

SITE NAME: TRINIGROUP		BUILDER: GREENPARK HOMES		TYPE: VILLA 2		GFA: 2487		DATE: Sep-23 LO# 102632		WINTER NATURAL AIR CHANGE RATE 0.354 SUMMER NATURAL AIR CHANGE RATE 0.110		HEAT LOSS ΔT °F. 78 HEAT GAIN ΔT °F. 13		CSA-F280-12 SB-12 PACKAGE A1	
ROOM USE	EXP. WALL CLG. HT.	MBR	ENS	WIC	BED-2	BED-3	BED-4	BATH	FLEX	WIC-2	ENS-2				
		32	24	5	12	26	34	6	8	5	9				
		9	9	9	9	9	9	9	9	9	9				
FACTORS															
GRS.WALL AREA	LOSS GAIN	291	218	46	109	237	309	55	73	46	82				
GLAZING	LOSS GAIN														
NORTH	21.8 16.0	0 0 0	16 349 256	0 0 0	16 349 256	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	7 152 112				
EAST	21.8 41.6	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	40 871 1662	35 762 1454	0 0 0	0 0 0	10 218 416	0 0 0			
SOUTH	21.8 24.9	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	7 152 174	11 240 274	0 0 0	0 0 0			
WEST	21.8 41.6	28 610 1163	7 152 291	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			
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	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 0 0	0 0 0			
NET EXPOSED WALL	4.6 0.8	263 1202 198	195 893 147	46 208 34	93 426 70	197 898 148	274 1254 206	48 217 36	62 282 46	36 162 27	75 342 56				
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	257 338 151	148 194 87	39 51 23	148 194 87	168 221 99	130 171 76	64 84 38	276 363 162	26 34 15	54 71 32				
NO ATTIC EXPOSED CLG	2.8 1.3	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	41 115 52	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	168 439 72	9 23 4	4 10 2	27 70 12	26 68 11	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		2150	1588	259	969	2429	2326	464	955	482	566				
SUB TOTAL HT GAIN		1512	780	57	413	1981	1792	249	494	469	200				
LEVEL FACTOR / MULTIPLIER	0.20 0.27			0.20 0.27		0.20 0.27		0.20 0.27		0.20 0.27					
AIR CHANGE HEAT LOSS		584	431	70	263	660	632	126	259	131	154				
AIR CHANGE HEAT GAIN		113	58	4	31	148	134	19	37	35	15				
DUCT LOSS		0	0	0	0	309	296	59	121	61	0				
DUCT GAIN		0	0	0	0	298	277	27	53	50	0				
HEAT GAIN PEOPLE	240	2	480	0	0	1 240	1 240	0	0	0	0				
HEAT GAIN APPLIANCES/LIGHTS		607	0	0	0	607	607	0	0	0	0				
TOTAL HT LOSS BTU/H		2734	2019	329	1232	3397	3253	650	1336	674	719				
TOTAL HT GAIN x 1.3 BTU/H		3526	1090	80	1678	4255	3966	383	759	720	279				

ROOM USE	EXP. WALL CLG. HT.	DN/LV	KT/BF	FAM	LAUN	PWD	FOY	MUD	WOD	BAS
		34	34	36	11	32	5	15	37	166
		10	10	10	10	10	10	10	10	10
FACTORS										
GRS.WALL AREA	LOSS GAIN	343	343	364	111	323	51	152	315	1024
GLAZING	LOSS GAIN									
NORTH	21.8 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	48
EAST	21.8 41.6	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	16 349 665	0 0 0	0 0 0	0
SOUTH	21.8 24.9	44 958 1096	0 0 0	0 0 0	0 0 0	7 152 174	0 0 0	0 0 0	0 0 0	13 149
WEST	21.8 41.6	0 0 0	56 1220 2327	22 479 914	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
DOORS	20.5 3.4	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	28 575 95	21 431 71	0 0 0	71
NET EXPOSED WALL	4.6 0.8	299 1368 225	287 1313 216	342 1561 257	111 508 84	316 1445 238	7 30 5	131 596 98	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	0
EXPOSED CLG	1.3 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
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
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
BASEMENT/CRAWL HEAT LOSS		0	0	0	0	0	0	0	0	5624
SLAB ON GRADE HEAT LOSS		0	0	0	0	0	0	0	0	0
SUBTOTAL HT LOSS		2326	2533	2040	508	1597	953	1027	818	7677
SUB TOTAL HT GAIN		1321	2543	1171	84	412	764	169	135	503
LEVEL FACTOR / MULTIPLIER	0.30 0.45		0.30 0.45	0.30 0.45	0.30 0.45	0.30 0.45	0.30 0.45	0.30 0.45		0.50 0.97
AIR CHANGE HEAT LOSS		1052	1145	922	229	722	431	464		8275
AIR CHANGE HEAT GAIN		99	190	87	6	31	57	13		48
DUCT LOSS		0	0	0	0	0	0	0		0
DUCT GAIN		0	0	0	0	0	0	0		0
HEAT GAIN PEOPLE	240	0	0	0	0	0	0	0		0
HEAT GAIN APPLIANCES/LIGHTS		607	607	607	607	607	0	0		607
TOTAL HT LOSS BTU/H		3378	3678	2962	737	2319	1384	1492	818	15952
TOTAL HT GAIN x 1.3 BTU/H		2634	4342	2425	906	576	1068	236	175	1505

