14’ x 14’ Pergola Design

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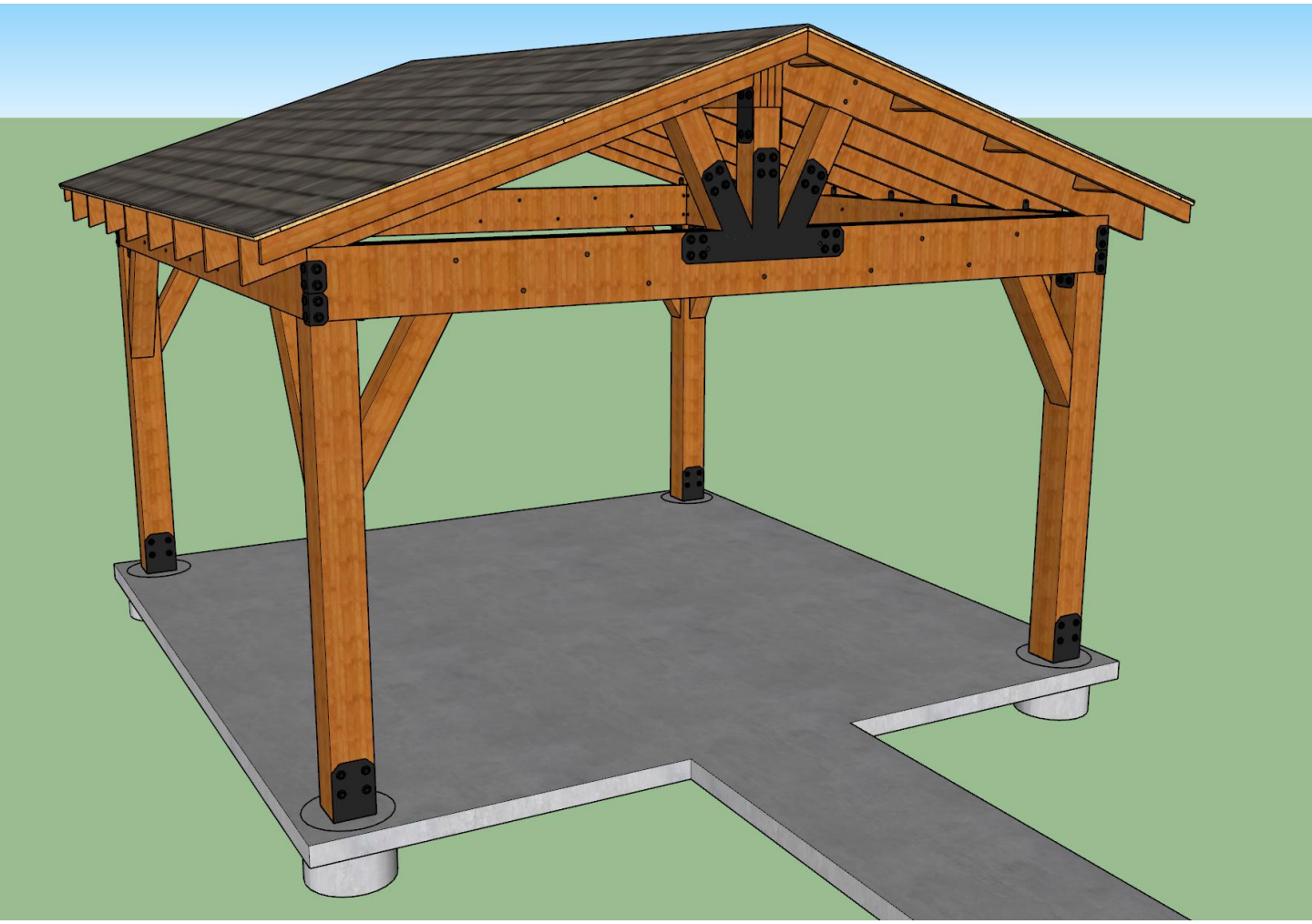
