HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 Ajax, ON L1S 2E2
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MHP 23034

SITE NAME: ZADORRA ESTATES INC — WOB — DATE: Jul-23 — WINTER NATURAL AIR CHANGE RATE 0.365 — HEAT LOSS ΔT °F. 74 — CSA-F280-12
BUILDER: GREENPARK HOMES — TYPE: VIELA 2 — GFA: 2487 — LO# 101806 — SUMMER NATURAL AIR CHANGE RATE 0.100 — HEAT GAIN ΔT °F. 11 — SB-12 PACKAGE A1

ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4			BATH			FLEX			WIC-2			ENS-2		
EXP. WALL			32			24			0			12			26			34			6			8			5			9		
CLG. HT.			9			9			9			9			9			9			9			9			9			9		
	FACTORS																															
GRS.WALL AREA	LOSS	GAIN	291			211			0			109			237			309			55			73			46			82		
GLAZING				LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN
NORTH	20.8	15.5	0	0	0	16	332	248	0	0	0	16	332	248	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	145	108
EAST	20.8	41.0	0	0	0	0	0	0	0	0	0	0	0	0	40	831	1642	35	727	1437	0	0	0	0	0	0	10	208	410	0	0	0
SOUTH	20.8	24.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	145	171	11	229	268	0	0	0	0	0	0
WEST	20.8	41.0	28	582	1149	7	145	287	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.	36.4	100.7	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	19.6	2.9	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	4.4	0.6	263	1147	170	195	851	126	46	198	29	93	406	60	197	857	127	274	1196	177	48	207	31	62	269	40	36	155	23	75	326	48
NET EXPOSED BSMT WALL ABOVE GR	3.5	0.5	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
EXPOSED CLG	1.3	0.6	257	322	143	148	185	82	39	49	22	148	185	82	168	210	94	130	163	72	64	80	36	276	346	154	26	33	14	54	68	30
NO ATTIC EXPOSED CLG	2.7	1.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	110	49	0	0	0	0	0	0	0	0	0	0	0	0
EXPOSED FLOOR	2.5	0.4	0	0	0	0	0	0	0	0	0	0	0	0	168	418	62	9	22	3	4	10	1	27	67	10	26	65	10	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				2051			1515			247			924			2316			2218			443			911			460			539	
SUB TOTAL HT GAIN					1463			744			51			390			1925			1739			239			472			457			187
LEVEL FACTOR / MULTIPLIER			0.20	0.28		0.20	0.28		0.20	0.28		0.20	0.28		0.20	0.28		0.20	0.28		0.20	0.28		0.20	0.28		0.20	0.28		0.20	0.28	
AIR CHANGE HEAT LOSS				574			424			69			259			649			621			124			255			129			151	
AIR CHANGE HEAT GAIN					82			42			3			22			108			98			13			27			26			10
DUCT LOSS				0			0			0			0			297			284			57			117			59			0	
DUCT GAIN					0			0			0			0			279			259			25			50			48			0
HEAT GAIN PEOPLE	240		2		480	0		0	0		0	1		240	1		240	1		240	0		0	0		0	0		0	0		0
HEAT GAIN APPLIANCES/LIGHTS					514			0			0			514			514			514			0			0			0			0
TOTAL HT LOSS BTU/H				2625			1939			316			1183			3262			3123			624			1282			647			690	
TOTAL HT GAIN x 1.3 BTU/H					3300			1021			70			1516			3985			3704			360			713			691			256

