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BUILDING BUREAU SOLUTIONS, INC.
REVIEWED BY: STEVE KIM, PE, CASp

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ENGINEERS

STRUCTURAL CALCULATIONS

CITY OF PERRIS
SOUTH FIRE STATION AND ADMINISTRATIVE BUILDING
2495 Murrieta Rd.
Perris, CA 92585

Prepared for:

STK Architecture, Inc.
42095 Zevo Dr., Suite A15,
Temecula, CA 92590-3780

Prepared by:

ISE Structural Engineers, Inc.
27369 Via Industria
Temecula, CA 92590



November 25, 2025
ISE Project # 8400.0067



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STRUCTURAL DESIGN CRITERIA

Project: SOUTH FIRE STATION AND ADMINISTRATIVE BUILDING
 Project Manager: Sandy Fong
 Engineer: Valeria Gallardo

General

Governing Building Code(s): 2022 California Building Code, ASCE 7-16
 Building Risk Category: IV (CBC Table 1604.5)
 Construction Fire Resistance Type: Type V-B (CBC Chapter 6)
 Is building located in a Wildland Urban Interface Zone (WUI): No

Building Description: One-story Fire station

Building System:	Fire Station	Admin Building
Roof Shape	Gable/Hip	Gable/Hip
Roof Framing System	Wood Truss	Wood Truss
Roof Diaphragm System	Wood Sheathed	Wood Sheathed
Floor Framing System	N/A	N/A
Floor Diaphragm System	N/A	N/A
Wall Framing System	Wood Stud	Wood Stud
Build Method	Site Built	Site Built

Foundation System:		
Slab on Grade	Conventional Rebar	Conventional Rebar
Footings/Grade Beams	Conventional Rebar	Conventional Rebar
Curbs/Stemwalls	Concrete	Concrete
Deep Foundation Members	N/A	N/A

Earth Retaining Systems	Cant. Masonry	N/A
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Non-Building Structures	N/A	N/A
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STRUCTURAL DESIGN CRITERIA

Design Live Loads

(CBC Table 1607.1)

Roofs:

Uniform load: 20 psf
Reducible? Yes

(CBC 1607.13.2.1)

Floors:

Uniform Load: N/A psf
Reducible? N/A
Concentrated Load: N/A lbs

(CBC 1607.11)

Stairs:

Uniform Load: N/A psf
Concentrated Load: N/A lbs

Corridors:

Uniform Load: N/A psf

Snow Load

(ASCE 7-16, Chapter 7)

Elevation: ft
Pg (Ground): 0 psf Source: N/A
Pf (Flat): 0.0 psf ($P_f = 0.7 C_e C_t I P_g$)
Ps (Sloped): 0.0 psf ($P_s = C_s P_f$)
Ce 1.00
Ct 1.00
I 1.00
Cs: 1.00
Drift Loads: Per snow load diagram attached

(7.3-1)

(7.4-1)

Table 7.3-1

Table 7.3-2

Section 7.3.3

Figure 7.4-1

Section 7.7

Deflection Criteria

(CBC, Table 1604.3)

	L	E, S, W	D+L
Roof:	L/ 360	L/ 360	L/ 240
Floor:	L/		L/ 240
Exterior Walls:		L/ 360	
Interior Walls:	L/ 240		

Load Combinations

(CBC, Section 1605)

Strength Design or Load and Resistance Factor Design (LRFD)

(CBC, Section 1605.2)

Alternate ASD Load Combinations

(CBC, Section 1605.3.2)



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Seismic Design Criteria

(ASCE 7-16, Chapter 11 & 12)

Site Factors:

Spectral acceleration for short period buildings (S_s):	1.422	g
Spectral acceleration for 1-sec period buildings (S_1):	0.526	g
Soil Site Class:	D	
Seismic Importance Factor: (I_E)	1.50	
Effective Seismic Weight:	Dead	(ASCE 12.7.2)

Narrative of Design to resist Seismic Loads:

Wood framed fire station with wood sheathed shear walls and wood sheathed flexible diaphragms. The respective diaphragms may be assumed flexible per ASCE 7-16, Section 12.3.

Lateral Resisting System Parameters:

(ASCE Table 12.2-1, Table 12.12-1)

Description	R	Ω_o	Cd	Allowable Drift, Δ_a
Light Framed Wood Sheathed Shear Walls	6.5	2.5	4.0	0.025h

Redundancy Factor, p : 1.00 With exceptions per ASCE 12.3.4

Seismic Analysis Procedure:

Equivalent Lateral Force Procedure, Section 12.8

(ASCE Table 12.6-1)

Structural Irregularities:

Horizontal Structural Irregularities:

(ASCE Table 12.3-1)

Type	Description	Location
	Type 1a	Torsional Irregularity
	Type 1b	Extreme Torsional Irregularity
X	Type 2	Reentrant Corner Irregularity
	Type 3	Diaphragm Discontinuity Irregularity
	Type 4	Out-of-Plane Offset Irregularity
	Type 5	Nonparallel System Irregularity

Vertical Structural Irregularities:

(ASCE Table 12.3-2)

Type	Description	Location
	Type 1a	Stiffness-Soft Story Irregularity
	Type 1b	Stiffness-Extreme Soft Story Irregularity
	Type 2	Weight (Mass) Irregularity
	Type 3	Vertical Geometry Irregularity
	Type 4	In-Plane Discontinuity VLFR Element
	Type 5a	Discontinuity in Lateral - Weak Story
	Type 5b	Discont. in Lat. - Extreme Weak Story



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Wind Design Criteria

(ASCE 7-16, Chapter 26)

Basic Wind Speed:	110	mph (3s Gust)	(ASCE 26.5)
Special Wind Region	Yes	Source: ASCE 7 Hazard Tool	
Surface Roughness Category:	C		(ASCE 26.7.2)
Exposure Category:	C		(ASCE 26.7.3)
Enclosure Classification	Enclosed		(ASCE 26.12)

Design procedure for Main Wind Force
Resisting System (MWFRS):

Directional Procedure, Ch. 27

Design procedure for Component & Cladding
Wind Loads (C&C):

Component & Cladding, Ch. 30

Geotechnical Design Criteria & Foundation Type

Geotechnical Report:

Prepared by: Inland Foundation Engineering, Inc.
Report Number: S168-196
Date: September 23, 2025

Expansive Soil: NoneEI = 69, medium expansion class. Import soil required per soils report.
Static Settlement: <1"
Liquefaction Settlement: not provided
Seismic Hazards: Liquefaction potential, flood.
Corrosive Soil: 28 ppm Cl concentration, generally not corrosive

Foundation Type: Conventional slab on grade with Shallow grade beam footings



FIRE STATION GRAVITY DESIGN



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PROJECT DEAD LOAD ANALYSIS

ROOF TYPES

R1	Main Sloped Roof:		
	Lightweight Tile/Membrane:	5.0	psf
	15/32" Sheathing:	2.5	psf
	Roof Framing (Trusses at 24" o.c.):	3.0	psf
	Insulation (Batt):	0.5	psf
	(1) Layer 5/8" Drywall at Ceiling:	2.5	psf
	Mech/Elec/Plumbing:	1.5	psf
	Ceiling Framing:	0.0	psf
	Total Dead Load =	15.0	psf

WALL TYPES

W1	2x6 Wood Stud Exterior Wall		
	7/8" Plaster/Stucco	8.0	psf
	15/32" Sheathing:	1.5	psf
	Wall Framing (2x6 at 16" o.c.):	1.5	psf
	Insulation (Batt):	0.5	psf
	(1) Layer 5/8" Drywall:	3.0	psf
	Mech/Elec/Plumbing:	0.5	psf
	Total Dead Load =	15.0	psf

W2	2x4 Wood Stud Interior Wall		
	15/32" Sheathing:	1.5	psf
	Wall Framing (2x4 at 16" o.c.):	1.5	psf
	Insulation (Batt):	0.5	psf
	(1) Layer 5/8" Drywall each side:	6.0	psf
	Mech/Elec/Plumbing:	0.5	psf
	Total Dead Load =	10.0	psf

W3	2x6 Wood Stud Exterior Wall w/ Stone Veneer		
	7/8" Plaster/Stucco	8.0	psf
	15/32" Sheathing:	1.5	psf
	Wall Framing (2x6 at 16" o.c.):	1.5	psf
	Insulation (Batt):	0.5	psf
	(1) Layer 5/8" Drywall:	3.0	psf
	Stone Veneer:	50.0	psf
	Mech/Elec/Plumbing:	0.5	psf
	Total Dead Load =	65.0	psf

Level			
Member Name	Results (Max UTIL %)	Current Solution	Comments
H1	Passed (25% M)	1 piece(s) 6 x 6 DF No.1	
H2	Passed (62% M)	1 piece(s) 6 x 8 DF No.1	
H3	Passed (39% M)	1 piece(s) 6 x 6 DF No.1	
H4	Passed (67% ΔT)	1 piece(s) 6 x 8 DF No.1	
H5	Passed (82% ΔT _{lat})	1 piece(s) 5 1/4" x 11 7/8" 2.2E Parallam® PSL	
H6	Passed (68% ΔT _{lat})	1 piece(s) 6 x 6 DF No.1	
H7	Passed (38% M)	1 piece(s) 6 x 6 DF No.1	
H8	Passed (80% R)	1 piece(s) 6 x 10 DF No.1	
H9	Passed (70% R)	1 piece(s) 5 1/4" x 11 7/8" 2.0E Parallam® PSL	
H10	Passed (90% M)	1 piece(s) 6 x 8 DF No.1	
H11	Passed (35% B/C)	1 piece(s) 6 x 8 DF No.1	
Tower Low Roof Joists-type changed	Passed (55% M)	1 piece(s) 2 x 6 DF No.2 @ 24" OC	

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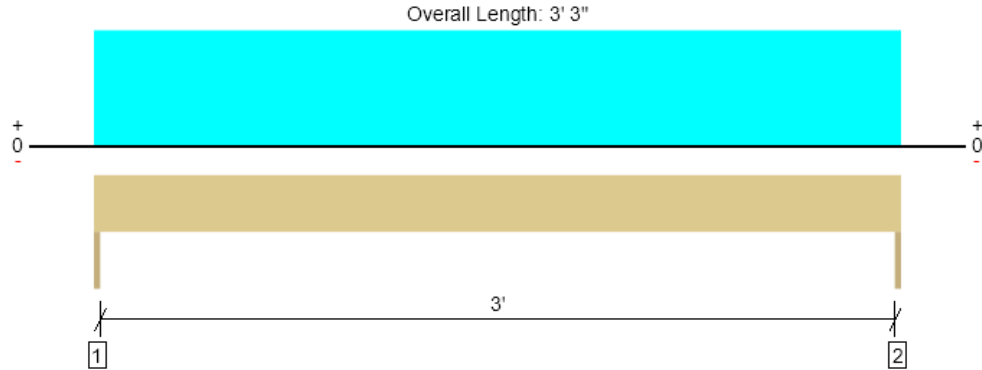
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Level, H1

1 piece(s) 6 x 6 DF No.1


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Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1050 @ 0	5156 (1.50")	Passed (20%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	673 @ 7"	4285	Passed (16%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	853 @ 1' 7 1/2"	3466	Passed (25%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.007 @ 1' 7 1/2"	0.108	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.013 @ 1' 7 1/2"	0.162	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	161 @ 3' 3"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	103 @ 7"	5485	Passed (2%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	131 @ mid-span	4437	Passed (3%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.001 @ mid-span	0.108	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.19	1.00	Passed (19%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 3' 3"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Wall deflection criteria: TL (L/360)
- Moment capacity has been adjusted by a factor of 0.89 to account for the beam stability and/or volume/size factors.
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	465	585	1050	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	465	585	1050	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

Lateral Connections						
Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	
Right	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 3' 3"	N/A	7.7	--	
1 - Uniform (PSF)	0 to 3' 3"	18'	15.5	20.0	Roof

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	5'	33.0	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (22' 2"), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(IV), Wind Zone (4), GCPi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

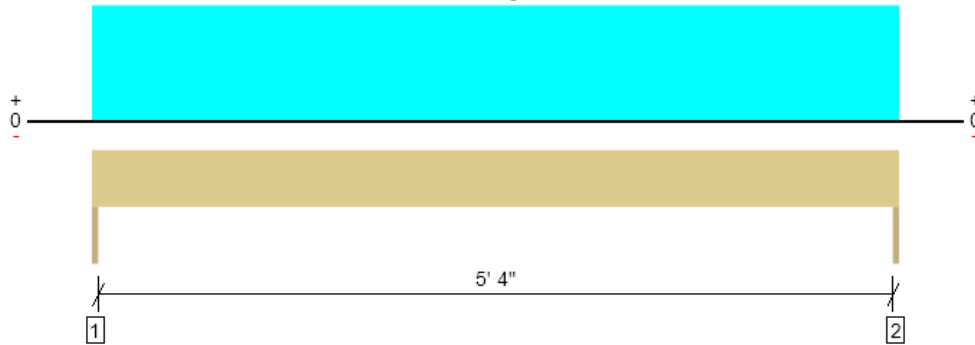
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Level, H2

1 piece(s) 6 x 8 DF No.1

Overall Length: 5' 7"



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2851 @ 0	5156 (1.50")	Passed (55%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	2085 @ 9"	5844	Passed (36%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	3979 @ 2' 9 1/2"	6445	Passed (62%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.040 @ 2' 9 1/2"	0.186	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.072 @ 2' 9 1/2"	0.279	Passed (L/928)	--	1.0 D + 1.0 Lr (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Moment capacity has been adjusted by a factor of 0.89 to account for the beam stability and/or volume/size factors.
- Applicable calculations are based on NDS.

Member Length : 5' 7"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	1259	1591	2851	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	1259	1591	2851	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 5' 7"	N/A	10.4	--	
1 - Uniform (PSF)	0 to 5' 7"	28' 6"	15.5	20.0	Roof

Member Notes

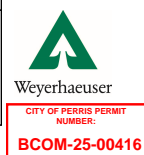
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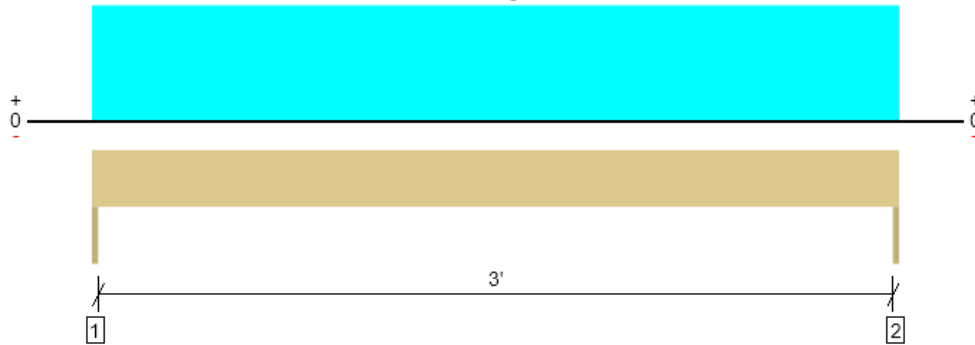


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Level, H3

1 piece(s) 6 x 6 DF No.1

Overall Length: 3' 3"



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1655 @ 0	5156 (1.50")	Passed (32%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	1061 @ 7"	4285	Passed (25%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	1345 @ 1' 7 1/2"	3466	Passed (39%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.012 @ 1' 7 1/2"	0.108	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.021 @ 1' 7 1/2"	0.162	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Moment capacity has been adjusted by a factor of 0.89 to account for the beam stability and/or volume/size factors.
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Member Length : 3' 3"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	729	926	1655	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	729	926	1655	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 3' 3"	N/A	7.7	--	
1 - Uniform (PSF)	0 to 3' 3"	28' 6"	15.5	20.0	Roof

Member Notes

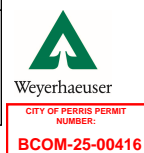
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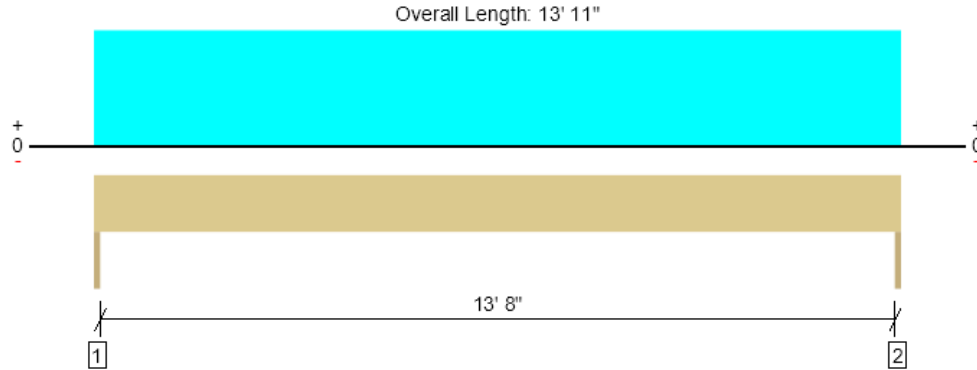
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Level, H4

1 piece(s) 6 x 8 DF No.1



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1183 @ 0	5156 (1.50")	Passed (23%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	1056 @ 9"	5844	Passed (18%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	4116 @ 6' 11 1/2"	6445	Passed (64%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.246 @ 6' 11 1/2"	0.464	Passed (L/680)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.464 @ 6' 11 1/2"	0.696	Passed (L/360)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	126 @ 13' 11"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	115 @ 7"	7480	Passed (2%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	438 @ mid-span	6050	Passed (7%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.064 @ mid-span	0.464	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.49	1.00	Passed (49%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 13' 11"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Wall deflection criteria: TL (L/360)
- Moment capacity has been adjusted by a factor of 0.89 to account for the beam stability and/or volume/size factors.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	557	626	1183	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	557	626	1183	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

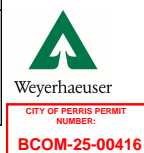
Lateral Connections						
Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	
Right	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 13' 11"	N/A	10.4	--	
1 - Uniform (PSF)	0 to 13' 11"	4' 6"	15.5	20.0	Roof

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	30.2	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (22' 2"), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(IV), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

FortewEB Software Operator	Job Notes
Sandy Fong Innovative Structural Engineering (951) 600-0032 SANDY@ISEENGINEERS.COM	



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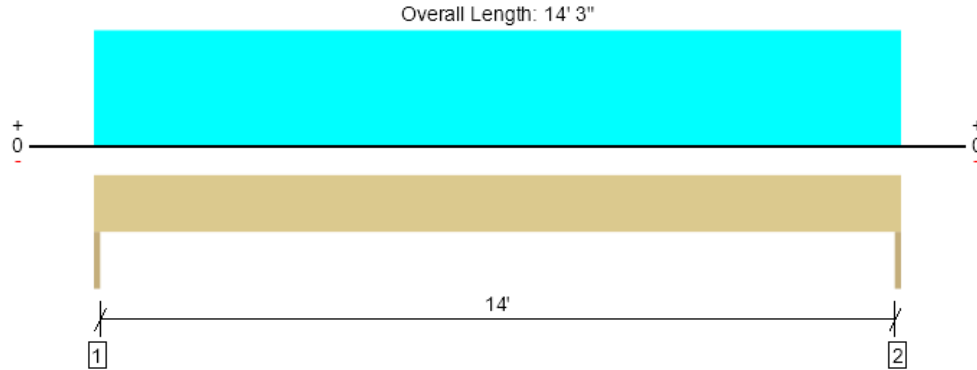
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
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Level, H5

1 piece(s) 5 1/4" x 11 7/8" 2.2E Parallam® PSL


Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1528 @ 0	4922 (1.50")	Passed (31%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	1289 @ 1' 1 3/8"	15066	Passed (9%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	5445 @ 7' 1 1/2"	37317	Passed (15%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.068 @ 7' 1 1/2"	0.475	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.133 @ 7' 1 1/2"	0.712	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	1333 @ 14' 3"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	1228 @ 6 3/4"	13965	Passed (9%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	4750 @ mid-span	21127	Passed (22%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.391 @ mid-span	0.475	Passed (L/437)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.28	1.00	Passed (28%)	1.60	1.0 D + 0.6 W

- Deflection criteria: LL (L/360) and TL (L/240).
- Wall deflection criteria: TL (L/360)
- Initial eccentricity applied as per ESR-1387.

Member Length : 14' 3"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	745	784	1528	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	745	784	1528	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

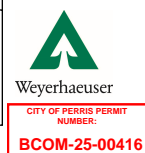
Lateral Connections: Simpson Strong-Tie						
Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Angle Connectors	A34	3	(8) - 8d x 1 1/2"
Right	2X	Douglas Fir-Larch	Angle Connectors	A34	3	(8) - 8d x 1 1/2"

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 14' 3"	N/A	19.5	--	
1 - Uniform (PSF)	0 to 14' 3"	5' 6"	15.5	20.0	Roof

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	11'	28.4	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (22' 2"), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(IV), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Forteweb Software Operator	Job Notes
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File Name: Firestation

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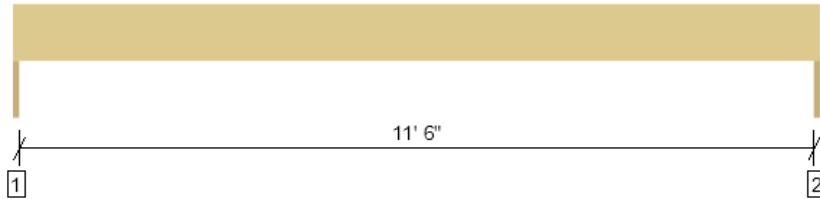
ForteWEB Software Operator	Job Notes
Sandy Fong Innovative Structural Engineering (951) 600-0032 SANDY@ISEENGINEERS.COM	



Level, H6

1 piece(s) 6 x 6 DF No.1

Overall Length: 11' 9"



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	45 @ 0	5156 (1.50")	Passed (1%)	--	1.0 D (All Spans)
Shear (lbs)	41 @ 7"	3086	Passed (1%)	0.90	1.0 D (All Spans)
Moment (Ft-lbs)	132 @ 5' 10 1/2"	2496	Passed (5%)	0.90	1.0 D (All Spans)
Vert Live Load Defl. (in)	0.000 @ 0	0.392	Passed (2L/999+)	--	1.0 D (All Spans)
Vert Total Load Defl. (in)	0.027 @ 5' 10 1/2"	0.313	Passed (L/999+)	--	1.0 D (All Spans)
Lat Member Reaction (lbs)	634 @ 11' 9"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	571 @ 7"	5485	Passed (10%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	1862 @ mid-span	4437	Passed (42%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.266 @ mid-span	0.392	Passed (L/531)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.45	1.00	Passed (45%)	1.60	1.0 D + 0.6 W

Member Length : 11' 9"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (5/16").
- Wall deflection criteria: TL (L/360)
- Moment capacity has been adjusted by a factor of 0.89 to account for the beam stability and/or volume/size factors.
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Bearing Length			Loads to Supports (lbs)		Accessories
	Total	Available	Required	Dead	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	45	45	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	45	45	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

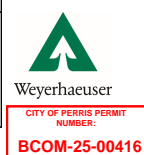
Lateral Connections						
Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	7	
Right	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	7	

Vertical Load	Location	Tributary Width	Dead (0.90)	Comments
0 - Self Weight (PLF)	0 to 11' 9"	N/A	7.7	

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	6'	30.0	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (22' 2"), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(IV), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

FortewEB Software Operator	Job Notes
Sandy Fong Innovative Structural Engineering (951) 600-0032 SANDY@ISEENGINEERS.COM	



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File Name: Firestation

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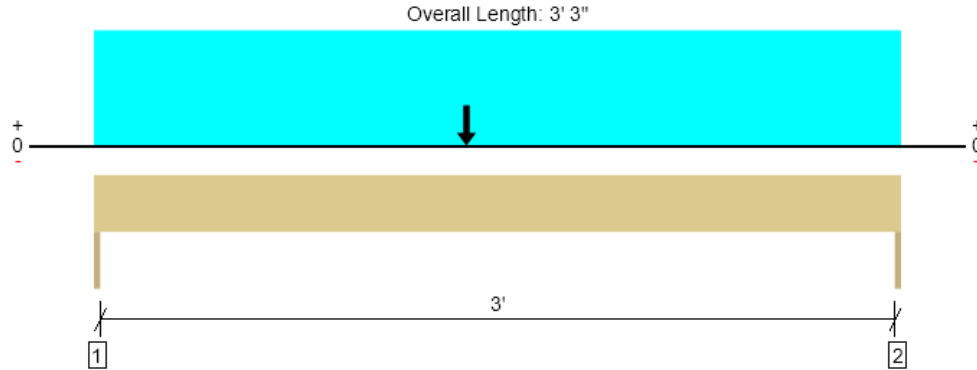
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
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Level, H7

