

RVE

River Valley Engineering, Inc.

1526 Whitlock Dr., Alma, AR 72921
(479) 410-2208

Project No. : 2025-1140 Subject : Longview Pickleball Cor Page :
Calc. by : JPL Date : 9/4/2025 Rev : 0

SHADE STRUCTURE DESIGN

LONGVIEW PICKLEBALL COMPLEX

STRUCTURE # 1

LEE'S SUMMIT, MISSOURI

JPL

STATE OF MISSOURI
JOHN PAUL
LONGNECKER
REGISTERED PROFESSIONAL ENGINEER
NUMBER
E-26817

9/4/25



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Shade Structure Design

Basic Building Loads

Structure#1

Basic Wind Speed With Fabric, V	90 mph
Basic Wind Speed Without Fabric, V	115 mph
Ground Snow Load	0 psf

Wind Loading Calculation

Maximum Structure Height	22.1667 ft	
Risk Category	I	
Kd (Table 26.6-1)	0.85	
Kzt (No topo)	1	
Exposure Category (26.7.3)	C	
Kz (Table 27.3-1) for h = 22.1667 ft	0.92	0-15 .85 20 .90 25 .94 30 .98
Angle of Roof	18 Deg	
Sieve Factor of Material, SVf	64 %	
Gust factor, G	0.85	
Curved Rafter Shape Factor, f	1	
Per Figure 27.4-5 :		
Maximum Net Pressure Coefficient Downforce, Cn	1.1	Case A
Maximum Net Pressure Coefficient Dowforce, Cn	0.1	Case A
Maximum Net Pressure Coefficient Upforce, Cn	-0.1	Case B
Maximum Net Pressure Coefficient Upforce, Cn	-0.8	Case B
Parallel Net Pressure Coefficient, Cn	0.5	Plus and Minus



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Output: Wind Loading

Uniform Loadings With Fabric

$q_h = .00256 * K_z * K_{zt} * K_d * V^2$ = **16.22 psf** See Page 1 For Values
 $P = q_h * G * C_n * S_V * f$ = **8.82 * C_n** psf

Downforce Effect
Pushing on Top
Surface (+)
Case A

Uplift Effect
Pulling on Top
Surface (-)
Case B

Front	Pw	9.7033863 psf	-7.057008 psf
Back	Pw	0.882126 psf	-0.882126 psf
Parallel	Pw	4.4106301 psf	-4.41063 psf
Minimum Load	Pw	10 psf	

Uniform Loadings Without Fabric (Load on Post)

$q_h = .00256 * K_z * K_{zt} * K_d * V^2$ = **26.48 psf** See Page 1 For Values

Snow Loadings with Fabric

Sloped Roof Snow Loads on Structure $P_s = 0.7 * C_e * C_t * I_s * P_g * C_s$ **0.00 psf**

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Load Combinations

- | | |
|---|----------------|
| 1 | D |
| 2 | D + Lr |
| 3 | D + .6W or .7E |
| 4 | .6D + .6W |
| 5 | .6D + .7E |

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Design of Shallow Pier

Input

Location	Longview Pickleball Complex #1		
Axial Load on Pier	2.6 kips		
Uplift Load on Pier	1.35 kips		
Lateral Load on Pier	1 kips		
Diameter or Width of Pier in Ground	3.5 ft		
Is Pier Square	N		
Height of Load Above Grade	16.083 ft	Equivalent Moment =	16.083 ft-kips
Bearing Capacity of Soil under Pier	1.7 ksf		4802.4
Skin Friction Capacity of Pier	100 psf		
Allowable Average Soil Stress for Lateral, S1	500 psf ==	Avg For for Sand and Clay due to Wind	1750 psf
Weight of Pier Cap	0 lbs		
Height of Pier Out of Ground	0 ft		
Depth of Water Table	20 ft		

Note: For S1:
See Gaylord and Gaylord Lateral Stability of Poles

For Skin Friction:
Use 200 psf for all soils. Unless value is known

Output

Area of Pier	9.62 sqft		
Required Embedment Depth of Pier	5.63 ft	67.50 in	
Depth of Pier to Use	5.67 ft	68.00 in	
Weight of Pier	8.12 kip		
Bearing Stress on Pier	0.55 kip	O.K.	
Uplift Capacity of Pier	11.10 kip	O.K.	
Lateral Capacity Using Brohms Method	11.24 kip	O.K.	
Minimum Vertical Reinforcement	6.93 sqin	15.7	#6 Vertical Bars
Diameter of Vert. Reinforcement	2.833 ft		
Maximum Tension on Reinforcement	1.419 kip		
Maximum Tension Stress on Reinforcement	3.226 ksi		