

TOTAL HEAT GAIN BTU/H:	25057	TONS: 2.09	LOSS DUE TO VENTILATION LOAD BTU/H: 2852	STRUCTURAL HEAT LOSS: 32273	TOTAL COMBINED HEAT LOSS BTU/H: 35125
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					

SITE NAME: STAR TIME

BUILDER: GREENPARK HOMES

TYPE: ELMBROOK 4A

DATE: Jan-17

GFA: 1932 LO# 71729

HEATING CFM 890 COOLING CFM 890
TOTAL HEAT LOSS 32,273 TOTAL HEAT GAIN 24,457
AIR FLOW RATE CFM 27.58 AIR FLOW RATE CFM 36.39

AFUE = 96 %
INPUT (BTU/H) = 40,000
OUTPUT (BTU/H) = 38,400

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	8	6	4
R/A	0	0	4	1	1

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	10	12	14	15	18	19	20	21	22	23	24
ROOM NAME	MBR	ENS	BED-3	BED-4	BED-2	BATH	BED-2	MBR	MBR	LVDN	KT/DI	KT/DI	W/R	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH	1.43	1.06	1.31	1.56	1.31	0.28	1.31	1.43	1.43	1.91	2.16	2.16	0.67	3.20	1.42	2.60	2.60	2.60	2.60
CFM PER RUN HEAT	39	29	36	55	43	8	36	39	39	53	60	60	18	88	39	72	72	72	72
RM GAIN MBH	1.93	0.70	1.98	2.10	2.10	0.13	1.98	1.93	1.93	2.01	2.89	2.89	0.39	0.71	0.98	0.26	0.26	0.26	0.26
CFM PER RUN COOLING	70	26	72	102	76	5	72	70	70	73	105	105	14	26	36	9	9	9	9
ADJUSTED PRESSURE	0.17	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.17	0.16	0.17	0.17	0.17	0.17	0.17
ACTUAL DUCT LGH	33	27	51	43	33	45	44	45	45	15	28	36	23	38	26	22	32	16	30
EQUIVALENT LENGTH	190	190	190	120	190	190	190	110	110	140	160	150	190	140	150	190	150	110	140
TOTAL EFFECTIVE LENGTH	223	217	241	153	234	235	234	155	155	188	188	186	213	178	176	212	182	126	170
ADJUSTED PRESSURE	0.08	0.08	0.07	0.11	0.07	0.07	0.07	0.11	0.11	0.11	0.09	0.09	0.08	0.09	0.1	0.08	0.09	0.14	0.1
ROUND DUCT SIZE	5	4	6	5	5	4	5	5	5	5	6	6	4	5	4	5	5	5	5
HEATING VELOCITY (ft/min)	286	333	264	316	280	92	264	286	286	389	306	306	207	646	447	529	529	529	529
COOLING VELOCITY (ft/min)	514	298	529	558	520	57	529	514	514	536	535	535	161	191	413	66	66	66	66
OUTLET GRILL SIZE	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10
TRUNK	C	C	A	B	A	A	A	C	C	B	C	C	A	A	B	C	C	B	A

RUN #	1	2	3	4	5	6	7	8	10	12	14	15	18	19	20	21	22	23	24
ROOM NAME	MBR	ENS	BED-3	BED-4	BED-2	BATH	BED-2	MBR	MBR	LVDN	KT/DI	KT/DI	W/R	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH	1.43	1.06	1.31	1.56	1.31	0.28	1.31	1.43	1.43	1.91	2.16	2.16	0.67	3.20	1.42	2.60	2.60	2.60	2.60
CFM PER RUN HEAT	39	29	36	55	43	8	36	39	39	53	60	60	18	88	39	72	72	72	72
RM GAIN MBH	1.93	0.70	1.98	2.10	2.10	0.13	1.98	1.93	1.93	2.01	2.89	2.89	0.39	0.71	0.98	0.26	0.26	0.26	0.26
CFM PER RUN COOLING	70	26	72	102	76	5	72	70	70	73	105	105	14	26	36	9	9	9	9
ADJUSTED PRESSURE	0.17	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.17	0.16	0.17	0.17	0.17	0.17	0.17
ACTUAL DUCT LGH	33	27	51	43	33	45	44	45	45	15	28	36	23	38	26	22	32	16	30
EQUIVALENT LENGTH	190	190	190	120	190	190	190	110	110	140	160	150	190	140	150	190	150	110	140
TOTAL EFFECTIVE LENGTH	223	217	241	153	234	235	234	155	155	188	188	186	213	178	176	212	182	126	170
ADJUSTED PRESSURE	0.08	0.08	0.07	0.11	0.07	0.07	0.07	0.11	0.11	0.11	0.09	0.09	0.08	0.09	0.1	0.08	0.09	0.14	0.1
ROUND DUCT SIZE	5	4	6	5	5	4	5	5	5	5	6	6	4	5	4	5	5	5	5
HEATING VELOCITY (ft/min)	286	333	264	316	280	92	264	286	286	389	306	306	207	646	447	529	529	529	529
COOLING VELOCITY (ft/min)	514	298	529	558	520	57	529	514	514	536	535	535	161	191	413	66	66	66	66
OUTLET GRILL SIZE	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10
TRUNK	C	C	A	B	A	A	A	C	C	B	C	C	A	A	B	C	C	B	A

