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: TRINIGROUP | DATE: Sep-23 | WINTER NATURAL AIR CHANGE RATE 0.354 | HEAT LOSS ΔT °F. 78 | CSA-F280-12
BUILDER: GREENPARK HOMES | TYPE: ROSE 3 | GFA: 2596 | LO# 102624 | SUMMER NATURAL AIR CHANGE RATE 0.110 | HEAT GAIN ΔT °F. 13 | SB-12 PACKAGE A1

ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4			S-BATH			FLEX				ENS-4		
EXP. WALL			36			24			7			12			15			10			24			37				5		
CLG. HT.			9			9			9			9			9			9			9			9				9		
	FACTORS																													
GRS.WALL AREA	LOSS	GAIN	328			218			64			109			137			91			218			337				46		
GLAZING				LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN	
NORTH	21.8	16.0	0	0	0	0	0	0	0	0	0	16	349	256	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EAST	21.8	41.6	0	0	0	0	0	0	0	0	0	0	0	0	44	958	1828	0	0	0	9	196	374	46	1002	1911	0	0	0	0
SOUTH	21.8	24.9	0	0	0	14	305	349	0	0	0	0	0	0	0	0	0	16	349	398	0	0	0	16	349	398	0	0	0	0
WEST	21.8	41.6	22	479	914	23	501	956	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
DOORS	20.5	3.4	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
NET EXPOSED WALL	4.6	0.8	306	1396	230	181	829	136	64	291	48	93	426	70	93	423	70	75	343	56	209	957	157	275	1255	206	46	208	34	
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	
EXPOSED CLG	1.3	0.6	325	427	191	134	176	79	75	99	44	238	313	140	196	257	115	187	246	110	98	129	58	289	380	170	48	63	28	
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	
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	
BASEMENT/CRAWL HEAT LOSS				0			0			0			0			0			0			0			0			0		
SLAB ON GRADE HEAT LOSS				0			0			0			0			0			0			0			0			0		
SUBTOTAL HT LOSS				2302			1811			390			1087			1639			937			1281			2985			27		
SUB TOTAL HT GAIN					1335			1519			92			465			2013			565			589			2686			62	
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		
AIR CHANGE HEAT LOSS				633			498			107			299			450			257			352			820			74		
AIR CHANGE HEAT GAIN					92			104			6			32			138			39			40			185			4	
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		2		480	0		0	0		0	1		240	1		240	1		240	0		0	0		0	0		0	
HEAT GAIN APPLIANCES/LIGHTS					780			0			0			780			780			780			0			0			0	
TOTAL HT LOSS BTU/H				2935			2308			497			1386			2089			1194			1634			3806			345		
TOTAL HT GAIN x 1.3 BTU/H					3493			2111			128			1973			4123			2111			818			3732			87	

