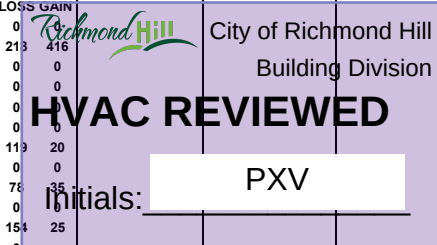


SITE NAME: TRINIGROUP		BUILDER: GREENPARK HOMES		TYPE: VILLA 7		GFA: 2741		DATE: Sep-23 LO# 102638		WINTER NATURAL AIR CHANGE RATE 0.352		HEAT LOSS ΔT °F. 78		CSA-F280-12	
										SUMMER NATURAL AIR CHANGE RATE 0.110		HEAT GAIN ΔT °F. 13		SB-12 PACKAGE A1	
ROOM USE		MBR		ENS		WIC		BED-2		BED-3		BED-4		ENS2/3	
EXP. WALL		33		25		7		13		31		31		8	
CLG. HT.		9		9		9		9		9		9		9	
FACTORS															
GRS.WALL AREA	LOSS GAIN	297		225		63		117		279		279		72	
GLAZING	LOSS GAIN														
NORTH	21.8 16.0	0 0 0		0 0 0		0 0 0		20 436 319		0 0 0		0 0 0		0 0 0	
EAST	21.8 41.6	0 0 0		0 0 0		0 0 0		41 893 1704		39 850 1621		0 0 0		0 0 0	
SOUTH	21.8 24.9	0 0 0		7 152 174		0 0 0		0 0 0		0 0 0		0 0 0		19 414 473	
WEST	21.8 41.6	20 436 831		16 349 665		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	
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	
NET EXPOSED WALL	4.6 0.8	277 1265 208		202 923 152		63 288 47		97 443 73		238 1087 179		240 1096 180		72 329 54	
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	
EXPOSED CLG	1.3 0.6	310 407 182		159 209 93		72 95 42		153 201 90		148 194 87		136 179 80		90 118 53	
NO ATTIC EXPOSED CLG	2.8 1.3	0 0 0		0 0 0		0 0 0		0 0 0		54 152 68		45 127 57		0 0 0	
EXPOSED FLOOR	2.6 0.4	0 0 0		0 0 0		0 0 0		0 0 0		202 527 87		33 86 14		13 34 6	
BASEMENT/CRAWL HEAT LOSS		0		0		0		0		0		0		0	
SLAB ON GRADE HEAT LOSS		0		0		0		0		0		0		0	
SUBTOTAL HT LOSS		2108		1633		382		1080		2854		2337		481	
SUB TOTAL HT GAIN			1221		1084		90		482		2124		1952		113
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	
AIR CHANGE HEAT LOSS		578		447		105		296		782		640		132	
AIR CHANGE HEAT GAIN			91		81		7		36		158		145		8
DUCT LOSS		0		0		0		0		364		298		61	
DUCT GAIN		0		0		0		0		315		297		12	
HEAT GAIN PEOPLE	240	2	480	0	0	0	0	1	240	1	240	0	0	0	0
HEAT GAIN APPLIANCES/LIGHTS			631		0		0		631		631		0		0
TOTAL HT LOSS BTU/H		2686		2080		487		1376		4000		3275		674	
TOTAL HT GAIN x 1.3 BTU/H			3150		1515		125		1806		4509		4244		173



ROOM USE		DIN		KT/BF		FAM		LAUN		PWD		FOY		MUD	
EXP. WALL		13		49		33		6		12		39		27	
CLG. HT.		10		10		10		9		10		10		10	
FACTORS															
GRS.WALL AREA	LOSS GAIN	130		490		330		54		120		390		270	
GLAZING	LOSS GAIN														
NORTH	21.8 16.0	25 545 399		0 0 0		0 0 0		0 0 0		0 0 0		22 479 351		0 0 0	
EAST	21.8 41.6	0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		22 479 914		0 0 0	
SOUTH	21.8 24.9	0 0 0		25 545 622		0 0 0		7 152 174		7 152 174		0 0 0		0 0 0	
WEST	21.8 41.6	0 0 0		58 1263 2410		22 479 914		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	
DOORS	20.5 3.4	0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		21 431 71	
NET EXPOSED WALL	4.6 0.8	105 480 79		407 1859 306		308 1407 231		47 215 35		113 516 85		346 1581 260		249 1138 187	
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	
EXPOSED CLG	1.3 0.6	0 0 0		0 0 0		0 0 0		62 81 36		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	
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	
BASEMENT/CRAWL HEAT LOSS		0		0		0		0		0		0		0	
SLAB ON GRADE HEAT LOSS		0		0		0		0		0		0		0	
SUBTOTAL HT LOSS		1024		3667		1886		449		669		2539		1569	
SUB TOTAL HT GAIN			478		3338		1146		246		259		1526		258
LEVEL FACTOR / MULTIPLIER	0.30 0.48			0.30 0.48		0.30 0.48		0.20 0.27		0.30 0.48		0.30 0.48		0.30 0.48	
AIR CHANGE HEAT LOSS		490		1755		902		123		320		1215		750	
AIR CHANGE HEAT GAIN			36		248		85		18		19		114		19
DUCT LOSS		0		0		0		0		0		0		0	
DUCT GAIN		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
HEAT GAIN APPLIANCES/LIGHTS			631		631		0		631		0		0		0
TOTAL HT LOSS BTU/H		1514		5422		2789		572		989		3754		2319	
TOTAL HT GAIN x 1.3 BTU/H			1488		5483		1600		1164		362		2131		360

