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: ROUNDEL HOMES INC — OPT 2ND — DATE: May-21 — WINTER NATURAL AIR CHANGE RATE 0.352 — HEAT LOSS ΔT °F. 78 — CSA-F280-12
BUILDER: GREENPARK HOMES — TYPE: TERRACOTA 2 — GFA: 3389 — LO# 90742 — SUMMER NATURAL AIR CHANGE RATE 0.110 — HEAT GAIN ΔT °F. 13 — SB-12 PACKAGE A1

ROOM USE			MBR			ENS			WIC			BED-3			BED-4			BED-5			ENS-4/5			BED-2			WIC-3			ENS-2/3		
EXP. WALL			38			26			7			27			38			12			6			11			5			6		
CLG. HT.			9			9			9			9			9			9			9			9			9			9		
	FACTORS																															
GRS.WALL AREA	LOSS	GAIN	342			234			63			243			342			108			54			99			45			54		
GLAZING			LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN
NORTH	21.8	14.9	0	0	0	14	305	209	0	0	0	16	349	239	0	0	0	0	0	0	0	0	0	13	283	194	0	0	0	7	152	105
EAST	21.8	38.4	0	0	0	0	0	0	0	0	0	53	1155	2035	60	1307	2303	0	0	0	0	0	0	0	0	0	9	196	345	0	0	0
SOUTH	21.8	23.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	349	370	7	152	162	0	0	0	0	0	0	0	0	0
WEST	21.8	38.4	32	697	1228	14	305	537	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.	38.1	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	25.8	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	4.6	0.8	310	1416	233	206	941	155	63	288	47	174	795	131	282	1288	212	92	420	69	47	215	35	86	393	65	36	164	27	47	215	35
NET EXPOSED BSMT WALL ABOVE GR	3.7	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	1.3	0.6	351	461	206	169	222	99	140	184	82	236	310	139	195	256	115	195	256	115	78	102	46	220	289	129	40	53	24	66	87	39
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0	16	45	20	45	127	57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EXPOSED FLOOR	2.6	0.4	0	0	0	0	0	0	0	0	0	241	629	104	0	0	0	0	0	0	0	0	0	69	180	30	40	104	17	66	172	28
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			2574			1773			472			3282			2978			1025			470			1145			517			626		
SUB TOTAL HT GAIN				1668			1001			130			2667			2686			554			243			418			413			207
LEVEL FACTOR / MULTIPLIER			0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27	
AIR CHANGE HEAT LOSS			705			486			129			899			816			281			129			314			142			172		
AIR CHANGE HEAT GAIN				129			77			10			206			208			43			19			32			32			16
DUCT LOSS			0			0			0			418			0			0			0			146			66			80		
DUCT GAIN				0			0			0			368			0			0			0			125			45			22	
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					564			0			0			564			564			564			0			564			0			0
TOTAL HT LOSS BTU/H			3280			2259			601			4600			3794			1306			598			1605			725			878		
TOTAL HT GAIN x 1.3 BTU/H				3693			1402			182			5259			4808			1821			340			1794			637			319	

ROOM USE			FAM			LV/DN			KIT			LIB			LAUN			W/R			FOY			MUD			WOD			BAS		
EXP. WALL			36			30			37			19			12			18			18			30			47			182		
CLG. HT.			10			10			10			10			9			10			10			11			8			8		
	FACTORS																															
GRS.WALL AREA	LOSS	GAIN	360			300			370			190			108			180			180			330			376			1119		
GLAZING			LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN
NORTH	21.8	14.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	152	105	0	0	0	4	87	60
EAST	21.8	38.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	479	845	6	131	230	0	0	0	0	0	0	0	0	0
SOUTH	21.8	23.1	0	0	0	42	915	971	0	0	0	14	305	324	7	152	162	0	0	0	0	0	0	0	0	0	0	0	0	8	174	185
WEST	21.8	38.4	28	610	1075	0	0	0	51	1111	1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	305	537	0	0	0
SKYLT.	38.1	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	25.8	4.3	0	0	0	0	0	0	10	258	43	0	0	0	0	0	0	0	0	0	40	1034	170	0	0	0	0	0	0	20	517	85
NET EXPOSED WALL	4.6	0.8	332	1517	250	258	1179	194	309	1412	232	176	804	132	101	461	76	158	722	119	134	612	101	323	1476	243	0	0	0	0	0	0
NET EXPOSED BSMT WALL ABOVE GR	3.7	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	268	987	162	338	1243	205
EXPOSED CLG	1.3	0.6	0	0	0	0	0	0	0	0	0	0	0	0	192	252	113	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NO ATTIC EXPOSED CLG	2.8	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
EXPOSED FLOOR	2.6	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
BASEMENT/CRAWL HEAT LOSS			0			0			0			0			0			0			0			0			0			5864		
SLAB ON GRADE HEAT LOSS			0			0			0			0			0			0			0			0			0					
SUBTOTAL HT LOSS			2127			2094			2781			1109			866			1201			1777			1628			1292			7885		
SUB TOTAL HT GAIN				1324			1165			2233			456			351			963			501			347		700				534	
LEVEL FACTOR / MULTIPLIER			0.30	0.51		0.30	0.51		0.30	0.51		0.30	0.51		0.20	0.27		0.30	0.51		0.30	0.51		0.30	0.51		0.50	1.17				
AIR CHANGE HEAT LOSS			1081			1064			1414			564			237			611			903			828				10775				
AIR CHANGE HEAT GAIN				102			90			173			35			27			75			39			27						95	
DUCT LOSS			0			0			0			0			0			0			0			0				0				
DUCT GAIN				0			0			0			0			0			0			0			0						0	
HEAT GAIN PEOPLE	240		0		0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0		0			0
HEAT GAIN APPLIANCES/LIGHTS					564			564			564			564			564			0			0									564
TOTAL HT LOSS BTU/H			3208			3158			4195			1673			1103			1812			2680			2456			1292			18661		
TOTAL HT GAIN x 1.3 BTU/H				2589			2366			3861			1372			1225			1349			702			487		910				1553	