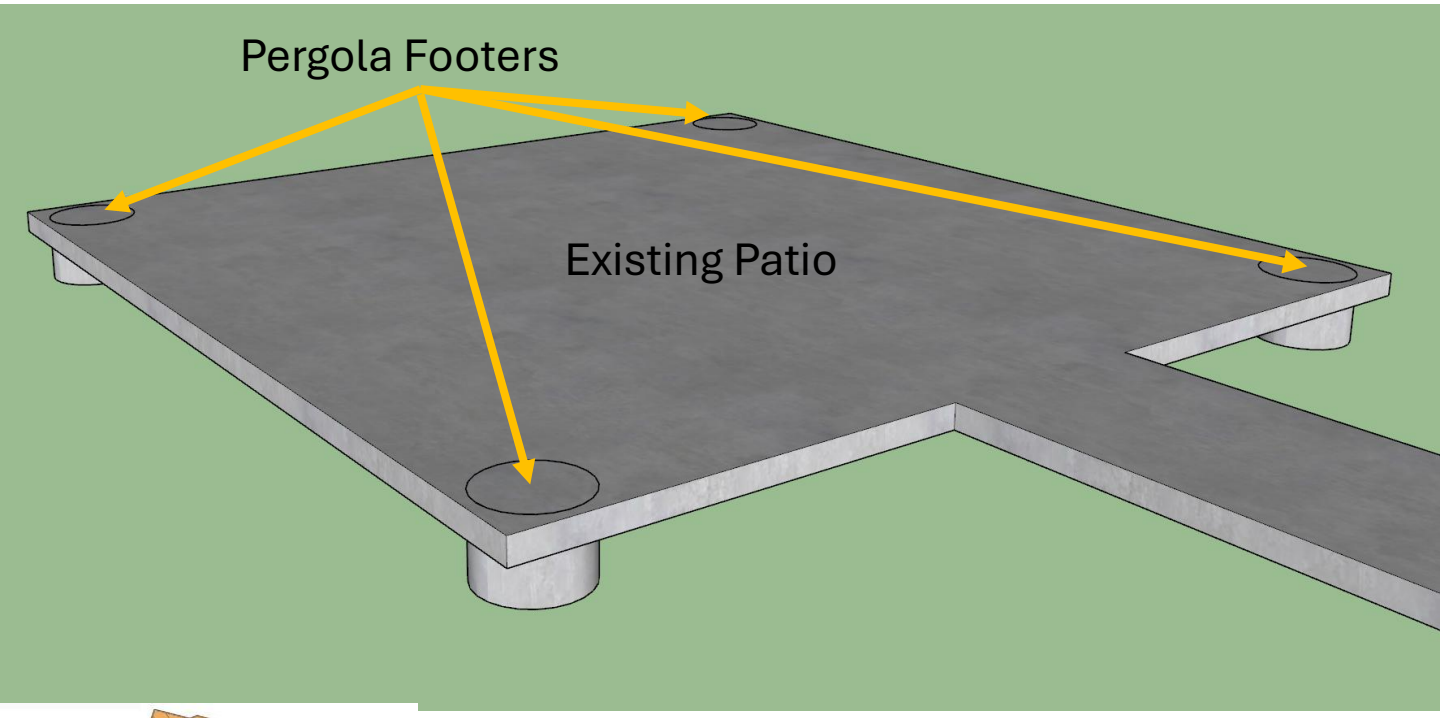
Design meets all requirements set out in NCRC and exceeds requirements for a 120mph Vult wind.