TOTAL HEAT GAIN BTU/H: 31976 TONS: 2.66 LOSS DUE TO VENTILATION LOAD BTU/H: 1670 STRUCTURAL HEAT LOSS: 52445 TOTAL COMBINED HEAT LOSS BTU/H: 54115

Michael O'Rourke

05/01/2024

Capacity required when HRV
running at full
speed=52445+3151=55595
btu/h, only 3.6% margin too low.
Builder to ensure a very tight
construction

SITE NAME: TRINIGROUP
BUILDER: GREENPARK HOMES

TYPE: VILLA 7

DATE: Sep-23

GFA: 2741

LO# 102638

HEATING CFM 978
TOTAL HEAT LOSS 52,445
AIR FLOW RATE CFM 18.65

COOLING CFM 978
TOTAL HEAT GAIN 31,701
AIR FLOW RATE CFM 30.85

furnace pressure 0.7
furnace filter 0.14
a/c coil pressure 0.24
available pressure
for s/a & r/a 0.32

#GOODMAN
GMEC960603BNA
FAN SPEED 60

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

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	14	7	4
R/A	0	0	5	1	1

plenium pressure s/a 0.17
max s/a dif press. loss 0.02
min adjusted pressure s/a 0.15

r/a pressure 0.15
r/a grille press. Loss 0.02
adjusted pressure r/a 0.13

MEDLOW
MEDIUM 978
MEDIUM HIGH 1017
HIGH 1131

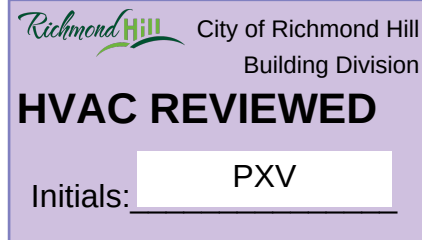
DESIGN CFM = 978
CFM @ .7" E.S.P.

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	ENS2/3	HALL	BED-3	MBR	ENS-4	BED-4	DIN	KT/BF	KT/BF	FAM	LAUN	PWD	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.34	1.04	0.49	1.38	2.00	1.64	0.67	1.86	2.00	1.34	0.80	1.64	1.51	2.71	2.71	2.79	0.57	0.99	3.75	2.32	4.46	4.46	4.46	4.46
CFM PER RUN HEAT	25	19	9	26	37	31	13	35	37	25	15	31	28	51	51	52	11	18	70	43	83	83	83	83
RM GAIN MBH.	1.57	0.76	0.13	1.81	2.25	2.12	0.17	1.10	2.25	1.57	0.76	2.12	1.49	2.74	2.74	1.60	1.16	0.36	2.13	0.36	0.43	0.43	0.43	0.43
CFM PER RUN COOLING	49	23	4	56	70	65	5	34	70	49	23	65	46	85	85	49	36	11	66	11	13	13	13	13
ADJUSTED PRESSURE	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.15	0.15	0.15	0.15
ACTUAL DUCT LGH.	38	52	34	40	45	46	41	31	48	51	42	51	24	40	30	45	18	29	30	16	38	34	24	32
EQUIVALENT LENGTH	130	180	180	140	140	140	160	120	150	170	130	190	130	120	120	120	160	160	110	160	150	140	80	120
TOTAL EFFECTIVE LENGTH	168	232	214	180	185	186	201	151	198	221	172	241	154	160	150	165	178	189	140	176	188	174	104	152
ADJUSTED PRESSURE	0.09	0.07	0.07	0.09	0.08	0.08	0.08	0.1	0.08	0.07	0.09	0.06	0.1	0.09	0.1	0.09	0.09	0.08	0.11	0.09	0.08	0.08	0.14	0.1
ROUND DUCT SIZE	5	4	4	6	5	6	4	4	5	5	4	6	4	6	6	5	4	4	5	4	6	6	6	6
HEATING VELOCITY (ft/min)	184	218	103	133	272	158	149	402	272	184	172	158	321	260	260	382	126	207	514	493	423	423	423	423
COOLING VELOCITY (ft/min)	360	264	46	286	514	331	57	390	514	360	264	331	528	433	433	360	413	126	485	126	66	66	66	66
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	4X10	3X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	D	C	D	D	B	A	B	B	B	D	B	A	D	C	C	C	D	A	A	D	C	C	D	A

RUN #	26
ROOM NAME	ENS
RM LOSS MBH.	1.04
CFM PER RUN HEAT	19
RM GAIN MBH.	0.76
CFM PER RUN COOLING	23
ADJUSTED PRESSURE	0.16
ACTUAL DUCT LGH.	65
EQUIVALENT LENGTH	160
TOTAL EFFECTIVE LENGTH	225
ADJUSTED PRESSURE	0.07
ROUND DUCT SIZE	4
HEATING VELOCITY (ft/min)	218
COOLING VELOCITY (ft/min)	264
OUTLET GRILL SIZE	3X10
TRUNK	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	233	0.06	8.7	10	x	8	419	TRUNK G	0	0.00	0	0	8
TRUNK B	370	0.06	10.4	14	x	8	476	TRUNK H	0	0.00	0	0	8
TRUNK C	358	0.07	9.9	12	x	8	537	TRUNK I	0	0.00	0	0	8
TRUNK D	608	0.07	12	16	x	8	684	TRUNK J	0	0.00	0	0	8
TRUNK E	0	0.00	0	0	x	8	0	TRUNK K	0	0.00	0	0	8
TRUNK F	0	0.00	0	0	x	8	0	TRUNK L	0	0.00	0	0	8