TOTAL HEAT GAIN BTU/H:

30879

TONS: 2.57

LOSS DUE TO VENTILATION LOAD BTU/H: 1670

STRUCTURAL HEAT LOSS: 49063

TOTAL COMBINED HEAT LOSS BTU/H: 50733

SITE NAME: TRINIGROUP

BUILDER: GREENPARK HOMES

TYPE: VILLA 2

DATE: Sep-23

GFA: 2487

LO# 102632

HEATING CFM	978	COOLING CFM	978
TOTAL HEAT LOSS	49,063	TOTAL HEAT GAIN	30,604
AIR FLOW RATE CFM	19.93	AIR FLOW RATE CFM	31.96

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

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	14	9	4
R/A	0	0	5	1	1

plenium pressure s/a	0.17	r/a pressure	0.15
max s/a dif press. loss	0.02	r/a grille press. Loss	0.02
min adjusted pressure s/a	0.15	adjusted pressure r/a	0.13

MEDLOW
MEDIUM 978
MEDIUM HIGH 1017
HIGH 1131DESIGN CFM = 978
CFM @ .7" E.S.P.

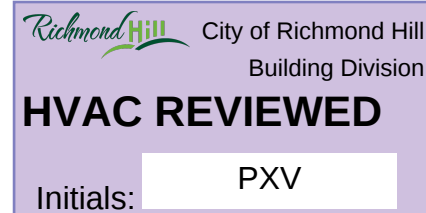
TEMPERATURE RISE 55 °F

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	BATH	FLEX	WIC-2	MBR	ENS-2	ENS	DN/LV	KT/BF	KT/BF	FAM	LAUN	PWD	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.37	1.01	0.33	1.23	1.70	1.63	0.65	1.34	0.67	1.37	0.72	1.01	3.38	1.84	1.84	1.48	0.74	2.32	1.38	1.49	4.19	4.19	4.19	4.19
CFM PER RUN HEAT	27	20	7	25	34	32	13	27	13	27	14	20	67	37	37	30	15	46	28	30	84	84	84	84
RM GAIN MBH.	1.76	0.55	0.08	1.68	2.13	1.98	0.38	0.76	0.72	1.76	0.28	0.55	2.63	2.17	2.17	1.21	0.91	0.58	1.07	0.24	0.42	0.42	0.42	0.42
CFM PER RUN COOLING	56	17	3	54	68	63	12	24	23	56	9	17	84	69	69	39	29	18	34	8	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	0.15	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.15	0.15	0.15	0.15
ACTUAL DUCT LGH.	48	45	30	28	48	54	53	37	44	30	26	37	24	20	26	34	10	39	38	41	28	23	17	37
EQUIVALENT LENGTH	190	180	140	170	140	180	190	160	130	130	190	220	150	110	120	130	120	150	110	150	90	80	100	140
TOTAL EFFECTIVE LENGTH	238	225	170	198	188	234	243	197	174	160	216	257	174	130	146	164	130	189	148	191	118	103	117	177
ADJUSTED PRESSURE	0.07	0.07	0.09	0.08	0.08	0.07	0.06	0.08	0.09	0.1	0.07	0.06	0.08	0.12	0.11	0.1	0.12	0.08	0.11	0.08	0.12	0.14	0.13	0.08
ROUND DUCT SIZE	5	4	4	6	5	6	4	4	4	5	4	4	6	5	5	4	4	5	4	4	6	6	6	6
HEATING VELOCITY (ft/min)	198	229	80	127	250	163	149	310	149	198	161	229	342	272	272	344	172	338	321	344	428	428	428	428
COOLING VELOCITY (ft/min)	411	195	34	275	499	321	138	275	264	411	103	195	428	507	507	447	333	132	390	92	66	66	66	66
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	C	D	C	C	B	A	B	C	B	C	C	C	B	D	D	D	E	A	A	B	E	E	E	A