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	LOSS	GAIN		343			343			364			111			323			51			152					315			710		
GLAZING					LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN				LOSS	GAIN		LOSS	GAIN
NORTH	20.8	15.5		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			34	706	526	3	62	46
EAST	20.8	41.0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	332	657	0	0	0			0	0	0	0	0	0
SOUTH	20.8	24.4		44	914	1073	0	0	0	0	0	0	0	0	0	7	145	171	0	0	0	0	0	0			0	0	0	6	125	146
WEST	20.8	41.0		0	0	0	56	1163	2299	22	457	903	0	0	0	0	0	0	0	0	0	0	0	0			24	499	985	0	0	0
SKYLT.	36.4	100.7		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	19.6	2.9		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	548	81	21	411	61			0	0	0	21	411	61
NET EXPOSED WALL	4.4	0.6		299	1304	193	287	1252	186	342	1488	221	111	484	72	316	1378	204	7	28	4	131	569	84			257	1118	166	0	0	0
NET EXPOSED BSMT WALL ABOVE GR	3.5	0.5		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	387	1360	202
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	0	0
NO ATTIC EXPOSED CLG	2.7	1.2		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	2.5	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							2242	
SLAB ON GRADE HEAT LOSS					0			0			0			0			0			0			0					437				
SUBTOTAL HT LOSS					2219			2416			1945			484			1523			909			980					2760			4200	
SUB TOTAL HT GAIN						1267			2484			1124			72			375			742			145					1677			455
LEVEL FACTOR / MULTIPLIER				0.30	0.47		0.30	0.47		0.30	0.47		0.30	0.47		0.30	0.47		0.30	0.47		0.30	0.47							0.50	1.17	
AIR CHANGE HEAT LOSS					1034			1126			907			226			710			424			457								8137	
AIR CHANGE HEAT GAIN						71			140			63			4			21			42			8									120
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		0	0		0	0		0				0		0	0		0
HEAT GAIN APPLIANCES/LIGHTS						514			514			514			514			0			0			0					0				514
TOTAL HT LOSS BTU/H					3253			3541			2852			710			2233			1333			1436					2760			12337	
TOTAL HT GAIN x 1.3 BTU/H						2408			4079			2211			767			515			1019			199					2180			1416

TOTAL HEAT GAIN BTU/H: 30648 TONS: 2.55 LOSS DUE TO VENTILATION LOAD BTU/H: 1593 STRUCTURAL HEAT LOSS: 46146 TOTAL COMBINED HEAT LOSS BTU/H: 47738

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

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MHP 23034

SITE NAME: ZADORRA ESTATES INC
BUILDER: GREENPARK HOMES

V.C.B
TYPE: VILLA 2
DATE: Jul-23
GFA: 2487
LO# 101806

HEATING CFM	928	COOLING CFM	928	furnace pressure	0.6																			
TOTAL HEAT LOSS	46,146	TOTAL HEAT GAIN	30,411	furnace filter	0.05																			
AIR FLOW RATE CFM	20.11	AIR FLOW RATE CFM	30	a/c coil pressure	0.2																			
				lable pressure																				
				for s/a & r/a	0.35																			

#GOODMAN
GMEC960603BNA 60
FAN SPEED
LOW
MEDLOW
MEDIUM 928
MEDIUM HIGH 1017
HIGH 1131

AFUE = 96 %
INPUT (BTU/H) = 60,000
OUTPUT (BTU/H) = **57,600**
DESIGN CFM = **928**
CFM @ .6 " E.S.P.
TEMPERATURE RISE 57 °F

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

plenum pressure s/a	0.18	r/a pressure	0.17
max s/a dif press. loss	0.01	r/a grille press. Loss	0.02
min adjusted pressure s/a	0.17	adjusted pressure r/a	0.15