RETURN AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT		VELOCITY (ft/min)
TRUNK O	0	0.06	0	0	x	8
TRUNK P	0	0.06	0	0	x	8
TRUNK Q	0	0.06	0	0	x	8
TRUNK R	0	0.06	0	0	x	8
TRUNK S	0	0.06	0	0	x	8
TRUNK T	0	0.06	0	0	x	8
TRUNK U	0	0.06	0	0	x	8
TRUNK V	0	0.06	0	0	x	8
TRUNK W	0	0.06	0	0	x	8
TRUNK X	978	0.06	14.9	26	x	8
TRUNK Y	435	0.06	11	14	x	8
TRUNK Z	190	0.06	8.1	8	x	8
DROP	978	0.06	14.9	24	x	8

RETURN AIR #	1	2	3	4	5	6										BR
AIR VOLUME	95	95	95	95	92	340	0	0	0	0	0	0	0	0	0	166
PLENUM PRESSURE	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
ACTUAL DUCT LGH.	39	36	48	49	35	23	1	1	1	1	1	1	1	1	1	14
EQUIVALENT LENGTH	145	175	185	190	135	150	0	0	0	0	0	0	0	0	0	180
TOTAL EFFECTIVE LH	184	211	233	239	170	173	1	1	1	1	1	1	1	1	1	194
ADJUSTED PRESSURE	0.07	0.06	0.06	0.06	0.08	0.08	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	0.07
ROUND DUCT SIZE	6	6	6	6	5.7	9.4	0	0	0	0	0	0	0	0	0	7.4
INLET GRILL SIZE	8	8	8	8	8	8	0	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	30	0	0	0	0	0	0	0	0	0	14

CITY OF RICHMOND HILL
BUILDING DIVISION

05/01/2024

RECEIVED
Per: joshua.nabua

TYPE: VILLA 7
SITE NAME: TRINIGROUP

LO # 102638

RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY

COMBUSTION APPLIANCES		9.32.3.1(1)
a)	☒ Direct vent (sealed combustion) only	
b)	☐ Positive venting induced draft (except fireplaces)	
c)	☐ Natural draft, B-vent or induced draft gas fireplace	
d)	☐ Solid Fuel (including fireplaces)	
e)	☐ No Combustion Appliances	

HEATING SYSTEM	
☒ Forced Air	☐ Non Forced Air
☐ Electric Space Heat	

HOUSE TYPE		9.32.1(2)
☒ I	Type a) or b) appliance only, no solid fuel	
☐ II	Type I except with solid fuel (including fireplaces)	
☐ III	Any Type c) appliance	
☐ IV	Type I, or II with electric space heat	
☐	Other: Type I, II or IV no forced air	

SYSTEM DESIGN OPTIONS		O.N.H.W.P.
☐ 1	Exhaust only/Forced Air System	
☐ 2	HRV with Ducting/Forced Air System	
☒ 3	HRV Simplified/connected to forced air system	
☐ 4	HRV with Ducting/non forced air system	
☐	Part 6 Design	

TOTAL VENTILATION CAPACITY		9.32.3.3(1)
Basement + Master Bedroom	<u>2</u> @ 21.2 cfm	<u>42.4</u> cfm
Other Bedrooms	<u>3</u> @ 10.6 cfm	<u>31.8</u> cfm
Kitchen & Bathrooms	<u>4</u> @ 10.6 cfm	<u>42.4</u> cfm
Other Rooms	<u>3</u> @ 10.6 cfm	<u>31.8</u> cfm
Table 9.32.3.A.	TOTAL	<u>148.4</u> 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		<u>79.5</u> cfm

SUPPLEMENTAL VENTILATION CAPACITY		9.32.3.5.
Total Ventilation Capacity	<u>148.4</u>	cfm
Less Principal Ventil. Capacity	<u>79.5</u>	cfm
Required Supplemental Capacity	<u>68.9</u>	cfm

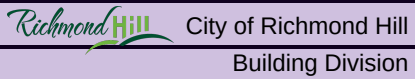
PRINCIPAL EXHAUST FAN CAPACITY	
Model:	VANEE V150H
Location:	BSMT
<u>79.5</u> cfm	☒ HVI Approved

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
ENS2/3	BY INSTALLING CONTRACTOR	50	☒	3.5
PWD	BY INSTALLING CONTRACTOR	50	☒	3.5

HEAT RECOVERY VENTILATOR		9.32.3.11.
Model:	VANEE V150H	
<u>150</u> cfm high	<u>35</u> cfm low	
<u>75</u> % Sensible Efficiency	☒ HVI Approved	
@ 32 deg F (0 deg C)		

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

BUILDER:		GREENPARK HOMES
Name:		
Address:		
City:	HVAC REVIEWED	
Telephone #:	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:	
HRAI #	001820
Date:	September-23