SUPPLY AIR TRUNK SIZE	TRUNK	STATIC PRESS.	ROUND DUCT	RECT DUCT	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT	VELOCITY (ft/min)	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT	VELOCITY (ft/min)
TRUNK A	313	0.07	9.4	10	0	0.00	0	0	0	0	0.00	0	0	0
TRUNK B	520	0.07	11.3	14	0	0.00	0	0	0	0	0.00	0	0	0
TRUNK C	371	0.08	9.7	12	0	0.00	0	0	0	0	0.00	0	0	0
TRUNK D	0	0.00	0	0	0	0.00	0	0	0	0	0.00	0	0	0
TRUNK E	0	0.00	0	0	0	0.00	0	0	0	0	0.00	0	0	0
TRUNK F	0	0.00	0	0	0	0.00	0	0	0	0	0.00	0	0	0

RETURN AIR #	1	2	3	4	5	6	7	8	10	12	14	15	18	19	20	21	22	23	24
AIR VOLUME	155	85	75	85	330	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	0.15	0.15	0.15
ACTUAL DUCT LGH	34	47	56	53	35	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EQUIVALENT LENGTH	145	220	215	175	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL EFFECTIVE LH	179	267	271	228	185	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ADJUSTED PRESSURE	0.08	0.06	0.05	0.06	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
ROUND DUCT SIZE	7	6	6	6	9.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INLET GRILL SIZE	8	8	8	8	8	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
INLET GRILL SIZE	14	14	14	14	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TYPE: ELMBROOK 4A
SITE NAME: STAR TIME

LO # 71729

RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY

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

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

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

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

TOTAL VENTILATION CAPACITY		9.32.3.3(1)
Basement + Master Bedroom	<u>2</u> @ 21.2 cfm	<u>42.4</u> cfm
Other Bedrooms	<u>3</u> @ 10.6 cfm	<u>31.8</u> cfm
Kitchen & Bathrooms	<u>4</u> @ 10.6 cfm	<u>42.4</u> cfm
Other Rooms	<u>4</u> @ 10.6 cfm	<u>42.4</u> cfm
Table 9.32.3.A.	TOTAL	<u>159.0</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	
More than 5 - Part 6	TOTAL	<u>79.5</u> cfm

SUPPLEMENTAL VENTILATION CAPACITY		9.32.3.5.
Total Ventilation Capacity	<u>159</u>	cfm
Less Principal Ventil. Capacity	<u>139</u>	cfm
Required Supplemental Capacity	<u>20.0</u>	cfm

PRINCIPAL EXHAUST FAN CAPACITY	
Model: VANEE 60H-V+	Location: BSMT
<u>139.0</u> cfm	<u>3.0</u> sones ☒ HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION			
CFM	ΔT °F	FACTOR	% LOSS
139.0 CFM	X 76 F	X 1.08	X 0.25

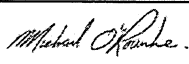
SUPPLEMENTAL FANS		NUTONE	
Location	Model	cfm	HVI Sones
ENS	QTXEN050C	50	☒ 0.3
BATH	QTXEN050C	50	☒ 0.3
W/R	QTXEN050C	50	☒ 0.3

HEAT RECOVERY VENTILATOR		9.32.3.11.
Model: VANEE 60H-V+		
<u>139</u> cfm high	<u>50</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:	January-17