RUN #	25	26	27
ROOM NAME	BED-3	BED-4	FAM
RM LOSS MBH.	1.70	1.63	1.48
CFM PER RUN HEAT	34	32	30
RM GAIN MBH.	2.13	1.98	1.21
CFM PER RUN COOLING	68	63	39
ADJUSTED PRESSURE	0.16	0.16	0.16
ACTUAL DUCT LGH.	52	58	22
EQUIVALENT LENGTH	150	210	110
TOTAL EFFECTIVE LENGTH	202	268	132
ADJUSTED PRESSURE	0.08	0.06	0.12
ROUND DUCT SIZE	5	6	4
HEATING VELOCITY (ft/min)	250	163	344
COOLING VELOCITY (ft/min)	499	321	447
OUTLET GRILL SIZE	3X10	4X10	3X10
TRUNK	B	A	D



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	222	0.06	8.6	8	x 8	500	TRUNK G	0	0.00	0	0 x 8 0
TRUNK B	413	0.06	10.8	14	x 8	531	TRUNK H	0	0.00	0	0 x 8 0
TRUNK C	560	0.06	12.1	20	x 8	504	TRUNK I	0	0.00	0	0 x 8 0
TRUNK D	154	0.07	7.2	8	x 8	347	TRUNK J	0	0.00	0	0 x 8 0
TRUNK E	421	0.07	10.5	14	x 8	541	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	STATIC	ROUND	RECT		VELOCITY	
	CFM	PRESS.	DUCT	DUCT		(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

RETURN AIR #	1	2	3	4	5	6	0	0	0	0	0	0	0	0	0	BR
AIR VOLUME	100	110	85	85	85	345	0	0	0	0	0	0	0	0	0	168
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.	53	29	66	61	60	41	1	1	1	1	1	1	1	1	1	14
EQUIVALENT LENGTH	185	135	225	195	190	230	0	0	0	0	0	0	0	0	0	140
TOTAL EFFECTIVE LH	238	164	291	256	250	271	1	1	1	1	1	1	1	1	1	154
ADJUSTED PRESSURE	0.06	0.08	0.05	0.05	0.05	0.05	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	0.09
ROUND DUCT SIZE	6.4	6	6	6	6	10.6	0	0	0	0	0	0	0	0	0	7
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 2
SITE NAME: TRINIGROUP

LO # 102632

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>5</u> @ 10.6 cfm <u>53</u> cfm
Other Rooms	<u>5</u> @ 10.6 cfm <u>53.0</u> cfm
Table 9.32.3.A.	TOTAL <u>180.2</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	79.5 cfm

SUPPLEMENTAL VENTILATION CAPACITY	9.32.3.5.
Total Ventilation Capacity	<u>180.2</u> cfm
Less Principal Ventil. Capacity	<u>79.5</u> cfm
Required Supplemental Capacity	<u>100.7</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	
BATH BY INSTALLING CONTRACTOR 50 ☒ 3.5	
ENS-2 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)	

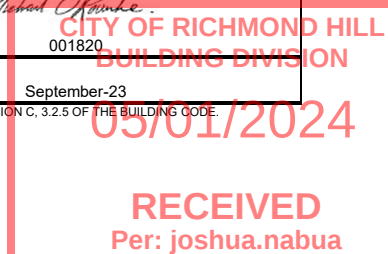
LOCATION OF INSTALLATION	
Lot: Concession	
Township Plan:	
Address City of Richmond Hill	
Roll # Building Permit # Building Division	
BUILDER:	HVAC REVIEWED
Name: PXV	
Address: Initials:	
City:	
Telephone #: Fax #:	

