Schedule 1: Designer Information

Use one form for each individual who reviews and takes responsibility for design activities with respect to the project.

A. Project Information

Building number, street name			Unit no.	Lot/con.
Municipality	**Postal code**	**Plan number/ other description**		
RICHMOND HILL				

B. Individual who reviews and takes responsibility for design activities

Name		Firm		
MICHAEL O'ROURKE		**HVAC DESIGNS LTD.**		
Street address			Unit no.	Lot/con.
375 FINLEY AVE			**202**	**N/A**
Municipality	Postal code	Province	E-mail	
AJAX	**L1S 2E2**	**ONTARIO**	**info@hvacdesigns.ca**	
Telephone number	Fax number		Cell number	
(905) 619-2300	**(905) 619-2375**		( )	

C. Design activities undertaken by individual identified in Section B. [Building Code Table 3.5.2.1 OF Division C]

❑ House	☒ HVAC – House	❑ Building Structural
❑ Small Buildings	❑ Building Services	❑ Plumbing – House
❑ Large Buildings	❑ Detection, Lighting and Power	❑ Plumbing – All Buildings
❑ Complex Buildings	❑ Fire Protection	❑ On-site Sewage Systems

Description of designer's work	
HEAT LOSS / GAIN CALCULATIONS **DUCT SIZING** **RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY** **RESIDENTIAL SYSTEM DESIGN per CSA-F280-12**	**Model:** 4505 ELMWOOD **Project:** CENTREFIELD (WEST GORMLEY)

D. Declaration of Designer

I **MICHAEL O'ROURKE** declare that (choose one as appropriate):
(print name)

❑ I review and take responsibility for the design work on behalf of a firm registered under subsection 3.2.4.of Division C, of the Building Code. I am qualified, and the firm is registered, in the appropriate classes/categories.

Individual BCIN: _____
Firm BCIN: _____

City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: PXV

☒ I review and take responsibility for the design and am qualified in the appropriate category as an "other designer" under subsection 3.2.5.of Division C, of the Building Code.

Individual BCIN: 19669
Basis for exemption from registration and qualification: O.B.C SENTENCE 3.2.4.1 (4)

❑ The design work is exempt from the registration and qualification requirements of the Building Code.
Basis for exemption from registration and qualification: _____

I certify that:

1. The information contained in this schedule is true to the best of my knowledge.
2. I have submitted this application with the knowledge and consent of the firm.

June 4, 2021
Date

Michael O'Rourke
Signature of Designer

NOTE:

1. For the purposes of this form, "individual" means the "person" referred to in Clause 3.2.4.7(1) d).of Division C, Article 3.2.5.1. of Division C, and all other persons who are exempt from qualification under Subsections 3.2.4. and 3.2.5. of Division C.
2. Schedule 1 is not required to be completed by a holder of a license, temporary license, or a certificate of authorization, issued by the Ontario Association of Architects. Schedule 1 is also not required to be completed by a holder of a license to practise, a limited license to practise, or a certificate of authorization, issued by the Association of Professional Engineers of Ontario.

Schedule 1: Designer Information

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Municipality	**Postal code**	**Plan number/ other description**		
RICHMOND HILL				

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Street address			Unit no.	Lot/con.
375 FINLEY AVE			**202**	**N/A**
Municipality	Postal code	Province	E-mail	
AJAX	**L1S 2E2**	**ONTARIO**	**info@hvacdesigns.ca**	
Telephone number	Fax number		Cell number	
(**905**) **619-2300**	(**905**) **619-2375**		( )	

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Description of designer's work
HEAT LOSS / GAIN CALCULATIONS
DUCT SIZING
RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY
RESIDENTIAL SYSTEM DESIGN per CSA-F280-12

Model: 4505
ELMWOOD
OPT 2ND

Project: CENTREFIELD (WEST GORMLEY)

D. Declaration of Designer

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(print name)

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Date

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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

SITE NAME: CENTREFIELD (WEST GORMLEY) | OPT 2ND | DATE: Jun-21 | WINTER NATURAL AIR CHANGE RATE 0.229 | HEAT LOSS ΔT °F. 78 | CSA-F280-12
BUILDER: ROYAL PINE HOMES | TYPE: 4505 | GFA: 3289 | LO# 87521 | SUMMER NATURAL AIR CHANGE RATE 0.072 | HEAT GAIN ΔT °F. 13 | SB-12 PERFORMANCE

ROOM USE			MBR			ENS				BED-2			BED-3			BED-4			BATH-2				BED-5			BATH				
EXP. WALL			37			34				34			44			15			7				14			9				
CLG. HT.			10			9				9			10			9			9				9			9				
	FACTORS																													
GRS.WALL AREA	LOSS	GAIN	370			306				306			418			135			63				126			81				
GLAZING				LOSS	GAIN		LOSS	GAIN			LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN			LOSS	GAIN		LOSS	GAIN		
NORTH	21.8	15.6	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0		
EAST	21.8	40.5	0	0	0	0	0	0		58	1263	2347	64	1394	2590	0	0	0	0	0	0		0	0	0	0	0	0		
SOUTH	21.8	24.3	0	0	0	0	0	0		0	0	0	0	0	0	17	370	413	0	0	0		17	370	413	7	152	170		
WEST	21.8	40.5	26	566	1052	17	370	688		0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0		
SKYLT.	35.8	101.2	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0		
DOORS	25.8	4.3	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0		
NET EXPOSED WALL	4.2	0.7	344	1447	238	289	1215	200		248	1043	172	354	1489	245	118	496	82	63	265	44		109	458	75	74	311	51		
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0		
EXPOSED CLG	1.3	0.6	390	513	229	264	347	155		241	317	142	245	322	144	320	421	188	77	101	45		196	258	115	117	154	69		
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0		24	67	30	90	253	113	0	0	0	0	0	0		0	0	0	0	0	0		
EXPOSED FLOOR	2.6	0.4	0	0	0	0	0	0		265	692	114	42	110	18	0	0	0	48	125	21		98	256	42	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				2526			1933				3382			3567			1287			491				1342			617			
SUB TOTAL HT GAIN					1519			1043				2804			3110			683			109				646			290		
LEVEL FACTOR / MULTIPLIER			0.20	0.20		0.20	0.20			0.20	0.20		0.20	0.20		0.20	0.20		0.20	0.20			0.20	0.20		0.20	0.20			
AIR CHANGE HEAT LOSS				499			382				668			705			254			97				265			122			
AIR CHANGE HEAT GAIN					89			61				164			182			40			6				38			17		
DUCT LOSS				0			0				405			427			0			59				161			0			
DUCT GAIN					0			0				388			420			0			12				159			0		
HEAT GAIN PEOPLE	240		2		480	0		0		1		240	1		240	1		240	0		0		1		240	0		0		
HEAT GAIN APPLIANCES/LIGHTS					667			0				667			667			667			0				667			0		
TOTAL HT LOSS BTU/H				3025			2314				4456			4699			1541			647				1768			739			
TOTAL HT GAIN x 1.3 BTU/H					3582			1435				5542			6005			2119			166				2275			399		

ROOM USE			LIV				K/B/G			DIN			LAUN			W/R			FOY			WIC						BAS		
EXP. WALL			35				72			23			28			7			24			10						188		
CLG. HT.			11				11			11			12			11			11			11						10		
	FACTORS																													
GRS.WALL AREA	LOSS	GAIN	385				792			253			336			77			264			110						1410		
GLAZING				LOSS	GAIN			LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN					LOSS	GAIN
NORTH	21.8	15.6	0	0	0		0	0	0	0	0	0	8	174	125	0	0	0	0	0	0	0	0	0				3	65	47
EAST	21.8	40.5	37	806	1497		0	0	0	0	0	0	0	0	0	0	0	0	12	261	486	0	0	0				0	0	0
SOUTH	21.8	24.3	0	0	0		0	0	0	31	675	753	0	0	0	9	196	219	0	0	0	0	0	0				7	152	170
WEST	21.8	40.5	0	0	0		75	1634	3035	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				3	65	121
SKYLT.	35.8	101.2	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0
DOORS	25.8	4.3	0	0	0		20	517	85	0	0	0	20	517	85	0	0	0	30	775	128	0	0	0				20	517	85
NET EXPOSED WALL	4.2	0.7	348	1463	241		697	2931	482	222	934	154	308	1295	213	68	286	47	222	934	154	110	463	76				0	0	0
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				470	1731	285
EXPOSED CLG	1.3	0.6	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	118	53				0	0	0
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0		10	28	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0
EXPOSED FLOOR	2.6	0.4	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0
BASEMENT/CRAWL HEAT LOSS				0				0			0			0			0			0			0					5902		
SLAB ON GRADE HEAT LOSS				0				0			0			0			0			0			0							
SUBTOTAL HT LOSS				2269				5110			1609			1986			482			1970			581					8433		
SUB TOTAL HT GAIN					1738				3615			907			423			266			767			129						708	
LEVEL FACTOR / MULTIPLIER			0.30	0.32			0.30	0.32		0.30	0.32		0.30	0.32		0.30	0.32		0.30	0.32		0.30	0.32					0.50	0.89	
AIR CHANGE HEAT LOSS				727				1637			515			636			154			631			186					7480		
AIR CHANGE HEAT GAIN					102				211			53			25			16			45			8						41	
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	
HEAT GAIN APPLIANCES/LIGHTS					667				667			667			667			0			0			0						0	
TOTAL HT LOSS BTU/H				2997				6747			2124			2623			636			2602			767					15913		
TOTAL HT GAIN x 1.3 BTU/H					3259				5842			2115			1450			366			1055			178						975	

TOTAL HEAT GAIN BTU/H: 37092 TONS: 3.09 LOSS DUE TO VENTILATION LOAD BTU/H: 2004 STRUCTURAL HEAT LOSS: 53600 TOTAL COMBINED HEAT LOSS BTU/H: 55603

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

HVAC DESIGNS LTD.

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Tel: 905.619.2300 Fax: 905.619.2375
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SITE NAME: CENTREFIELD (WEST GORMLEY) OPT 2ND
BUILDER: ROYAL PINE HOMES TYPE: 4505 DATE: Jun-21 GFA: 3289 LO# 87521

				furnace pressure	0.6				
HEATING CFM	1200	COOLING CFM	1200	furnace filter	0.05		**CARRIER	AFUE =	97 %
TOTAL HEAT LOSS	53,600	TOTAL HEAT GAIN	36,762	a/c coil pressure	0.2		**59TN6A-060-14V** **60**	INPUT (BTU/H) =	60,000
AIR FLOW RATE CFM	22.39	AIR FLOW RATE CFM	32.64	available pressure			FAN SPEED	OUTPUT (BTU/H) =	**58,000**
				for s/a & r/a	0.35		LOW 820		
							MEDLOW 0	DESIGN CFM =	**1200**
				plenum pressure s/a	0.18	r/a pressure 0.17	MEDIUM 1200	CFM @ .6 " E.S.P.	
				max s/a dif press. loss	0.02	r/a grille press. Loss 0.02	MEDIUM HIGH 0		
				min adjusted pressure s/a	0.16	adjusted pressure r/a 0.15	HIGH 1520	TEMPERATURE RISE	45 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	13	9	4
R/A	0	0	6	3	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	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
ROOM NAME	MBR	ENS	BED-2	BED-2	BED-3	BATH	BATH-2	BED-3	BATH-2	MBR	BED-4	LIV	K/B/G	K/B/G	K/B/G	DIN	LAUN	W/R	FOY	WIC	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.51	1.16	2.23	2.23	2.35	0.74	0.32	2.35	0.32	1.51	1.54	3.00	2.25	2.25	2.25	2.12	2.62	0.64	2.60	0.77	3.98	3.98	3.98	3.98
CFM PER RUN HEAT	34	26	50	50	53	17	7	53	7	34	35	67	50	50	50	48	59	14	58	17	89	89	89	89
RM GAIN MBH.	1.79	0.72	2.77	2.77	3.00	0.40	0.08	3.00	0.08	1.79	2.12	3.26	1.95	1.95	1.95	2.12	1.45	0.37	1.06	0.18	0.24	0.24	0.24	0.24
CFM PER RUN COOLING	58	23	90	90	98	13	3	98	3	58	69	106	64	64	64	69	47	12	34	6	8	8	8	8
ADJUSTED PRESSURE	0.17	0.17	0.16	0.16	0.16	0.17	0.17	0.16	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.	32	58	58	51	49	29	41	47	45	49	32	31	28	39	51	6	43	17	36	46	45	26	8	27
EQUIVALENT LENGTH	150	150	150	140	180	130	120	170	130	150	140	90	130	130	100	140	120	150	100	160	110	120	150	110
TOTAL EFFECTIVE LENGTH	182	208	208	191	229	159	161	217	175	199	172	121	158	169	151	146	163	167	136	206	155	146	158	137
ADJUSTED PRESSURE	0.09	0.08	0.08	0.08	0.07	0.11	0.11	0.07	0.1	0.09	0.1	0.13	0.11	0.1	0.11	0.12	0.11	0.1	0.13	0.08	0.1	0.11	0.1	0.12
ROUND DUCT SIZE	5	5	**6**	**6**	**6**	5	4	**6**	4	5	**6**	**6**	5	5	5	**6**	5	4	5	4	**6**	**6**	**6**	**6**
HEATING VELOCITY (ft/min)	250	191	255	255	270	125	80	270	80	250	178	342	367	367	367	245	433	161	426	195	454	454	454	454
COOLING VELOCITY (ft/min)	426	169	459	459	500	95	34	500	34	426	352	540	470	470	470	352	345	138	250	69	41	41	41	41
OUTLET GRILL SIZE	3X10	3X10	4X10	4X10	4X10	3X10	3X10	4X10	3X10	3X10	4X10	4X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	D	D	B	B	A	B	B	A	B	D	A	A	D	C	C	B	C	A	A	C	C	D	B	A

RUN #	25	26
ROOM NAME	ENS	BED-5
RM LOSS MBH.	1.16	1.77
CFM PER RUN HEAT	26	40
RM GAIN MBH.	0.72	2.27
CFM PER RUN COOLING	23	74
ADJUSTED PRESSURE	0.17	0.17
ACTUAL DUCT LGH.	30	9
EQUIVALENT LENGTH	170	170
TOTAL EFFECTIVE LENGTH	200	179
ADJUSTED PRESSURE	0.09	0.1
ROUND DUCT SIZE	4	**6**
HEATING VELOCITY (ft/min)	298	204
COOLING VELOCITY (ft/min)	264	377
OUTLET GRILL SIZE	3X10	4X10
TRUNK	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	369	0.07	10	14	x	8	474	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	637	0.07	12.2	20	x	8	573	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	265	0.08	8.5	8	x	8	596	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	564	0.08	11.3	14	x	8	725	TRUNK J	0	0.00	0	0	x	8	0
TRUNK E	0	0.00	0	0	x	8	0	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	910	0.05	15.2	26	x	8	630
TRUNK Y	425	0.05	11.5	16	x	8	478
TRUNK Z	290	0.05	9.9	12	x	8	435
DROP	1200	0.05	16.9	24	x	12	600

RETURN AIR #	1	2	3	4	5	6	7	8	9							**BR**
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	135	75	75	85	75	155	175	175	75	0	0	0	0	0	0	175
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.	41	50	53	52	58	35	23	30	46	1	1	1	1	1	1	17
EQUIVALENT LENGTH	215	205	245	165	175	200	185	190	185	0	0	0	0	0	0	185
TOTAL EFFECTIVE LH	256	255	298	217	233	235	208	220	231	1	1	1	1	1	1	202
ADJUSTED PRESSURE	0.06	0.06	0.05	0.07	0.06	0.06	0.07	0.07	0.06	14.80	14.80	14.80	14.80	14.80	14.80	0.07
ROUND DUCT SIZE	7.1	5.7	6	5.8	5.7	7.5	7.5	7.5	5.7	0	0	0	0	0	0	7.5
INLET GRILL SIZE	8	8	8	8	8	8	8	8	8	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	14	14	14	14	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

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

TYPE: 4505 LO # 87521
SITE NAME: CENTREFIELD (WEST GORMLEY) OPT 2ND

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, 3 vented induced draft appliance
- d) [ ] Solid Fuel (including fireplaces)
- e) [ ] No Combustion Appliances

City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: PXV

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	4	@ 10.6 cfm	42.4	cfm
Kitchen & Bathrooms	5	@ 10.6 cfm	53	cfm
Other Rooms	5	@ 10.6 cfm	53.0	cfm
Table 9.32.3.A.		TOTAL	190.8	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	**95.4**	**cfm**

SUPPLEMENTAL VENTILATION CAPACITY 9.32.3.5.

Total Ventilation Capacity	190.8	cfm
Less Principal Ventil. Capacity	95.4	cfm
Required Supplemental Capacity	95.4	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE 65H Location: BSMT

95.4 cfm [✓] HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM		ΔT °F		FACTOR		% LOSS
95.4 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-2	BY INSTALLING CONTRACTOR	50	✓	3.5
BATH	BY INSTALLING CONTRACTOR	50	✓	3.5
W/R	BY INSTALLING CONTRACTOR	50	✓	3.5

HEAT RECOVERY VENTILATOR 9.32.3.11.

Model: VANEE 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: ROYAL PINE 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: June-21

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

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

CSA F280-12 Residential Heat Loss and Heat Gain Calculations

Formula Sheet (For Air Leakage / Ventiliation Calculation)

LO#: 87521 Model: 4505 Builder: ROYAL PINE HOMES Date: 2021-06-04

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1434	10	14340
First	1434	11	15774
Second	1861	9	16749
Third	0	9	0
Fourth	0	9	0
		Total:	46,863.0 ft³
		Total:	1327.0 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.229
SUMMER NATURAL AIR CHANGE RATE	0.072

Design Temperature Difference

	Tin °C	Tout °C	ΔT °C	ΔT °F
Winter DTDh	22	-21	43	78
Summer DTDc	24	31	7	13

5.2.3.1 Heat Loss due to Air Leakage

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

0.229 x 368.61 x 43 °C x 1.2 = 4385 W

= **14960 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

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

= 0.072 x 368.61 x 7 °C x 1.2 = 225 W

= **768 Btu/h**

5.2.3.2 Heat Loss due to Mechanical Ventilation

$$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

95 CFM x 78 °F x 1.08 x 0.25 = **2004 Btu/h**

6.2.7 Sensible heat Gain due to Ventilation

$$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

95 CFM x 13 °F x 1.08 x 0.25 = **330 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	14,960	8,433	0.887
2	0.3		14,008	0.320
3	0.2		15,146	0.198
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: 4505 OPT 2ND **BUILDER:** ROYAL PINE HOMES
SFQT: 3289 **LO#** 87521 **SITE:** CENTREFIELD (WEST GORMLEY)

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

BUILDING DATA

ATTACHMENT:	DETACHED	# OF STORIES (+BASEMENT):	3
FRONT FACES:	EAST	ASSUMED (Y/N):	Y
AIR CHANGES PER HOUR:	2.50	ASSUMED (Y/N):	Y
AIR TIGHTNESS CATEGORY:	TIGHT	ASSUMED (Y/N):	Y
WIND EXPOSURE:	SHELTERED	ASSUMED (Y/N):	Y
HOUSE VOLUME (ft^3):	46863.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	6
INTERIOR LIGHTING LOAD ($Btu/h/ft^2$):	1.27	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	7.5 ft
LENGTH: 38.0 ft	WIDTH: 56.0 ft	EXPOSED PERIMETER:	188.0 ft

2012 OBC - COMPLIANCE PACKAGE **Component**	**Compliance Package SB-12 PERFORMANCE**	
	Nominal	**Min. Eff.**
Ceiling with Attic Space Minimum RSI (R)-Value	60	59.20
Ceiling Without Attic Space Minimum RSI (R)-Value	31	27.70
Exposed Floor Minimum RSI (R)-Value	31	29.80
Walls Above Grade Minimum RSI (R)-Value	22+1.5	18.50
Basement Walls Minimum RSI (R)-Value	20	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	1.6	-
Skylights Maximum U-Value	2.6	-
Space Heating Equipment Minimum AFUE	0.96	-
HRV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	TE=94%	-

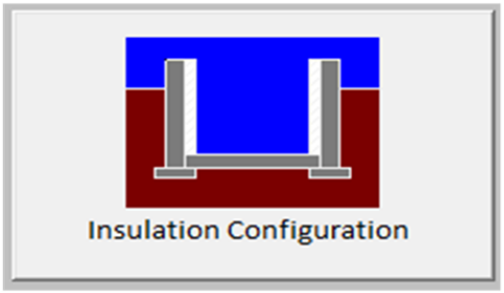
INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

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):	**11.6**	 Insulation Configuration
Floor Width (m):	**17.1**	
Exposed Perimeter (m):	**0.0**	
Wall Height (m):	**3.0**	
Depth Below Grade (m):	**2.29**	
Window Area (m^2):	**1.2**	
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):		**1729**

TYPE: 4505 OPT 2ND
LO# 87521

HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

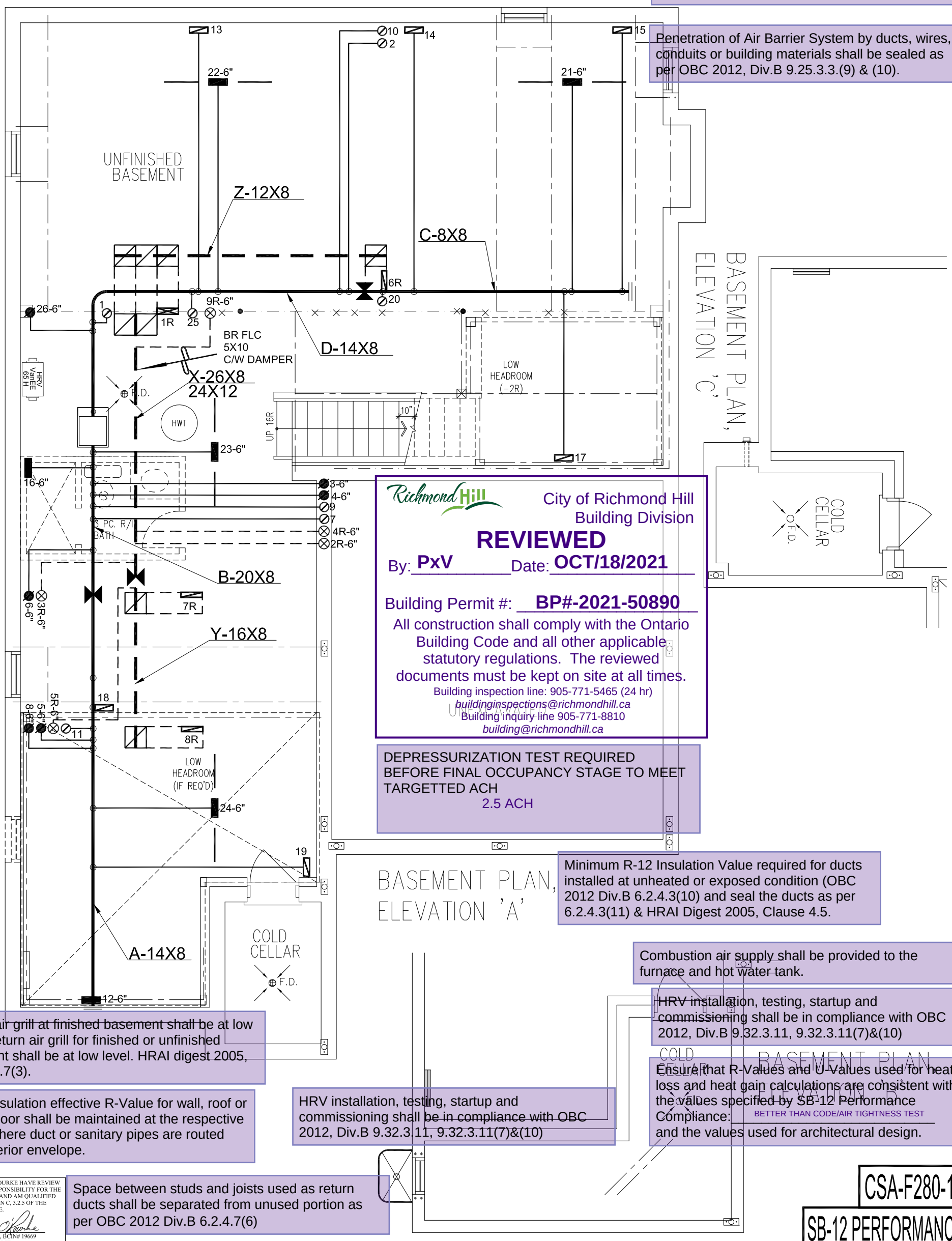
Weather Station Description	
Province:	Ontario
Region:	Richmond Hill
Weather Station Location:	Open flat terrain, grass
Anemometer height (m):	10
Local Shielding	
Building Site:	Suburban, forest
Walls:	Heavy
Flue:	Heavy
Highest Ceiling Height (m):	6.86
Building Configuration	
Type:	Detached
Number of Stories:	Two
Foundation:	Full
House Volume (m^3):	1327.0
Air Leakage/Ventilation	
Air Tightness Type:	Energy Star Detached (2.5 ACH)
Custom BDT Data:	ELA @ 10 Pa. 1238.8 cm^2
	2.50 ACH @ 50 Pa
Mechanical Ventilation (L/s):	Total Supply 45.0 / Total Exhaust 45.0
Flue Size	
Flue #:	#1 #2 #3 #4
Diameter (mm):	0 0 0 0
Natural Infiltration Rates	
Heating Air Leakage Rate (ACH/H):	**0.229**
Cooling Air Leakage Rate (ACH/H):	**0.072**

TYPE: 4505 OPT 2ND

LO# 87521

Volume control dampers to all branches to be installed per OBC 2012, Div.B, 6.2.4.5.