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



05/01/2024

RECEIVED
Per: joshua.nabua

CSA F280-12 Residential Heat Loss and Heat Gain Calculations																																																												
Formula Sheet (For Air Leakage / Ventilation Calculation)																																																												
LO#: 102638		Model: VILLA 7		Builder: GREENPARK HOMES																																																								
				Date: 9/22/2023																																																								
Volume Calculation			Air Change & Delta T Data																																																									
House Volume <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Level</th> <th>Floor Area (ft²)</th> <th>Floor Height (ft)</th> <th>Volume (ft³)</th> </tr> </thead> <tbody> <tr><td>Bsmt</td><td>1213</td><td>9</td><td>10917</td></tr> <tr><td>First</td><td>1213</td><td>10</td><td>12130</td></tr> <tr><td>Second</td><td>1547</td><td>9</td><td>13923</td></tr> <tr><td>Third</td><td>0</td><td>9</td><td>0</td></tr> <tr><td>Fourth</td><td>0</td><td>9</td><td>0</td></tr> <tr><td colspan="3" style="text-align: right;">Total:</td><td>36,970.0 ft³</td></tr> <tr><td colspan="3" style="text-align: right;">Total:</td><td>1046.9 m³</td></tr> </tbody> </table>			Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)	Bsmt	1213	9	10917	First	1213	10	12130	Second	1547	9	13923	Third	0	9	0	Fourth	0	9	0	Total:			36,970.0 ft³	Total:			1046.9 m³	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">WINTER NATURAL AIR CHANGE RATE</td> <td style="width: 20%;">0.352</td> </tr> <tr> <td>SUMMER NATURAL AIR CHANGE RATE</td> <td>0.110</td> </tr> </table> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th colspan="5" style="text-align: center;">Design Temperature Difference</th> </tr> <tr> <th></th> <th>Tin °C</th> <th>Tout °C</th> <th>ΔT °C</th> <th>ΔT °F</th> </tr> <tr> <td>Winter DTDh</td> <td>22</td> <td>-21</td> <td>43</td> <td>78</td> </tr> <tr> <td>Summer DTDc</td> <td>24</td> <td>31</td> <td>7</td> <td>13</td> </tr> </table>		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
Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)																																																									
Bsmt	1213	9	10917																																																									
First	1213	10	12130																																																									
Second	1547	9	13923																																																									
Third	0	9	0																																																									
Fourth	0	9	0																																																									
Total:			36,970.0 ft³																																																									
Total:			1046.9 m³																																																									
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			6.2.6 Sensible Gain due to Air Leakage																																																									
$HL_{airb} = LR_{airh} \times \frac{V_b}{3.6} \times DTD_h \times 1.2$ 0.352 x 290.80 x 43 °C x 1.2 = 5307 W = 18107 Btu/h			$HG_{salb} = LR_{airc} \times \frac{V_b}{3.6} \times DTD_c \times 1.2$ = 0.110 x 290.80 x 7 °C x 1.2 = 272 W = 929 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 78 °F x 1.08 x 0.25 = 1670 Btu/h			$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$ 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)																																																												
$HL_{airr} = Level\ Factor \times HL_{airbv} \times \{(HL_{agcr} + HL_{bgcr}) \div (HL_{agclevel} + HL_{bgclevel})\}$ <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Level</th> <th>Level Factor (LF)</th> <th>HLairve Air Leakage + Ventilation Heat Loss (Btu/h)</th> <th>Level Conductive Heat Loss: (HL_{clevel})</th> <th>Air Leakage Heat Loss Multiplier (LF x HLairbv / HLlevel)</th> </tr> </thead> <tbody> <tr><td>1</td><td>0.5</td><td rowspan="5" style="text-align: center;">18,107</td><td>8,798</td><td>1.029</td></tr> <tr><td>2</td><td>0.3</td><td>11,355</td><td>0.478</td></tr> <tr><td>3</td><td>0.2</td><td>13,221</td><td>0.274</td></tr> <tr><td>4</td><td>0</td><td>0</td><td>0.000</td></tr> <tr><td>5</td><td>0</td><td>0</td><td>0.000</td></tr> </tbody> </table>					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	18,107	8,798	1.029	2	0.3	11,355	0.478	3	0.2	13,221	0.274	4	0	0	0.000	5	0	0	0.000																														
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	18,107	8,798	1.029																																																								
2	0.3		11,355	0.478																																																								
3	0.2		13,221	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																																																												

Michael O'Rourke
BCIN# 19669

CITY OF RICHMOND HILL
BUILDING DIVISION

05/01/2024

RECEIVED
Per: joshua.nabua

HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: VILLA 7	BUILDER: GREENPARK HOMES
SFQT: 2741	LO# 102638 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 (ft³):	36970.0	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: 57.0 ft	WIDTH: 29.0 ft	EXPOSED PERIMETER:	172.0 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



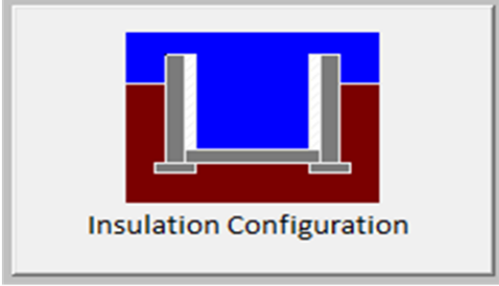
CITY OF RICHMOND HILL
BUILDING DIVISION

05/01/2024

RECEIVED
Per: joshua.nabua

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):	17.4	 Insulation Configuration
Floor Width (m):	8.8	
Exposed Perimeter (m):	0.0	
Wall Height (m):	2.7	
Depth Below Grade (m):	1.83	
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):		1714

TYPE: VILLA 7
LO# 102638

Michael O'Rourke BCIN #19669

CITY OF RICHMOND HILL
BUILDING DIVISION

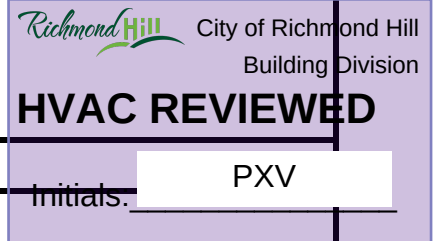
05/01/2024


RECEIVED
Per: joshua.nabua

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):	1046.9			
Air Leakage/Ventilation				
Air Tightness Type:	Present (1961-) (3.57 ACH)			
Custom BDT Data:	ELA @ 10 Pa.	1395.5 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):	0.352			
Cooling Air Leakage Rate (ACH/H):	0.110			

