.4	7.9	163.4	52.2	111.5	12.6	122.1	182.5	237.4	282.9	357.4	445.2	545.1	684.0	860.3	1075.7

TOTAL HEAT GAIN BTU/H:

42464

TONS: 3.64

LOSS DUE TO VENTILATION LOAD BTU/H: 1212

STRUCTURAL HEAT LOSS: 54677

TOTAL COMBINED HEAT LOSS BTU/H: 55889

I REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED IN THE APPROPRIATE CATEGORY AS AN "OTHER DESIGNER" UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke

INDIVIDUAL BCIN: 19669

MICHAEL O'ROURKE

SITE NAME: RUSSEL GARDENS PH 4
BUILDER: GREENPARK HOMES

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

WOB

TYPE: SPRINGFIELD 1S

DATE: Jul-21

GFA: 3392

LO# 91949

HEATING CFM 1504
TOTAL HEAT LOSS 54,677
AIR FLOW RATE CFM 27.51

COOLING CFM 1504
TOTAL HEAT GAIN 42,245
AIR FLOW RATE CFM 35.6

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
GMCE960804CNA 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 @ .5" E.S.P.

TEMPERATURE RISE 47 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	14	10	5
R/A	0	0	5	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	ENS-2	FLEX	ENS	MBR	ENS-3	DIN	FAM	KT/BR	KT/BR	LB/OF	LAUN	FAM	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH	1.51	1.08	0.71	2.16	2.00	1.44	0.60	1.08	1.08	1.51	1.34	2.19	1.62	2.08	2.08	1.03	0.13	1.62	2.84	1.52	3.81	3.81	3.81	3.81
CFM PER RUN HEAT	42	30	20	59	55	40	17	30	30	42	37	60	44	57	57	28	4	44	78	42	105	105	105	105
RM GAIN MBH	1.87	0.73	0.18	2.15	2.42	1.94	0.38	1.42	0.73	1.87	2.01	1.39	1.65	2.60	2.60	1.31	0.81	1.65	0.78	0.25	1.17	1.17	1.17	1.17
CFM PER RUN COOLING	67	26	6	77	86	69	14	51	26	67	72	49	59	92	92	47	29	59	28	9	42	42	42	42
ADJUSTED PRESSURE	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	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH	42	64	34	44	51	39	44	60	60	55	43	8	48	33	42	55	32	57	35	50	44	68	52	13
EQUIVALENT LENGTH	200	180	180	140	120	160	160	140	150	160	210	110	130	130	120	140	140	140	140	100	150	140	160	140
TOTAL EFFECTIVE LENGTH	242	244	214	184	171	199	204	200	210	215	253	118	178	163	162	195	172	197	175	150	194	208	212	153
ADJUSTED PRESSURE	0.07	0.07	0.08	0.08	0.09	0.09	0.08	0.09	0.08	0.08	0.07	0.15	0.1	0.1	0.1	0.09	0.1	0.09	0.1	0.11	0.08	0.08	0.08	0.11
ROUND DUCT SIZE	6	4	4	6	6	6	4	6	4	6	6	5	5	5	5	5	4	5	5	4	6	6	6	6
HEATING VELOCITY (ft/min)	214	344	229	301	280	204	195	153	344	214	189	441	323	291	291	206	46	323	573	482	535	535	535	535
COOLING VELOCITY (ft/min)	342	298	69	393	438	352	161	260	298	342	367	360	433	469	469	345	333	433	206	103	214	214	214	214
OUTLET GRILL SIZE	4X10	3X10	3X10	4X10	4X10	4X10	3X10	4X10	3X10	4X10	4X10	3X10	3X10	4X10	4X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10	4X10
TRUNK	B	A	B	D	D	C	D	A	A	B	C	D	B	B	B	A	D	A	C	B	A	A	A	D