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.	1.31	0.97	0.32	1.18	1.63	1.56	0.62	1.28	0.65	1.31	0.69	0.97	3.25	1.77	1.77	1.43	0.71	2.23	1.33	1.44	3.02	3.02	3.02	3.02
CFM PER RUN HEAT	26	19	6	24	33	31	13	26	13	26	14	19	65	36	36	29	14	45	27	29	61	61	61	61
RM GAIN MBH.	1.65	0.51	0.07	1.52	1.99	1.85	0.36	0.71	0.69	1.65	0.26	0.51	2.41	2.04	2.04	1.11	0.77	0.51	1.02	0.20	0.72	0.72	0.72	0.72
CFM PER RUN COOLING	50	16	2	46	61	57	11	22	21	50	8	16	73	62	62	34	23	16	31	6	22	22	22	22
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
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	0.08	0.1	0.09	0.09	0.07	0.07	0.09	0.1	0.11	0.08	0.07	0.1	0.13	0.12	0.1	0.13	0.09	0.12	0.09	0.11	0.12	0.15	0.1
ROUND DUCT SIZE	5	4	4	**6**	5	**6**	4	4	4	4	4	4	5	5	5	4	4	4	4	4	5	5	5	5
HEATING VELOCITY (ft/min)	191	218	69	122	242	158	149	298	149	298	161	218	477	264	264	333	161	516	310	333	448	448	448	448
COOLING VELOCITY (ft/min)	367	184	23	235	448	291	126	252	241	574	92	184	536	455	455	390	264	184	356	69	162	162	162	162
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	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.	1.63	1.56	1.43	3.02
CFM PER RUN HEAT	33	31	29	61
RM GAIN MBH.	1.99	1.85	1.11	0.72
CFM PER RUN COOLING	61	57	34	22
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17
ACTUAL DUCT LGH.	52	58	22	26
EQUIVALENT LENGTH	150	210	110	140
TOTAL EFFECTIVE LENGTH	202	268	132	166
ADJUSTED PRESSURE	0.09	0.06	0.13	0.1
ROUND DUCT SIZE	5	**6**	4	5
HEATING VELOCITY (ft/min)	242	158	333	448
COOLING VELOCITY (ft/min)	448	291	390	162
OUTLET GRILL SIZE	3X10	4X10	3X10	3X10
TRUNK	B	A	D	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	195	0.06	8.2	8	x	8	439	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	381	0.06	10.5	14	x	8	490	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	522	0.06	11.8	18	x	8	522	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	210	0.08	7.8	8	x	8	473	TRUNK J	0	0.00	0	0	x	8	0
TRUNK E	407	0.08	10	12	x	8	611	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	928	0.05	15.3	28	x	8	597
TRUNK Y	680	0.05	13.7	22	x	8	556
TRUNK Z	515	0.05	12.3	18	x	8	515
DROP	928	0.05	15.3	24	x	10	557

RETURN AIR #	1	2	3	4	5	6										**BR**
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	85	95	85	80	80	350	0	0	0	0	0	0	0	0	0	153
PLENUM PRESSURE	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
ACTUAL DUCT LGH.	53	29	66	61	60	49	1	1	1	1	1	1	1	1	1	14
EQUIVALENT LENGTH	185	135	235	195	190	240	0	0	0	0	0	0	0	0	0	140
TOTAL EFFECTIVE LH	238	164	301	256	250	289	1	1	1	1	1	1	1	1	1	154
ADJUSTED PRESSURE	0.06	0.09	0.05	0.06	0.06	0.05	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.10
ROUND DUCT SIZE	6	5.6	6	5.9	5.9	10.6	0	0	0	0	0	0	0	0	0	6.6
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

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

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MHP 23034

TYPE: VILLA 2 LO # 101806
SITE NAME: ZADORRA ESTATES INC WOB

CORPORATION OF THE CITY OF OSHAWA
TRUE COPY
OF BUILDING RECORDS
Nov 14 2023
PER: _____
CHIEF BUILDING OFFICIAL

RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY

COMBUSTION APPLIANCES

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	74 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

150 cfm high 35 cfm low

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

LOCATION OF INSTALLATION

Lot: Concession
Township Plan:
Address
Roll # Building Permit #

BUILDER: GREENPARK HOMES

Name:
Address:
City:
Telephone #: Fax #:

INSTALLING CONTRACTOR

Name:
Address:
City:
Telephone #: Fax #:

DESIGNER CERTIFICATION

I hereby certify that this ventilation system has been designed in accordance with the Ontario Building Code.
Name: HVAC Designs Ltd.
Signature: Michael O'Rourke
HRAI # 001820
Date: July-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

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

MHP 23034

80-12 Residential Heat Loss and Heat Gain Calculations

ula Sheet (For Air Leakage / Ventiliation Calculation)

LO#: 101806 Model: VILLA 2 Builder: GREENPARK HOMES Date: 2023-07-14

Volume Calculation

House Volume

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

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.365
SUMMER NATURAL AIR CHANGE RATE	0.100

Design Temperature Difference

	Tin °C	Tout °C	ΔT °C	ΔT °F
Winter DTDh	22	-19	41	74
Summer DTDc	24	30	6	11

5.2.3.1 Heat Loss due to Air Leakage

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

0.365 x 264.36 x 41 °C x 1.2 = 4770 W

= **16274 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

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

= 0.100 x 264.36 x 6 °C x 1.2 = 194 W

= **663 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 74 °F x 1.08 x 0.25 = **1593 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 11 °F x 1.08 x 0.25 = **236 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	16,274	6,960	1.169
2	0.3		10,476	0.466
3	0.2		11,624	0.280
4	0		0	0.000
5	0		0	0.000