TYPE: VILLA 7
LO# 102638

Michael O'Rourke BCIN# 19669



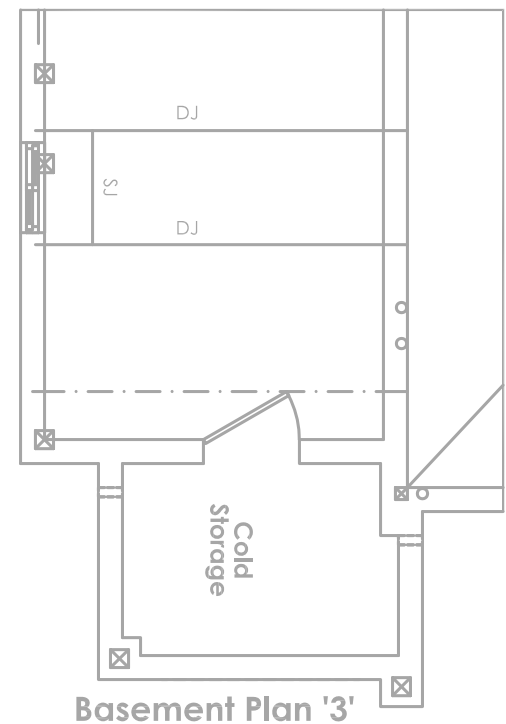
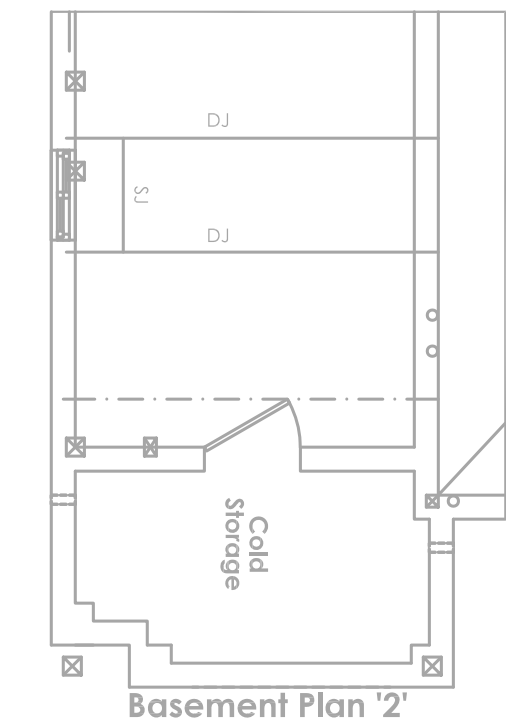
ALL DRAWINGS, CALCULATIONS AND SPECIFICATIONS ARE THE PROPERTY OF HVAC DESIGNS LTD. ? AND MAY NOT BE REPRODUCED, MODIFIED OR ALTERED WITHOUT EXPRESSED WRITTEN CONSENT. THE DRAWINGS ARE DATED AND USE OF THESE DRAWINGS AFTER ONE YEAR FROM THE DATED NOTED IS NOT AUTHORIZED. CONTRACTOR SHALL CHECK ALL CONDITIONS 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.

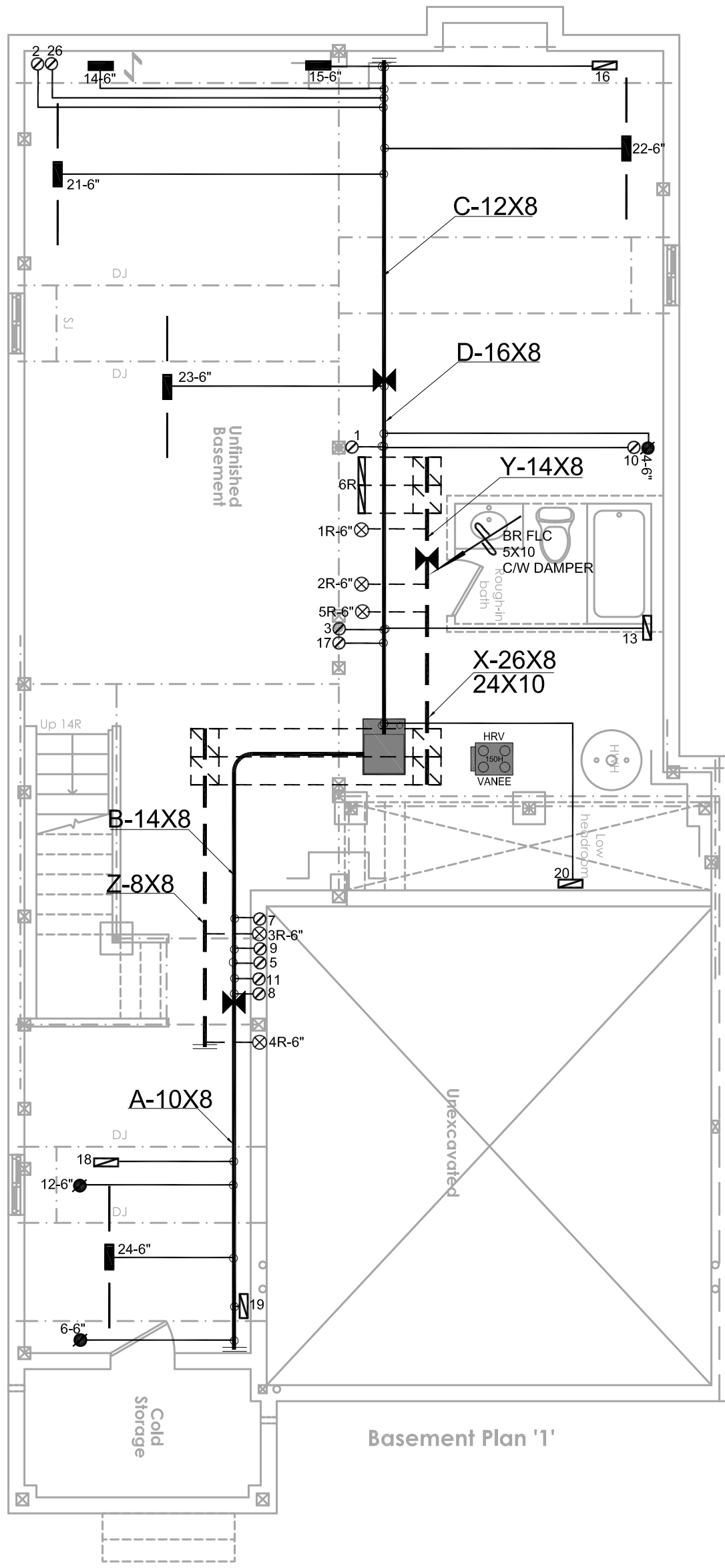
Partial Basement Plan For Deck Condition Elevation 1, 2 and 3