HEAT LOSS AND GAIN SUMMARY SHEET**MODEL:** ELMBROOK 4A**BUILDER:** GREENPARK HOMES**SFQT:** 1932**LO#** 71729**SITE:** STAR TIME**DESIGN ASSUMPTIONS**

HEATING	°F	COOLING	°F
OUTDOOR DESIGN TEMP.	-4	OUTDOOR DESIGN TEMP.	88
INDOOR DESIGN TEMP.	72	INDOOR DESIGN TEMP. (MAX 75°F)	72

BUILDING DATA

ATTACHMENT:	ATTACHED	# 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:	UNSHELTERED	ASSUMED (Y/N):	Y
HOUSE VOLUME (ft³):	24743.5	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD (Btu/h/ft²):	1.27	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	6.6 ft
LENGTH: 52.0 ft	WIDTH: 21.0 ft	EXPOSED PERIMETER:	115.0 ft

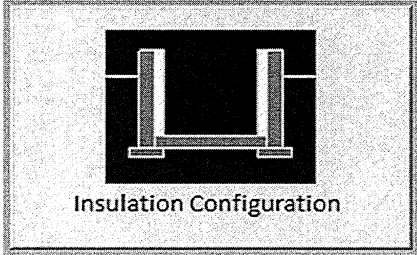
2012 OBC - COMPLIANCE PACKAGE		
Component	Compliance Package A1	
	Nominal	Min. Eff.
Ceiling with Attic Space Minimum RSI (R)-Value	60	59.22
Ceiling Without Attic Space Minimum RSI (R)-Value	31	27.65
Exposed Floor Minimum RSI (R)-Value	31	29.8
Walls Above Grade Minimum RSI (R)-Value	22	17.03
Basement 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	11.13
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	0.96	-
HRV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	0.8	-

INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

CSA F280-12 Residential Heat Loss and Heat Gain Calculations																																																																																			
Formula Sheet (For Air Leakage / Ventilation Calculation)																																																																																			
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139 CFM	x	16 °F	x																																																																																
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5.2.3.3 Calculation of Air Change Heat Loss for Each Room (Floor Multiplier Section)																																																																																			
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Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description		
Province:	Ontario	
Region:	Vaughan (Woodbridge)	
Site Description		
Soil Conductivity:	Normal conductivity: dry sand, loam, clay	
Water Table:	Normal (7-10 m, 23-33 ft)	
Foundation Dimensions		
Floor Length (m):	15.8	 Insulation Configuration
Floor Width (m):	6.4	
Exposed Perimeter (m):	35.1	
Wall Height (m):	2.6	
Depth Below Grade (m):	2.0	
Window Area (m ²):	2.1	
Door Area (m ²):	1.9	
Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Foundation Loads		
Heating Load (Watts):		936