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).



Richmond Hill

City of Richmond Hill
Building Division

REVIEWED

By: **PxV** Date: **OCT/18/2021**

Building Permit #: **BP#-2021-50890**

All construction shall comply with the Ontario Building Code and all other applicable statutory regulations. The reviewed documents must be kept on site at all times.

Building inspection line: 905-771-5465 (24 hr)
buildinginspections@richmondhill.ca
Building inquiry line 905-771-8810
building@richmondhill.ca

DEPRESSURIZATION TEST REQUIRED BEFORE FINAL OCCUPANCY STAGE TO MEET TARGETTED ACH
2.5 ACH

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.

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

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)

Ensure that R-Values and U-Values used for heat loss and heat gain calculations are consistent with the values specified by SB-12 Performance Compliance: BETTER THAN CODE/AIR TIGHTNESS TEST and the values used for architectural design.

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).

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.

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)

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)

I MICHAEL O'ROURKE HAVE REVIEW 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.

CSA-F280-12

SB-12 PERFORMANCE

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.	REVISED AS PER CAD	JUNE/2021
2.	REVISED AS PER ARCHITECTURALS	APR/2021
1.	REVISED TO PERFORMANCE	SEPT/2020

REVISIONS

Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

OPT 2ND
4505 3289 sqft

HVAC DESIGNS 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

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	55603 BTU/H
UNIT DATA	
MAKE	CARRIER
MODEL	59TN6A-060-14V
INPUT	60 MBTU/H
OUTPUT	58 MBTU/H
COOLING	3.0 TONS
FAN SPEED	1200 cfm @ 0.6" w.c.

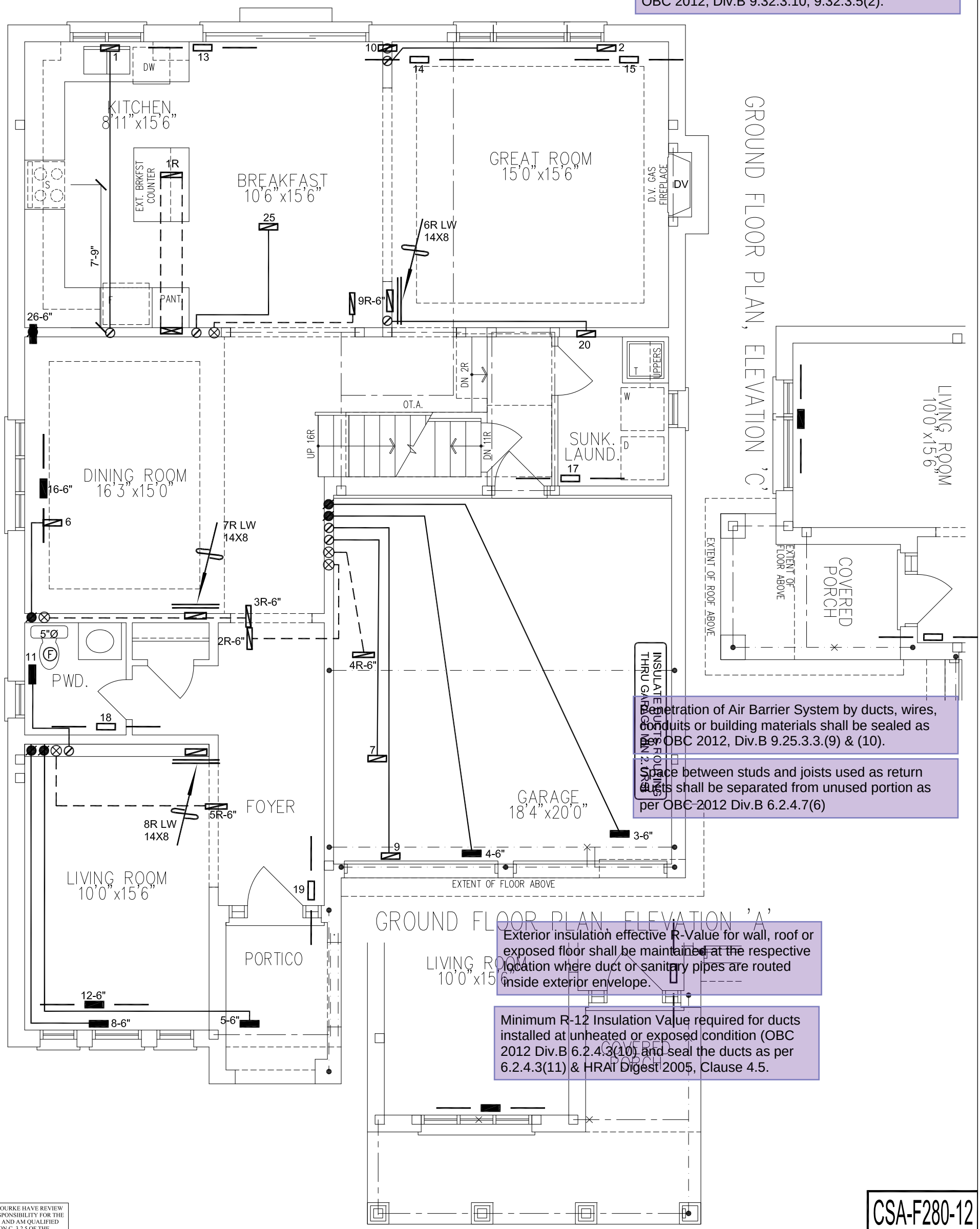
# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	13	6	4
1ST FLOOR	9	3	2
BASEMENT	4	1	0

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 SEPT/2020
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 87521

Kitchen hood exhaust duct shall be provided as per OBC 2012, Div.B 9.32.3.10, 9.32.3.5(2).



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).

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)

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.

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.

GROUND FLOOR PLAN, ELEVATION 'B'

CSA-F280-12

SB-12 PERFORMANCE

I MICHAEL O'ROURKE HAVE REVIEW 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.

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.	REVISED AS PER CAD	JUNE/2021
2.	REVISED AS PER ARCHITECTURALS	APR/2021
1.	REVISED TO PERFORMANCE	SEPT/2020

REVISIONS

Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

OPT 2ND
4505 3289 sqft

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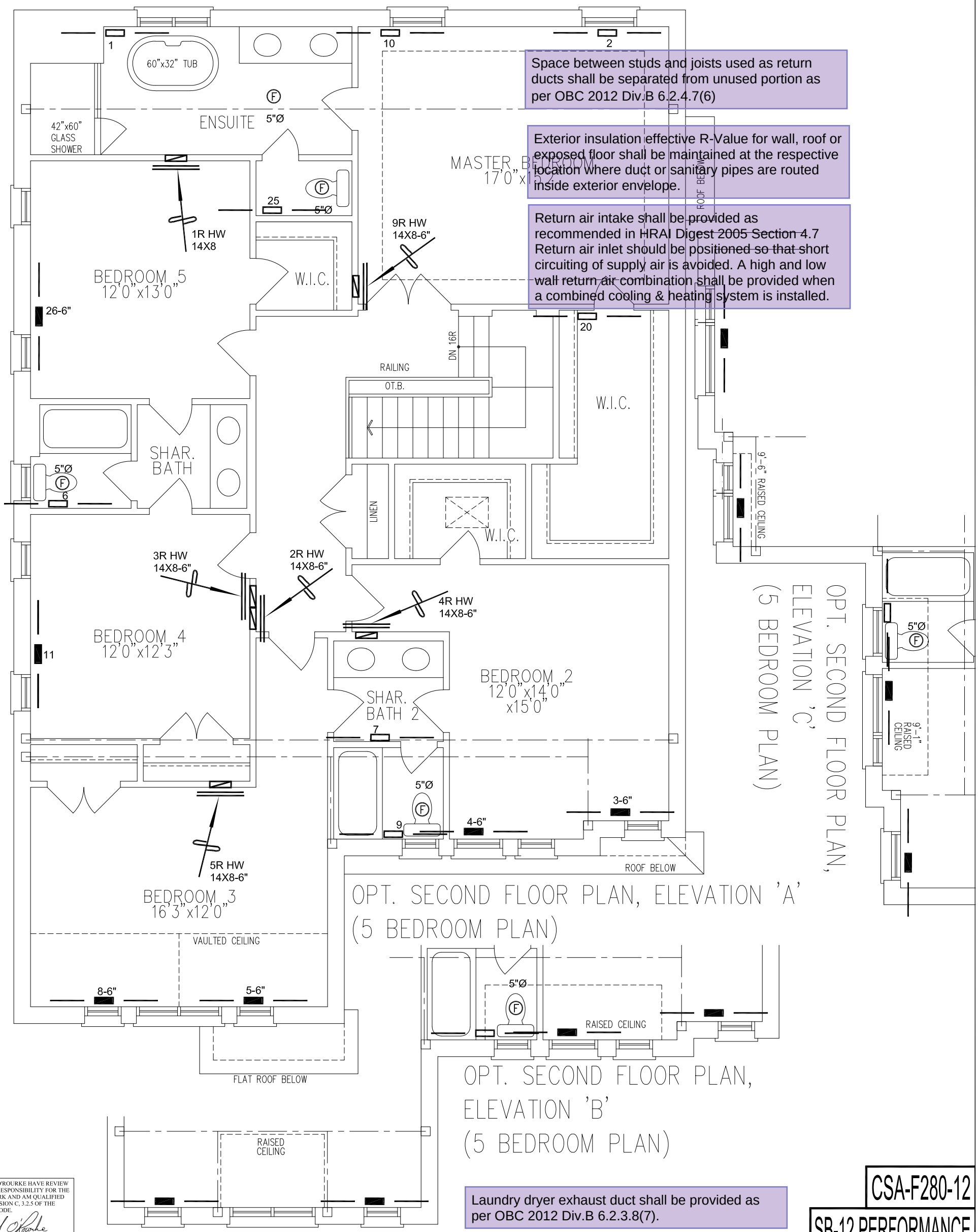
Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

Sheet Title
FIRST FLOOR HEATING LAYOUT

Date SEPT/2020
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 87521



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)

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.

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.

Laundry dryer exhaust duct shall be provided as per OBC 2012 Div.B 6.2.3.8(7).

CSA-F280-12

SB-12 PERFORMANCE

I MICHAEL O'ROURKE HAVE REVIEW 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.

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
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	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
3.	REVISED AS PER CAD	JUNE/2021
2.	REVISED AS PER ARCHITECTURALS	APR/2021
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REVISIONS

Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

OPT 2ND
4505 3289 sqft

HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 - Ajax, Ontario
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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
SECOND FLOOR HEATING LAYOUT

Date SEPT/2020
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 87521

Schedule 1: Designer Information

Use one form for each individual who reviews and takes responsibility for design activities with respect to the project.

A. Project Information

Building number, street name			Unit no.	Lot/con.
Municipality	**Postal code**	**Plan number/ other description**		
RICHMOND HILL				

B. Individual who reviews and takes responsibility for design activities

Name		Firm		
MICHAEL O'ROURKE		**HVAC DESIGNS LTD.**		
Street address			Unit no.	Lot/con.
375 FINLEY AVE			**202**	**N/A**
Municipality	Postal code	Province	E-mail	
AJAX	**L1S 2E2**	**ONTARIO**	**info@hvacdesigns.ca**	
Telephone number	Fax number		Cell number	
(**905**) **619-2300**	(**905**) **619-2375**		( )	

C. Design activities undertaken by individual identified in Section B. [Building Code Table 3.5.2.1 OF Division C]

❑ House	☒ HVAC – House	❑ Building Structural
❑ Small Buildings	❑ Building Services	❑ Plumbing – House
❑ Large Buildings	❑ Detection, Lighting and Power	❑ Plumbing – All Buildings
❑ Complex Buildings	❑ Fire Protection	❑ On-site Sewage Systems

Description of designer's work
HEAT LOSS / GAIN CALCULATIONS
DUCT SIZING
RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY
RESIDENTIAL SYSTEM DESIGN per CSA-F280-12

Model: 4505
ELMWOOD
OPT 2ND

Project: CENTREFIELD (WEST GORMLEY)

D. Declaration of Designer

I **MICHAEL O'ROURKE** declare that (choose one as appropriate):
(print name)

❑ I review and take responsibility for the design work on behalf of a firm registered under subsection 3.2.4.of Division C, of the Building Code. I am qualified, and the firm is registered, in the appropriate classes/categories.

Individual BCIN: _____
Firm BCIN: _____

☒ I review and take responsibility for the design and am qualified in the appropriate category as an "other designer" under subsection 3.2.5.of Di vision C, of the Building Code.

Individual BCIN: 19669
Basis for exemption from registration and qualification: O.B.C SENTENCE 3.2.4.1 (4)

❑ The design work is exempt from the registration and qualification requirements of the Building Code.
Basis for exemption from registration and qualification: _____

I certify that:

1. The information contained in this schedule is true to the best of my knowledge.
2. I have submitted this application with the knowledge and consent of the firm.

June 4, 2021
Date

Michael O'Rourke
Signature of Designer

NOTE:

1. For the purposes of this form, "individual" means the "person" referred to in Clause 3.2.4.7(1) d).of Division C, Article 3.2.5.1. of Division C, and all other persons who are exempt from qualification under Subsections 3.2.4. and 3.2.5. of Division C.
2. Schedule 1 is not required to be completed by a holder of a license, temporary license, or a certificate of authorization, issued by the Ontario Association of Architects. Schedule 1 is also not required to be completed by a holder of a license to practise, a limited license to practise, or a certificate of authorization, issued by the Association of Professional Engineers of Ontario.

Schedule 1: Designer Information

Use one form for each individual who reviews and takes responsibility for design activities with respect to the project.

A. Project Information

Building number, street name			Unit no.	Lot/con.
Municipality	**Postal code**	**Plan number/ other description**		
RICHMOND HILL				

B. Individual who reviews and takes responsibility for design activities

Name		Firm		
MICHAEL O'ROURKE		**HVAC DESIGNS LTD.**		
Street address			**Unit no.**	**Lot/con.**
375 FINLEY AVE			**202**	**N/A**
Municipality	**Postal code**	**Province**	**E-mail**	
AJAX	**L1S 2E2**	**ONTARIO**	**info@hvacdesigns.ca**	
Telephone number	**Fax number**		**Cell number**	
(905) 619-2300	**(905) 619-2375**		( )	

C. Design activities undertaken by individual identified in Section B. [Building Code Table 3.5.2.1 OF Division C]

☐ House	☒ HVAC – House	☐ Building Structural
☐ Small Buildings	☐ Building Services	☐ Plumbing – House
☐ Large Buildings	☐ Detection, Lighting and Power	☐ Plumbing – All Buildings
☐ Complex Buildings	☐ Fire Protection	☐ On-site Sewage Systems

Description of designer's work	
HEAT LOSS / GAIN CALCULATIONS **DUCT SIZING** **RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY** **RESIDENTIAL SYSTEM DESIGN per CSA-F280-12**	**Model:** 4505 ELMWOOD OPT 5 BED 4 BATH **Project:** CENTREFIELD (WEST GORMLEY)

D. Declaration of Designer

I **MICHAEL O'ROURKE** declare that (choose one as appropriate):
(print name)

☐ I review and take responsibility for the design work on behalf of a firm registered under subsection 3.2.4.of Division C, of the Building Code. I am qualified, and the firm is registered, in the appropriate classes/categories.

Individual BCIN: _____
Firm BCIN: _____

☒ I review and take responsibility for the design and am qualified in the appropriate category as an "other designer" under subsection 3.2.5.of Di vision C, of the Building Code.

Individual BCIN: 19669
Basis for exemption from registration and qualification: O.B.C SENTENCE 3.2.4.1 (4)

☐ The design work is exempt from the registration and qualification requirements of the Building Code.
Basis for exemption from registration and qualification: _____

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June 4, 2021
Date

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Signature of Designer

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Schedule 1: Designer Information

Use one form for each individual who reviews and takes responsibility for design activities with respect to the project.

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Building number, street name			Unit no.	Lot/con.
Municipality	**Postal code**	**Plan number/ other description**		
RICHMOND HILL				

B. Individual who reviews and takes responsibility for design activities

Name		Firm		
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Street address			**Unit no.**	**Lot/con.**
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Municipality	**Postal code**	**Province**	**E-mail**	
AJAX	**L1S 2E2**	**ONTARIO**	**info@hvacdesigns.ca**	
Telephone number	**Fax number**		**Cell number**	
(905) 619-2300	**(905) 619-2375**		( )	

C. Design activities undertaken by individual identified in Section B. [Building Code Table 3.5.2.1 OF Division C]

☐ House	☒ HVAC – House	☐ Building Structural
☐ Small Buildings	☐ Building Services	☐ Plumbing – House
☐ Large Buildings	☐ Detection, Lighting and Power	☐ Plumbing – All Buildings
☐ Complex Buildings	☐ Fire Protection	☐ On-site Sewage Systems

Description of designer's work	
HEAT LOSS / GAIN CALCULATIONS **DUCT SIZING** **RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY** **RESIDENTIAL SYSTEM DESIGN per CSA-F280-12**	**Model:** 4505 OPT 5 BED 4 BATH **Project:** CENTREFIELD (WEST GORMLEY)

D. Declaration of Designer

I **MICHAEL O'ROURKE** declare that (choose one as appropriate):
(print name)

☐ I review and take responsibility for the design work on behalf of a firm registered under subsection 3.2.4.of Division C, of the Building Code. I am qualified, and the firm is registered, in the appropriate classes/categories.

Individual BCIN: _____
Firm BCIN: _____

☒ I review and take responsibility for the design and am qualified in the appropriate category as an "other designer" under subsection 3.2.5.of Di vision C, of the Building Code.

