Wind Load Report - Garage Conversion

1. Site & Building Data

Roof Type:	Gable
Wind Speed (ult):	110 mph
Exposure Category:	C
Enclosure Class:	Enclosed
Building Width (W):	24 ft.
Building Length (L):	30 ft.
Eave Height (h_e):	8 ft.
Foundation Height (h_f):	0 ft.
Roof Pitch:	4 /12
Eave Overhang (OH_e):	1.3 ft.
Gable Overhang (OH_g):	1.3 ft.

2. Parameters & Coefficients

Topographic Factor (K_{zt}):	1.0
Directionality Factor (K_d):	.85
Roof Angle (θ):	18.43 deg.
Mean Roof Height (h):	10.00 ft.
Ridge Height (h_r):	12.00 ft.
Pos. Internal Pressure (+GCpi):	+0.18
Neg. Internal Pressure (-GCpi):	-0.18
Velocity Pressure Exp. Coeff. (K_h):	0.85 @ z=h
Velocity Pressure (q_h):	22.35 psf
End Zone Width (a):	3.00 ft.
Zone 2/2E Dist.:	12.00 ft.

3. Design Assumptions and Notes

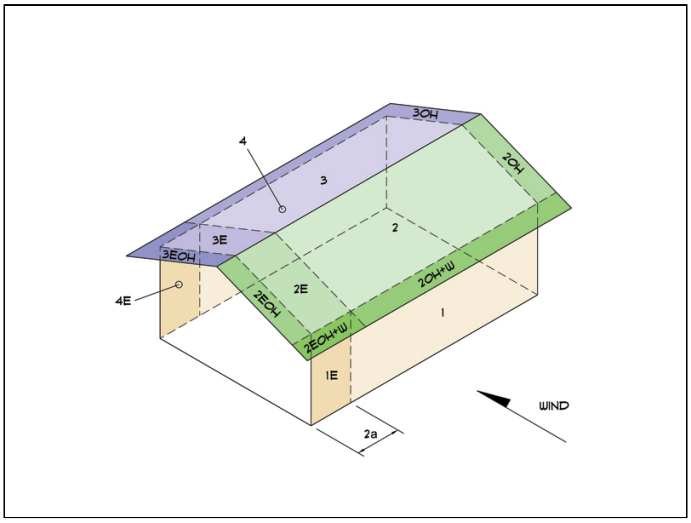
Code Standard:	ASCE 7-10
Geometry:	Regular-Shaped Bldg.
Height Class:	Low-Rise Building
Notes:	

4. Design Loads

Top Chord Dead Load:	7 psf
Bottom Chord Dead Load:	10 psf
Truss/Rafter Spacing:	24 in. o/c

4. Design Wind Pressures: MWFRS Envelope Procedure

Load Case A: Transverse Direction			
Surface	GCpf	Design Pressure (psf)	
		(w/ +GCpi)	(w/ -GCpi)
1	0.52	7.52	15.57
2	-0.69	-19.45	-11.40
3	-0.47	-14.49	-6.45
4	-0.42	-13.31	-5.26
1E	0.78	13.41	21.46
2E	-1.07	-27.94	-19.89
3E	-0.67	-19.07	-11.03
4E	-0.62	-17.84	-9.79
2OH	-0.69	-15.42	
2EOH	-1.07	-23.92	
3OH	-0.47	-10.47	
3EOH	-0.67	-15.05	
2OH+W	-0.69/-0.7	-31.07	
2EOH+W	-1.07/-0.7	-39.56	



a) (+) and (-) signs signify wind pressures acting toward & away from surfaces.
b) External Pressure Coefficients linearly interpolated from Fig. 28.4-1 ASCE 7-10.
c) Design building for all wind directions, 4 load patterns per load case.
d) Total horizontal shear shall not be less than that by neglecting roof wind forces.
e) Min. wind load for enclosed or partially enclosed bldg.: 16 psf wall, 8 psf roof.
f) Design pressures are for strength design, multiply by 0.6 for ASD.