RUN #	25	26	27	28	29
ROOM NAME	BAS	BED-3	BED-4	LIV	LIV
RM LOSS MBH	3.81	2.00	1.44	1.29	1.29
CFM PER RUN HEAT	105	55	40	36	36
RM GAIN MBH	1.17	2.42	1.94	1.65	1.65
CFM PER RUN COOLING	42	86	69	59	59
ADJUSTED PRESSURE	0.16	0.16	0.17	0.17	0.17
ACTUAL DUCT LGH	28	47	44	23	24
EQUIVALENT LENGTH	130	110	190	120	120
TOTAL EFFECTIVE LENGTH	158	157	234	143	144
ADJUSTED PRESSURE	0.1	0.1	0.07	0.12	0.12
ROUND DUCT SIZE	6	6	6	5	5
HEATING VELOCITY (ft/min)	535	280	204	264	264
COOLING VELOCITY (ft/min)	214	438	352	433	433
OUTLET GRILL SIZE	4X10	4X10	4X10	3X10	3X10
TRUNK	C	D	C	C	C

SUPPLY AIR TRUNK SIZE

TRUNK	CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT	VELOCITY (ft/min)
TRUNK A	372	0.07	10	12	558
TRUNK B	781	0.07	13.2	20	703
TRUNK C	372	0.07	10	12	558
TRUNK D	727	0.07	12.9	20	654
TRUNK E	0	0.00	0	0	0
TRUNK F	0	0.00	0	0	0

RETURN AIR TRUNK SIZE

TRUNK	CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT	VELOCITY (ft/min)
TRUNK G	0	0.00	0	0	0
TRUNK H	0	0.00	0	0	0
TRUNK I	0	0.00	0	0	0
TRUNK J	0	0.00	0	0	0
TRUNK K	0	0.00	0	0	0
TRUNK L	0	0.00	0	0	0
TRUNK O	0	0.05	0	0	0
TRUNK P	0	0.05	0	0	0
TRUNK Q	0	0.05	0	0	0
TRUNK R	0	0.05	0	0	0
TRUNK S	0	0.05	0	0	0
TRUNK T	0	0.05	0	0	0
TRUNK U	0	0.05	0	0	0
TRUNK V	0	0.05	0	0	0
TRUNK W	0	0.05	0	0	0
TRUNK X	1504	0.05	18.4	32	677
TRUNK Y	520	0.05	12.3	18	520
TRUNK Z	0	0.05	0	0	0
DROP	1504	0.05	18.4	24	645

RETURN AIR #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
AIR VOLUME	130	145	130	130	115	360	190	85	0	0	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	64	51	55	45	72	19	51	57	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EQUIVALENT LENGTH	175	155	195	200	255	135	240	175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL EFFECTIVE LH	239	206	250	245	327	154	291	232	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ADJUSTED PRESSURE	0.06	0.07	0.06	0.06	0.05	0.10	0.05	0.06	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	14.80	14.80
ROUND DUCT SIZE	7	7	7	7	7	9	8.5	6	0	0	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	0	0	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
	14	14	14	14	14	30	24	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

I REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED IN THE APPROPRIATE CATEGORY AS AN "OTHER DESIGNER" UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke

INDIVIDUAL BCIN: 19669

MICHAEL O'ROURKE

TYPE: SPRINGFIELD 1S
SITE NAME: RUSSEL GARDENS PH 4

LO # 91949
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	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	8	@ 10.6 cfm	84.8	cfm
Table 9.32.3.A.	TOTAL		212.0	cfm

PRINCIPAL VENTILATION CAPACITY REQUIRED 9.32.3.4(1)

1 Bedroom	31.8	cfm
2 Bedroom	47.7	cfm
3 Bedroom	63.6	cfm
4 Bedroom	79.5	cfm
5 Bedroom	95.4	cfm
TOTAL		79.5 cfm

SUPPLEMENTAL VENTILATION CAPACITY 9.32.3.5.

Total Ventilation Capacity	212	cfm
Less Principal Ventil. Capacity	79.5	cfm
Required Supplemental Capacity	132.5	cfm

PRINCIPAL EXHAUST FAN CAPACITY
Model: VANE G2400H ECM Location: BSMT
79.5 cfm ☒ HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM	ΔT °F	FACTOR	% LOSS
79.5 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-3	BY INSTALLING CONTRACTOR	50	✓	3.5

HEAT RECOVERY VENTILATOR 9.32.3.11.
Model: VANE G2400H ECM
210 cfm high 50 cfm low
80 % Sensible Efficiency @ 32 deg F (0 deg C) ☒ HVI Approved