ROOM USE			H-OFF			DIN			KT/BF			FAM			LAUN			PWD			FOY			MUD				WOD			BAS	
EXP. WALL			24			44			41			37			7			9			50			7				41			174	
CLG. HT.			10			10			10			10			9			10			10			10				9			9	
	FACTORS																															
GRS.WALL AREA	LOSS	GAIN	242			444			414			374			64			91			505			71				349			1080	
GLAZING				LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN
NORTH	21.8	16.0	22	479	351	22	479	351	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	65	48
EAST	21.8	41.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	479	914	0	0	0	0	0	0	0	0	0
SOUTH	21.8	24.9	0	0	0	0	0	0	0	0	0	0	0	0	7	152	174	0	0	0	0	0	0	0	0	0	0	0	0	6	131	149
WEST	21.8	41.6	0	0	0	0	0	0	69	1503	2867	30	654	1247	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	20.5	3.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	452	74	21	431	71	0	0	0	21	431	71
NET EXPOSED WALL	4.6	0.8	220	1007	166	422	1930	317	345	1577	259	344	1570	258	57	259	43	91	415	68	461	2106	346	50	227	37	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	246	906	149	399	1470	242
EXPOSED CLG	1.3	0.6	0	0	0	0	0	0	0	0	0	0	0	0	100	131	59	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							5944	
SLAB ON GRADE HEAT LOSS				0			0			0			0			0			0			0			0				0				
SUBTOTAL HT LOSS				1486			2409			3080			2224			543			415			3037			658				906			8041	
SUB TOTAL HT GAIN					517			669			3126			1505			276			68			1335			108					149		510
LEVEL FACTOR / MULTIPLIER			0.30	0.41		0.30	0.41		0.30	0.41		0.30	0.41		0.20	0.27		0.30	0.41		0.30	0.41		0.30	0.41					0.50	1.02	
AIR CHANGE HEAT LOSS				610			988			1264			912			149			170			1246			270							9101	
AIR CHANGE HEAT GAIN					36			46			215			103			19			5			92			7							45
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		0	
HEAT GAIN APPLIANCES/LIGHTS					780			780			780			780			780			0			0			0							780
TOTAL HT LOSS BTU/H				2096			3397			4343			3136			692			586			4283			928				906			17143	
TOTAL HT GAIN x 1.3 BTU/H					1733			1944			5358			3105			1397			95			1855			150					194		1736

TOTAL HEAT GAIN BTU/H: 36417 TONS: 3.03 LOSS DUE TO VENTILATION LOAD BTU/H: 1670 STRUCTURAL HEAT LOSS: 53704 TOTAL COMBINED HEAT LOSS BTU/H: 55374

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
05/01/2024
RECEIVED
Per: joshua.nabua

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: TRINIGROUP
BUILDER: GREENPARK HOMES | TYPE: ROSE 3 | DATE: Sep-23 | GFA: 2596 | LO# 102624

HEATING CFM	1083	COOLING CFM	1083		
TOTAL HEAT LOSS	53,704	TOTAL HEAT GAIN	36,142		
AIR FLOW RATE CFM	20.17	AIR FLOW RATE CFM	29.97		

furnace pressure	0.7
furnace filter	0.14
a/c coil pressure	0.26
available pressure for s/a & r/a	0.30
plenum pressure s/a	0.16
max s/a dif press. loss	0.02
min adjusted pressure s/a	0.14
r/a pressure	0.14
r/a grille press. Loss	0.02
adjusted pressure r/a	0.12

#GOODMAN
GMEC960603BNA 60

FAN SPEED	
LOW	
MEDLOW	
MEDIUM	928
MEDIUM HIGH	1083
HIGH	1131

AFUE = 96 %
INPUT (BTU/H) = 60,000
OUTPUT (BTU/H) = **57,600**

DESIGN CFM = **1083**
CFM @ .7 " E.S.P.