1 piece(s) 6 x 6 DF No.1



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1290 @ 0	5156 (1.50")	Passed (25%)	--	1.0 D + 0.7 E (All Spans)
Shear (lbs)	1155 @ 7"	5485	Passed (21%)	1.60	1.0 D + 0.7 E (All Spans)
Moment (Ft-lbs)	1674 @ 1' 6"	4437	Passed (38%)	1.60	1.0 D + 0.7 E (All Spans)
Live Load Defl. (in)	0.008 @ 1' 7 1/2"	0.108	Passed (L/999+)	--	1.0 D + 0.45 W + 0.75 L + 0.75 Lr (All Spans)
Total Load Defl. (in)	0.012 @ 1' 7 9/16"	0.162	Passed (L/999+)	--	1.0 D + 0.45 W + 0.75 L + 0.75 Lr (All Spans)

Member Length : 3' 3"
 System : Wall
 Member Type : Header
 Building Use : Commercial
 Building Code : IBC 2021
 Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Moment capacity has been adjusted by a factor of 0.89 to account for the beam stability and/or volume/size factors.
- -685 lbs uplift at support located at 0". Strapping or other restraint may be required.
- -555 lbs uplift at support located at 3' 3". Strapping or other restraint may be required.
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Roof Live	Wind	Seismic	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	378	488	346	1303/-130 3	1290/-685	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	378	488	296	1117/-111 7	1160/-555	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Wind (1.60)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 3' 3"	N/A	7.7	--	--	--	
1 - Point (lb)	1' 6"	N/A	--	--	642	2420	tower SW F.5 end post load
2 - Uniform (PSF)	0 to 3' 3"	15'	15.0	20.0	--	--	roof truss

Member Notes

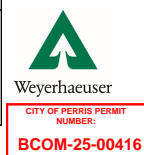
H7 Header along grid F.5 - Tower SW post loaded

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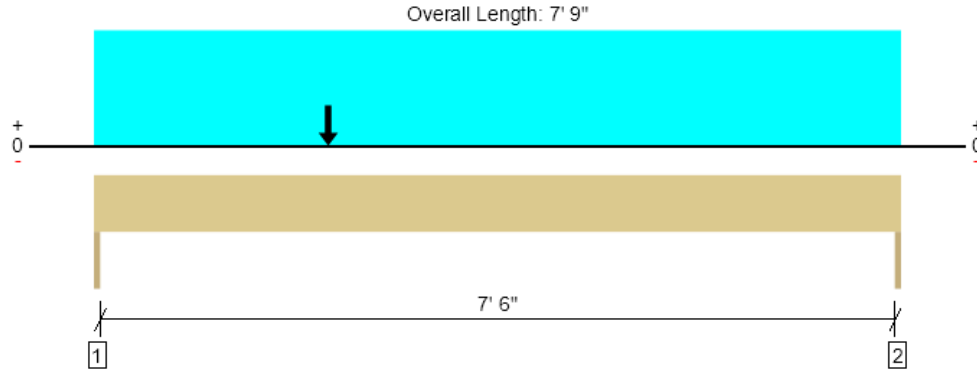
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ForteWEB Software Operator	Job Notes
Sandy Fong Innovative Structural Engineering (951) 600-0032 SANDY@ISEENGINEERS.COM	



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Level, H8
1 piece(s) 6 x 10 DF No.1



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4126 @ 0	5156 (1.50")	Passed (80%)	--	1.0 D + 0.7 E (All Spans)
Shear (lbs)	2304 @ 11"	5330	Passed (43%)	0.90	1.0 D (All Spans)
Moment (Ft-lbs)	5569 @ 3' 5 5/16"	8376	Passed (66%)	0.90	1.0 D (All Spans)
Vert Live Load Defl. (in)	0.011 @ 3' 5 7/8"	0.258	Passed (L/999+)	--	1.0 D + 0.45 W + 0.75 L + 0.75 Lr (All Spans)
Vert Total Load Defl. (in)	0.107 @ 3' 9 11/16"	0.387	Passed (L/870)	--	1.0 D + 0.45 W + 0.75 L + 0.75 Lr (All Spans)
Lat Member Reaction (lbs)	628 @ 7' 9"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	533 @ 7"	9475	Passed (6%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	1216 @ mid-span	6380	Passed (19%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.044 @ mid-span	0.258	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.60	1.00	Passed (60%)	1.60	1.0 D + 0.6 W

Member Length : 7' 9"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Wall deflection criteria: TL (L/360)
- Lumber grading provisions must be extended over the length of the member per NDS 4.2.5.5.
- Applicable calculations are based on NDS.

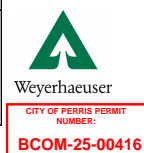
Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Roof Live	Wind	Seismic	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	2924	220	456	1717/-1717	4126	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	2743	90	186	703/-703	3235	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

Lateral Connections						
Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	7	
Right	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	7	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Wind (1.60)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 7' 9"	N/A	13.2	--	--	--	
1 - Point (lb)	2' 3"	N/A	--	--	642	2420	tower SW end post load
2 - Uniform (PSF)	0 to 7' 9"	8'	65.0	--	--	--	Wall above (stone veneer)
3 - Uniform (PSF)	0 to 7' 9"	9' 6"	15.0	--	--	--	wall above
4 - Point (lb)	2' 3"	N/A	430	310	--	--	trimmer reaction

FortewEB Software Operator	Job Notes
Sandy Fong Innovative Structural Engineering (951) 600-0032 SANDY@ISEENGINEERS.COM	



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Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	9'	30.0	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (22' 2"), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(IV), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

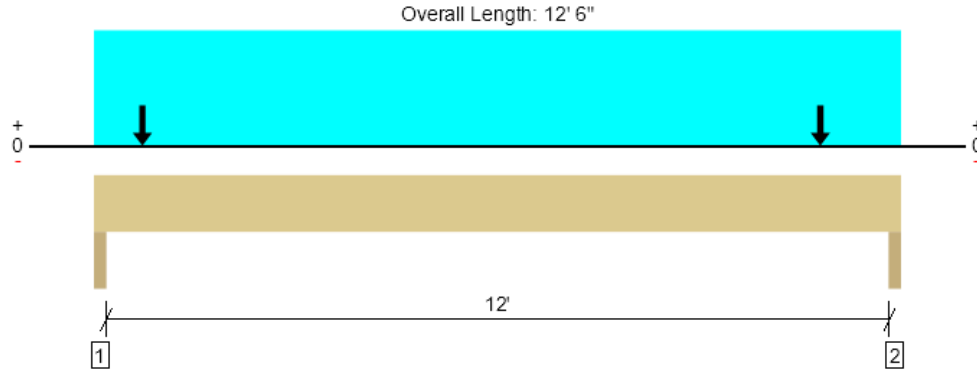
Member Notes
H8 Header along grid 4&5 - Tower SW post loaded

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ForteWEB Software Operator	Job Notes
Sandy Fong Innovative Structural Engineering (951) 600-0032 SANDY@ISEENGINEERS.COM	



Level, H9

1 piece(s) 5 1/4" x 11 7/8" 2.0E Parallam® PSL

Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	6923 @ 1 1/2"	9844 (3.00")	Passed (70%)	--	1.0 D + 0.7 E (All Spans)
Shear (lbs)	4244 @ 11' 3 1/8"	10848	Passed (39%)	0.90	1.0 D (All Spans)
Moment (Ft-lbs)	13548 @ 6' 3 5/8"	26868	Passed (50%)	0.90	1.0 D (All Spans)
Vert Live Load Defl. (in)	0.020 @ 6' 6 1/16"	0.408	Passed (L/999+)	--	1.0 D + 0.45 W + 0.75 L + 0.75 Lr (All Spans)
Vert Total Load Defl. (in)	0.297 @ 6' 3 3/8"	0.613	Passed (L/495)	--	1.0 D + 0.45 W + 0.75 L + 0.75 Lr (All Spans)
Lat Member Reaction (lbs)	960 @ 12' 4 1/2"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	872 @ 8 1/4"	13965	Passed (6%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	2940 @ mid-span	21127	Passed (14%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.198 @ mid-span	0.408	Passed (L/743)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.43	1.00	Passed (43%)	1.60	1.0 D + 0.6 W

Member Length : 12' 6"
 System : Wall
 Member Type : Header
 Building Use : Commercial
 Building Code : IBC 2021
 Design Methodology : ASD

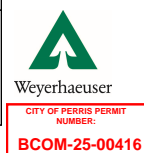
- Deflection criteria: LL (L/360) and TL (L/240).
- Wall deflection criteria: TL (L/360)
- Initial eccentricity applied as per ESR-1387.

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Roof Live	Wind	Seismic	Factored	
1 - Trimmer - DF	3.00"	3.00"	2.11"	5160	916	668	2519/-2519	6923	None
2 - Trimmer - DF	3.00"	3.00"	2.05"	5089	844	616	2321/-2321	6714	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

Lateral Connections: Simpson Strong-Tie						
Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Angle Connectors	A23	2	(8) - 10d x 1 1/2"
Right	2X	Douglas Fir-Larch	Angle Connectors	A23	2	(8) - 10d x 1 1/2"

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Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Wind (1.60)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 12' 6"	N/A	19.5	--	--	--	
1 - Point (lb)	9"	N/A	--	--	642	2420	tower SW end post load
2 - Uniform (PSF)	0 to 12' 6"	8'	65.0	--	--	--	Wall above (stone veneer)
3 - Uniform (PSF)	0 to 12' 6"	9' 6"	15.0	--	--	--	wall above
4 - Point (lb)	11' 3"	N/A	--	--	642	2420	tower SW end post load
5 - Point (lb)	11' 3"	N/A	862	880	--	--	trimmer reaction
6 - Point (lb)	9"	N/A	862	880	--	--	trimmer reaction

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	9'	29.0	

• ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (22' 2"), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(IV), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.

• IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes

H9 Header along grid I - Tower SW post loaded

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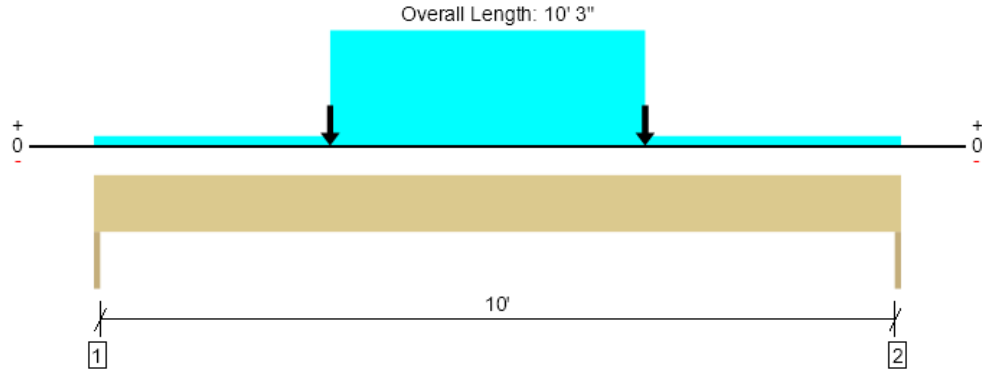
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File Name: Firestation

Level, H10

1 piece(s) 6 x 8 DF No.1



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1742 @ 0	5156 (1.50")	Passed (34%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	1715 @ 9"	5844	Passed (29%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	5789 @ 5' 1 9/16"	6445	Passed (90%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.183 @ 5' 1 5/16"	0.342	Passed (L/672)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.352 @ 5' 1 5/16"	0.512	Passed (L/349)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	471 @ 10' 3"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	417 @ 7"	7480	Passed (6%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	1207 @ mid-span	6050	Passed (20%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.096 @ mid-span	0.342	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.76	1.00	Passed (76%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 10' 3"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Wall deflection criteria: TL (L/360)
- Moment capacity has been adjusted by a factor of 0.89 to account for the beam stability and/or volume/size factors.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	862	881	1742	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	829	839	1668	None

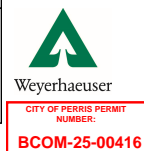
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

Lateral Connections						
Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	5	
Right	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	5	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 10' 3"	N/A	10.4	--	
1 - Point (lb)	3'	N/A	410	540	Girder truss
2 - Uniform (PSF)	0 to 10' 3"	1' 9"	15.0	--	wall above
3 - Point (lb)	7'	N/A	410	540	Girder truss
4 - Uniform (PSF)	3' to 7'	8'	15.5	20.0	roof

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	5'	30.6	

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Member Notes

H10 Header at Tower

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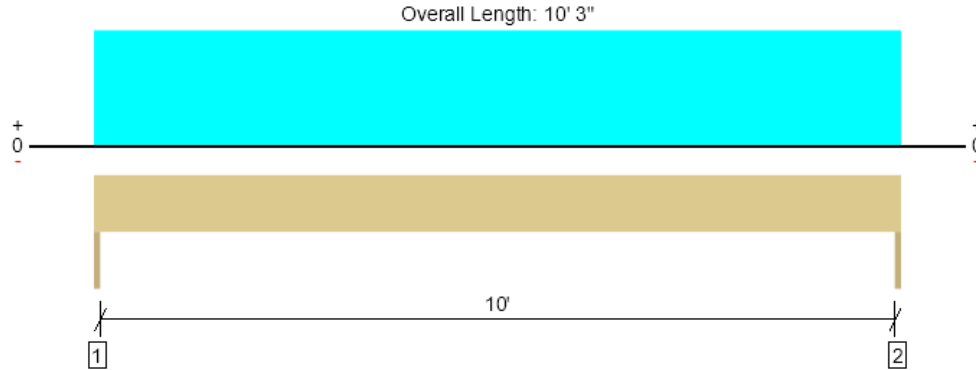
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Level, H11

1 piece(s) 6 x 8 DF No.1



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	733 @ 0	5156 (1.50")	Passed (14%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	626 @ 9"	5844	Passed (11%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	1879 @ 5' 1 1/2"	6445	Passed (29%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.048 @ 5' 1 1/2"	0.342	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.115 @ 5' 1 1/2"	0.512	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	471 @ 10' 3"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	417 @ 7"	7480	Passed (6%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	1207 @ mid-span	6050	Passed (20%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.096 @ mid-span	0.342	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.35	1.00	Passed (35%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 10' 3"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Wall deflection criteria: TL (L/360)
- Moment capacity has been adjusted by a factor of 0.89 to account for the beam stability and/or volume/size factors.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	426	308	733	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	426	308	733	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

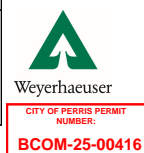
Lateral Connections						
Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	5	
Right	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	5	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 10' 3"	N/A	10.4	--	
1 - Uniform (PSF)	0 to 10' 3"	1' 9"	15.0	--	wall above
2 - Uniform (PSF)	0 to 10' 3"	3'	15.5	20.0	roof

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	5'	30.6	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (22' 2"), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(IV), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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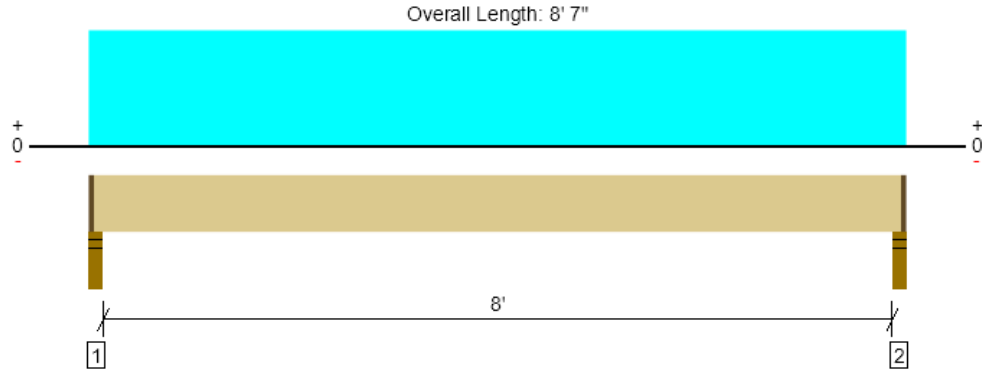
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Level, Tower Low Roof Joists-type changed
1 piece(s) 2 x 6 DF No.2 @ 24" OC



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	293 @ 2 1/2"	2109 (2.25")	Passed (14%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	248 @ 9"	1238	Passed (20%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	584 @ 4' 3 1/2"	1060	Passed (55%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.120 @ 4' 3 1/2"	0.272	Passed (L/815)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.211 @ 4' 3 1/2"	0.408	Passed (L/465)	--	1.0 D + 1.0 Lr (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

Member Length : 8' 4 1/2"
System : Roof
Member Type : Joist
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 0/12

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Stud wall - DF	3.50"	2.25"	1.50"	129	172	300	1 1/4" Rim Board
2 - Stud wall - DF	3.50"	2.25"	1.50"	129	172	300	1 1/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' 5" o/c	
Bottom Edge (Lu)	8' 5" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (1.25)	Comments
1 - Uniform (PSF)	0 to 8' 7"	24"	15.0	20.0	Default Commercial Load

Member Notes

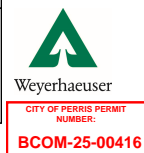
(converted from: Floor Joist)

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FIRE STATION LATERAL DESIGN

 STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

SEISMIC DESIGN LOAD - EQUIVALENT LATERAL FORCE PROCEDURE

Structure: CITY OF PERRIS

Building Seismic Design Criteria

(ASCE - Chapter 11)

Risk Category of Building or Structure:	IV	Table 1.5-1
Short-Period Spectral Response Acceleration, S_s :	1.422	Per ASCE 7 Hazard Tool
Long-Period Spectral Response Acceleration, S_1 :	0.526	Per ASCE 7 Hazard Tool
Average Height of Building Roof, h_n :	26.33	ft
Site-specific ground motion analysis provided?	Yes	11.4.8
Analytical procedure (Limit per Table 12.6-1)	ELF	Equivalent Lateral Force 12.8
Structural irregularities per 12.3.2?	Yes	12.8.1.3 - Item 1
Exceed 5 story above base/grade including mezzanines?	No	12.8.1.3 - Item 2

Site Class

11.4.3 & 11.4.4

Soil Site Class:	D	Per Geotech Report
------------------	---	--------------------

Site Coefficients & Spectral Response Acceleration Parameters

11.4.4

	Table 11.4-1 & 11.4-2	11.4.8 Exceptions	Site-specific analysis per Geotech Report	Calculation Warnings/Notes
Site Coefficient, F_a :	1.00	N/A	1.20	
Site Coefficient, F_v :	Site Specific	1.77	1.77	

$S_{MS} = F_a * S_s$:	1.48	Equation 11.4-1
$S_{M1} = F_v * S_1$:	1.05	Equation 11.4-2
$S_{DS} = 2/3 * S_{MS}$:	0.99	Equation 11.4-3
$S_{D1} = 2/3 * S_{M1}$:	0.70	Equation 11.4-4
$T_s = S_{D1} / S_{DS}$:	0.71	11.4.6
Seismic Design Category (SDC):	D	11.6 & Table 11.6-1 & 2


Seismic Equivalent Lateral Force Procedure

Section 12.8

Importance Factor, I_e :	1.50	Table 1.5-2
Response Modification Factor, R : Table 12.2-1	6.50	Light Framed Shear Walls
Overstrength Amplification factor, Ω_o :	2.5	Table 12.2-1
Approximate Period Values: Table 12.8-2:	C_t : 0.02	All other systems
	x : 0.75	
Approximate Fundamental Period, $T_a = C_t (h_n)^x$:	0.23	s
Long Period Transition Period, T_L :	8	

Equation 12.8-7

Figure 22 (14-17)

 STRUCTURAL ENGINEERS	www.ISEngineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

Seismic Response Coefficient, C_s :

$$C_s = S_{DS} / (R / I_e):$$

0.228

Equation 12.8-2

Maximum C_s :

MAX

$$C_s = S_{D1} / T_a (R / I_e): \quad T \leq T_L$$

0.696

Equation 12.8-3

$$C_s = S_{D1} T_L / T_a^2 (R / I_e): \quad T > T_L$$

23.958

Equation 12.8-4

Minimum C_s :

MIN

$$C_s = 0.044 S_{DS} I_e: \quad \geq 0.01$$

0.065

Equation 12.8-5

$$C_s = 0.5 S_1 / (R / I_e): \quad \text{for } S_1 \geq 0.6$$

N/A

Equation 12.8-6

$$\text{Seismic Base Shear, } V = C_s W:$$

0.228

W

Equation 12.8-1

Building Structure - Horizontal Seismic Load Effect, E_h Redundancy Factor, ρ :

1.00

Section 12.3.4.2

(Strength Level) $1.0E_h = \rho Q_e$:

0.228

W

Equation 12.4-3

(ASD Level) $0.7E_h = \rho Q_e$:

0.159

W

Equation 12.4-3

Diaphragm Design Forces per 12.10.1

$$F_{px} = 0.2 S_{DS} I_e w_{px} =$$

0.296

W (Min)

Section 12.10

Equation 12.10-2

$$F_{px} = 0.4 S_{DS} I_e w_{px} =$$

0.592

W (Max)

Equation 12.10-3

$$F_{px} = w_{px} * \Sigma F_i / \Sigma w_i$$

Equation 12.10-1

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Sheet:	Seismic Base Shear - FLEXIBLE
Date:	--
Project ID:	--
Version:	2022 CBC / ASCE 7-16

SEISMIC BASE SHEAR ANALYSIS - FLEXIBLE DIAPHRAGM

STRUCTURE: CITY OF PERRIS

Structural period Factor, k: 1.00

VERTICAL DISTRIBUTION OF SEISMIC FORCES																
Level	Height from Base (ft)	Weight Summary (k)	Floor Plan Area (ft ²)	ΣWi (k)	Wi hi ^k	ΣWi hi ^k	C _{vx}	Level Forces - 1.0E Strength Level			Alternate ASD 0.7E		Diaphragm F _{px} (k) - 1.0E			
								Force (k)		Unit Force (psf)	Unit Force (psf)		F _{px}		ΩF _{px}	
								F _x	ΣF _x	1.0 E _h = ρF _x	F _x	1.0 E _h = ρF _x	F _x	0.7 E _h = ρF _x	F _{px}	ΩF _{px}
TU	31.33	10.8	400	10.8	338	338	0.037	2.9	2.9	2.9	7.36	7.36	5.15	5.15	3.2	8.0
1	26.00	0.0	12,755	10.8	0	338	0.000	0.0	2.9	0.0					0.0	0.0
				345.6	8704	9042	0.963	75.7	78.7	75.7	5.94	5.94	4.16	4.16	99.1	247.7