TOTAL HEAT GAIN BTU/H: 36997 TONS: 3.08 LOSS DUE TO VENTILATION LOAD BTU/H: 2004 STRUCTURAL HEAT LOSS: 59884 TOTAL COMBINED HEAT LOSS BTU/H: 61888

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

Richmond Hill
City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: PXV

CITY OF RICHMOND HILL
BUILDING DIVISION
09/22/2022
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SITE NAME: ROUNDEL HOMES INC
BUILDER: GREENPARK HOMES

OPT 2ND
TYPE: TERRACOTA 2

DATE: May-21

GFA: 3389 LO# 90742

HEATING CFM	1122	COOLING CFM	1122
TOTAL HEAT LOSS	59,884	TOTAL HEAT GAIN	36,667
AIR FLOW RATE CFM	18.74	AIR FLOW RATE CFM	30.6

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
GMEC960803BNA 80

FAN SPEED	
LOW	
MEDLOW	
MEDIUM	885
MEDIUM HIGH	1005
HIGH	1122

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

DESIGN CFM = 1122
CFM @ .6 " E.S.P.

TEMPERATURE RISE 63 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	15	8	4
R/A	0	0	6	2	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-3	BED-4	BED-5	ENS-4/5	BED-2	WIC-3	MBR	ENS-2/3	FAM	LV/DN	KIT	KIT	LIB	LAUN	W/R	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.64	2.26	0.60	2.30	1.90	1.31	0.60	1.60	0.73	1.64	0.44	3.21	3.16	2.10	2.10	1.67	1.10	1.81	2.68	2.46	4.99	4.99	4.99	4.99
CFM PER RUN HEAT	31	42	11	43	36	24	11	30	14	31	8	60	59	39	39	31	21	34	50	46	93	93	93	93
RM GAIN MBH.	1.85	1.40	0.18	2.63	2.40	1.82	0.34	1.79	0.64	1.85	0.16	2.59	2.37	1.93	1.93	1.37	1.22	1.35	0.70	0.49	0.62	0.62	0.62	0.62
CFM PER RUN COOLING	57	43	6	80	74	56	10	55	19	57	5	79	72	59	59	42	37	41	21	15	19	19	19	19
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH.	37	56	39	59	56	34	34	51	45	39	39	22	10	40	31	27	20	33	41	44	38	19	5	31
EQUIVALENT LENGTH	190	160	150	130	170	200	220	160	110	130	150	140	130	150	160	140	180	110	90	140	140	120	140	130
TOTAL EFFECTIVE LENGTH	227	216	189	189	226	234	254	211	155	169	189	162	140	190	191	167	200	143	131	184	178	139	145	161
ADJUSTED PRESSURE	0.08	0.08	0.09	0.09	0.08	0.07	0.07	0.08	0.11	0.1	0.09	0.11	0.12	0.09	0.09	0.1	0.09	0.12	0.13	0.09	0.09	0.12	0.11	0.1
ROUND DUCT SIZE	5	5	4	**6**	**6**	**6**	4	**6**	4	5	4	5	5	5	5	4	4	4	4	4	**6**	**6**	**6**	**6**
HEATING VELOCITY (ft/min)	228	308	126	219	184	122	126	153	161	228	92	441	433	286	286	356	241	390	574	528	474	474	474	474
COOLING VELOCITY (ft/min)	419	316	69	408	377	286	115	280	218	419	57	580	529	433	433	482	424	470	241	172	97	97	97	97
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	4X10	4X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	B	A	B	D	C	C	C	A	D	B	D	B	D	A	A	C	B	C	C	A	A	B	D	C