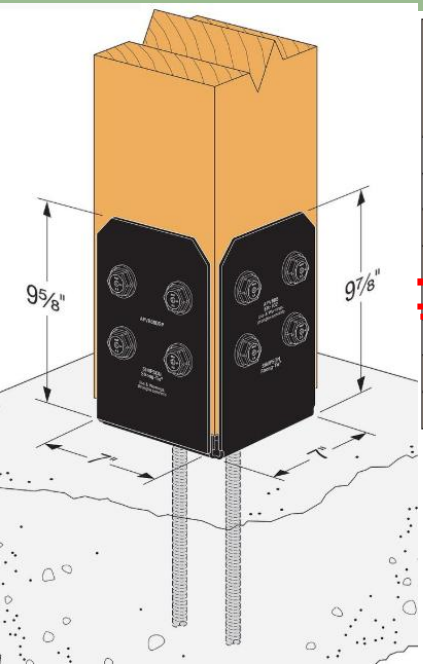


A: Foundation

Footers are constructed into existing **15’ x 15’** concrete patio. A core drill removes concrete in the corners and **4x 16”H x 16”W x 12”D footers** are poured at **13’4-1/2” O/C**, using a calculated tributary area of 49 sqft / footer and complying with NCRC AM102.1.

Poured footers will be flush with the existing patio.