Building Weight, W =

345.6

Base Shear, V = C_s*W =

78.68

k

BUILDING WEIGHT & SEISMIC TRIBUTARY ANALYSIS																																	
Building Mass Element	Type	Level	Unit weight (psf)	Area (sf)	Weight (k)	↕ Dir.		% Distribution to resistance gridlines								↔ Dir.		% Distribution to resistance gridlines														Check	
						Gridlines										Check	Gridlines										Check						
						1	2	3	4	5	6	7	8	9	10		B	C	D	E	E.3	F	G	H	I	J		K	L				
Apparatus Roof	R1	1	15.0	5,314	79.71	0%	0%		50%	50%	0%	0%	0%		100%	0%	50%	0%	0%	0%	0%		0%	0%	0%	50%	0%	0%		100%			
Electrical Low Roof	R1	1	15.0	1,233	18.50	0%	0%		0%	50%	50%	0%	0%		100%	0%	0%	21%	0%	47%		0%	32%	0%	0%	0%	0%		100%				
Sleeping Qtrs Roof	R1	1	15.0	2,912	43.68	16%	49%		35%	0%	0%	0%	0%		100%	50%	0%	0%	50%	0%		0%	0%	0%	0%	0%	0%		100%				
Day Room Roof	R1	1	15.0	3,296	49.44	0%	53%		47%	0%	0%	0%	0%		100%	0%	0%	0%	50%	0%		50%	0%	0%	0%	0%	0%		100%				
Wall A (upper 1/2)	W1	1	15.0	84	1.26	100%	0%		0%	0%	0%	0%	0%		100%	100%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		100%				
Wall B (upper 1/2)	W1	1	15.0	396	5.94	50%	0%		50%	0%	0%	0%	0%		100%	100%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		100%				
Wall C (upper 1/2)	W1	1	15.0	549	8.24	0%	0%		50%	50%	0%	0%	0%		100%	0%	100%	0%	0%	0%		0%	0%	0%	0%	0%	0%		100%				
Wall D (upper 1/2)	W1	1	15.0	73	1.10	0%	0%		0%	50%	50%	0%	0%		100%	0%	0%	100%	0%	0%		0%	0%	0%	0%	0%	0%		100%				
Wall E (upper 1/2)	W2	1	10.0	294	2.94	0%	50%		50%	0%	0%	0%	0%		100%	0%	0%	0%	100%	0%		0%	0%	0%	0%	0%	0%		100%				
Wall E.3 (upper 1/2)	W2	1	10.0	71	0.71	0%	0%		0%	50%	50%	0%	0%		100%	0%	0%	0%	0%	100%		0%	0%	0%	0%	0%	0%		100%				
Wall G (upper 1/2)	W1	1	15.0	399	10.94	0%	53%		47%	0%	0%	0%	0%		100%	0%	0%	0%	0%	0%		100%	0%	0%	0%	0%	0%		100%				
Wall H (upper 1/2)	W1	1	15.0	55	0.83	0%	0%		0%	50%	50%	0%	0%		100%	0%	0%	0%	0%	0%		0%	100%	0%	0%	0%	0%		100%				
Wall J (upper 1/2)	W1	1	15.0	549	8.24	0%	0%		50%	50%	0%	0%	0%		100%	0%	0%	0%	0%	0%		0%	0%	100%	0%	0%	0%		100%				
Wall 1 (upper 1/2)	W1	1	15.0	220	3.30	100%	0%		0%	0%	0%	0%	0%		100%	50%	0%	0%	50%	0%		0%	0%	0%	0%	0%	0%		100%				
Wall 2 (upper 1/2)	W2	1	10.0	345	7.27	0%	100%		0%	0%	0%	0%	0%		100%	0%	0%	0%	100%	0%		0%	0%	0%	0%	0%	0%		100%				
					0.00																												
Wall 6 (upper 1/2)	W2	1	10.0	752	7.52	0%	0%		100%	0%	0%	0%	0%		100%	0%	50%	0%	0%	0%		0%	0%	0%	50%	0%	0%		100%				
Wall 7 (upper 1/2)	W2	1	10.0	690	6.90	0%	0%		0%	100%	0%	0%	0%		100%	0%	50%	0%	0%	0%		0%	0%	0%	50%	0%	0%		100%				
Wall 8 (upper 1/2)	W1	1	15.0	330	4.95	0%	0%		0%	0%	100%	0%	0%		100%	0%	0%	21%	0%	47%		0%	32%	0%	0%	0%	0%		100%				
Sleeping Int. Walls (upper 1/2)	W2	1	10.0	1,775	17.75	16%	49%		35%	0%	0%	0%	0%		100%	50%	0%	0%	50%	0%		0%	0%	0%	0%	0%	0%		100%				
Day Rm Int. Walls (upper 1/2)	W2	1	10.0	2,022	20.22	0%	50%		50%	0%	0%	0%	0%		100%	0%	0%	0%	50%	0%		50%	0%	0%	0%	0%	0%		100%				
Electrical Int Walls (upper 1/2)	W2	1	10.0	143.3	1.43	0%	0%		0%	50%	50%	0%	0%		100%	0%	0%	100%	0%	0%		0%	0%	0%	0%	0%	0%		100%				
					0.00																												
Tower Roof	R	TU	15.0	400	6.00	0%	0%		0%	0%	0%	50%	50%		100%	0%	0%	0%	0%	0%		0%	0%	50%	0%	50%	0%		100%				
Wall F.5 (upper 1/2)	W1	TU	15.0	80.0	1.20	0%	0%		0%	0%	0%	50%	50%		100%	0%	0%	0%	0%	0%		0%	0%	0%	0%	100%	0%		100%				
Wall I (upper 1/2)	W1	TU	15.0	80.0	1.20	0%	0%		0%	0%	0%	50%	50%		100%	0%	0%	0%	0%	0%		0%	0%	100%	0%	0%	0%		100%				
Wall 4 (upper 1/2)	W1	TU	15.0	80.0	1.20	0%	0%		0%	0%	0%	0%	100%		100%	0%	0%	0%	0%	0%		0%	0%	50%	0%	50%	0%		100%				
Wall 5 (upper 1/2)	W1	TU	15.0	80.0	1.20	0%	0%		0%	0%	0%	0%	100%		100%	0%	0%	0%	0%	0%		0%	0%	50%	0%	50%	0%		100%				
Wall F.5 (Lower 1/2)	W1	1	15.0	80.0	1.20	0%	50%		50%	0%	0%	0%	0%		100%	0%	0%	0%	50%	0%		50%	0%	0%	0%	0%	0%		100%				
Wall I (Lower 1/2)	W1	1	15.0	80.0	1.20	0%	50%		50%	0%	0%	0%	0%		100%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	100%		100%				
Wall 4 (Lower 1/2)	W1	1	15.0	80.0	1.20	0%	50%		50%	0%	0%	0%	0%		100%	0%	0%	0%	0%	0%		50%	0%	0%	0%	0%	50%		100%				
Wall 5 (Lower 1/2)	W1	1	15.0	80.0	1.20	0%	50%		50%	0%	0%	0%	0%		100%	0%	0%	0%	0%	0%		50%	0%	0%	0%	0%	50%		100%				
Wall F.5L (upper 1/2)	W3	1	65.0	110.0	7.15	0%	50%		50%	0%	0%	0%	0%		100%	0%	0%	0%	50%	0%		50%	0%	0%	0%	0%	0%		100%				
Wall IL (upper 1/2)	W3	1	65.0	126.0	8.19	0%	50%		50%	0%	0%	0%	0%		100%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	100%		100%				
Wall 4L (upper 1/2)	W3	1	65.0	106.0	6.89	0%	50%		50%	0%	0%	0%	0%		100%	0%	0%	0%	0%	0%		50%	0%	0%	0%	0%	50%		100%				
Wall 5L (upper 1/2)	W3	1	65.0	106.0	6.89	0%	50%		50%	0%	0%	0%	0%		100%	0%	0%	0%	0%	0%		50%	0%	0%	0%	0%	50%		100%				
ΣWi=				345.6		17.4	97.7	0.0	137.1	66.3	16.2	5.4	5.4	0.0	0.0		39.6	55.3	7.4	81.6	11.7	0.0	58.0	8.4	5.4	55.3	5.4	17.5	0.0				


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Sheet: Seismic Base Shear - FLEXIBLE

Date: --

Project ID: --

Version: 2022 CBC / ASCE 7-16

SEISMIC BASE SHEAR ANALYSIS - FLEXIBLE DIAPHRAGM

STRUCTURE: CITY OF PERRIS

				SEISMIC LOAD SUMMARY BY ELEMENT																							
Building Mass Element	Level	Height (ft)	Notes	↕ Dir.	% Distribution to resistance gridlines										↔ Dir.	% Distribution to resistance gridlines											
				Gridlines										Gridlines													
				1	2		6	7	8	4	5			B	C	D	E	E.3		G	H	I	J	F.5	IL		
Apparatus Roof	1	26		0.0	0.0	0.0	9.0	9.0	0.0	0.0	0.0	0.0	0.0		0.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	0.0	0.0	0.0
Electrical Low Roof	1	26		0.0	0.0	0.0	0.0	0.0	2.1	2.1	0.0	0.0	0.0	0.0		0.0	0.0	0.9	0.0	2.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0
Sleeping Qtrs Roof	1	26		1.6	4.9	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0		4.9	0.0	0.0	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Day Room Roof	1	26		0.0	5.9	0.0	5.3	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	5.6	0.0	0.0	5.6	0.0	0.0	0.0	0.0	0.0	0.0
Wall A (upper 1/2)	1	26		0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wall B (upper 1/2)	1	26		0.7	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0		1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wall C (upper 1/2)	1	26		0.0	0.0	0.0	0.9	0.9	0.0	0.0	0.0	0.0	0.0		0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wall D (upper 1/2)	1	26		0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0		0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wall E (upper 1/2)	1	26		0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wall E.3 (upper 1/2)	1	26		0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wall G (upper 1/2)	1	26		0.0	1.3	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0
Wall H (upper 1/2)	1	26		0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Wall J (upper 1/2)	1	26		0.0	0.0	0.0	0.9	0.9	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	1.9	0.0	0.0	0.0	0.0
Wall 1 (upper 1/2)	1	26		0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.4	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wall 2 (upper 1/2)	1	26		0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wall 6 (upper 1/2)	1	26		0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0
Wall 7 (upper 1/2)	1	26		0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0		0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0
Wall 8 (upper 1/2)	1	26		0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0		0.0	0.0	0.2	0.0	0.5	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0
Sleeping Int. Walls (u	1	26		0.6	2.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0		2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Day Rm Int. Walls (u	1	26		0.0	2.3	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	2.3	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0
Electrical Int Walls (u	1	26		0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0		0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tower Roof	TU	31.33		0.0	0.0	0.0	0.0	0.0	0.8	0.8	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.8	0.0	0.0	0.0
Wall F.5 (upper 1/2)	TU	31.33		0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Wall I (upper 1/2)	TU	31.33		0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0
Wall 4 (upper 1/2)	TU	31.33		0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0
Wall 5 (upper 1/2)	TU	31.33		0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0
Wall F.5 (Lower 1/2)	1	26		0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Wall I (Lower 1/2)	1	26		0.0	0.1	0.0	0.1	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	0.0	0.3	0.0	0.0
Wall 4 (Lower 1/2)	1	26		0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
Wall 5 (Lower 1/2)	1	26		0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
Wall F.5L (upper 1/2)	1	26		0.0	0.8	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.8	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0
Wall IL (upper 1/2)	1	26		0.0	0.9	0.0	0.9	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	0.0	1.9	0.0	0.0
Wall 4L (upper 1/2)	1	26		0.0	0.8	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.8	0.0	0.0
Wall 5L (upper 1/2)	1	26		0.0	0.8	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.8	0.0	0.0
Σ				3.9	22.1	0.0	31.0	15.0	3.7	1.5	1.5	0.0	0.0		9.0	12.5	1.7	18.5	2.7	0.0	13.1	1.9	1.5	1.5	1.5	4.0	0.0

SUMMARY OF SEISMIC LOADING BY GRIDLINE (KIPS - 1.0E STRENGTH LEVEL)																											
Level	1.0 E _h = pF _x	↕ Direction										Check	↔ Direction														Check
		Gridlines											Gridlines														
		1	2		6	7	8	4	5				B	C	D	E	E.3		G	H	I	J	F.5	IL			
TU	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.5	0.0	0.0	100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%	
1	75.7	3.9	22.1	0.0	31.0	15.0	3.7	0.0	0.0	0.0	0.0	100%	9.0	12.5	1.7	18.5	2.7	0.0	13.1	1.9	0.0	12.5	0.0	4.0	0.0	100%	
Base	78.68	3.9	22.1	0.0	31.0	15.0	3.7	1.5	1.5	0.0	0.0	100%	9.0	12.5	1.7	18.5	2.7	0.0	13.1	1.9	1.5	12.5	1.5	4.0	0.0	100%	

 STRUCTURAL ENGINEERS	Sheet:	Wind Analysis
	Date:	--
	Project ID:	--
	Version:	2022 CBC / ASCE 7-16

Chapter 27 - Wind Loads on Buildings: Main Wind Force Resisting System (Directional Procedure)
Enclosed & Partially Enclosed Structures - Gable, Hip, Monoslope, & Mansard Roof

Structure: **CITY OF PERRIS Apparatus**

Building Data:

Type of Roof:	Gable	
Horiz building dimension parallel to wind, L:	60.7	ft
Horiz building dimension normal to wind, B:	78.3	ft
h/L:	0.43	
L/B:	0.77	
Roof Pitch, Θ :	slope ratio: 3 :12 =	14.0 degrees
Ground Elevation, Zg:		1415 ft, above sea level

General Wind Load Requirements:

Risk category:	IV	(ASCE 7-16) Table 1.5-1
V, Basic wind speed (3-s gust): mph	110	ASCE 7 Hazard Tool & Fig 26.5-1A, B, C, & D
$V_{asd} = V\sqrt{0.6}$: mph	85	Where exceptions 4 & 5 of Sec. 16.9.1.1 apply
Wind directionality factor, K_d	0.85	Section 26.6 & Table 26.6-1
Exposure category:	C	Section 26.7
Topographic factor, K_{zt} :	1.0	Section 26.8 & Fig 26.8-1
Ground elevation factor, K_e :	0.95	Section 26.9
Gust-effect factor, G_f :	0.85	Section 26.11
Enclosure classification:	Enclosed	
Internal pressure coefficient, +/- GC_{pi}	0.18	Section 26.13 & Table 26.13-1
Velocity pressure exposure coefficient, K_z or K_h	0.92	Table 26.10-1
Minimum design wind loading, ASD	8.0	psf Section 27.1.5

Determine Velocity Pressure: $q_z = 0.00256 K_z K_{zt} K_d K_e V^2$, psf

Section 26.10.2

1-Story Building Wind Analysis			
Level	Height (ft)	K_z or K_h	q_z (psf)
Ridge Height	26.33	0.95	23.78
Mean Roof, h	22.17	0.92	22.95
1st Level	18.00	0.88	22.01

= q_h

Pressure on Building By Component (Roof Loads Normal to Roof Surface)								
Surface	Level (ft)	C_p	q_h or q_z	q (psf)	External Pressure, $q(GC_p)$ (psf)	Internal Pressure, $q_h(+/-GC_{pi})$	(psf)	
							$+(GC_{pi})$	$-(GC_{pi})$
Windward Roof - ($-C_p$)	26.33	-0.69	q_h	23.78	-13.86	4.3	-9.58	-18.14
Windward Roof - ($+C_p$)	26.33	-0.14	q_h	23.78	-2.86	4.3	1.42	-7.14
Leeward Roof	26.33	-0.49	q_h	23.78	-9.90	4.3	-5.62	-14.18
Windward Wall	18.00	0.8	q_z	22.01	14.97	4.3	19.25	10.69
Leeward Wall	18.00	-0.50	q_h	23.78	-10.11	4.3	-5.83	-14.39

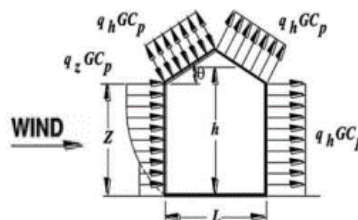
Wind Loading - Horizontal Components

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Surface	Level (ft)	+Internal	-Internal	Design (psf)	Min. (psf)
		psf			
Windward Roof	26.33	0.34	-1.73	1.71	8
Leeward Roof	26.33	-1.36	-3.44		
Windward Wall	18.00	19.25	10.69	25.08	16
Leeward Wall	18.00	-5.83	-14.39		

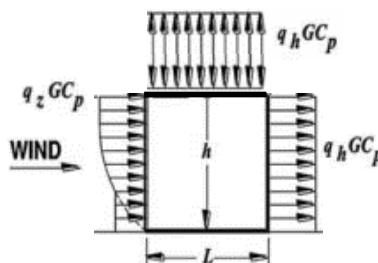
Wind Load Normal to Gable, Hip Roof

Level	1.0W (Strength)	0.6W (ASD)
1st Flr	292 plf	175 plf



Wind Load Normal to Gable End Roof

Level	1.0W (Strength)	0.6W (ASD)
1st Flr	365 plf	219 plf



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Chapter 27 - Wind Loads on Buildings: Main Wind Force Resisting System (Directional Procedure)
Enclosed & Partially Enclosed Structures - Gable, Hip, Monoslope, & Mansard Roof

Structure: **CITY OF PERRIS Electrical Area**

Building Data:

Type of Roof:	Monoslope
Horiz building dimension parallel to wind, L:	14.7 ft
Horiz building dimension normal to wind, B:	70.0 ft
h/L:	0.99
L/B:	0.21
Roof Pitch, Θ :	slope ratio: 3 :12 = 14.0 degrees
Ground Elevation, Zg:	1415 ft, above sea level

General Wind Load Requirements:

Risk category:	IV	(ASCE 7-16) Table 1.5-1
V, Basic wind speed (3-s gust): mph	110	ASCE 7 Hazard Tool & Fig 26.5-1A, B, C, & D
$V_{asd} = V\sqrt{0.6}$: mph	85	Where exceptions 4 & 5 of Sec. 16.9.1.1 apply
Wind directionality factor, K_d	0.85	Section 26.6 & Table 26.6-1
Exposure category:	C	Section 26.7
Topographic factor, K_{zt} :	1.0	Section 26.8 & Fig 26.8-1
Ground elevation factor, K_e :	0.95	Section 26.9
Gust-effect factor, G_f :	0.85	Section 26.11
Enclosure classification:	Enclosed	
Internal pressure coefficient, +/- GC_{pi}	0.18	Section 26.13 & Table 26.13-1
Velocity pressure exposure coefficient, K_z or K_h	0.85	Table 26.10-1
Minimum design wind loading, ASD	8.0 psf	Section 27.1.5

Determine Velocity Pressure: $q_z = 0.00256 K_z K_{zt} K_d K_e V^2$, psf

Section 26.10.2

1-Story Building Wind Analysis			
Level	Height (ft)	K_z or K_h	q_z (psf)
Ridge Height	14.50	0.85	21.26
Mean Roof, h	12.25	0.85	21.26
1st Level	10.00	0.85	21.26

= q_h

Pressure on Building By Component (Roof Loads Normal to Roof Surface)								
Surface	Level (ft)	C_p	q_h or q_z	q (psf)	External Pressure, $q(GC_p)$ (psf)	Internal Pressure, $q_h(+/-GC_{pi})$	(psf)	
							+(GC _{pi})	-(GC _{pi})
Windward Roof - (-C _p)	14.50	-1.05	q_h	21.26	-18.98	3.8	-15.16	-22.81
Windward Roof - (+C _p)	14.50	-0.30	q_h	21.26	-5.36	3.8	-1.54	-9.19
Leeward Roof	14.50	-0.62	q_h	21.26	-11.14	3.8	-7.32	-14.97
Windward Wall	10.00	0.8	q_z	21.26	14.46	3.8	18.29	10.63
Leeward Wall	10.00	-0.50	q_h	21.26	-9.04	3.8	-5.21	-12.86

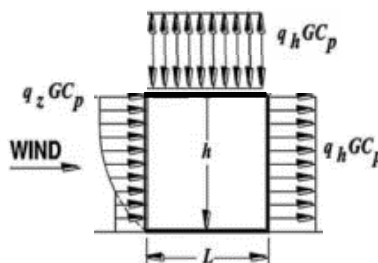
Wind Loading - Horizontal Components

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Surface	Level (ft)	+Internal	-Internal	Design (psf)	Min. (psf)
		psf			
Windward Roof	14.50	-0.37	-2.23	1.40	8
Leeward Roof	14.50	-1.77	-3.63		
Windward Wall	10.00	18.29	10.63	23.50	16
Leeward Wall	10.00	-5.21	-12.86		

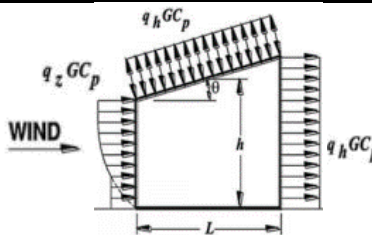
Wind Load Normal to Gable End Roof

Level	1.0W (Strength)	0.6W (ASD)
1st Flr	188 plf	113 plf



Wind Load Normal to Monoslope Roof

Level	1.0W (Strength)	0.6W (ASD)
1st Flr	153 plf	92 plf



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Chapter 27 - Wind Loads on Buildings: Main Wind Force Resisting System (Directional Procedure)
Enclosed & Partially Enclosed Structures - Gable, Hip, Monoslope, & Mansard Roof

Structure: **CITY OF PERRIS Sleeping Quarters**

Building Data:

Type of Roof:	Mansard	
Horiz building dimension parallel to wind, L:	33.5	ft
Horiz building dimension normal to wind, B:	36.7	ft
h/L:	0.49	
L/B:	0.91	
Roof Pitch, Θ :	slope ratio: 3 :12 =	14.0 degrees
Ground Elevation, Zg:	1415	ft, above sea level

General Wind Load Requirements:

Risk category:	IV	(ASCE 7-16) Table 1.5-1
V, Basic wind speed (3-s gust): mph	110	ASCE 7 Hazard Tool & Fig 26.5-1A, B, C, & D
$V_{asd} = V\sqrt{0.6}$: mph	85	Where exceptions 4 & 5 of Sec. 16.9.1.1 apply
Wind directionality factor, K_d	0.85	Section 26.6 & Table 26.6-1
Exposure category:	C	Section 26.7
Topographic factor, K_{zt} :	1.0	Section 26.8 & Fig 26.8-1
Ground elevation factor, K_e :	0.95	Section 26.9
Gust-effect factor, G_f :	0.85	Section 26.11
Enclosure classification:	Enclosed	
Internal pressure coefficient, +/- GC_{pi}	0.18	Section 26.13 & Table 26.13-1
Velocity pressure exposure coefficient, K_z or K_h	0.85	Table 26.10-1
Minimum design wind loading, ASD	8.0	psf Section 27.1.5

Determine Velocity Pressure: $q_z = 0.00256 K_z K_{zt} K_d K_e V^2$, psf

Section 26.10.2

1-Story Building Wind Analysis			
Level	Height (ft)	K_z or K_h	q_z (psf)
Ridge Height	16.25	0.86	21.58
Mean Roof, h	14.13	0.85	21.26
1st Level	12.00	0.85	21.26

= q_h

Pressure on Building By Component (Roof Loads Normal to Roof Surface)								
Surface	Level (ft)	C_p	q_h or q_z	q (psf)	External Pressure, $q(GC_p)$ (psf)	Internal Pressure, $q_h(+/-GC_{pi})$	(psf)	
							$+(GC_{pi})$	$-(GC_{pi})$
Windward Roof - ($-C_p$)	16.25	-0.73	q_h	21.58	-13.33	3.9	-9.44	-17.21
Windward Roof - ($+C_p$)	16.25	-0.17	q_h	21.58	-3.14	3.9	0.74	-7.03
Leeward Roof	16.25	-0.50	q_h	21.58	-9.13	3.9	-5.24	-13.01
Windward Wall	12.00	0.8	q_z	21.26	14.46	3.9	18.34	10.58
Leeward Wall	12.00	-0.50	q_h	21.58	-9.17	3.9	-5.29	-13.05

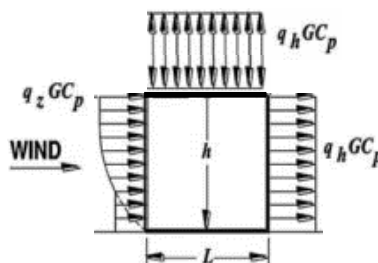
Wind Loading - Horizontal Components

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Surface	Level (ft)	+Internal	-Internal	Design (psf)	Min. (psf)
		psf			
Windward Roof	16.25	0.18	-1.70	1.45	8
Leeward Roof	16.25	-1.27	-3.16		
Windward Wall	12.00	18.34	10.58	23.63	16
Leeward Wall	12.00	-5.29	-13.05		

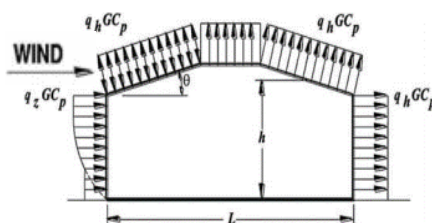
Wind Load Normal to Gable End Roof

Level	1.0W (Strength)	0.6W (ASD)
1st Flr	209 plf	125 plf



Wind Load Normal to Mansard Roof

Level	1.0W (Strength)	0.6W (ASD)
1st Flr	176 plf	105 plf



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Chapter 27 - Wind Loads on Buildings: Main Wind Force Resisting System (Directional Procedure)
Enclosed & Partially Enclosed Structures - Gable, Hip, Monoslope, & Mansard Roof

Structure: **CITY OF PERRIS Day Room**

Building Data:

Type of Roof:	Mansard	
Horiz building dimension parallel to wind, L:	66.2	ft
Horiz building dimension normal to wind, B:	75.3	ft
h/L:	0.33	
L/B:	0.88	
Roof Pitch, Θ :	slope ratio: 3 :12 =	14.0 degrees
Ground Elevation, Zg:	1415	ft, above sea level

General Wind Load Requirements:

Risk category:	IV	(ASCE 7-16) Table 1.5-1
V, Basic wind speed (3-s gust): mph	110	ASCE 7 Hazard Tool & Fig 26.5-1A, B, C, & D
$V_{asd} = V\sqrt{0.6}$: mph	85	Where exceptions 4 & 5 of Sec. 16.9.1.1 apply
Wind directionality factor, Kd	0.85	Section 26.6 & Table 26.6-1
Exposure category:	C	Section 26.7
Topographic factor, Kzt:	1.0	Section 26.8 & Fig 26.8-1
Ground elevation factor, Ke:	0.95	Section 26.9
Gust-effect factor, Gf:	0.85	Section 26.11
Enclosure classification:	Enclosed	
Internal pressure coefficient, +/- GCpi	0.18	Section 26.13 & Table 26.13-1
Velocity pressure exposure coefficient, Kz or Kh	0.87	Table 26.10-1
Minimum design wind loading, ASD	8.0	psf Section 27.1.5

Determine Velocity Pressure: $qz = 0.00256 Kz Kzt Kd Ke V^2$, psf

Section 26.10.2

1-Story Building Wind Analysis			
Level	Height (ft)	Kz or Kh	qz (psf)
Ridge Height	22.00	0.92	22.91
Mean Roof, h	17.00	0.87	21.76
1st Level	12.00	0.85	21.26