RUN #	25	26	27
ROOM NAME	BED-3	BED-4	ENS-2/3
RM LOSS MBH.	2.30	1.90	0.44
CFM PER RUN HEAT	43	36	8
RM GAIN MBH.	2.63	2.40	0.16
CFM PER RUN COOLING	80	74	5
ADJUSTED PRESSURE	0.17	0.17	0.17
ACTUAL DUCT LGH.	52	48	36
EQUIVALENT LENGTH	120	170	140
TOTAL EFFECTIVE LENGTH	172	218	176
ADJUSTED PRESSURE	0.1	0.08	0.1
ROUND DUCT SIZE	**6**	**6**	4
HEATING VELOCITY (ft/min)	219	184	92
COOLING VELOCITY (ft/min)	408	377	57
OUTLET GRILL SIZE	4X10	4X10	3X10
TRUNK	D	C	D

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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	289	0.08	8.8	10	x	8	520	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	536	0.08	11.1	14	x	8	689	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	315	0.07	9.4	10	x	8	567	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	583	0.07	11.8	16	x	8	656	TRUNK J	0	0.00	0	0	x	8	0
TRUNK 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	1032	0.05	16	30	x	8	619
TRUNK Y	695	0.05	13.8	22	x	8	569
TRUNK Z	445	0.05	11.6	16	x	8	501
DROP	1122	0.05	16.5	24	x	10	673

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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	90	85	90	90	85	75	360	85	0	0	0	0	0	0	0	162
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.	41	52	53	58	53	59	45	41	1	1	1	1	1	1	1	15
EQUIVALENT LENGTH	185	195	165	165	215	265	165	190	0	0	0	0	0	0	0	150
TOTAL EFFECTIVE LH	226	247	218	223	268	324	210	231	1	1	1	1	1	1	1	165
ADJUSTED PRESSURE	0.07	0.06	0.07	0.07	0.06	0.05	0.07	0.06	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.09
ROUND DUCT SIZE	5.9	6	5.9	5.9	6	6	9.9	6	0	0	0	0	0	0	0	6.9
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	14	30	14	0	0	0	0	0	0	0	14

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

INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

HVAC DESIGNS LTD.
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TYPE: TERRACOTA 2 LO # 90742
SITE NAME: ROUNDEL HOMES INC OPT 2ND

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	4	@ 10.6 cfm	42.4	cfm
Kitchen & Bathrooms	5	@ 10.6 cfm	53	cfm
Other Rooms	7	@ 10.6 cfm	74.2	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	95.4	cfm

SUPPLEMENTAL VENTILATION CAPACITY 9.32.3.5.

Total Ventilation Capacity	212	cfm
Less Principal Ventil. Capacity	95.4	cfm
Required Supplemental Capacity	116.6	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE V150H Location: BSMT

95.4 cfm 3.0 sones [✓] HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM		ΔT °F		FACTOR		% LOSS
95.4 CFM	X	78 F	X	1.08	X	0.25

SUPPLEMENTAL FANS PANASONIC

Location	Model	cfm	HVI	Sones
ENS	FV-05-11VK1	50	✓	0.3
ENS-4/5	FV-05-11VK1	50	✓	0.3
ENS-2/3	FV-05-11VK1	50	✓	0.3
W/R	FV-05-11VK1	50	✓	0.3

HEAT RECOVERY VENTILATOR 9.32.3.11.

Model: VANEE V150H

150 cfm high 35 cfm low

75 % Sensible Efficiency @ 32 deg F (0 deg C) [✓] HVI Approved

LOCATION OF INSTALLATION

Lot: Concession

Township Plan:

Address

Roll # Building Permit #

BUILDER: GREENPARK HOMES

Name:

Address:

City:

Telephone #: Fax #:

INSTALLING CONTRACTOR

Name:

Address:

City:

Telephone #: Fax #:

DESIGNER CERTIFICATION

I hereby certify that this ventilation system has been designed in accordance with the Ontario Building Code.

Name: HVAC Designs Ltd.