*HLairbv = Air leakage heat loss + ventilation heat loss
*For a balanced or supply only ventilation system HLairve = 0

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HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: VILLA 2 WOB **BUILDER:** GREENPARK HOMES
SFQT: 2487 **LO#** 101806 **SITE:** ZADORRA ESTATES INC

DESIGN ASSUMPTIONS

HEATING	°F	COOLING	°F
OUTDOOR DESIGN TEMP.	-2	OUTDOOR DESIGN TEMP.	86
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):	33608.9	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD ($Btu/h/ft^2$):	1.27	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	5.5 ft
LENGTH: 54.0 ft	WIDTH: 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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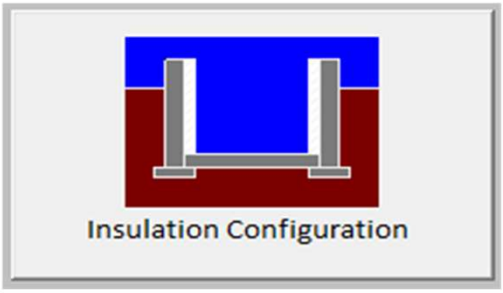
MHP 23034

Residential Fou[illegible]hermal Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description	
Province:	Ontario
Region:	Oshawa
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**	
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):	**657** ✓	

TYPE: VILLA 2 WOB
LO# 101806

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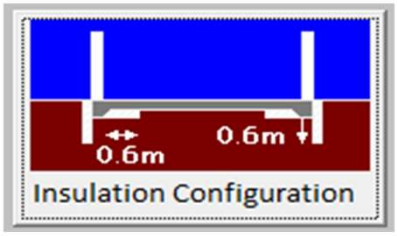
PER: _____
CHIEF BUILDING OFFICIAL

Residential Slab on Grade Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description	
Province:	Ontario
Region:	Oshawa
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):	**128** ✓

TYPE: VILLA 2 WOB
LO# 101806

Michael O'Rourke BCIN# 19669

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Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description	
Province:	Ontario
Region:	Oshawa
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 37.5 / Total Exhaust 37.5
Flue Size	
Flue #:	#1 #2 #3 #4
Diameter (mm):	0 0 0 0
Natural Infiltration Rates	
Heating Air Leakage Rate (ACH/H):	**0.365**
Cooling Air Leakage Rate (ACH/H):	**0.100**

