

SITE NAME: TRINIGROUP				WOB				DATE: Sep-23				WINTER NATURAL AIR CHANGE RATE 0.377				HEAT LOSS ΔT °F. 78				CSA-F280-12			
BUILDER: GREENPARK HOMES				TYPE: VILLA 2				GFA: 2487				SUMMER NATURAL AIR CHANGE RATE 0.118				HEAT GAIN ΔT °F. 13				SB-12 PACKAGE A1			
ROOM USE				MBR				ENS				WIC				BED-2				BED-3			
EXP. WALL				32				24				5				12				26			
CLG. HT.				9				9				9				9				9			
FACTORS																							
GRS.WALL AREA				291				218				46				109				237			
GLAZING				LOSS GAIN				LOSS GAIN				LOSS GAIN				LOSS GAIN				LOSS GAIN			
NORTH				21.8 16.0				0 0 0				16 349 256				0 0 0				0 0 0			
EAST				21.8 41.6				0 0 0				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			
WEST				21.8 41.6				28 610 1163				7 152 291				0 0 0				0 0 0			
SKYLT.				38.1 101.5				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			
NET EXPOSED WALL				4.6 0.8				263 1202 198				195 893 147				46 208 34				93 426 70			
NET EXPOSED BSMT WALL ABOVE GR				3.7 0.6				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			
NO ATTIC EXPOSED CLG				2.8 1.3				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				168 439 72			
BASEMENT/CRAWL HEAT LOSS								0				0				0				0			
SLAB ON GRADE HEAT LOSS								0				0				0				0			
SUBTOTAL HT LOSS				2150				1588				259				969				2429			
SUB TOTAL HT GAIN				1512				780				57				413				1981			
LEVEL FACTOR / MULTIPLIER				0.20 0.29				0.20 0.29				0.20 0.29				0.20 0.29				0.20 0.29			
AIR CHANGE HEAT LOSS				623				460				75				280				703			
AIR CHANGE HEAT GAIN				107				55				4				29				140			
DUCT LOSS				0				0				0				0				313			
DUCT GAIN				0				0				0				0				288			
HEAT GAIN PEOPLE				240				2				480				0				1			
HEAT GAIN APPLIANCES/LIGHTS				514				0				0				514				514			
TOTAL HT LOSS BTU/H				2772				2048				334				1249				3445			
TOTAL HT GAIN x 1.3 BTU/H				3398				1086				80				1555				4111			

ROOM USE			DN/LV		KT/BF		FAM		LAUN		PWD		FOY		MUD		WOB		BAS		
EXP. WALL			34		34		36		11		32		5		15		37		129		
CLG. HT.			10		10		10		10		10		10		10		9		9		
FACTORS																					
GRS.WALL AREA			343		343		364		111		323		51		152		315		710		
LOSS GAIN			LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		
GLAZING																					
NORTH			21.8	16.0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	741	543	3
EAST			21.8	41.6	0	0	0	0	0	0	0	0	0	16	349	665	0	0	0	0	65
SOUTH			21.8	24.9	44	958	1096	0	0	0	0	0	7	152	174	0	0	0	0	0	131
WEST			21.8	41.6	0	0	0	56	1220	2327	22	479	914	0	0	0	0	0	0	0	149
SKYLT.			38.1	101.5	0	0	0	0	0	0	0	0	0	0	0	0	0	24	523	997	0
DOORS			20.5	3.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NET EXPOSED WALL			4.6	0.8	299	1368	225	287	1313	216	342	1561	257	111	508	84	316	1445	238	21	431
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	71
EXPOSED CLG			1.3	0.6	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
EXPOSED FLOOR			2.6	0.4	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					2326		2533		2040		508		1597		953		1027		440		2292
SUB TOTAL HT GAIN						1321		2543		1171		84		412		764		169		1733	503
LEVEL FACTOR / MULTIPLIER			0.30	0.48			0.30	0.48	0.30	0.48	0.30	0.48	0.30	0.48	0.30	0.48	0.30	0.48	0.50	1.22	
AIR CHANGE HEAT LOSS					1121		1221		983		245		770		459		495				8822
AIR CHANGE HEAT GAIN						94		180		83		6		29		54		12			158
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		0
HEAT GAIN APPLIANCES/LIGHTS						514		514		514		514		514		0		0		0	514
TOTAL HT LOSS BTU/H					3447		3753		3023		752		2367		1412		1522		2876		13167
TOTAL HT GAIN x 1.3 BTU/H						2507		4208		2298		785		573		1064		235		2253	1501