=qh

Pressure on Building By Component (Roof Loads Normal to Roof Surface)								
Surface	Level (ft)	Cp	qh or qz	q (psf)	External Pressure, q(GCp) (psf)	Internal Pressure, qh(+/-GCpi)	(psf)	
							+(GCpi)	-(GCpi)
Windward Roof - (-Cp)	22.00	-0.60	qh	22.91	-11.77	4.1	-7.65	-15.90
Windward Roof - (+Cp)	22.00	-0.08	qh	22.91	-1.61	4.1	2.52	-5.73
Leeward Roof	22.00	-0.47	qh	22.91	-9.23	4.1	-5.11	-13.36
Windward Wall	12.00	0.8	qz	21.26	14.46	4.1	18.58	10.33
Leeward Wall	12.00	-0.50	qh	22.91	-9.74	4.1	-5.61	-13.86

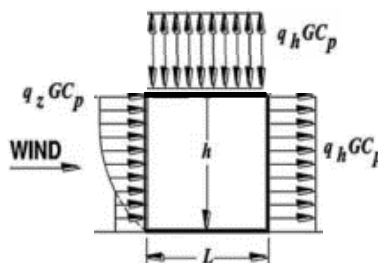
Wind Loading - Horizontal Components

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Surface	Level (ft)	+Internal	-Internal	Design (psf)	Min. (psf)
		psf			
Windward Roof	22.00	0.61	-1.39	1.85	8
Leeward Roof	22.00	-1.24	-3.24		
Windward Wall	12.00	18.58	10.33	24.20	16
Leeward Wall	12.00	-5.61	-13.86		

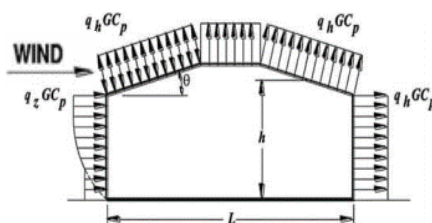
Wind Load Normal to Gable End Roof

Level	1.0W (Strength)	0.6W (ASD)
1st Flr	307 plf	184 plf



Wind Load Normal to Mansard Roof

Level	1.0W (Strength)	0.6W (ASD)
1st Flr	225 plf	135 plf



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Chapter 27 - Wind Loads on Buildings: Main Wind Force Resisting System (Directional Procedure)
Enclosed & Partially Enclosed Structures - Gable, Hip, Monoslope, & Mansard Roof

Structure: **CITY OF PERRIS**

Building Data:

Type of Roof:	Gable	
Horiz building dimension parallel to wind, L:	20.0	ft
Horiz building dimension normal to wind, B:	20.0	ft
h/L:	1.63	
L/B:	1.00	
Roof Pitch, Θ :	slope ratio: 3 :12 =	14.0 degrees
Ground Elevation, Zg:		1,415 ft, above sea level

General Wind Load Requirements:

Risk category:	IV	(ASCE 7-16) Table 1.5-1
V, Basic wind speed (3-s gust): mph	110	ASCE 7 Hazard Tool & Fig 26.5-1A, B, C, & D
$V_{asd} = V\sqrt{0.6}$: mph	85	Where exceptions 4 & 5 of Sec. 16.9.1.1 apply
Wind directionality factor, Kd	0.85	Section 26.6 & Table 26.6-1
Exposure category:	C	Section 26.7
Topographic factor, Kzt:	1.0	Section 26.8 & Fig 26.8-1
Ground elevation factor, Ke:	0.95	Section 26.9
Gust-effect factor, Gf:	0.85	Section 26.11
Enclosure classification:	Enclosed	
Internal pressure coefficient, +/- GCpi	0.18	Section 26.13 & Table 26.13-1
Velocity pressure exposure coefficient, Kz or Kh	0.99	Table 26.10-1
Minimum design wind loading, ASD	8.0	psf Section 27.1.5

Determine Velocity Pressure: $qz = 0.00256 Kz Kzt Kd Ke V^2$, psf

Section 26.10.2

1-Story Building Wind Analysis			
Level	Height (ft)	Kz or Kh	qz (psf)
Ridge Height	32.67	1.00	24.92
Mean Roof, h	31.34	0.99	24.71
1st Level	30.00	0.98	24.51

=qh

Pressure on Building By Component (Roof Loads Normal to Roof Surface)								
Surface	Level (ft)	Cp	qh or qz	q (psf)	External Pressure, q(GCp) (psf)	Internal Pressure, qh(+/-GCpi)	(psf)	
							+(GCpi)	-(GCpi)
Windward Roof - (-Cp)	32.67	-1.06	qh	24.92	-22.40	4.5	-17.92	-26.89
Windward Roof - (+Cp)	32.67	-0.30	qh	24.92	-6.34	4.5	-1.86	-10.83
Leeward Roof	32.67	-0.62	qh	24.92	-13.12	4.5	-8.63	-17.60
Windward Wall	30.00	0.8	qz	24.51	16.67	4.5	21.15	12.19
Leeward Wall	30.00	-0.50	qh	24.92	-10.59	4.5	-6.10	-15.07

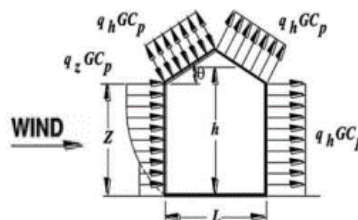
Wind Loading - Horizontal Components

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Surface	Level (ft)	+Internal	-Internal	Design (psf)	Min. (psf)
		psf			
Windward Roof	32.67	-0.45	-2.63	1.64	8
Leeward Roof	32.67	-2.09	-4.27		
Windward Wall	30.00	21.15	12.19	27.26	16
Leeward Wall	30.00	-6.10	-15.07		

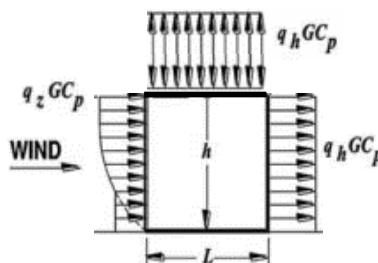
Wind Load Normal to Gable, Hip Roof

Level	1.0W (Strength)	0.6W (ASD)
1st Flr	430 plf	258 plf



Wind Load Normal to Gable End Roof

Level	1.0W (Strength)	0.6W (ASD)
1st Flr	457 plf	274 plf





Sheet:	CC-Walls
Date:	11/25/2025
#:	-
Version:	2

ASCE 7-16 Chapter 30 Component and Cladding -Part I Low Rise Buildings ($h \leq 60$ ft.)

Walls

Basic Wind Speed	$V =$	110 mph	ASCE Hazard Tool
Nominal Wind Speed ($\sqrt{.6}$) $V_{ult.}$	$V_{nom} =$	85 mph	
Ground elevation above sea level	$z_g =$	1415 ft.	ASCE Hazard Tool
Risk Category Factor	$=$	IV	Table 1.5-1
Surface Roughness	$=$	C	26.7.2
Exposure Category	$=$	C	26.7.3
Mean roof height of building or height of structure h	$=$	22.17 ft.	
Enclosure Classification	$=$	Enclosed	Table 26.13-1
Roof Slope	$=$	3 :12 $\rightarrow \theta = 14.0^\circ$	

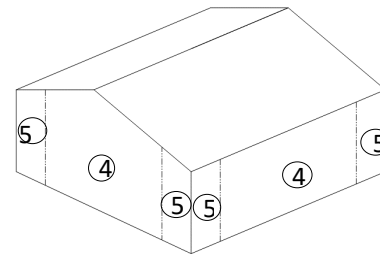
Wind Load Parameters:

K_z Velocity pressure exposure coefficient	$=$	0.9173	Table 26.10-1
K_d Wind load directionality factor	$=$	0.85	Table 26.6-1
K_e Ground Elevation Factor	$=$	0.9501	Table 26.9-1
K_{zt} Topographic Factor	$=$	1	(26.8.2)

Velocity Pressure: $q_z = .00256 K_z K_{zt} K_d K_e V^2 = 22.95$ psf ASD : $q_z = 13.77$ psf (26.10-1)

G Gust effect factor	$=$	0.85	30.3.2
G_{cpi} Internal pressure coefficient	$=$	+/- 0.18	30.3.2
G_{cp} Product of external pressure coefficient and gust-effect factor			

G_{cp} coefficients							
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-) Away	4	-1.10	-1.05	-0.95	-0.92	-0.87	-0.80
	5	-1.40	-1.29	-1.15	-1.04	-0.94	-0.80
(+) Toward 4&5	ALL	1	0.94	0.88	0.82	0.77	0.7



ELEVATION

Figure 30.3-1

$G_{cp}^* - G_{cpi}$							
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-) Away	4	-1.28	-1.23	-1.13	-1.10	-1.05	-0.98
	5	-1.58	-1.47	-1.33	-1.22	-1.12	-0.98
(+) Toward ALL	ALL	0.82	0.76	0.70	0.64	0.59	0.52

* G_{cp} reduction NOT applied

Net Surface Pressures ($G_{cp} - G_{cpi}$)							
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-) Away	4	-29.4	-28.2	-25.9	-25.2	-24.1	-22.5
	5	-36.3	-33.7	-30.5	-28.0	-25.7	-22.5
(+) Toward ALL	ALL	18.8	17.4	16.1	14.7	13.5	11.9

$G_{cp}^* + G_{cpi}$							
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-) Away	4	-0.92	-0.87	-0.77	-0.74	-0.69	-0.62
	5	-1.22	-1.11	-0.97	-0.86	-0.76	-0.62
(+) Toward ALL	ALL	1.18	1.12	1.06	1	0.95	0.88

* G_{cp} reduction NOT applied

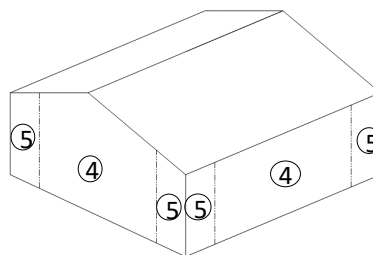
Net Surface Pressures ($G_{cp} + G_{cpi}$)							
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-) Away	4	-21.1	-20.0	-17.7	-17.0	-15.8	-14.2
	5	-28.0	-25.5	-22.3	-19.7	-17.4	-14.2
(+) Toward ALL	ALL	27.1	25.7	24.3	22.9	21.8	20.2

Design Wind Surface Pressures																	
Governing GC_p +/- G_{cpi} Factors								Max Net Surface Pressures (psf) $p = q_h[(GC_p - G_{cpi})]$									
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf	Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf		
(-)	Away	4	-1.28	-1.23	-1.13	-1.10	-1.05	-0.98	(-)	Away	4	-29.37	-28.22	-25.93	-25.24	-24.09	-22.49
		5	-1.58	-1.47	-1.33	-1.22	-1.12	-0.98			5	-36.26	-33.73	-30.52	-27.99	-25.70	-22.49
(+)	Toward	ALL	1.18	1.12	1.06	1.00	0.95	0.88	(+)	Toward	ALL	27.08	25.70	24.32	22.95	21.80	20.19

Tributary Areas (sq ft) - User Input					
Area	10 < x < 20	20 < x < 50	50 < x < 100	100 < x < 200	200 < x < 500
	20	33	56	150	250

Strength (1.0W) - Effective Wind Pressure at "h" (psf)						
		10 < x < 20	20 < x < 50	50 < x < 100	100 < x < 200	200 < x < 500
	A	20 sq ft	33 sq ft	56 sq ft	150.0 sq ft	250.0 sq ft
(-)	4	-28.20	-27.23	-25.85	-24.67	-23.83
	5	-33.68	-32.34	-30.22	-26.85	-25.16
(+)	ALL	25.67	25.10	24.16	22.37	21.53

ASD (.6W) - Effective Wind Pressure at "h" (psf)						
		10< x <20	20< x <50	50< x <100	100< x <200	200< x < 500
	A	20 sq ft	33.0 sq ft	56.0 sq ft	150.0 sq ft	250.0 sq ft
(-)	4	-16.92	-16.34	-15.51	-14.80	-14.30
	5	-20.21	-19.40	-18.13	-16.11	-15.10
(+)	ALL	15.40	15.06	14.49	13.42	12.92



ELEVATION

Figure 30.3-1

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level:	1
SW ID:	1
Grid Reference	1

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L _{total}	=	305 in. 25'-5"
L _{min}	=	140 in. 11'-8"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	11.875 in.
² Fire Treated Lumber Condition?		=	No
⁴ Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

Height:		ft.	in.
H_{OTM} (in.)	=	14	2
H_{ASPECT} (in.)	=	12	0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

[illegible]

ΣL = **25.42 ft.** Weighted Average: **1.00**

Resisting Dead Load Data Table

[illegible]

Total M_D : 14.29 ft-kips

ASD Seismic Loading Data Table

Load Description	F _{x1} (psf)	A _{t1} (ft ²)	A _{t2} (ft ²)	% _{Trib}	Load (lbs)
Line Loads(lbs)					
Roof	2749 lbs.				2749
					0

Total $V_{(E)}$: 2749 lbs

ASD Wind Loading Data Table

[illegible]

Total $V_{(w)}$: 1189.9 lbs


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	2749.4	2749.3919	108.2	260.7	6	8d	6 in. o.c.	3/8	E	0.4149	6
Wind:	1189.9	-	46.8	365.0	6	8d	6 in. o.c.	3/8		0.1283	

ASD Tension Load Combinations:

 Seismic: $0.6D - 7E_v + 7E_h = (.6 - .14S_{DS})D + 7E_h = \mathbf{0.46 D - .7pQ_E}$ ASCE 2.4.5

 Wind: $0.6D + .7W = \mathbf{0.6 D - .6W}$ ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W (lbs)	
							HD	Strap	HD	Strap
Seismic:	-17.88	6.60	-11.28	134.8	138.5	output:	-1004.3	-977.1	-2274.5	-2212.9
Wind:	-7.74	8.58	0.84	134.8	138.5	output:	74.6	72.6	0.0	0.0

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0	Yes	24	7.2		-997.1	-969.9	-2264.2	-2202.6
Wind:		0.0		447	134.0		208.6	206.6	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.	Wood to Wood Connection Design Strap	Min. Design Post	Post to Conc. Connection Design HD	Min. Design Post
HD:	STHD14	3815	0.2614	CS14	2x6	STHD14	4x6
STRAP:	CS14	2490	0.3895			ALT: HTT4	

OUTPUT HOLDOWN SUMMARY:

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level: 1

SW ID: 2

Grid Reference 2

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x4
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L _{total}	=	399 in. 33'-3"
L _{min}	=	111 in. 9'-3"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)			No
	Beam Depth	=	11.875 in.

²Fire Treated Lumber Condition? = No

$$\text{Reduction to Allowable Capacity} = 1.0$$

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
3	3/8	CD	8d	3 in. o.c.	3x	1370	2	2.8	0.00	1.00	1.0	-	489	685

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

Height:		ft.	in.
H_{OTM} (in.)	=	17	2
H_{ASPECT} (in.)	=	12	0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

[illegible]

ΣL = **33.25 ft.** Weighted Average: **1.00**

Resisting Dead Load Data Table

[illegible]

Total M_D : 6.42 ft-kips

ASD Seismic Loading Data Table

Load Description	F _{x1} (psf)	A _{t1} (ft ²)	A _{t2} (ft ²)	% _{Trib}	Load (lbs)
Line Loads(lbs)					
Roof	15480 lbs.				15480
					0

Total $V_{(E)}$: 15480 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	% _{Trib}	Load (lbs)
Slp Qutrs	125	18.75	50	1174
Day Rm	184	66.2	50	6089

Total $V_{(w)}$: 7262.8 lbs


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	15480.1	15480.082	465.6	489.3	3	8d	3 in. o.c.	3/8	E	0.9515	3
Wind:	7262.8	-	218.4	365.0	6	8d	6 in. o.c.	3/8		0.5984	

ASD Tension Load Combinations:

 Seismic: $0.6D + 0.7E_v + 0.7E_h = (0.6 - 1.4S_{DS})D + 0.7E_h$ = **0.46 D - 0.7pQ_E** ASCE 2.4.5

 Wind: $0.6D + 0.7W$ = **0.6 D - 0.6W** ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W (lbs)	
							HD	Strap	HD	Strap
Seismic:	-73.93	2.96	-70.96	111.0	109.5	output:	-7671.8	-7776.9	-11417.5	-11573.9
Wind:	-34.68	3.85	-30.83	111.0	109.5	output:	-3333.5	-3379.1	-6249.5	-6335.1

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹	Orthogonal (-) Uplift (lbs) ⁵		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%	?	100%	30%		HD	STRAP	HD	STRAP
	Seismic:		0.0			0.0		-7671.8	-7776.9	-11417.5	-11573.9
Wind:		0.0			0.0		-3333.5	-3379.1	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.	Wood to Wood Connection Design Strap	Min. Design Post	Post to Conc. Connection Design HD	Min. Design Post
HD:	HDU8	7870	0.9748	CMST12	2-2x4	HDU8	4x6
STRAP:	CMST12	9215	0.8439				

OUTPUT HOLDOWN SUMMARY:

WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level:	T
SW ID:	4
Grid Reference	4

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
S.G.	=	0.5
Adjustment Factor	=	1.00

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	α_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	16.00 in.
² Fire Treated Lumber Condition?		=	No
² Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
3	3/8	CD	8d	3 in. o.c.	3x	1370	2	2.8	1.00	1.0	1.00	-	480	672

1. See Global Parameter Sheet for Additional Notes.

Shear Panel Data Table

Segments				Openings			
	ft.	in.	h_{OI}/L_i		ft.	in.	
L_1	2	2	P_1 2.15 :1	O_1	10	3	
L_2	2	2	P_2 2.15 :1	O_2			
L_3			P_3	O_3			
L_4			P_4	O_4			
L_5			P_5	O_5			
L_6			P_6				
ΣL	14'	7"	14.58 ft.				

Resisting Dead Load Data Table

[illegible]

Total M_D : **31.90 ft-kips**

Shear Aspect Ratio Adjustment Factor

(WSP) = 1.25-0.125 h/b
Average Wall Pier WSP = 0.9813

Notes:

4.3.3.2 1. Apply All Dead Load At 1st Level
2. Input Additional Concentrated Dead Load As Occurs Per
Plan in Overturning Design Section Below

ASD Seismic Loading Data Table

Load Description	F _x (psf)	A _{H1} (ft ²)	A _{H2} (ft ²)	% _{TRIB}	Load (lbs)
LINE Loads (lbs)					
Tower	1031				1031
					0

Total $V_{(E)}$: 1031 lbs

ASD Wind Loading Data Table

[illegible]

Total $V_{(w)}$: 2744.6 lbs


WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	1030.5	1031	237.8	255.8	6	8d	6 in. o.c.	3/8	W	0.9296	3
Wind:	2744.6	-	633.4	672.2	3	8d	3 in. o.c.	3/8		0.9423	

ASD Tension Load Combinations:

Seismic: $0.6D + 0.7E_v + 0.7E_h = (0.6 + 14S_{DS})D + 0.7E_h = \mathbf{0.46 D + 0.7pQ_E}$ ASCE 2.4.5
 Wind: $0.6D + 0.6W = \mathbf{0.6 D + 0.6W}$ ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W	
							HD	Strap	HD	Strap
Seismic:	-9.79	31.90	4.94	168.4	173.5	output:	0	0	-996.4	-967.3
Wind:	-26.07	31.90	-6.93	168.4	173.5	output:	-494	-480	-3095.9	-3005.6

 Apply Omega (Ω)? **No**

 Include Uplift F.A.in Omega? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs)		Point Load D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0E Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0	Yes	0	0.0		0.0	0.0	-996.4	-967.3
Wind:		0		-494	-148.2		-642.1	-637.8	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

Wood to Wood Connection

Post to Conc. Connection

Type Hardware Capacity U.C.

Design Strap Min. Design Post

Design HD

Min. Design Post

HD: HTT4 3610 0.1779

STRAP: 1-CS14 2490 0.2579

OUTPUT HOLDOWN SUMMARY:

1-CS14

2x6

HTT4

4x6

Shear Wall Type: 3Required Strap Force: **712 lbs**Strap Above & Below Opening: **CS14**

$V_{c1} =$	V_{a1}	$V_{c2} =$	V_{a1}	$V_{c3} =$	V_{a1}	$V_{c4} =$	V_{a1}	$V_{c5} =$	V_{a1}	$V_{c6} =$
-91	370	-91								
CS14										
$V_1 =$	O_1	$V_2 =$	O_2	$V_3 =$	O_3	$V_4 =$	O_4	$V_5 =$	O_5	$V_6 =$
633		633		0		0		0		0
CS14										
$V_{c1} =$	$V_{b1} =$	$V_{c2} =$	$V_{b2} =$	$V_{c3} =$	$V_{b3} =$	$V_{c4} =$	$V_{b4} =$	$V_{c5} =$	$V_{b5} =$	$V_{c6} =$
-91	370	-91								
$L_1 =$	$L_2 =$	$L_3 =$	$L_4 =$	$L_5 =$	$L_5 =$					
2' 2"	2' 2"	0' 0"	0' 0"	0' 0"	0' 0"					



WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION																		
FTAO Tension Strap Design (Horizontal Strap Across Opening)																		
Load	T (lbs)	Unit Shear Above & Below Opening				Total Force Above & Below Openings (lbs)		Corner Forces (lbs)										
Seismic:	671	1st Opening	V_{a1}	=	V_{b1}	=	139 plf	O_1	=	1424	F_1	=	712	F_6	=			
		2nd Opening	V_{a2}	=	V_{b2}	=	139 plf	O_2	=	0	F_2	=	712	F_7	=			
		3rd Opening	V_{a3}	=	V_{b3}	=	139 plf	O_3	=	0	F_3	=	0	F_8	=			
		4th Opening	V_{a4}	=	V_{b4}	=	139 plf	O_4	=	0.0	F_4	=		F_9	=			
							O_5	=	0.0	F_5	=		F_{10}	=				
Wind:	1788	1st Opening	V_{a1}	=	V_{b1}	=	370 plf	O_1	=	3792	F_1	=	1896	F_6	=			
		2nd Opening	V_{a2}	=	V_{b2}	=	370 plf	O_2	=	0	F_2	=	1896	F_7	=			
		3rd Opening	V_{a3}	=	V_{b3}	=	370 plf	O_3	=	0	F_3	=	0	F_8	=			
		4th Opening	V_{a4}	=	V_{b4}	=	370 plf	O_4	=	0	F_4	=		F_9	=			
							O_5	=	0	F_5	=		F_{10}	=				
Load	Tributary Length of Internal Shear Lines (in.)				Unit Shear Besides Openings (plf)				Resistance to Corner Forces (lbs)									
Seismic:	T_1	=	61.5	T_6	=	V_1	=	238	V_4	=	0	R_1	=	515	R_4	=	0	
	T_2	=	61.5	T_7	=	0.0	V_2	=	238	V_5	=	0	R_2	=	515	R_5	=	0
	T_3	=	0.0	T_8	=	0.0	V_3	=	0	V_6	=	0	R_3	=	0	R_6	=	0
	T_4	=	0.0	T_9	=	0.0	V_{total}				=	1031	V_{total}				=	1031
	T_5	=		T_{10}	=	0												
Wind:	T_1	=	61.5	T_6	=	V_1	=	633	V_4	=	0	R_1	=	1372	R_4	=	0	
	T_2	=	61.5	T_7	=	0.0	V_2	=	633	V_5	=	0	R_2	=	1372	R_5	=	0
	T_3	=	0.0	T_8	=	0.0	V_3	=	0	V_6	=	0	R_3	=	0	R_6	=	0
	T_4	=	0.0	T_9	=	0.0	V_{total}				=	2745	V_{total}				=	2745
	T_5	=		T_{10}	=	0												
Load	Net Corner Forces (lbs)				Unit Net Shear In Corner Zones (lbs)													
Seismic	$R_1 - F_1$	=	-197	VC_1	=	-91												
	$R_2 - F_2 - F_3$	=	-197	VC_2	=	-91												
	$R_3 - F_4 - F_5$	=	0	VC_3	=	0												
	$R_4 - F_6 - F_7$	=	0	VC_4	=	0												
	$R_5 - F_8 - F_9$	=	0	VC_5	=	0												
	$R_6 - F_{10}$	=	0	VC_6	=	0												
Wind	$R_1 - F_1$	=	-523	VC_1	=	-242												
	$R_2 - F_2 - F_3$	=	-523	VC_2	=	-242												
	$R_3 - F_4 - F_5$	=	0	VC_3	=	0												
	$R_4 - F_6 - F_7$	=	0	VC_4	=	0												
	$R_5 - F_8 - F_9$	=	0	VC_5	=	0												
	$R_6 - F_{10}$	=	0	VC_6	=	0												


WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	1030.5	1031	237.8	255.8	6	8d	6 in. o.c.	3/8	W	0.9296	3
Wind:	2744.6	-	633.4	672.2	3	8d	3 in. o.c.	3/8		0.9423	

ASD Tension Load Combinations:

 Seismic: $0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h = \text{####} D - .7pQ_E$ ASCE 2.4.5

 Wind: $0.6D - .6W = \text{####} D - .6W$ ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W	
							HD	Strap	HD	Strap
Seismic:	-9.79	31.90	4.94	168.4	173.5	output:	0	0	-996.4	-967.3
Wind:	-26.07	31.90	-6.93	168.4	173.5	output:	-494	-480	-3095.9	-3005.6

 Apply Omega (Ω)? **No**

 Include Uplift F.A.in Omega? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs)		Point Load D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0E Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0	Yes	0	0.0		0.0	0.0	-996.4	-967.3
Wind:		0		-494	-148.2		-642.1	-637.8	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction


Hold Down Design:
Wood to Wood Connection
Post to Conc. Connection

Type Hardware Capacity U.C.