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-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

Michael O'Rourke



CSA F280-12 Residential Heat Loss and Heat Gain Calculations																																																												
Formula Sheet (For Air Leakage / Ventilation Calculation)																																																												
LO#: 102632		Model: VILLA 2		Builder: GREENPARK HOMES																																																								
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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>1144</td><td>9</td><td>9724</td></tr> <tr><td>First</td><td>1144</td><td>10</td><td>11554.4</td></tr> <tr><td>Second</td><td>1355</td><td>9</td><td>12330.5</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>33,608.9 ft³</td></tr> <tr><td colspan="3" style="text-align: right;">Total:</td><td>951.7 m³</td></tr> </tbody> </table>			Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)	Bsmt	1144	9	9724	First	1144	10	11554.4	Second	1355	9	12330.5	Third	0	9	0	Fourth	0	9	0	Total:			33,608.9 ft³	Total:			951.7 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%;">0.354</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	0.354	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
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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																																																									
$HL_{airb} = LR_{airh} \times \frac{V_b}{3.6} \times DTD_h \times 1.2$ 0.354 x 264.36 x 43 °C x 1.2 = 4851 W = 16550 Btu/h			$HG_{salb} = LR_{airc} \times \frac{V_b}{3.6} \times DTD_c \times 1.2$ = 0.110 x 264.36 x 7 °C x 1.2 = 249 W = 849 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">16,550</td><td>8,495</td><td>0.974</td></tr> <tr><td>2</td><td>0.3</td><td>10,984</td><td>0.452</td></tr> <tr><td>3</td><td>0.2</td><td>12,188</td><td>0.272</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	16,550	8,495	0.974	2	0.3	10,984	0.452	3	0.2	12,188	0.272	4	0	0	0.000	5	0	0	0.000																														
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*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

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Per: joshua.nabua

HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: VILLA 2	BUILDER: GREENPARK HOMES
SFQT: 2487	LO# 102632 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):	33608.9	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD (Btu/h/ft²):	1.50	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	5.5 ft
LENGTH: 54.0 ft	WIDTH: 29.0 ft	EXPOSED PERIMETER:	166.0 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



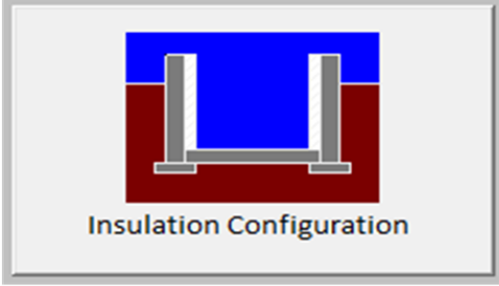
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BUILDING DIVISION

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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):	8.8	
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):		1648

TYPE: VILLA 2
LO# 102632

Michael O'Rourke BCIN #19669

CITY OF RICHMOND HILL
BUILDING DIVISION

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HVAC REVIEWEDInitials: PXV

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):	951.7			
Air Leakage/Ventilation				
Air Tightness Type:	Present (1961-) (3.57 ACH)			
Custom BDT Data:	ELA @ 10 Pa.	1268.6 cm ²		
	3.57	ACH @ 50 Pa		
Mechanical Ventilation (L/s):	Total Supply	Total Exhaust		
	37.5	37.5		
Flue Size				
Flue #:	#1	#2	#3	#4
Diameter (mm):	0	0	0	0
Natural Infiltration Rates				
Heating Air Leakage Rate (ACH/H):	0.354			
Cooling Air Leakage Rate (ACH/H):	0.110			