LOCATION OF INSTALLATION
Lot: Concession
Township: Plan:
Address:
Roll # Building Permit #

BUILDER: GREENPARK HOMES
Name:
Address:
City:
Telephone #: Fax #:

INSTALLING CONTRACTOR
Name:
Address:
City:
Telephone #: Fax #:

DESIGNER CERTIFICATION
I hereby certify that this ventilation system has been designed in accordance with the Ontario Building Code.
Name: HVAC Designs Ltd.
Signature: *Michael O'Rourke*
HRAI #: 001820
Date: July-21

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

LO#: 91949

Model: SPRINGFIELD 1S

Builder: GREENPARK HOMES

Date: 2021-07-27

Volume Calculation
Air Change & Delta T Data
House Volume

Level	Floor Area (ft ²)	Floor Height (ft)	Volume (ft ³)
Bsmt	1487	9	13383
First	1487	10	14870
Second	1905	9	17145
Third	0	9	0
Fourth	0	9	0
Total:			45,398.0 ft ³
Total:			1285.5 m ³

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

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
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 357.09 x 39 °C x 1.2 = 6130 W

= 20914 Btu/h

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

= 0.130 x 357.09 x 7 °C x 1.2 = 398 W

= 1357 Btu/h

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

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

80 CFM x 71 °F x 1.08 x 0.20 = 1212 Btu/h

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

80 CFM x 13 °F x 1.08 x 0.20 = 220 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)	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	20,914	8,575	1.219
2	0.3		11,283	0.556
3	0.2		13,279	0.315
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: SPRINGFIELD 15	WOB	BUILDER: GREENPARK HOMES
SFQT: 3392	LO# 91949	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):	45398.0	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:	6.0 ft
LENGTH: 53.0 ft	WIDTH: 38.0 ft	EXPOSED PERIMETER:	162.0 ft
WOB INSULATION CONFIGURATION	SCB_9	WOB EXPOSED PERIMETER	20.0 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	-

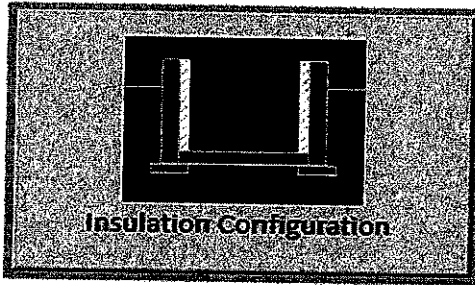
INDIVIDUAL BCIN: 19669

MICHAEL O'ROURKE

Michael O'Rourke

Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

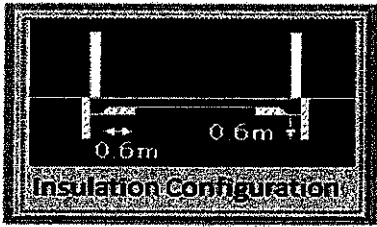
Weather Station Description		
Province:	Ontario	
Region:	Hamilton	
Site Description		
Soil Conductivity:	Normal conductivity: dry sand, loam, clay	
Water Table:	Normal (7-10 m, 23-33 ft)	
Foundation Dimensions		
Floor Length (m):	7.6	
Floor Width (m):	11.6	
Exposed Perimeter (m):	49.4	
Wall Height (m):	2.7	
Depth Below Grade (m):	1.50	
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):	1144	

TYPE: SPRINGFIELD 1S
LO# 91949

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):	4.6	
Width (m):	1.5	
Exposed Perimeter (m):	6.1	
Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Results		
Heating Load (Watts):		42