Subject: Wind Loads	Customer:	Location: 150 Bannock St Bakersfield, CA	Job No.: 40701
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Date: 7/1/2024			Page: 1

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Load Case B: Longitudinal Direction			
Surface	GCpf	Design Pressure (psf)	
		(w/ +GCpi)	(w/ -GCpi)
1	-0.45	-14.08	-6.03
2	-0.69	-19.45	-11.40
3	-0.37	-12.29	-4.25
4	-0.45	-14.08	-6.03
5	0.40	4.92	12.96
6	-0.29	-10.50	-2.46
1E	-0.48	-14.75	-6.71
2E	-1.07	-27.94	-19.89
3E	-0.53	-15.87	-7.82
4E	-0.48	-14.75	-6.71
5E	0.61	9.61	17.66
6E	-0.43	-13.63	-5.59
2OH	-0.69	-15.42	
2EOH	-1.07	-23.92	
3OH	-0.37	-8.27	
3EOH	-0.53	-11.85	
2EOH+W	-1.07/-0.7	-39.56	
3EOH+W	-0.53/-0.7	-27.49	

a) (+) and (-) signs signify wind pressures acting toward & away from surfaces.
b) External Pressure Coefficients linearly interpolated from Fig. 28.4-1 ASCE 7-10.
c) Design building for all wind directions, 4 load patterns per load case.
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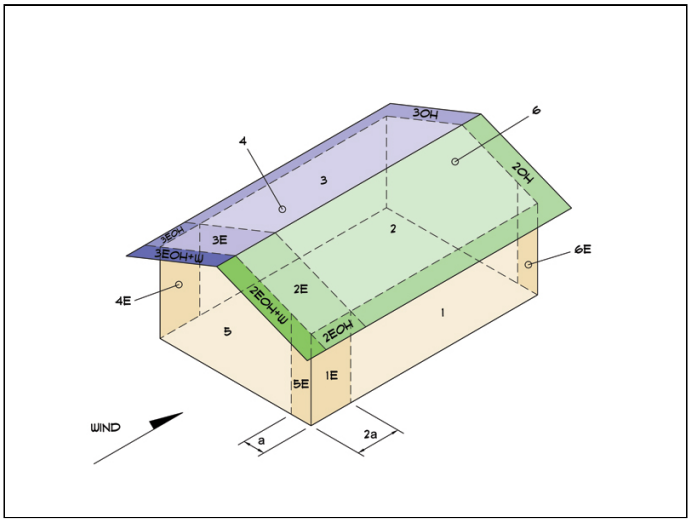
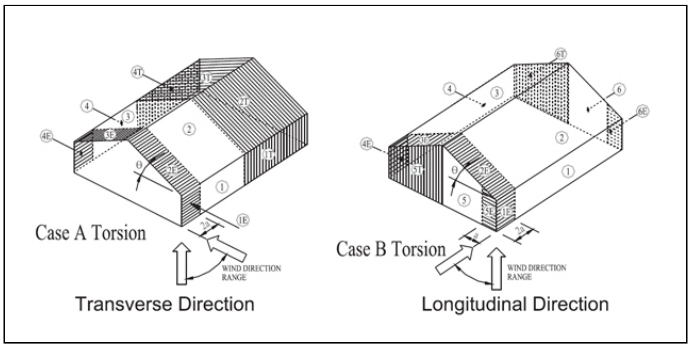


Torsional Load Cases				
Surface	Load Case	GCpf	Design Pressure (psf)	
			(w/ +GCpi)	(w/ -GCpi)
1T	A	-	1.88	3.89
2T	A	-	-4.86	-2.85
3T	A	-	-3.62	-1.61
4T	A	-	-3.33	-1.32
5T	B	-	1.23	3.24
6T	B	-	-2.63	-0.61

a) (+) and (-) signs signify wind pressures acting toward & away from surfaces.
b) Pressures designated with a "T" are 25% of full design wind pressures.
c) Torsional loading shall apply to all 8 load patterns using the figures shown.
d) Design pressures are for strength design, multiply by 0.6 for ASD.
e) Torsional Design Exceptions: One story bldg. with h ≤ 30 ft,
Two stories or less framed with light frame construction,
Two stories or less with flexible diaphragms.