Signature: Michael O'Rourke

HRAI # 001820

Date: May-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@hvacdesigns.ca

CSA F280-12 Residential Heat Loss and Heat Gain Calculations

Formula Sheet (For Air Leakage / Ventiliation Calculation)

LO#: 90742 Model: TERRACOTA 2 Builder: GREENPARK HOMES Date: 2021-05-10

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1500	8	12000
First	1500	10	15000
Second	1889	9	17001
Third	0	9	0
Fourth	0	9	0
		Total:	44,001.0 ft³
		Total:	1246.0 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.352
SUMMER NATURAL AIR CHANGE RATE	0.110

Design Temperature Difference

	Tin °C	Tout °C	ΔT °C	ΔT °F
Winter DTDh	22	-21	43	78
Summer DTDc	24	31	7	13

5.2.3.1 Heat Loss due to Air Leakage

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

0.352 x 346.10 x 43 °C x 1.2 = 6316 W

= **21551 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

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

= 0.110 x 346.10 x 7 °C x 1.2 = 324 W

= **1106 Btu/h**

5.2.3.2 Heat Loss due to Mechanical Ventilation

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

95 CFM x 78 °F x 1.08 x 0.25 = **2004 Btu/h**

6.2.7 Sensible heat Gain due to Ventilation

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

95 CFM x 13 °F x 1.08 x 0.25 = **330 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	21,551	9,177	1.174
2	0.3		12,716	0.508
3	0.2		15,729	0.274
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

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HEAT LOSS AND GAIN SUMMARY SHEET

MODEL:	TERRACOTA 2		OPT 2ND	**BUILDER:**	GREENPARK HOMES
SFQT:	3389	**LO#**	90742	**SITE:**	ROUNDEL HOMES INC

DESIGN ASSUMPTIONS

HEATING	°F	COOLING	°F
OUTDOOR DESIGN TEMP.	-6	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):	44001.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	6
INTERIOR LIGHTING LOAD ($Btu/h/ft^2$):	1.27	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	5.5 ft
LENGTH: 54.0 ft	WIDTH: 37.0 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	0.96	-
HRV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	0.8	-

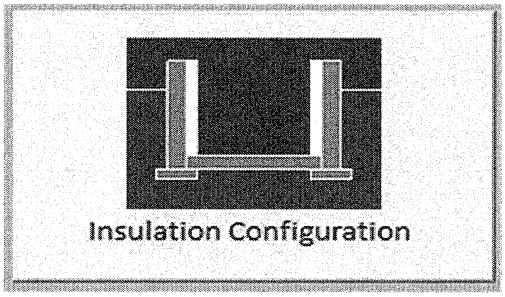
INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

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:	Richmond Hill
Site Description	
Soil Conductivity:	Normal conductivity: dry sand, loam, clay
Water Table:	Normal (7-10 m, 23-33 ft)

Foundation Dimensions		
Floor Length (m):	**16.5**	 Insulation Configuration
Floor Width (m):	**11.3**	
Exposed Perimeter (m):	**0.0**	
Wall Height (m):	**2.4**	
Depth Below Grade (m):	**1.68**	
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):	**1718**	