TYPE: SPRINGFIELD 1S
LO# 91949

WOB

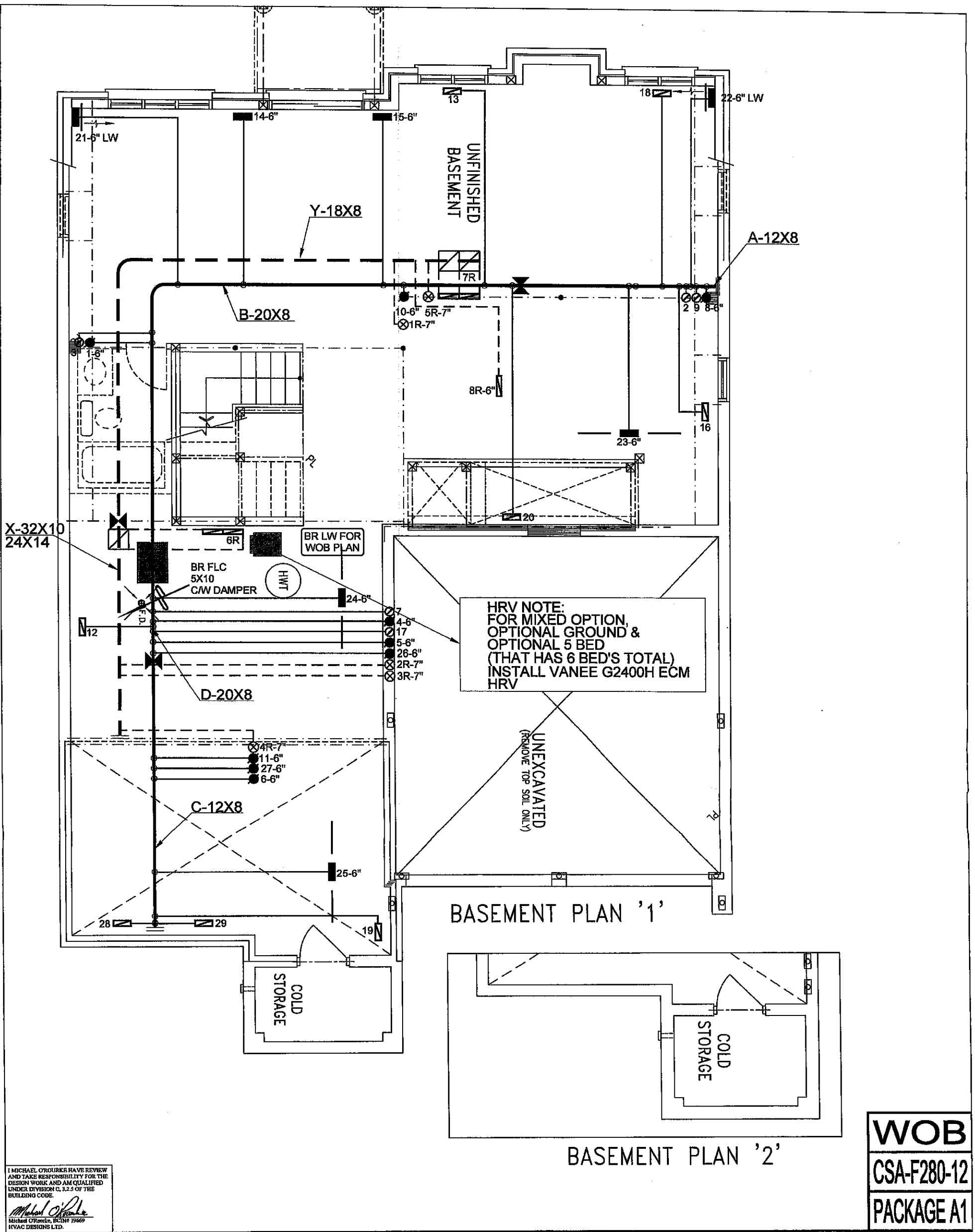
Air Infiltration Residential Load Calculator

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):	1285.5			
Air Leakage/Ventilation				
Air Tightness Type:	Present (1961-) (3.57 ACH)			
Custom BDT Data:	ELA @ 10 Pa.	1713.6 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):	0.365			
Cooling Air Leakage Rate (ACH/H):	0.130			

