

SITE NAME: MINNISALE HOMES CORP				LOT 18				DATE: Oct-18				WINTER NATURAL AIR CHANGE RATE 0.325				HEAT LOSS AT °F. 74		CSA-F280-12						
BUILDER: GREENPARK HOMES				TYPE: MILLWOOD 2				GFA: 2554				SUMMER NATURAL AIR CHANGE RATE 0.106				HEAT GAIN AT °F. 11		SB-12 PACKAGE A1						
ROOM USE		MBR		ENS		WIC		BED-2		BED-3		BED-4		BATH		WIC-2		ENS-2						
EXP. WALL		34		22		10		26		33		11		10		0		10						
CLG. HT.		10		9		9		9		10		9		9		9		9						
FACTORS																								
GRS.WALL AREA		340		198		90		234		330		99		90		0		90						
GLAZING		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN						
NORTH		20.8	16.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
EAST		20.8	41.0	0	0	0	0	0	0	20	416	821	30	623	1231	0	0	0	0					
SOUTH		20.8	24.4	0	0	0	10	208	244	0	0	0	0	0	12	249	293	8	166	195				
WEST		20.8	41.0	32	465	1314	12	249	493	0	0	0	0	0	0	0	0	0	0					
SKYL.T.		36.4	106.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
DOORS		24.7	3.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
NET EXPOSED WALL		4.4	0.6	308	1342	199	176	767	114	90	392	58	214	932	138	300	1307	194	87	379	56	82	357	53
NET EXPOSED BMT 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
EXPOSED CLG		1.3	0.6	280	351	156	120	160	67	120	160	67	105	132	69	135	169	75	229	276	123	176	221	98
NO ATTIC EXPOSED CLG		2.7	1.2	0	0	0	0	0	0	0	0	0	80	161	72	60	161	72	0	0	0	0	0	0
EXPOSED FLOOR		2.5	0.4	0	0	0	0	0	0	0	0	0	165	411	61	0	0	0	0	0	0	0	0	0
BASEMENT/CRAWL HEAT LOSS				0		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		0
SUBTOTAL HT LOSS				2358		1374		542		2051		2261		904		744		225		823				
SUB TOTAL HT GAIN					1669			917		125		1160		1572		472			56				322	
LEVEL FACTOR / MULTIPLIER		0.20	0.25			0.20	0.25			0.20	0.25		0.20	0.25		0.20	0.25			0.20	0.25		0.20	0.25
AIR CHANGE HEAT LOSS				587		342		135		511		563		225		185		56		205				
AIR CHANGE HEAT GAIN					116		64		9		80		110		33		24		4				22	
DUCT LOSS				0		0		0		256		0		0		0		28		103				
DUCT GAIN				0		0		0		225		0		0		0		6		34				
HEAT GAIN PEOPLE		240		2		480	0	0	0	0	1		240	1		240	1	240	0	0	0	0	0	0
HEAT GAIN APPLIANCES/LIGHTS						784		0		0		784		784		784		784		0		0		0
TOTAL HT LOSS BTU/H				2945		1717		678		2819		2824		1129		929		309		1131				
TOTAL HT GAIN x 1.3 BTU/H					3964		1276		174		3224		3518		1987		481		86		493			

ROOM USE		LIV		KT/IFM		LAUN		WIR		FOY		MUD				WUB		BAS			
EXP. WALL		38		78		8		12		27		17				25		129			
CLG. HT.		10		10		9		11		10		11				9		9			
GRS.WALL AREA	FACTORS	380		780		72		132		270		187				225		774			
GLAZING	LOSS GAIN	LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN				LOSS GAIN		LOSS GAIN			
NORTH	20.8 16.5	0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0				0 0 0		0 0 0			
EAST	20.8 41.0	0 0 0		0 0 0		10 208 410		0 0 0		6 125 246		0 0 0				0 0 0		0 0 0			
SOUTH	20.8 24.4	40 831 976		0 0 0		0 0 0		10 208 244		0 0 0		0 0 0				0 0 0		8 166 195			
WEST	20.8 41.0	0 0 0		72 1496 2955		0 0 0		0 0 0		0 0 0		0 0 0				7 145 287		0 0 0			
SKYL.T.	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			
DOORS	24.7 3.7	0 0 0		20 493 73		0 0 0		0 0 0		40 986 146		20 493 73				20 493 73		20 493 73			
NET EXPOSED WALL	4.4 0.6	340 1481 220		688 2958 444		62 270 40		122 532 79		224 976 145		187 738 108				196 653 128		0 0 0			
NET EXPOSED BMT 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		387 1360 202			
EXPOSED CLG	1.3 0.6	0 0 0		0 0 0		128 160 71		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		36 97 43		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		128 319 47		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			
SLAB ON GRADE HEAT LOSS		0		0		0		0		0		0				0		0			
SUBTOTAL HT LOSS		2312		5063		957		739		2087		1221				227		6339			
SUB TOTAL HT GAIN			1195		3516		549		323		637		181			1728		488		470	
LEVEL FACTOR / MULTIPLIER	0.30 0.40			0.30 0.40		0.20 0.25		0.30 0.40		0.30 0.40		0.30 0.40				0.50 0.54		7622			
AIR CHANGE HEAT LOSS		924		2032		238		295		634		488									
AIR CHANGE HEAT GAIN			83		245		40		23		37		13					0			
DUCT LOSS		0		0		120		0		0		0				0		0			
DUCT GAIN			0		0		139		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			784		784		784		784		784		784			0		784			
TOTAL HT LOSS BTU/H		3237		7115		1316		1035		2921		1708				1728		13960			
TOTAL HT GAIN x 1.3 BTU/H			2682		5909		1992		449		747		252			635		1717			