City of Richmond Hill Building Division
REVIEWED
By: **PV** Date: **May/30/2024**
Building Permit #: **RM#-24-00028**
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

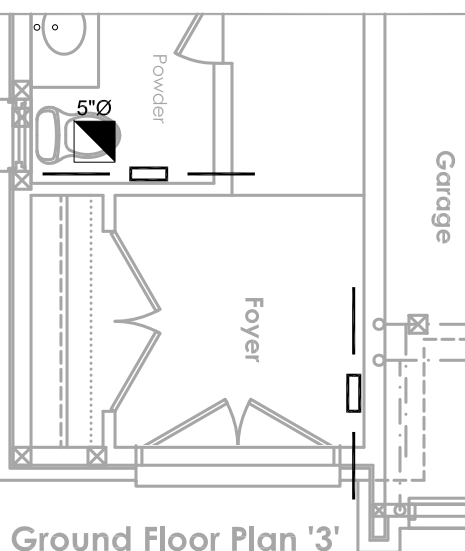
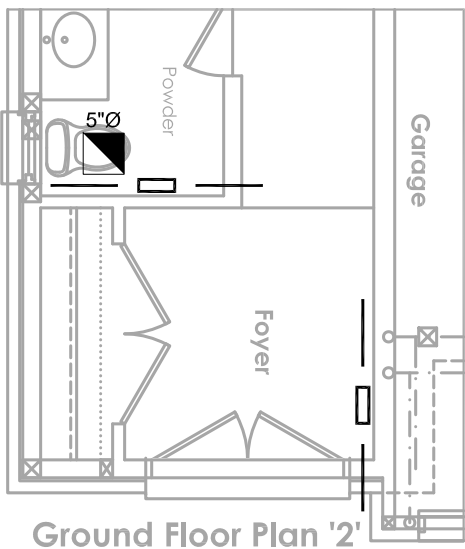
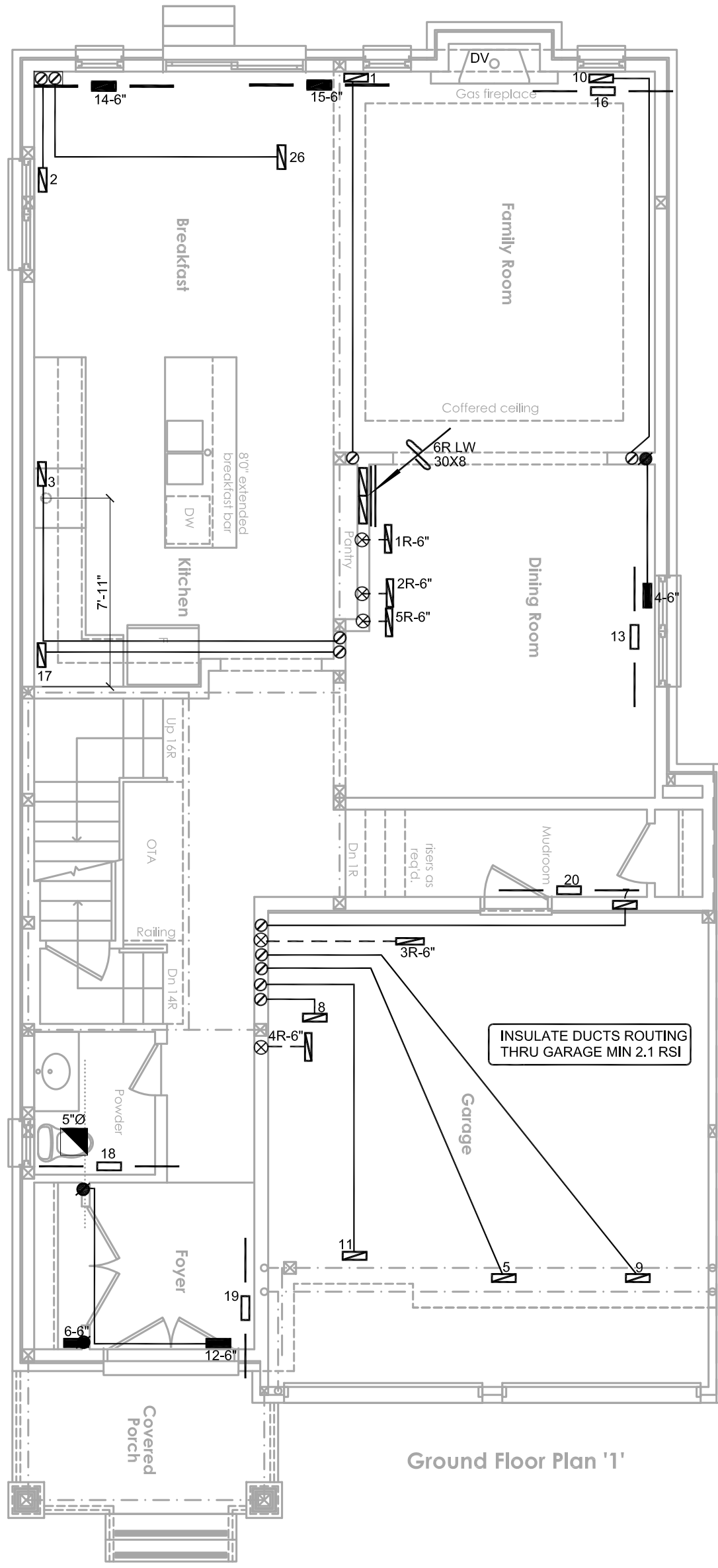
Ensure that R-Values and U-Values used for heat loss and heat gain calculations are consistent with the values specified by SB-12 Prescriptive Package: **A1** and the values used for architectural design.