Model No.	Ga.		Dimensions (in.)			Fastener Qty.		DF/SP Allowable Loads	
	Base	Strap	L	W	H	Column	Anchor Dia. (in.)	Uplift (160)	Down (100)
APVB44	16	12	3	3 3/16	6 3/4	4	(1) 5/8	1,035	6,725
APVB44R	16	12	3	4 1/16	6 1/2	4	(1) 5/8	1,035	6,725
APVB66	12	12	5	5 1/2	6 13/16	4	(1) 5/8	1,260	11,450
APVB66R	12	12	5	6	6 9/16	4	(1) 5/8	1,260	11,450
APVB88	14	12	7	7 1/2	9 7/8	8	(2) 5/8	2,670	22,255
APVB88R	14	12	7	8	9 5/8	8	(2) 5/8	2,670	22,255
APVB1010	14	12	9	9 1/2	9 3/4	8	(2) 5/8	2,365	23,725
APVB1010R	14	12	9	10	9 1/2	8	(2) 5/8	2,365	23,725

8”x8” Corner Posts will be secured to the footers using Simpson APVB88 post bases and hardware, providing **2,670lbs of uplift resistance per post.** (**10,680lbs total**)

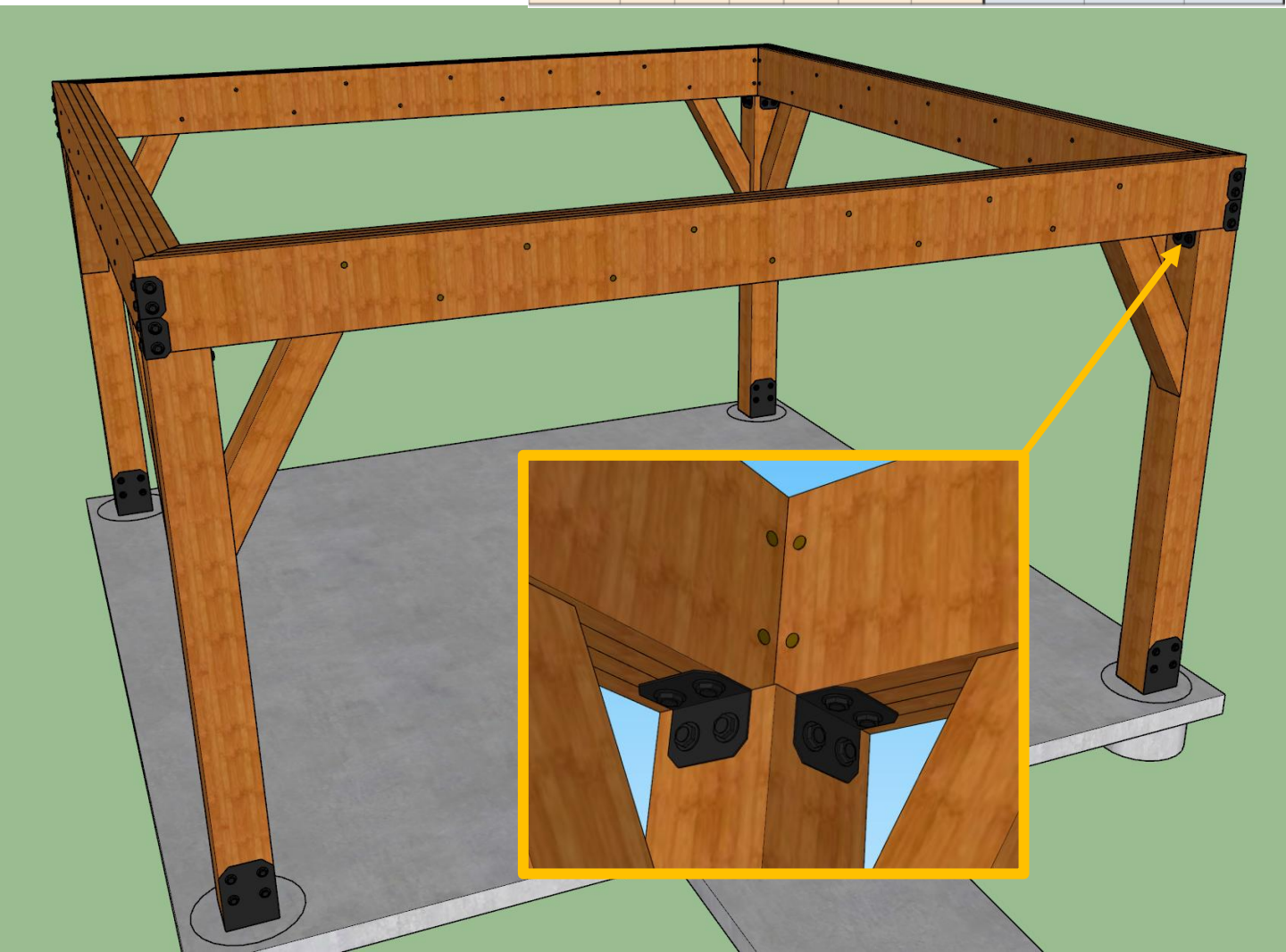
B: Posts / Perimeter Beams

Corner posts are **8”x8”x7’6”** with **6”x6”** knee braces. Knee braces are attached 28” from the top of the corner posts at 60°, secured with 4x 5/16” x 6” structural screws to comply with NCRC AM109.1.2.

Each perimeter beam is composed of **4x 2”x12”x14’**, secured with staggered 1/4“ x 5-1/2“ structural screws spaced 12” O/C. Ends of perimeter beams are mitered at 45° and sit atop the corner posts. This complies with both NCRC R602.7(1) and NCRC R602.3(1).

Corner posts are connected to perimeter beams using 2x Simpson APA6 angles and hardware, providing **1,350lbs of uplift resistance per post** (**5,400lbs total**)

Model No.	Ga.	Dimensions (in.)			Fastener Qty.		DF/SP Allowable Loads		
		L	W_1	W_2	Column	Beam	Uplift (160)	F_1 (160)	F_2 (100/160)
APA4	12	3	3¼	3	2	2	710	1,220	380
APA6	12	5	3¾	3½	4	4	1,350	1,985	1,215