Design Strap Min. Design Post Design HD Min. Design Post

HD: HTT4 3610 0.1779

STRAP: 1-CS14 2490 0.2579

OUTPUT HOLDOWN SUMMARY:
1-CS14
2x6
HTT4
4x6
Shear Wall Type: 3
Required Strap Force: 712 lbs
Strap Above & Below Opening: CS14

$V_{c1} =$	V_{a1}	$V_{c2} =$	V_{a1}	$V_{c3} =$	V_{a1}	$V_{c4} =$	V_{a1}	$V_{c5} =$	V_{a1}	$V_{c6} =$
-91	370	-91								
CS14										
$V_1 =$	O_1	$V_2 =$	O_2	$V_3 =$	O_3	$V_4 =$	O_4	$V_5 =$	O_5	$V_6 =$
633		633		0		0		0		0
CS14										
$V_{c1} =$	$V_{b1} =$	$V_{c2} =$	$V_{b2} =$	$V_{c3} =$	$V_{b3} =$	$V_{c4} =$	$V_{b4} =$	$V_{c5} =$	$V_{b5} =$	$V_{c6} =$
-91	370	-91								
$L_1 =$	$L_2 =$	$L_3 =$	$L_4 =$	$L_5 =$	$L_5 =$					
2' 2"	2' 2"	0' 0"	0' 0"	0' 0"	0' 0"					

WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION																		
FTAO Tension Strap Design (Horizontal Strap Across Opening)																		
Load	T (lbs)	Unit Shear Above & Below Opening				Total Force Above & Below Openings (lbs)		Corner Forces (lbs)										
Seismic:	671	1st Opening	V_{a1}	=	V_{b1}	=	139 plf	O_1	=	1424	F_1	=	712	F_6	=			
		2nd Opening	V_{a2}	=	V_{b2}	=	139 plf	O_2	=	0	F_2	=	712	F_7	=			
		3rd Opening	V_{a3}	=	V_{b3}	=	139 plf	O_3	=	0	F_3	=	0	F_8	=			
		4th Opening	V_{a4}	=	V_{b4}	=	139 plf	O_4	=	0.0	F_4	=		F_9	=			
							O_5	=	0.0	F_5	=		F_{10}	=				
Wind:	1788	1st Opening	V_{a1}	=	V_{b1}	=	370 plf	O_1	=	3792	F_1	=	1896	F_6	=			
		2nd Opening	V_{a2}	=	V_{b2}	=	370 plf	O_2	=	0	F_2	=	1896	F_7	=			
		3rd Opening	V_{a3}	=	V_{b3}	=	370 plf	O_3	=	0	F_3	=	0	F_8	=			
		4th Opening	V_{a4}	=	V_{b4}	=	370 plf	O_4	=	0	F_4	=		F_9	=			
							O_5	=	0	F_5	=		F_{10}	=				
Load	Tributary Length of Internal Shear Lines (in.)				Unit Shear Besides Openings (plf)				Resistance to Corner Forces (lbs)									
Seismic:	T_1	=	61.5	T_6	=	V_1	=	238	V_4	=	0	R_1	=	515	R_4	=	0	
	T_2	=	61.5	T_7	=	0.0	V_2	=	238	V_5	=	0	R_2	=	515	R_5	=	0
	T_3	=	0.0	T_8	=	0.0	V_3	=	0	V_6	=	0	R_3	=	0	R_6	=	0
	T_4	=	0.0	T_9	=	0.0	V_{total}				=	1031	V_{total}				=	1031
	T_5	=		T_{10}	=	0												
Wind:	T_1	=	61.5	T_6	=	V_1	=	633	V_4	=	0	R_1	=	1372	R_4	=	0	
	T_2	=	61.5	T_7	=	0.0	V_2	=	633	V_5	=	0	R_2	=	1372	R_5	=	0
	T_3	=	0.0	T_8	=	0.0	V_3	=	0	V_6	=	0	R_3	=	0	R_6	=	0
	T_4	=	0.0	T_9	=	0.0	V_{total}				=	2745	V_{total}				=	2745
	T_5	=		T_{10}	=	0												
Load	Net Corner Forces (lbs)				Unit Net Shear In Corner Zones (lbs)													
Seismic	$R_1 - F_1$	=	-197	VC_1	=	-91												
	$R_2 - F_2 - F_3$	=	-197	VC_2	=	-91												
	$R_3 - F_4 - F_5$	=	0	VC_3	=	0												
	$R_4 - F_6 - F_7$	=	0	VC_4	=	0												
	$R_5 - F_8 - F_9$	=	0	VC_5	=	0												
	$R_6 - F_{10}$	=	0	VC_6	=	0												
Wind	$R_1 - F_1$	=	-523	VC_1	=	-242												
	$R_2 - F_2 - F_3$	=	-523	VC_2	=	-242												
	$R_3 - F_4 - F_5$	=	0	VC_3	=	0												
	$R_4 - F_6 - F_7$	=	0	VC_4	=	0												
	$R_5 - F_8 - F_9$	=	0	VC_5	=	0												
	$R_6 - F_{10}$	=	0	VC_6	=	0												

WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level:	T
SW ID:	F.5
Grid Reference	F.5

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
S.G.	=	0.5
Adjustment Factor	=	1.00

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	α_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	16.00 in.
² Fire Treated Lumber Condition?		=	No
² Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
3	3/8	CD	8d	3 in. o.c.	3x	1370	2	2.8	1.00	1.0	1.00	-	480	672

1. See Global Parameter Sheet for Additional Notes.

Shear Panel Data Table

Segments				Openings			
	ft.	in.	h_{OI}/L_i		ft.	in.	
L_1	2	2	P_1 2.15 : 1	O_1	10	3	
L_2	2	2	P_2 2.15 : 1	O_2			
L_3			P_3	O_3			
L_4			P_4	O_4			
L_5			P_5	O_5			
L_6			P_6				
ΣL	14'	7"	14.58 ft.				

		h_a (in.)	h_b (in.)	h_b (in.)
		24	56	34
		24	56	34
		24	56	34
		24	56	34
		24	56	34

	# of Panel Sides	
1	=	
114	= H_{OTM} (in.)	9'-6"
78	= H_{ASPECT} (in.)	6'-6"

Resisting Dead Load Data Table

[illegible]

Total M_D : **31.90 ft-kips**

Shear Aspect Ratio Adjustment Factor

(WSP) = 1.25-0.125 h/b
Average Wall Pier WSP = 0.9813

Notes:

4.3.3.2 1. Apply All Dead Load At 1st Level
2. Input Additional Concentrated Dead Load As Occurs Per
Plan in Overturning Design Section Below

ASD Seismic Loading Data Table

Load Description	F _x (psf)	A _{H1} (ft ²)	A _{H2} (ft ²)	% _{Trib}	Load (lbs)
LINE Loads (lbs)					
Tower	1031				1031
					0

Total $V_{(E)}$: 1031 lbs

ASD Wind Loading Data Table

[illegible]

Total $V_{(w)}$: 2744.6 lbs


WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	1030.5	1031	237.8	255.8	6	8d	6 in. o.c.	3/8	W	0.9296	3
Wind:	2744.6	-	633.4	672.2	3	8d	3 in. o.c.	3/8		0.9423	

ASD Tension Load Combinations:

 Seismic: $0.6D + 7E_v + 7E_h = (.6 + 14S_{DS})D + 7E_h = \text{####} D + 7pQ_E$ ASCE 2.4.5

 Wind: $0.6D + .6W = \text{0.6} D + .6W$ ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W	
							HD	Strap	HD	Strap
Seismic:	-9.79	31.90	4.94	168.4	173.5	output:	0	0	-996.4	-967.3
Wind:	-26.07	31.90	-6.93	168.4	173.5	output:	-494	-480	-3095.9	-3005.6

 Apply Omega (Ω)? **Yes**

 Include Uplift F.A.in Omega? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs)		Point Load D _L (+) (lbs)	Total Net ASD Tension Uplift		Ω1.0E Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0	Yes	0	0.0		0.0	0.0	-2490.9	-2418.2
Wind:		0		-494	-148.2		-642.1	-637.8	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

Wood to Wood Connection

Post to Conc. Connection

Type Hardware Capacity U.C.

Design Strap Min. Design Post

Design HD

Min. Design Post

HD: HTT4 3610 0.1779

STRAP: 1-CS14 2490 0.2579

OUTPUT HOLDOWN SUMMARY:

1-CS14

2x6

HTT4

4x6

Shear Wall Type: 3Required Strap Force: **712 lbs**Strap Above & Below Opening: **CS14**

$V_{c1} =$	V_{a1}	$V_{c2} =$	V_{a1}	$V_{c3} =$	V_{a1}	$V_{c4} =$	V_{a1}	$V_{c5} =$	V_{a1}	$V_{c6} =$
-91	370	-91								
CS14										
$V_1 =$	O_1	$V_2 =$	O_2	$V_3 =$	O_3	$V_4 =$	O_4	$V_5 =$	O_5	$V_6 =$
633		633		0		0		0		0
CS14										
$V_{c1} =$	$V_{b1} =$	$V_{c2} =$	$V_{b2} =$	$V_{c3} =$	$V_{b3} =$	$V_{c4} =$	$V_{b4} =$	$V_{c5} =$	$V_{b5} =$	$V_{c6} =$
-91	370	-91								
$L_1 =$	$L_2 =$	$L_3 =$	$L_4 =$	$L_5 =$	$L_5 =$					
2' 2"	2' 2"	0' 0"	0' 0"	0' 0"	0' 0"					



WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION												
FTAO Tension Strap Design (Horizontal Strap Across Opening)												
Load		T (lbs)		Unit Shear Above & Below Opening				Total Force Above & Below Openings (lbs)			Corner Forces (lbs)	
Seismic:	671	1st Opening	$V_{a1} = V_{b1}$	=	139	plf	$O_1 =$	1424	$F_1 =$	712	$F_6 =$	
		2nd Opening	$V_{a2} = V_{b2}$	=	139	plf	$O_2 =$	0	$F_2 =$	712	$F_7 =$	
		3rd Opening	$V_{a3} = V_{b3}$	=	139	plf	$O_3 =$	0	$F_3 =$	0	$F_8 =$	
		4th Opening	$V_{a4} = V_{b4}$	=	139	plf	$O_4 =$	0.0	$F_4 =$		$F_9 =$	
						$O_5 =$	0.0	$F_5 =$		$F_{10} =$		
Wind:	1788	1st Opening	$V_{a1} = V_{b1}$	=	370	plf	$O_1 =$	3792	$F_1 =$	1896	$F_6 =$	
		2nd Opening	$V_{a2} = V_{b2}$	=	370	plf	$O_2 =$	0	$F_2 =$	1896	$F_7 =$	
		3rd Opening	$V_{a3} = V_{b3}$	=	370	plf	$O_3 =$	0	$F_3 =$	0	$F_8 =$	
		4th Opening	$V_{a4} = V_{b4}$	=	370	plf	$O_4 =$	0	$F_4 =$		$F_9 =$	
						$O_5 =$	0	$F_5 =$		$F_{10} =$		
Load		Tributary Length of Internal Shear Lines (in.)			Unit Shear Besides Openings (plf)				Resistance to Corner Forces (lbs)			
Seismic:	$T_1 =$	61.5	$T_6 =$		$V_1 =$	238	$V_4 =$	0	$R_1 =$	515	$R_4 =$	0
	$T_2 =$	61.5	$T_7 =$	0.0	$V_2 =$	238	$V_5 =$	0	$R_2 =$	515	$R_5 =$	0
	$T_3 =$	0.0	$T_8 =$	0.0	$V_3 =$	0	$V_6 =$	0	$R_3 =$	0	$R_6 =$	0
	$T_4 =$	0.0	$T_9 =$	0.0	$V_{total} =$				1031	$V_{total} =$		1031
	$T_5 =$		$T_{10} =$	0								
Wind:	$T_1 =$	61.5	$T_6 =$		$V_1 =$	633	$V_4 =$	0	$R_1 =$	1372	$R_4 =$	0
	$T_2 =$	61.5	$T_7 =$	0.0	$V_2 =$	633	$V_5 =$	0	$R_2 =$	1372	$R_5 =$	0
	$T_3 =$	0.0	$T_8 =$	0.0	$V_3 =$	0	$V_6 =$	0	$R_3 =$	0	$R_6 =$	0
	$T_4 =$	0.0	$T_9 =$	0.0	$V_{total} =$				2745	$V_{total} =$		2745
	$T_5 =$		$T_{10} =$	0								
Load		Net Corner Forces (lbs)			Unit Net Shear In Corner Zones (lbs)							
Seismic	$R_1 - F_1$	=	-197	VC_1	=	-91						
	$R_2 - F_2 - F_3$	=	-197	VC_2	=	-91						
	$R_3 - F_4 - F_5$	=	0	VC_3	=	0						
	$R_4 - F_6 - F_7$	=	0	VC_4	=	0						
	$R_5 - F_8 - F_9$	=	0	VC_5	=	0						
	$R_6 - F_{10}$	=	0	VC_6	=	0						
Wind	$R_1 - F_1$	=	-523	VC_1	=	-242						
	$R_2 - F_2 - F_3$	=	-523	VC_2	=	-242						
	$R_3 - F_4 - F_5$	=	0	VC_3	=	0						
	$R_4 - F_6 - F_7$	=	0	VC_4	=	0						
	$R_5 - F_8 - F_9$	=	0	VC_5	=	0						
	$R_6 - F_{10}$	=	0	VC_6	=	0						

WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION

Applicable Code Reference: 2021 SDPWS

Level: T
SW ID: I
Grid Reference: I

Shear Wall Input Data:

Wood Species = DF
Wall Size = 2x6
S.G. = 0.5
Adjustment Factor = 1.00

General Data Inputs

Redundancy Factor ρ = 1
Overstrength Factor Ω_o = 2.5
Discontinuous Lateral System? (Beam Below Strap) = No
Beam Depth = 16.00 in.
²Fire Treated Lumber Condition? = No
²Reduction to Allowable Capacity = 1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
3	3/8	CD	8d	3 in. o.c.	3x	1370	2	2.8	1.00	1.0	1.00	-	480	672

1. See Global Parameter Sheet for Additional Notes.

Shear Panel Data Table

Segments					Openings					
	ft.	in.	h_o/L_i		ft.	in.	h_a (in.)	h_o (in.)	h_b (in.)	
L ₁	2	2	P ₁	2.15 :1	O ₁	10	3	24	56	34
L ₂	2	2	P ₂	2.15 :1	O ₂			24	56	34
L ₃			P ₃		O ₃			24	56	34
L ₄			P ₄		O ₄			24	56	34
L ₅			P ₅		O ₅			24	56	34
L ₆			P ₆							

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	$M_{resisting}$ (ft-kips)
Roof	15.00	10	150.00	15.95
Wall	15.00	10	150.00	15.95
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 31.90 ft-kips

Shear Aspect Ratio Adjustment Factor

(WSP) = 1.25-0.125 h/b
Average Wall Pier WSP = 0.9813

Notes:

- 4.3.3.2
1. Apply All Dead Load At 1st Level
 2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft ²)	A_{t2} (ft ²)	% _{Trib}	Load (lbs)
LINE Loads (lbs)					
Tower		1031			1031
					0

Total $V_{(E)}$: 1031 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	% _{Trib}	Load (lbs)
Tower	274	20	50	2745

Total $V_{(w)}$: 2744.6 lbs

WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	1030.5	1031	237.8	255.8	6	8d	6 in. o.c.	3/8	W	0.9296	3
Wind:	2744.6	-	633.4	672.2	3	8d	3 in. o.c.	3/8		0.9423	

ASD Tension Load Combinations:

Seismic: $0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h = \mathbf{0.46 D - .7pQ_E}$ ASCE 2.4.5
 Wind: $0.6D - .6W = \mathbf{0.6 D - .6W}$ ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W	
							HD	Strap	HD	Strap
Seismic:	-9.79	31.90	4.94	168.4	173.5	output:	0	0	-996.4	-967.3
Wind:	-26.07	31.90	-6.93	168.4	173.5	output:	-494	-480	-3095.9	-3005.6

 Apply Omega (Ω)? **No**

 Include Uplift F.A.in Omega? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs)		Point Load D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0E Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0	Yes	0	0.0		0.0	0.0	-996.4	-967.3
Wind:		0		-494	-148.2		-642.1	-637.8	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:**Wood to Wood Connection****Post to Conc. Connection**

Type Hardware Capacity U.C.

Design Strap Min. Design Post Design HD Min. Design Post

HD: HTT4 3610 0.1779

STRAP: 1-CS14 2490 0.2579

OUTPUT HOLDOWN SUMMARY:**1-CS14****2x6****HTT4****4x6****Shear Wall Type: 3****Required Strap Force: 712 lbs****Strap Above & Below Opening: CS14**

$V_{c1} =$	V_{a1}	$V_{c2} =$	V_{a1}	$V_{c3} =$	V_{a1}	$V_{c4} =$	V_{a1}	$V_{c5} =$	V_{a1}	$V_{c6} =$
-91	370	-91								
CS14										
$V_1 =$	O_1	$V_2 =$	O_2	$V_3 =$	O_3	$V_4 =$	O_4	$V_5 =$	O_5	$V_6 =$
633		633		0		0		0		0
CS14										
$V_{c1} =$	$V_{b1} =$	$V_{c2} =$	$V_{b2} =$	$V_{c3} =$	$V_{b3} =$	$V_{c4} =$	$V_{b4} =$	$V_{c5} =$	$V_{b5} =$	$V_{c6} =$
-91	370	-91								
$L_1 =$	$L_2 =$	$L_3 =$	$L_4 =$	$L_5 =$	$L_5 =$					
2' 2"	2' 2"	0' 0"	0' 0"	0' 0"	0' 0"					



WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION																		
FTAO Tension Strap Design (Horizontal Strap Across Opening)																		
Load		T (lbs)	Unit Shear Above & Below Opening				Total Force Above & Below Openings (lbs)			Corner Forces (lbs)								
Seismic:	671	1st Opening	V_{a1}	=	V_{b1}	=	139 plf	O_1	=	1424	F_1	=	712	F_6	=			
		2nd Opening	V_{a2}	=	V_{b2}	=	139 plf	O_2	=	0	F_2	=	712	F_7	=			
		3rd Opening	V_{a3}	=	V_{b3}	=	139 plf	O_3	=	0	F_3	=	0	F_8	=			
		4th Opening	V_{a4}	=	V_{b4}	=	139 plf	O_4	=	0.0	F_4	=		F_9	=			
							O_5	=	0.0	F_5	=		F_{10}	=				
Wind:	1788	1st Opening	V_{a1}	=	V_{b1}	=	370 plf	O_1	=	3792	F_1	=	1896	F_6	=			
		2nd Opening	V_{a2}	=	V_{b2}	=	370 plf	O_2	=	0	F_2	=	1896	F_7	=			
		3rd Opening	V_{a3}	=	V_{b3}	=	370 plf	O_3	=	0	F_3	=	0	F_8	=			
		4th Opening	V_{a4}	=	V_{b4}	=	370 plf	O_4	=	0	F_4	=		F_9	=			
							O_5	=	0	F_5	=		F_{10}	=				
Load		Tributary Length of Internal Shear Lines (in.)				Unit Shear Besides Openings (plf)				Resistance to Corner Forces (lbs)								
Seismic:	T_1	=	61.5	T_6	=		V_1	=	238	V_4	=	0	R_1	=	515	R_4	=	0
	T_2	=	61.5	T_7	=	0.0	V_2	=	238	V_5	=	0	R_2	=	515	R_5	=	0
	T_3	=	0.0	T_8	=	0.0	V_3	=	0	V_6	=	0	R_3	=	0	R_6	=	0
	T_4	=	0.0	T_9	=	0.0	V_{total}				=	1031	V_{total}				=	1031
	T_5	=		T_{10}	=	0												
Wind:	T_1	=	61.5	T_6	=		V_1	=	633	V_4	=	0	R_1	=	1372	R_4	=	0
	T_2	=	61.5	T_7	=	0.0	V_2	=	633	V_5	=	0	R_2	=	1372	R_5	=	0
	T_3	=	0.0	T_8	=	0.0	V_3	=	0	V_6	=	0	R_3	=	0	R_6	=	0
	T_4	=	0.0	T_9	=	0.0	V_{total}				=	2745	V_{total}				=	2745
	T_5	=		T_{10}	=	0												
Load		Net Corner Forces (lbs)				Unit Net Shear In Corner Zones (lbs)												
Seismic	$R_1 - F_1$	=	-197	VC_1	=	-91												
	$R_2 - F_2 - F_3$	=	-197	VC_2	=	-91												
	$R_3 - F_4 - F_5$	=	0	VC_3	=	0												
	$R_4 - F_6 - F_7$	=	0	VC_4	=	0												
	$R_5 - F_8 - F_9$	=	0	VC_5	=	0												
	$R_6 - F_{10}$	=	0	VC_6	=	0												
Wind	$R_1 - F_1$	=	-523	VC_1	=	-242												
	$R_2 - F_2 - F_3$	=	-523	VC_2	=	-242												
	$R_3 - F_4 - F_5$	=	0	VC_3	=	0												
	$R_4 - F_6 - F_7$	=	0	VC_4	=	0												
	$R_5 - F_8 - F_9$	=	0	VC_5	=	0												
	$R_6 - F_{10}$	=	0	VC_6	=	0												

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level:	1
SW ID:	6
Grid Reference	6

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L _{total}	=	778 in. 64'-10.000000000000001"
L _{min}	=	270 in. 22'-6"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	11.875 in.
² Fire Treated Lumber Condition?		=	No
⁴ Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
4	3/8	CD	8d	4 in. o.c.	2x	1065	2	2.8	0.00	1.00	1.0	-	350	533

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

Height:		ft.	in.
H_{OTM} (in.)	=	18	0
H_{ASPECT} (in.)	=	18	0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

[illegible]

ΣL = **64.83 ft.** Weighted Average: **1.00**

Resisting Dead Load Data Table

[illegible]

Total M_D : 53.16 ft-kips

ASD Seismic Loading Data Table

Load Description	F _{x1} (psf)	A _{t1} (ft ²)	A _{t2} (ft ²)	% _{Trib}	Load (lbs)
Line Loads(lbs)					
Roof	21705 lbs.				21705
					0

Total $V_{(E)}$: 21705 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	% _{Trib}	Load (lbs)
Apparatus	219	60.67	50	6643
Day Rm	184	66.2	50	6089

Total $V_{(w)}$: 12732.0 lbs


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	21705.2	21705.211	334.8	350.0	4	8d	4 in. o.c.	3/8	E	0.9565	4
Wind:	12732.0	-	196.4	365.0	6	8d	6 in. o.c.	3/8		0.5380	

ASD Tension Load Combinations:

 Seismic: $0.6D + 0.7E_v + 0.7E_h = (0.6 - 1.4S_{DS})D + 0.7E_h$ = **0.46 D - 0.7pQ_E** ASCE 2.4.5

 Wind: $0.6D + 0.7W$ = **0.6 D - 0.6W** ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift 0.7pE & 0.6W (lbs)		Uplift 1.0pE & 1.0W (lbs)	
							HD	Strap	HD	Strap
Seismic:	-135.59	24.55	-111.04	264.8	268.5	output:	-5032.8	-4962.5	-8779.5	-8656.8
Wind:	-79.53	31.89	-47.64	264.8	268.5	output:	-2159.3	-2129.2	-6008.2	-5924.3
										Apply Omega (Ω)? No
										Include Uplift F.A.? No

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0	Yes	-1903	-570.8		-5603.6	-5533.3	-9594.9	-9472.3
Wind:		0.0		-796	-238.7		-2398.1	-2367.9	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	HDU5	5645	0.9927	OUTPUT HOLDOWN SUMMARY:	CMST14	2-2x6	HDU5	4x6
STRAP:	CMST14	6475	0.8546					

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level:	1
SW ID:	7
Grid Reference	7