TEMPERATURE RISE 49 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	15	9	4
R/A	0	0	5	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-2	BED-3	BED-4	S-BATH	FLEX	BED-3	MBR	ENS-4	H-OFF	DIN	KT/BF	KT/BF	FAM	LAUN	PWD	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.47	1.15	0.50	1.39	1.04	1.19	0.82	1.90	1.04	1.47	0.35	2.10	3.40	2.17	2.17	1.57	0.69	0.59	4.28	0.93	4.51	4.51	4.51	4.51
CFM PER RUN HEAT	30	23	10	28	21	24	16	38	21	30	7	42	69	44	44	32	14	12	86	19	91	91	91	91
RM GAIN MBH.	1.75	1.06	0.13	1.97	2.06	2.11	0.41	1.87	2.06	1.75	0.09	1.73	1.94	2.68	2.68	1.55	1.40	0.09	1.85	0.15	0.48	0.48	0.48	0.48
CFM PER RUN COOLING	52	32	4	59	62	63	12	56	62	52	3	52	58	80	80	47	42	3	56	5	14	14	14	14
ADJUSTED 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	0.14	0.15	0.14	0.14	0.14	0.14
ACTUAL DUCT LGH.	37	53	35	34	41	35	41	50	42	48	35	20	21	37	30	30	34	19	29	20	34	26	18	25
EQUIVALENT LENGTH	140	190	200	180	130	180	150	160	140	170	120	180	120	160	150	120	200	120	140	130	80	90	120	140
TOTAL EFFECTIVE LENGTH	177	243	235	214	171	215	191	210	182	218	155	200	141	197	180	150	234	139	169	150	114	116	138	165
ADJUSTED PRESSURE	0.08	0.06	0.06	0.07	0.09	0.07	0.08	0.07	0.08	0.07	0.09	0.07	0.1	0.07	0.08	0.1	0.06	0.11	0.08	0.1	0.12	0.12	0.1	0.08
ROUND DUCT SIZE	5	5	4	**6**	5	**6**	4	**6**	5	5	4	5	5	**6**	**6**	4	5	4	**6**	4	**6**	**6**	**6**	**6**
HEATING VELOCITY (ft/min)	220	169	115	143	154	122	184	194	154	220	80	308	507	224	224	367	103	138	438	218	464	464	464	464
COOLING VELOCITY (ft/min)	382	235	46	301	455	321	138	286	455	382	34	382	426	408	408	539	308	34	286	57	71	71	71	71
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	3X10	4X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	3X10	3X10	3X10	4X10	3X10	4X10	4X10	4X10	4X10
TRUNK	C	C	D	D	B	B	B	A	B	C	D	B	D	C	C	C	B	B	A	B	D	D	D	A

RUN #	25	26	27	28
ROOM NAME	FLEX	ENS	FAM	S-BATH
RM LOSS MBH.	1.90	1.15	1.57	0.82
CFM PER RUN HEAT	38	23	32	16
RM GAIN MBH.	1.87	1.06	1.55	0.41
CFM PER RUN COOLING	56	32	47	12
ADJUSTED PRESSURE	0.15	0.15	0.15	0.15
ACTUAL DUCT LGH.	54	39	40	35
EQUIVALENT LENGTH	200	170	140	160
TOTAL EFFECTIVE LENGTH	254	209	180	195
ADJUSTED PRESSURE	0.06	0.07	0.08	0.07
ROUND DUCT SIZE	**6**	4	5	4
HEATING VELOCITY (ft/min)	194	264	235	184
COOLING VELOCITY (ft/min)	286	367	345	138
OUTLET GRILL SIZE	4X10	3X10	3X10	3X10
TRUNK	A	C	C	B

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

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	253	0.06	9	10	x	8	455	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	438	0.06	11.1	16	x	8	493	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	258	0.06	9.1	14	x	8	332	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	645	0.06	12.8	20	x	8	581	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	1083	0.05	16.3	32	x	8	609
TRUNK Y	265	0.05	9.6	10	x	8	477
TRUNK Z	267	0.05	9.6	10	x	8	481
DROP	1083	0.05	16.3	24	x	10	650

RETURN AIR #	1	2	3	4	5	6	7									BR
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	115	85	95	85	85	116	320	0	0	0	0	0	0	0	0	182
PLENUM PRESSURE	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
ACTUAL DUCT LGH.	56	48	49	47	46	18	17	1	1	1	1	1	1	1	1	14
EQUIVALENT LENGTH	150	185	190	145	145	135	175	0	0	0	0	0	0	0	0	150
TOTAL EFFECTIVE LH	206	233	239	192	191	153	192	1	1	1	1	1	1	1	1	164
ADJUSTED PRESSURE	0.06	0.05	0.05	0.06	0.06	0.08	0.06	12.40	12.40	12.40	12.40	12.40	12.40	12.40	12.40	0.08
ROUND DUCT SIZE	6.7	6	6.5	6	6	6	9.8	0	0	0	0	0	0	0	0	7.4
INLET GRILL SIZE	8	8	8	8	8	8	8	0	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	0	0	0	0	0	0	0	0	14