SITE NAME: TRINIGROUP
BUILDER: GREENPARK HOMESWOB
TYPE: VILLA 2

DATE: Sep-23

GFA: 2487 LO# 102633

HEATING CFM	978	COOLING CFM	978
TOTAL HEAT LOSS	48,894	TOTAL HEAT GAIN	31,639
AIR FLOW RATE CFM	20	AIR FLOW RATE CFM	30.91

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	5
R/A	0	0	5	1	1

plenum pressure s/a	0.17	r/a pressure	0.15
max s/a dif press. loss	0.01	r/a grille press. Loss	0.02
min adjusted pressure s/a	0.16	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.	1.39	1.02	0.33	1.25	1.72	1.65	0.66	1.35	0.68	1.39	0.73	1.02	3.45	1.88	1.88	1.51	0.75	2.37	1.41	1.52	3.21	3.21	3.21	3.21
CFM PER RUN HEAT	28	20	7	25	34	33	13	27	14	28	15	20	69	38	38	30	15	47	28	30	64	64	64	64
RM GAIN MBH.	1.70	0.54	0.08	1.55	2.06	1.91	0.38	0.76	0.72	1.70	0.28	0.54	2.51	2.10	2.10	1.15	0.78	0.57	1.06	0.24	0.76	0.76	0.76	0.76
CFM PER RUN COOLING	53	17	2	48	64	59	12	23	22	53	9	17	77	65	65	36	24	18	33	7	23	23	23	23
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	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH.	48	45	30	28	48	54	53	37	44	30	26	37	24	20	26	34	10	39	38	41	40	35	17	37
EQUIVALENT LENGTH	190	180	140	170	140	180	190	160	130	130	190	220	150	110	120	130	120	150	110	150	120	110	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	160	145	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	0.09	0.12	0.11	0.1	0.12	0.08	0.11	0.08	0.1	0.11	0.13	0.09
ROUND DUCT SIZE	5	4	4	5	5	6	4	4	4	5	4	4	5	5	5	4	4	5	4	4	5	5	5	5
HEATING VELOCITY (ft/min)	206	229	80	184	250	168	149	310	161	206	172	229	507	279	279	344	172	345	321	344	470	470	470	470
COOLING VELOCITY (ft/min)	389	195	23	352	470	301	138	264	252	389	103	195	565	477	477	413	275	132	379	80	169	169	169	169
OUTLET GRILL SIZE	3X10	3X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10
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	28
ROOM NAME	BED-3	BED-4	FAM	BAS
RM LOSS MBH.	1.72	1.65	1.51	3.21
CFM PER RUN HEAT	34	33	30	64
RM GAIN MBH.	2.06	1.91	1.15	0.76
CFM PER RUN COOLING	64	59	36	23
ADJUSTED PRESSURE	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH.	52	58	22	26
EQUIVALENT LENGTH	150	210	110	140
TOTAL EFFECTIVE LENGTH	202	268	132	166
ADJUSTED PRESSURE	0.08	0.06	0.12	0.09
ROUND DUCT SIZE	5	6	4	5
HEATING VELOCITY (ft/min)	250	168	344	470
COOLING VELOCITY (ft/min)	470	301	413	169
OUTLET GRILL SIZE	3X10	4X10	3X10	3X10
TRUNK	B	A	D	D

