Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

SITE NAME: RUSSEL GARDENS PH 4 | OPT GROUND | DATE: Sep-21 | WINTER NATURAL AIR CHANGE RATE 0.338 | HEAT LOSS ΔT °F. 71 | CSA-F280-12
BUILDER: GREENPARK HOMES | TYPE: SPRINGFIELD 1 | GFA: 3491 | LO# 90151 | SUMMER NATURAL AIR CHANGE RATE 0.121 | HEAT GAIN ΔT °F. 13 | SB-12 PACKAGE A1

ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4			ENS-2			FLX/BD5						ENS-3			LIV					
EXP. WALL			37			29			12			11			30			33			6			11						10			22					
CLG. HT.			9			9			9			9			9			9			9			9						9			11					
	FACTORS																																					
GRS.WALL AREA	LOSS	GAIN	333			261			108			99			270			297			54			99						90			242					
GLAZING			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	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	0	0	0	0				0	0	0	0	0	0			
SOUTH	19.8	24.9	0	0	0	7	138	174	0	0	0	16	316	398	0	0	0	0	0	0	7	138	174	16	316	398				0	0	0	0	0	0			
WEST	19.8	41.6	0	0	0	0	0	0	0	0	0	0	0	0	49	969	2036	42	830	1745	0	0	0	0	0	0				32	633	1330	42	830	1745			
SKYLT.	34.6	101.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0			
DOORS	23.5	4.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0			
NET EXPOSED WALL	4.1	0.8	301	1248	226	240	995	180	108	448	81	83	344	62	221	916	166	255	1057	192	47	195	35	83	344	62				58	240	44	200	829	150			
NET EXPOSED BSMT WALL ABOVE GR	3.3	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0			
EXPOSED CLG	1.2	0.6	385	459	226	193	230	113	80	95	47	234	279	138	191	228	112	252	300	148	70	83	41	135	161	79				70	83	41	0	0	0			
NO ATTIC EXPOSED CLG	2.6	1.3	0	0	0	0	0	0	0	0	0	0	0	0	40	102	50	0	0	0	0	0	0	0	0	0				25	64	31	0	0	0			
EXPOSED FLOOR	2.4	0.4	0	0	0	0	0	0	0	0	0	234	554	101	231	547	99	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0			
BASEMENT/CRAWL HEAT LOSS			0			0			0				0			0			0			0			0						0			0					
SLAB ON GRADE HEAT LOSS			0			0			0				0			0			0			0			0						0			0					
SUBTOTAL HT LOSS			2339			1640			543				1494			2762			2168			417			821						1020			1659					
SUB TOTAL HT GAIN					1782			1050			128			699			2384			2085			251			540						1446			1896			
LEVEL FACTOR / MULTIPLIER			0.20	0.30		0.20	0.30		0.20	0.30		0.20	0.30			0.30		0.20	0.30		0.20	0.30		0.20	0.30					0.20	0.30		0.30	0.53				
AIR CHANGE HEAT LOSS				702			492			163			449			657			657			126			246						308			881					
AIR CHANGE HEAT GAIN					151			89			11			59			209			177			21			46						122			161			
DUCT LOSS				0			0			0			194			259			0			54			0						0			0					
DUCT GAIN					0			0			0			163			354			0			27			0						0			0			
HEAT GAIN PEOPLE	240		2		480	0		0	0		0	1		240	1		240	1		240	0		0	1		240				0		0	0		0			
HEAT GAIN APPLIANCES/LIGHTS					629			0			0			629			629			629			0			629						0			629			
TOTAL HT LOSS BTU/H				3041			2132			706			2130			3420			2844			596			1068						1326			2541			
TOTAL HT GAIN x 1.3 BTU/H					3954			1480			181			2326			5064			4069			389			1891						2039			3490			