Individual BCIN: 19669
Basis for exemption from registration and qualification: O.B.C SENTENCE 3.2.4.1 (4)

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June 4, 2021
Date

Michael O'Rourke
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Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

SITE NAME: CENTREFIELD (WEST GORMLEY) | OPT 5 BED 4 BATH | DATE: Jun-21 | WINTER NATURAL AIR CHANGE RATE 0.219 | HEAT LOSS ΔT °F. 78 | CSA-F280-12

BUILDER: ROYAL PINE HOMES | TYPE: 4505 | GFA: 3289 | LO# 91154 | SUMMER NATURAL AIR CHANGE RATE 0.068 | HEAT GAIN ΔT °F. 13 | SB-12 PERFORMANCE

ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4			ENS-2			BED-5			ENS-3			ENS-4/5				
EXP. WALL			35			26			8			29			42			13			6			14			6			6				
CLG. HT.			9			8			8			8			9			8			8			8			8			8				
	FACTORS																																	
GRS.WALL AREA	LOSS	GAIN	315			208			64			232			357			104			48			112			48			48				
GLAZING			LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN		
NORTH	21.8	15.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
EAST	21.8	40.5	0	0	0	0	0	0	0	0	0	43	937	1740	65	1416	2630	0	0	0	0	0	0	0	0	0	16	349	647	0	0	0		
SOUTH	21.8	24.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	349	389	0	0	0	16	349	389	0	0	0	7	152	170		
WEST	21.8	40.5	26	566	1052	18	392	728	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.	35.8	101.2	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	0	0	0		
DOORS	25.8	4.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
NET EXPOSED WALL	4.2	0.7	289	1215	200	190	799	131	64	269	44	189	795	131	292	1228	202	88	370	61	48	202	33	96	404	66	32	135	22	41	172	28		
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
EXPOSED CLG	1.3	0.6	348	457	205	164	216	96	72	95	42	294	386	173	198	260	116	210	276	123	50	66	29	235	309	138	70	92	41	105	138	62		
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0	24	67	30	90	253	113	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	318	830	137	0	0	0	0	0	0	42	110	18	0	0	0	70	183	30	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				2239			1407			364			3016			3157			995			377			1061			758			463			
SUB TOTAL HT GAIN					1457			956			87			2210			3062			573			81			593			741			260		
LEVEL FACTOR / MULTIPLIER			0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19			
AIR CHANGE HEAT LOSS				418			263			68			563			589			186			70			198			141			86			
AIR CHANGE HEAT GAIN					79			52			5			119			165			31			4			32			40			14		
DUCT LOSS				0			0			0			358			0			0			45			0			90			0			
DUCT GAIN					0			0			0			317			0			0			8			0			78			0		
HEAT GAIN PEOPLE	240		2		480	0		0	0		0	1		240	1		240	1		240	0		0	1		240	0		0	0		0		
HEAT GAIN APPLIANCES/LIGHTS					601			0			0			601			601			601			0			601			0			0		
TOTAL HT LOSS BTU/H				2657			1669			432			3936			3746			1180			492			1259			989			549			
TOTAL HT GAIN x 1.3 BTU/H					3401			1310			119			4534			5288			1878			122			1906			1117			356		

ROOM USE			LIV				K/B/G			DIN			LAUN			W/R			FOY									BAS		
EXP. WALL			35				72			23			28			7			24									188		
CLG. HT.			10				10			10			11			10			10									9		
	FACTORS																													
GRS.WALL AREA	LOSS	GAIN	354				727			232			311			71			242									1128		
GLAZING			LOSS		GAIN		LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN							LOSS		GAIN
NORTH	21.8	15.6	0	0	0		0	0	0	0	0	0	8	174	125	0	0	0	0	0	0							3	65	47
EAST	21.8	40.5	37	806	1497		0	0	0	0	0	0	0	0	0	0	0	0	12	261	486							0	0	0
SOUTH	21.8	24.3	0	0	0		0	0	0	31	675	753	0	0	0	9	196	219	0	0	0							7	152	170
WEST	21.8	40.5	0	0	0		75	1634	3035	0	0	0	0	0	0	0	0	0	0	0	0							3	65	121
SKYLT.	35.8	101.2	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							0	0	0
DOORS	25.8	4.3	0	0	0		20	517	85	0	0	0	20	517	85	0	0	0	30	775	128							20	517	85
NET EXPOSED WALL	4.2	0.7	317	1331	219		632	2659	437	201	847	139	283	1189	196	62	259	43	200	843	139							0	0	0
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							564	2078	342
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
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0		10	28	13	0	0	0	0	0	0	0	0	0	0	0	0							0	0	0
EXPOSED FLOOR	2.6	0.4	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							0	0	0
BASEMENT/CRAWL HEAT LOSS				0				0			0			0			0			0									6330	
SLAB ON GRADE HEAT LOSS				0				0			0			0			0			0										
SUBTOTAL HT LOSS				2137				4837			1522			1881			456			1880									9207	
SUB TOTAL HT GAIN					1716				3570			892			406			261			752										765
LEVEL FACTOR / MULTIPLIER			0.30	0.30			0.30	0.30		0.30	0.30		0.30	0.30		0.30	0.30		0.30	0.30								0.50	0.70	
AIR CHANGE HEAT LOSS				651				1474			464			573			139			573									6458	
AIR CHANGE HEAT GAIN					93				193			48			22			14			41										41
DUCT LOSS				0				0			0			0			0			0									0	
DUCT GAIN					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
HEAT GAIN APPLIANCES/LIGHTS					601				601			601			601			0			0										601
TOTAL HT LOSS BTU/H				2788				6312			1986			2454			594			2452									15665	
TOTAL HT GAIN x 1.3 BTU/H					3132				5672			2003			1337			358			1030										1829

TOTAL HEAT GAIN BTU/H: 35720 TONS: 2.98 LOSS DUE TO VENTILATION LOAD BTU/H: 2004 STRUCTURAL HEAT LOSS: 49163 TOTAL COMBINED HEAT LOSS BTU/H: 51167

I REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED IN THE APPROPRIATE CATEGORY AS AN "OTHER DESIGNER" UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

HVAC DESIGNS LTD.

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Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

SITE NAME: CENTREFIELD (WEST GORMLEY) — OPT 5 BED 4 BATH
BUILDER: ROYAL PINE HOMES — TYPE: 4505 — DATE: Jun-21 — GFA: 3289 — LO# 91154

HEATING CFM	1200	COOLING CFM	1200
TOTAL HEAT LOSS	49,163	TOTAL HEAT GAIN	35,391
AIR FLOW RATE CFM	24.41	AIR FLOW RATE CFM	33.91

furnace pressure	0.6
furnace filter	0.05
a/c coil pressure	0.2
available pressure for s/a & r/a	0.35
plenum pressure s/a	0.18
max s/a dif 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

**CARRIER
59TN6A-060-14V 60
FAN SPEED
LOW 820
MEDLOW 0
MEDIUM 1200
MEDIUM HIGH 0
HIGH 1520

AFUE = 97 %
INPUT (BTU/H) = 60,000
OUTPUT (BTU/H) = **58,000**
DESIGN CFM = **1200**
CFM @ .6 " E.S.P.
TEMPERATURE RISE 45 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	16	8	4
R/A	0	0	5	3	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	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
ROOM NAME	ENS	MBR	BED-2	BED-2	BED-3	BED-4	ENS-2	BED-3	ENS-3	MBR	ENS-4/5	LIV	K/B/G	K/B/G	K/B/G	DIN	LAUN	W/R	FOY	ENS	BAS	BAS	BAS	BAS
RM LOSS MBH.	0.56	1.33	1.97	1.97	1.87	1.18	0.49	1.87	0.49	1.33	0.55	2.79	2.10	2.10	2.10	1.99	2.45	0.59	2.45	0.56	3.92	3.92	3.92	3.92
CFM PER RUN HEAT	14	32	48	48	46	29	12	46	12	32	13	68	51	51	51	48	60	15	60	14	96	96	96	96
RM GAIN MBH.	0.44	1.70	2.27	2.27	2.64	1.88	0.12	2.64	0.56	1.70	0.36	3.13	1.89	1.89	1.89	2.00	1.34	0.36	1.03	0.44	0.46	0.46	0.46	0.46
CFM PER RUN COOLING	15	58	77	77	90	64	4	90	19	58	12	106	64	64	64	68	45	12	35	15	16	16	16	16
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.16	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.	32	58	58	51	49	29	37	47	44	49	27	31	28	39	51	6	43	17	36	46	45	26	8	27
EQUIVALENT LENGTH	150	150	130	120	180	130	140	170	130	150	140	90	130	130	100	140	120	150	100	160	110	120	150	110
TOTAL EFFECTIVE LENGTH	182	208	188	171	229	159	177	217	174	199	167	121	158	169	151	146	163	167	136	206	155	146	158	137
ADJUSTED PRESSURE	0.09	0.08	0.09	0.1	0.07	0.11	0.1	0.07	0.1	0.09	0.1	0.13	0.11	0.1	0.11	0.12	0.11	0.1	0.13	0.08	0.1	0.11	0.1	0.12
ROUND DUCT SIZE	4	5	**6**	**6**	**6**	**6**	4	**6**	4	5	4	**6**	5	5	5	**6**	5	4	5	4	**6**	**6**	**6**	**6**
HEATING VELOCITY (ft/min)	161	235	245	245	235	148	138	235	138	235	149	347	374	374	374	245	441	172	441	161	489	489	489	489
COOLING VELOCITY (ft/min)	172	426	393	393	459	326	46	459	218	426	138	540	470	470	470	347	330	138	257	172	82	82	82	82
OUTLET GRILL SIZE	3X10	3X10	4X10	4X10	4X10	4X10	3X10	4X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	D	D	B	B	A	B	B	A	B	D	B	A	D	C	C	B	C	A	A	C	C	D	B	A

RUN #	25	26	27	28
ROOM NAME	ENS	WIC	ENS-3	BED-5
RM LOSS MBH.	0.56	0.43	0.49	1.26
CFM PER RUN HEAT	14	11	12	31
RM GAIN MBH.	0.44	0.12	0.56	1.91
CFM PER RUN COOLING	15	4	19	65
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17
ACTUAL DUCT LGH.	35	45	41	22
EQUIVALENT LENGTH	160	170	140	190
TOTAL EFFECTIVE LENGTH	195	215	181	212
ADJUSTED PRESSURE	0.09	0.08	0.1	0.08
ROUND DUCT SIZE	4	4	4	**6**
HEATING VELOCITY (ft/min)	161	126	138	158
COOLING VELOCITY (ft/min)	172	46	218	331
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10
TRUNK	D	C	B	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	331	0.07	9.6	12	x	8	497	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	649	0.07	12.3	20	x	8	584	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	283	0.08	8.7	10	x	8	509	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	553	0.08	11.2	14	x	8	711	TRUNK J	0	0.00	0	0	x	8	0
TRUNK E	0	0.00	0	0	x	8	0	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	915	0.05	15.3	28	x	8	588
TRUNK Y	480	0.05	12	16	x	8	540
TRUNK Z	285	0.05	9.9	12	x	8	428
DROP	1200	0.05	16.9	24	x	12	600

RETURN AIR #	1	2	3	4	5	6	7	8								BR
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	130	85	75	95	130	155	175	175	0	0	0	0	0	0	0	180
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.	54	50	53	52	58	35	23	30	1	1	1	1	1	1	1	17
EQUIVALENT LENGTH	215	205	245	165	175	200	185	190	0	0	0	0	0	0	0	145
TOTAL EFFECTIVE LH	269	255	298	217	233	235	208	220	1	1	1	1	1	1	1	162
ADJUSTED PRESSURE	0.06	0.06	0.05	0.07	0.06	0.06	0.07	0.07	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.09
ROUND DUCT SIZE	7	6	6	6	7	7.5	7.5	7.5	0	0	0	0	0	0	0	7.2
INLET GRILL SIZE	8	8	8	8	8	8	8	8	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	14	14	14	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.

INDIVIDUAL BCIN: 19669 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

TYPE: 4505 LO # 91154
SITE NAME: CENTREFIELD (WEST GORMLEY) OPT 5 BED 4 BATH

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	2	@ 21.2 cfm	42.4	cfm
Other Bedrooms	4	@ 10.6 cfm	42.4	cfm
Kitchen & Bathrooms	6	@ 10.6 cfm	63.6	cfm
Other Rooms	5	@ 10.6 cfm	53.0	cfm
Table 9.32.3.A.		TOTAL	201.4	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	**95.4**	**cfm**

SUPPLEMENTAL VENTILATION CAPACITY 9.32.3.5.

Total Ventilation Capacity	201.4	cfm
Less Principal Ventil. Capacity	95.4	cfm
Required Supplemental Capacity	106.0	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE 65H Location: BSMT

95.4 cfm [✓] HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM		ΔT °F		FACTOR		% LOSS
95.4 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
ENS-2	BY INSTALLING CONTRACTOR	50	✓	3.5
ENS-4/5	BY INSTALLING CONTRACTOR	50	✓	3.5
W/R	BY INSTALLING CONTRACTOR	50	✓	3.5

HEAT RECOVERY VENTILATOR 9.32.3.11.

Model: VANEE 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: ROYAL PINE 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: June-21

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

CSA F280-12 Residential Heat Loss and Heat Gain Calculations

Formula Sheet (For Air Leakage / Ventiliation Calculation)

LO#: 91154 Model: 4505 Builder: ROYAL PINE HOMES Date: 2021-06-04

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1434	9	12906
First	1434	10	14483.4
Second	1861	8	14888
Third	0	9	0
Fourth	0	9	0
		Total:	42,277.4 ft³
		Total:	1197.2 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.219
SUMMER NATURAL AIR CHANGE RATE	0.068

Design Temperature Difference

	Tin °C	Tout °C	ΔT °C	ΔT °F
Winter DTDh	22	-21	43	78
Summer DTDc	24	31	7	13

5.2.3.1 Heat Loss due to Air Leakage

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

0.219 x 332.55 x 43 °C x 1.2 = 3785 W

= **12916 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

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

= 0.068 x 332.55 x 7 °C x 1.2 = 194 W

= **662 Btu/h**

5.2.3.2 Heat Loss due to Mechanical Ventilation

$$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

95 CFM x 78 °F x 1.08 x 0.25 = **2004 Btu/h**

6.2.7 Sensible heat Gain due to Ventilation

$$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

95 CFM x 13 °F x 1.08 x 0.25 = **330 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	12,916	9,207	0.701
2	0.3		12,712	0.305
3	0.2		13,836	0.187
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: 4505 OPT 5 BED 4 BATH **BUILDER:** ROYAL PINE HOMES
SFQT: 3289 **LO#** 91154 **SITE:** CENTREFIELD (WEST GORMLEY)

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

BUILDING DATA

ATTACHMENT:	DETACHED	# OF STORIES (+BASEMENT):	3
FRONT FACES:	EAST	ASSUMED (Y/N):	Y
AIR CHANGES PER HOUR:	2.50	ASSUMED (Y/N):	Y
AIR TIGHTNESS CATEGORY:	TIGHT	ASSUMED (Y/N):	Y
WIND EXPOSURE:	SHELTERED	ASSUMED (Y/N):	Y
HOUSE VOLUME (ft^3):	42277.4	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	6
INTERIOR LIGHTING LOAD (Btu/h/ft^2):	1.27	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	6.0 ft
LENGTH: 38.0 ft	WIDTH: 56.0 ft	EXPOSED PERIMETER:	188.0 ft

2012 OBC - COMPLIANCE PACKAGE **Component**	**Compliance Package SB-12 PERFORMANCE**	
	Nominal	**Min. Eff.**
Ceiling with Attic Space Minimum RSI (R)-Value	60	59.20
Ceiling Without Attic Space Minimum RSI (R)-Value	31	27.70
Exposed Floor Minimum RSI (R)-Value	31	29.80
Walls Above Grade Minimum RSI (R)-Value	22+1.5	18.50
Basement Walls Minimum RSI (R)-Value	20	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	1.6	-
Skylights Maximum U-Value	2.6	-
Space Heating Equipment Minimum AFUE	0.96	-
HRV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	TE=94%	-

INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

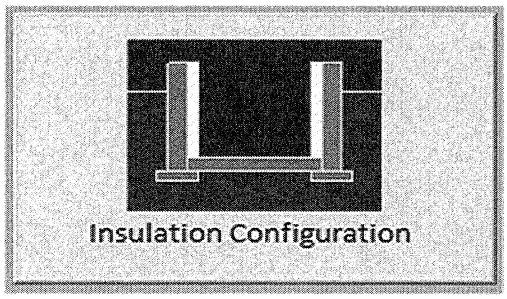
Michael O'Rourke

HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

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):	**11.6**	 Insulation Configuration
Floor Width (m):	**17.1**	
Exposed Perimeter (m):	**0.0**	
Wall Height (m):	**2.7**	
Depth Below Grade (m):	**1.83**	
Window Area (m^2):	**1.2**	
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):		**1855**

TYPE: 4505 OPT 5 BED 4 BATH
LO# 91154

HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

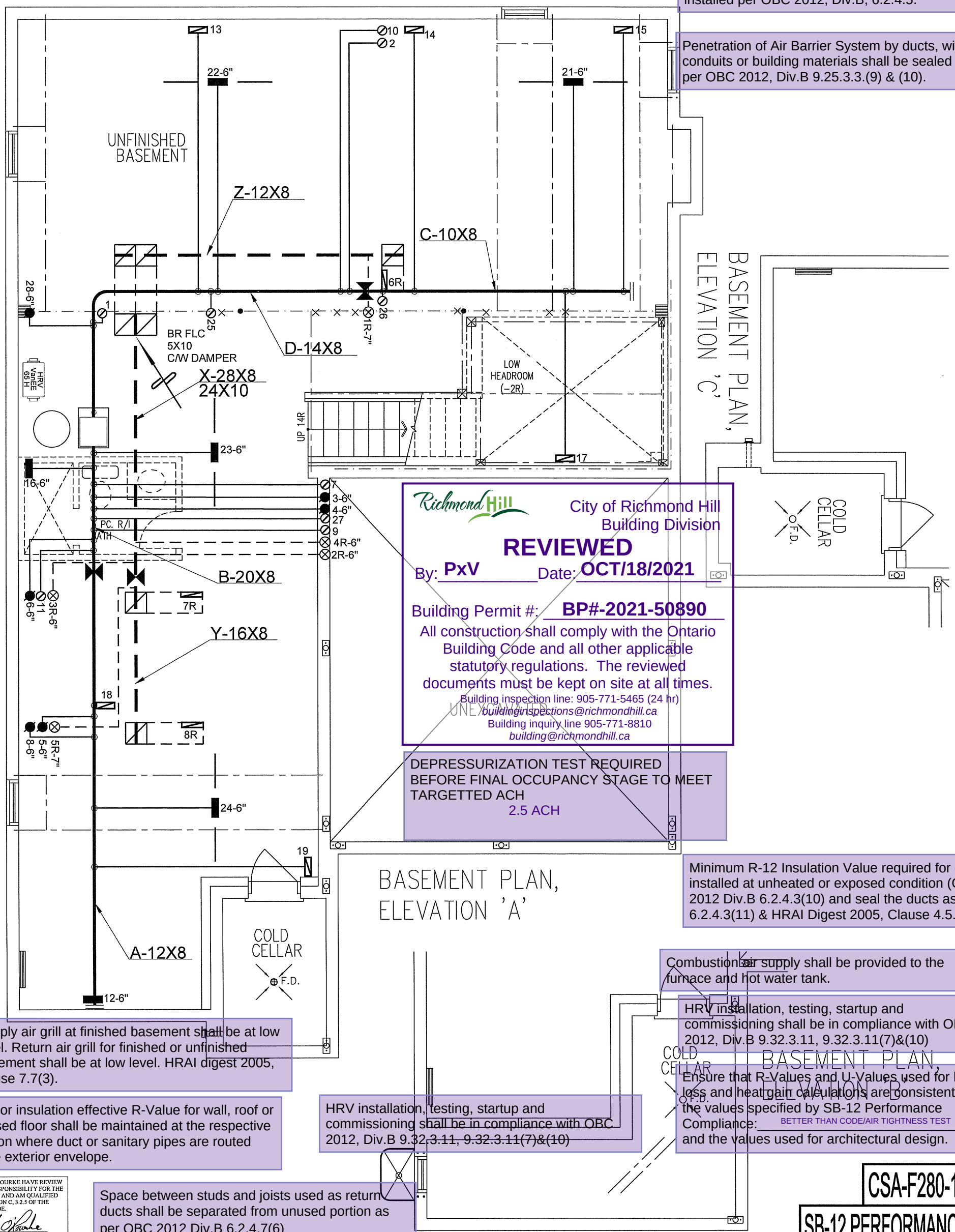
Weather Station Description	
Province:	Ontario
Region:	Richmond Hill
Weather Station Location:	Open flat terrain, grass
Anemometer height (m):	10
Local Shielding	
Building Site:	Suburban, forest
Walls:	Heavy
Flue:	Heavy
Highest Ceiling Height (m):	6.43
Building Configuration	
Type:	Detached
Number of Stories:	Two
Foundation:	Full
House Volume (m^3):	1197.2
Air Leakage/Ventilation	
Air Tightness Type:	Energy Star Detached (2.5 ACH)
Custom BDT Data:	ELA @ 10 Pa. 1117.5 cm^2
	2.50 ACH @ 50 Pa
Mechanical Ventilation (L/s):	Total Supply 45.0 / Total Exhaust 45.0
Flue Size	
Flue #:	#1 #2 #3 #4
Diameter (mm):	0 0 0 0
Natural Infiltration Rates	
Heating Air Leakage Rate (ACH/H):	**0.219**
Cooling Air Leakage Rate (ACH/H):	**0.068**

TYPE: 4505 OPT 5 BED 4 BATH

LO# 91154

Volume control dampers to all branches to be installed per OBC 2012, Div.B, 6.2.4.5.

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).



Richmond Hill

City of Richmond Hill
Building Division

REVIEWED

By: **PxV** Date: **OCT/18/2021**

Building Permit #: **BP#-2021-50890**

All construction shall comply with the Ontario Building Code and all other applicable statutory regulations. The reviewed documents must be kept on site at all times.

Building inspection line: 905-771-5465 (24 hr)
buildinginspections@richmondhill.ca
Building inquiry line 905-771-8810
building@richmondhill.ca

UNEXAMINED

DEPRESSURIZATION TEST REQUIRED BEFORE FINAL OCCUPANCY STAGE TO MEET TARGETTED ACH
2.5 ACH

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.

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

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)

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).

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.

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)

Ensure that R-Values and U-Values used for heat loss and heat gain calculations are consistent with the values specified by SB-12 Performance Compliance: BETTER THAN CODE/AIR TIGHTNESS TEST and the values used for architectural design.

I MICHAEL O'ROURKE HAVE REVIEW 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.

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)

CSA-F280-12

SB-12 PERFORMANCE

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

Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

OPT 5 BED 4 BATH
4505 3289 sqft

HVAC DESIGNS 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
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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.