SUPPLY AIR TRUNK SIZE								RETURN AIR TRUNK SIZE							
TRUNK	STATIC	ROUND	RECT	VELOCITY				TRUNK	STATIC	ROUND	RECT	VELOCITY			
CFM	PRESS.	DUCT	DUCT	(ft/min)				CFM	PRESS.	DUCT	DUCT	(ft/min)			
TRUNK A	205	0.06	8.3	8	x	8	461	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	399	0.06	10.7	14	x	8	513	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	549	0.06	12	20	x	8	494	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	220	0.07	8.2	8	x	8	495	TRUNK J	0	0.00	0	0	x	8	0
TRUNK E	427	0.07	10.5	14	x	8	549	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 #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
AIR VOLUME	100	113	85	85	85	350	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
ACTUAL DUCT LGH.	53	29	66	61	60	49	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EQUIVALENT LENGTH	185	135	225	195	190	240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL EFFECTIVE LH	238	164	291	256	250	289	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
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	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36
ROUND DUCT SIZE	6.4	6	6	6	6	10.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INLET GRILL SIZE	8	8	8	8	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INLET GRILL SIZE	X	X	X	X	X	X	X	X	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	0	0	0	0	0	0	0	0	0

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
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	978	0.05	15.6	28	x	8	629
TRUNK Y	705	0.05	13.8	22	x	8	577
TRUNK Z	520	0.05	12.3	18	x	8	520
DROP	978	0.05	15.6	24	x	10	687

CITY OF RICHMOND HILL
BUILDING DIVISION

05/01/2024

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Per: joshua.nabua

TYPE: VILLA 2
SITE NAME: TRINIGROUPLO # 102633
WOB

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
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: 
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'ROURKECITY OF RICHMOND HILL
BUILDING DIVISION

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#: 102633	Model: VILLA 2	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>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: 70%;">WINTER NATURAL AIR CHANGE RATE</td> <td style="width: 30%;">0.377</td> </tr> <tr> <td>SUMMER NATURAL AIR CHANGE RATE</td> <td>0.118</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	0.377	SUMMER NATURAL AIR CHANGE RATE	0.118	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	1144	9	9724																																																									
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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																																																									
$HL_{airb} = LR_{airh} \times \frac{V_b}{3.6} \times DTD_h \times 1.2$ 0.377 x 264.36 x 43 °C x 1.2 = 5171 W = 17644 Btu/h			$HG_{salb} = LR_{airc} \times \frac{V_b}{3.6} \times DTD_c \times 1.2$ = 0.118 x 264.36 x 7 °C x 1.2 = 265 W = 905 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 / HL_{clevel})</th> </tr> </thead> <tbody> <tr><td>1</td><td>0.5</td><td rowspan="5" style="text-align: center; vertical-align: middle;">17,644</td><td>7,221</td><td>1.222</td></tr> <tr><td>2</td><td>0.3</td><td>10,984</td><td>0.482</td></tr> <tr><td>3</td><td>0.2</td><td>12,188</td><td>0.290</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 / HL _{clevel})	1	0.5	17,644	7,221	1.222	2	0.3	10,984	0.482	3	0.2	12,188	0.290	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

RECEIVED
Per: joshua.nabua

HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: VILLA 2	WOB	BUILDER: GREENPARK HOMES
SFQT: 2487	LO# 102633	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):	1.27	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:	129.0 ft
WOB INSULATION CONFIGURATION	SCB_9	WOB EXPOSED PERIMETER	37.0 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



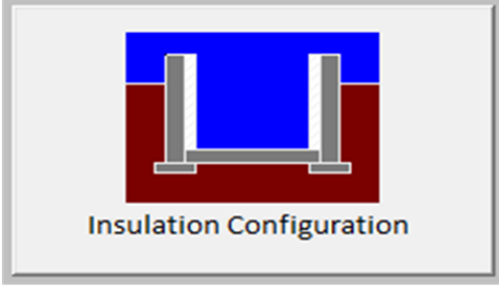
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BUILDING DIVISION

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):	4.6	 Insulation Configuration
Floor Width (m):	8.8	
Exposed Perimeter (m):	39.3	
Wall Height (m):	2.6	
Depth Below Grade (m):	1.38	
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):		672

TYPE: VILLA 2
LO# 102633

WOB

Michael O'Rourke BCIN #19669

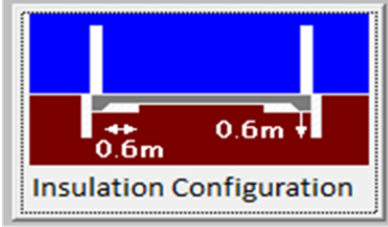
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Residential Slab on Grade Thermal Load Calculator