Capacity required when HRV running at full speed=52445+3151=55595 btu/h, only 3.6% margin , too low. Builder to ensure a very tight construction



- 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)

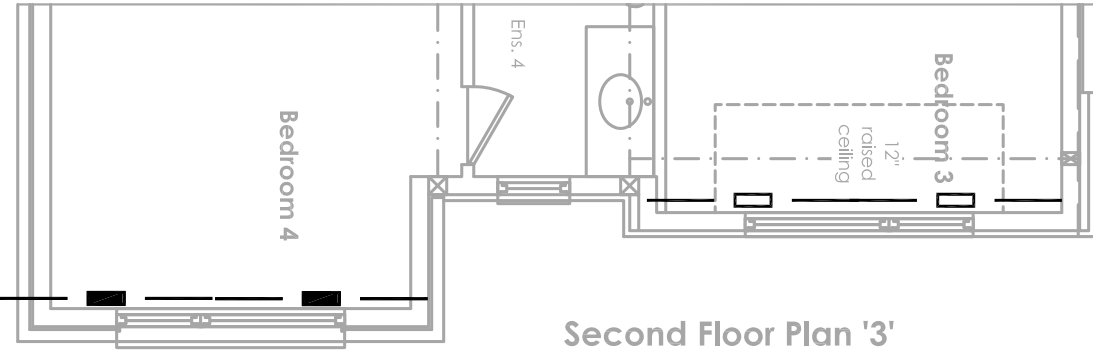
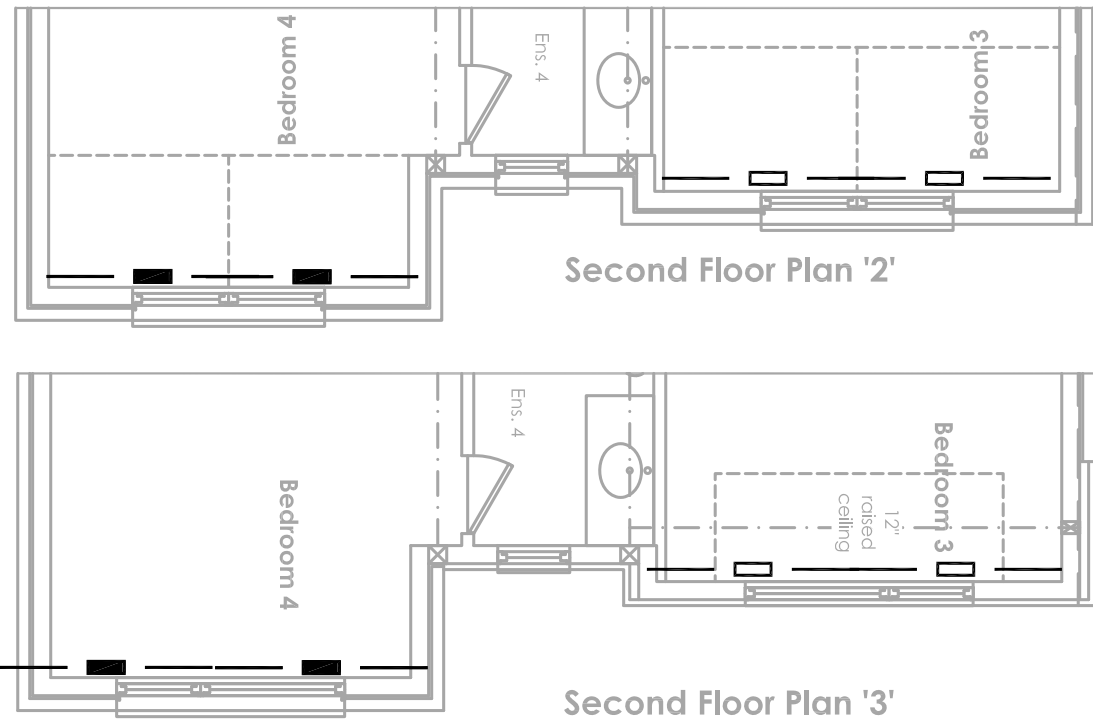
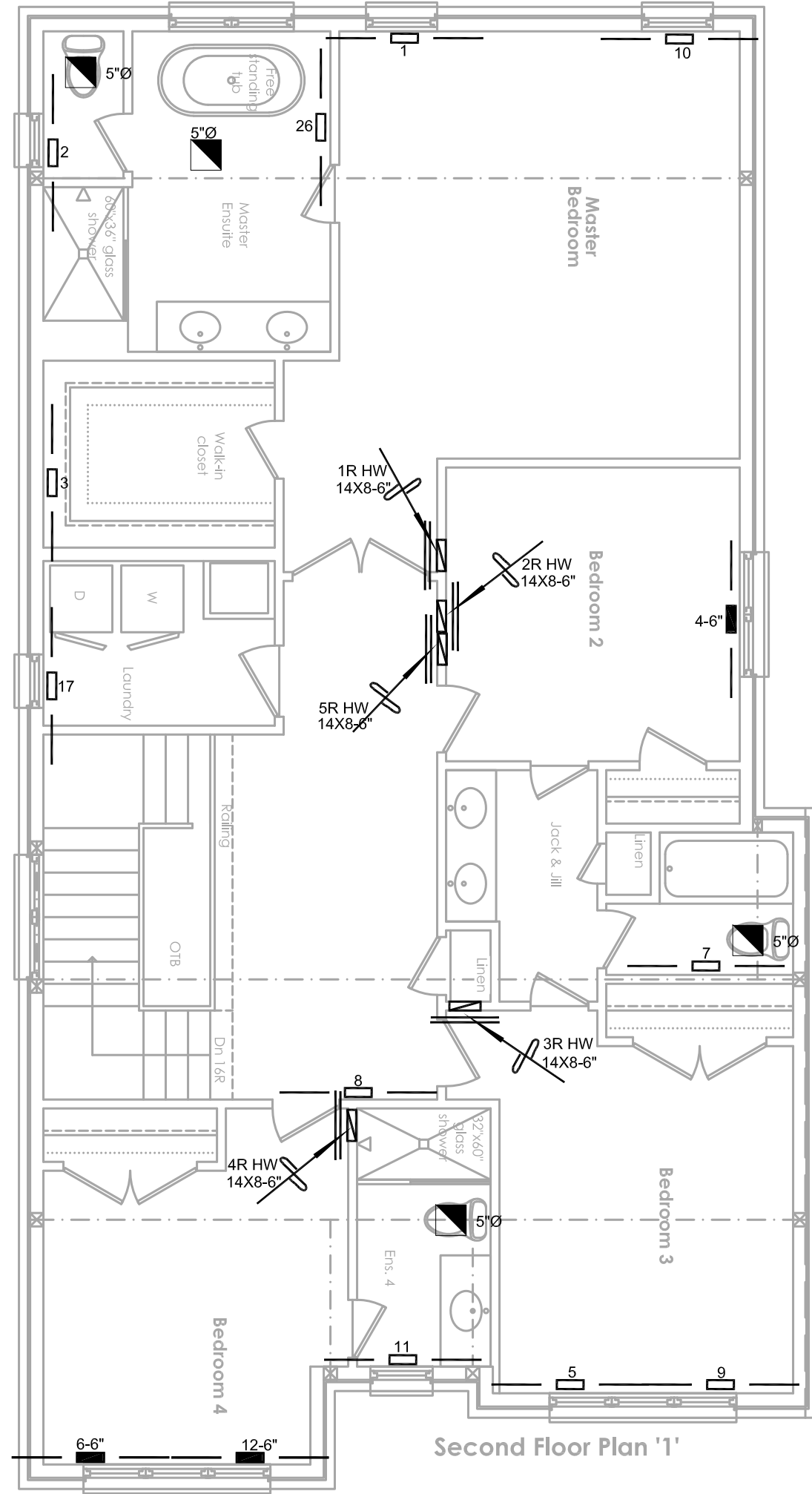
- 13.Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.
14. Return air intake shall be provided as recommended in HRAI Digest 2005 Section 4.7 Return air inlet should be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



HEAT LOSS 54115 BTU/H	# OF RUNS	S/A	R/A	FANS
UNIT DATA	3RD FLOOR			
MAKE GOODMAN	2ND FLOOR	14	5	4
MODEL GMEC960603BNA	1ST FLOOR	7	1	2
INPUT 60 MBTU/H	BASEMENT	4	1	0
OUTPUT 57.6 MBTU/H	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			
COOLING 2.5 TONS				
FAN SPEED 978 cfm @ 0.6" w.c.				

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 REDUCER
	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
	DRYER BOOSTER FAN

2			
1	ISSUED FOR PERMIT	SEPT23	HR
Rev	Revision	Date	By

SB-12 PACKAGE

A1

Michael Offutt has reviewed and attests responsibility for the design work as an engineer under division C.22 of the building code.

Michael Offutt OCEM 1998 HVAC Design 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@hvacdsgns.ca
Web: www.hvacdsgns.ca
Specializing in Residential Mechanical Design Services

Client: GREENPARK HOMES
Project Name: TRINIGROUP RICHMOND HILL, ONTARIO
VILLA 7
2741 SQFT

Copyright & Copy: © 2023 HVAC Designs Ltd.
Sheet Title: HVAC
Drawn By: HR
Scale: 3/16"=1'-0"
Date: SEPTEMBER 2023
LO #: 102638

CITY OF RICHMOND HILL
BUILDING DIVISION
05/01/2024
RECEIVED
Per: Joshua.nabul