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L_{total}	=	520 in. 43'-4"
L_{min}	=	240 in. 20'-0"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	11.875 in.
² Fire Treated Lumber Condition?		=	No
⁴ Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.0	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

Height:		ft.	in.
H_{OTM} (in.)	=	18	0
H_{ASPECT} (in.)	=	18	0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

[illegible]

ΣL = **43.33 ft.** Weighted Average: **1.00**

Resisting Dead Load Data Table

[illegible]

Total M_D : 42.00 ft-kips

ASD Seismic Loading Data Table

Load Description	F _{x1} (psf)	A _{t1} (ft ²)	A _{t2} (ft ²)	% _{Trib}	Load (lbs)
Line Loads(lbs)					
Roof	10495 lbs.				10495
					0

Total $V_{(E)}$: 10495 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	% _{TriB}	Load (lbs)
Apparatus	219	60.67	50	6643
Elec Rm	113	14.67	50	827

Total $V_{(w)}$: 7470.8 lbs


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	10495.4	10495.38	242.2	260.7	6	8d	6 in. o.c.	3/8	E	0.9290	6
Wind:	7470.8	-	172.4	365.0	6	8d	6 in. o.c.	3/8		0.4723	

ASD Tension Load Combinations:

 Seismic: $0.6D + 0.7E_v + 0.7E_h = (0.6 - 1.4S_{DS})D + 0.7E_h$ = **0.46 D - 0.7pQ_E** ASCE 2.4.5

 Wind: $0.6D + 0.7W$ = **0.6 D - 0.6W** ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W (lbs)	
							HD	Strap	HD	Strap
Seismic:	-87.19	19.40	-67.79	234.8	238.5	output:	-3465.5	-3411.0	-6367.3	-6267.2
Wind:	-62.06	25.20	-36.86	234.8	238.5	output:	-1884.5	-1854.8	-5287.7	-5204.6

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A. ³ . (-)		30% Ortho. Increase ¹ ?	Orthogonal (-)		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0	Yes	-1903	-570.8		-4036.3	-3981.8	-7182.7	-7082.6
Wind:		0.0		-796	-238.7		-2123.2	-2093.6	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	HDU5	5645	0.7150	OUTPUT HOLDOWN SUMMARY:	2-CS14	2-2x6	HDU5	4x6
STRAP:	2-CS14	4980	0.7996					

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level: 1

SW ID: 8

Grid Reference 8

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L_{total}	=	296 in. 24'-8"
L_{min}	=	296 in. 24'-8"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	11.875 in.
² Fire Treated Lumber Condition?		=	No
⁴ Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.0	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

Height:		ft.	in.
H_{OTM} (in.)	=	10	0
H_{ASPECT} (in.)	=	10	0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

[illegible]

ΣL = **24.67 ft.** Weighted Average: **1.00**

Resisting Dead Load Data Table

[illegible]

Total M_D : 191.66 ft-kips

ASD Seismic Loading Data Table

Load Description	F _{x1} (psf)	A _{t1} (ft ²)	A _{t2} (ft ²)	% _{Trib}	Load (lbs)
Line Loads(lbs)					
Roof	2570 lbs.				2570
					0

Total $V_{(E)}$: 2570 lbs

ASD Wind Loading Data Table

[illegible]

Total $V_{(w)}$: 827.4 lbs


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	2570.5	2570.4989	104.2	260.7	6	8d	6 in. o.c.	3/8	E	0.3997	6
Wind:	827.4	-	33.5	365.0	6	8d	6 in. o.c.	3/8		0.0919	

ASD Tension Load Combinations:

 Seismic: $0.6D + 0.7E_v + 0.7E_h = (0.6 + 1.4S_{DS})D + 0.7E_h$ = **0.46** D - 0.7pQ_E ASCE 2.4.5

 Wind: $0.6D + 0.7W$ = **0.6** D - 0.6W ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift 0.7pE & 0.6W (lbs)		Uplift 1.0pE & 1.0W (lbs)	
							HD	Strap	HD	Strap
Seismic:	-25.70	88.52	62.82	290.8	293.0	output:	2592.6	2572.7	0.0	0.0
Wind:	-8.27	115.00	106.72	289.4	293.0	output:	4424.7	4370.9	0.0	0.0
No Net Uplift										
Apply Omega (Ω)?										No
Include Uplift F.A.?										No

Load Type	ASD Uplift F.A. ³ (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0			0.0		2592.6	2572.7	0.0	0.0
Wind:		0.0			0.0		4424.7	4370.9	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	-	-	0.0000	OUTPUT HOLDOWN SUMMARY:	NONE REQUIRED	2x	NONE REQUIRED	2x
STRAP:	-	-	0.0000					

 STRUCTURAL ENGINEERS			Project	ISE
			Project #:	
			Date:	11/15/2024
			Designer:	-

WOOD SHEAR WALL DESIGN WITH FORCE TRANSFER AT DOOR OPENING PER THE DIEKMANN METHOD

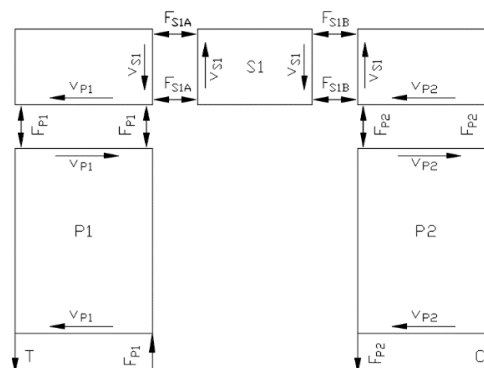
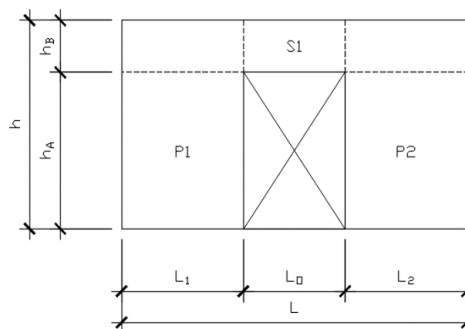
SWI	ROOF FRAMING PLAN - ALONG GRID I
-----	----------------------------------

Roof DL =	15.0	psf
Floor DL =	0.0	psf
Wall DL =	15.0	psf

S_{DS} =	0.99
C_d =	4.0
FRT	N

WALL INFORMATION	Story	L (ft)	L ₁ (ft)	L _O (ft)	L ₂ (ft)	h (ft)	h _A (ft)	h _B (ft)
	1	19.00	3.50	12.00	3.50	20.00	12.00	8.00

WALL INFORMATION	Story	DL Trib. Width (ft)	Trib. P _{DL} (lb)	Max L/h Ratio	Aspect Ratio Factor	ΣL_i (ft)
	1	2.00	285	3.43	0.58	7.00



WIND ANALYSIS	Story	WL (plf)	B _{trib} (ft)	F (lb)	V (lb)	OM _w (lb-ft)	$v_{P1} = v_{P2}$ (plf)	v_{S1} (plf)	T = C (lb)	T _{net} (lb)	$F_{P1} = F_{P2}$ (lb)	F_{S1A} (lb)	F_{S1B} (lb)	Δ_i (in)	$\Sigma \Delta_{wi}$ (in)
	1	274	8.00	2,196	2,196	43,913	314	202	2,311	2,140	1,882	1,213	1,213	0.656	0.656

EQ ANALYSIS	Story	EL (plf)	A _{trib} (ft)	F (lb)	V (lb)	OM _w (lb-ft)	$v_{P1} = v_{P2}$ (plf)	v_{S1} (plf)	T = C (lb)	T _{net} (lb)	$F_{P1} = F_{P2}$ (lb)	F_{S1A} (lb)	F_{S1B} (lb)	Δ_i (in)	$\Sigma \Delta_{wi}$ (in)
	1	3,799	1	3,799	3,799	75,976	543	350	3,999	3,867	3,256	2,099	2,099	1.770	1.770

WALL DESIGN	Story	Shear Wall Type	Dbl. Sided	Post Size	End Post Strap/HD	Door Jamb Strap/HD	Force Transfer Strap	Allowable Shear		End Post Capacity (lb)	End Post Strap/HD Capacity (lb)	Jamb Strap/HD Capacity (lb)	F.T. Strap Capacity (lb)	D/C Check
								Wind (plf)	Seismic (in)					
	1	3	Y	4x6	HU5	HU5	1-CS14	799.17	570.83	12,030	5,645	5,645	2,490	OK


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION
Applicable Code Reference: 2021 SDPWS

Level: 1
SW ID: A
Grid Reference: A

Shear Wall Input Data:

Wood Species = **DF**
 Wall Size = **2x6**
 # of Panel Sides = **1**

S.G. = 0.5
 S.G. Adjustment Factor = 1.00
 L_{total} = **166 in. 13'-10"**
 L_{min} = **166 in. 13'-10"**

General Data Inputs

Redundancy Factor ρ = **1**
Overstrength Factor Ω_o = **2.5**
 Discontinuous Lateral System? (Beam Below Strap) = **No**
 Beam Depth = **11.875 in.**

²Fire Treated Lumber Condition? = **No**
⁴Reduction to Allowable Capacity = **1.0**

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

	ft.	in.
H_{OTM} (in.)	13	6
H_{ASPECT} (in.)	12	0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Length ft	Length in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
13 ft.	10 in.	100%	0.87 :1	1.00	OK

 ΣL = **13.83 ft.** Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Roof	15.00	3	45.00	4.31
Wall	15.00	12	180.00	17.22
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 21.53 ft-kips
ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft ²)	A_{t2} (ft ²)	% _{Trib}	Load (lbs)
Roof	5.94	240		50	713
Line Loads(lbs)					
					0
					0

Total $V_{(E)}$: 713 lbs
ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	% _{Trib}	Load (lbs)
Slp Qtrs	125	8.2	50	514

Total $V_{(w)}$: 513.5 lbs


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	712.6	712.55778	51.5	260.7	6	8d	6 in. o.c.	3/8	E	0.1976	6
Wind:	513.5	-	37.1	365.0	6	8d	6 in. o.c.	3/8		0.1017	

ASD Tension Load Combinations:

 Seismic: $0.6D - 7E_v + 7E_h = (.6 - .14S_{DS})D + 7E_h = \mathbf{0.46 D - .7pQ_E}$ ASCE 2.4.5

 Wind: $0.6D + .7W = \mathbf{0.6 D - .6W}$ ASCE 2.4.1

Overturning Design:

Load Type	M _{OT}	M _D	M _{net}	HD	Strap		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W (lbs)	
	(ft-kips)	(ft-kips)	(ft-kips)	b _{eff} (in.)	b _{eff} (in.)		HD	Strap	HD	Strap
Seismic:	-9.62	9.94	0.32	160.8	164.5	output:	24.2	23.6	0.0	0.0
Wind:	-6.93	12.92	5.98	160.8	164.5	output:	446.7	436.5	0.0	0.0
No Net Uplift										
									Apply Omega (Ω)?	No
									Include Uplift F.A.?	No

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0	Yes	-1004	-301.3		-980.2	-980.7	-1434.7	-1434.7
Wind:		0.0		75	22.4		469.1	458.9	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	STHD14	3815	0.2569	OUTPUT HOLDOWN SUMMARY:	CS14	2x6	STHD14	4x6
STRAP:	CS14	2490	0.3939				ALT: HTT4	

WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION

Applicable Code Reference: 2021 SDPWS

Level: 1
SW ID: B
Grid Reference: B

Shear Wall Input Data:

Wood Species = DF
Wall Size = 2x6
S.G. = 0.5
Adjustment Factor = 1.00

General Data Inputs

Redundancy Factor ρ = 1
Overstrength Factor Ω_o = 2.5
Discontinuous Lateral System? (Beam Below Strap) = No
Beam Depth = 16.00 in.
²Fire Treated Lumber Condition? = No
²Reduction to Allowable Capacity = 1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	1.00	1.0	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Panel Data Table

Segments					Openings					
	ft.	in.	h_o/L_i		ft.	in.	h_a (in.)	h_o (in.)	h_b (in.)	
L ₁	5	2	P ₁ 0.77 :1	O ₁	4	0	4	52	48	104
L ₂	5	2	P ₂ 0.77 :1	O ₂	4	0		52	48	104
L ₃	5	2	P ₃ 0.77 :1	O ₃	4	0		52	48	104
L ₄	5	2	P ₄ 0.77 :1	O ₄	4	0		52	48	104
L ₅	5	2	P ₅ 0.77 :1	O ₅	4	0		52	48	104
L ₆	5	2	P ₆ 0.77 :1							
ΣL	51'	0"	51.00 ft.							
					1			# of Panel Sides		
					204			= H _{OTM} (in.)		17'-0"
					144			= H _{ASPECT} (in.)		12'-0"

Resisting Dead Load Data Table

Level	psf	L _{trib} (ft.)	Uniform plf	M _{resisting} (ft-kips)
Roof	15.00	10	150.00	195.08
Wall	15.00	12	180.00	234.09
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 429.17 ft-kips

Shear Aspect Ratio Adjustment Factor

(WSP) = 1.25-0.125 h/b
Average Wall Pier WSP = 1.0000

Notes:

- 4.3.3.2
1. Apply All Dead Load At 1st Level
 2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

ASD Seismic Loading Data Table

Load Description	F _s (psf)	A ₁₁ (ft ²)	A ₁₂ (ft ²)	% _{Trib}	Load (lbs)
LINE Loads (lbs)					
Roof	6266				6266
					0

Total V_(E) : 6266 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	% _{Trib}	Load (lbs)
Day Room	184	30	50	2759

Total V_(w) : 2759.2 lbs


WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	6265.8	6266	218.0	260.7	6	8d	6 in. o.c.	3/8	E	0.8361	6
Wind:	2759.2	-	96.0	365.0	6	8d	6 in. o.c.	3/8		0.2630	

ASD Tension Load Combinations:

 Seismic: $0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h = \mathbf{0.46 D - .7pQ_E}$ ASCE 2.4.5

 Wind: $0.6D - .6W = \mathbf{0.6 D - .6W}$ ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W	
							HD	Strap	HD	Strap
Seismic:	-106.52	429.17	91.70	605.4	610.5	output:	0	0	-3016.1	-2991.1
Wind:	-46.91	429.17	210.59	605.4	610.5	output:	0	0	-1549.5	-1536.6

No Net Uplift From This Level

 Apply Omega (Ω)? **No**

 Include Uplift F.A.in Omega? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs)		Point Load D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0E Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0			0.0		0.0	0.0	-3016.1	-2991.1
Wind:		0			0.0		0.0	0.0	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	HTT4	3610	0.0000	OUTPUT HOLDOWN SUMMARY:	NONE	2x6	NONE	4x6
STRAP:	1-CS14	2490	0.0000		REQUIRED		REQUIRED	

Shear Wall Type: 6

Required Strap Force: **321 lbs**
 Strap Above & Below Opening: **CS14**

V _{c1} =	V _{a1}	V _{c2} =	V _{a1}	V _{c3} =	V _{a1}	V _{c4} =	V _{a1}	V _{c5} =	V _{a1}	V _{c6} =
108	161	94	161	94	161	94	161	94	161	108
CS14										
V ₁ =	O ₁	V ₂ =	O ₂	V ₃ =	O ₃	V ₄ =	O ₄	V ₅ =	O ₅	V ₆ =
170		218		218		218		218		170
CS14										
V _{c1} =	V _{b1} =	V _{c2} =	V _{b2} =	V _{c3} =	V _{b3} =	V _{c4} =	V _{b4} =	V _{c5} =	V _{b5} =	V _{c6} =
108	161	94	161	94	161	94	161	94	161	108
L ₁ =	L ₂ =	L ₃ =	L ₄ =	L ₅ =	L ₅ =					
5' 2"	5' 2"	5' 2"	5' 2"	5' 2"	5' 2"					

WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION											
FTAO Tension Strap Design (Horizontal Strap Across Opening)											
Load		T (lbs)	Unit Shear Above & Below Opening				Total Force Above & Below Openings (lbs)		Corner Forces (lbs)		
Seismic:	2089	1st Opening	V_{a1}	=	V_{b1}	=	161 plf	O_1 =	643	F_1 =	321
		2nd Opening	V_{a2}	=	V_{b2}	=	161 plf	O_2 =	643	F_2 =	321
		3rd Opening	V_{a3}	=	V_{b3}	=	161 plf	O_3 =	643	F_3 =	321
		4th Opening	V_{a4}	=	V_{b4}	=	161 plf	O_4 =	642.6	F_4 =	321
							O_5 =	642.6	F_5 =	321	
									F_6 =	321	
									F_7 =	321.3	
									F_8 =	321.3	
									F_9 =	321.3	
									F_{10} =	321.3	
Wind:	920	1st Opening	V_{a1}	=	V_{b1}	=	71 plf	O_1 =	283	F_1 =	141
		2nd Opening	V_{a2}	=	V_{b2}	=	71 plf	O_2 =	283	F_2 =	141
		3rd Opening	V_{a3}	=	V_{b3}	=	71 plf	O_3 =	283	F_3 =	141
		4th Opening	V_{a4}	=	V_{b4}	=	71 plf	O_4 =	283	F_4 =	141
							O_5 =	283	F_5 =	141	
									F_6 =	141	
									F_7 =	141.5	
									F_8 =	141.5	
									F_9 =	141.5	
									F_{10} =	141.5	
Load		Tributary Length of Internal Shear Lines (in.)				Unit Shear Besides Openings (plf)		Resistance to Corner Forces (lbs)			
Seismic:	T_1 =	24.0	T_6 =	24.0	V_1 =	170	V_4 =	218	R_1 =	880	
	T_2 =	24.0	T_7 =	24.0	V_2 =	218	V_5 =	218	R_2 =	1126	
	T_3 =	24.0	T_8 =	24.0	V_3 =	218	V_6 =	170	R_3 =	1126	
	T_4 =	24.0	T_9 =	24.0	V_{total} =		6266	V_{total} =		6266	
	T_5 =	24.0	T_{10} =	24.0							
Wind:	T_1 =	24.0	T_6 =	24.0	V_1 =	75	V_4 =	96	R_1 =	388	
	T_2 =	24.0	T_7 =	24.0	V_2 =	96	V_5 =	96	R_2 =	496	
	T_3 =	24.0	T_8 =	24.0	V_3 =	96	V_6 =	75	R_3 =	496	
	T_4 =	24.0	T_9 =	24.0	V_{total} =		2759	V_{total} =		2759	
	T_5 =	24.0	T_{10} =	24.0							
Load		Net Corner Forces (lbs)				Unit Net Shear In Corner Zones (lbs)					
Seismic	$R_1 - F_1$	=	559	VC_1	=	108					
	$R_2 - F_2 - F_3$	=	484	VC_2	=	94					
	$R_3 - F_4 - F_5$	=	484	VC_3	=	94					
	$R_4 - F_6 - F_7$	=	484	VC_4	=	94					
	$R_5 - F_8 - F_9$	=	484	VC_5	=	94					
	$R_6 - F_{10}$	=	559	VC_6	=	108					
Wind	$R_1 - F_1$	=	246	VC_1	=	48					
	$R_2 - F_2 - F_3$	=	213	VC_2	=	41					
	$R_3 - F_4 - F_5$	=	213	VC_3	=	41					
	$R_4 - F_6 - F_7$	=	213	VC_4	=	41					
	$R_5 - F_8 - F_9$	=	213	VC_5	=	41					
	$R_6 - F_{10}$	=	246	VC_6	=	48					

 STRUCTURAL ENGINEERS	Project	ISE
	Project #:	
	Date:	11/15/2024
	Designer:	-

WOOD SHEAR WALL DESIGN WITH FORCE TRANSFER AT DOOR OPENING PER THE DIEKMANN METHOD

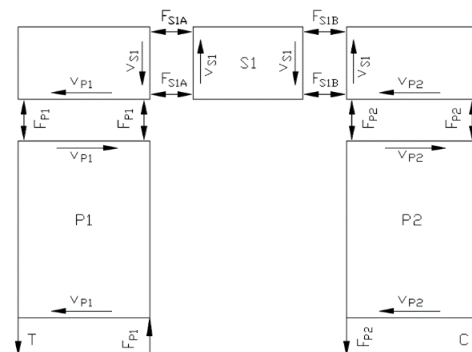
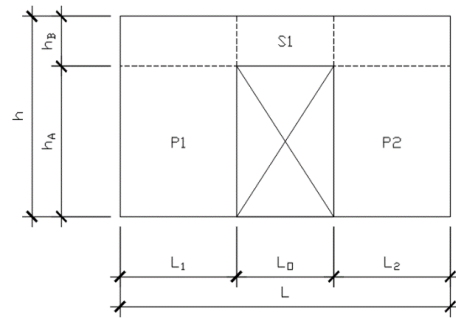
SWC	ROOF FRAMING PLAN - ALONG GRID C
-----	----------------------------------

Roof DL =	15.0	psf
Floor DL =	0.0	psf
Wall DL =	15.0	psf

$S_{DS} =$	0.99
$C_d =$	4.0
FRT	N

WALL INFORMATION	Story	L (ft)	L ₁ (ft)	L _O (ft)	L ₂ (ft)	h (ft)	h _A (ft)	h _B (ft)
	1	61.17	8.00	48.50	4.67	22.17	14.67	7.50

WALL INFORMATION	Story	DL Trib. Width (ft)	Trib. P _{DL} (lb)	Max L/h Ratio	Aspect Ratio Factor	ΣL_i (ft)
	1	6.00	2,753	3.14	0.64	12.67



WIND ANALYSIS	Story	WL (plf)	B _{trib} (ft)	F (lb)	V (lb)	OM _w (lb-ft)	$V_{P1} = V_{P2}$ (plf)	V_{S1} (plf)	T = C (lb)	T _{net} (lb)	$F_{P1} = F_{P2}$ (lb)	F_{S1A} (lb)	F_{S1B} (lb)	Δ_i (in)	$\Sigma \Delta_{wi}$ (in)
	1	175	38.50	6,753	6,753	149,705	533	218	2,447	796	3,909	6,687	3,903	0.759	0.759

EQ ANALYSIS	Story	EL (plf)	A _{trib} (ft)	F (lb)	V (lb)	OM _w (lb-ft)	$V_{P1} = V_{P2}$ (plf)	V_{S1} (plf)	T = C (lb)	T _{net} (lb)	$F_{P1} = F_{P2}$ (lb)	F_{S1A} (lb)	F_{S1B} (lb)	Δ_i (in)	$\Sigma \Delta_{wi}$ (in)
	1	8,757	1	8,757	8,757	194,153	691	283	3,174	1,903	5,070	8,672	5,062	1.681	1.681

WALL DESIGN	Story	Shear Wall Type	Dbl. Sided	Post Size	End Post Strap/HD	Door Jamb Strap/HD	Force Transfer Strap	Allowable Shear		End Post Capacity (lb)	End Post Strap/HD Capacity (lb)	Jamb Strap/HD Capacity (lb)	F.T. Strap Capacity (lb)	D/C Check
								Wind (plf)	Seismic (plf)					
	1	2	Y	4x6	HTT4	HDU5	CMST12	1139.6	814.0	12,030	3,610	5,645	9,215	OK


PERFORATED WOOD SHEAR PANEL DESIGN (SITE CONSTRUCTION) PER SECTION 4.3.2.3
Applicable Code Reference: 2021 SDPWS

Level: 1
SW ID: D
Grid Reference: D

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1
A_o	=	6 ft ²
A_{fhs}	=	133 ft ²
A_{wall}	=	139.333 ft ²
$\sum b_i$	=	142 in. 1'-10"
L_{min}	=	68 in. 5'-8"
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00

General Data Inputs

Redundancy Factor ρ	=	1
Overstrength Factor Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)	=	No
Beam Depth	=	11.875 in.
Fire Treated Lumber Condition?	=	No
Reduction to Allowable Capacity	=	1.0

Shear Wall Capacity Data:

C_o	=	0.92	≤	1.0	OK
A_o / A_{wall}	=	5%			
A_{fhs} / A_{wall}	=	95%			

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N.O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Seismic Reduction Factor	Wind Reduction Factor	S.G. Adjustment Factor	WSP Factor	Fire Treated Factor	Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	1.00	1.0	No	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

	ft	in.
L_{total}	14	8
H_{OTM} (in.)	147	12'-3"
H_{ASPECT} (in.)	114	9'-6"

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Full Height Segment Lengths	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
ft in.				
5 8	48%	1.68 :1	1.00	OK
6 2	52%	1.54 :1	1.00	OK

 $\sum b_i$ = 11.83 ft. Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	$M_{resisting}$ (ft-kips)
Roof	15.00	3.75	56.25	6.05
Wall	15.00	10	150.00	16.13

Total M_D : 22.18 ft-kips

**CITY OF PERRIS PERMIT
NUMBER:
BCOM-25-00416**


PERFORATED WOOD SHEAR PANEL DESIGN (SITE CONSTRUCTION) PER SECTION 4.3.2.3
ASD Tension Load Combinations:

 Seismic: $0.6D + .7E_v + .7E_h = (.6 + .14S_{DS})D + .7E_h = 1.0 D + .7pQ_E$ ASCE 2.4.5

 Wind: $0.6D + .7W = 0.6 D + .6W$ ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD $C_o \sum b_i$ (ft.)	Strap $C_o \sum b_i$ (ft.)		Net Uplift $.7pE$ & $.6W$ (lbs)		Uplift $1.0pE$ & $1.0W$ (lbs)	
							HD	Strap	HD	Strap
Seismic:	-14.40	21.89	7.49	10.8	10.8	output:	690.6	690.6	0.0	0.0
Wind:	-15.23	13.31	-1.92	10.8	10.8	output:	-176.9	-176.9	-2339.8	-2339.8

 Apply Omega (Ω)? **Yes**

 Include Uplift F.A.? **Yes**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs)		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		Ω1.0E Tension Uplift	
	100%	30%		100%	30%		HD	Strap	HD	STRAP
Seismic:		0			0.0		690.6	690.6	0.0	0.0
Wind:		0			0.0		-176.9	-176.9	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

 4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift $1.0pE$ & $1.0W$ (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	HTT4	3610	0.0490	OUTPUT HOLDOWN SUMMARY:	CS14	2x6	HTT4	4x6
STRAP:	CS14	2490	0.0710				ALT: STHD14	

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level: 1

SW ID: E

Grid Reference **E**

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x4
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L _{total}	=	409 in. 34'-1"
L _{min}	=	409 in. 34'-1"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	11.875 in.
² Fire Treated Lumber Condition?		=	No
⁴ Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
3	3/8	CD	8d	3 in. o.c.	3x	1370	2	2.8	0.00	1.00	1.0	-	489	685

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

Height:		ft.	in.
H_{OTM} (in.)	=	17	0
H_{ASPECT} (in.)	=	12	0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

[illegible]

ΣL = **34.08 ft.** Weighted Average: **1.00**

Resisting Dead Load Data Table

[illegible]

Total M_D : 287.51 ft-kips

ASD Seismic Loading Data Table

Load Description	F _{x1} (psf)	A _{t1} (ft ²)	A _{t2} (ft ²)	% _{Trib}	Load (lbs)
Line Loads(lbs)					
Roof	12921 lbs.				12921
					0

Total $V_{(F)}$: 12921 lbs

ASD Wind Loading Data Table

[illegible]

Total $V_{(w)}$: 6851.9 lbs


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	12920.5	12920.511	379.1	489.3	3	8d	3 in. o.c.	3/8	E	0.7748	3
Wind:	6851.9	-	201.0	365.0	6	8d	6 in. o.c.	3/8		0.5508	

ASD Tension Load Combinations:

 Seismic: $0.6D + 0.7E_v + 0.7E_h = (0.6 - 1.4S_{DS})D + 0.7E_h$ = **0.46 D - 0.7pQ_E** ASCE 2.4.5

 Wind: $0.6D + 0.7W$ = **0.6 D - 0.6W** ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift 0.7pE & 0.6W (lbs)		Uplift 1.0pE & 1.0W (lbs)	
							HD	Strap	HD	Strap
Seismic:	-219.65	132.79	-86.86	409.0	407.5	output:	-2548.3	-2557.7	-9206.4	-9240.3
Wind:	-116.48	172.51	56.03	409.0	407.5	output:	1643.8	1649.8	0.0	0.0

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0			0.0		-2548.3	-2557.7	-9206.4	-9240.3
Wind:		0.0			0.0		1643.8	1649.8	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	STHD14	3815	0.67	OUTPUT HOLDOWN SUMMARY:	2-CS14	2-2x4	STHD14	4x4
STRAP:	2-CS14	4980	0.51				ALT: HTT4	

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level:	1
SW ID:	E.3
Grid Reference	E.3

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L _{total}	=	130 in. 10'-10"
L _{min}	=	130 in. 10'-10"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	11.875 in.
² Fire Treated Lumber Condition?		=	No
⁴ Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

Height:		ft.	in.
H_{OTM} (in.)	=	12	4
H_{ASPECT} (in.)	=	10	0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

[illegible]

ΣL = **10.83 ft.** Weighted Average: **1.00**

Resisting Dead Load Data Table

[illegible]

Total M_D : 10.56 ft-kips

ASD Seismic Loading Data Table

Load Description	F _{x1} (psf)	A _{t1} (ft ²)	A _{t2} (ft ²)	% _{Trib}	Load (lbs)
Line Loads(lbs)					
Roof	1859 lbs.				1859
					0

Total $V_{(F)}$: 1859 lbs

ASD Wind Loading Data Table

[illegible]

Total $V_{(w)}$: 3200.0 lbs


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	1858.8	1858.7593	171.6	260.7	6	8d	6 in. o.c.	3/8	W	0.6581	6
Wind:	3200.0	-	295.4	365.0	6	8d	6 in. o.c.	3/8		0.8093	

ASD Tension Load Combinations:

 Seismic: $0.6D - 0.7E_v + 0.7E_h = (0.6 - 1.4S_{DS})D + 0.7E_h$ = **0.46 D - 0.7pQ_E** ASCE 2.4.5

 Wind: $0.6D + 0.7W$ = **0.6 D - 0.6W** ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W (lbs)	
							HD	Strap	HD	Strap
Seismic:	-22.92	4.88	-18.05	124.8	128.5	output:	-1735.9	-1685.3	-3150.3	-3058.3
Wind:	-39.47	6.34	-33.13	124.8	128.5	output:	-3186.7	-3093.7	-6327.3	-6142.6

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0			0.0		-1735.9	-1685.3	-3150.3	-3058.3
Wind:		0.0			0.0		-3186.7	-3093.7	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	STHD14	3815	0.84	OUTPUT HOLDOWN SUMMARY:	2-CS14	2-2x6	STHD14	4x6
STRAP:	2-CS14	4980	0.62				ALT: HTT4	

WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION

Applicable Code Reference: 2021 SDPWS

Level: 1
SW ID: G
Grid Reference: G

Shear Wall Input Data:

Wood Species = DF
Wall Size = 2x6
S.G. = 0.5
Adjustment Factor = 1.00

General Data Inputs

Redundancy Factor ρ = 1
Overstrength Factor Ω_o = 2.5
Discontinuous Lateral System? (Beam Below Strap) = No
Beam Depth = 16.00 in.
²Fire Treated Lumber Condition? = No
²Reduction to Allowable Capacity = 1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
2	3/8	CD	8d	2 in. o.c.	3x	1790	2	2.8	1.00	1.0	1.00	-	639	895

1. See Global Parameter Sheet for Additional Notes.

Shear Panel Data Table

Segments					Openings				
	ft.	in.	h_o/L_i		ft.	in.	h_a (in.)	h_o (in.)	h_b (in.)
L ₁	5	7	P ₁ 0.36 :1	O ₁	3	0	30	24	150
L ₂	3	9	P ₂ 0.53 :1	O ₂	3	0	30	24	150
L ₃	3	9	P ₃ 0.53 :1	O ₃	3	0	30	24	150
L ₄	5	1	P ₄ 0.39 :1	O ₄			30	24	150
L ₅			P ₅	O ₅			30	24	150
L ₆			P ₆						
					# of Panel Sides				
					1	=			
					204	=	H _{OTM} (in.)	17'-0"	
					144	=	H _{ASPECT} (in.)	12'-0"	
ΣL	27'	2"	27.17 ft.						

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	$M_{resisting}$ (ft-kips)
Roof	15.00	10	150.00	55.35
Wall	15.00	12	180.00	66.42
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 121.77 ft-kips

Shear Aspect Ratio Adjustment Factor

(WSP) = 1.25-0.125 h/b
Average Wall Pier WSP = 1.0000

Notes:

- 4.3.3.2
1. Apply All Dead Load At 1st Level
 2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft ²)	A_{t2} (ft ²)	% _{Trib}	Load (lbs)
LINE Loads (lbs)					
Roof		9191			9191
					0

Total $V_{(E)}$: 9191 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	% _{Trib}	Load (lbs)
Day Room	184	36	50	3311

Total $V_{(w)}$: 3311.0 lbs

WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	9190.6	9191	588.5	639.3	2	8d	2 in. o.c.	3/8	E	0.9206	2
Wind:	3311.0	-	212.0	365.0	6	8d	6 in. o.c.	3/8		0.5809	

ASD Tension Load Combinations:

Seismic: $0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h = \mathbf{0.46 D - .7pQ_E}$ ASCE 2.4.5
 Wind: $0.6D - .6W = \mathbf{0.6 D - .6W}$ ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W	
							HD	Strap	HD	Strap
Seismic:	-156.24	121.77	-100.00	319.4	324.5	output:	-3756	-3698	-8384.7	-8253.9
Wind:	-56.29	121.77	16.78	319.4	324.5	output:	0	0	-3524.1	-3469.2

 Apply Omega (Ω)? **No**

 Include Uplift F.A.in Omega? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs)		Point Load D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0E Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0			0.0		-3756.5	-3697.9	-8384.7	-8253.9
Wind:		0			0.0		0.0	0.0	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:**Wood to Wood Connection****Post to Conc. Connection**

Type Hardware Capacity U.C.

Design Strap Min. Design Post Design HD Min. Design Post

HD: HDU5 5645 **0.6655****STRAP:** 2-CS14 4980 **0.7543****OUTPUT HOLDOWN SUMMARY:****2-CS14****2-2x6****HDU5****4x6****Shear Wall Type: 2****Required Strap Force: 688 lbs****Strap Above & Below Opening: CS14**

$V_{c1} =$	V_{a1}	$V_{c2} =$	V_{a1}	$V_{c3} =$	V_{a1}	$V_{c4} =$	V_{a1}	$V_{c5} =$	V_{a1}	$V_{c6} =$
324	383	306	383	282	383	323				
CS14										
$V_1 =$	O_1	$V_2 =$	O_2	$V_3 =$	O_3	$V_4 =$	O_4	$V_5 =$	O_5	$V_6 =$
447		582		589		453		0		0
CS14										
$V_{c1} =$	$V_{b1} =$	$V_{c2} =$	$V_{b2} =$	$V_{c3} =$	$V_{b3} =$	$V_{c4} =$	$V_{b4} =$	$V_{c5} =$	$V_{b5} =$	$V_{c6} =$
324	383	306	383	282	383	323				
$L_1 =$	$L_2 =$	$L_3 =$	$L_4 =$	$L_5 =$	$L_5 =$					
5' 7"	3' 9"	3' 9"	5' 1"	0' 0"	0' 0"					



WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION														
FTAO Tension Strap Design (Horizontal Strap Across Opening)														
Load		T (lbs)	Unit Shear Above & Below Opening				Total Force Above & Below Openings (lbs)		Corner Forces (lbs)					
Seismic:	5751	1st Opening	V_{a1}	=	V_{b1}	=	383 plf	O_1	1150	F_1	688	F_6	662	
		2nd Opening	V_{a2}	=	V_{b2}	=	383 plf	O_2	1150	F_2	462	F_7	0.0	
		3rd Opening	V_{a3}	=	V_{b3}	=	383 plf	O_3	1150	F_3	575	F_8	0.0	
		4th Opening	V_{a4}	=	V_{b4}	=	383 plf	O_4	0.0	F_4	662	F_9		
							O_5	0.0	F_5	488	F_{10}			
Wind:	2072	1st Opening	V_{a1}	=	V_{b1}	=	138 plf	O_1	414	F_1	248	F_6	238	
		2nd Opening	V_{a2}	=	V_{b2}	=	138 plf	O_2	414	F_2	166	F_7	0.0	
		3rd Opening	V_{a3}	=	V_{b3}	=	138 plf	O_3	414	F_3	207	F_8	0.0	
		4th Opening	V_{a4}	=	V_{b4}	=	138 plf	O_4	0	F_4	238	F_9		
							O_5	0	F_5	176	F_{10}			
Load		Tributary Length of Internal Shear Lines (in.)				Unit Shear Besides Openings (plf)		Resistance to Corner Forces (lbs)						
Seismic:	T_1	=	21.5	T_6	=	20.7	V_1	447	V_4	453	R_1	2496	R_4	2304
	T_2	=	14.5	T_7	=	0.0	V_2	582	V_5	0	R_2	2184	R_5	0
	T_3	=	18.0	T_8	=	0.0	V_3	589	V_6	0	R_3	2207	R_6	0
	T_4	=	18.0	T_9	=	0.0	V_{total}		9191	V_{total}		9191		
	T_5	=	15.3	T_{10}	=	0								
Wind:	T_1	=	21.5	T_6	=	20.7	V_1	161	V_4	163	R_1	899	R_4	830
	T_2	=	14.5	T_7	=	0.0	V_2	210	V_5	0	R_2	787	R_5	0
	T_3	=	18.0	T_8	=	0.0	V_3	212	V_6	0	R_3	795	R_6	0
	T_4	=	18.0	T_9	=	0.0	V_{total}		3311	V_{total}		3311		
	T_5	=	15.3	T_{10}	=	0								
Load		Net Corner Forces (lbs)				Unit Net Shear In Corner Zones (lbs)								
Seismic	$R_1 - F_1$	=	1808	VC_1	=	324								
	$R_2 - F_2 - F_3$	=	1147	VC_2	=	306								
	$R_3 - F_4 - F_5$	=	1057	VC_3	=	282								
	$R_4 - F_6 - F_7$	=	1642	VC_4	=	323								
	$R_5 - F_8 - F_9$	=	0	VC_5	=	0								
	$R_6 - F_{10}$	=	0	VC_6	=	0								
Wind	$R_1 - F_1$	=	651	VC_1	=	117								
	$R_2 - F_2 - F_3$	=	413	VC_2	=	110								
	$R_3 - F_4 - F_5$	=	381	VC_3	=	102								
	$R_4 - F_6 - F_7$	=	830	VC_4	=	163								
	$R_5 - F_8 - F_9$	=	0	VC_5	=	0								
	$R_6 - F_{10}$	=	0	VC_6	=	0								

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level:	1
SW ID:	H
Grid Reference	H

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L_{total}	=	176 in. 14'-8"
L_{min}	=	176 in. 14'-8"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	11.875 in.
² Fire Treated Lumber Condition?		=	No
⁴ Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

Height:		ft.	in.
H_{OTM} (in.)	=	12	4
H_{ASPECT} (in.)	=	10	0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

[illegible]

ΣL = **14.67 ft.** Weighted Average: **1.00**

Resisting Dead Load Data Table

[illegible]

Total M_D : 22.18 ft-kips

ASD Seismic Loading Data Table

Load Description	F _{x1} (psf)	A _{t1} (ft ²)	A _{t2} (ft ²)	% _{Trib}	Load (lbs)
Line Loads(lbs)					
Roof	1326 lbs.				1326
					0

Total $V_{(E)}$: 1326 lbs

ASD Wind Loading Data Table

[illegible]

Total $V_{(w)}$: 1964.6 lbs


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	1326.2	1326.1577	90.4	260.7	6	8d	6 in. o.c.	3/8	W	0.3468	6
Wind:	1964.6	-	134.0	365.0	6	8d	6 in. o.c.	3/8		0.3670	

ASD Tension Load Combinations:

 Seismic: $0.6D - 7E_v + 7E_h = (.6 - .14S_{DS})D + 7E_h$ = **0.46 D - .7pQ_E** ASCE 2.4.5

 Wind: $0.6D + .7W =$ = **0.6 D - .6W** ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W (lbs)	
							HD	Strap	HD	Strap
Seismic:	-16.36	10.25	-6.11	170.8	174.5	output:	-429.4	-420.2	-1642.1	-1606.8
Wind:	-24.23	13.31	-10.92	170.8	174.5	output:	-767.5	-751.0	-2838.1	-2777.2

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0			0.0		-429.4	-420.2	-1642.1	-1606.8
Wind:		0.0			0.0		-767.5	-751.0	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	STHD14	3815	0.20	OUTPUT HOLDOWN SUMMARY:	CS14	2x6	STHD14	4x6
STRAP:	CS14	2490	0.30				ALT: HTT4	

 STRUCTURAL ENGINEERS	Project		ISE
	Project #:		
	Date:		11/15/2024
	Designer:		-

WOOD SHEAR WALL DESIGN WITH FORCE TRANSFER AT DOOR OPENING PER THE DIEKMANN METHOD

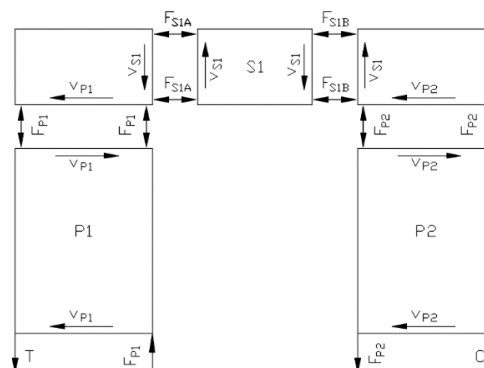
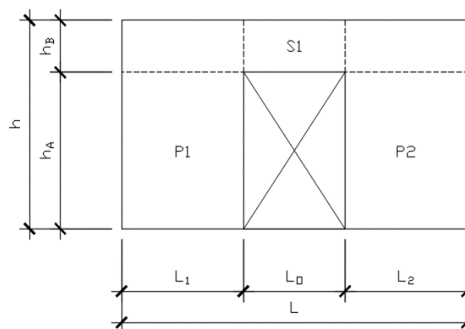
SWJ	ROOF FRAMING PLAN - ALONG GRID J
-----	----------------------------------

Roof DL =	15.0	psf
Floor DL =	0.0	psf
Wall DL =	15.0	psf

S_{DS} =	0.99
C_d =	4.0
FRT	N

WALL INFORMATION	Story	L (ft)	L ₁ (ft)	L _O (ft)	L ₂ (ft)	h (ft)	h _A (ft)	h _B (ft)
	1	61.17	8.00	48.50	4.67	22.17	14.67	7.50

WALL INFORMATION	Story	DL Trib. Width (ft)	Trib. P _{DL} (lb)	Max L/h Ratio	Aspect Ratio Factor	ΣL_i (ft)
	1	6.00	2,753	3.14	0.64	12.67



WIND ANALYSIS	Story	WL (plf)	B _{trib} (ft)	F (lb)	V (lb)	OM _w (lb-ft)	$v_{P1} = v_{P2}$ (plf)	v_{S1} (plf)	T = C (lb)	T _{net} (lb)	$F_{P1} = F_{P2}$ (lb)	F_{S1A} (lb)	F_{S1B} (lb)	Δ_i (in)	$\Sigma \Delta_{wi}$ (in)
	1	175	38.50	6,753	6,753	149,705	533	218	2,447	796	3,909	6,687	3,903	0.759	0.759

EQ ANALYSIS	Story	EL (plf)	A _{trib} (ft)	F (lb)	V (lb)	OM _w (lb-ft)	$v_{P1} = v_{P2}$ (plf)	v_{S1} (plf)	T = C (lb)	T _{net} (lb)	$F_{P1} = F_{P2}$ (lb)	F_{S1A} (lb)	F_{S1B} (lb)	Δ_i (in)	$\Sigma \Delta_{wi}$ (in)
	1	8,757	1	8,757	8,757	194,153	691	283	3,174	1,903	5,070	8,672	5,062	1.681	1.681

WALL DESIGN	Story	Shear Wall Type	Dbl. Sided	Post Size	End Post Strap/HD	Door Jamb Strap/HD	Force Transfer Strap	Allowable Shear		End Post Capacity (lb)	End Post Strap/HD Capacity (lb)	Jamb Strap/HD Capacity (lb)	F.T. Strap Capacity (lb)	D/C Check
								Wind (plf)	Seismic (plf)					
	1	2	Y	4x6	HTT4	HJU5	CMST12	1139.6	814.0	12,030	3,610	5,645	9,215	OK



STRUCTURAL
ENGINEERS

Sheet:	DIAPH 1
Date:	-
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Δ :	-

**SHEAR TRANSFER LOAD CHECK - DIAPHRAGM, HARDWARE, TOP PLATE, COLLECTORS & CHORDS AT SITE BUILT WOOD STUD WALL
FRAMED BUILDINGS - DF LUMBER**

HARDWARE LOADS	
ITEM	LBS
A34	515
A35	695
LTP4	670
LTP5	620
LS50	730
LS70	915
RBC	435
-	-

ALLOWABLE DIAPHRAGM LOADS		
TYPE	DIAPHRAGM	(PLF)
ROOF 1	UNBLOCKED - 15/32" SHEATHING W/ 8d AT 6" O.C. E.N.	180
ROOF 2	2x BLOCKED - 15/32" SHEATHING W/ 8d AT 4" O.C. E.N.	360
ROOF 3	-	-
ROOF 4	-	-
FLOOR 1	-	-
FLOOR 2	-	-
FLOOR 3	-	-
FLOOR 4	-	-

STRAP LOADS	
ITEM	LBS
CS16	1705
2-CS16	3410
CMSTC16	4585
CMST14	6490
CMST12	9215

ALLOWABLE TOP PLATE NAIL LOADS (Cd = 1.6)		
TYPE	NAIL SIZE	(LBS)
16d SHORT	16d SHORT - 0.131" x 3.25"	155
-	-	-

GRID		1	2	6	A	B	E	G		
Fx (0.7E) SHEAR LOAD (LBS)		2749	15480	7637	514	6266	12921	9191		
DIAPHRAGM	Fpx (0.7E) SHEAR (LBS)	2767.01	15579.3	7685.61	516.811	6305.96	13003.3	9249.47		
	DIAPHRAGM TYPE	ROOF 1	ROOF 2	ROOF 1	ROOF 1	ROOF 1	ROOF 1	ROOF 1		
	EDGE LENGTH (FT)	36.67	78	83	14	85	85	66		
	EDGE STRESS (PLF)	75	200	93	37	74	153	140		
	ALLOW STRESS (PLF)	180	360	180	180	180	180	180		
TOP PLATE CLIPS	WALL LENGTH (FT)	36.67	78	83	14	85	85	66		
	HARDWARE USED	A35	A35	A35	A35	A35	A35	A35		
	MAX. SPACING (IN) O.C.	48	42	48	48	48	48.0	48		
TOP PLATE SPLICE	TRIB SPLICE LENGTH (FT)	6	19	20	6	9	36	20		
	SPLICE LOAD (LBS)	449.86	3770.79	1840.16	220.081	663.44	5472.22	2785.03		
	#16d SHORT NAILS	3	25	12	2	5	36	18		
	ALT. STRAP	CS16	CMSTC16	2-CS16	CS16	CS16	CMST14	2-CS16		
CHORD	Perp. - Fpx (0.7E) SHEAR (PLF)	171.181	394.662	386.353	217.471	140.999	211.499	211.499		
	PARALLEL LENGTH (FT)	28.2	47	48	20	66	66	66		
	PERP. WIDTH (FT)	18.83	66	66	6	27	36	36		
	CHORD TENSION (LBS)	1129.6	2020.26	2063.71	2153.48	3554.35	3998.65	4054.97		
	STRAP AT CHORD BREAK	CS16	2-CS16	2-CS16	2-CS16	CMSTC16	CMSTC16	CMSTC16		



STRUCTURAL
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Sheet:	DRAG (1)
By:	-
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Δ :	2022 CBC

DRAG (1)	Drag along Grid 1
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	2,749						
V_{WIND} , lbs:	1,190						
Start:	0.00						
Length:	36.67						
End:	36.67	0.00	0.00	0.00	0.00	0.00	0.00

$v_{SEISMIC}$, plf:	74.98	0.00	0.00	0.00	0.00	0.00	0.00
v_{WIND} , plf:	32.45	0.00	0.00	0.00	0.00	0.00	0.00

DRAG (1) Cont.	Drag along Grid 1
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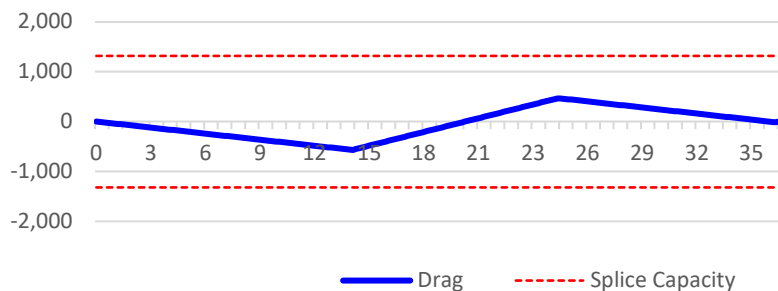
SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	0.00	24.83					
Length:	13.75	11.67					
End:	13.75	36.50	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{SW}
End:	0.00	0.00	0.00	0.00	0.00	0.00	25.42

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	2,749.4	108.2
V_{WIND}	1,189.9	46.8

Design Summary

Drag Load



Total Line Length (ft):	36.67
Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
464.3	24.8	Plate Splice OK
-566.8	13.8	Plate Splice OK
0.0	0.0	
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