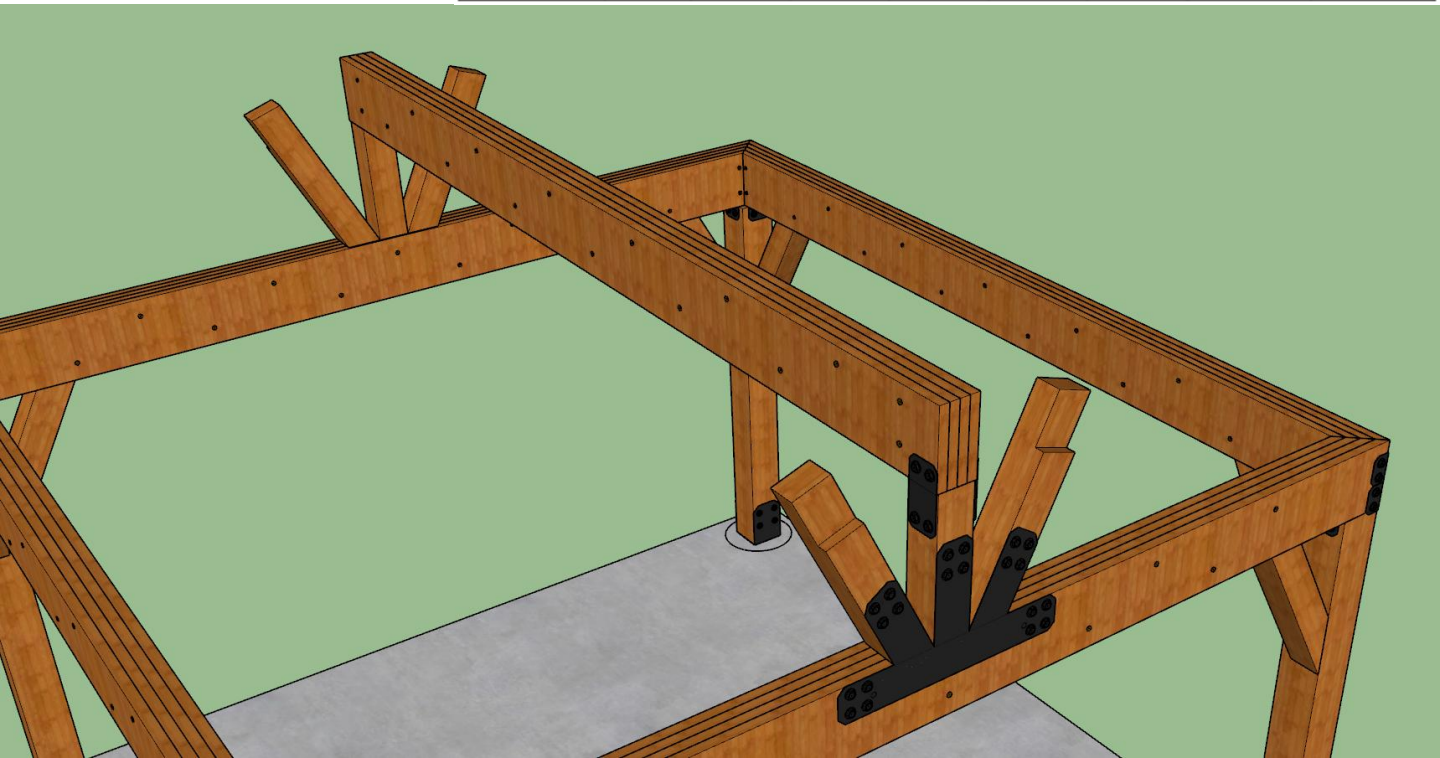
C: Gable / Ridge Beam

Gable consists of a **6”x6”x1’9” center post** supporting ends of the structural ridge beam, with **2x 6”x6”x2’6” posts** supporting the last rafters. A Simpson APVGP612 gable plate and hardware connect the gable posts to perimeter beam, providing **1,962 lbs of uplift resistance per side (3,925 lbs total)**.

Structural ridge beam consists of **4x 2”x12”x14**’, secured with staggered 1/4“ x 5-1/2“ structural screws spaced 12” O/C. This complies with both NCRC R602.7(1) and NCRC R602.3(1). Ridge beam is connected to center gable post with 2x Simpson APVST610 straps and hardware, providing **1,505 lbs of uplift resistance per side (3,010 lbs total).**

Model No.	Ga.	Roof Pitch	Angle (deg.)	Dimensions (in.)			Fastener Qty.			DF/SP Allowable Loads
				W	H	L	Beam	Center Column	Angled Struts	Uplift (160)
APVGP612	12	6:12	27°	5	19 3/4	34 1/2	16	8	16	3,925
APVGP812		8:12	34°							
APVGP1212		12:12	45°							
APVGP1212-4		12:12	45°	3	11 1/2	20	8	4	8	2,195

Model No.	Ga.	Dimensions (in.)			Fastener Quantity		DF/SP Allowable Loads	
		W	L	H	Column	Beam	Uplift (160)	F_1 (160)
APVST412	12	3	11¼	—	—	8	850	—
APVST610	12	5	9¾	—	—	8	1,505	—



D: Rafters

Rafters are **2”x8”x8’** spaced **24” O/C (16 total)**, connected to the structural ridge beam and perimeter beams and forming a **4:12 pitch**. Each rafter is secured to the perimeter beam with 2x Simpson APVA21 angles, providing **400 lbs of uplift resistance at the base**, and to the structural ridge beam with 1x Simpson APLH26 joist hanger, providing **900 lbs of uplift resistance at the ridge**. This provides 1300 lbs of uplift resistance per rafter, exceeding the minimum of 178lbs per connection listed in NCRC R802.11.

Rafters overhang the perimeter beams by 10-1/2” and employ a birdsmouth cut in compliance with NCRC 802.7.1.1.

Model No.	Ga.	Dimensions (in.)			Fastener Quantity		DF/SP Allowable Loads	
		L	W_1	W_2	Column	Beam	Uplift (160)	F_1 (160)
APVA21	14	1⅜	2	1½	1	1	200	120

Joist Size	Model No.	Ga.	Dimensions (in.)			Fastener Qty.		DF/SP Allowable Loads			
			W	H	B	Header	Joist	Uplift (160)	Floor (100)	Snow (115)	Roof (125)
2x4	APLH24	14	1 9/16	3 5/16	1⅞	4	2	315	690	795	865
	APLH24R		2 1/16	3 1/16							
2x6 or 2x8	APLH26	14	1 9/16	5⅛	1⅞	6	4	900	1,040	1,195	1,300
	APLH1.75-6		1 13/16	5							
	APLH26R		2 1/16	4⅞							

E: Roof Sheathing

Roof will be sheathed with **5/8” PT CDX Plywood** in compliance with NCRC R803.1

12” sheathing overhang from last rafter will be supported with 2”x4” fly rafters supported with 2”x4” blocking connected to last rafter spaced 24” O/C (Ladder Framing).

F: Roof Shingles

Asphalt shingles will meet ASTM D7158 H wind resistance, and installation of shingles will comply with NCRC R905.