CITY OF RICHMOND HILL
BUILDING DIVISION
05/01/2024
RECEIVED
Per: joshua.nabua

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

TYPE: ROSE 3 LO # 102624
SITE NAME: TRINIGROUP

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	5	@ 10.6 cfm	53.0	cfm
Table 9.32.3.A.		TOTAL	180.2	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	180.2	cfm
Less Principal Ventil. Capacity	79.5	cfm
Required Supplemental Capacity	100.7	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE V150H Location: BSMT

79.5 cfm [✓] HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

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

SUPPLEMENTAL FANS BY INSTALLING CONTRACTOR

Location	Model	cfm	HVI	Sones
ENS	BY INSTALLING CONTRACTOR	50	✓	3.5
S-BATH	BY INSTALLING CONTRACTOR	50	✓	3.5
ENS-4	BY INSTALLING CONTRACTOR	50	✓	3.5
PWD	BY INSTALLING CONTRACTOR	50	✓	3.5

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 #:

City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: PXV

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-23

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

CITY OF RICHMOND HILL
BUILDING DIVISION
05/01/2024
RECEIVED
Per: joshua.nabua

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#: 102624 Model: ROSE 3 Builder: GREENPARK HOMES Date: 9/25/2023

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1388	9	11798
First	1388	10	14018.8
Second	1225	9	11147.5
Third	0	9	0
Fourth	0	9	0
		Total:	36,964.3 ft³
		Total:	1046.7 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.354
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

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

0.354 x 290.75 x 43 °C x 1.2 = 5335 W

= **18203 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 290.75 x 7 °C x 1.2 = 274 W

= **934 Btu/h**

5.2.3.2 Heat Loss due to Mechanical Ventilation

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

80 CFM x 78 °F x 1.08 x 0.25 = **1670 Btu/h**

6.2.7 Sensible heat Gain due to Ventilation

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

80 CFM x 13 °F x 1.08 x 0.25 = **275 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	18,203	8,948	1.017
2	0.3		13,309	0.410
3	0.2		13,245	0.275
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

Michael O'Rourke
BCIN# 19669

CITY OF RICHMOND HILL
BUILDING DIVISION
05/01/2024
RECEIVED
Per: joshua.nabua

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: ROSE 3 **BUILDER:** GREENPARK HOMES
SFQT: 2596 **LO#** 102624 **SITE:** TRINIGROUP

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
		WINDOW SHGC	0.50

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):	36964.3	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD ($Btu/h/ft^2$):	1.95	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	5.5 ft
LENGTH: 56.0 ft	WIDTH: 31.0 ft	EXPOSED PERIMETER:	174.0 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/ERV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	0.8	-

INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

Michael O'Rourke

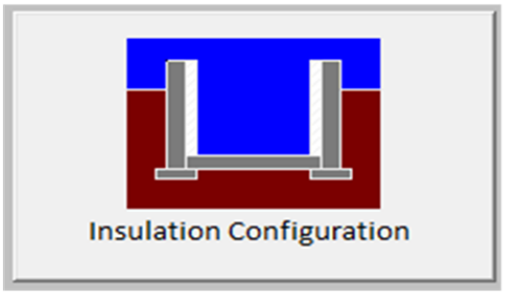
CITY OF RICHMOND HILL
BUILDING DIVISION
05/01/2024
RECEIVED
Per: joshua.nabua

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):	**17.1**	
Floor Width (m):	**9.4**	
Exposed Perimeter (m):	**0.0**	
Wall Height (m):	**2.6**	
Depth Below Grade (m):	**1.68**	
Window Area (m^2):	**0.8**	
Door Area (m^2):	**2.0**	
Radiant Slab		
Heated Fraction of the Slab:	**0**	
Fluid Temperature (°C):	**33**	
Design Months		
Heating Month	**1**	
Foundation Loads		
Heating Load (Watts):		**1742**