ROOM USE			DIN			FAM			KT/BR			GUEST			LAUN			FOY			MUD									WOD			BAS		
EXP. WALL			26			35			37			10			0			24			13									48			182		
CLG. HT.			10			10			10			10			9			14			11									9			9		
	FACTORS																																		
GRS.WALL AREA	LOSS	GAIN	260			350			370			100			0			231			143									432			1236		
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	415	336	0	0	0	0	0	0	0	0	0	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	0	0	0							12	237	499	0	0	0
SOUTH	19.8	24.9	0	0	0	0	0	0	0	0	0	16	316	398	0	0	0	0	0	0	0	0	0							0	0	0	6	119	149
WEST	19.8	41.6	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
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
DOORS	23.5	4.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	938	170	20	469	85							0	0	0	20	469	85
NET EXPOSED WALL	4.1	0.8	239	991	180	310	1285	233	297	1231	223	84	348	63	0	0	0	185	767	139	123	510	92							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	0	0	0							276	923	167	402	1344	244
EXPOSED CLG	1.2	0.6	0	0	0	0	0	0	0	0	0	0	0	0	76	89	44	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	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
BASEMENT/CRAWL HEAT LOSS			0			0			0			0			0			0			0												6050		
SLAB ON GRADE HEAT LOSS			0			0			0			0			0			0			0									0					
SUBTOTAL HT LOSS			1406			2076			2674			665			90			1824			979									1160			8041		
SUB TOTAL HT GAIN					515			1895			3257			462			44			558			177								668			526	
LEVEL FACTOR / MULTIPLIER			0.30	0.53		0.30	0.53		0.30	0.53		0.30	0.53		0.20	0.30		0.30	0.53		0.30	0.53										0.50	1.09	
AIR CHANGE HEAT LOSS				747			1103			1420			353			27			969			620												9988	
AIR CHANGE HEAT GAIN					44			161			276			39			4			47			15												101
DUCT LOSS				0			0			0			0			12			0			0												0	
DUCT GAIN					0			0			0			0			68			0			0												0
HEAT GAIN PEOPLE	240		0		0	0		0	0		0	1		240	0		0	0		0	0		0							0		0	0		0
HEAT GAIN APPLIANCES/LIGHTS					629			629			629			629			629			0			0									0			629
TOTAL HT LOSS BTU/H				2153			3178			4095			1017			128			2792			1499								1160			18029		
TOTAL HT GAIN x 1.3 BTU/H					1644			3490			5410			1780			968			788			250								866			1632	

TOTAL HEAT GAIN BTU/H: 42046 TONS: 3.50 LOSS DUE TO VENTILATION LOAD BTU/H: 2397 STRUCTURAL HEAT LOSS: 54393 TOTAL COMBINED HEAT LOSS BTU/H: 56791

CITY OF HAMILTON
Building Division
Permit No.
THESE STAMPED DRAWINGS SHALL BE AVAILABLE ON SITE
THE OWNER AND/OR CONTRACTOR SHALL COMPLY WITH
THE ONTARIO BUILDING CODE AND ALL OTHER APPLICABLE LAW
The drawings and specifications have been reviewed by
FOR CHIEF BUILDING OFFICIAL
DATE

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

HVAC DESIGNS LTD.

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

SITE NAME: RUSSEL GARDENS PH 4
BUILDER: GREENPARK HOMES

OPT GROUND
TYPE: SPRINGFIELD 1

DATE: Sep-21

GFA: 3491 LO# 90151

HEATING CFM	1504	COOLING CFM	1504
TOTAL HEAT LOSS	54,393	TOTAL HEAT GAIN	41,611
AIR FLOW RATE CFM	27.65	AIR FLOW RATE CFM	36.14

furnace pressure	0.6
furnace filter	0.05
a/c coil pressure	0.2
available pressure for s/a & r/a	0.35
plenum pressure s/a	0.18
max s/a dif press. loss	0.02
min adjusted pressure s/a	0.16
r/a pressure	0.17
r/a grille press. Loss	0.02
adjusted pressure r/a	0.15

#"GOODMAN
GMEC960804CNA 80

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

AFUE = 96 %
INPUT (BTU/H) = 80,000
OUTPUT (BTU/H) = 76,800

DESIGN CFM = 1504
CFM @ .6 " E.S.P.

TEMPERATURE RISE 47 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	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	FLX/BD5	ENS	MBR	ENS-3	DIN	FAM	KT/BR	KT/BR	GUEST	LAUN	FAM	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.52	1.07	0.71	2.14	1.97	1.42	0.60	1.07	1.07	1.52	1.33	2.15	1.59	2.05	2.05	1.02	0.13	1.59	2.79	1.50	3.84	3.84	3.84	3.84
CFM PER RUN HEAT	42	29	20	59	55	39	16	30	29	42	37	60	44	57	57	28	4	44	77	41	106	106	106	106
RM GAIN MBH.	1.98	0.74	0.18	2.33	2.53	2.03	0.39	1.89	0.74	1.98	2.04	1.54	1.74	2.70	2.70	1.78	0.97	1.74	0.79	0.25	0.50	0.50	0.50	0.50
CFM PER RUN COOLING	71	27	7	84	92	74	14	68	27	71	74	56	63	98	98	64	35	63	28	9	18	18	18	18
ADJUSTED PRESSURE	0.17	0.17	0.17	0.16	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	23	52	52	13
EQUIVALENT LENGTH	200	180	180	140	120	160	160	140	150	160	210	110	130	130	120	140	140	140	140	100	140	150	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	163	202	212	153
ADJUSTED PRESSURE	0.07	0.07	0.08	0.09	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	0.1	0.08	0.08	0.11
ROUND DUCT SIZE	6	4	4	6	6	5	4	6	4	6	6	5	5	6	6	5	4	5	5	4	6	6	6	6
HEATING VELOCITY (ft/min)	214	333	229	301	280	286	184	153	333	214	189	441	323	291	291	206	46	323	565	470	540	540	540	540
COOLING VELOCITY (ft/min)	362	310	80	428	469	543	161	347	310	362	377	411	463	500	500	470	402	463	206	103	92	92	92	92
OUTLET GRILL SIZE	4X10	3X10	3X10	4X10	4X10	3X10	3X10	4X10	3X10	4X10	4X10	3X10	3X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10	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	B	A	A	D