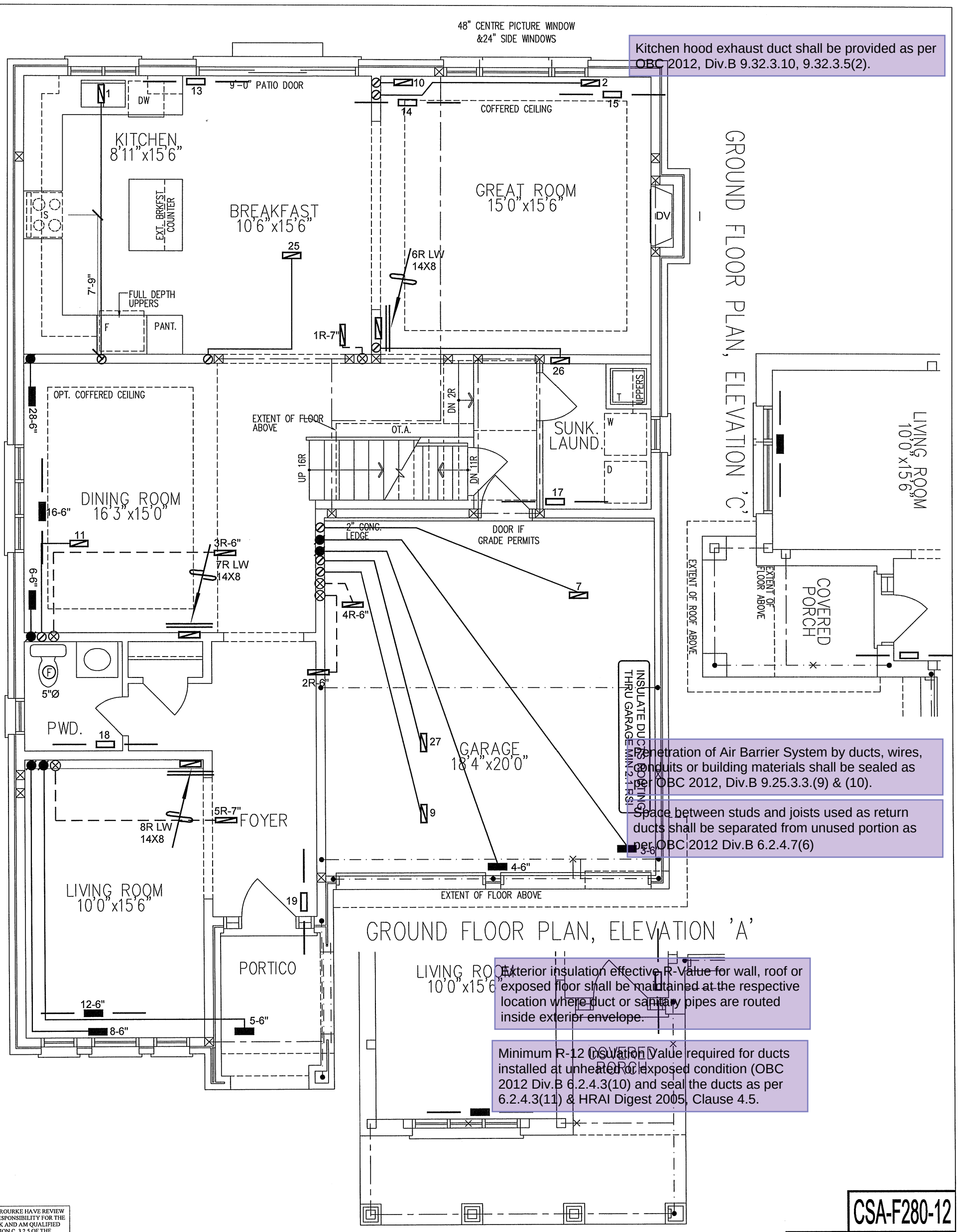
HEAT LOSS 51167 BTU/H	
UNIT DATA	
MAKE	CARRIER
MODEL	59TN6A-060-14V
INPUT	60 MBTU/H
OUTPUT	58 MBTU/H
COOLING	3.0 TONS
FAN SPEED	1200 cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	16	5	5
1ST FLOOR	8	3	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 JUNE/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 91154



Kitchen hood exhaust duct shall be provided as per OBC 2012, Div.B 9.32.3.10, 9.32.3.5(2).

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).

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)

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.

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.

I MICHAEL O'ROURKE HAVE REVIEW 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.

CSA-F280-12

SB-12 PERFORMANCE

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

Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

OPT 5 BED 4 BATH
4505 3289 sqft

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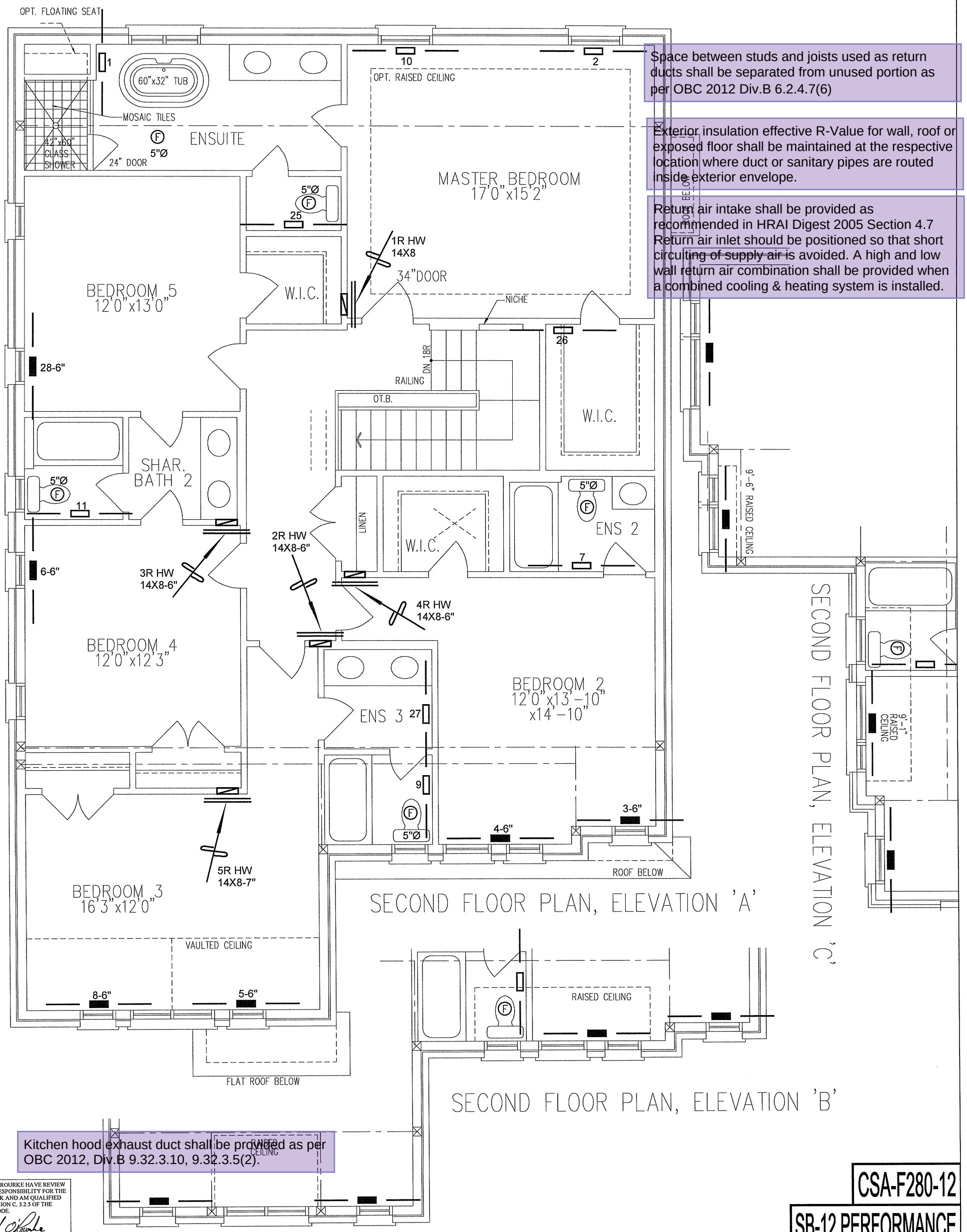
Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

Sheet Title
FIRST FLOOR HEATING LAYOUT

Date JUNE/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 91154



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)

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.

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.

Kitchen hood exhaust duct shall be provided as per OBC 2012, Div.B 9.32.3.10, 9.32.3.5(2).

I MICHAEL O'ROURKE HAVE REVIEW 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.

CSA-F280-12

SB-12 PERFORMANCE

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

Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

OPT 5 BED 4 BATH
4505 3289 sqft

HVAC DESIGNS LTD.
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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
SECOND FLOOR HEATING LAYOUT

Date JUNE/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 91154

Schedule 1: Designer Information

Use one form for each individual who reviews and takes responsibility for design activities with respect to the project.

A. Project Information

Building number, street name			Unit no.	Lot/con.
Municipality	**Postal code**	**Plan number/ other description**		
RICHMOND HILL				

B. Individual who reviews and takes responsibility for design activities

Name		Firm		
MICHAEL O'ROURKE		**HVAC DESIGNS LTD.**		
Street address			Unit no.	Lot/con.
375 FINLEY AVE			**202**	**N/A**
Municipality	Postal code	Province	E-mail	
AJAX	**L1S 2E2**	**ONTARIO**	**info@hvacdesigns.ca**	
Telephone number	Fax number		Cell number	
(**905**) **619-2300**	(**905**) **619-2375**		( )	

C. Design activities undertaken by individual identified in Section B. [Building Code Table 3.5.2.1 OF Division C]

❑ House	☒ HVAC – House	❑ Building Structural
❑ Small Buildings	❑ Building Services	❑ Plumbing – House
❑ Large Buildings	❑ Detection, Lighting and Power	❑ Plumbing – All Buildings
❑ Complex Buildings	❑ Fire Protection	❑ On-site Sewage Systems

Description of designer's work
HEAT LOSS / GAIN CALCULATIONS
DUCT SIZING
RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY
RESIDENTIAL SYSTEM DESIGN per CSA-F280-12

Model: 4505
ELMWOOD
OPT GROUND

Project: CENTREFIELD (WEST GORMLEY)

D. Declaration of Designer

I **MICHAEL O'ROURKE** declare that (choose one as appropriate):
(print name)

❑ I review and take responsibility for the design work on behalf of a firm registered under subsection 3.2.4.of Division C, of the Building Code. I am qualified, and the firm is registered, in the appropriate classes/categories.

Individual BCIN: _____
Firm BCIN: _____

☒ I review and take responsibility for the design and am qualified in the appropriate category as an "other designer" under subsection 3.2.5.of Di vision C, of the Building Code.

Individual BCIN: 19669
Basis for exemption from registration and qualification: O.B.C SENTENCE 3.2.4.1 (4)

❑ The design work is exempt from the registration and qualification requirements of the Building Code.
Basis for exemption from registration and qualification: _____

I certify that:

1. The information contained in this schedule is true to the best of my knowledge.
2. I have submitted this application with the knowledge and consent of the firm.

June 4, 2021
Date

Michael O'Rourke
Signature of Designer

NOTE:

1. For the purposes of this form, "individual" means the "person" referred to in Clause 3.2.4.7(1) d).of Division C, Article 3.2.5.1. of Division C, and all other persons who are exempt from qualification under Subsections 3.2.4. and 3.2.5. of Division C.
2. Schedule 1 is not required to be completed by a holder of a license, temporary license, or a certificate of authorization, issued by the Ontario Association of Architects. Schedule 1 is also not required to be completed by a holder of a license to practise, a limited license to practise, or a certificate of authorization, issued by the Association of Professional Engineers of Ontario.

Schedule 1: Designer Information

Use one form for each individual who reviews and takes responsibility for design activities with respect to the project.

A. Project Information

Building number, street name			Unit no.	Lot/con.
Municipality	**Postal code**	**Plan number/ other description**		
RICHMOND HILL				

B. Individual who reviews and takes responsibility for design activities

Name		Firm		
MICHAEL O'ROURKE		**HVAC DESIGNS LTD.**		
Street address			Unit no.	Lot/con.
375 FINLEY AVE			**202**	**N/A**
Municipality	Postal code	Province	E-mail	
AJAX	**L1S 2E2**	**ONTARIO**	**info@hvacdesigns.ca**	
Telephone number	Fax number		Cell number	
(905) 619-2300	**(905) 619-2375**		( )	

C. Design activities undertaken by individual identified in Section B. [Building Code Table 3.5.2.1 OF Division C]

☐ House	☒ HVAC – House	☐ Building Structural
☐ Small Buildings	☐ Building Services	☐ Plumbing – House
☐ Large Buildings	☐ Detection, Lighting and Power	☐ Plumbing – All Buildings
☐ Complex Buildings	☐ Fire Protection	☐ On-site Sewage Systems

Description of designer's work	
HEAT LOSS / GAIN CALCULATIONS **DUCT SIZING** **RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY** **RESIDENTIAL SYSTEM DESIGN per CSA-F280-12**	**Model:** 4505 OPT GROUND 5 BED 4 BATH **Project:** CENTREFIELD (WEST GORMLEY)

D. Declaration of Designer

I **MICHAEL O'ROURKE** declare that (choose one as appropriate):
(print name)

☐ I review and take responsibility for the design work on behalf of a firm registered under subsection 3.2.4.of Division C, of the Building Code. I am qualified, and the firm is registered, in the appropriate classes/categories.

Individual BCIN: _____
Firm BCIN: _____

☒ I review and take responsibility for the design and am qualified in the appropriate category as an "other designer" under subsection 3.2.5.of Di vision C, of the Building Code.

Individual BCIN: 19669
Basis for exemption from registration and qualification: O.B.C SENTENCE 3.2.4.1 (4)

☐ The design work is exempt from the registration and qualification requirements of the Building Code.
Basis for exemption from registration and qualification: _____

I certify that:

1. The information contained in this schedule is true to the best of my knowledge.
2. I have submitted this application with the knowledge and consent of the firm.

June 4, 2021
Date

Signature of Designer

NOTE:

1. For the purposes of this form, "individual" means the "person" referred to in Clause 3.2.4.7(1) d).of Division C, Article 3.2.5.1. of Division C, and all other persons who are exempt from qualification under Subsections 3.2.4. and 3.2.5. of Division C.
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Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

SITE NAME: CENTREFIELD (WEST GORMLEY) | OPT GROUND 5 BED 4 BATH | DATE: Jun-21 | WINTER NATURAL AIR CHANGE RATE 0.219 | HEAT LOSS ΔT °F. 78 | CSA-F280-12

BUILDER: ROYAL PINE HOMES | TYPE: 4505 | GFA: 3289 | LO# 91155 | SUMMER NATURAL AIR CHANGE RATE 0.068 | HEAT GAIN ΔT °F. 13 | SB-12 PERFORMANCE

ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4			ENS-2			BED-5			ENS-3			ENS-4/5		
EXP. WALL			35			26			8			29			42			13			6			14			6			6		
CLG. HT.			9			8			8			8			9			8			8			8			8			8		
	FACTORS																															
GRS.WALL AREA	LOSS	GAIN	315			208			64			232			357			104			48			112			48			48		
GLAZING			LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN	
NORTH	21.8	15.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EAST	21.8	40.5	0	0	0	0	0	0	0	0	0	43	937	1740	65	1416	2630	0	0	0	0	0	0	0	0	0	16	349	647	0	0	0
SOUTH	21.8	24.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	349	389	0	0	0	16	349	389	0	0	0	7	152	170
WEST	21.8	40.5	26	566	1052	18	392	728	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.	35.8	101.2	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	0	0	0
DOORS	25.8	4.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NET EXPOSED WALL	4.2	0.7	289	1215	200	190	799	131	64	269	44	189	795	131	292	1228	202	88	370	61	48	202	33	96	404	66	32	135	22	41	172	28
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EXPOSED CLG	1.3	0.6	348	457	205	164	216	96	72	95	42	294	386	173	198	260	116	210	276	123	50	66	29	235	309	138	70	92	41	105	138	62
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0	24	67	30	90	253	113	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	318	830	137	0	0	0	0	0	0	42	110	18	0	0	0	70	183	30	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				2239			1407			364			3016			3157			995			377			1061			758			463	
SUB TOTAL HT GAIN					1457			956			87			2210			3062			573			81			593			741			260
LEVEL FACTOR / MULTIPLIER			0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19	
AIR CHANGE HEAT LOSS				418			263			68			563			589			186			70			198			141			86	
AIR CHANGE HEAT GAIN					77			51			5			117			163			30			4			31			39			14
DUCT LOSS				0			0			0			358			0			0			45			0			90			0	
DUCT GAIN					0			0			0			317			0			0			8			0			78			0
HEAT GAIN PEOPLE	240		2		480	0		0	0		0	1		240	1		240	1		240	0		0	1		240	0		0	0		0
HEAT GAIN APPLIANCES/LIGHTS					601			0			0			601			601			601			0			601			0			0
TOTAL HT LOSS BTU/H				2657			1669			432			3936			3746			1180			492			1259			989			549	
TOTAL HT GAIN x 1.3 BTU/H					3399			1309			119			4531			5284			1877			121			1905			1116			356

ROOM USE			LIV				K/B/G			DIN			LAUN			W/R			FOY									BAS		
EXP. WALL			32				74			24			28			7			24									188		
CLG. HT.			10				10			10			11			10			10									9		
	FACTORS																													
GRS.WALL AREA	LOSS	GAIN	323				747			242			311			71			242									1128		
GLAZING			LOSS	GAIN			LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN								LOSS	GAIN	
NORTH	21.8	15.6	0	0	0		0	0	0	0	0	0	8	174	125	0	0	0	0	0	0							3	65	47
EAST	21.8	40.5	37	806	1497		0	0	0	0	0	0	0	0	0	0	0	0	12	261	486							0	0	0
SOUTH	21.8	24.3	0	0	0		10	218	243	36	784	874	0	0	0	7	152	170	0	0	0							7	152	170
WEST	21.8	40.5	0	0	0		75	1634	3035	0	0	0	0	0	0	0	0	0	0	0	0							3	65	121
SKYLT.	35.8	101.2	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							0	0	0
DOORS	25.8	4.3	0	0	0		20	517	85	0	0	0	20	517	85	0	0	0	30	775	128							20	517	85
NET EXPOSED WALL	4.2	0.7	286	1204	198		642	2702	444	206	868	143	283	1189	196	64	268	44	200	843	139							0	0	0
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							564	2078	342
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
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0		10	28	13	0	0	0	0	0	0	0	0	0	0	0	0							0	0	0
EXPOSED FLOOR	2.6	0.4	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							0	0	0
BASEMENT/CRAWL HEAT LOSS				0				0			0			0			0			0									6330	
SLAB ON GRADE HEAT LOSS				0				0			0			0			0			0										
SUBTOTAL HT LOSS				2010				5098			1652			1881			420			1880									9207	
SUB TOTAL HT GAIN					1695				3820			1017			406			214			752										765
LEVEL FACTOR / MULTIPLIER			0.30	0.30			0.30	0.30		0.30	0.30		0.30	0.30		0.30	0.30		0.30	0.30								0.50	0.70	
AIR CHANGE HEAT LOSS				602				1527			495			563			126			563									6458	
AIR CHANGE HEAT GAIN					90				203			54			22			11			40										41
DUCT LOSS				0				0			0			0			0			0									0	
DUCT GAIN					0				0			0			0			0			0										0
HEAT GAIN PEOPLE	240		0		0		0		0	0		0	0		0	0		0	0		0										
HEAT GAIN APPLIANCES/LIGHTS					601				601			601			601			0			0									0	
TOTAL HT LOSS BTU/H				2611				6625			2147			2444			546			2442										601
TOTAL HT GAIN x 1.3 BTU/H					3102				6010			2173			1336			293			1029									15665	
																														1828

TOTAL HEAT GAIN BTU/H: 36119 TONS: 3.01 LOSS DUE TO VENTILATION LOAD BTU/H: 2004 STRUCTURAL HEAT LOSS: 49392 TOTAL COMBINED HEAT LOSS BTU/H: 51396

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

HVAC DESIGNS LTD.

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Tel: 905.619.2300 Fax: 905.619.2375
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SITE NAME: CENTREFIELD (WEST GORMLEY)
BUILDER: ROYAL PINE HOMES

OPT GROUND 5 BED 4 BATH
TYPE: 4505
DATE: Jun-21
GFA: 3289
LO# 91155

HEATING CFM	1200	COOLING CFM	1200
TOTAL HEAT LOSS	49,392	TOTAL HEAT GAIN	35,789
AIR FLOW RATE CFM	24.3	AIR FLOW RATE CFM	33.53

furnace pressure	0.6
furnace filter	0.05
a/c coil pressure	0.2
available pressure for s/a & r/a	0.35
plenum pressure s/a	0.18
max s/a dif 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

**CARRIER
59TN6A-060-14V 60

FAN SPEED	
LOW	820
MEDLOW	0
MEDIUM	1200
MEDIUM HIGH	0
HIGH	1520

AFUE = 97 %
INPUT (BTU/H) = 60,000
OUTPUT (BTU/H) = **58,000**
DESIGN CFM = **1200** CFM @ .6 " E.S.P.
TEMPERATURE RISE 45 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	16	8	4
R/A	0	0	5	3	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	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
ROOM NAME	ENS	MBR	BED-2	BED-2	BED-3	BED-4	ENS-2	BED-3	ENS-3	MBR	ENS-4/5	LIV	K/B/G	K/B/G	K/B/G	DIN	LAUN	W/R	FOY	ENS	BAS	BAS	BAS	BAS
RM LOSS MBH.	0.56	1.33	1.97	1.97	1.87	1.18	0.49	1.87	0.49	1.33	0.55	2.61	2.21	2.21	2.21	2.15	2.44	0.55	2.44	0.56	3.92	3.92	3.92	3.92
CFM PER RUN HEAT	14	32	48	48	46	29	12	46	12	32	13	63	54	54	54	52	59	13	59	14	95	95	95	95
RM GAIN MBH.	0.44	1.70	2.27	2.27	2.64	1.88	0.12	2.64	0.56	1.70	0.36	3.10	2.00	2.00	2.00	2.17	1.34	0.29	1.03	0.44	0.46	0.46	0.46	0.46
CFM PER RUN COOLING	15	57	76	76	89	63	4	89	19	57	12	104	67	67	67	73	45	10	35	15	15	15	15	15
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.16	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.	32	58	58	51	49	29	37	47	44	49	27	31	28	39	51	6	43	17	36	46	45	26	8	27
EQUIVALENT LENGTH	150	150	130	120	180	130	140	170	130	150	140	90	130	130	100	140	120	150	100	160	110	120	150	110
TOTAL EFFECTIVE LENGTH	182	208	188	171	229	159	177	217	174	199	167	121	158	169	151	146	163	167	136	206	155	146	158	137
ADJUSTED PRESSURE	0.09	0.08	0.09	0.1	0.07	0.11	0.1	0.07	0.1	0.09	0.1	0.13	0.11	0.1	0.11	0.12	0.11	0.1	0.13	0.08	0.1	0.11	0.1	0.12
ROUND DUCT SIZE	4	5	**6**	**6**	**6**	**6**	4	**6**	4	5	4	**6**	5	5	5	**6**	5	4	5	4	**6**	**6**	**6**	**6**
HEATING VELOCITY (ft/min)	161	235	245	245	235	148	138	235	138	235	149	321	396	396	396	265	433	149	433	161	484	484	484	484
COOLING VELOCITY (ft/min)	172	419	388	388	454	321	46	454	218	419	138	530	492	492	492	372	330	115	257	172	76	76	76	76
OUTLET GRILL SIZE	3X10	3X10	4X10	4X10	4X10	4X10	3X10	4X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	D	D	B	B	A	B	B	A	B	D	B	A	D	C	C	B	C	A	A	C	C	D	B	A

RUN #	25	26	27	28
ROOM NAME	ENS	WIC	ENS-3	BED-5
RM LOSS MBH.	0.56	0.43	0.49	1.26
CFM PER RUN HEAT	14	10	12	31
RM GAIN MBH.	0.44	0.12	0.56	1.90
CFM PER RUN COOLING	15	4	19	64
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17
ACTUAL DUCT LGH.	35	45	41	22
EQUIVALENT LENGTH	160	170	140	190
TOTAL EFFECTIVE LENGTH	195	215	181	212
ADJUSTED PRESSURE	0.09	0.08	0.1	0.08
ROUND DUCT SIZE	4	4	4	**6**
HEATING VELOCITY (ft/min)	161	115	138	158
COOLING VELOCITY (ft/min)	172	46	218	326
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10
TRUNK	D	C	B	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	322	0.07	9.5	12	x	8	483	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	643	0.07	12.3	20	x	8	579	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	286	0.08	8.8	10	x	8	515	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	558	0.08	11.3	14	x	8	717	TRUNK J	0	0.00	0	0	x	8	0
TRUNK E	0	0.00	0	0	x	8	0	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	915	0.05	15.3	28	x	8	588
TRUNK Y	480	0.05	12	16	x	8	540
TRUNK Z	285	0.05	9.9	12	x	8	428
DROP	1200	0.05	16.9	24	x	12	600

RETURN AIR #	1	2	3	4	5	6	7	8								BR
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	130	85	75	95	130	155	175	175	0	0	0	0	0	0	0	180
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.	54	50	53	52	58	35	23	30	1	1	1	1	1	1	1	17
EQUIVALENT LENGTH	215	205	245	165	175	200	185	190	0	0	0	0	0	0	0	145
TOTAL EFFECTIVE LH	269	255	298	217	233	235	208	220	1	1	1	1	1	1	1	162
ADJUSTED PRESSURE	0.06	0.06	0.05	0.07	0.06	0.06	0.07	0.07	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.09
ROUND DUCT SIZE	7	6	6	6	7	7.5	7.5	7.5	0	0	0	0	0	0	0	7.2
INLET GRILL SIZE	8	8	8	8	8	8	8	8	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	14	14	14	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

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

TYPE: 4505 LO # 91155
SITE NAME: CENTREFIELD (WEST GORMLEY) OPT GROUND 5 BED 4 BATH

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	2	@ 21.2 cfm	42.4	cfm
Other Bedrooms	4	@ 10.6 cfm	42.4	cfm
Kitchen & Bathrooms	6	@ 10.6 cfm	63.6	cfm
Other Rooms	5	@ 10.6 cfm	53.0	cfm
Table 9.32.3.A.		TOTAL	201.4	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	**95.4**	**cfm**

SUPPLEMENTAL VENTILATION CAPACITY 9.32.3.5.