TYPE: VILLA 2 WOB
LO# 101806

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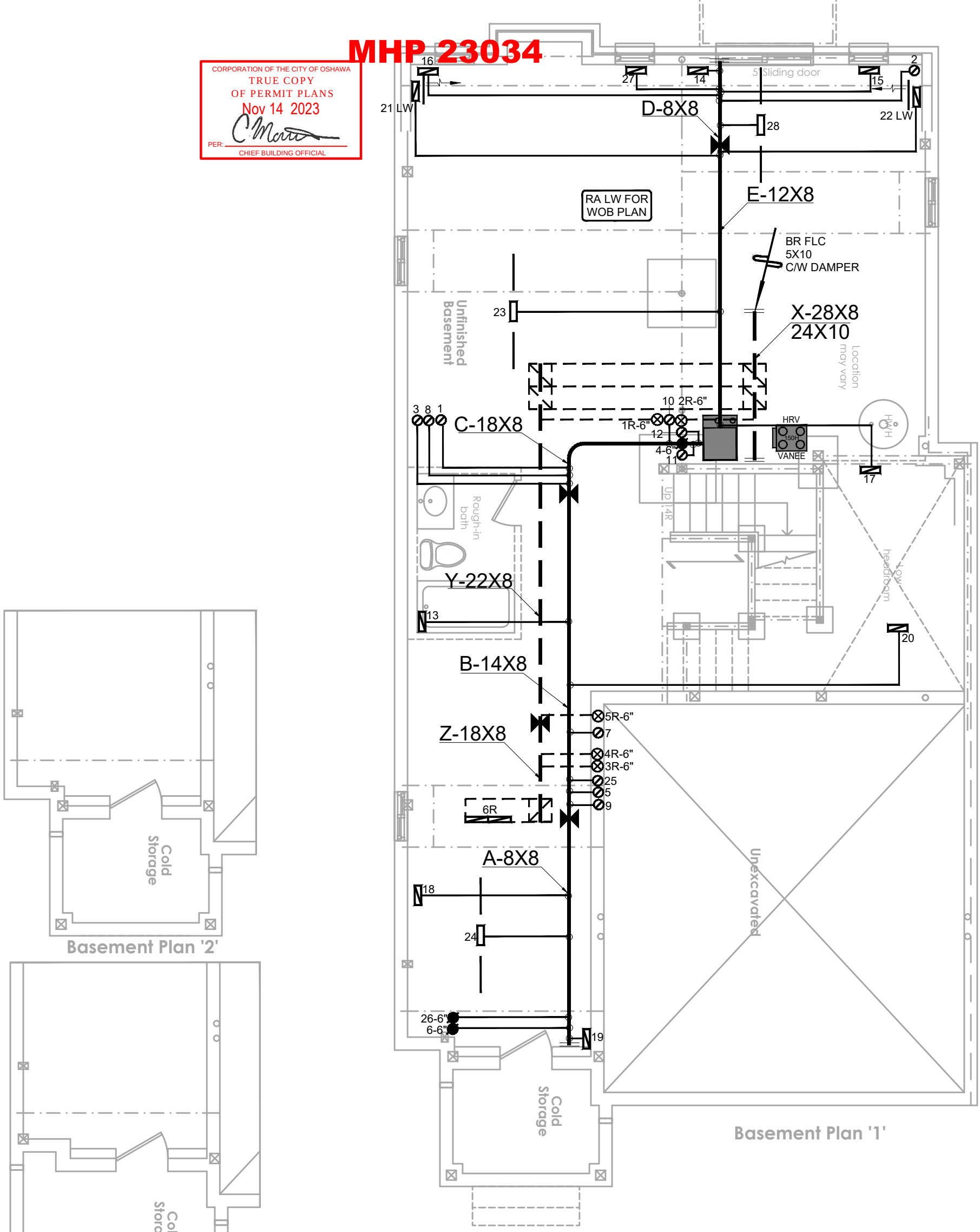

WOB

HVAC LEGEND							
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
3.		
2.		
1.		

REVISIONS

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 BCIN # 19669
HVAC Designs Ltd.

PACKAGE A1

Client
GREENPARK HOMES

Project Name
ZADORRA
OSHAWA, ONTARIO

WOB
VILLA 2 2487 sqft

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

HEAT LOSS 47738 BTU/H	
UNIT DATA	
MAKE	GOODMAN
MODEL	GMEC960603BNA
INPUT	60.0 MBTU/H
OUTPUT	57.6 MBTU/H
COOLING	2.5 TONS
FAN SPEED	928 cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	14	5	4
1ST FLOOR	9	1	3
BASEMENT	5	1	0