TOTAL HEAT GAIN BTU/H: 29620

TONS: 2.46

LOSS DUE TO VENTILATION LOAD BTU/H: 1693

STRUCTURAL HEAT LOSS: 47497

TOTAL COMBINED HEAT LOSS BTU/H: 49090

SITE NAME: MINNISALE HOMES CORP
 BUILDER: GREENPARK HOMES

 LOT 18
 TYPE: MILLWOOD 2

DATE: Oct-18

GFA: 2654 LO# 80391

 HEATING CFM 1131 COOLING CFM 1131
 TOTAL HEAT LOSS 47,497 TOTAL HEAT GAIN 29,584
 AIR FLOW RATE CFM 23.81 AIR FLOW RATE CFM 38.23

 furnace pressure 0.6
 furnace filter 0.05
 a/c coil pressure 0.2
 available pressure for s/a & r/a 0.35

 #GOODMAN
 GMCC960603BNA 60
 FAN SPEED LOW
 MEDLOW
 MEDIUM
 MEDIUM HIGH
 HIGH 1131

 AFUE = 96 %
 INPUT (BTU/H) = 60,000
 OUTPUT (BTU/H) = 57,600
 DESIGN CFM = 1131
 CFM @ 5" E.S.P.

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	13	7	4
R/A	0	0	4	2	1

 All S/A diffusers 4"x10" unless noted otherwise on layout.
 All S/A runs 5"Ø unless noted otherwise on layout.

 plenum pressure s/a 0.18
 max s/a diff. press. loss 0.02
 min adjusted pressure s/a 0.16
 r/a pressure 0.17
 r/a grille press. Loss 0.02
 adjusted pressure r/a 0.15

TEMPERATURE RISE 47 °F

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	BED-2	BED-3	MBR	ENS-2	LIV	WIC-2	KT/FM	KT/FM	KT/FM	LAUN	W/R	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH	1.47	1.72	0.68	1.41	1.41	1.13	0.93	1.41	1.41	1.47	1.13	3.24	0.31	2.37	2.37	2.37	1.31	1.03	2.92	1.71	3.92	3.92	3.92	3.92
CFM PER RUN HEAT	35	41	16	34	34	27	22	34	34	35	27	77	7	56	56	56	31	25	70	41	93	93	93	93
RM GAIN MBH	1.98	1.28	0.17	1.61	1.76	1.99	0.48	1.61	1.76	1.98	0.49	2.68	0.09	1.97	1.97	1.97	1.99	0.45	0.75	0.25	0.59	0.59	0.59	0.59
CFM PER RUN COOLING	76	49	7	62	67	76	18	62	67	76	19	103	3	75	75	75	76	17	29	10	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	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH.	55	54	40	46	33	15	37	47	47	45	38	15	30	48	44	49	39	39	29	32	39	47	20	10
EQUIVALENT LENGTH	190	170	130	140	180	160	110	140	190	150	140	120	170	130	110	140	130	150	140	170	150	170	110	160
TOTAL EFFECTIVE LENGTH	245	224	170	186	213	175	147	187	237	195	178	135	200	178	154	189	169	169	169	202	189	217	130	170
ADJUSTED PRESSURE	0.07	0.08	0.1	0.09	0.08	0.1	0.12	0.09	0.07	0.09	0.1	0.12	0.09	0.1	0.11	0.09	0.1	0.09	0.1	0.09	0.09	0.07	0.12	0.1
ROUND DUCT SIZE	5	5	4	5	5	5	4	5	5	5	4	6	4	5	5	5	5	4	5	4	6	6	6	6
HEATING VELOCITY (ft/min)	257	301	184	250	250	198	252	250	250	257	310	393	80	411	411	411	228	287	514	470	474	474	474	474
COOLING VELOCITY (ft/min)	558	360	80	455	492	558	207	455	492	558	218	525	34	551	551	551	558	195	213	115	112	112	112	112
OUTLET GRILL SIZE	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	A	B	B	D	C	B	D	D	C	A	D	C	D	A	A	A	D	B	C	B	A	A	C	B