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Engr. Engineer Name	ENGINEERING COMPANY INC.		Rev. -
Date 7/1/2024	Street Address City, CA 99999 ph. (800) 000-0000 www.website.com		Page 2

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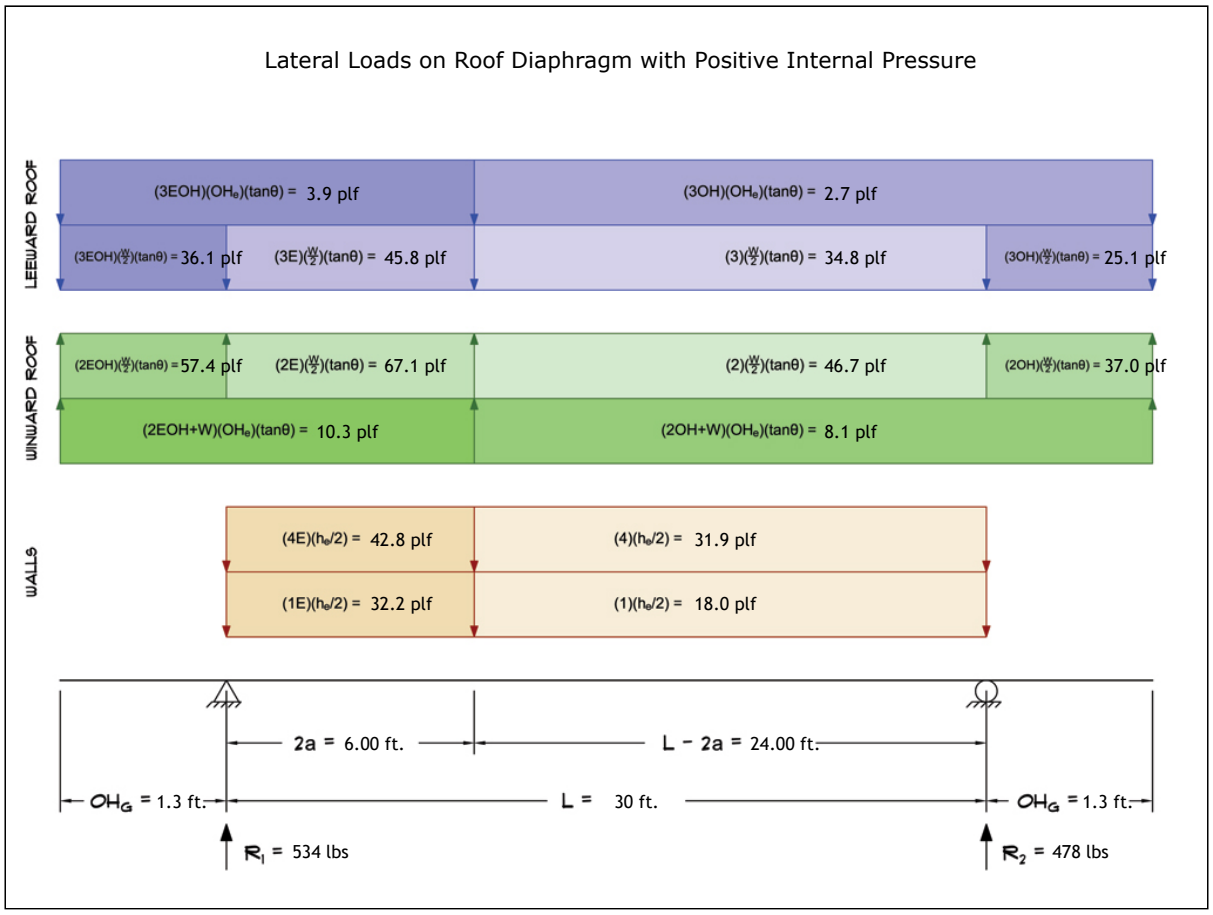
5. Wind Load Calculations

1.) Lateral Loads - Transverse Direction:



a) (-) signs signify wind lateral forces acting opposite to the direction of the arrows shown.
b) Strength design values multiplied by 0.6 to obtain ASD values.

Wind Base Shear (ASD)						
Load Case A: Transverse Direction						
Load Case	Walls (lbs)	Roof (lbs)	Roof Overhangs (lbs)	Total Lateral Load (lbs)	R_1 (lbs)	R_2 (lbs)
Positive Internal Pressure	1650	-413	-225	1012	534	478
Negative Internal Pressure	1650	-413	-225	1012	534	478
Roof Pressure = 0	1650	0	0	1650	885	765
Min. Pressures (8 psf, 16 psf)	1152	576	118	1846	923	923

a) Bottom half of wall neglected in tributary area calculations.
b) Strength design values multiplied by 0.6 to obtain ASD values.