TYPE: ROSE 3
LO# 102624

Michael O'Rourke BCIN #19669

CITY OF RICHMOND HILL
BUILDING DIVISION
05/01/2024
RECEIVED
Per: joshua.nabua

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):	7.68	
Building Configuration		
Type:	Detached	
Number of Stories:	Two	
Foundation:	Full	
House Volume (m^3):	1046.7	
Air Leakage/Ventilation		
Air Tightness Type:	Present (1961-) (3.57 ACH)	
Custom BDT Data:	ELA @ 10 Pa.	1395.3 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):	**0.354**	
Cooling Air Leakage Rate (ACH/H):	**0.110**	

TYPE: ROSE 3
LO# 102624

Michael O'Rourke BCIN# 19669

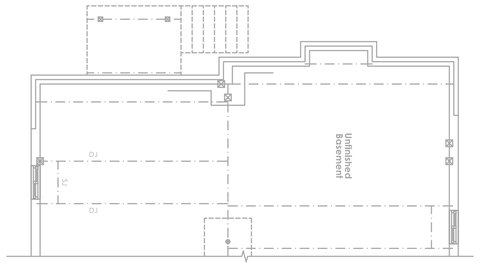
CITY OF RICHMOND HILL
BUILDING DIVISION
05/01/2024
RECEIVED
Per: joshua.nabua

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.

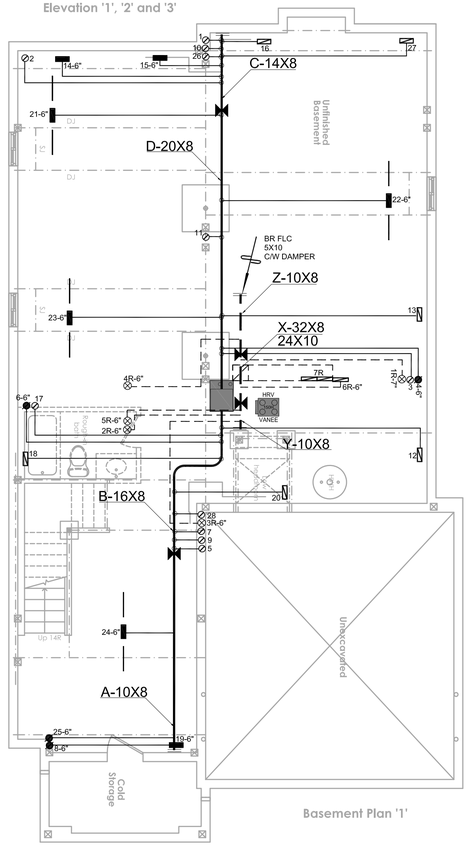
INSTALLATION TO COMPLY WITH THE LATEST ONTARIO BUILDING CODE. ALL SUPPLY BRANCH OUTLETS SHALL BE EQUIPPED WITH MANUAL BALANCING DAMPER. DUCTWORK WHICH PASSES THROUGH THE GARAGE OR UNHEATED SPACES SHALL BE ADEQUATELY INSULATED AND GAS-PROOFED

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

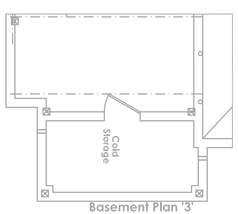
SUPPLEMENTAL EXHAUST FAN (MINIMUM 100 CFM) DISCHARGING DIRECTLY TO THE EXTERIOR WILL BE PROVIDED IN THE KITCHEN. EXHAUST DUCTS SERVING THE KITCHEN SHALL NOT BE SMALLER THAN RECOMMENDED BY THE MANUFACTURER OF THE FANS AND MUST AT LEAST MEET O.B.C. STATED MINIMUMS.