 RUN #
 ROOM NAME
 RM LOSS MBH
 CFM PER RUN HEAT
 RM GAIN MBH
 CFM PER RUN COOLING
 ADJUSTED PRESSURE
 ACTUAL DUCT LGH.
 EQUIVALENT LENGTH
 TOTAL EFFECTIVE LENGTH
 ADJUSTED PRESSURE
 ROUND DUCT SIZE
 HEATING VELOCITY (ft/min)
 COOLING VELOCITY (ft/min)
 OUTLET GRILL SIZE
 TRUNK

 CITY OF BRAMPTON
 BUILDING DIVISION
 REVIEWED

NOV 28 2018

 HVAC
 BY
 JOAN LIN

SUPPLY 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	424	0.07	10.5	14	x	8	545		
TRUNK B	667	0.07	12.5	18	x	8	667		
TRUNK C	308	0.07	9.3	10	x	8	554		
TRUNK D	463	0.07	10.9	16	x	8	521		
TRUNK E	0	0.00	0	0	x	8	0		
TRUNK F	0	0.00	0	0	x	8	0		
TRUNK G	0	0.00	0	0	x	8	0		
TRUNK H	0	0.00	0	0	x	8	0		
TRUNK I	0	0.00	0	0	x	8	0		
TRUNK J	0	0.00	0	0	x	8	0		
TRUNK K	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
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
145	155	95	95	155	310	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58	43	42	48	38	15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
150	135	175	175	145	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
208	178	217	223	183	150	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.07	0.08	0.07	0.07	0.08	0.10	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80
7	7	6	6	7	8.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	8	8	8	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14	14	14	14	14	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

RETURN AIR TRUNK SIZE

	TRUNK	STATIC	ROUND	RECT			VELOCITY
	CFM	PRESS.	DUCT	DUCT			(ft/min)
TRUNK O	0	0.07	0	0	x	8	0
TRUNK P	0	0.07	0	0	x	8	0
TRUNK Q	0	0.07	0	0	x	8	0
TRUNK R	0	0.07	0	0	x	8	0
TRUNK S	0	0.07	0	0	x	8	0
TRUNK T	0	0.07	0	0	x	8	0
TRUNK U	0	0.07	0	0	x	8	0
TRUNK V	0	0.07	0	0	x	8	0
TRUNK W	0	0.07	0	0	x	8	0
TRUNK X	1131	0.07	15.2	30	x	8	679
TRUNK Y	300	0.07	9.2	10	x	8	540
TRUNK Z	0	0.07	0	0	x	8	0
DROP	1131	0.07	15.2	24	x	10	679

TYPE: MILLWOOD 2
 SITE NAME: MINNISALE HOMES CORP

 LO # 80391
 LOT 18

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/on 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 9.32.3.6.

Total Ventilation Capacity	180.2	cfm
Less Principal Ventil. Capacity	79.5	cfm
Required Supplemental Capacity	100.7	cfm

PRINCIPAL EXHAUST FAN CAPACITY
 Model: VANE 65H Location: BSMT
 79.5 cfm 3.0 sones ☒ HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM	ΔT °F	FACTOR	% LOSS
79.5 CFM	74 F	1.08	0.25

SUPPLEMENTAL FANS PANASONIC

Location	Model	cfm	HVI	Sones
ENS	FV-05-11VK1	50	☒	0.3
BATH	FV-05-11VK1	50	☒	0.3
ENS-2	FV-05-11VK1	50	☒	0.3
WIR	FV-05-11VK1	50	☒	0.3

HEAT RECOVERY VENTILATOR 9.32.3.11.
 Model: VANE 65H
 155 cfm high 64 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 #:
 NOV 28 2018
 HVAC BY
 JOAN LIN