TYPE: SPRINGFIELD 1S
LO# 91949

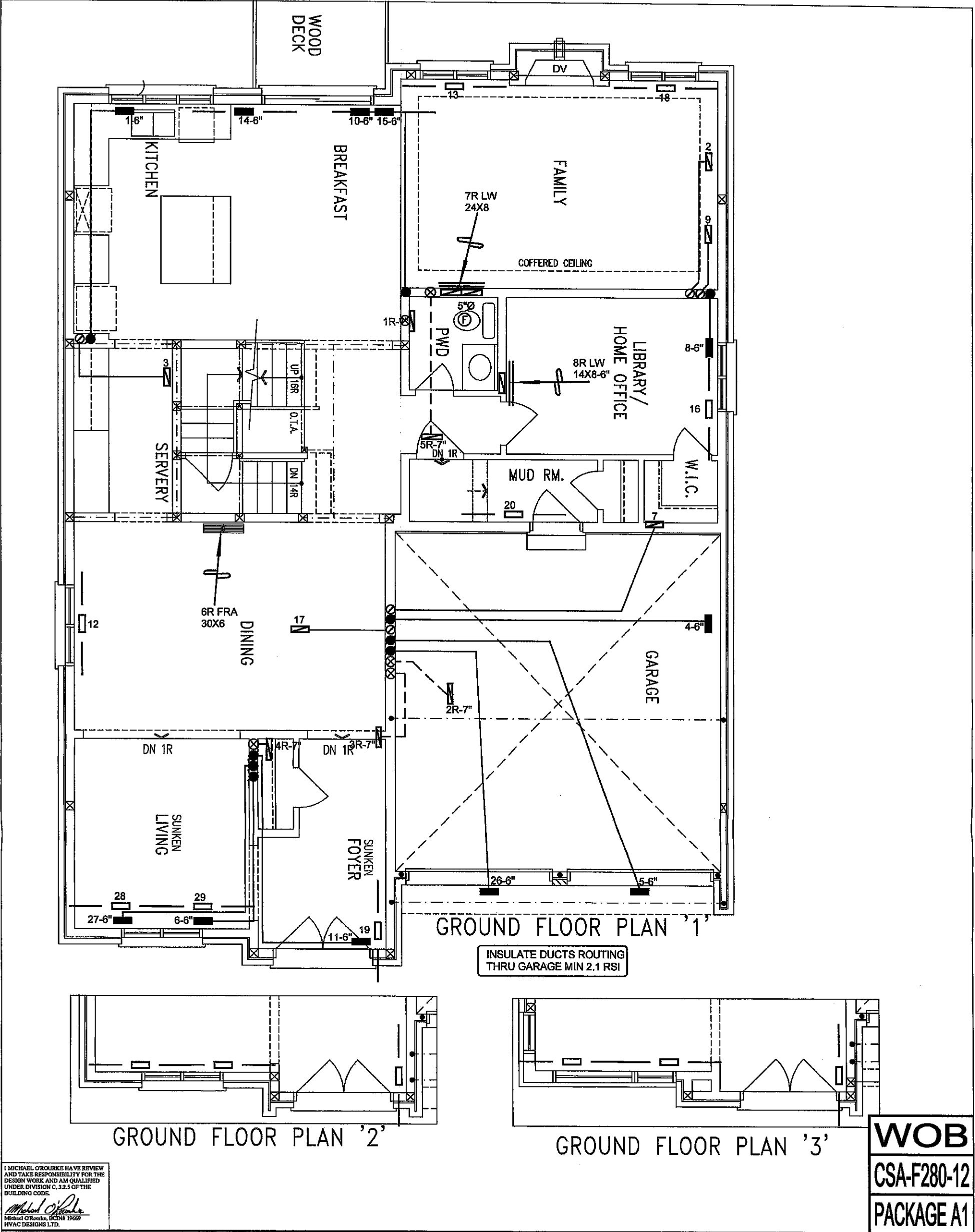
WOB



I MICHAEL O'DOURKE HAVE REVIEWED AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.3 OF THE BUILDING CODE.