RUN #	25	26	27	28	29
ROOM NAME	BAS	BED-3	BED-4	LIV	LIV
RM LOSS MBH.	3.84	1.97	1.42	1.27	1.27
CFM PER RUN HEAT	106	55	39	35	35
RM GAIN MBH.	0.50	2.53	2.03	1.75	1.75
CFM PER RUN COOLING	18	92	74	63	63
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)	540	280	199	257	257
COOLING VELOCITY (ft/min)	92	469	377	463	463
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 CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)
TRUNK A	372	0.07	10	12	x	8	558	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	781	0.07	13.2	20	x	8	703	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	368	0.07	10	12	x	8	552	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	723	0.07	12.8	20	x	8	651	TRUNK J	0	0.00	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 F	0	0.00	0	0	x	8	0	TRUNK L	0	0.00	0	0	x	8	0

RETURN AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)
TRUNK O	0	0.05	0	0	x	8	0
TRUNK P	0	0.05	0	0	x	8	0
TRUNK Q	0	0.05	0	0	x	8	0
TRUNK R	0	0.05	0	0	x	8	0
TRUNK S	0	0.05	0	0	x	8	0
TRUNK T	0	0.05	0	0	x	8	0
TRUNK U	0	0.05	0	0	x	8	0
TRUNK V	0	0.05	0	0	x	8	0
TRUNK W	0	0.05	0	0	x	8	0
TRUNK X	1504	0.05	18.4	32	x	10	677
TRUNK Y	520	0.05	12.3	18	x	8	520
TRUNK Z	0	0.05	0	0	x	8	0
DROP	1504	0.05	18.4	24	x	14	645

RETURN AIR #	1	2	3	4	5	6	7	8								BR
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	130	130	120	120	115	360	190	85	0	0	0	0	0	0	0	254
PLENUM PRESSURE	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
ACTUAL DUCT LGH.	64	51	55	45	72	19	51	62	1	1	1	1	1	1	1	14
EQUIVALENT LENGTH	175	155	195	200	255	135	240	175	0	0	0	0	0	0	0	135
TOTAL EFFECTIVE LH	239	206	250	245	327	154	291	237	1	1	1	1	1	1	1	149
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	0.10
ROUND DUCT SIZE	7	6.8	6.8	6.8	7	9	8.5	6	0	0	0	0	0	0	0	7.9
INLET GRILL SIZE	8	8	8	8	8	8	8	8	0	0	0	0	0	0	0	8
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
INLET GRILL SIZE	14	14	14	14	14	30	24	14	0	0	0	0	0	0	0	24

HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 Ajax, ON L1S
Tel: 905.619.2300 Fax: 905.619.
Web: www.hvacdesigns.ca E-mail: info@hvacdesigr

TYPE: SPRINGFIELD 1
SITE NAME: RUSSEL GARDENS PH 4

LO # 90151
OPT GROUND

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	5	@ 10.6 cfm	53	cfm
Other Rooms	6	@ 10.6 cfm	63.6	cfm
Table 9.32.3.A.		TOTAL	212.0	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 157.2 cfm

SUPPLEMENTAL VENTILATION CAPACITY 9.32.3.5.

Total Ventilation Capacity	212	cfm
Less Principal Ventil. Capacity	157.2	cfm
Required Supplemental Capacity	54.8	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE G2400H ECM Location: BSMT

157.2 cfm [✓] HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM		ΔT °F		FACTOR		% LOSS
157.2 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: VANEE 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: September-21

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

INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

Michael O'Rourke.

HVAC DESIGNS LTD.

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

CSA F280-12 Residential Heat Loss and Heat Gain Calculations

Formula Sheet (For Air Leakage / Ventiliation Calculation)

LO#: 90151 Model: SPRINGFIELD 1 Builder: GREENPARK HOMES Date: 9/30/2021

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1539	9	13851
First	1539	10	15390
Second	1952	9	17568
Third	0	9	0
Fourth	0	9	0
		Total:	46,809.0 ft³
		Total:	1325.5 m³

Air Change & Delta T Data

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

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

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

0.338 x 368.19 x 39 °C x 1.2 = 5855 W

= 19976 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 368.19 x 7 °C x 1.2 = 380 W