TYPE: TERRACOTA 2 OPT 2ND
LO# 90742

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

Air Infiltration Residential Load Calculator

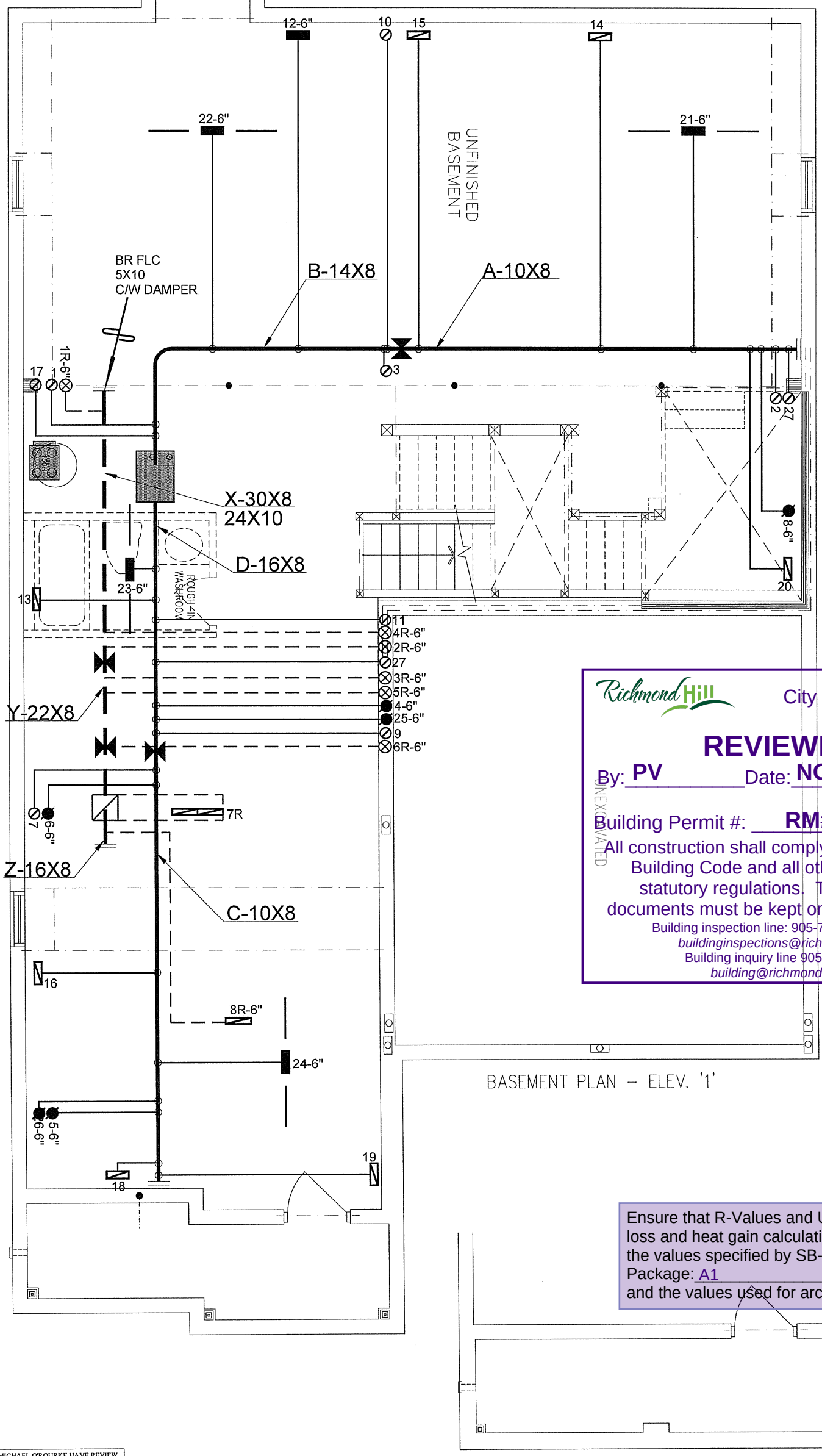
Supplemental tool for CAN/CSA-F280

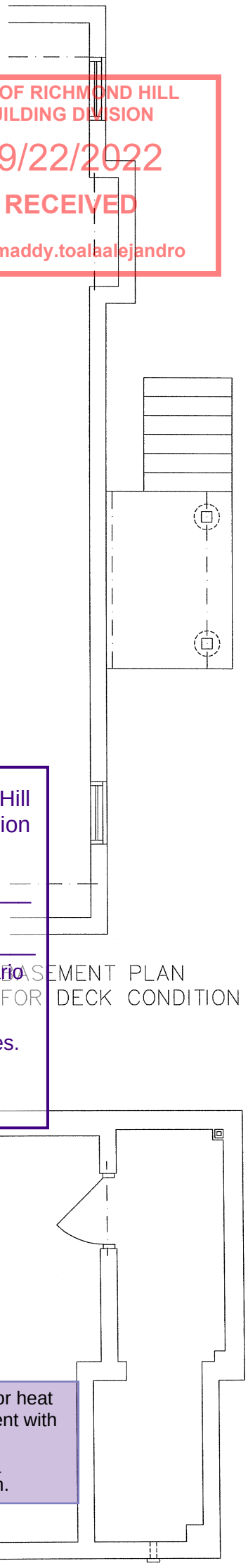
Weather Station Description	
Province:	Ontario
Region:	Richmond Hill
Weather Station Location:	Open flat terrain, grass
Anemometer height (m):	10
Local Shielding	
Building Site:	Suburban, forest
Walls:	Heavy
Flue:	Heavy
Highest Ceiling Height (m):	7.62
Building Configuration	
Type:	Detached
Number of Stories:	Two
Foundation:	Full
House Volume (m^3):	1246.0
Air Leakage/Ventilation	
Air Tightness Type:	Present (1961-) (3.57 ACH)
Custom BDT Data:	ELA @ 10 Pa. 1660.9 cm^2
	3.57 ACH @ 50 Pa
Mechanical Ventilation (L/s):	Total Supply 45.0 / Total Exhaust 45.0