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		
Length (m):	1.5	
Width (m):	8.2	
Exposed Perimeter (m):	11.3	
Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Results		
Heating Load (Watts):		129

TYPE: VILLA 2
LO# 102633

WOB

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):	8.44			
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):	0.377			
Cooling Air Leakage Rate (ACH/H):	0.118			

TYPE: VILLA 2
LO# 102633

WOB

Michael O'Rourke BCIN# 19669

CITY OF RICHMOND HILL
BUILDING DIVISION

05/01/2024

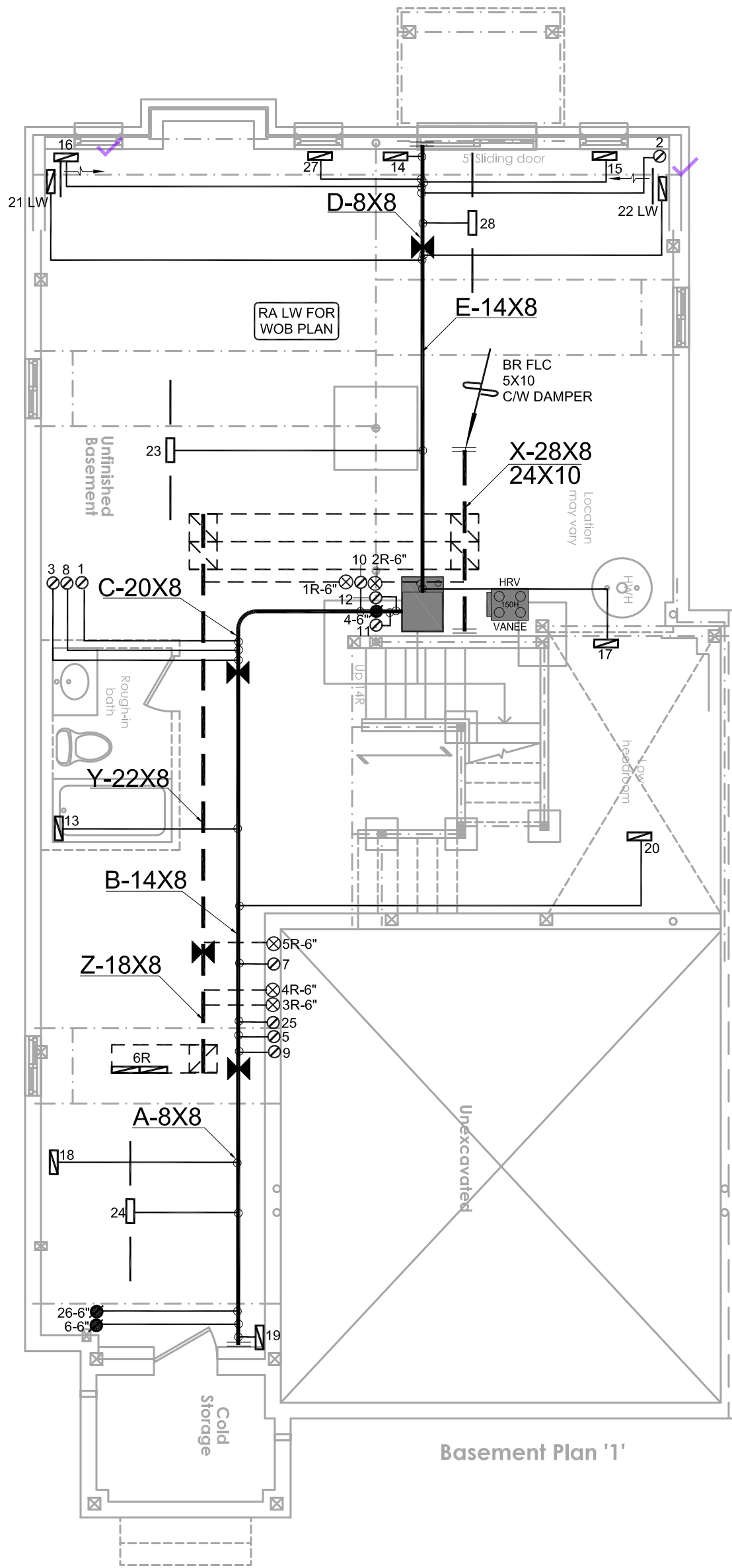

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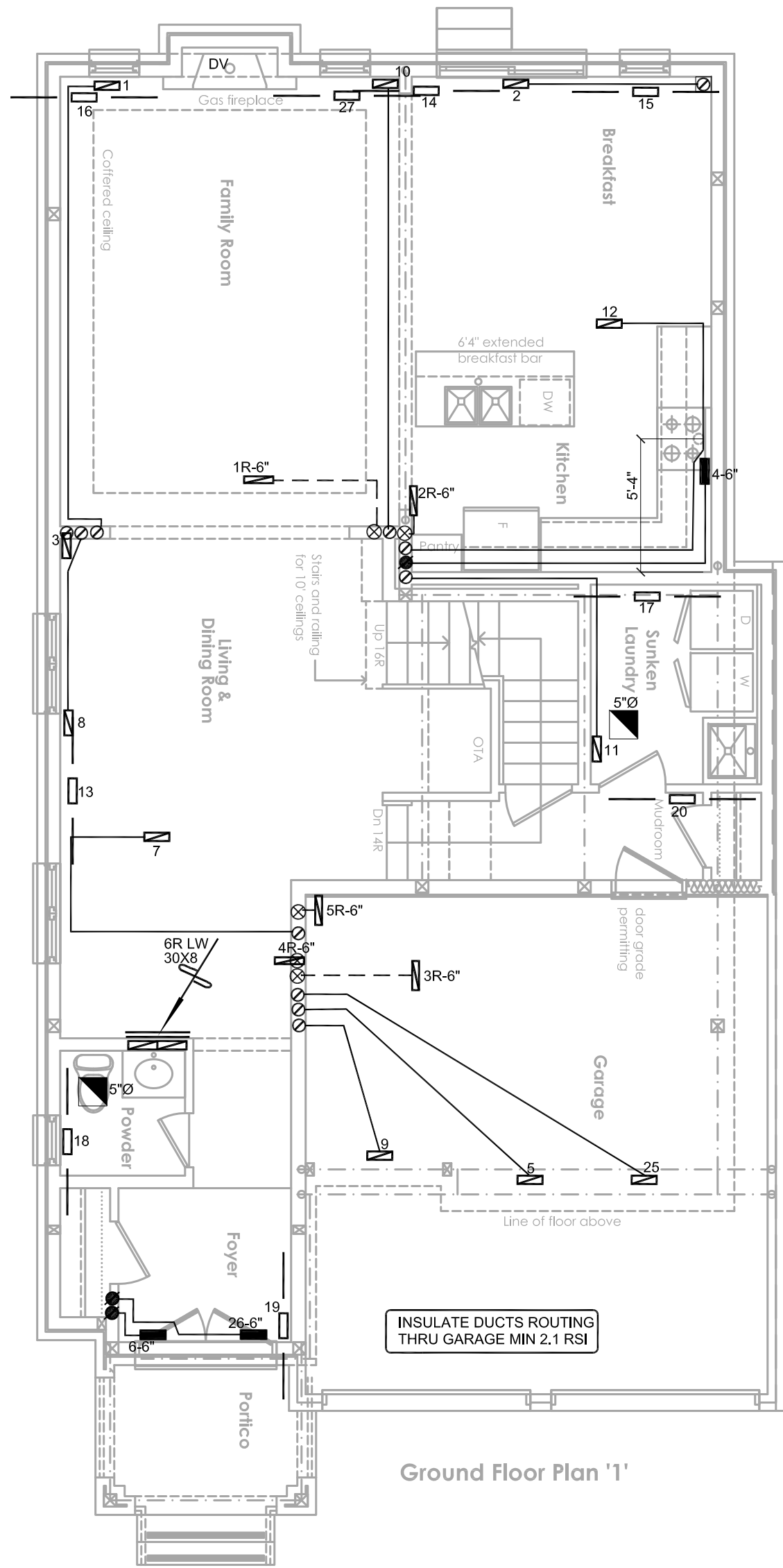
INSTALLATION TO COMPLY WITH THE LATEST ONTARIO BUILDING CODE. ALL SUPPLY BRANCH OUTLETS SHALL BE EQUIPPED WITH MANUAL BALANCING DAMPER. DUCTWORK WHICH PASSES THROUGH THE GARAGE OR UNHEATED SPACES SHALL BE ADEQUATELY INSULATED AND GAS-PROOFED