= 1297 Btu/h

5.2.3.2 Heat Loss due to Mechanical Ventilation

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

157 CFM x 71 °F x 1.08 x 0.20 = 2397 Btu/h

6.2.7 Sensible heat Gain due to Ventilation

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

157 CFM x 13 °F x 1.08 x 0.20 = 435 Btu/h

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

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

Level	Level Factor (LF)	HLairve Air Leakage + Ventilation Heat Loss (Btu/h)	Level Conductive Heat Loss: (HL_{clevel})	Air Leakage Heat Loss Multiplier (LF x HLairbv / HLlevel)
1	0.5	19,976	9,201	1.086
2	0.3		11,283	0.531
3	0.2		13,314	0.300
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

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

HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: SPRINGFIELD 1 OPT GROUND **BUILDER:** GREENPARK HOMES
SFQT: 3491 **LO#** 90151 **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):	46809.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	7
INTERIOR LIGHTING LOAD ($Btu/h/ft^2$):	1.50	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:	182.0 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

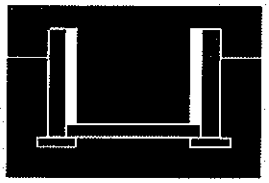
Michael O'Rourke.

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

Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description	
Province:	Ontario
Region:	Hamilton
Site Description	
Soil Conductivity:	Normal conductivity: dry sand, loam, clay
Water Table:	Normal (7-10 m, 23-33 ft)

Foundation Dimensions		
Floor Length (m):	16.2	 Insulation Configuration
Floor Width (m):	11.6	
Exposed Perimeter (m):	0.0	
Wall Height (m):	2.7	
Depth Below Grade (m):	1.83	
Window Area (m^2):	2.0	
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):	**1773**	

TYPE: SPRINGFIELD 1 OPT GROUND
LO# 90151

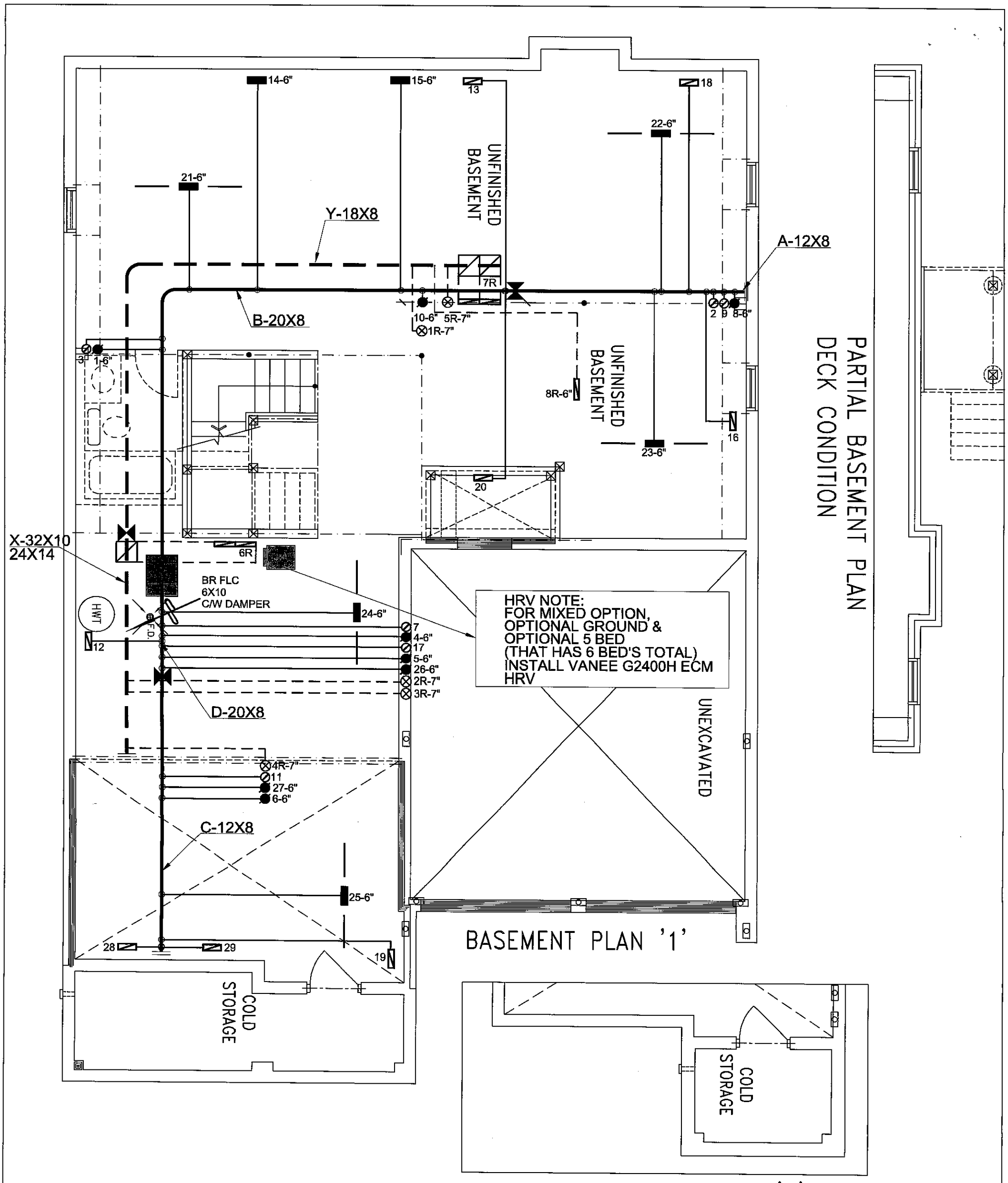
HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description		
Province:	Ontario	
Region:	Hamilton	
Weather Station Location:	Open flat terrain, grass	
Anemometer height (m):	10	
Local Shielding		
Building Site:	Suburban, forest	
Walls:	Heavy	
Flue:	Heavy	
Highest Ceiling Height (m):	7.62	
Building Configuration		
Type:	Detached	
Number of Stories:	Two	
Foundation:	Full	
House Volume (m^3):	1325.5	
Air Leakage/Ventilation		
Air Tightness Type:	Present (1961-) (3.57 ACH)	
Custom BDT Data:	ELA @ 10 Pa.	1766.9 cm^2
	3.57	ACH @ 50 Pa
Mechanical Ventilation (L/s):	Total Supply	Total Exhaust
	74.2	74.2
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: SPRINGFIELD 1 OPT GROUND
LO# 90151