Flue Size				
Flue #:	#1	#2	#3	#4
Diameter (mm):	0	0	0	0

Natural Infiltration Rates	
Heating Air Leakage Rate (ACH/H):	**0.352**
Cooling Air Leakage Rate (ACH/H):	**0.110**

TYPE: TERRACOTA 2 OPT 2ND
LO# 90742





CITY OF RICHMOND HILL
BUILDING DIVISION
09/22/2022
RECEIVED
Per:maddy.toalaalejandro

Richmond Hill
City of Richmond Hill
Building Division
REVIEWED
By: PV Date: NOV/22/2022
Building Permit #: RM#-22-00102
All construction shall comply with the Ontario Building Code and all other applicable statutory regulations. The reviewed documents must be kept on site at all times.
Building inspection line: 905-771-5465 (24 hr)
buildinginspections@richmondhill.ca
Building inquiry line 905-771-8810
building@richmondhill.ca

UNEXCAVATED

BASEMENT PLAN FOR DECK CONDITION

BASEMENT PLAN – ELEV. '1'

BASEMENT PLAN – ELEV. '3'

Ensure that R-Values and U-Values used for heat loss and heat gain calculations are consistent with the values specified by SB-12 Prescriptive Package: A1
and the values used for architectural design.

BASEMENT PLAN – ELEV. '2'

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

Client
GREENPARK HOMES

Project Name
ROUNDEL HOMSE INC
RICHMOND HILL, ONTARIO

OPT 2ND
TERRACOTA 2 3389 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
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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.

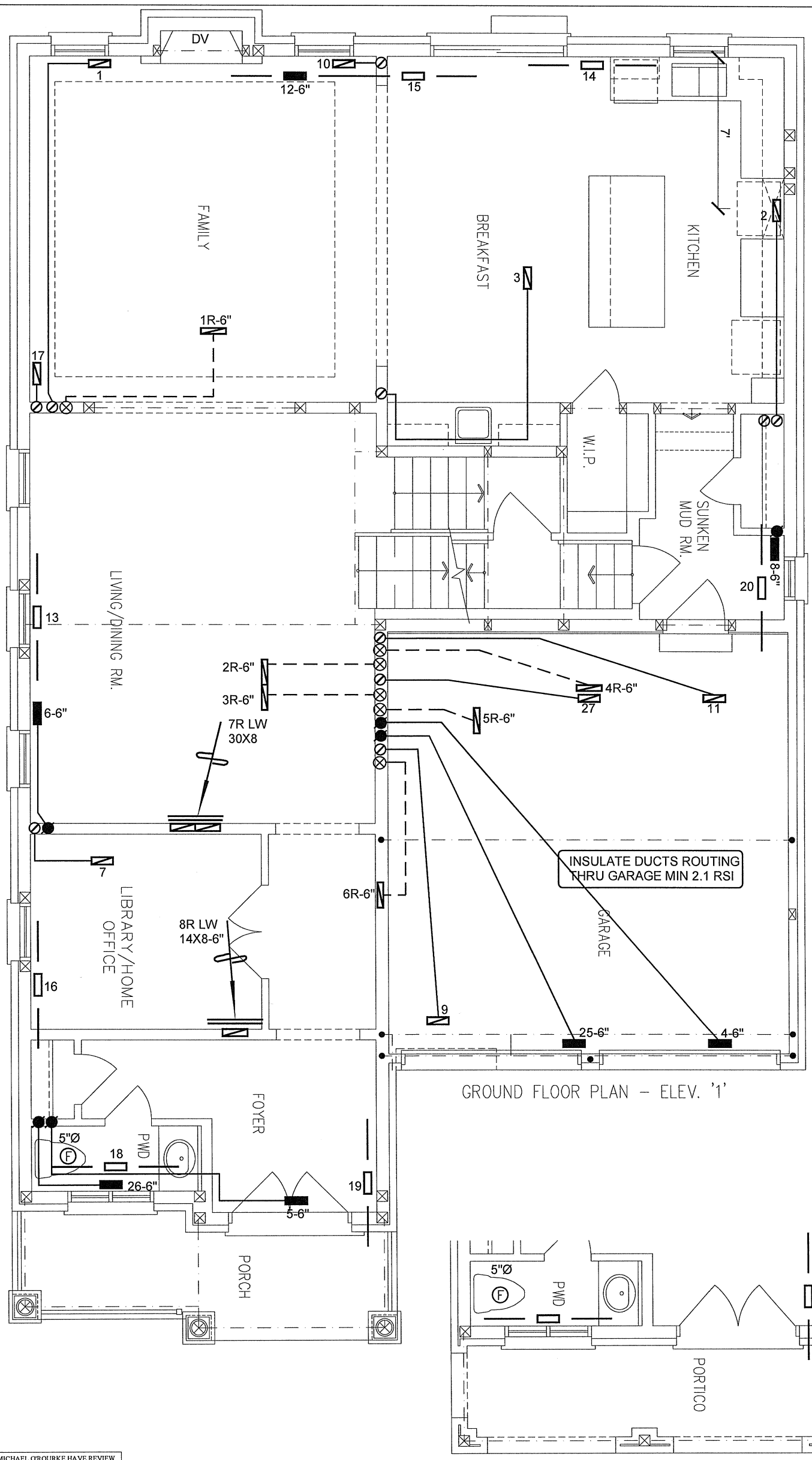
HEAT LOSS 61847 BTU/H	
UNIT DATA	
MAKE	GOODMAN
MODEL	GMEC960803BNA
INPUT	80 MBTU/H
OUTPUT	76.8 MBTU/H
COOLING	3.0 TONS
FAN SPEED	1122 cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	15	6	3
1ST FLOOR	8	2	3
BASEMENT	4	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