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: October-18

CSA F280-12 Residential Heat Loss and Heat Gain Calculations																																																												
Formula Sheet (For Air Leakage / Ventilation Calculation)																																																												
LOW: 80391	Model: MILLWOOD 2	Builder: GREENPARK HOMES	Date: 19/10/2018																																																									
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>1148</td> <td>9</td> <td>10332</td> </tr> <tr> <td>First</td> <td>1148</td> <td>10</td> <td>11480</td> </tr> <tr> <td>Second</td> <td>1506</td> <td>9</td> <td>13554</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>35,366.0 ft³</td> </tr> <tr> <td colspan="3" style="text-align: right;">Total:</td> <td>1001.5 m³</td> </tr> </tbody> </table>		Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)	Bsmt	1148	9	10332	First	1148	10	11480	Second	1506	9	13554	Third	0	9	0	Fourth	0	9	0	Total:			35,366.0 ft³	Total:			1001.5 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%;">0.325</td> </tr> <tr> <td>SUMMER NATURAL AIR CHANGE RATE</td> <td>0.106</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>-19</td> <td>41</td> <td>74</td> </tr> <tr> <td>Summer DTDc</td> <td>24</td> <td>30</td> <td>6</td> <td>11</td> </tr> </table>			WINTER NATURAL AIR CHANGE RATE	0.325	SUMMER NATURAL AIR CHANGE RATE	0.106	Design Temperature Difference						Tin °C	Tout °C	ΔT °C	ΔT °F	Winter DTDh	22	-19	41	74	Summer DTDc	24	30	6	11
Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)																																																									
Bsmt	1148	9	10332																																																									
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Second	1506	9	13554																																																									
Third	0	9	0																																																									
Fourth	0	9	0																																																									
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SUMMER NATURAL AIR CHANGE RATE	0.106																																																											
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		6.2.6 Sensible Gain due to Air Leakage																																																										
$HL_{airb} = LR_{airh} \times \frac{V_b}{3.6} \times DTD_h \times 1.2$ 0.325 x 278.18 x 41 °C x 1.2 = 4468 W = 15244 Btu/h		$HG_{salb} = LR_{airc} \times \frac{V_b}{3.6} \times DTD_c \times 1.2$ 0.106 x 278.18 x 6 °C x 1.2 = 215 W = 734 Btu/h																																																										
5.2.3.2 Heat Loss due to Mechanical Ventilation		6.2.7 Sensible heat Gain due to Ventilation																																																										
$HL_{vaib} = PVC \times DTD_h \times 1.08 \times (1 - E)$ 80 CFM x 74 °F x 1.08 x 0.25 = 1593 Btu/h		$HL_{vaib} = PVC \times DTD_h \times 1.08 \times (1 - E)$ 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)																																																												
$HL_{airr} = \text{Level Factor} \times HL_{airbv} \times ((HL_{ager} + HL_{bgcr}) + (HL_{agcleve} + HL_{bgcleve}))$																																																												
Level	Level Factor (LF)	HLairbv Air Leakage + Ventilation Heat Loss (Btu/h)	Level Conductive Heat Loss: (HL _{level})	Air Leakage Heat Loss Multiplier (LF x HLairbv / HL _{level})																																																								
1	0.5	15,244	8,066	0.945																																																								
2	0.3		11,442	0.400																																																								
3	0.2		12,239	0.249																																																								
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 HLairv = 0																																																												

CITY OF BRAMPTON
BUILDING DIVISION
REVIEWED
NOV 28 2018
H V A C
BY
JOAN LIN

HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: MILLWOOD 2	LOT 18	BUILDER: GREENPARK HOMES
SFQT: 2654	LO# 80391	SITE: MINNISALE HOMES CORP

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

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):	35366.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD (Btu/h/ft²):	1.65	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	6.0 ft
LENGTH: 46.0 ft	WIDTH: 31.0 ft	EXPOSED PERIMETER:	129.0 ft

2012 OBC - COMPLIANCE PACKAGE**Component**

Ceiling with Attic Space Minimum RSI (R)-Value
Ceiling Without Attic Space Minimum RSI (R)-Value
Exposed Floor Minimum RSI (R)-Value
Walls Above Grade Minimum RSI (R)-Value
Basement Walls Minimum RSI (R)-Value
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
Heated Slab or Slab ≤ 600 mm below grade Minimum RSI (R)-Value
Windows and Sliding Glass Doors Maximum U-Value
Skylights Maximum U-Value
Space Heating Equipment Minimum AFUE
HRV Minimum Efficiency
Domestic Hot Water Heater Minimum EF

**CITY OF BRAMPTON
BUILDING DIVISION
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NOV 28 2018

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BY
JOAN LIN**

**Compliance Package
A1**

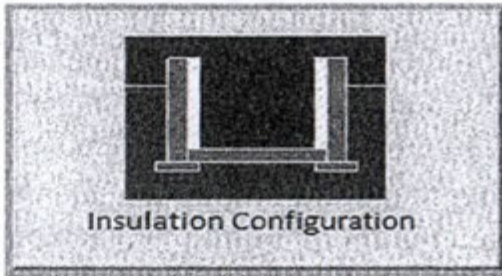
Nominal	Min. Eff.
60	59.22
31	27.65
31	29.80
22	17.03
20 ci	21.12
-	-
10	10
10	11.13
0.28	-
0.49	-
0.96	-
75%	-
0.8	-

INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

Michael O'Rourke

Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description		
Province:	Ontario	
Region:	Brampton	
Site Description		
Soil Conductivity:	Normal conductivity: dry sand, loam, clay	
Water Table:	Normal (7-10 m, 23-33 ft)	
Foundation Dimensions		
Floor Length (m):	14.0	 Insulation Configuration
Floor Width (m):	9.4	
Exposed Perimeter (m):	39.3	
Wall Height (m):	2.7	
Depth Below Grade (m):	1.83	
Window Area (m ²):	1.4	
Door Area (m ²):	3.7	
Radiant Slab		
Heated Fraction of the Slab:	0	CITY OF BRAMPTON BUILDING DIVISION REVIEWED NOV 28 2018 H V A C BY JOAN LIN
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Foundation Loads		
Heating Load (Watts):		1266

TYPE: MILLWOOD 2
LO# 80391

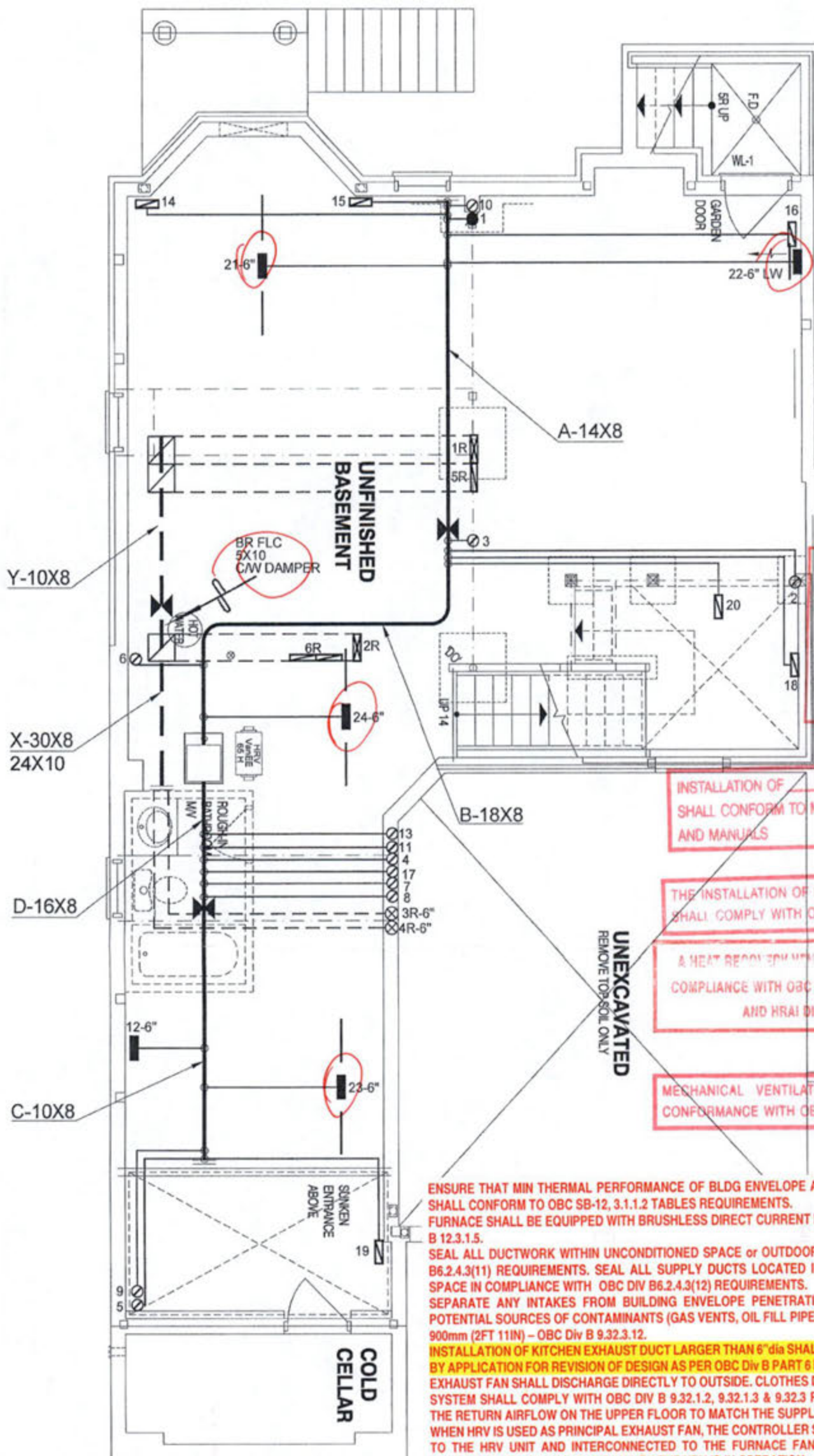
LOT 18

Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description				
Province:	Ontario			
Region:	Brampton			
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):	6.71			
Building Configuration				
Type:	Detached			
Number of Stories:	Two			
Foundation:	Full			
House Volume (m ³):	1001.5			
Air Leakage/Ventilation				
Air Tightness Type:	Present (1961-) (3.57 ACH)			
Custom BDT Data:	ELA @ 10 Pa.	1335.0 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):	0.325			
Cooling Air Leakage Rate (ACH/H):	0.106			