TYPE: VILLA 2

LO# 102632

Michael O'Rourke BCIN# 19669

CITY OF RICHMOND HILL
BUILDING DIVISION

05/01/2024

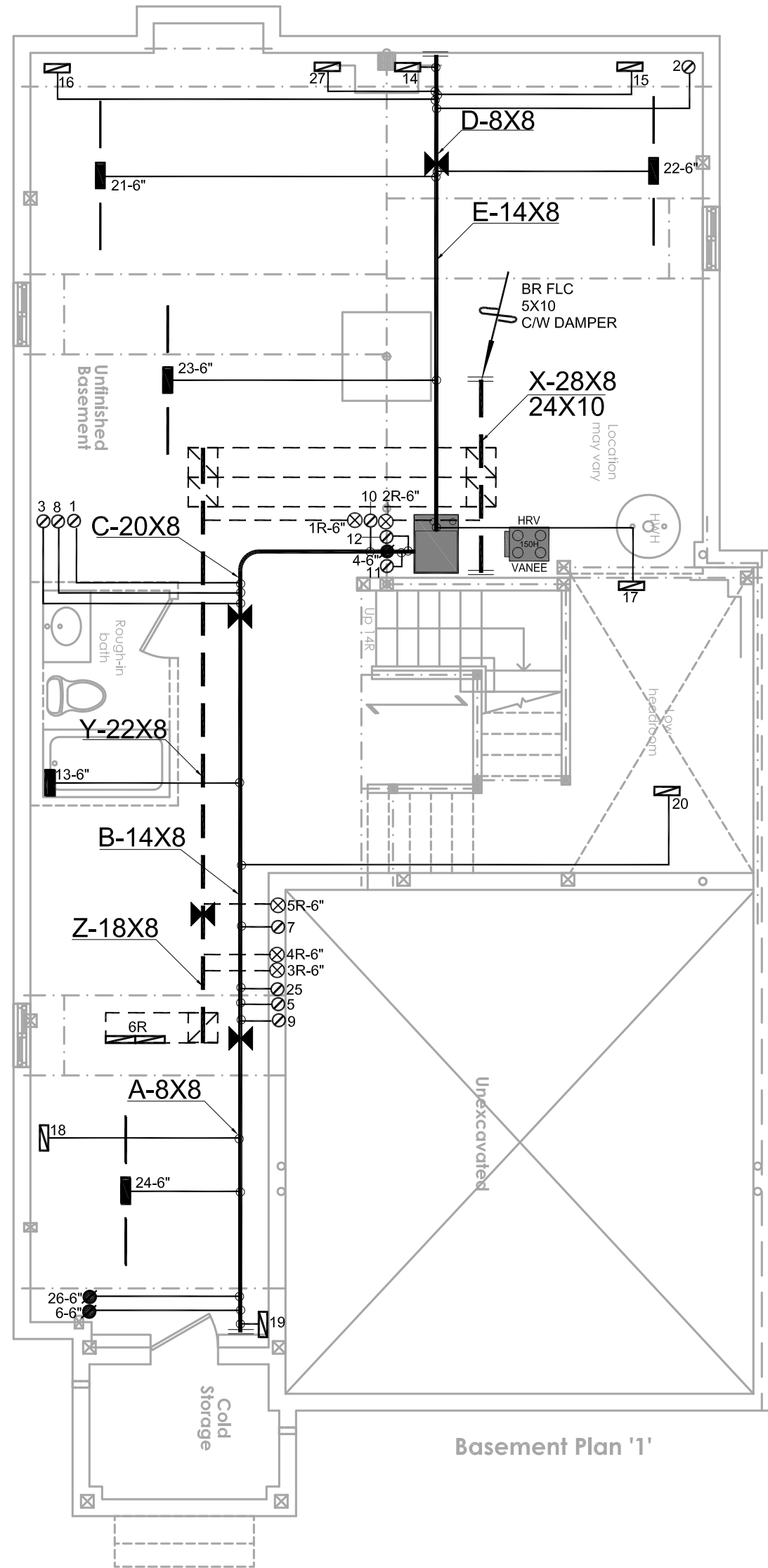
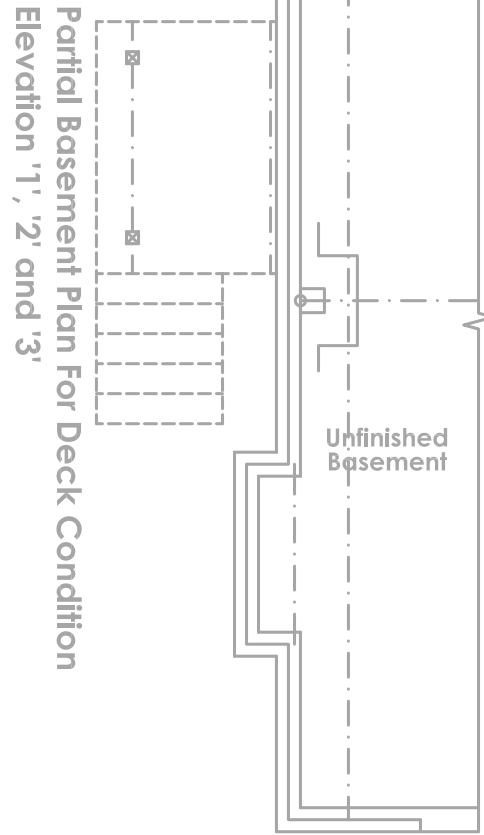
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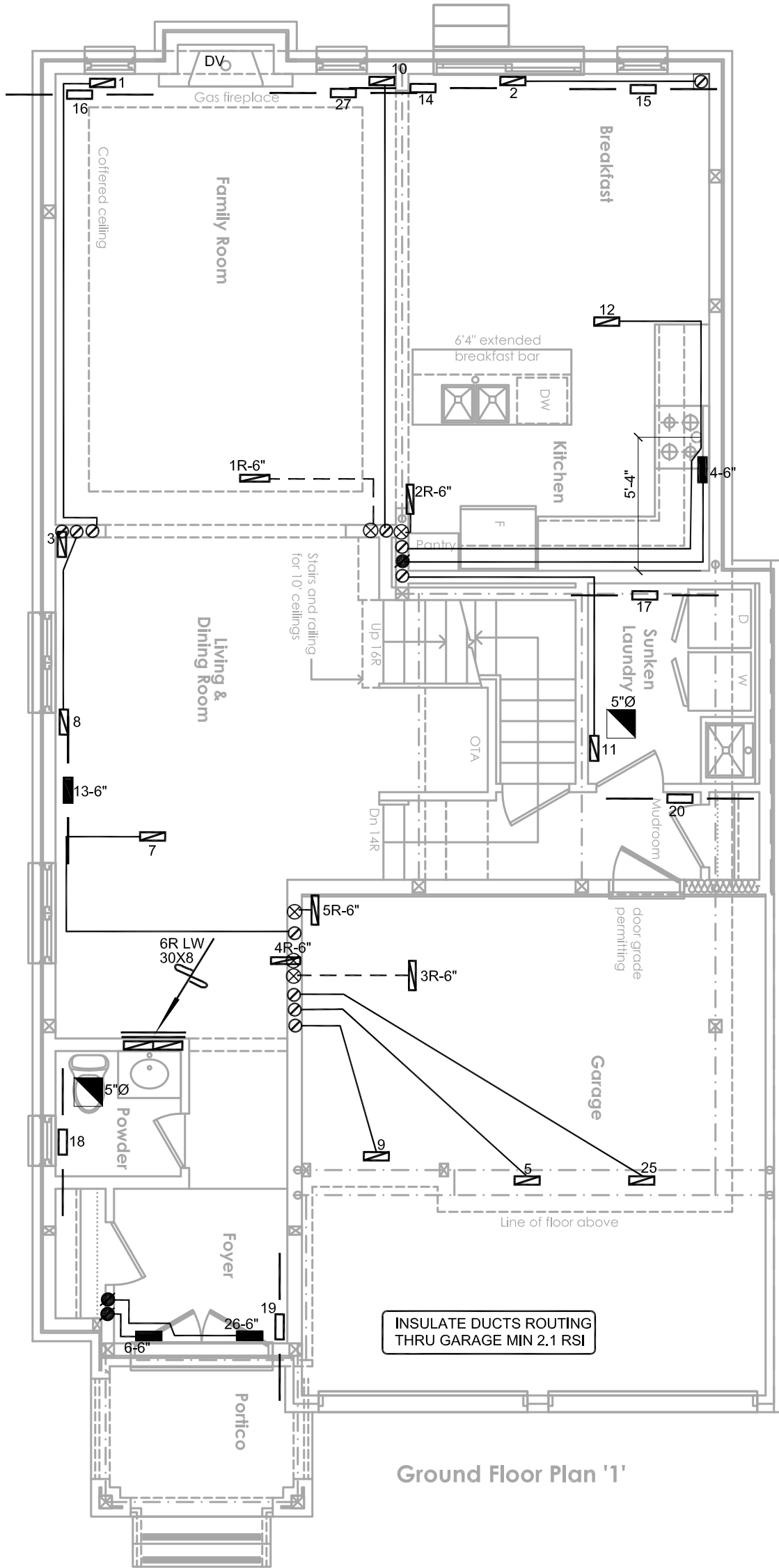
INSTALLATION TO COMPLY WITH THE LATEST ONTARIO BUILDING CODE. ALL SUPPLY BRANCH OUTLETS SHALL BE EQUIPPED WITH MANUAL BALANCING DAMPER. DUCTWORK WHICH PASSES THROUGH THE GARAGE OR UNHEATED SPACES SHALL BE ADEQUATELY INSULATED AND GAS-PROOFED