Michael O'Dourke
Michael O'Dourke, 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"x6" 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			
ALL DRAWINGS, CALCULATIONS AND SPECIFICATIONS ARE THE PROPERTY OF HVAC DESIGNS LTD.© AND MAY NOT BE REPRODUCED, MODIFIED OR ALTERED WITHOUT EXPRESSED WRITTEN CONSENT. THE DRAWINGS ARE DATED AND USE OF THESE DRAWINGS AFTER ONE YEAR FROM THE DATED NOTED IS NOT AUTHORIZED. CONTRACTOR SHALL CHECK ALL CONDITIONS BEFORE PROCEEDING WITH WORK. LATEST MUNICIPAL APPROVED DRAWINGS ONLY TO BE USED DURING INSTALLATION OF HEATING SYSTEM. HVAC DESIGNS LTD. IS NOT LIABLE FOR ANY CLAIMS ARISING FROM UNAUTHORIZED USE OF THE DRAWINGS OR FROM ANY CHANGES TO ACCEPTED STANDARDS AND/OR THE ONTARIO BUILDING CODE.											
Client		 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 55889 BTU/H UNIT DATA		# OF RUNS S/A R/A FANS		Sheet Title	
GREENPARK HOMES						MAKE GOODMAN		3RD FLOOR		BASEMENT HEATING LAYOUT	
Project Name		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.				MODEL GMEC960804CNA		2ND FLOOR 14 5 5		Data JULY/2021	
RUSSELL GARDENS PH 4 HAMILTON, ONTARIO						INPUT 80 MBTU/H		1ST FLOOR 10 3 2		Scale 3/16" = 1'-0"	
WOB						OUTPUT 76.8 MBTU/H		BASEMENT 5 1 0		BCIN# 19669	
SPRINGFIELD 1S 3392 sqft						COOLING 3.5 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		LO# 91949	
						FAN SPEED 1504 cfm @ 0.6" w.c.					