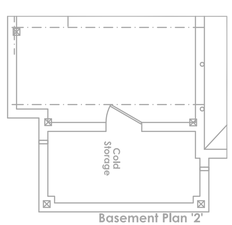
Partial Basement Plan For Deck Condition Elevation '1', '2' and '3'



Basement Plan '1'



Basement Plan '3'

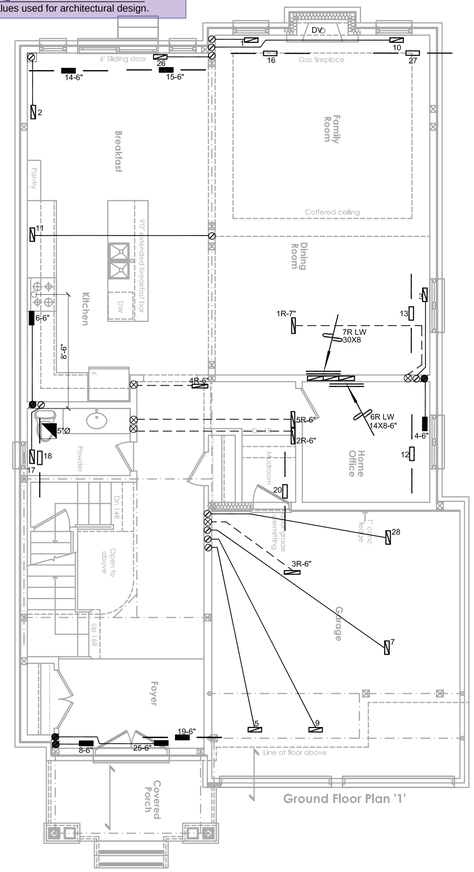


Basement Plan '2'

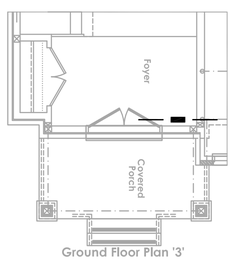
1.Laundry dryer exhaust duct shall be provided as per OBC 2012 Div.B 6.2.3.8(7).
2.Kitchen hood exhaust duct shall be provided as per OBC 2012, Div.B 9.32.3.10, 9.32.3.5(2).
3.Minimum R-12 Insulation Value required for ducts installed at unheated or exposed condition (OBC 2012 Div.B 6.2.4.3(10) and seal 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)

City of Richmond Hill
Building Division
REVIEWED
By: PV Date: May/14/2024
Building Permit #: RM#24-00018
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

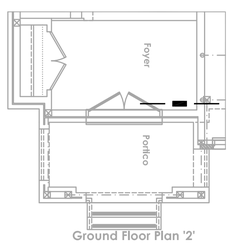
Ensure that R-Values and U-Values used for heat loss and heat gain calculations are consistent with the values specified by SB-12 Prescriptive Package: A1
and the values used for architectural design.



Ground Floor Plan '1'



Ground Floor Plan '3'



Ground Floor Plan '2'

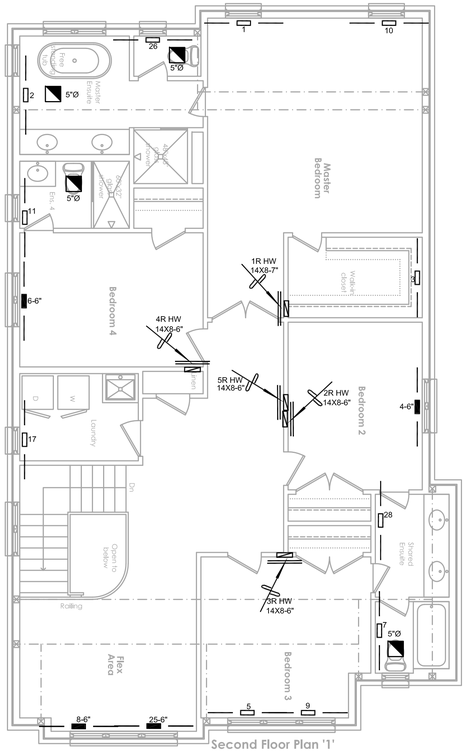
13.Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.
14. Return air intake shall be provided as recommended in HRAI Digest 2005 Section 4.7 Return air inlet should be positioned 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.