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.



- 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)



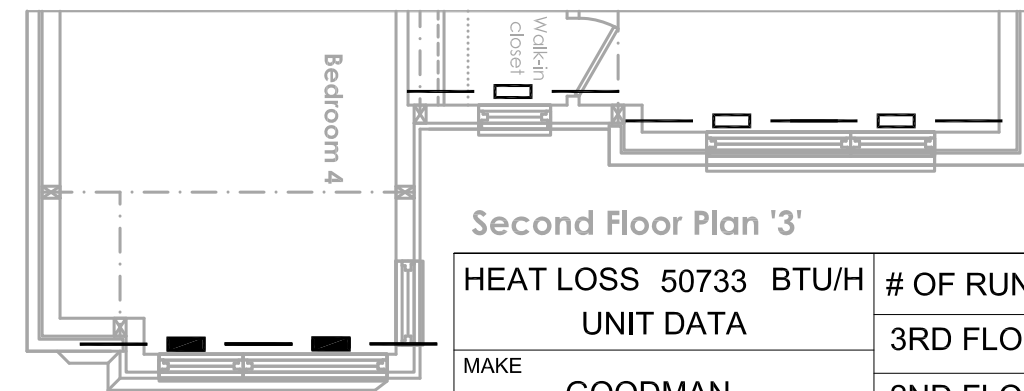
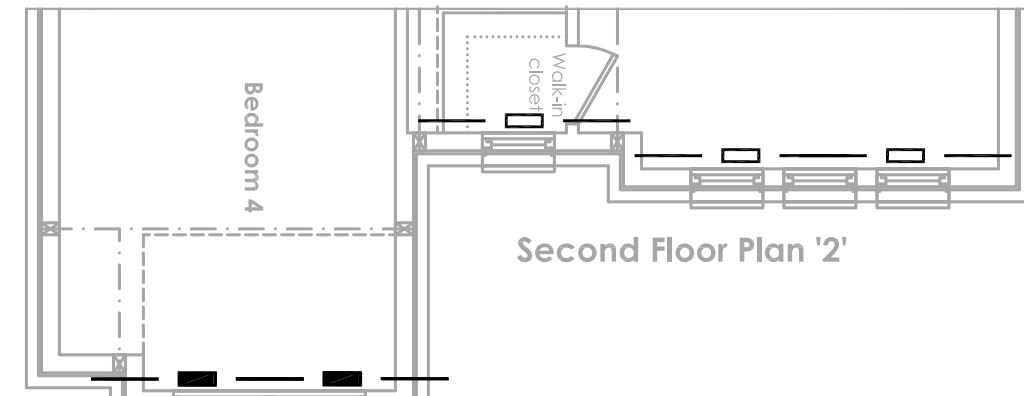
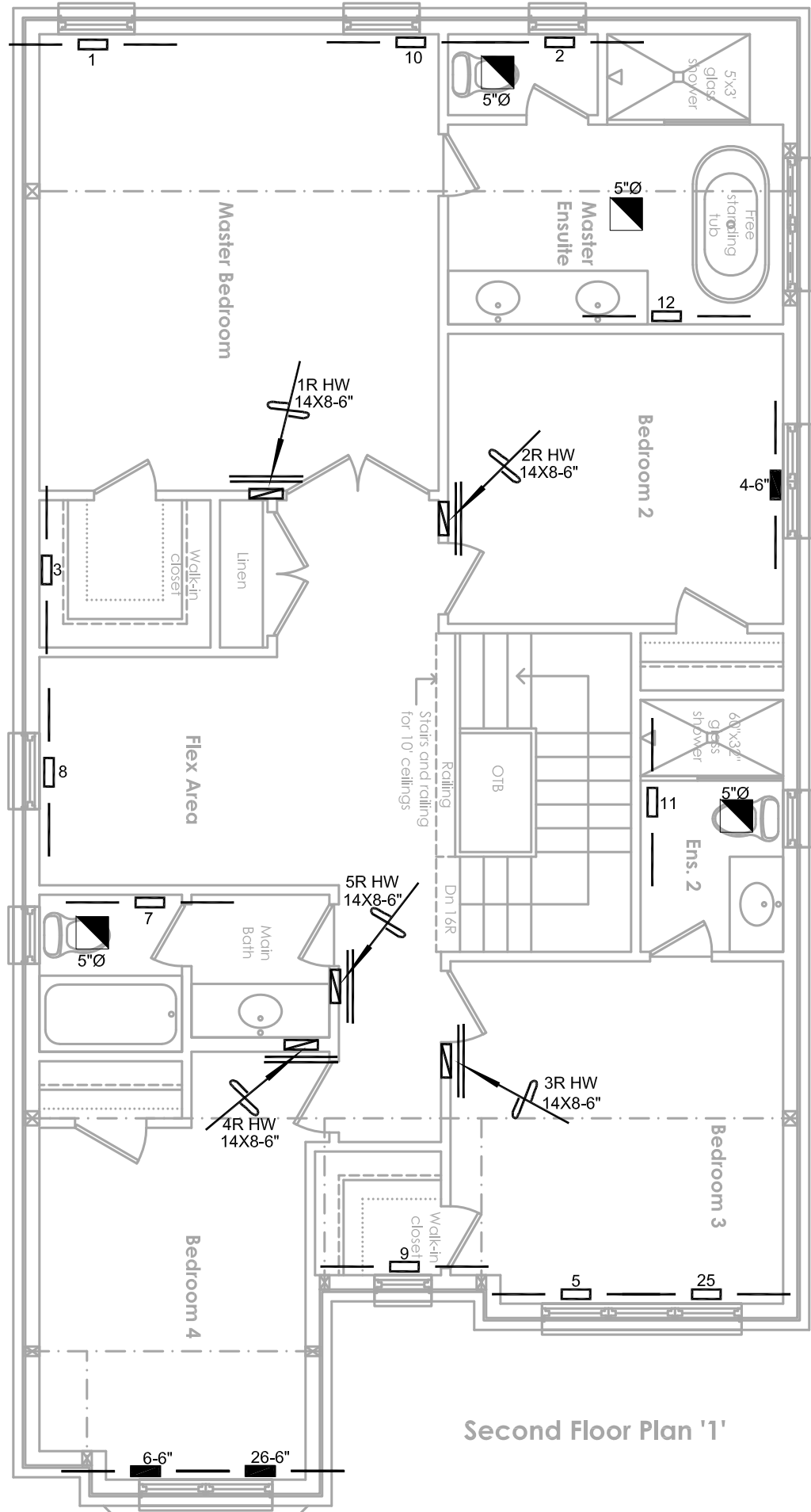
7. Combustion air supply shall be provided to the furnace and hot water tank.

- 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.



HEAT LOSS 50733 BTU/H	# OF RUNS	S/A	R/A	FANS
UNIT DATA	3RD FLOOR			
MAKE GOODMAN	2ND FLOOR	14	5	4
MODEL GMEC960603BNA	1ST FLOOR	9	1	3
INPUT 60 MBTU/H	BASEMENT	4	1	0
OUTPUT 57.6 MBTU/H				
COOLING 2.5 TONS				
FAN SPEED 978 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
	REDUCER
	SUPPLY DUCTWORK
	RETURN DUCTWORK
	FLEX DUCT
	EXHAUST FAN
	LT LIN 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 and is qualified under division C.22.5 of the building code.

HVACDESIGNS LTD.
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Web: www.hvacedesigns.ca
Specializing in Residential Mechanical Design Services

Client	GREENPARK HOMES
Project Name	TRINIGROUP RICHMOND HILL, ONTARIO
	VILLA 2
	2487 SQFT
Sheet Title	HVAC
Drawn By	HR
Scale	3/16"=1'-0"
Date	SEPTEMBER 2023
LO #	102632

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Per: joshua.nabul