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

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

CSA-F280-12
PACKAGE A1

HVAC LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
3.		
2.		
1.		

REVISIONS

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
GREENPARK HOMES

Project Name
RUSSELL GARDENS PH 4
HAMILTON, ONTARIO

OPT GROUND
SPRINGFIELD 1 3491 sqft

HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 - Ajax, Ontario
L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375
Email: info@hvacdesigns.ca
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 56791 BTU/H

UNIT DATA

MAKE	GOODMAN	
MODEL	GMEC960804CNA	
INPUT	80	MBTU/H
OUTPUT	76.8	MBTU/H
COOLING	3.5	TONS
FAN SPEED	1504	cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	14	5	5
1ST FLOOR	10	3	2
BASEMENT	5	1	0

ALL S/A DIFFUSERS 4 "x10" UNLESS NOTED OTHERWISE ON LAYOUT. ALL S/A RUNS 5"Ø UNLESS NOTED OTHERWISE ON LAYOUT. UNDERCUT DOORS 1" min. FOR R/A

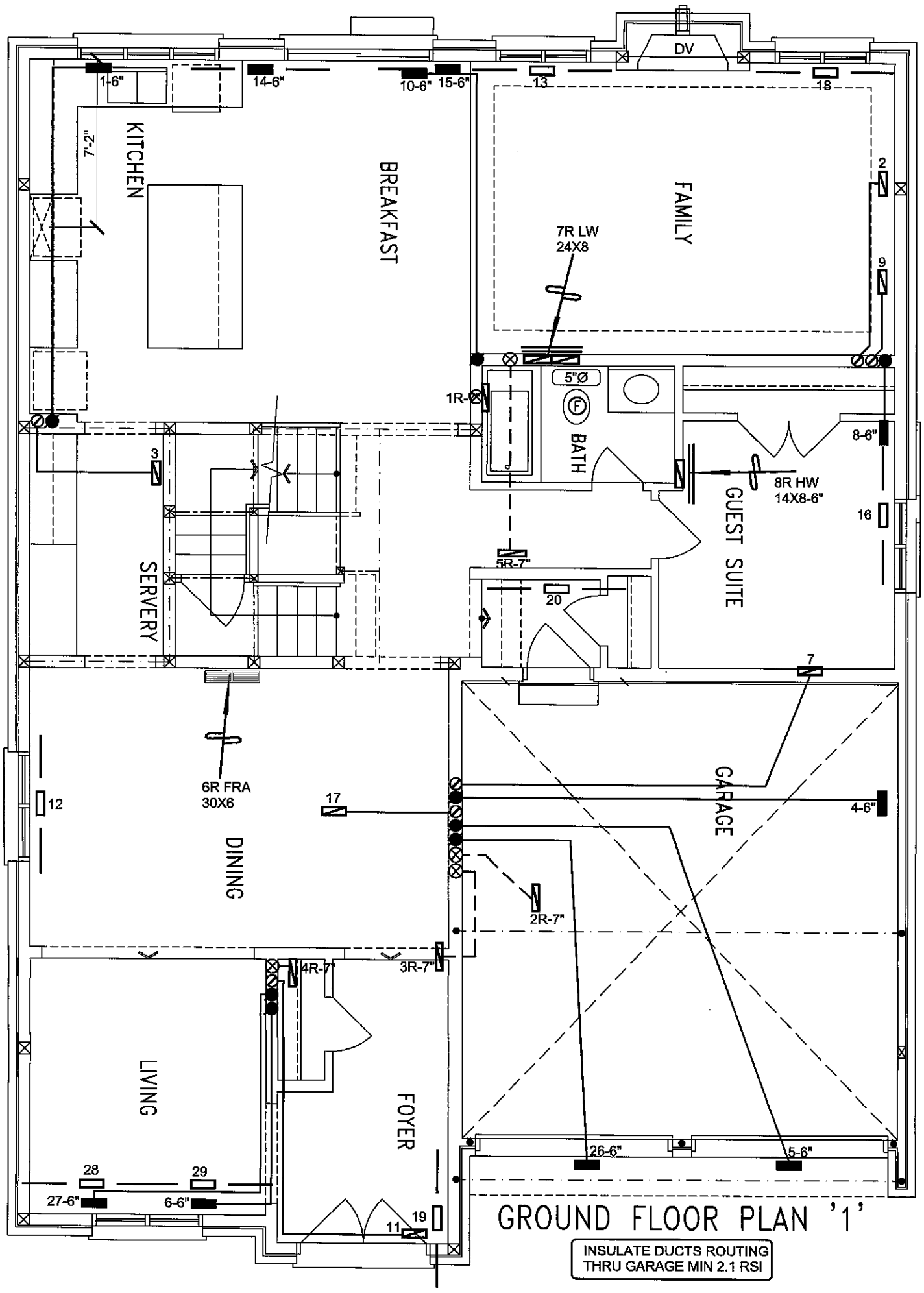
Sheet Title
BASEMENT HEATING LAYOUT

Date APR/2021

Scale 3/16" = 1'-0"

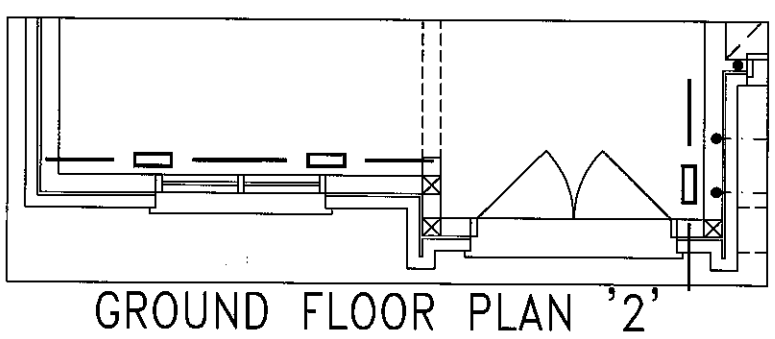
BCIN# 19669

LO# 90151

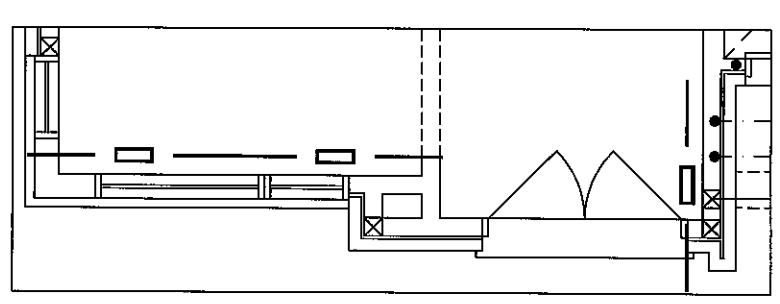


GROUND FLOOR PLAN '1'

INSULATE DUCTS ROUTING THRU GARAGE MIN 2.1 RSI



GROUND FLOOR PLAN '2'



GROUND FLOOR PLAN '3'

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

Michael O'Rourke

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

CSA-F280-12

PACKAGE A1

HVAC LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
3.		
2.		
1.		

REVISIONS

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

GREENPARK HOMES

Project Name

RUSSELL GARDENS PH 4
HAMILTON, ONTARIO

OPT GROUND
SPRINGFIELD 1 3491 sqft

HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 - Ajax, Ontario
L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375
Email: info@hvacdesigns.ca
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