Total Ventilation Capacity	201.4	cfm
Less Principal Ventil. Capacity	95.4	cfm
Required Supplemental Capacity	106.0	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE 65H Location: BSMT

95.4 cfm [✓] HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM		ΔT °F		FACTOR		% LOSS
95.4 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
ENS-2	BY INSTALLING CONTRACTOR	50	✓	3.5
ENS-4/5	BY INSTALLING CONTRACTOR	50	✓	3.5
W/R	BY INSTALLING CONTRACTOR	50	✓	3.5

HEAT RECOVERY VENTILATOR 9.32.3.11.

Model: VANEE 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: ROYAL PINE 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: June-21

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.

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Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

CSA F280-12 Residential Heat Loss and Heat Gain Calculations

Formula Sheet (For Air Leakage / Ventiliation Calculation)

LO#: 91155 Model: 4505 Builder: ROYAL PINE HOMES Date: 2021-06-04

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1434	9	12906
First	1434	10	14483.4
Second	1861	8	14888
Third	0	9	0
Fourth	0	9	0
		Total:	42,277.4 ft³
		Total:	1197.2 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.219
SUMMER NATURAL AIR CHANGE RATE	0.068

Design Temperature Difference

	Tin °C	Tout °C	ΔT °C	ΔT °F
Winter DTDh	22	-21	43	78
Summer DTDc	24	31	7	13

5.2.3.1 Heat Loss due to Air Leakage

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

0.219 x 332.55 x 43 °C x 1.2 = 3785 W

= **12916 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

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

= 0.068 x 332.55 x 7 °C x 1.2 = 194 W

= **662 Btu/h**

5.2.3.2 Heat Loss due to Mechanical Ventilation

$$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

95 CFM x 78 °F x 1.08 x 0.25 = **2004 Btu/h**

6.2.7 Sensible heat Gain due to Ventilation

$$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

95 CFM x 13 °F x 1.08 x 0.25 = **330 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	12,916	9,207	0.701
2	0.3		12,941	0.299
3	0.2		13,836	0.187
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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Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: 4505 OPT GROUND 5 BED 4 BATH **BUILDER:** ROYAL PINE HOMES
SFQT: 3289 **LO#** 91155 **SITE:** CENTREFIELD (WEST GORMLEY)

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

BUILDING DATA

ATTACHMENT:	DETACHED	# OF STORIES (+BASEMENT):	3
FRONT FACES:	EAST	ASSUMED (Y/N):	Y
AIR CHANGES PER HOUR:	2.50	ASSUMED (Y/N):	Y
AIR TIGHTNESS CATEGORY:	TIGHT	ASSUMED (Y/N):	Y
WIND EXPOSURE:	SHELTERED	ASSUMED (Y/N):	Y
HOUSE VOLUME (ft^3):	42277.4	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	6
INTERIOR LIGHTING LOAD ($Btu/h/ft^2$):	1.27	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	6.0 ft
LENGTH: 38.0 ft	WIDTH: 56.0 ft	EXPOSED PERIMETER:	188.0 ft

2012 OBC - COMPLIANCE PACKAGE **Component**	**Compliance Package SB-12 PERFORMANCE**	
	Nominal	**Min. Eff.**
Ceiling with Attic Space Minimum RSI (R)-Value	60	59.20
Ceiling Without Attic Space Minimum RSI (R)-Value	31	27.70
Exposed Floor Minimum RSI (R)-Value	31	29.80
Walls Above Grade Minimum RSI (R)-Value	22+1.5	18.50
Basement Walls Minimum RSI (R)-Value	20	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	1.6	-
Skylights Maximum U-Value	2.6	-
Space Heating Equipment Minimum AFUE	0.96	-
HRV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	TE=94%	-

INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

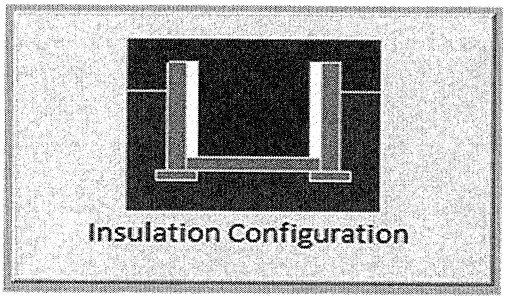
Michael O'Rourke

HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

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):	**11.6**	 Insulation Configuration
Floor Width (m):	**17.1**	
Exposed Perimeter (m):	**0.0**	
Wall Height (m):	**2.7**	
Depth Below Grade (m):	**1.83**	
Window Area (m^2):	**1.2**	
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):	**1855**	

TYPE: 4505
LO# 91155

OPT GROUND 5 BED 4 BATH

HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

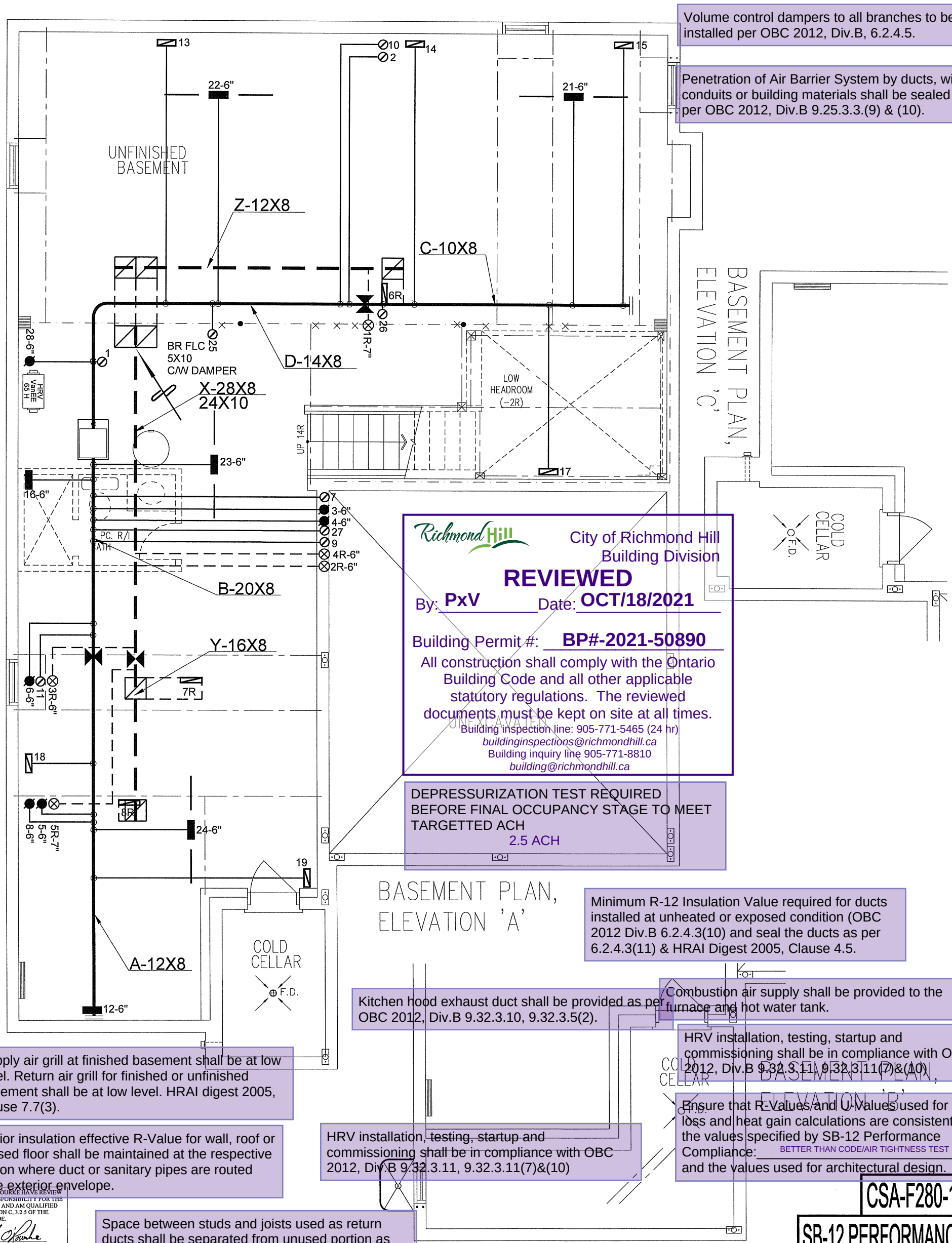
Weather Station Description	
Province:	Ontario
Region:	Richmond Hill
Weather Station Location:	Open flat terrain, grass
Anemometer height (m):	10
Local Shielding	
Building Site:	Suburban, forest
Walls:	Heavy
Flue:	Heavy
Highest Ceiling Height (m):	6.43
Building Configuration	
Type:	Detached
Number of Stories:	Two
Foundation:	Full
House Volume (m^3):	1197.2
Air Leakage/Ventilation	
Air Tightness Type:	Energy Star Detached (2.5 ACH)
Custom BDT Data:	ELA @ 10 Pa. 1117.5 cm^2
	2.50 ACH @ 50 Pa
Mechanical Ventilation (L/s):	Total Supply 45.0 / Total Exhaust 45.0
Flue Size	
Flue #:	#1 #2 #3 #4
Diameter (mm):	0 0 0 0
Natural Infiltration Rates	
Heating Air Leakage Rate (ACH/H):	**0.219**
Cooling Air Leakage Rate (ACH/H):	**0.068**

TYPE: 4505
LO# 91155

OPT GROUND 5 BED 4 BATH

Volume control dampers to all branches to be installed per OBC 2012, Div.B, 6.2.4.5.

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).



Richmond Hill

City of Richmond Hill
Building Division

REVIEWED

By: **PxV** Date: **OCT/18/2021**

Building Permit #: **BP#-2021-50890**

All construction shall comply with the Ontario Building Code and all other applicable statutory regulations. The reviewed documents must be kept on site at all times.

Building inspection line: 905-771-5465 (24 hr)
buildinginspections@richmondhill.ca
Building inquiry line 905-771-8810
building@richmondhill.ca

UNEXCAVATED

DEPRESSURIZATION TEST REQUIRED BEFORE FINAL OCCUPANCY STAGE TO MEET TARGETTED ACH
2.5 ACH

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.

Kitchen hood exhaust duct shall be provided as per OBC 2012, Div.B 9.32.3.10, 9.32.3.5(2).

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

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)

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).

Ensure that R-Values and U-Values used for heat loss and heat gain calculations are consistent with the values specified by SB-12 Performance Compliance: BETTER THAN CODE/AIR TIGHTNESS TEST and the values used for architectural design.

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.

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)

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)

I MICHAEL O'ROURKE HAVE REVIEW 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.

CSA-F280-12

SB-12 PERFORMANCE

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

Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

OPT GROUND 5 BED 4 BATH
4505 3289 sqft

HVAC DESIGNS 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

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.

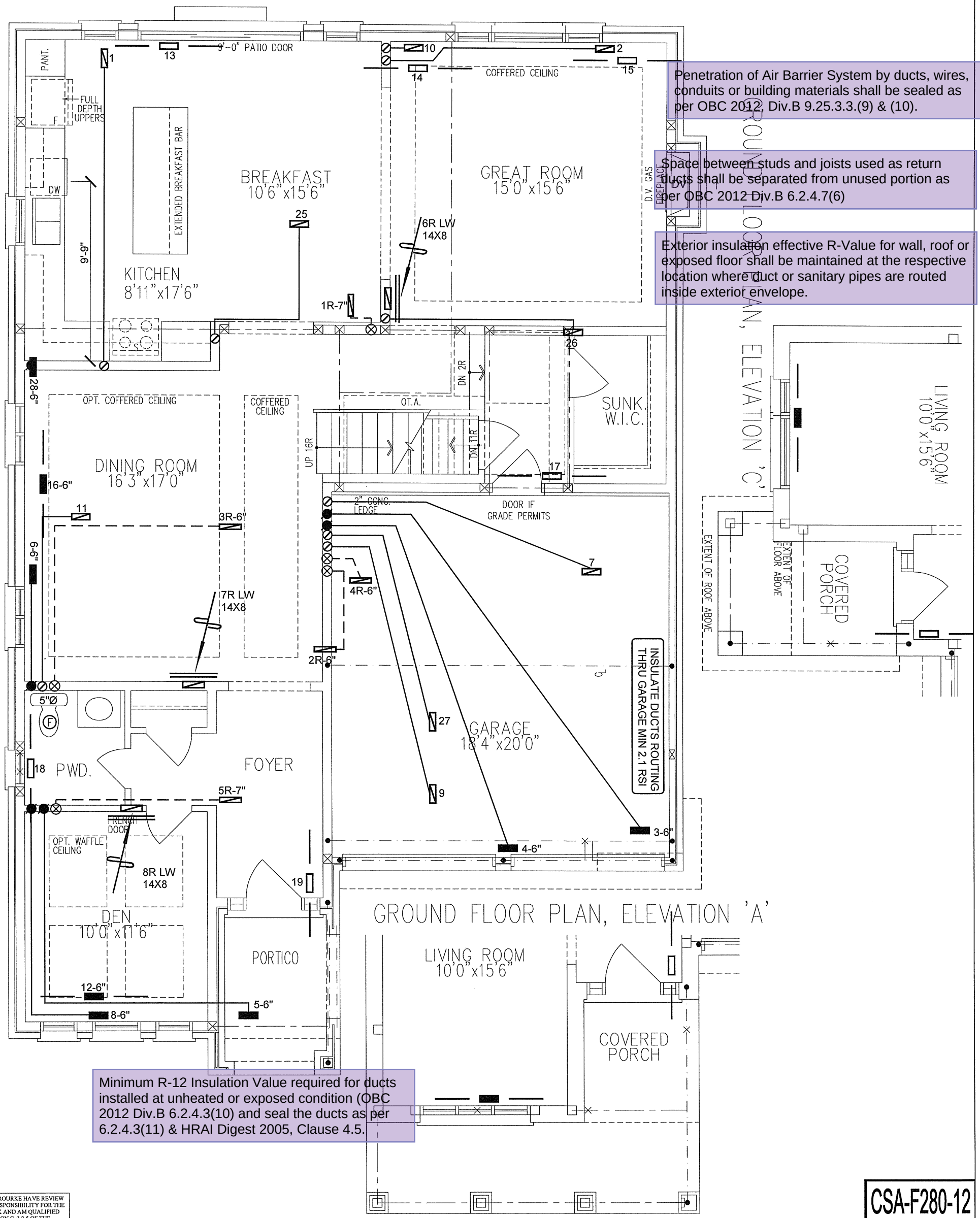
HEAT LOSS	51396 BTU/H
UNIT DATA	
MAKE	CARRIER
MODEL	59TN6A-060-14V
INPUT	60 MBTU/H
OUTPUT	58 MBTU/H
COOLING	3.0 TONS
FAN SPEED	1200 cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	16	5	5
1ST FLOOR	8	3	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 JUNE/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 91155



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).

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)

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.

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.

I MICHAEL O'ROURKE HAVE REVIEW 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.

CSA-F280-12

SB-12 PERFORMANCE

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

Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

OPT GROUND 5 BED 4 BATH
4505 3289 sqft

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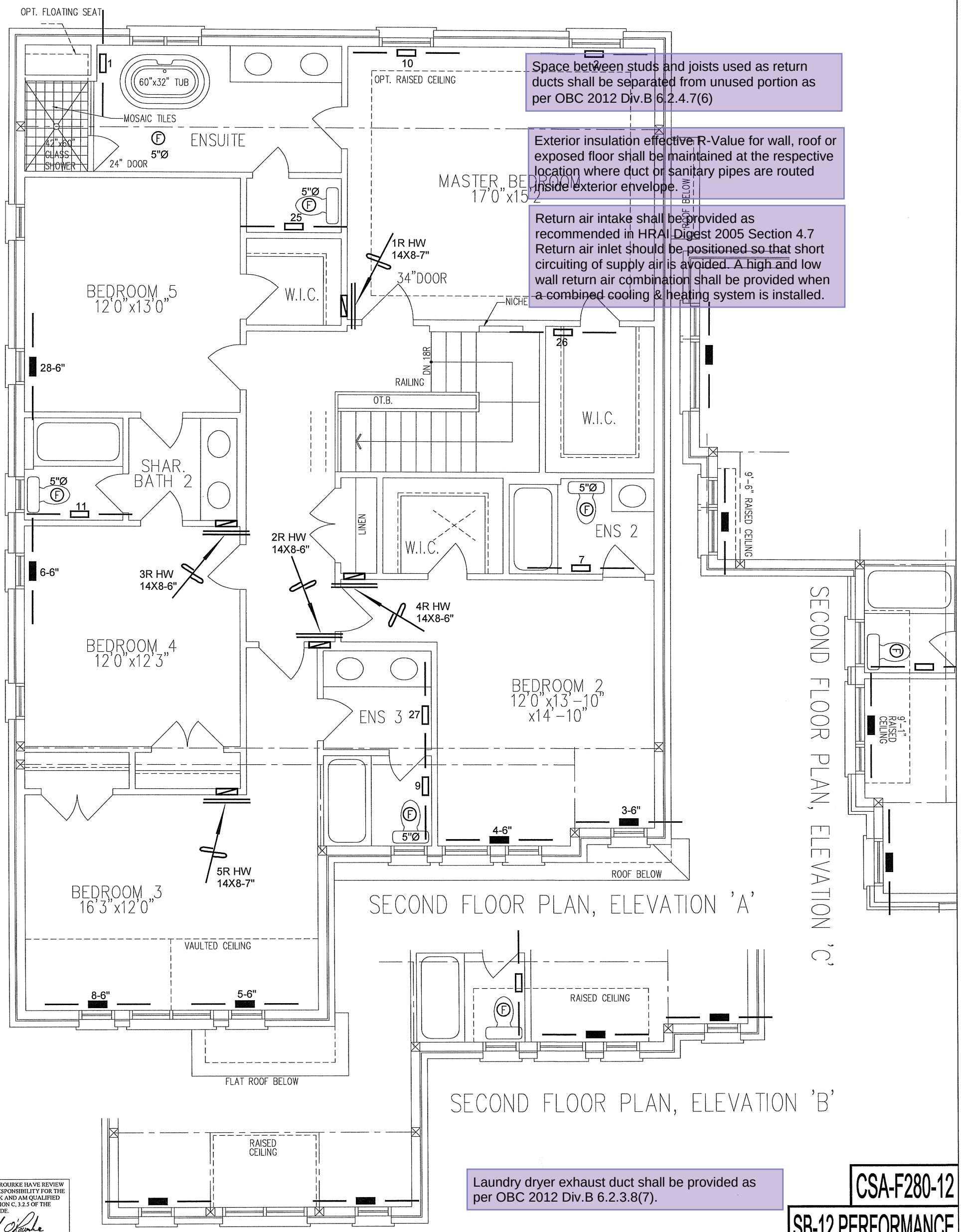
Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

Sheet Title
FIRST FLOOR HEATING LAYOUT

Date JUNE/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 91155



SECOND FLOOR PLAN, ELEVATION 'A'

SECOND FLOOR PLAN, ELEVATION 'C'

SECOND FLOOR PLAN, ELEVATION 'B'

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)

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.

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.

Laundry dryer exhaust duct shall be provided as per OBC 2012 Div.B 6.2.3.8(7).

CSA-F280-12

SB-12 PERFORMANCE

I MICHAEL O'ROURKE HAVE REVIEW 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.

HVAC LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
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	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
3.		
2.		
1.		

REVISIONS

Client

ROYAL PINE HOMES

Project Name

CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

OPT GROUND 5 BED 4 BATH
4505 3289 sqft

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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.

Sheet Title

SECOND FLOOR HEATING LAYOUT

Date JUNE/2021

Scale 3/16" = 1'-0"

BCIN# 19669

LO# 91155

Schedule 1: Designer Information

Use one form for each individual who reviews and takes responsibility for design activities with respect to the project.