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

Sheet Title
BASEMENT HEATING LAYOUT

Date JULY/2023
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 101806

MHP 23034

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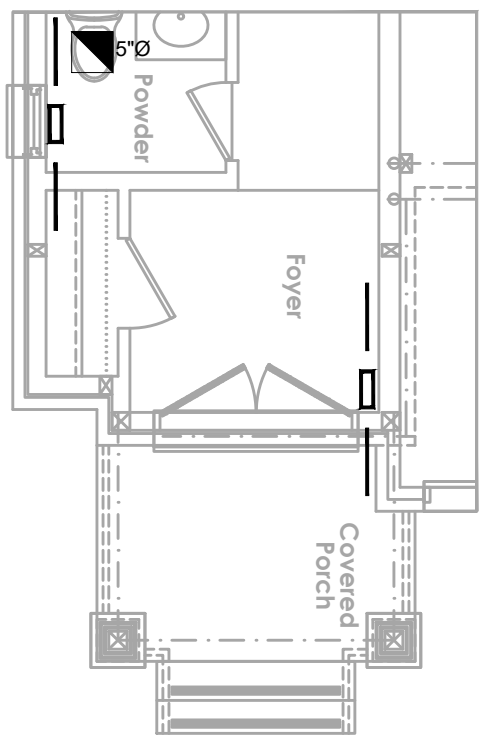
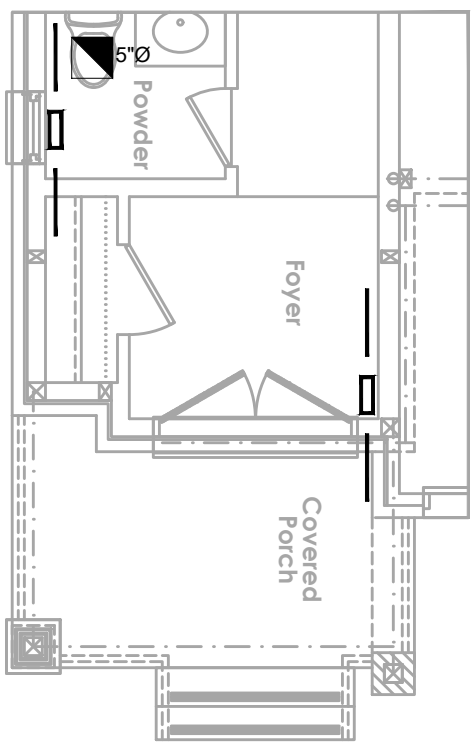
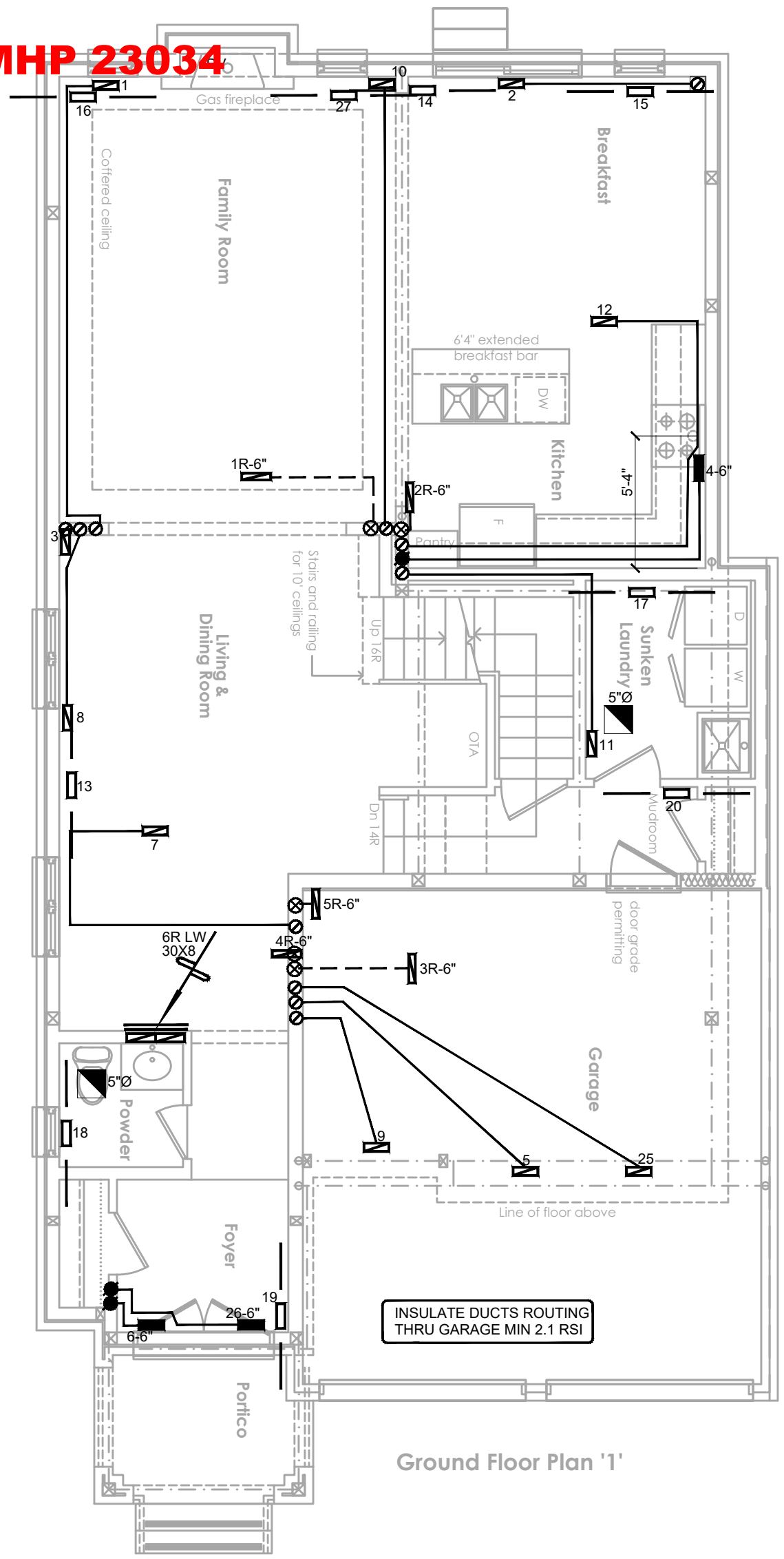