TYPE: MILLWOOD 2
LO# 80391



CITY OF BRAMPTON
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INSTALLATION OF
SHALL CONFORM TO MANUFACTURER'S SPECIFICATIONS
AND MANUALS

THE INSTALLATION OF CARBON MONOXIDE DETECTOR(S)
SHALL COMPLY WITH OBC DIV. B, 9.33.4 REQUIREMENTS.

A HEAT RECOVERY VENTILATOR SHALL BE INSTALLED IN
COMPLIANCE WITH OBC DIV. B, 6.2.1.5, 9.32.3.6(3), 9.32.3.11
AND HRAI DIGEST REQUIREMENTS.

MECHANICAL VENTILATION SHALL BE PROVIDED IN
CONFORMANCE WITH OBC DIV. B, 9.32.3 REQUIREMENTS.

ENSURE THAT MIN THERMAL PERFORMANCE OF BLDG ENVELOPE AND EQUIPMENT
SHALL CONFORM TO OBC SB-12, 3.1.1.2 TABLES REQUIREMENTS.
FURNACE SHALL BE EQUIPPED WITH BRUSHLESS DIRECT CURRENT MOTOR OBC DIV
B 12.3.1.5.
SEAL ALL DUCTWORK WITHIN UNCONDITIONED SPACE or OUTDOORS PER OBC DIV
B6.2.4.3(11) REQUIREMENTS. SEAL ALL SUPPLY DUCTS LOCATED IN CONDITIONED
SPACE IN COMPLIANCE WITH OBC DIV B6.2.4.3(12) REQUIREMENTS.
SEPARATE ANY INTAKES FROM BUILDING ENVELOPE PENETRATIONS THAT ARE
POTENTIAL SOURCES OF CONTAMINANTS (GAS VENTS, OIL FILL PIPES, etc. BY MIN
900mm (2FT 11IN) - OBC Div B 9.32.3.12.
INSTALLATION OF KITCHEN EXHAUST DUCT LARGER THAN 6" dia SHALL BE PRECEDED
BY APPLICATION FOR REVISION OF DESIGN AS PER OBC Div B PART 6 REQUIREMENTS.
EXHAUST FAN SHALL DISCHARGE DIRECTLY TO OUTSIDE. CLOTHES DRYER EXHAUST
SYSTEM SHALL COMPLY WITH OBC DIV B 9.32.1.2, 9.32.1.3 & 9.32.3 REQ'S. BALANCE
THE RETURN AIRFLOW ON THE UPPER FLOOR TO MATCH THE SUPPLY.
WHEN HRV IS USED AS PRINCIPAL EXHAUST FAN, THE CONTROLLER SHALL BE WIRED
TO THE HRV UNIT AND INTERCONNECTED TO THE FURNACE FAN. THE FURNACE
BLOWER MUST BE IN OPERATION WHEN THE HRV IS IN OPERATION.
INSTALL ADDITIONAL S/A REGISTER AS REQUIRED IN ORDER TO ENSURE MIN 72degF
- OBC DIV B 9.33.3.1(1).
UNDERCUT BY MIN 1" THE DOOR TO ANY ROOM WITHOUT RETURN AIR GRILLE.
ENSURE RETURN AIR INTAKE SHALL BE CONNECTED TO THE MAIN R/A DUCT AT A
HORIZONTAL DISTANCE OF MIN 6FT FROM THE CASING OF THE UNIT (HRAI DIGEST).