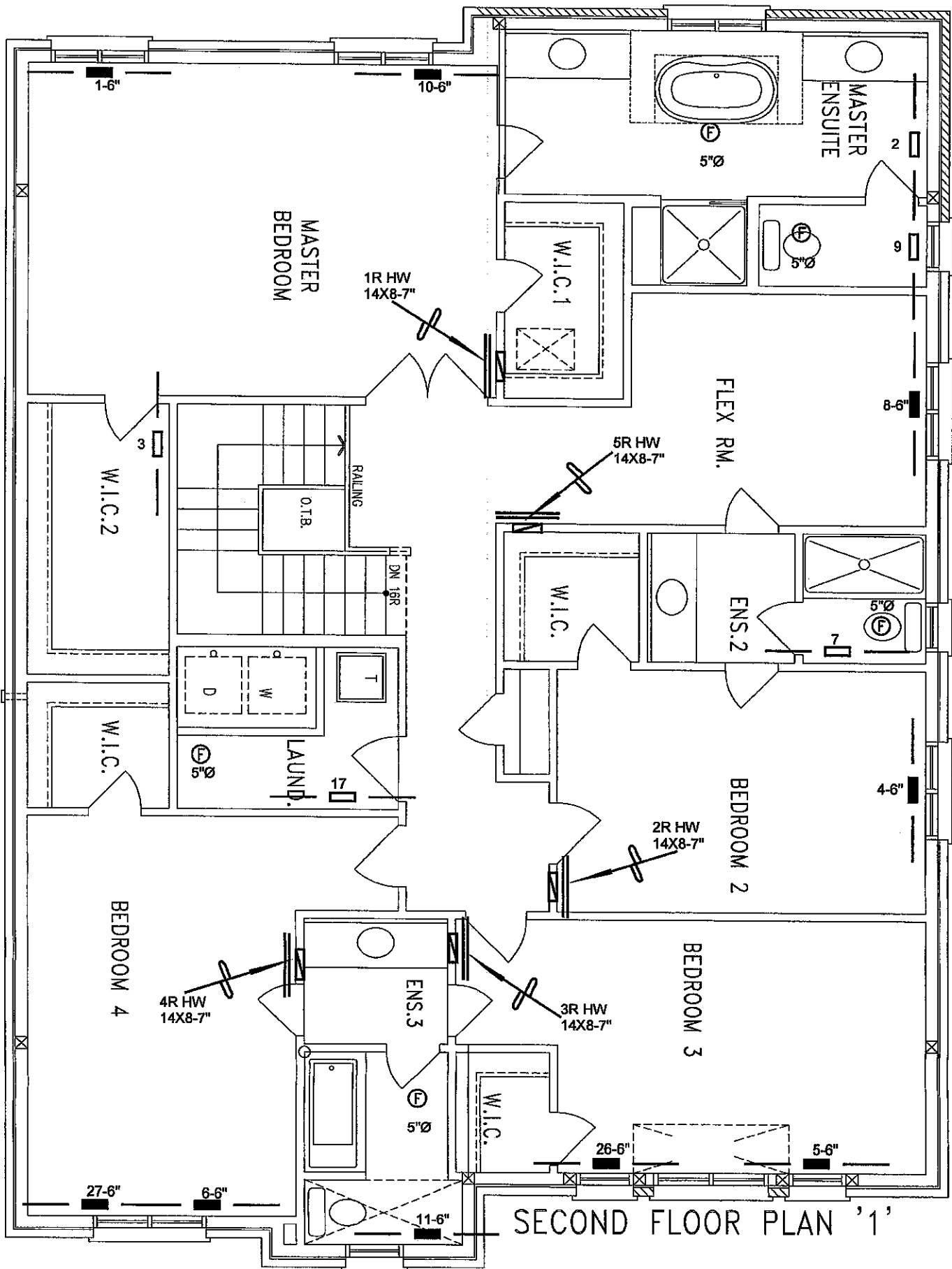


WOB
CSA-F280-12
PACKAGE A1

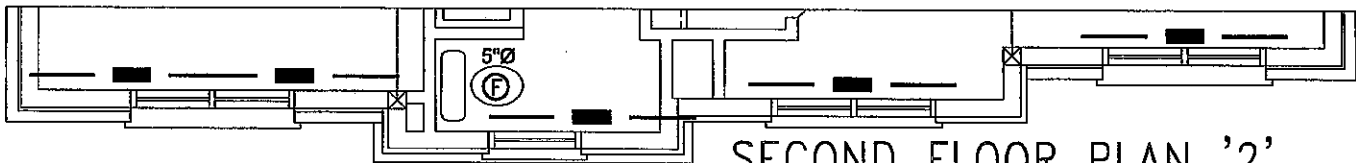
HVAC LEGEND								3.		
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	2.		
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE	1.		
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR 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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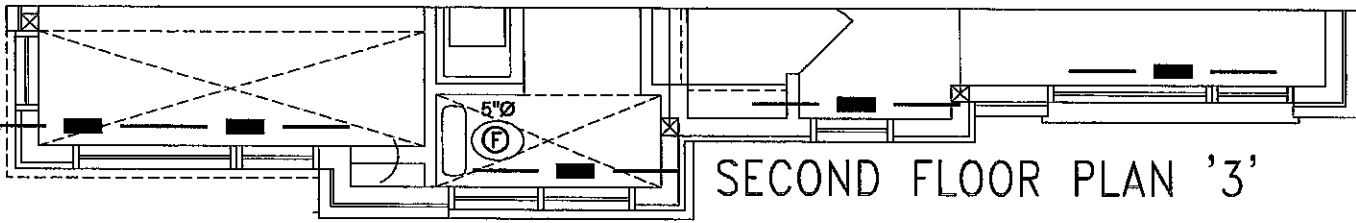
Client GREENPARK HOMES		 375 Finley Ave. Suite 202 - Ajax, Ontario L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375 Email: info@hvacdesigns.ca Web: www.hvacdesigns.ca Specializing in Residential Mechanical Design Services Installation to comply with the latest Ontario Building Code. All supply 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 FIRST FLOOR HEATING LAYOUT
Project Name RUSSELL GARDENS PH 4 HAMILTON, ONTARIO	WOB SPRINGFIELD 1S 3392 sqft		
			Date JULY/2021
			Scale 3/16" = 1'-0"
			BCIN# 19669
			LO# 91949



SECOND FLOOR PLAN '1'



SECOND FLOOR PLAN '2'



SECOND FLOOR PLAN '3'