A. Project Information

Building number, street name		Unit no.	Lot/con.
Municipality	**Postal code**	**Plan number/ other description**	
RICHMOND HILL			

B. Individual who reviews and takes responsibility for design activities

Name		Firm	
MICHAEL O'ROURKE		**HVAC DESIGNS LTD.**	
Street address		Unit no.	Lot/con.
375 FINLEY AVE		**202**	**N/A**
Municipality	Postal code / Province	E-mail	
AJAX	**L1S 2E2** / **ONTARIO**	**info@hvacdesigns.ca**	
Telephone number	Fax number	Cell number	
(905) 619-2300	**(905) 619-2375**	( )	

DUPLICATED

C. Design activities undertaken by individual identified in Section B. [Building Code Table 3.5.2.1 OF Division C]

- ☐ House
- ☐ Small Buildings
- ☐ Large Buildings
- ☐ Complex Buildings
- ☒ HVAC – House
- ☐ Building Services
- ☐ Detection, Lighting and Power
- ☐ Fire Protection
- ☐ Building Structural
- ☐ Plumbing – House
- ☐ Plumbing – All Buildings
- ☐ On-site Sewage Systems

Description of designer's work
HEAT LOSS / GAIN CALCULATIONS
DUCT SIZING
RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY
RESIDENTIAL SYSTEM DESIGN per CSA-F280-12

Model: 4505
ELMWOOD
OPT GROUND 5 BED 4 BATH

Project: CENTREFIELD (WEST GORMLEY)

D. Declaration of Designer

I **MICHAEL O'ROURKE** declare that (choose one as appropriate):
(print name)

☐ I review and take responsibility for the design work on behalf of a firm registered under subsection 3.2.4.of Division C, of the Building Code. I am qualified, and the firm is registered, in the appropriate classes/categories.

Individual BCIN: _____
Firm BCIN: _____

☒ I review and take responsibility for the design and am qualified in the appropriate category as an "other designer" under subsection 3.2.5.of Division C, of the Building Code.

Individual BCIN: 19659
Basis for exemption from registration and qualification: O.B.C SENTENCE 3.2.4.1 (4)

☐ The design work is exempt from the registration and qualification requirements of the Building Code
Basis for exemption from registration and qualification: _____

I certify that:

1. The information contained in this schedule is true to the best of my knowledge.
2. I have submitted this application with the knowledge and consent of the firm.

June 4, 2021
Date

Michael O'Rourke
Signature of Designer

NOTE:
1. For the purposes of this form, "individual" means the "person" referred to in Clause 3.2.4.7(1) d).of Division C, Article 3.2.5.1. of Division C, and all other persons who are exempt from qualification under Subsections 3.2.4. and 3.2.5. of Division C.
2. Schedule 1 is not required to be completed by a holder of a license, temporary license, or a certificate of authorization, issued by the Ontario Association of Architects. Schedule 1 is also not required to be completed by a holder of a license to practise, a limited license to practise, or a certificate of authorization, issued by the Association of Professional Engineers of Ontario.

HVAC DESIGNS LTD.

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SITE NAME: CENTREFIELD (WEST GORMLEY) — OPT GROUND 5 BED 4 BATH — DATE: Jun-21 — WINTER NATURAL AIR CHANGE RATE 0.219 — HEAT LOSS ΔT °F. 78 — CSA-F280-12

BUILDER: ROYAL PINE HOMES — TYPE: 4505 — GFA: 3289 — LO# 91155 — SUMMER NATURAL AIR CHANGE RATE 0.068 — HEAT GAIN ΔT °F. 13 — SB-12 PERFORMANCE

ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4			ENS-2			BED-5			ENS-3			ENS-4				
EXP. WALL			35			26			8			29			42			13			6			14			6							
CLG. HT.			9						8			8			9			8			8			8			8							
	FACTORS																																
GRS.WALL AREA	LOSS	GAIN	315			208			64			232			357			104			48			112			48			48				
GLAZING			LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN			
NORTH	21.8	15.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
EAST	21.8	40.5	0	0	0	0	0	0	0	0	0	43	937	1740	65	1416	2630	0	0	0	0	0	0	0	0	0	16	349	647	0	0	0		
SOUTH	21.8	24.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	349	389	0	0	0	16	349	389	0	0	0	7	152	170		
WEST	21.8	40.5	26	566	1052	18	392	728	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.	35.8	101.2	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	0	0	0		
DOORS	25.8	4.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
NET EXPOSED WALL	4.2	0.7	289	1215	200	190	799	131	64	269	44	189	795	131	292	1228	202	88	370	61	48	202	33	96	404	66	32	135	22	41	172	28		
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
EXPOSED CLG	1.3	0.6	348	457	205	164	216	96	72	95	42	29	386	173	198	260	116	210	276	123	50	66	29	235	309	138	70	92	41	105	138	62		
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0	24	67	30	90	253	113	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	318	830	137	0	0	0	0	0	0	42	110	18	0	0	0	70	183	30	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			2239			1407			364			3016			3157			995			377			1061			758			463				
SUB TOTAL HT GAIN				1457			956			87			2210			3062			573			81			593			741			260			
LEVEL FACTOR / MULTIPLIER			0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19		0.20	0.19			
AIR CHANGE HEAT LOSS			418			263			68			563			589			186			70			198			141			86				
AIR CHANGE HEAT GAIN				77			51			5			117			163			30			4			31			39			14			
DUCT LOSS			0			0			0			358			0			0			45			0						0				
DUCT GAIN				0			0			0			317			0			0			8			0			78			0			
HEAT GAIN PEOPLE	240		2		480	0		0	0		0	1		240	1		240	1		240	0		0	1		240	0		0	0		0		
HEAT GAIN APPLIANCES/LIGHTS					601			0			0			601			601			601			0			601			0			0		
TOTAL HT LOSS BTU/H			2657			1669			432			3936			3746			1180			492			1259			981			549				
TOTAL HT GAIN x 1.3 BTU/H				3399			1309			119			4531			5284			1877			121			1905			1116			356			

ROOM USE			LIV					K/B/G			DIN			LAUN			W/R			FOY									BAS		
EXP. WALL			32					74			24			28			7			24									188		
CLG. HT.			10					10			10			11			10			10									9		
	FACTORS																														
GRS.WALL AREA	LOSS	GAIN	323					747			242			311			71			242									1128		
GLAZING			LOSS	GAIN				LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN								LOSS	GAIN	
NORTH	21.8	15.6	0	0	0			0	0	0	0	0	0	8	174	125	0	0	0	0	0	0							3	65	47
EAST	21.8	40.5	37	806	1497			0	0	0	0	0	0	0	0	0	0	0	0	12	261	486							0	0	0
SOUTH	21.8	24.3	0	0	0			10	218	243	36	784	874	0	0	0	7	152	170	0	0	0							7	152	170
WEST	21.8	40.5	0	0	0			75	1634	3035	0	0	0	0	0	0	0	0	0	0	0	0							3	65	121
SKYLT.	35.8	101.2	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							0	0	0
DOORS	25.8	4.3	0	0	0			20	517	85	0	0	0	20	517	85	0	0	0	30	775	128							20	517	85
NET EXPOSED WALL	4.2	0.7	286	1204	198			642	2702	444	206	867	143	283	1189	196	64	268	44	200	843	139							0	0	0
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							564	2078	342
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
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0			10	28	13	0	0	0	0	0	0	0	0	0	0	0	0							0	0	0
EXPOSED FLOOR	2.6	0.4	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							0	0	0
BASEMENT/CRAWL HEAT LOSS			0					0			0			0			0			0									6330		
SLAB ON GRADE HEAT LOSS			0					0			0			0			0			0											
SUBTOTAL HT LOSS			2010					509			1652			1881			420			1880									9207		
SUB TOTAL HT GAIN				1695					3820			1017			406			214			752									765	
LEVEL FACTOR / MULTIPLIER			0.30	0.30				0.30	0.30		0.30	0.30		0.30	0.30		0.30	0.30		0.30	0.30								0.50	0.70	
AIR CHANGE HEAT LOSS				602					1527			495			563			126			563									6458		
AIR CHANGE HEAT GAIN					90					203			54			22			11			40									41	
DUCT LOSS				0					0			0			0			0			0									0		
DUCT GAIN					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
HEAT GAIN APPLIANCES/LIGHTS					601					601			601			601			0			0									601
TOTAL HT LOSS BTU/H			2611					6625			2147			2444			546			2442									15665		
TOTAL HT GAIN x 1.3 BTU/H				3102					6010			2173			1336			293			1029									1828	

TOTAL HEAT GAIN BTU/H: 36119 — TONS: 3.01 — LOSS DUE TO VENTILATION LOAD BTU/H: 2004 — STRUCTURAL HEAT LOSS: 49392 — TOTAL COMBINED HEAT LOSS BTU/H: 51396

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: 29669 MICHAEL O'ROURKE

DUPLICATED

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SITE NAME: CENTREFIELD (WEST GORMLEY) — OPT GROUND 5 BED 4 BATH
BUILDER: ROYAL PINE HOMES — TYPE: 4505 — DATE: Jun-21 — GFA: 3289 — LO# 91155

HEATING CFM	1200	COOLING CFM	1200
TOTAL HEAT LOSS	49,392	TOTAL HEAT GAIN	35,789
AIR FLOW RATE CFM	24.3	AIR FLOW RATE CFM	33.3

furnace pressure	0.6
furnace filter	0.05
a/c coil pressure	0.2
available pressure for s/a & r/a	0.35
plenum pressure s/a	0.18
max s/a dif 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

**CARRIER
59TN6A-060-14V
FAN SPEED

LOW	820
MEDLOW	0
MEDIUM	1200
MEDIUM HIGH	0
HIGH	1520

60

AFUE = 97 %
INPUT (BTU/H) = 60,000
OUTPUT (BTU/H) = 58,000
DESIGN CFM = 1200
CFM @ .6 " E.S.P.
TEMPERATURE RISE 45 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	16	8	4
R/A	0	0	5	3	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	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
ROOM NAME	ENS	MBR	BED-2	BED-2	BED-3	BED-4	ENS-3	BED-3	ENS-3	MBR	ENS-4/5	LIV	K/B/G	K/B/G	K/B/G	DIN	LAUN	W/R	FOY	ENS	BAS	BAS	BAS	BAS
RM LOSS MBH.	0.56	1.33	1.97	1.97	1.87	1.18	0.49	1.87	0.49	1.33	0.55	2.61	2.21	2.21	2.21	2.15	2.44	0.55	2.41	0.56	3.92	3.92	3.92	3.92
CFM PER RUN HEAT	14	32	48	48	46	29	12	46	12	32	13	63	54	54	54	52	59	13	59	14	95	95	95	95
RM GAIN MBH.	0.44	1.70	2.27	2.27	2.64	1.88	0.12	2.64	0.56	1.70	0.36	3.10	2.00	2.00	2.00	2.17	1.34	0.29	1.03	0.44	0.46	0.46	0.46	0.46
CFM PER RUN COOLING	15	57	76	76	89	63	4	89	19	57	12	104	67	67	67	73	45	10	35	15	15	15	15	15
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.16	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.	32	58	58	51	49	29	37	47	44	49	27	31	28	39	51	6	43	17	36	46	45	26	8	27
EQUIVALENT LENGTH	150	150	130	120	180	130	140	170	130	150	140	90	130	130	100	140	120	150	100	160	110	120	150	110
TOTAL EFFECTIVE LENGTH	182	208	188	171	229	159	177	217	174	199	167	121	158	169	151	146	163	167	136	206	155	146	158	137
ADJUSTED PRESSURE	0.09	0.08	0.09	0.1	0.07	0.11	0.1	0.07	0.1	0.09	0.1	0.13	0.11	0.1	0.11	0.12	0.1	0.1	0.13	0.08	0.1	0.11	0.1	0.12
ROUND DUCT SIZE	4	5	**6**	**6**	**6**	**6**	4	**6**	4	5	4	**6**	5	5	5	**6**	5	4	5	4	**6**	**6**	**6**	**6**
HEATING VELOCITY (ft/min)	161	235	245	245	235	148	138	235	138	235	149	321	396	396	396	265	433	149	433	161	484	484	484	484
COOLING VELOCITY (ft/min)	172	419	388	388	454	321	46	454	218	419	138	530	492	492	492	372	330	115	257	172	76	76	76	76
OUTLET GRILL SIZE	3X10	3X10	4X10	4X10	4X10	4X10	3X10	4X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	D	D	B	B	A	B	B	A	B	D	B	A	D	C	C	B	C	A	A	C	C	D	B	A

RUN #	25	26	27	28
ROOM NAME	ENS	WIC	ENS-3	BED-5
RM LOSS MBH.	0.56	0.43	0.49	1.26
CFM PER RUN HEAT	14	10	12	31
RM GAIN MBH.	0.44	0.12	0.56	1.90
CFM PER RUN COOLING	15	4	19	64
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17
ACTUAL DUCT LGH.	35	45	41	22
EQUIVALENT LENGTH	160	170	140	190
TOTAL EFFECTIVE LENGTH	195	215	181	212
ADJUSTED PRESSURE	0.09	0.08	0.1	0.08
ROUND DUCT SIZE	4	4	4	**6**
HEATING VELOCITY (ft/min)	161	115	138	158
COOLING VELOCITY (ft/min)	172	46	218	326
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10
TRUNK	D	C	B	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	322	0.07	9.5	12	x	8	483	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	643	0.07	12.3	20	x	8	579	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	286	0.08	8.8	10	x	8	515	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	558	0.08	11.3	14	x	8	717	TRUNK J	0	0.00	0	0	x	8	0
TRUNK E	0	0.00	0	0	x	8	0	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	915	0.05	15.3	28	x	8	588
TRUNK Y	480	0.05	12	16	x	8	540
TRUNK Z	285	0.05	9.9	12	x	8	428
DROP	1200	0.05	16.9	24	x	12	600

RETURN AIR #	1	2	3	4	5	6	7	8								BR
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	130	85	75	95	130	155	175	175	0	0	0	0	0	0	0	180
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.	54	50	53	52	58	35	23	30	1	1	1	1	1	1	1	17
EQUIVALENT LENGTH	215	205	245	165	175	200	185	190	0	0	0	0	0	0	0	145
TOTAL EFFECTIVE LH	269	255	298	217	233	235	208	220	1	1	1	1	1	1	1	162
ADJUSTED PRESSURE	0.06	0.06	0.05	0.07	0.06	0.06	0.07	0.07	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.09
ROUND DUCT SIZE	7	6	6	6	7	7	7.5	7.5	0	0	0	0	0	0	0	7.2
INLET GRILL SIZE	8	8	8	8	8	8	8	8	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	14	14	14	0	0	0	0	0	0	0	14

DUPLICATED

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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TYPE: 4505 LO # 91155
SITE NAME: CENTREFIELD (WEST GORMLEY) OPT GROUND 5 BED 4 BATH

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	2	@ 21.2 cfm	42.4	cfm
Other Bedrooms	4	@ 10.6 cfm	42.4	cfm
Kitchen & Bathrooms	6	@ 10.6 cfm	63.6	cfm
Other Rooms	5	@ 10.6 cfm	53.0	cfm
Table 9.32.3.A.		TOTAL	201.4	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	**95.4**	**cfm**

SUPPLEMENTAL VENTILATION CAPACITY 9.32.3.5.

Total Ventilation Capacity	201.4	cfm
Less Principal Ventil. Capacity	95.4	cfm
Required Supplemental Capacity	106.0	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE 65H Location: BSMT

95.4 cfm [✓] HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM		ΔT °F		FACTOR		% LOSS
95.4 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
ENS-2	BY INSTALLING CONTRACTOR	50	✓	3.5
ENS-4/5	BY INSTALLING CONTRACTOR	50	✓	3.5
W/R	BY INSTALLING CONTRACTOR	50	✓	3.5

HEAT RECOVERY VENTILATOR 9.32.3.11.

Model: VANEE 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: ROYAL PINE 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: June-21

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

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CSA F280-12 Residential Heat Loss and Heat Gain Calculations

Formula Sheet (For Air Leakage / Ventiliation Calculation)

LO#: 91155 Model: 4505 Builder: ROYAL PINE HOMES Date: 2021-06-04

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1434	9	12906
First	1434	10	14483.4
Second	1861	8	14888
Third	0	9	0
Fourth	0	9	0
		Total:	42,277.4 ft³
		Total:	1197.2 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.219
SUMMER NATURAL AIR CHANGE RATE	0.068

Design Temperature Difference

	Tin °C	Tout °C	ΔT °C	ΔT °F
Winter DTDh	22	-21	43	78
Summer DTDc	24	31	7	13

5.2.3.1 Heat Loss due to Air Leakage

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

0.219 x 332.55 x 43 °C x 1.2 = 3785 W

= **12916 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

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

0.068 x 332.55 x 7 °C x 1.2 = 194 W

= **662 Btu/h**

5.2.3.2 Heat Loss due to Mechanical Ventilation

$$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

95 CFM x 78 °F x 1.08 x 0.25 = **2004 Btu/h**

6.2.7 Sensible heat Gain due to Ventilation

$$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

95 CFM x [illegible] °F x 1.08 x 0.25 = **330 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_{level})	Air Leakage Heat Loss Multiplier (LF x HLairbv / HLlevel)
1	0.5	12,916	9,207	0.701
2	0.3		12,941	0.299
3	0.2		13,836	0.187
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: 4505 OPT GROUND 5 BED 4 BATH **BUILDER:** ROYAL PINE HOMES
SFQT: 3289 **LO#** 91155 **SITE:** CENTREFIELD (WEST GORMLEY)

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

BUILDING DATA

DUPLICATED

ATTACHMENT:	DETACHED	# OF STORIES (+BASEMENT):	3
FRONT FACES:	EAST	ASSUMED (Y/N):	Y
AIR CHANGES PER HOUR:	2.50	ASSUMED (Y/N):	Y
AIR TIGHTNESS CATEGORY:	TIGHT	ASSUMED (Y/N):	Y
WIND EXPOSURE:	SHELTERED	ASSUMED (Y/N):	Y
HOUSE VOLUME (ft^3):	42277.4	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	6
INTERIOR LIGHTING LOAD ($Btu/h/ft^2$):	1.27	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	6.0 ft
LENGTH: 38.0 ft	WIDTH: 56.0 ft	EXPOSED PERIMETER:	188.0 ft

2012 OBC - COMPLIANCE PACKAGE Component	Compliance Package SB-12 PERFORMANCE	
	Nominal	Min. Eff.
Ceiling with Attic Space Minimum RSI (R)-Value	60	59.20
Ceiling Without Attic Space Minimum RSI (R)-Value	31	27.70
Exposed Floor Minimum RSI (R)-Value	31	29.80
Walls Above Grade Minimum RSI (R)-Value	22+1.5	18.50
Basement Walls Minimum RSI (R)-Value	20	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	1.6	-
Skylights Maximum U-Value	2.6	-
Space Heating Equipment Minimum AFUE	0.96	-
HRV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	TE=94%	-

INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

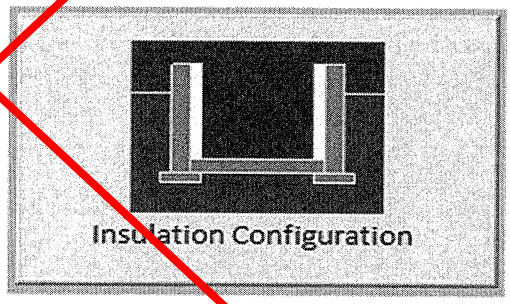
Michael O'Rourke

HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

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):	11.6
Floor Width (m):	17.1
Exposed Perimeter (m):	0.0
Wall Height (m):	2.7
Depth Below Grade (m):	1.83
Window Area (m^2):	1.2
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):	**1855**



TYPE: 4505
LO# 91155

OPT GROUND 5 BED 4 BATH

HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

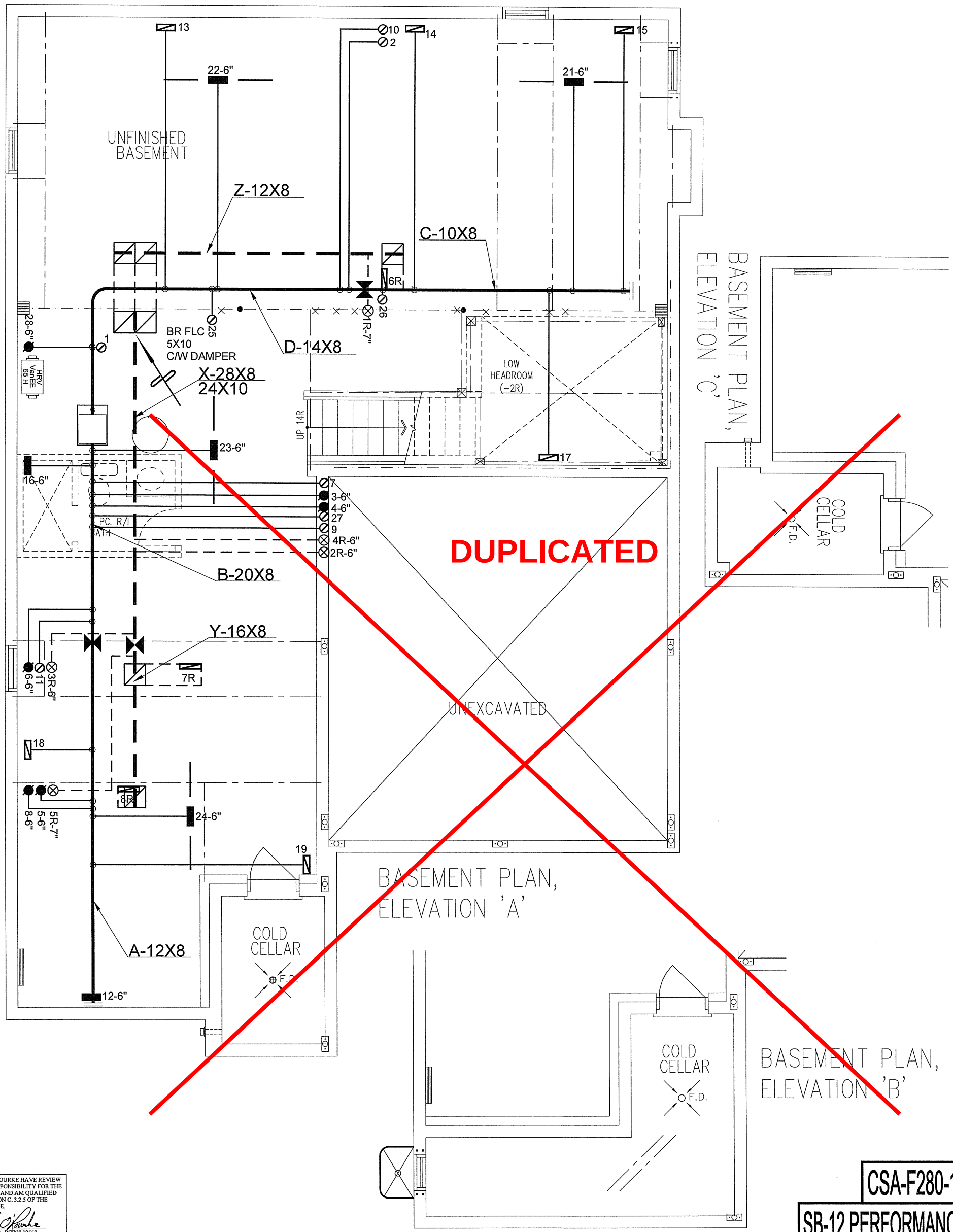
Weather Station Description		
Province:	Ontario	
Region:	Richmond Hill	
Weather Station Location:	Open flat terrain, grass	
Anemometer height (m):	10	
Local Shielding		
Building Site:	Suburban, forest	
Walls:	Heavy	
Flue:	Heavy	
Highest Ceiling Height (m):	6.43	
Building Configuration		
Type:	Detached	
Number of Stories:	Two	
Foundation:	Full	
House Volume (m^3):	1197.2	
Air Leakage/Ventilation		
Air Tightness Type:	Energy Star Detached (2.5 ACH)	
Custom BDT Data:	ELA @ 10 Pa.	1117.5 cm^2
	2.50	ACH @ 50 Pa
Mechanical Ventilation (L/s):	Total Supply	Total Exhaust
	45.0	45.0

Flue Size					
Flue #:	#1	#2	#3	#4	
Diameter (mm):	0	0	0	0	

Natural Infiltration Rates	
Heating Air Leakage Rate (ACH/H):	**0.219**
Cooling Air Leakage Rate (ACH/H):	**0.068**

TYPE: 4505 OPT GROUND 5 BED 4 BATH

LO# 91155



I MICHAEL O'ROURKE HAVE REVIEW 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.