Ground Floor Plan '2'



Ground Floor Plan '3'



Ground Floor Plan '1'

WOB

HVAC LEGEND							
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

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Project Name
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OSHAWA, ONTARIO

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VILLA 2 2487 sqft

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Sheet Title
FIRST FLOOR HEATING LAYOUT

Date JULY/2023
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 101806

MHP 23034

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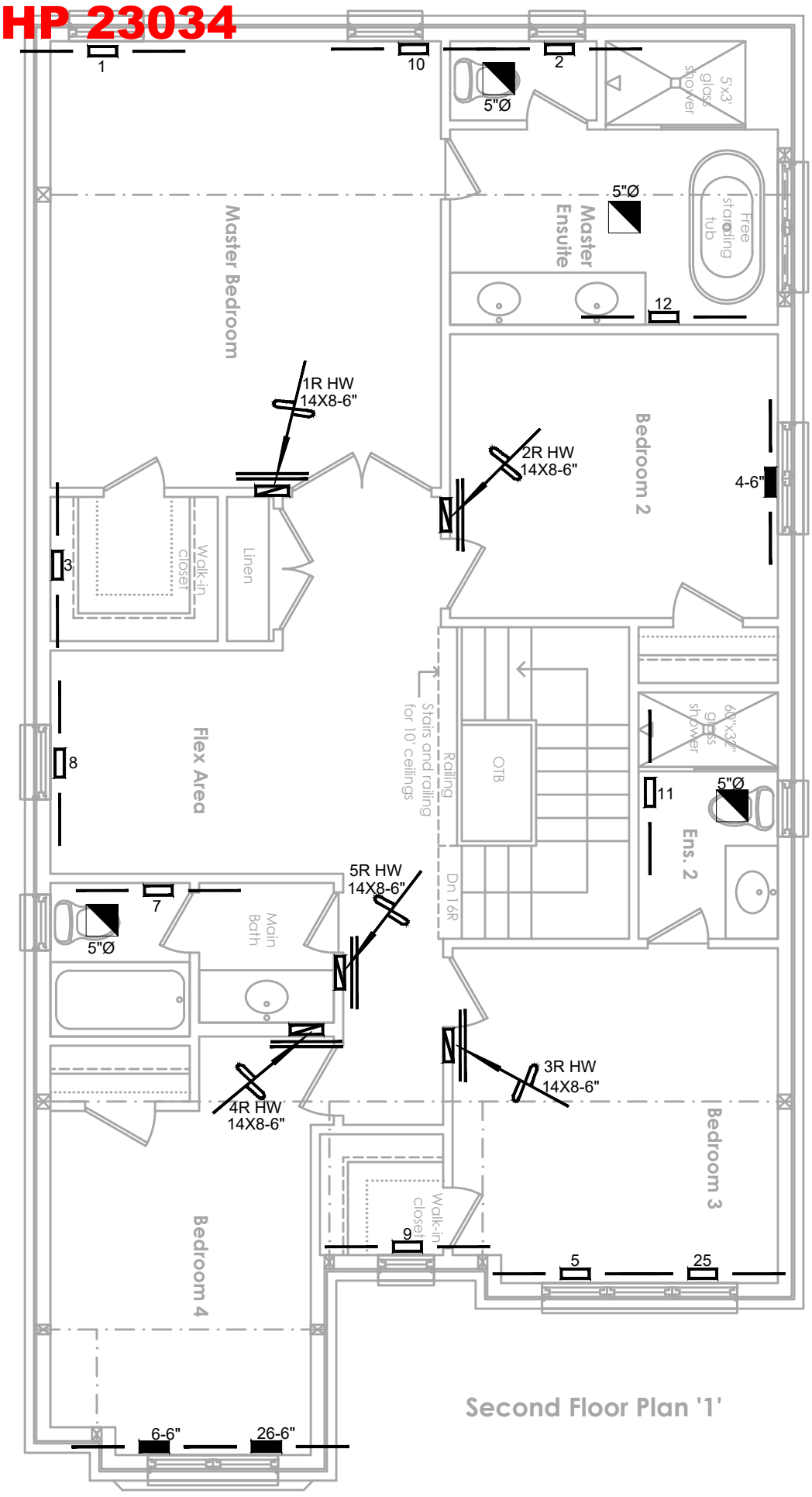
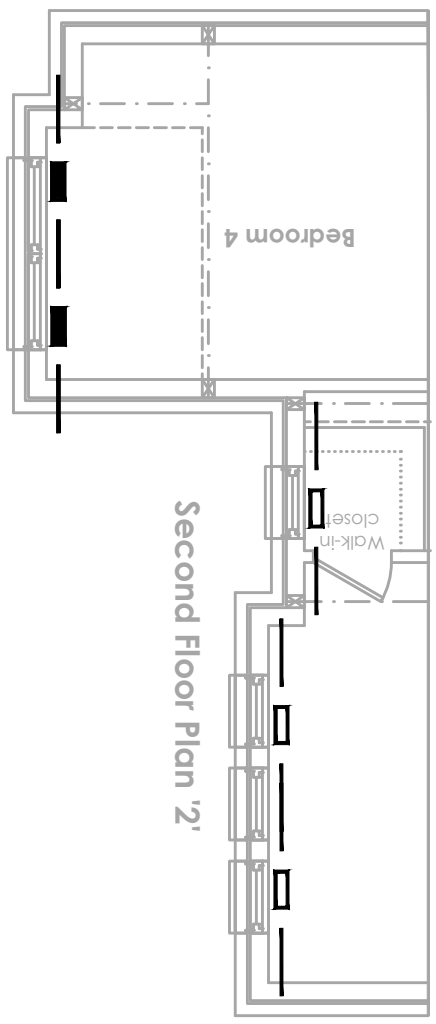
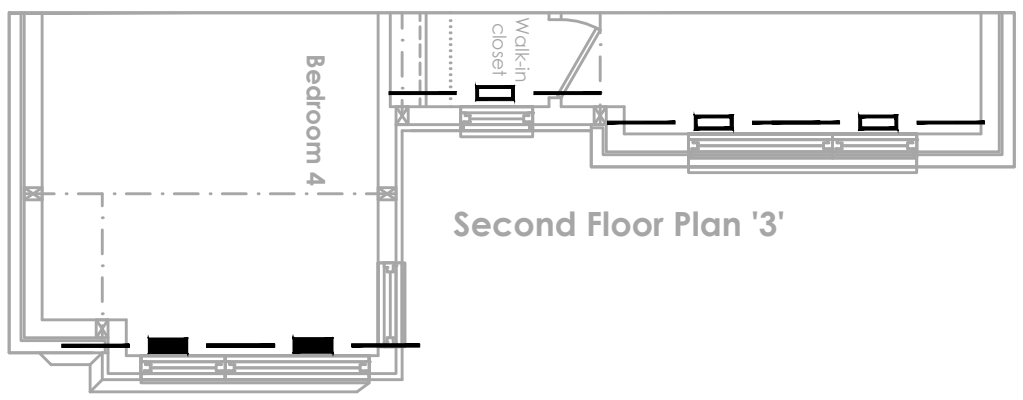


Second Floor Plan '1'



Second Floor Plan '2'



Second Floor Plan '3'

WOB

HVAC LEGEND							
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR
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Sheet Title
SECOND FLOOR HEATING LAYOUT

Date JULY/2023
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 101806