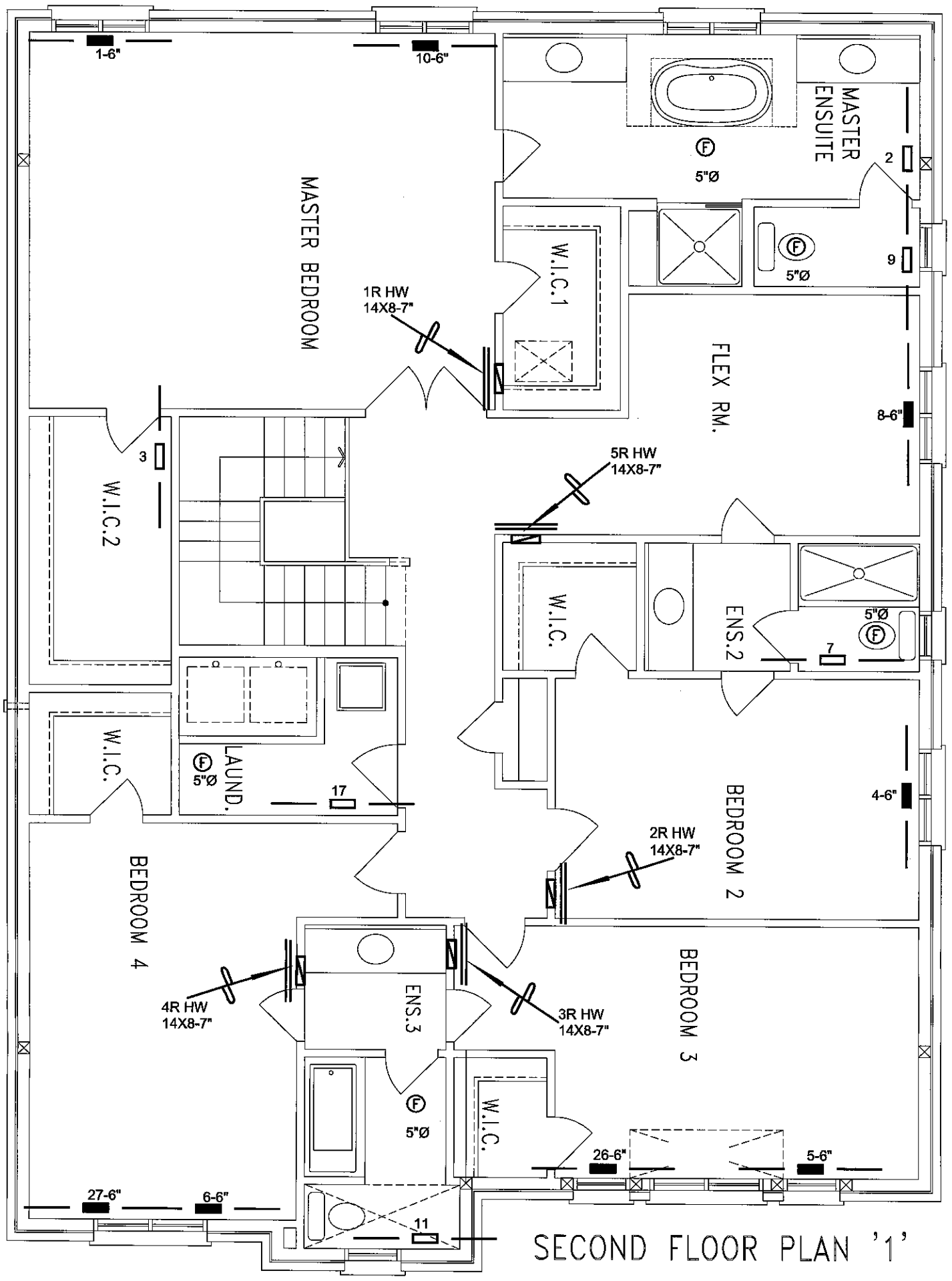
FIRST FLOOR HEATING LAYOUT

Date APR/2021

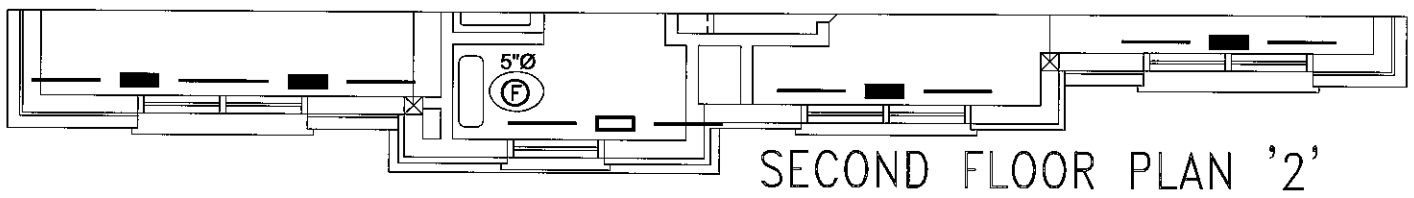
Scale 3/16" = 1'-0"

BCIN# 19669

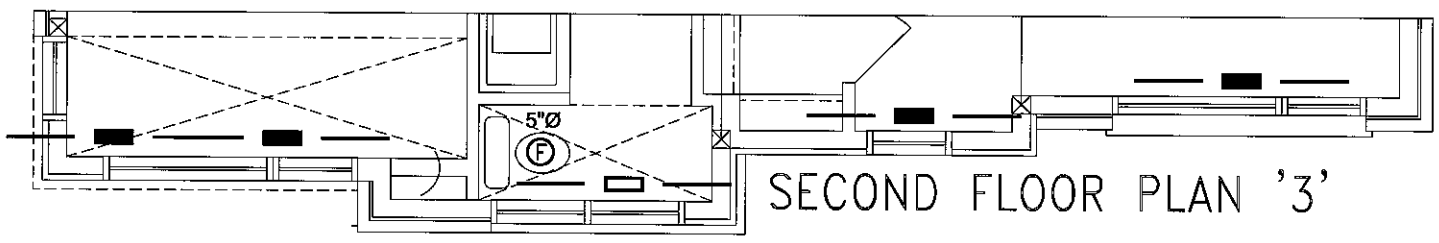
LO# 90151



SECOND FLOOR PLAN '1'



SECOND FLOOR PLAN '2'



SECOND FLOOR PLAN '3'

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

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

CSA-F280-12
PACKAGE A1

HVAC LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
3.		
2.		
1.		