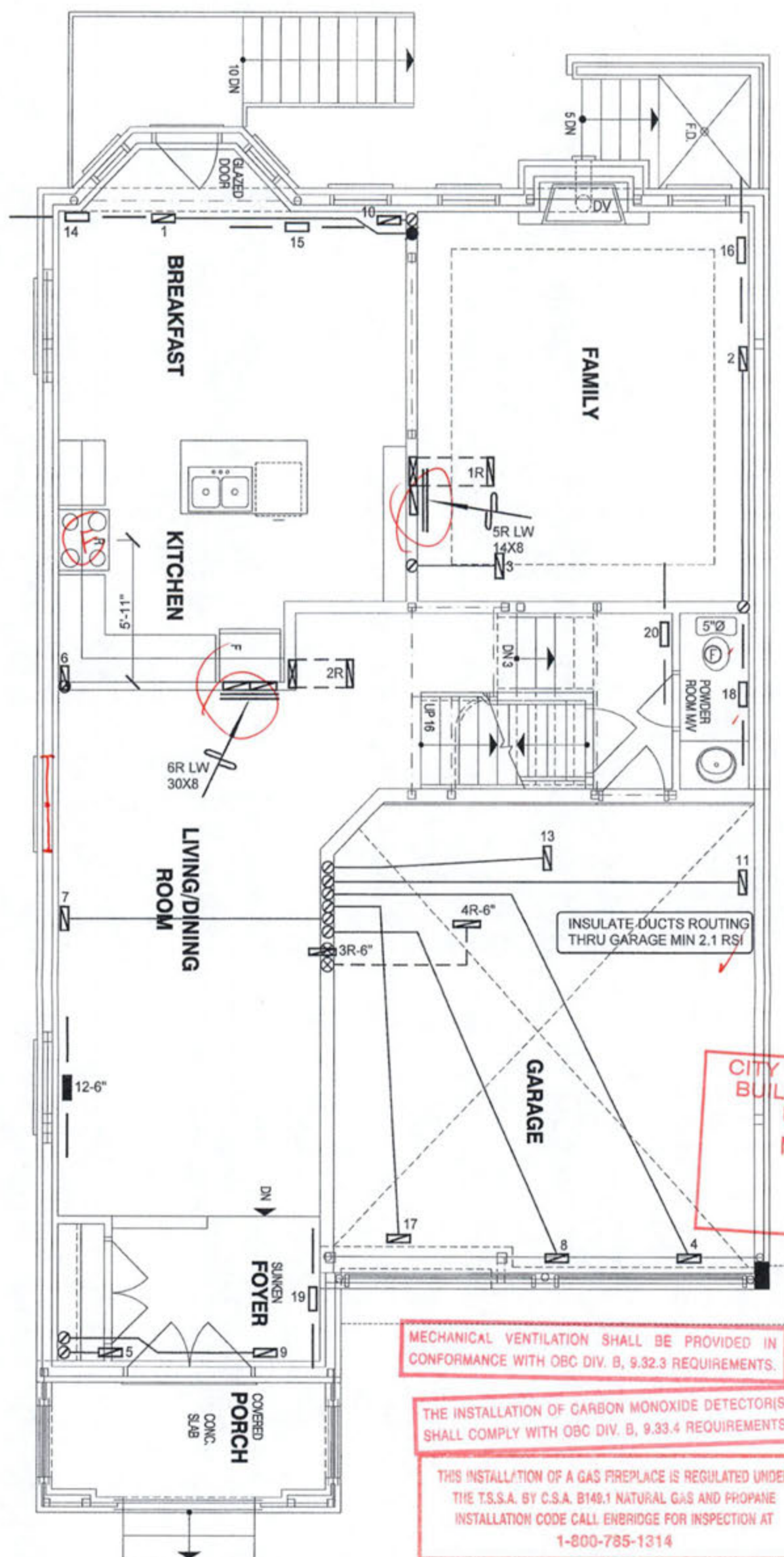
LOT 18
CSA-F280-12
PACKAGE A1

I MICHAEL O'SKIBKE HAVE REVIEWED
AND TAKE RESPONSIBILITY FOR THE
DESIGN WORK AND AM QUALIFIED
UNDER DIVISION C, 3.2.5 OF THE
BUILDING CODE.