TYPE: ELMBROOK 4A
LO# 71729

Air Infiltration Residential Load Calculator

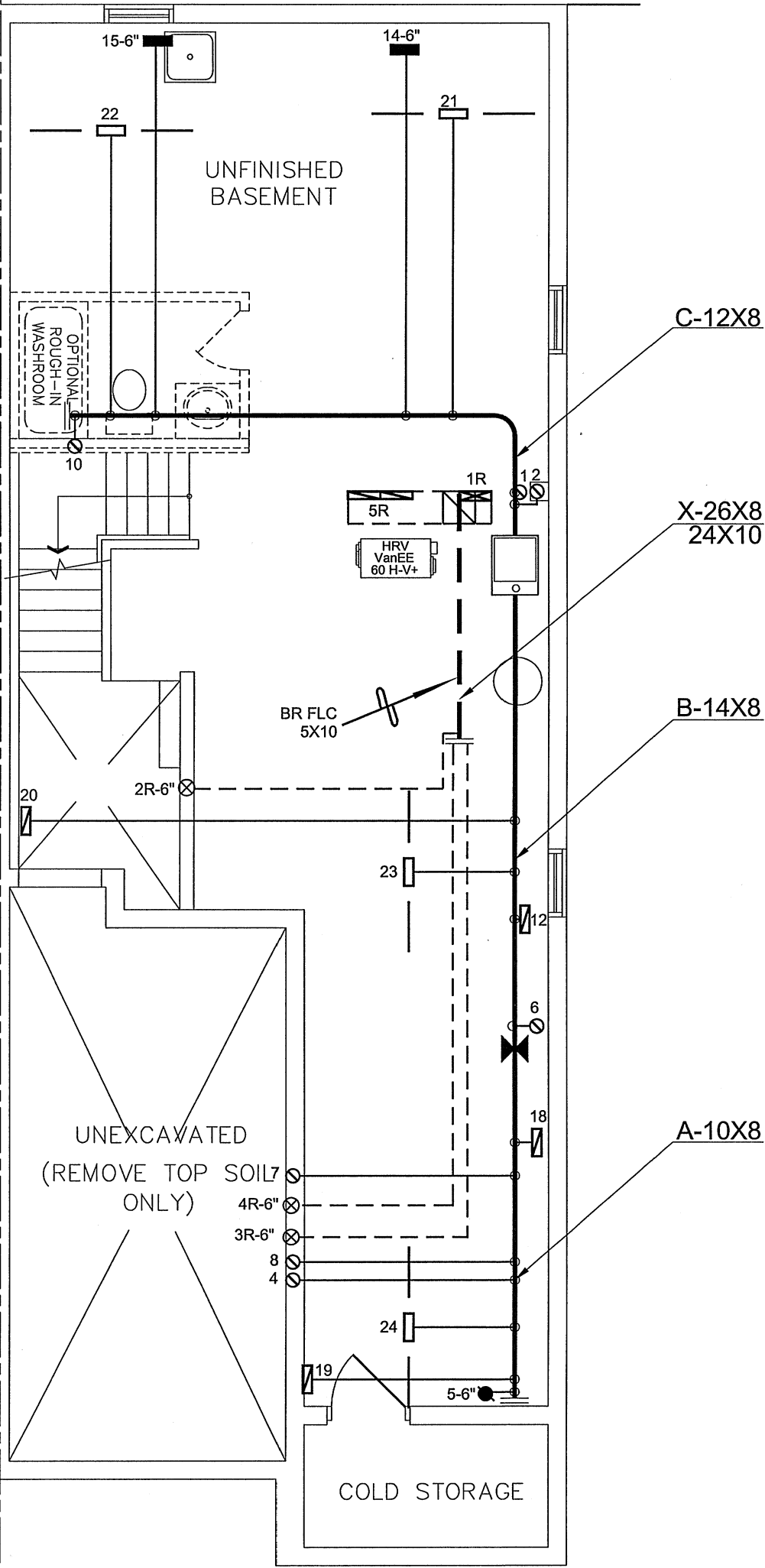
Supplemental tool for CAN/CSA-F280

Weather Station Description				
Province:	Ontario			
Region:	Vaughan (Woodbridge)			
Weather Station Location:	Open flat terrain, grass			
Anemometer height (m):	10			
Local Shielding				
Building Site:	Suburban, forest			
Walls:	Very heavy			
Flue:	Heavy			
Highest Ceiling Height (m):	6.10			
Building Configuration				
Type:	Semi			
Number of Stories:	Two			
Foundation:	Full			
House Volume (m ³):	700.7			
Air Leakage/Ventilation				
Air Tightness Type:	Present (1961-) (3.57 ACH)			
Custom BDT Data:	ELA @ 10 Pa.	934.0 cm ²		
	3.57	ACH @ 50 Pa		
Mechanical Ventilation (L/s):	Total Supply	Total Exhaust		
	65.6	65.6		
Flue Size				
Flue #:	#1	#2	#3	#4
Diameter (mm):	0	0	0	0
Natural Infiltration Rates				
Heating Air Leakage Rate (ACH/H):	0.304			
Cooling Air Leakage Rate (ACH/H):	0.101			

TYPE: ELMBROOK 4A
LO# 71729

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
Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.