REVISIONS

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
GREENPARK HOMES

Project Name
RUSSELL GARDENS PH 4
HAMILTON, ONTARIO

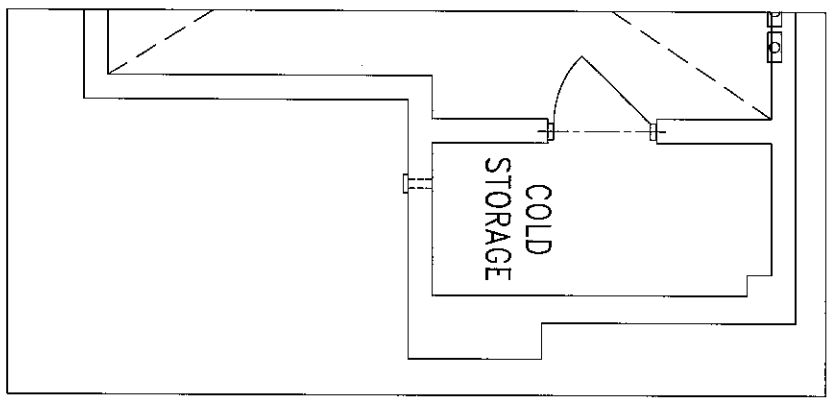
OPT GROUND
SPRINGFIELD 1 3491 sqft

HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 - Ajax, Ontario
L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375
Email: info@hvacdesigns.ca
Web: www.hvacdesigns.ca
Specializing in Residential Mechanical Design Services

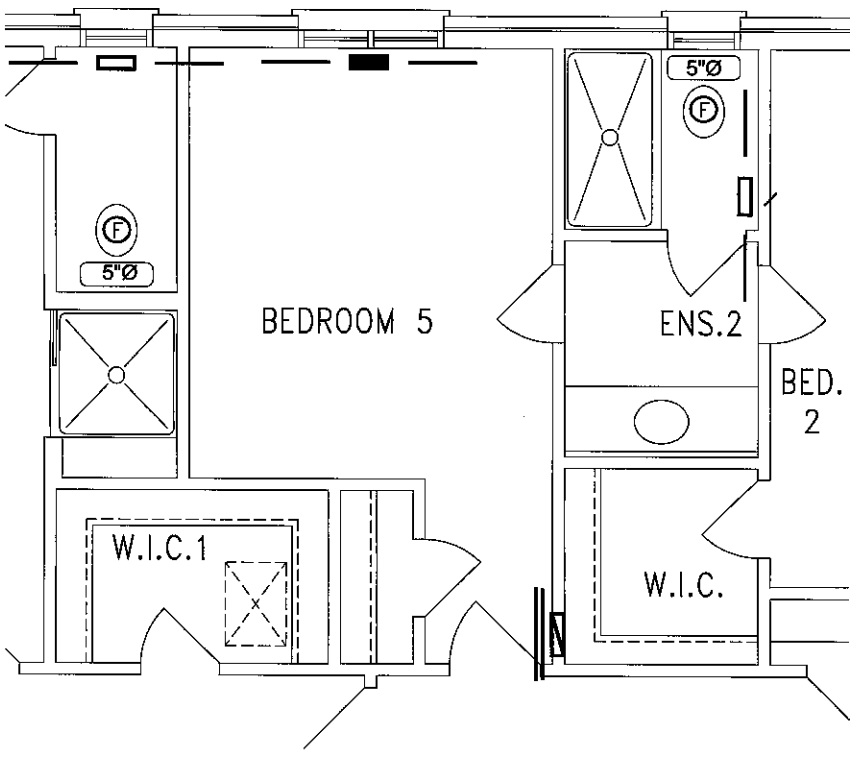
Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

Sheet Title
SECOND FLOOR HEATING LAYOUT

Date APR/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 90151



BASEMENT PLAN '3'



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

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

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

CSA-F280-12
PACKAGE A1

HVAC LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
3.		
2.		
1.		

REVISIONS

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
GREENPARK HOMES

Project Name
RUSSELL GARDENS PH 4
HAMILTON, ONTARIO

OPT GROUND
SPRINGFIELD 1 3491 sqft

HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 - Ajax, Ontario
L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375
Email: info@hvacdesigns.ca
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

Date APR/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 90151