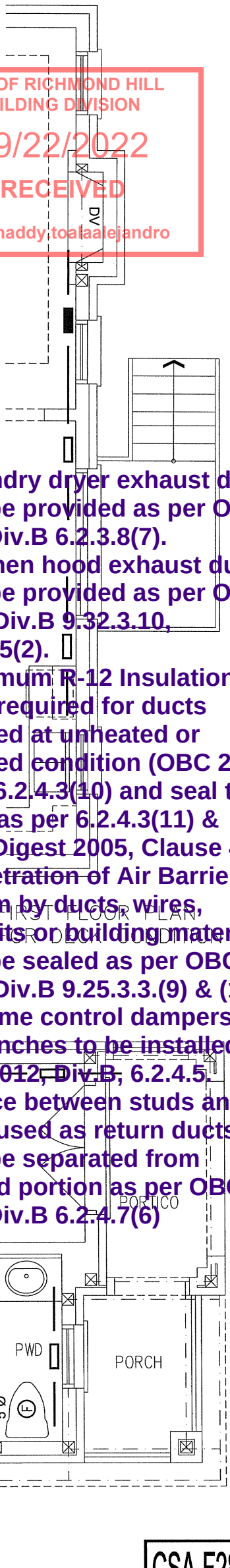
Sheet Title
BASEMENT HEATING LAYOUT

Date MAY/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 90742



GROUND FLOOR PLAN – ELEV. '1'

GROUND FLOOR PLAN – ELEV. '2'



1.Laundry dryer exhaust duct shall be provided as per OBC 2012 Div.B 6.2.3.8(7).
2.Kitchen hood exhaust duct shall be provided as per OBC 2012, Div.B 9.32.3.10, 9.32.3.5(2).
3.Minimum R-12 Insulation Value required for ducts installed at unheated or exposed condition (OBC 2012 Div.B 6.2.4.3(10) and seal the ducts as per 6.2.4.3(11) & HRAI Digest 2005, Clause 4.5.
4.Penetration of Air Barrier System by ducts, wires, conduits or building materials shall be sealed as per OBC 2012, Div.B 9.25.3.3.(9) & (10).
5.Volume control dampers to all branches to be installed per OBC 2012, Div.B, 6.2.4.5.
6.Space between studs and joists used as return ducts shall be separated from unused portion as per OBC 2012 Div.B 6.2.4.7(6)

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

CSA-F280-12
PACKAGE A1

HVAC LEGEND

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	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
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REVISIONS