ELMBROCK 4A
ELEV. 1

CSA-F280-12
PACKAGE A1

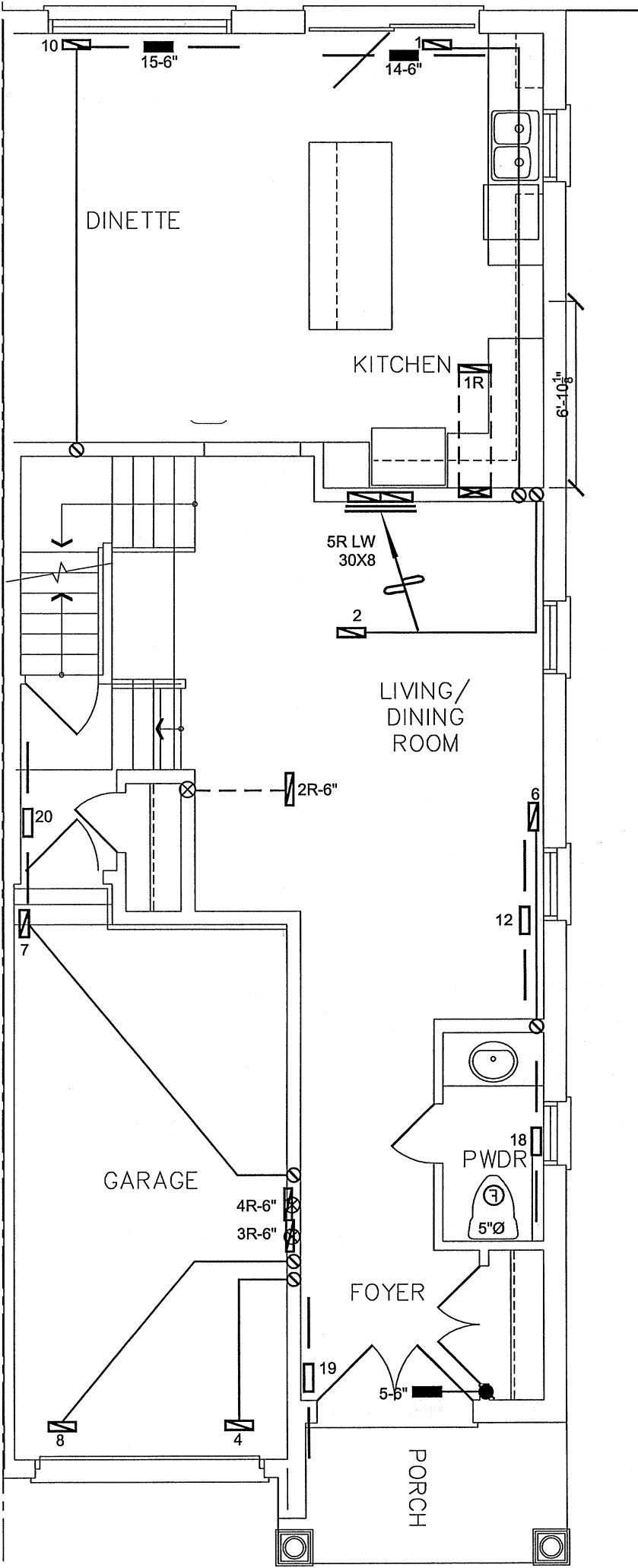
HVAC LEGEND							3.		
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	2.	
	FLOOR SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE	1.	
	FLOOR SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE	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

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Client GREENPARK HOMES	HVACDESIGNS LTD. 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	HEAT LOSS 35125 BTU/H UNIT DATA MAKE AMANA MODEL AMEC960402BNA-40 INPUT 40 MBTU/H OUTPUT 38.4 MBTU/H COOLING 2.0 TONS FAN SPEED 890 cfm @ 0.6" w.c.	# OF RUNS S/A R/A FANS 3RD FLOOR 2ND FLOOR 8 4 2 1ST FLOOR 6 1 2 BASEMENT 4 1 0	Sheet Title BASEMENT HEATING LAYOUT	
				Date	JAN/2017
Project Name STAR TIME VAUGHAN, ONTARIO	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.		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	Scale	3/16" = 1'-0"
				BCIN# 19669	
ELMBROOK 4A	1932 sqft			LO#	71729

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Michael O'Rourke
Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.



ELMBROCK 4A
ELEV. 1

CSA-F280-12
PACKAGE A1

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"x8" 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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Project Name STAR TIME VAUGHAN, ONTARIO			Date JAN/2017	
			Scale 3/16" = 1'-0"	
			BCIN# 19669	
ELMBROOK 4A	1932 sqft		LO#	71729

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Michael O'Rourke
Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

CSA-F280-12

PACKAGE A1

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"x8" 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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Project Name STAR TIME VAUGHAN, ONTARIO			Date JAN/2017	
ELMBROOK 4A 1932 sqft			Scale 3/16" = 1'-0"	
			BCIN# 19669	
			LO# 71729	