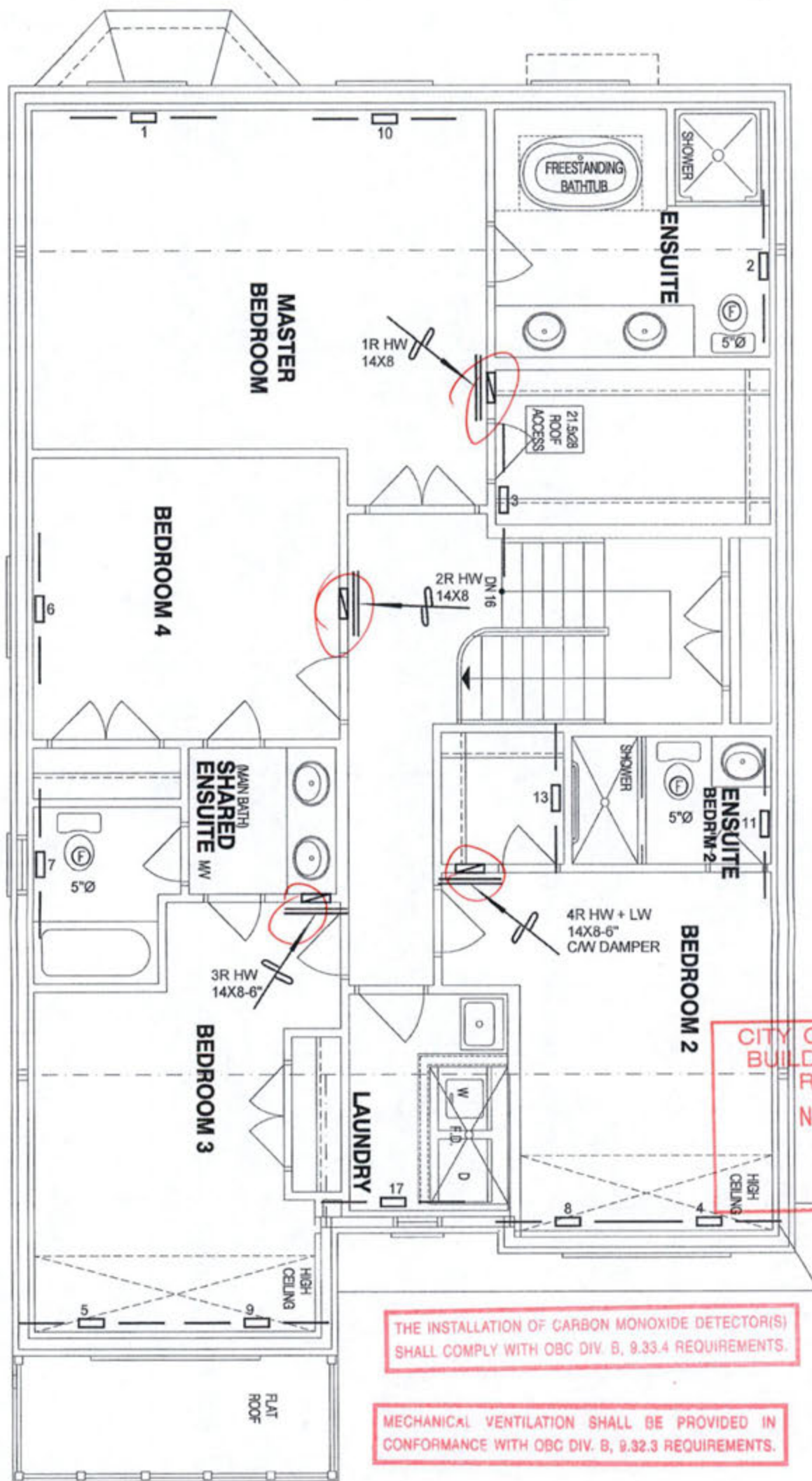
HVAC LEGEND							
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	FLOOR SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
	FLOOR SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK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

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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.

Client GREENPARK HOMES Project Name MINNISALE HOMES CORP. BRAMPTON, ONTARIO LOT 18 MILLWOOD 2	 375 Finley Ave. Suite 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 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 49090 BTU/H UNIT DATA MAKE GOODMAN MODEL GMEC960603BNA INPUT 60 MBTUH OUTPUT 57.6 MBTUH COOLING 2.5 TONS FAN SPEED 1131 cfm @ 0.6" w.c.	# OF RUNS S/A R/A FANS 3RD FLOOR 2ND FLOOR 13 4 3 1ST FLOOR 7 2 2 BASEMENT 4 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 OCT/2018 Scale 3/16" = 1'-0" BCIN# 19669 LO# 80391
				Revisions No. Description Date



Client	 375 Finley Ave. Suite 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	Sheet Title	FIRST FLOOR HEATING LAYOUT	
Project Name		MINNISALE HOMES CORP. BRAMPTON, ONTARIO	Date	OCT/2018
LOT 18 MILLWOOD 2	2654 sqft	Scale	3/16" = 1'-0"	BCIN# 19669
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.		LO# 80391		



I MICHAEL OROBOKI HAVE REVIEWED AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael Oroboki
Michael Oroboki, BCIN# 19669
HVAC DESIGNS LTD.

HVAC LEGEND								3.		
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	2.		
	FLOOR SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE	1.		
	FLOOR SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x6" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR	No.	Description	Date
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER	REVISIONS		

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Client		 375 Finley Ave. Suite 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 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.	Sheet Title	
GREENPARK HOMES			SECOND FLOOR HEATING LAYOUT	
Project Name			Date	OCT/2018
MINNISALE HOMES CORP. BRAMPTON, ONTARIO			Scale	3/16" = 1'-0"
LOT 18 MILLWOOD 2 2654 sqft			BCIN# 19669	
		LO#	80391	