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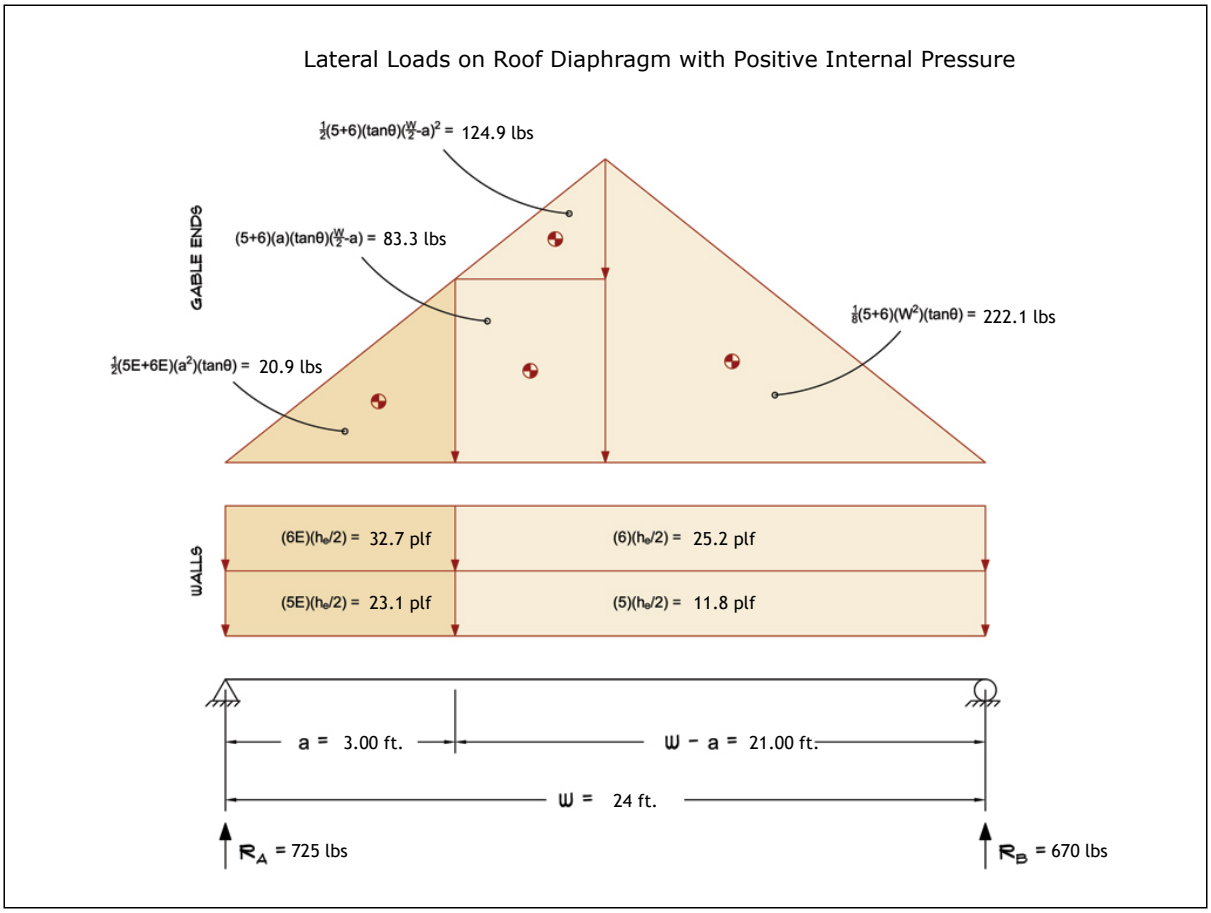
2.) Lateral Loads - Longitudinal Direction:



a) (-) signs signify wind lateral forces acting opposite to the direction of the arrows shown.
b) Strength design values multiplied by 0.6 to obtain ASD values.
c) Where the length of building (L) exceeds 4X the mean roof height (h), wind drag forces should additionally be considered.

Wind Base Shear (ASD)						
Load Case B: Longitudinal Direction						
Load Case	Walls (lbs)	Gable Ends (lbs)	Roof (lbs)	Total Lateral Load (lbs)	R_A (lbs)	R_B (lbs)
Positive Internal Pressure	945	451	0	1396	725	670
Negative Internal Pressure	945	451	0	1396	725	670
Roof Pressure = 0	945	451	0	1396	725	670
Min. Pressures (8 psf, 16 psf)	922	461	0	1382	691	691

a) Bottom half of wall neglected in tributary area calculations.
b) Strength design values multiplied by 0.6 to obtain ASD values.