CSA-F280-12

SB-12 PERFORMANCE

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

Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

OPT GROUND 5 BED 4 BATH
4505 3289 sqft

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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.

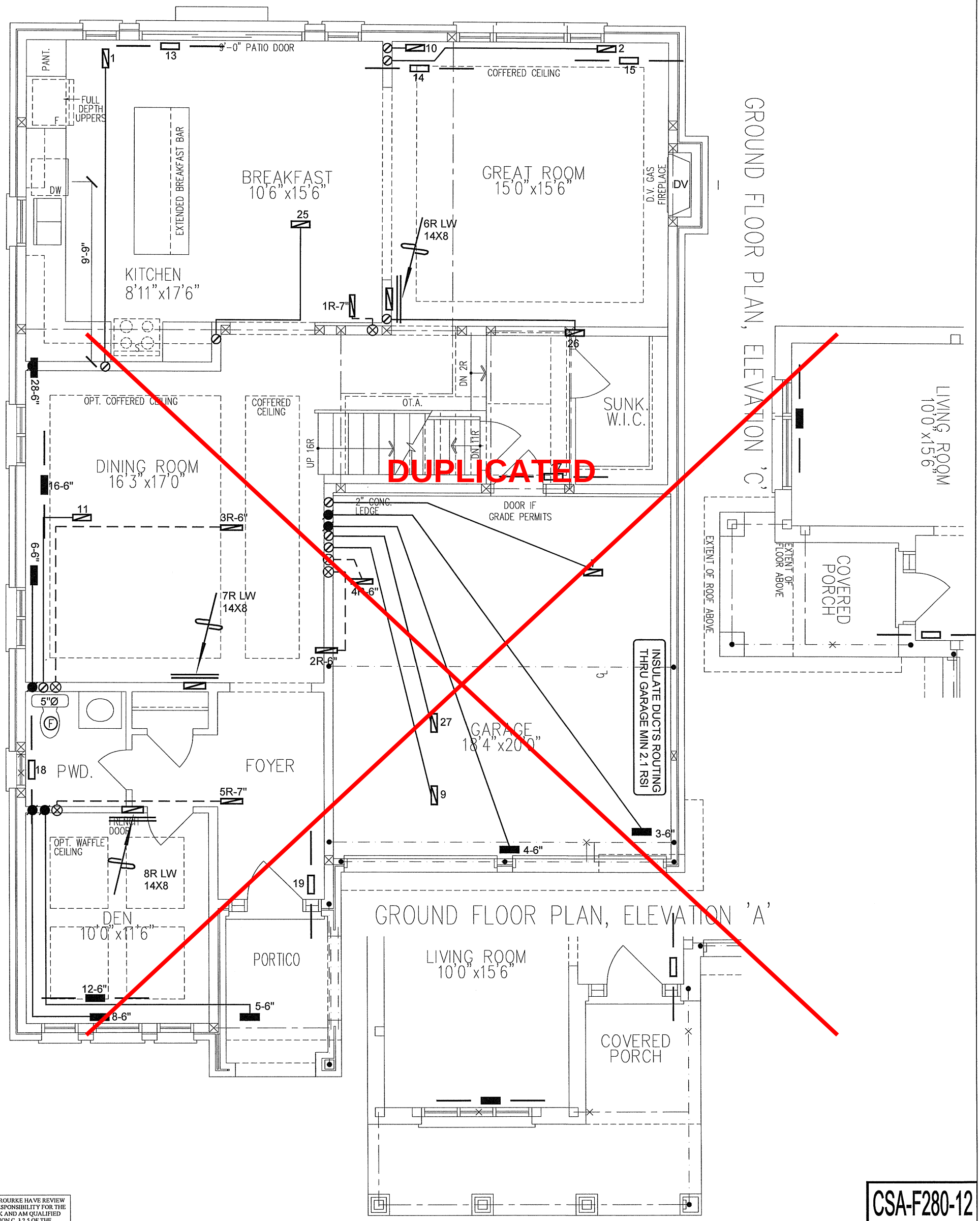
HEAT LOSS 51396 BTU/H	
UNIT DATA	
MAKE	CARRIER
MODEL	59TN6A-060-14V
INPUT	60 MBTU/H
OUTPUT	58 MBTU/H
COOLING	3.0 TONS
FAN SPEED	1200 cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	16	5	5
1ST FLOOR	8	3	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 JUNE/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 91155



DUPLICATED

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CSA-F280-12

SB-12 PERFORMANCE

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

Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

OPT GROUND 5 BED 4 BATH
4505 3289 sqft

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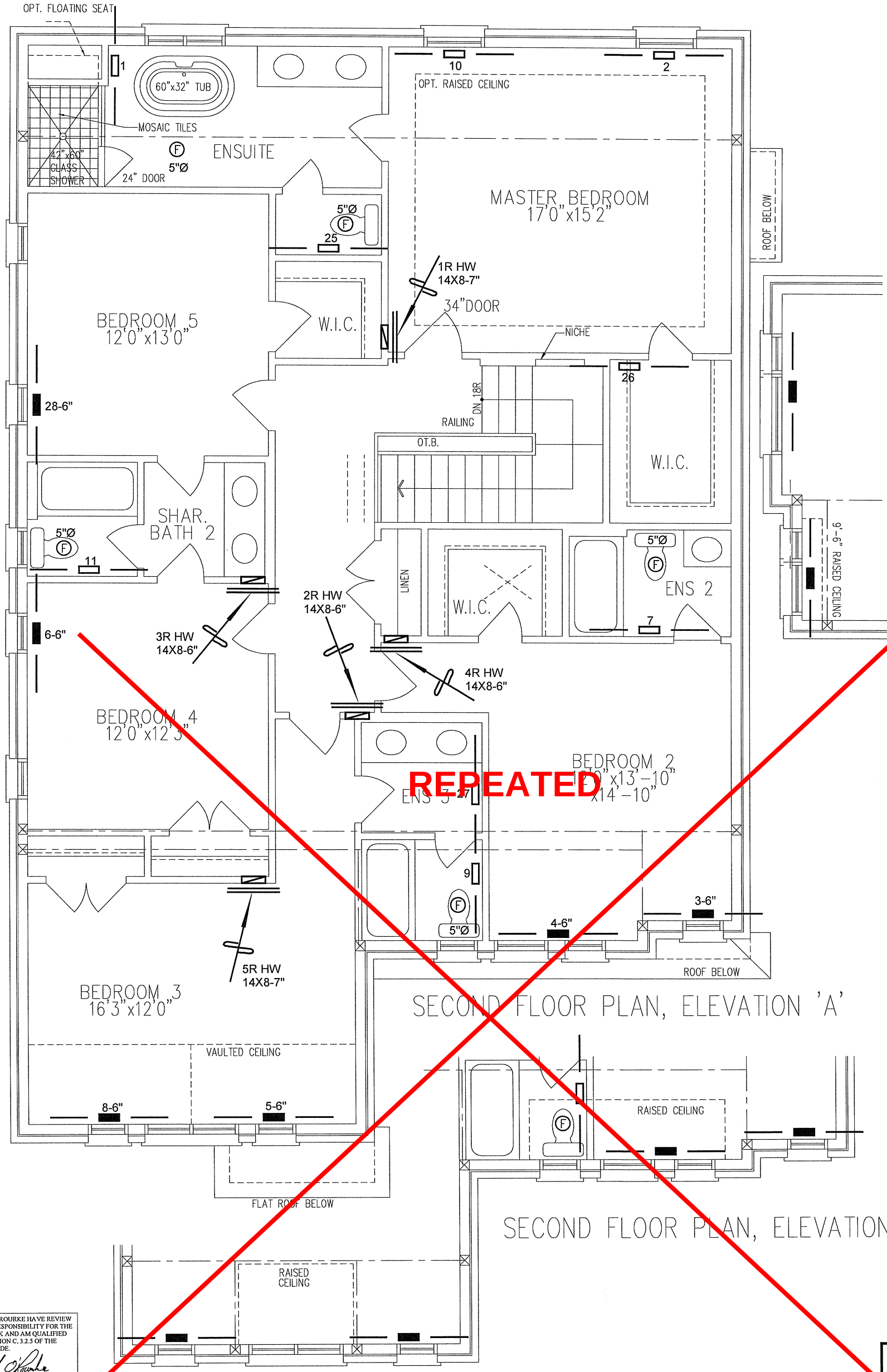
Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

Sheet Title
FIRST FLOOR HEATING LAYOUT

Date JUNE/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 91155



I MICHAEL O'ROURKE HAVE REVIEW 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.

CSA-F280-12

SB-12 PERFORMANCE

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

Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

OPT GROUND 5 BED 4 BATH
4505 3289 sqft

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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.

Sheet Title
SECOND FLOOR HEATING LAYOUT

Date JUNE/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 91155

Schedule 1: Designer Information

Use one form for each individual who reviews and takes responsibility for design activities with respect to the project.

A. Project Information

Building number, street name			Unit no.	Lot/con.
Municipality	**Postal code**	**Plan number/ other description**		
RICHMOND HILL				

B. Individual who reviews and takes responsibility for design activities

Name		Firm		
MICHAEL O'ROURKE		**HVAC DESIGNS LTD.**		
Street address			Unit no.	Lot/con.
375 FINLEY AVE			**202**	**N/A**
Municipality	Postal code	Province	E-mail	
AJAX	**L1S 2E2**	**ONTARIO**	**info@hvacdesigns.ca**	
Telephone number	Fax number		Cell number	
(**905**) **619-2300**	(**905**) **619-2375**		( )	

C. Design activities undertaken by individual identified in Section B. [Building Code Table 3.5.2.1 OF Division C]

❑ House	☒ HVAC – House	❑ Building Structural
❑ Small Buildings	❑ Building Services	❑ Plumbing – House
❑ Large Buildings	❑ Detection, Lighting and Power	❑ Plumbing – All Buildings
❑ Complex Buildings	❑ Fire Protection	❑ On-site Sewage Systems

Description of designer's work
HEAT LOSS / GAIN CALCULATIONS
DUCT SIZING
RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY
RESIDENTIAL SYSTEM DESIGN per CSA-F280-12

Model: 4505
ELMWOOD
OPT GROUND

Project: CENTREFIELD (WEST GORMLEY)

D. Declaration of Designer

I **MICHAEL O'ROURKE** declare that (choose one as appropriate):
(print name)

❑ I review and take responsibility for the design work on behalf of a firm registered under subsection 3.2.4.of Division C, of the Building Code. I am qualified, and the firm is registered, in the appropriate classes/categories.

Individual BCIN: _____
Firm BCIN: _____

☒ I review and take responsibility for the design and am qualified in the appropriate category as an "other designer" under subsection 3.2.5.of Di vision C, of the Building Code.

Individual BCIN: 19669
Basis for exemption from registration and qualification: O.B.C SENTENCE 3.2.4.1 (4)

❑ The design work is exempt from the registration and qualification requirements of the Building Code.
Basis for exemption from registration and qualification: _____

I certify that:

1. The information contained in this schedule is true to the best of my knowledge.
2. I have submitted this application with the knowledge and consent of the firm.

June 4, 2021
Date

Michael O'Rourke
Signature of Designer

NOTE:

1. For the purposes of this form, "individual" means the "person" referred to in Clause 3.2.4.7(1) d).of Division C, Article 3.2.5.1. of Division C, and all other persons who are exempt from qualification under Subsections 3.2.4. and 3.2.5. of Division C.
2. Schedule 1 is not required to be completed by a holder of a license, temporary license, or a certificate of authorization, issued by the Ontario Association of Architects. Schedule 1 is also not required to be completed by a holder of a license to practise, a limited license to practise, or a certificate of authorization, issued by the Association of Professional Engineers of Ontario.

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SITE NAME: CENTREFIELD (WEST GORMLEY) | OPT GROUND | DATE: Jun-21 | WINTER NATURAL AIR CHANGE RATE 0.233 | HEAT LOSS ΔT °F. 78 | CSA-F280-12
BUILDER: ROYAL PINE HOMES | TYPE: 4505 | GFA: 3289 | LO# 87520 | SUMMER NATURAL AIR CHANGE RATE 0.073 | HEAT GAIN ΔT °F. 13 | SB-12 PERFORMANCE

ROOM USE			MBR			ENS			WIC-2			BED-2			BED-3			BED-4			ENS-2				LAUND			BATH					
EXP. WALL			37			34			15			14			44			15			11				0			9					
CLG. HT.			10			9			9			9			10			9			9				9			9					
	FACTORS																																
GRS.WALL AREA	LOSS	GAIN	370			306			135			126			418			135			99				0			81					
GLAZING				LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN				
NORTH	21.8	15.6	0	0	0	24	523	375	0	0	0	0	0	0	0	0	0	0	0	0	7	152	109		0	0	0	0	0	0			
EAST	21.8	40.5	0	0	0	0	0	0	13	283	526	45	980	1821	64	1394	2590	0	0	0	0	0	0		0	0	0	0	0	0			
SOUTH	21.8	24.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	370	413	0	0	0		0	0	0	7	152	170			
WEST	21.8	40.5	35	762	1416	13	283	526	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0			
SKYLT.	35.8	101.2	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			
DOORS	25.8	4.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0			
NET EXPOSED WALL	4.2	0.7	335	1409	232	269	1131	186	122	513	84	81	341	56	354	1489	245	118	496	82	92	387	64		0	0	0	74	311	51			
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0			
EXPOSED CLG	1.3	0.6	390	513	229	264	347	155	54	71	32	142	187	83	245	322	144	320	421	188	72	95	42		98	129	58	117	154	69			
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0	24	67	30	90	253	113	0	0	0	0	0	0		0	0	0	0	0	0			
EXPOSED FLOOR	2.6	0.4	0	0	0	0	0	0	54	141	23	166	433	71	42	110	18	0	0	0	48	125	21		98	256	42	0	0	0			
BASEMENT/CRAWL HEAT LOSS				0			0			0			0			0			0			0				0			0				
SLAB ON GRADE HEAT LOSS				0			0			0			0			0			0			0				0			0				
SUBTOTAL HT LOSS				2684			2284			1008			2008			3567			1287			759				385			617				
SUB TOTAL HT GAIN					1877			1242			665			2062			3110			683			236				100			290			
LEVEL FACTOR / MULTIPLIER			0.20	0.21		0.20	0.21		0.20	0.21		0.20	0.21		0.20	0.21		0.20	0.21		0.20	0.21			0.20	0.21		0.20	0.21				
AIR CHANGE HEAT LOSS				558			475			210			418			742			268			158				80			128				
AIR CHANGE HEAT GAIN					104			69			37			114			172			38			13				6			16			
DUCT LOSS				0			0			122			243			431			0			92				46			0				
DUCT GAIN					0			0			70			308			419			0			25				77			0			
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					667			0			0			667			667			667			0				667			0			
TOTAL HT LOSS BTU/H				3242			2759			1340			2669			4740			1555			1009				511			746				
TOTAL HT GAIN x 1.3 BTU/H					4067			1705			1004			4410			5991			2116			356				1105			398			

ROOM USE			DEN						K/B/G			DIN			MUD			W/R			FOY								BAS		
EXP. WALL			35						72			23			28			7			24								188		
CLG. HT.			11						11			11			12			11			11								10		
	FACTORS																														
GRS.WALL AREA	LOSS	GAIN	385						792			253			336			77			264								1316		
GLAZING				LOSS	GAIN					LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN							LOSS	GAIN
NORTH	21.8	15.6	0	0	0				0	0	0	0	0	0	8	174	125	0	0	0	0	0	0						3	65	47
EAST	21.8	40.5	37	806	1497				0	0	0	0	0	0	0	0	0	0	0	0	12	261	486						0	0	0
SOUTH	21.8	24.3	0	0	0				8	174	194	34	741	826	0	0	0	9	196	219	0	0	0						7	152	170
WEST	21.8	40.5	0	0	0				75	1634	3035	0	0	0	0	0	0	0	0	0	0	0	0						3	65	121
SKYLT.	35.8	101.2	0	0	0				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						0	0	0
DOORS	25.8	4.3	0	0	0				20	517	85	0	0	0	20	517	85	0	0	0	30	775	128						20	517	85
NET EXPOSED WALL	4.2	0.7	348	1463	241				689	2898	477	219	921	152	308	1295	213	68	286	47	222	934	154						0	0	0
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6	0	0	0				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						564	2078	342
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
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0				10	28	13	0	0	0	0	0	0	0	0	0	0	0	0						0	0	0
EXPOSED FLOOR	2.6	0.4	0	0	0				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						0	0	0
BASEMENT/CRAWL HEAT LOSS				0						0			0			0			0			0							6278		
SLAB ON GRADE HEAT LOSS				0						0			0			0			0			0									
SUBTOTAL HT LOSS				2269						5251			1662			1986			482			1970							9156		
SUB TOTAL HT GAIN					1738						3804			977			423			266			767								765
LEVEL FACTOR / MULTIPLIER			0.30	0.33					0.30	0.33		0.30	0.33		0.30	0.33		0.30	0.33		0.30	0.33							0.50	0.83	
AIR CHANGE HEAT LOSS				759						1756			556			664			161			659							7593		
AIR CHANGE HEAT GAIN					96						211			54			23			15			43								42
DUCT LOSS				0						0			0			0			0			0							0		
DUCT GAIN					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
HEAT GAIN APPLIANCES/LIGHTS					667						667			667			0			0			0								667
TOTAL HT LOSS BTU/H				3029						7007			2217			2651			643			2630							16750		
TOTAL HT GAIN x 1.3 BTU/H					3252						6087			2209			581			365			1052								1917

TOTAL HEAT GAIN BTU/H: 36889 TONS: 3.07 LOSS DUE TO VENTILATION LOAD BTU/H: 1670 STRUCTURAL HEAT LOSS: 53497 TOTAL COMBINED HEAT LOSS BTU/H: 55167

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Michael O'Rourke

INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

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SITE NAME: CENTREFIELD (WEST GORMLEY) OPT GROUND
BUILDER: ROYAL PINE HOMES TYPE: 4505 DATE: Jun-21 GFA: 3289 LO# 87520

HEATING CFM 1200 COOLING CFM 1200
TOTAL HEAT LOSS 53,497 TOTAL HEAT GAIN 36,614
AIR FLOW RATE CFM 22.43 AIR FLOW RATE CFM 32.77

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	13	8	4
R/A	0	0	5	3	1

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

furnace pressure	0.6
furnace filter	0.05
a/c coil pressure	0.2
available pressure for s/a & r/a	0.35
plenum pressure s/a	0.18
max s/a dif press. loss	0.03
min adjusted pressure s/a	0.15
r/a pressure	0.17
r/a grille press. Loss	0.02
adjusted pressure r/a	0.15

**CARRIER
59TN6A-060-14V 60
AFUE = 97 %
INPUT (BTU/H) = 60,000
OUTPUT (BTU/H) = **58,000**

FAN SPEED	
LOW	820
MEDLOW	0
MEDIUM	1200
MEDIUM HIGH	0
HIGH	1520

DESIGN CFM = **1200** CFM @ .6 " E.S.P.
TEMPERATURE RISE 45 °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-2	BED-2	BED-3	BED-4	ENS-2	BED-3	LAUND	MBR	BATH	DEN	K/B/G	K/B/G	K/B/G	DIN	MUD	W/R	FOY	ENS	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.62	1.38	1.34	1.33	2.37	1.55	1.01	2.37	0.51	1.62	0.75	3.03	2.34	2.34	2.34	2.22	2.65	0.64	2.63	1.38	4.19	4.19	4.19	4.19
CFM PER RUN HEAT	36	31	30	30	53	35	23	53	11	36	17	68	52	52	52	50	59	14	59	31	94	94	94	94
RM GAIN MBH.	2.03	0.85	1.00	2.20	3.00	2.12	0.36	3.00	1.10	2.03	0.40	3.25	2.03	2.03	2.03	2.21	0.58	0.36	1.05	0.85	0.48	0.48	0.48	0.48
CFM PER RUN COOLING	67	28	33	72	98	69	12	98	36	67	13	107	66	66	66	72	19	12	34	28	16	16	16	16
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.16	0.17	0.17	0.17	0.15	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.	32	58	58	48	49	23	37	47	39	49	27	31	28	39	51	6	43	17	36	46	45	26	8	27
EQUIVALENT LENGTH	150	150	130	120	180	180	140	170	140	150	140	90	130	130	100	140	120	150	100	160	110	120	150	110
TOTAL EFFECTIVE LENGTH	182	208	188	168	229	203	177	217	179	199	167	121	158	169	151	146	163	167	136	206	155	146	158	137
ADJUSTED PRESSURE	0.09	0.08	0.09	0.1	0.07	0.08	0.1	0.07	0.1	0.09	0.1	0.13	0.11	0.1	0.11	0.12	0.11	0.1	0.13	0.08	0.1	0.11	0.1	0.12
ROUND DUCT SIZE	5	5	4	5	**6**	**6**	4	**6**	4	5	4	**6**	5	5	5	**6**	5	4	5	4	**6**	**6**	**6**	**6**
HEATING VELOCITY (ft/min)	264	228	344	220	270	178	264	270	126	264	195	347	382	382	382	255	433	161	433	356	479	479	479	479
COOLING VELOCITY (ft/min)	492	206	379	529	500	352	138	500	413	492	149	546	485	485	485	367	140	138	250	321	82	82	82	82
OUTLET GRILL SIZE	3X10	3X10	3X10	3X10	4X10	4X10	3X10	4X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	D	D	B	B	A	D	B	A	B	D	A	A	D	C	C	B	C	A	A	C	C	D	B	A

RUN #	25
ROOM NAME	BED-2
RM LOSS MBH.	1.33
CFM PER RUN HEAT	30
RM GAIN MBH.	2.20
CFM PER RUN COOLING	72
ADJUSTED PRESSURE	0.17
ACTUAL DUCT LGH.	55
EQUIVALENT LENGTH	130
TOTAL EFFECTIVE LENGTH	185
ADJUSTED PRESSURE	0.09
ROUND DUCT SIZE	5
HEATING VELOCITY (ft/min)	220
COOLING VELOCITY (ft/min)	529
OUTLET GRILL SIZE	3X10
TRUNK	B

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	358	0.07	9.9	12	x	8	537	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	626	0.07	12.2	20	x	8	563	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	288	0.08	8.8	10	x	8	518	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	572	0.08	11.4	16	x	8	644	TRUNK J	0	0.00	0	0	x	8	0
TRUNK E	0	0.00	0	0	x	8	0	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	920	0.05	15.3	28	x	8	591
TRUNK Y	480	0.05	12	16	x	8	540
TRUNK Z	280	0.05	9.8	12	x	8	420
DROP	1200	0.05	16.9	24	x	12	600

RETURN AIR #	1	2	3	4	5	6	7	8								BR
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	125	85	75	95	130	155	175	175	0	0	0	0	0	0	0	185
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.	41	50	58	52	58	35	23	30	1	1	1	1	1	1	1	17
EQUIVALENT LENGTH	215	205	245	165	175	200	185	190	0	0	0	0	0	0	0	145
TOTAL EFFECTIVE LH	256	255	303	217	233	235	208	220	1	1	1	1	1	1	1	162
ADJUSTED PRESSURE	0.06	0.06	0.05	0.07	0.06	0.06	0.07	0.07	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.09
ROUND DUCT SIZE	6.9	6	6	6	7	7.5	7.5	7.5	0	0	0	0	0	0	0	7.2
INLET GRILL SIZE	8	8	8	8	8	8	8	8	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	14	14	14	0	0	0	0	0	0	0	14

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Michael O'Rourke INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

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TYPE: 4505 LO # 87520
SITE NAME: CENTREFIELD (WEST GORMLEY) OPT GROUND

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	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 65H Location: BSMT

79.5 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
ENS-2	BY INSTALLING CONTRACTOR	50	✓	3.5
BATH	BY INSTALLING CONTRACTOR	50	✓	3.5
W/R	BY INSTALLING CONTRACTOR	50	✓	3.5

HEAT RECOVERY VENTILATOR 9.32.3.11.