Client
GREENPARK HOMES

Project Name
ROUNDEL HOMSE INC
RICHMOND HILL, ONTARIO

OPT 2ND
TERRACOTA 2 3389 sqft

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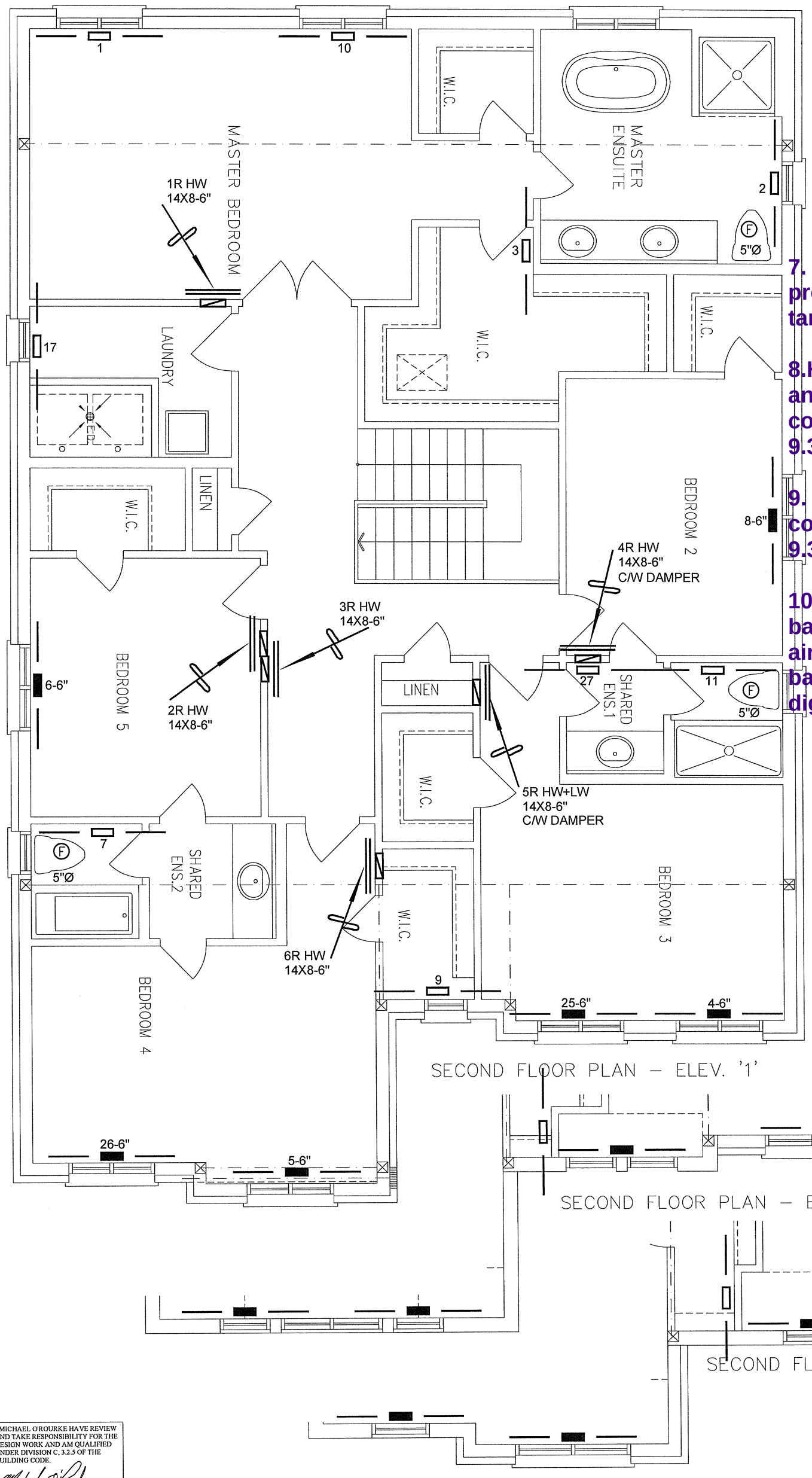
Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

Sheet Title
FIRST FLOOR HEATING LAYOUT

Date MAY/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 90742



CITY OF RICHMOND HILL
BUILDING DIVISION
09/22/2022
RECEIVED
Per:maddy.toalaalejandro

7. Combustion air supply shall be provided to the furnace and hot water tank.

8.HRV installation, testing, startup and commissioning shall be in compliance with OBC 2012, Div.B 9.32.3.11, 9.32.3.11(7)&(10)

9. HRV duct connection shall be in compliance with OBC 2012 Div.B 9.32.3.6(3) & 9.32.3.4(7).

10. Supply air grill at finished basement shall be at low level. Return air grill for finished or unfinished basement shall be at low level. HRAI digest 2005, clause 7.7(3).

13.Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.

14. Return air intake shall be provided as recommended in HRAI Digest 2005 Section 4.7 Return air inlet should be positioned so that short circuiting of supply air is avoided. A high and low wall return air combination shall be provided when a combined cooling & heating system is installed.

15. For simplified HRV/ERV installation, with stale air and fresh air connected to return air plenum, stale air intake and fresh air supply shall be separated minimum 3' or as recommended by HRV/ERV Manufacturer.

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

CSA-F280-12
PACKAGE A1

HVAC LEGEND

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TERRACOTA 2 3389 sqft

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Sheet Title
SECOND FLOOR HEATING LAYOUT

Date MAY/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 90742