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)

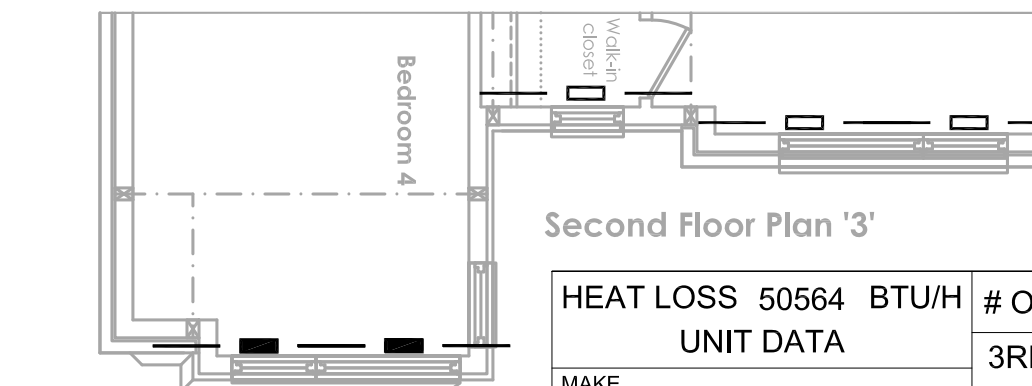
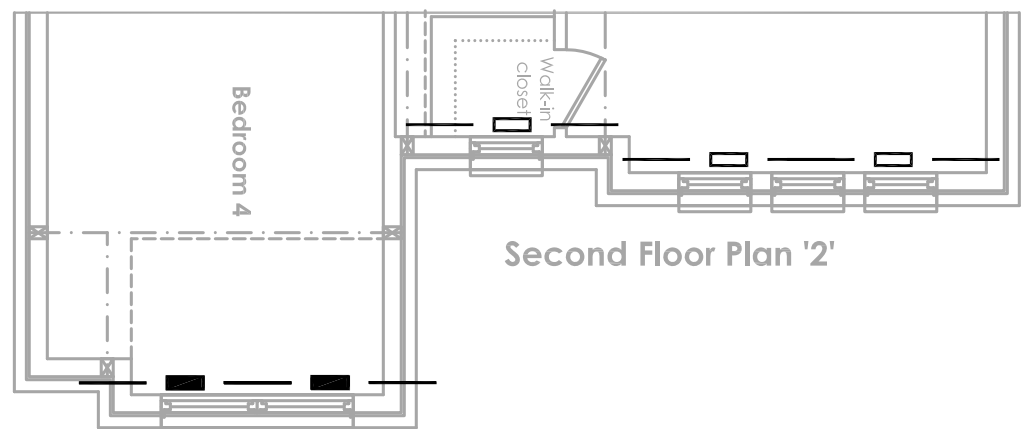
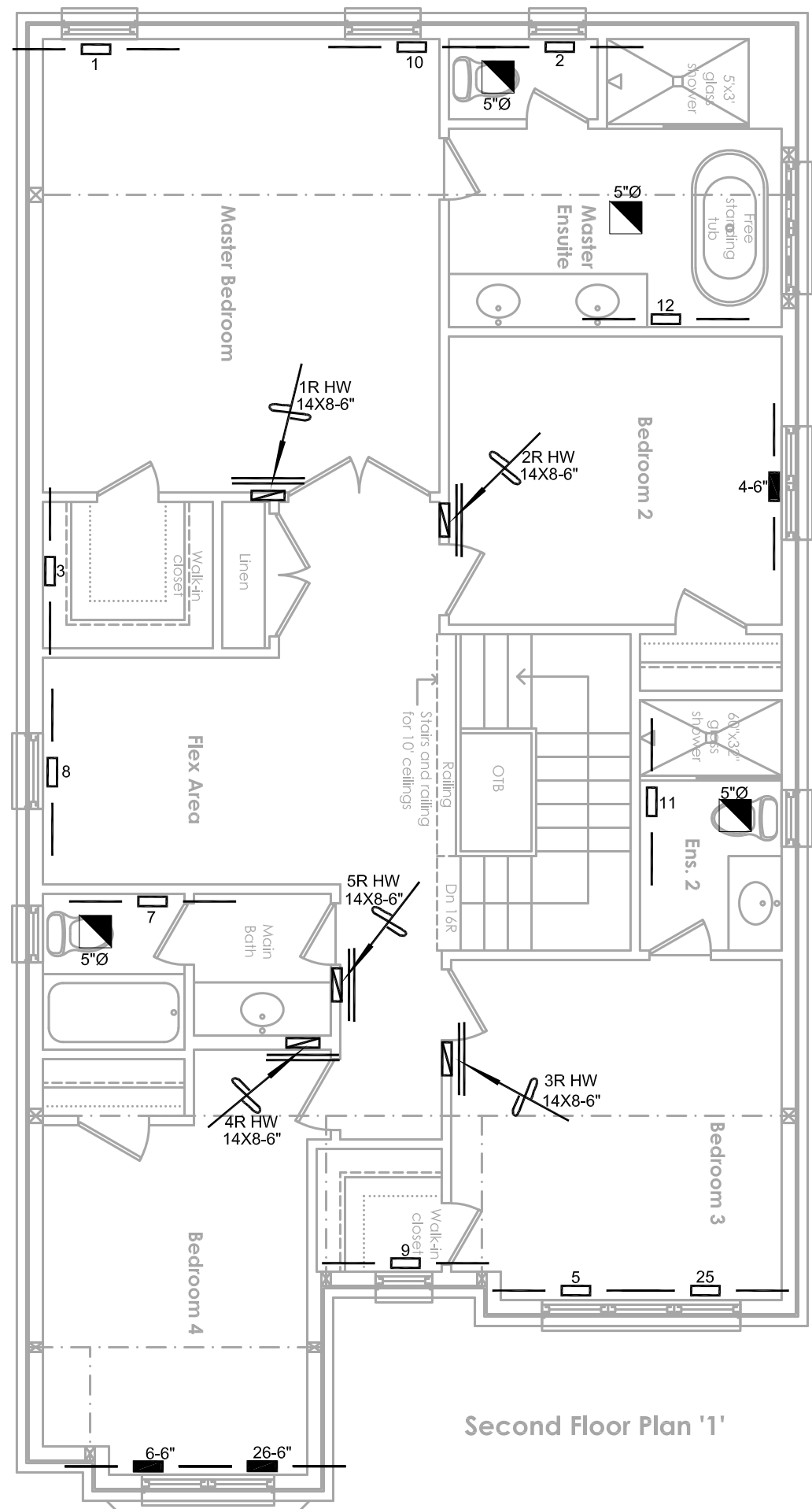
9. HRV duct connection shall be in compliance with OBC 2012 Div.B 9.32.3.6(3) & 9.32.3.4(7).

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	50564 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	5	1	0
OUTPUT	57.6 MBTU/H				
COOLING	2.5 TONS				
FAN SPEED	978 cfm @ 0.6" w.c.				

WOB

HVAC LEGEND	
	SUPPLY AIR GRILLE
	SUPPLY AIR GRILLE 6\"/>
	LINEAR BAR or LINEAR SLOT GRILLE
	SUPPLY AIR BOOT ABOVE
	6\"/>
	SUPPLY AIR STACK
	6\"/>
	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

ISSUED FOR PERMIT		SEPT/23
Revision		Date
SB-12 PACKAGE		A1
Michael O'Rourke has reviewed and take responsibility for the design work and am qualified under division C.2.2.5 of the building code.		
		
Michael O'Rourke BCIN# 19889 HWAC 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
VILLA 2 - WOB
2487 SQFT

Sheet Title: HVAC
Drawn By: HR
Scale: 3/16"=1'-0"
Date: SEPTEMBER 2023
LO #: 102633

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