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

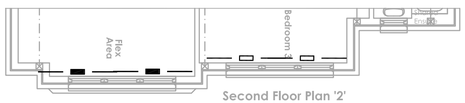
8.HRV installation, testing, startup and commissioning shall be in compliance with OBC 2012, Div.B 9.32.3.11, 9.32.3.11(7)&(10)

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

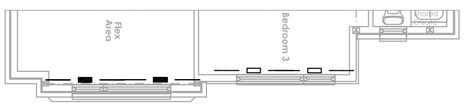
10. Supply air grill at finished basement shall be at low level. Return air grill for finished or unfinished basement shall be at low level. HRAI digest 2005, clause 7.7(3).



Second Floor Plan '1'



Second Floor Plan '2'



Second Floor Plan '3'

HEAT LOSS 55374 BTU/H		# OF RUNS	S/A	R/A	FANS
UNIT DATA		3RD FLOOR			
MAKE GOODMAN		2ND FLOOR	15	5	4
MODEL GMEC960603BNA		1ST FLOOR	9	2	2
INPUT 60.0	MBTU/H	BASEMENT	4	1	0
OUTPUT 57.6	MBTU/H				
COOLING 3.0	TONS				
FAN SPEED 1083	cfm @ 0.6" w.c.				

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

HVAC LEGEND

	SUPPLY AIR GRILLE
	SUPPLY AIR GRILLE 6" BOOT
	LINEAR BAR or LINEAR SLOT GRILLE
	SUPPLY AIR BOOT ABOVE
	6" SUPPLY AIR BOOT ABOVE
	SUPPLY AIR STACK
	6" SUPPLY AIR STACK
	14X8 RETURN AIR GRILLE
	30X8 RETURN AIR GRILLE
	FLOOR RETURN AIR GRILLE
	RETURN STACK ABOVE
	RETURN AIR STACK
	ER
	SUPPLY DUCTWORK
	RETURN DUCTWORK
	FLEX DUCT
	EXHAUST FAN
LT	LINT TRAP by REVERSOMATIC
DV	DIRECT VENT
LW	LOW WALL
HW	HIGH WALL
CLG.	CEILING
Z.D.	MOTORIZED ZONE DAMPER
M.D.	MOTORIZED DAMPER
	EXHAUST PIPE
	CONCENTRIC VENT KIT
	CONCENTRIC HRV or ERV VENT KIT
	SINGLE WALL BOX by REVERSOMATIC
	DOUBLE WALL BOX by REVERSOMATIC
	TRIPLE WALL BOX by REVERSOMATIC
CF	DRYER BOOSTER FAN

City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: PXV

No.	Revision	Date	By
2			
1	ISSUED FOR PERMIT	SEPT/23	YV

SB-12 PACKAGE **A1**

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 QCI#4-19899
HVAC Designs Ltd.

HVAC DESIGNS LTD.
375 Finley Ave - Unit 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

Client: GREENPARK HOMES
Project Name: TRINIGROUP RICHMOND HILL, ONTARIO
ROSE 3
2596 SQFT

Copyright & Copy: © 2023 HVAC Designs Ltd.

Sheet Title: HVAC HEATING LAYOUT
Drawn By: YV
Checked By:
Scale: 3/16"=1'-0"
Date: SEPTEMBER 2023
Sheet No.: 1
LO #: 102624

CITY OF RICHMOND HILL
BUILDING DIVISION
05/01/2024
RECEIVED
Per: joshua.nabua