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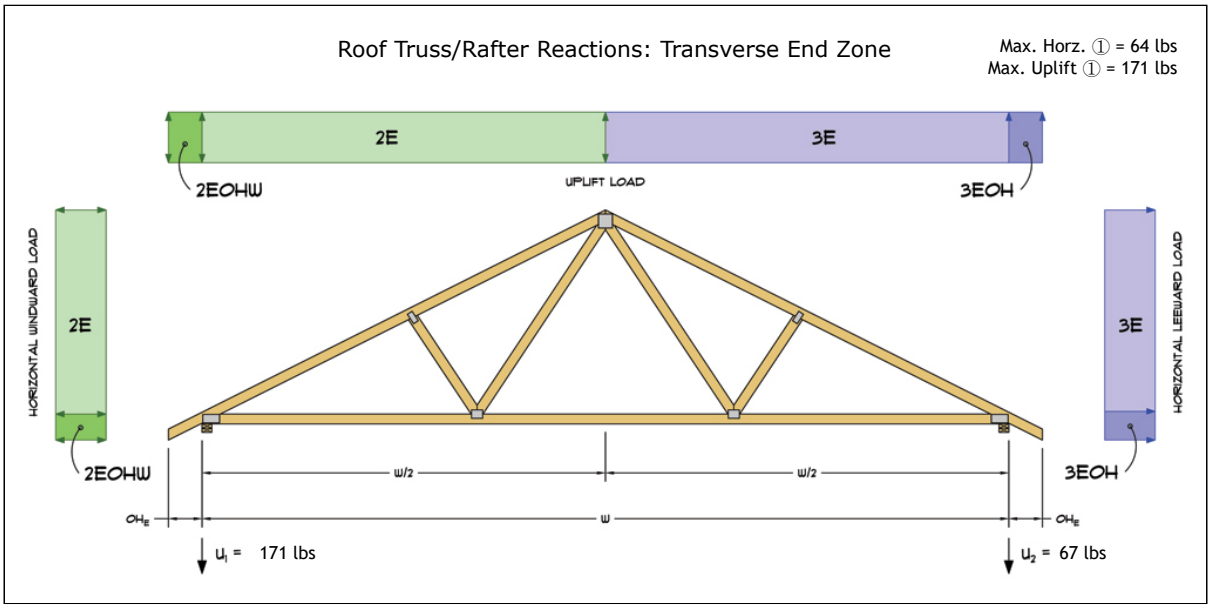
3.) Roof Truss Reactions:



a) Strength design values multiplied by 0.6 to obtain ASD values.
b) Windward loads may be positive or negative depending on pitch of roof.

Roof Truss/Rafter Reactions (ASD)					
w/ Positive Internal Pressure					
Load Case	Horizontal Load (lbs)	Gross Uplift (lbs)	Net Uplift (lbs)	U_1 (lbs)	U_2 (lbs)
Transverse Int. Zone	34	554	30	50	-20
Transverse End Zone	55	762	239	171	67
Longitudinal Int. Zone	38	494	-30	17	-46
Longitudinal End Zone	64	687	163	135	28

a) Gross Uplift calculations do not include any counteracting roof dead loads.
b) Net Uplift calculations include counteracting roof dead loads multiplied by 0.6 per load case (7) ASCE 7-10.
c) Strength design values multiplied by 0.6 to obtain ASD values for wind loads.
d) Loads based on truss spacing calculated at 24" o/c.
e) Negative values for horizontal load indicate load acting in windward direction (tranverse load cases).
f) Negative values for uplift indicate net downward force (zero uplift).

*Disclaimer: The calculations produced herein are for initial design and estimating purposes only. The calculations and drawings presented do not constitute a fully engineered design. All of the potential load cases required to fully design an actual structure may not be provided by this calculator. For the design of an actual structure, a registered and licensed professional should be consulted as per IRC 2012 Sec. R802.10.2 and designed according to the minimum requirements of ASCE 7-10. The wind load calculations provided by this online tool are for educational and illustrative purposes only. Medeek Design assumes no liability or loss for any designs presented and does not guarantee fitness for use.

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