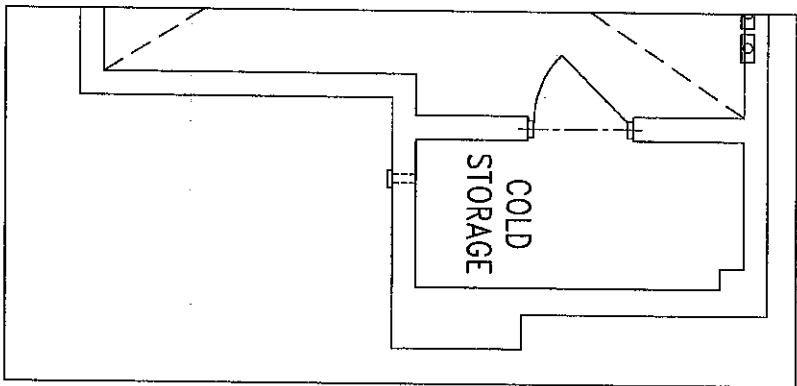
I MICHAEL O'ROURKE HAVE REVIEWED AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C.3.2.3 OF THE BUILDING CODE.
Michael O'Rourke
Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

WOB
CSA-F280-12
PACKAGE A1

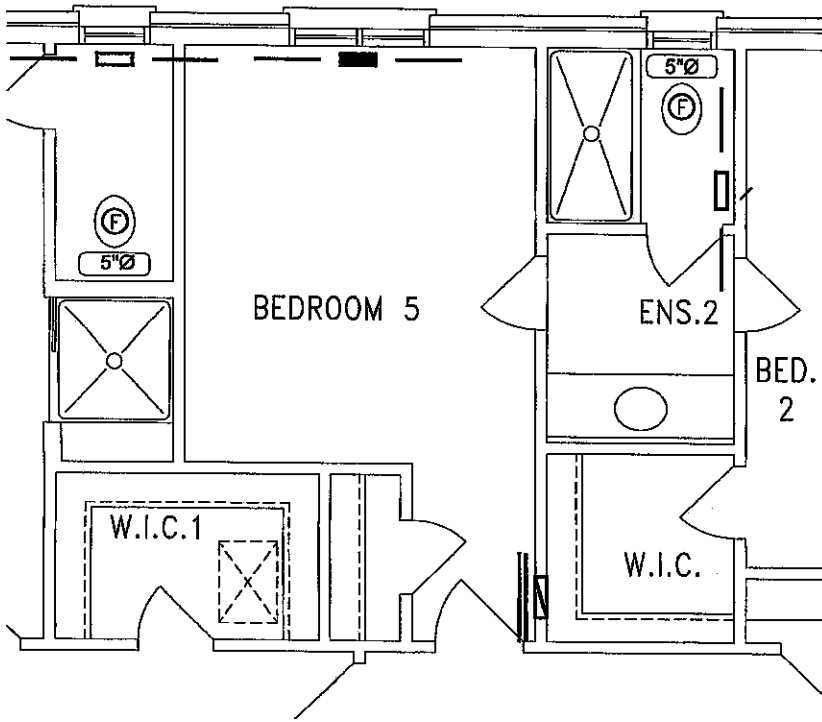
HVAC LEGEND						3.		
— □ —	SUPPLY AIR GRILLE	■	6" SUPPLY AIR BOOT ABOVE	— ▤ —	14"x8" RETURN AIR GRILLE	— ▤ —	RETURN AIR STACK ABOVE	
— ■ —	SUPPLY AIR GRILLE 6" BOOT	⊙	SUPPLY AIR STACK FROM 2nd FLOOR	— ▤ —	30"x8" RETURN AIR GRILLE	— ▤ —	RETURN AIR STACK 2nd FLOOR	
— ▤ —	SUPPLY AIR BOOT ABOVE	■	6" SUPPLY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

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Client GREENPARK HOMES		HVACDESIGNS 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.	Sheet Title SECOND FLOOR HEATING LAYOUT	
Project Name RUSSELL GARDENS PH 4 HAMILTON, ONTARIO			Date JULY/2021	
WOB SPRINGFIELD 1S 3392 sqft			Scale 3/16" = 1'-0"	
			BCIN# 19669	
		LO# 91949		



BASEMENT PLAN '3'



PARTIAL SECOND FLOOR PLAN '1'
W/ OPTIONAL 5 BEDROOM

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

WOB
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 THIRD FLOOR HEATING LAYOUT	
Project Name RUSSELL GARDENS PH 4 HAMILTON, ONTARIO			Date JULY/2021	
WOB SPRINGFIELD 1S 3392 sqft			Scale 3/16" = 1'-0"	
			BCIN# 19669	
			LO# 91949	