Model: VANEE 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: ROYAL PINE 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: June-21

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

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CSA F280-12 Residential Heat Loss and Heat Gain Calculations

Formula Sheet (For Air Leakage / Ventiliation Calculation)

LO#: 87520 Model: 4505 Builder: ROYAL PINE HOMES Date: 2021-06-04

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1434	10	14340
First	1434	11	15774
Second	1861	9	16749
Third	0	9	0
Fourth	0	9	0
		Total:	46,863.0 ft³
		Total:	1327.0 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.233
SUMMER NATURAL AIR CHANGE RATE	0.073

Design Temperature Difference

	Tin °C	Tout °C	ΔT °C	ΔT °F
Winter DTDh	22	-21	43	78
Summer DTDc	24	31	7	13

5.2.3.1 Heat Loss due to Air Leakage

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

0.233 x 368.61 x 43 °C x 1.2 = 4451 W

= **15187 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

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

= 0.073 x 368.61 x 7 °C x 1.2 = 228 W

= **779 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 78 °F x 1.08 x 0.25 = **1670 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 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)

$$HL_{airr} = Level\ Factor \times HL_{airbv} \times \{(HL_{agcr} + HL_{bgcr}) \div (HL_{agclevel} + HL_{bgclevel})\}$$

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	15,187	9,156	0.829
2	0.3		13,621	0.334
3	0.2		14,600	0.208
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: 4505 OPT GROUND **BUILDER:** ROYAL PINE HOMES
SFQT: 3289 **LO#** 87520 **SITE:** CENTREFIELD (WEST GORMLEY)

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

BUILDING DATA

ATTACHMENT:	DETACHED	# OF STORIES (+BASEMENT):	3
FRONT FACES:	EAST	ASSUMED (Y/N):	Y
AIR CHANGES PER HOUR:	2.50	ASSUMED (Y/N):	Y
AIR TIGHTNESS CATEGORY:	TIGHT	ASSUMED (Y/N):	Y
WIND EXPOSURE:	SHELTERED	ASSUMED (Y/N):	Y
HOUSE VOLUME (ft^3):	46863.0	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:	7.0 ft
LENGTH: 38.0 ft	WIDTH: 56.0 ft	EXPOSED PERIMETER:	188.0 ft

2012 OBC - COMPLIANCE PACKAGE **Component**	**Compliance Package SB-12 PERFORMANCE**	
	Nominal	**Min. Eff.**
Ceiling with Attic Space Minimum RSI (R)-Value	60	59.20
Ceiling Without Attic Space Minimum RSI (R)-Value	31	27.70
Exposed Floor Minimum RSI (R)-Value	31	29.80
Walls Above Grade Minimum RSI (R)-Value	22+1.5	18.50
Basement Walls Minimum RSI (R)-Value	20	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	1.6	-
Skylights Maximum U-Value	2.6	-
Space Heating Equipment Minimum AFUE	0.96	-
HRV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	TE=94%	-

INDIVIDUAL BCIN: 19669
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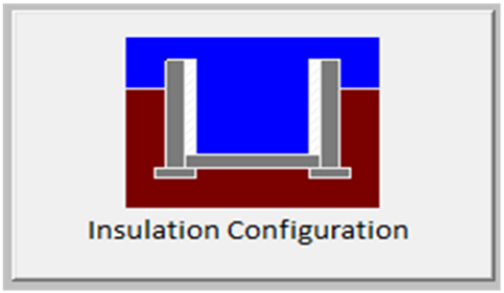
Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description	
Province:	Ontario
Region:	Richmond Hill
Site Description	
Soil Conductivity:	Normal conductivity: dry sand, loam, clay
Water Table:	Normal (7-10 m, 23-33 ft)

Foundation Dimensions		
Floor Length (m):	**11.6**	 Insulation Configuration
Floor Width (m):	**17.1**	
Exposed Perimeter (m):	**0.0**	
Wall Height (m):	**3.0**	
Depth Below Grade (m):	**2.13**	
Window Area (m^2):	**1.2**	
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):		**1840**

TYPE: 4505 OPT GROUND
LO# 87520

HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
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Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

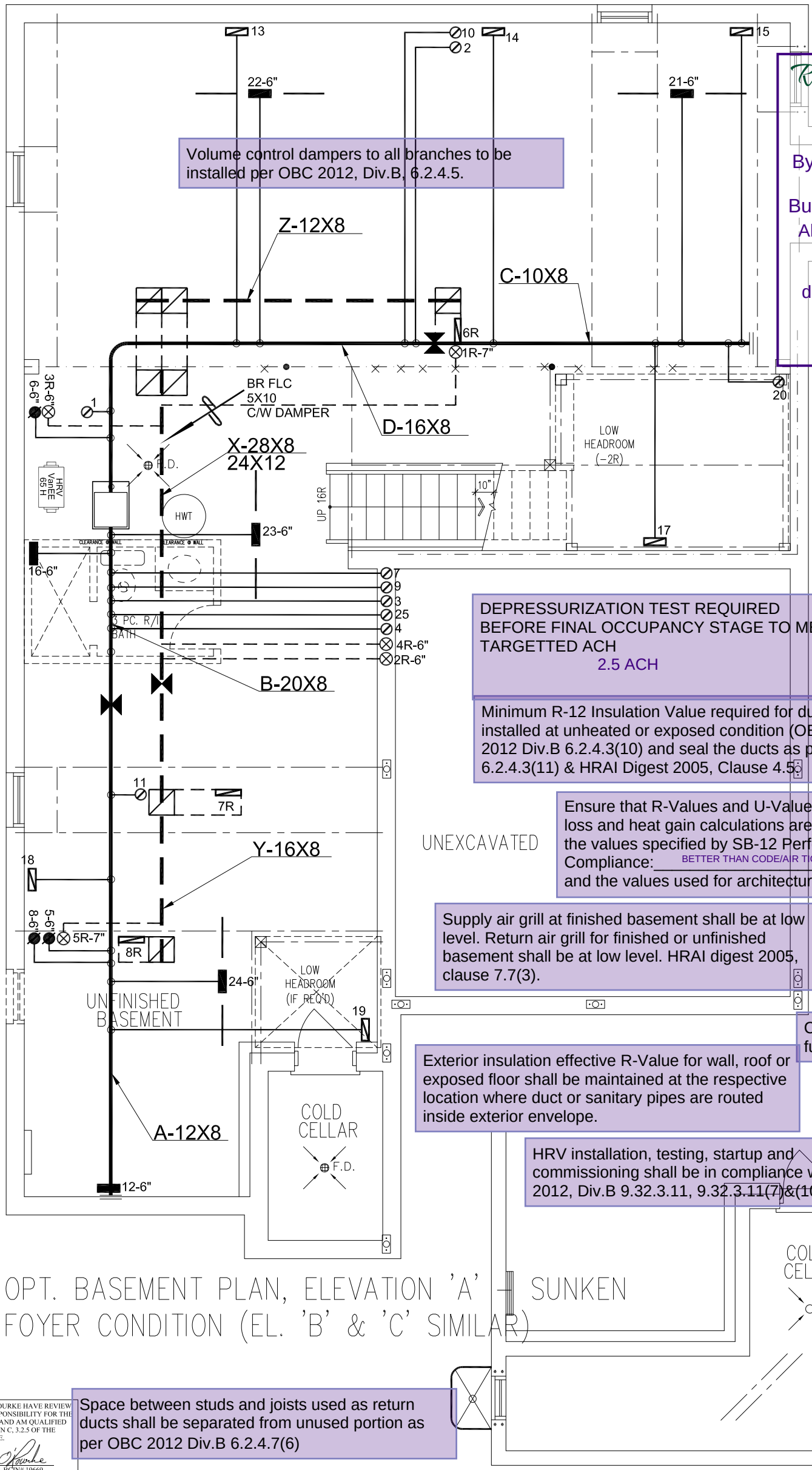
Weather Station Description	
Province:	Ontario
Region:	Richmond Hill
Weather Station Location:	Open flat terrain, grass
Anemometer height (m):	10
Local Shielding	
Building Site:	Suburban, forest
Walls:	Heavy
Flue:	Heavy
Highest Ceiling Height (m):	7.01
Building Configuration	
Type:	Detached
Number of Stories:	Two
Foundation:	Full
House Volume (m^3):	1327.0
Air Leakage/Ventilation	
Air Tightness Type:	Energy Star Detached (2.5 ACH)
Custom BDT Data:	ELA @ 10 Pa. 1238.8 cm^2
	2.50 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):	**0.233**
Cooling Air Leakage Rate (ACH/H):	**0.073**

TYPE: 4505 OPT GROUND

LO# 87520

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).

Volume control dampers to all branches to be installed per OBC 2012, Div.B, 6.2.4.5.



DEPRESSURIZATION TEST REQUIRED BEFORE FINAL OCCUPANCY STAGE TO MEET TARGETTED ACH
2.5 ACH

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

Ensure that R-Values and U-Values used for heat loss and heat gain calculations are consistent with the values specified by SB-12 Performance Compliance: BETTER THAN CODE/AIR TIGHTNESS TEST and the values used for architectural design.

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).

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

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.

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)

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)

City of Richmond Hill
Building Division

REVIEWED

By: PxV Date: OCT/18/2021

Building Permit #: BP#-2021-50890

All construction shall comply with the Ontario Building Code and all other applicable statutory regulations. The reviewed documents must be kept on site at all times.

Building inspection line: 905-771-5465 (24 hr)
buildinginspections@richmondhill.ca
Building inquiry line 905-771-8810
building@richmondhill.ca

I MICHAEL O'ROURKE HAVE REVIEW 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.

CSA-F280-12

SB-12 PERFORMANCE

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.	REVISED AS PER CAD	JUNE/2021
1.	REVISED TO PERFORMANCE	SEPT/2020

REVISIONS

Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

OPT GROUND
4505 3289 sqft

HVAC DESIGNS 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

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	55167 BTU/H
UNIT DATA	
MAKE	CARRIER
MODEL	59SP5A-80-16
INPUT	80 MBTU/H
OUTPUT	78 MBTU/H
COOLING	3.0 TONS
FAN SPEED	1200 cfm @ 0.6" w.c.

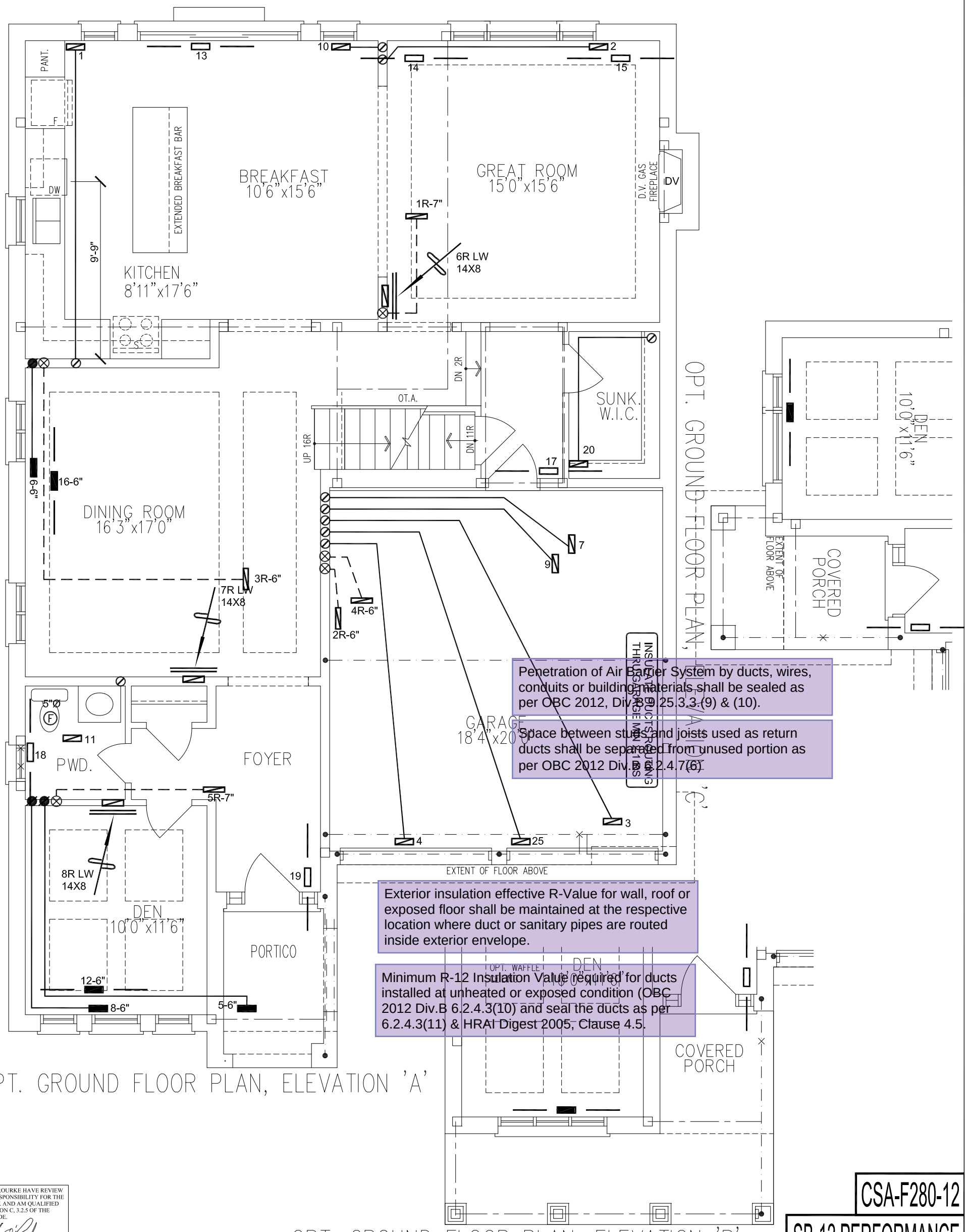
# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	13	5	5
1ST FLOOR	8	3	2
BASEMENT	4	1	0

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 SEPT/2020
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 87520

Kitchen hood exhaust duct shall be provided as per OBC 2012, Div.B 9.32.3.10, 9.32.3.5(2).



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).

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)

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.

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.

I MICHAEL O'ROURKE HAVE REVIEW 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.

CSA-F280-12

SB-12 PERFORMANCE

HVAC LEGEND

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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.

Sheet Title

FIRST FLOOR HEATING LAYOUT

Date SEPT/2020

Scale 3/16" = 1'-0"

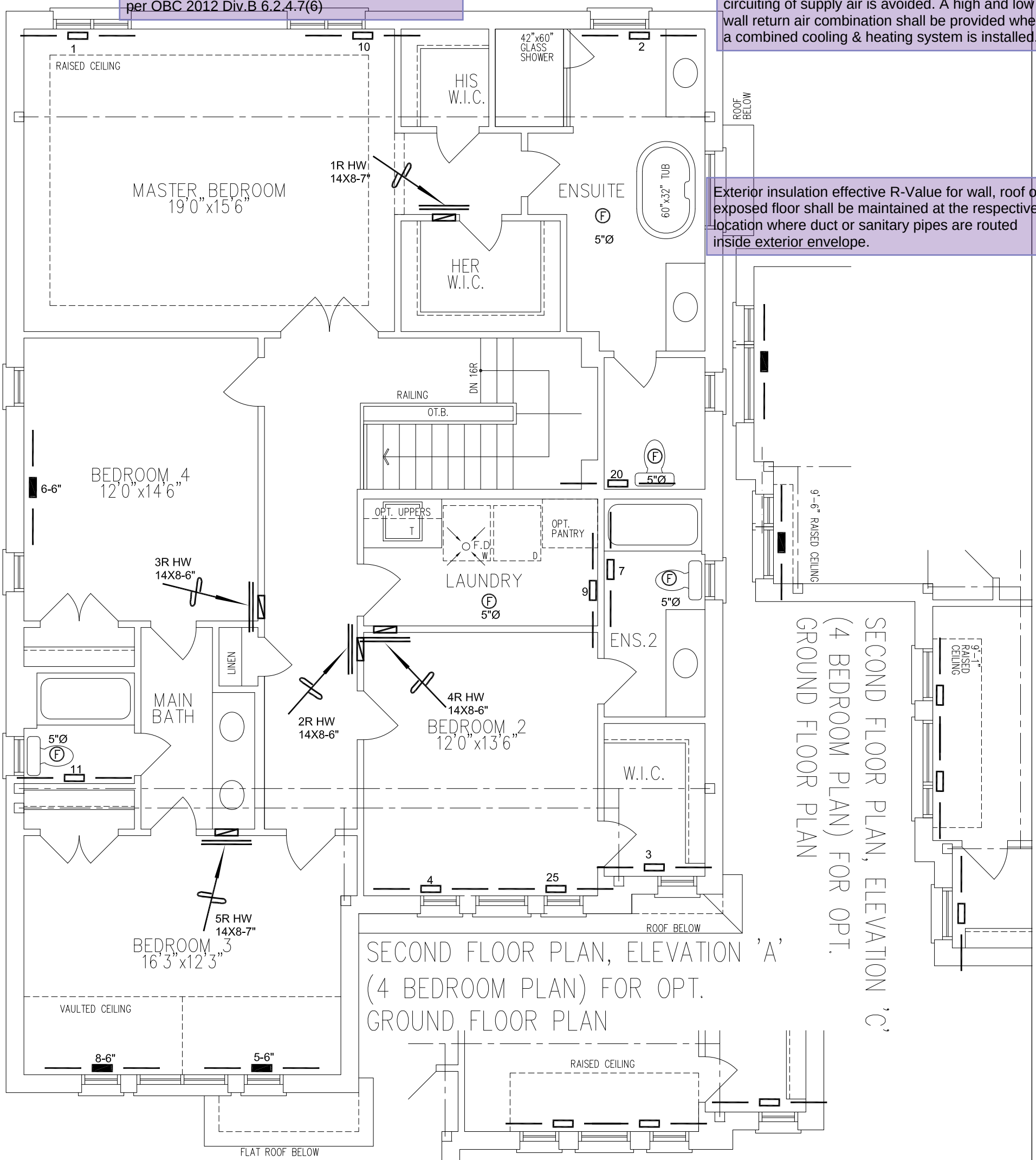
BCIN# 19669

LO# 87520

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)

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.

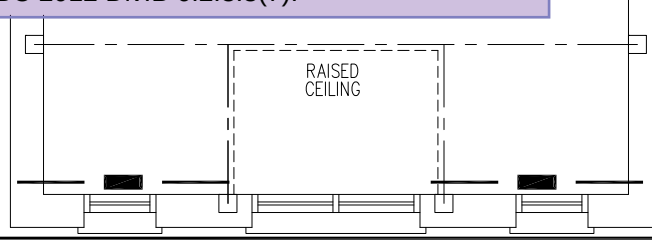
Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.



SECOND FLOOR PLAN, ELEVATION 'A'
(4 BEDROOM PLAN) FOR OPT.
GROUND FLOOR PLAN

SECOND FLOOR PLAN, ELEVATION 'C'
(4 BEDROOM PLAN) FOR OPT.
GROUND FLOOR PLAN

Laundry dryer exhaust duct shall be provided as per OBC 2012 Div.B 6.2.3.8(7).



SECOND FLOOR PLAN, ELEVATION 'B'
(4 BEDROOM PLAN) FOR OPT.
GROUND FLOOR PLAN

I MICHAEL O'ROURKE HAVE REVIEW 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.

CSA-F280-12

SB-12 PERFORMANCE

HVAC LEGEND

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SECOND FLOOR HEATING LAYOUT

Date SEPT/2020

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BCIN# 19669

LO# 87520