STRUCTURAL
ENGINEERS

Sheet:	DRAG (2)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (2)	Drag along Grid 2
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	15,480						
V_{WIND} , lbs:	7,263						
Start:	0.00						
Length:	83.00						
End:	83.00	0.00	0.00	0.00	0.00	0.00	0.00

$v_{SEISMIC}$, plf:	186.51	0.00	0.00	0.00	0.00	0.00	0.00
v_{WIND} , plf:	87.50	0.00	0.00	0.00	0.00	0.00	0.00

DRAG (2) Cont.	Drag along Grid 2
----------------	-------------------

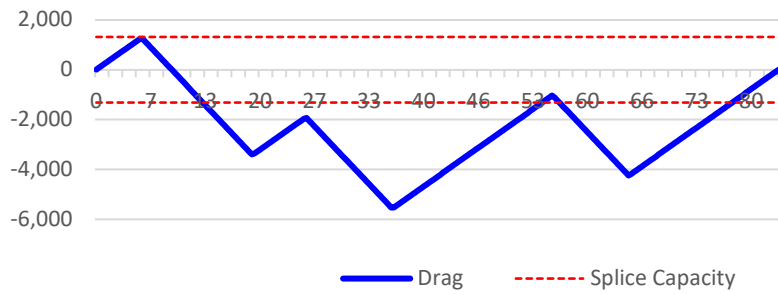
SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	5.50	25.50	55.50				
Length:	13.50	10.50	9.25				
End:	19.00	36.00	64.75	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{sw}
End:	0.00	0.00	0.00	0.00	0.00	0.00	33.25

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	15,480.1	465.6
V_{WIND}	7,262.8	218.4

Design Summary

Drag Load



Total Line Length (ft):	83.00
Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
1238.4	5.3	Plate Splice OK
-5530.3	36.2	CMST14
-3400.4	19.0	2-CS16
0.0	0.0	
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



STRUCTURAL
ENGINEERS

Sheet:	DRAG (6)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (6)	Drag along Grid 6
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	7,686						
V_{WIND} , lbs:	6,089						
Start:	0.00						
Length:	83.00						
End:	83.00	0.00	0.00	0.00	0.00	0.00	0.00

$v_{SEISMIC}$, plf:	92.60	0.00	0.00	0.00	0.00	0.00	0.00
v_{WIND} , plf:	73.36	0.00	0.00	0.00	0.00	0.00	0.00

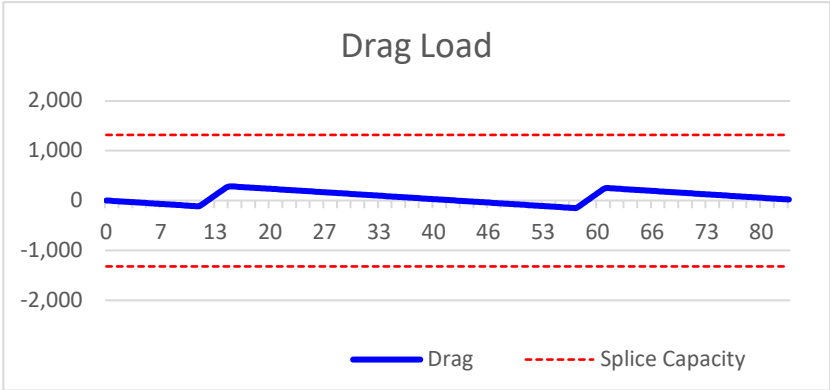
DRAG (6) Cont.	Drag along Grid 6
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SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	0.00	14.83	60.66				
Length:	11.33	42.33	22.50				
End:	11.33	57.16	83.16	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{SW}
End:	0.00	0.00	0.00	0.00	0.00	0.00	76.16

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	7,685.6	100.9
V_{WIND}	6,088.6	79.9

Design Summary



Total Line Length (ft):	83.00
Load Case:	Seismic
Seismic Drag Factor	1.25

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
286.2	14.9	Plate Splice OK
-152.1	57.1	Plate Splice OK
0.0	0.0	
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



STRUCTURAL
ENGINEERS

Sheet:	DRAG (B)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (B)	Drag along Grid B
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	6,306						
V_{WIND} , lbs:	2,759						
Start:	0.00						
Length:	85.00						
End:	85.00	0.00	0.00	0.00	0.00	0.00	0.00

$v_{SEISMIC}$, plf:	74.19	0.00	0.00	0.00	0.00	0.00	0.00
v_{WIND} , plf:	32.46	0.00	0.00	0.00	0.00	0.00	0.00

DRAG (B) Cont.	Drag along Grid B
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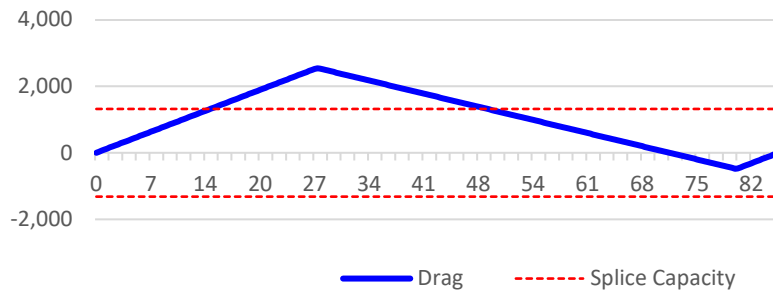
SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	27.50						
Length:	52.25						
End:	79.75	0.00	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{sw}
End:	0.00	0.00	0.00	0.00	0.00	0.00	52.25

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	6,306.0	120.7
V_{WIND}	2,759.2	52.8

Design Summary

Drag Load



Total Line Length (ft):	85.00
Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
2547.9	27.5	2-CS16
-475.8	79.6	Plate Splice OK
0.0	0.0	
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



STRUCTURAL
ENGINEERS

Sheet:	DRAG (E)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (E)	Drag along Grid E
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	6,318	6,711					
V_{WIND} , lbs:	3,426	3,426					
Start:	0.00	19.00					
Length:	84.67	66.00					
End:	84.67	85.00	0.00	0.00	0.00	0.00	0.00

$v_{SEISMIC}$, plf:	74.61	101.68	0.00	0.00	0.00	0.00	0.00
v_{WIND} , plf:	40.46	51.91	0.00	0.00	0.00	0.00	0.00

DRAG (E) Cont.	Drag along Grid E
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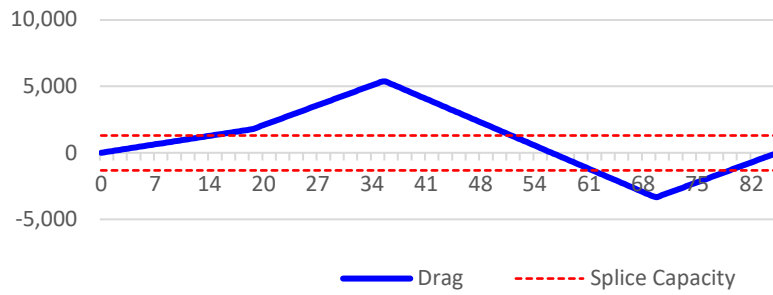
SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	35.50						
Length:	34.08						
End:	69.58	0.00	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{sw}
End:	0.00	0.00	0.00	0.00	0.00	0.00	34.08

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	13,028.4	382.3
V_{WIND}	6,851.9	201.1

Design Summary

Drag Load



Total Line Length (ft):	85.00
Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
5377.3	35.4	CMST14
-3340.8	69.7	2-CS16
0.0	0.0	
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



STRUCTURAL
ENGINEERS

Sheet:	DRAG (G)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (G)	Drag along Grid G
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	9,191						
V_{WIND} , lbs:	3,311						
Start:	0.00						
Length:	65.50						
End:	65.50	0.00	0.00	0.00	0.00	0.00	0.00

$V_{SEISMIC}$, plf:	140.31	0.00	0.00	0.00	0.00	0.00	0.00
V_{WIND} , plf:	50.55	0.00	0.00	0.00	0.00	0.00	0.00

DRAG (G) Cont.	Drag along Grid G
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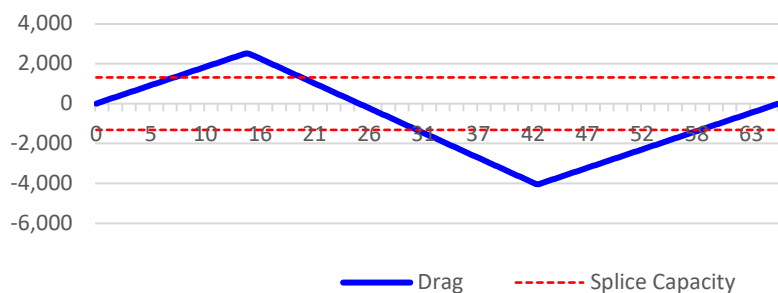
SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	14.50						
Length:	27.83						
End:	42.33	0.00	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{SW}
End:	0.00	0.00	0.00	0.00	0.00	0.00	27.83

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	9,190.6	330.2
V_{WIND}	3,311.0	119.0

Design Summary

Drag Load



Total Line Length (ft):	65.50
Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
2527.4	14.4	2-CS16
-4043.9	42.4	CMSTC16
0.0	0.0	
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4


STRUCTURAL
ENGINEERS

Sheet:	DIAPH 1
Date:	-
#:	-
Δ :	-

**SHEAR TRANSFER LOAD CHECK - DIAPHRAGM, HARDWARE, TOP PLATE, COLLECTORS & CHORDS AT SITE BUILT WOOD STUD WALL
FRAMED BUILDINGS - DF LUMBER**

HARDWARE LOADS	
ITEM	LBS
A34	515
A35	695
LTP4	670
LTP5	620
LS50	730
LS70	915
RBC	435
-	-

ALLOWABLE DIAPHRAGM LOADS		
TYPE	DIAPHRAGM	(PLF)
ROOF 1	UNBLOCKED - 15/32" SHEATHING W/ 8d AT 6" O.C. E.N.	180
ROOF 2	-	-
ROOF 3	-	-
ROOF 4	-	-
FLOOR 1	-	-
FLOOR 2	-	-
FLOOR 3	-	-
FLOOR 4	-	-

STRAP LOADS	
ITEM	LBS
CS16	1705
2-CS16	3410
CMSTC16	4585
CMST14	6490
CMST12	9215

ALLOWABLE TOP PLATE NAIL LOADS (Cd = 1.6)		
TYPE	NAIL SIZE	(LBS)
16d SHORT	16d SHORT - 0.131" x 3.25"	155
-	-	-

GRID		C	J	6	7					
Fx (0.7E) SHEAR LOAD (LBS)		8,757	8757	7616	7616					
DIAPHRAGM	Fpx (0.7E) SHEAR (LBS)	8813.59	8813.59	7664.81	7664.81					
	DIAPHRAGM TYPE	ROOF 1	ROOF 1	ROOF 1	ROOF 1					
	EDGE LENGTH (FT)	61	61	76	76					
	EDGE STRESS (PLF)	144	144	101	101					
	ALLOW STRESS (PLF)	180	180	180	180					
TOP PLATE CLIPS	WALL LENGTH (FT)	61	61	76	76					
	HARDWARE USED	A35	A35	A35	A35					
	MAX. SPACING (IN) O.C.	48	48	48	48					
TOP PLATE SPLICE	TRIB SPLICE LENGTH (FT)	24.25	24.25	20	31					
	SPLICE LOAD (LBS)	3481.46	3481.46	2004.21	3056.43					
	#16d SHORT NAILS	23	23	13	20					
	ALT. STRAP	CMSTC16	CMSTC16	2-CS16	2-CS16					
CHORD	Perp. - Fpx (0.7E) SHEAR (PLF)	251	251	232	232					
	PARALLEL LENGTH (FT)	61	61	76	76					
	PERP. WIDTH (FT)	76	76	61	61					
	CHORD TENSION (LBS)	1922.5	1922.5	3431.52	3431.52					
	STRAP AT CHORD BREAK	2-CS16	2-CS16	CMSTC16	CMSTC16					



STRUCTURAL
ENGINEERS

Sheet:	DRAG (6-)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (6-)	Drag along Grid 6
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	7,665						
V_{WIND} , lbs:	6,643						
Start:	0.00						
Length:	83.00						
End:	83.00	0.00	0.00	0.00	0.00	0.00	0.00

$v_{SEISMIC}$, plf:	92.35	0.00	0.00	0.00	0.00	0.00	0.00
v_{WIND} , plf:	80.04	0.00	0.00	0.00	0.00	0.00	0.00

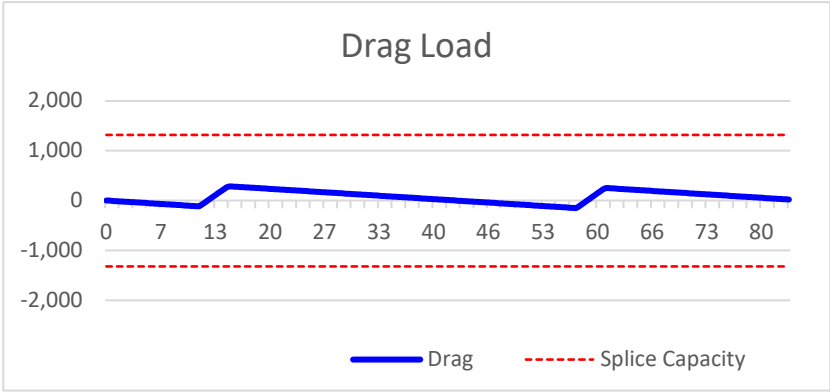
DRAG (6-) Cont.	Drag along Grid 6
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SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	0.00	14.83	60.66				
Length:	11.33	42.33	22.50				
End:	11.33	57.16	83.16	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{SW}
End:	0.00	0.00	0.00	0.00	0.00	0.00	76.16

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	7,664.8	100.6
V_{WIND}	6,643.4	87.2

Design Summary



Total Line Length (ft):	83.00
Load Case:	Seismic
Seismic Drag Factor	1.25

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
285.4	14.9	Plate Splice OK
-151.7	57.1	Plate Splice OK
0.0	0.0	
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



STRUCTURAL
ENGINEERS

Sheet:	DRAG (7)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (7)	Drag along Grid 7
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	7,665						
V_{WIND} , lbs:	6,643						
Start:	0.00						
Length:	76.50						
End:	76.50	0.00	0.00	0.00	0.00	0.00	0.00

$v_{SEISMIC}$, plf:	100.19	0.00	0.00	0.00	0.00	0.00	0.00
v_{WIND} , plf:	86.84	0.00	0.00	0.00	0.00	0.00	0.00

DRAG (7) Cont.	Drag along Grid 7
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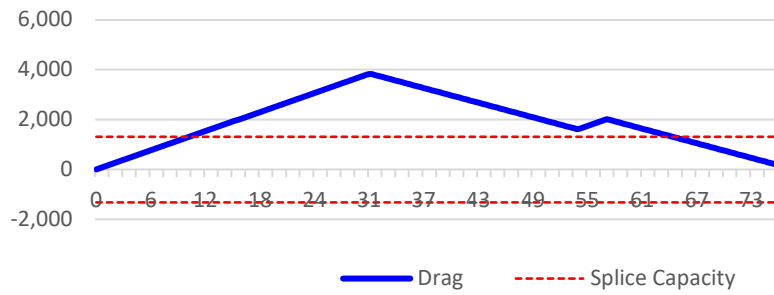
SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	30.67	57.25					
Length:	23.33	20.00					
End:	54.00	77.25	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{sw}
End:	0.00	0.00	0.00	0.00	0.00	0.00	43.33

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	7,664.8	176.9
V_{WIND}	6,643.4	153.3

Design Summary

Drag Load



Total Line Length (ft):	76.50
Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
3832.4	30.6	CMSTC16
0.0	0.0	
0.0	0.0	
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



STRUCTURAL
ENGINEERS

Sheet:	DIAPH 1
Date:	-
#:	-
Δ :	-

**SHEAR TRANSFER LOAD CHECK - DIAPHRAGM, HARDWARE, TOP PLATE, COLLECTORS & CHORDS AT SITE BUILT WOOD STUD WALL
FRAMED BUILDINGS - DF LUMBER**

HARDWARE LOADS	
ITEM	LBS
A34	515
A35	695
LTP4	670
LTP5	620
LS50	730
LS70	915
RBC	435
-	-

ALLOWABLE DIAPHRAGM LOADS		
TYPE	DIAPHRAGM	(PLF)
ROOF 1	UNBLOCKED - 15/32" SHEATHING W/ 8d AT 6" O.C. E.N.	180
ROOF 2	-	-
ROOF 3	-	-
ROOF 4	-	-
FLOOR 1	-	-
FLOOR 2	-	-
FLOOR 3	-	-
FLOOR 4	-	-

STRAP LOADS	
ITEM	LBS
CS16	1705
2-CS16	3410
CMSTC16	4585
CMST14	6490
CMST12	9215

ALLOWABLE TOP PLATE NAIL LOADS (Cd = 1.6)		
TYPE	NAIL SIZE	(LBS)
16d SHORT	16d SHORT - 0.131" x 3.25"	155
-	-	-

GRID		7	8	D	E.3	H	D	E.3	H	
Fx (0.7E) SHEAR LOAD (LBS)		1673	2570	1243	3200	1965	1175	1859	1326	
DIAPHRAGM	Fpx (0.7E) SHEAR (LBS)	1683.79	2586.97	1243	3200	1965	1183	1871	1335	
	DIAPHRAGM TYPE	ROOF 1	ROOF 1	ROOF 1	ROOF 1	ROOF 1	ROOF 1	ROOF 1	ROOF 1	
	EDGE LENGTH (FT)	70	70	15	15	15	15	15	15	
	EDGE STRESS (PLF)	24	37	85	218	134	81	128	91	
	ALLOW STRESS (PLF)	180	180	252	252	252	180	180	180	
TOP PLATE CLIPS	WALL LENGTH (FT)	70	70	15	15	15	15	15	15	
	HARDWARE USED	A35	A35	A35	A35	A35	A35	A35	A35	
	MAX. SPACING (IN) O.C.	48	48	48	38.2	48	48	48	48	
TOP PLATE SPLICE	TRIB SPLICE LENGTH (FT)	31	31	-	3.5	-	-	3.5	-	
	SPLICE LOAD (LBS)	740.93	1138.36	-	763.457	-	-	443.467	-	
	#16d SHORT NAILS	5	8	-	5	-	-	3	-	
	ALT. STRAP	CS16	CS16	-	CS16	-	-	CS16	-	
CHORD	Perp. - Fpx (0.7E) SHEAR (PLF)	122	122	291	291	291	-	-	-	
	PARALLEL LENGTH (FT)	42.5	43	15	15	15	-	-	-	
	PERP. WIDTH (FT)	14.67	15	27	27	43	-	-	-	
	CHORD TENSION (LBS)	1870.28	1870.28	362.569	362.569	230.338	-	-	-	
	STRAP AT CHORD BREAK	2-CS16	2-CS16	CS16	CS16	CS16	-	-	-	



STRUCTURAL
ENGINEERS

Sheet:	DRAG (7-)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (7-)	Drag along Grid 7 at Electrical
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	1,684						
V_{WIND} , lbs:	827						
Start:	0.00						
Length:	69.50						
End:	69.50	0.00	0.00	0.00	0.00	0.00	0.00

$v_{SEISMIC}$, plf:	24.23	0.00	0.00	0.00	0.00	0.00	0.00
v_{WIND} , plf:	11.90	0.00	0.00	0.00	0.00	0.00	0.00

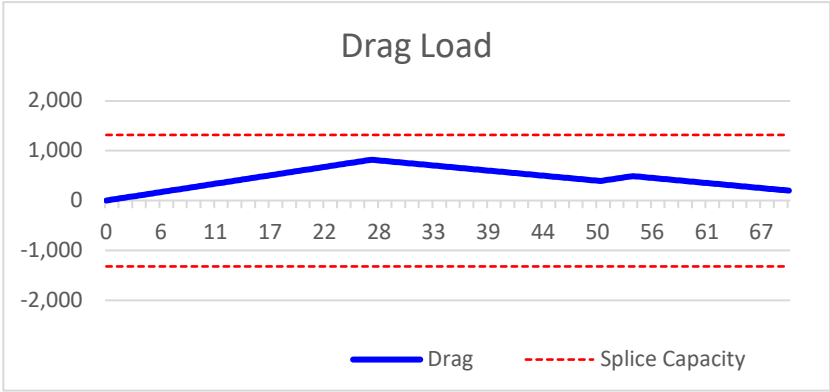
DRAG (7-) Cont.	Drag along Grid 7 at Electrical
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SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	27.00	53.58					
Length:	23.33	20.00					
End:	50.33	73.58	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{sw}
End:	0.00	0.00	0.00	0.00	0.00	0.00	43.33

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	1,683.8	38.9
V_{WIND}	827.4	19.1

Design Summary



Total Line Length (ft):	69.50
Load Case:	Seismic
Seismic Drag Factor	1.25

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
816.6	27.0	Plate Splice OK
0.0	0.0	
0.0	0.0	
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



STRUCTURAL
ENGINEERS

Sheet:	DRAG (8)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (8)	Drag along Grid 8
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	2,570						
V_{WIND} , lbs:	827						
Start:	0.00						
Length:	69.50						
End:	69.50	0.00	0.00	0.00	0.00	0.00	0.00

$v_{SEISMIC}$, plf:	36.99	0.00	0.00	0.00	0.00	0.00	0.00
v_{WIND} , plf:	11.90	0.00	0.00	0.00	0.00	0.00	0.00

DRAG (8) Cont.	Drag along Grid 8
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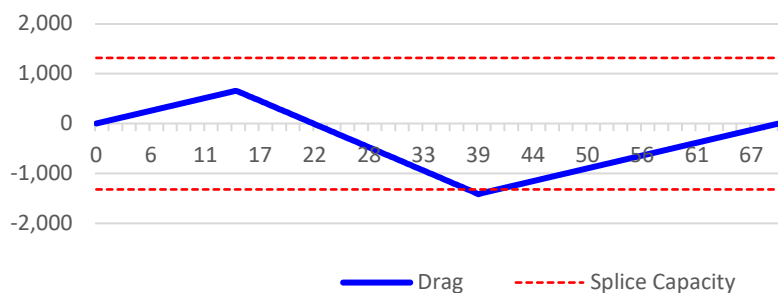
SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	14.25						
Length:	24.67						
End:	38.92	0.00	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{SW}
End:	0.00	0.00	0.00	0.00	0.00	0.00	24.67

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	2,570.5	104.2
V_{WIND}	827.4	33.5

Design Summary

Drag Load



Total Line Length (ft):	69.50
Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
655.5	14.2	Plate Splice OK
-1413.8	38.9	CS16
-1233.8	42.9	Plate Splice OK
0.0	0.0	
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



FIRE STATION FOUNDATION DESIGN


STRUCTURAL
ENGINEERS

Sheet: Cont. & Spread Footing

Date: --

Project ID: --

Version: 2022 CBC / ASCE 7-16

Conventional Footing & Spread Footing Design - Bearing wall footings (Non-Retaining)
Design Values:

 Allowable Soil Bearing Pressure (psf) = **2,000**

 Soils Report by: **Inland Foundation Engineering, Inc.**

 Job Number: **S168-196**

 Date: **September 23, 2025**
Max. Conventional Footing Load:

Roof DL=	15	psf * (	30	/ 2 +	0	) ft	=	225.0 plf
Roof LL=	20	psf * (	30	/ 2 +	0	) ft	=	300.0 plf
Exterior Wall =	15	psf * (	30	+	0	) ft	=	450.0 plf
Ceiling =	10	psf * (	30	/ 2 +	0	) ft	=	150.0 plf
		psf * (	0	/ 2 +	0	) ft	=	0.0 plf
		psf * (	0	/ 2 +	0	) ft	=	0.0 plf
							w =	1125.0 plf

 Required Footing Width= $1125 / (2000 - 50) =$ **0.58** ft

 Use Footing: **15** Wide " x **12** " Deep w/ Steel Reinforcing Per Plans

Allowable Point Load at Footing: (Soil Governed)

Bearing Length at Point Load = 2 x (Depth + Slab Edge Thickness) + Post Width

 Slab Edge Thickness: **8** in (Depth of slab and subgrade)

 Post Width: **3** in

Footing Size (in)		Allowable Point Load, P (lbs)	Longitudinal Rebar Size	# Longitudinal Bar T & B
Width	Depth			
15	12	8,958	4	2

Spread Footing: (Soil Governed)

 $P = \text{Width}^2 / \text{S.B.P.}$

Spread Ftg Size (in)		Allowable Point Load, P (k)	Rebar Size	# Bar
Width (SQ)	Depth			
24	18	7.1	5	3
30	18	11.1	5	4
36	18	16.0	5	4
42	18	21.7	5	5
48	18	28.4	5	6

Stone Veneer Pilar Weight =

253 SF stone veneer per side

506 sf x 65.0 psf = 16.4 k

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: FS.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL 7 12"Dx15"W

CODE REFERENCES

Calculations per ACI 318-19, IBC 2021

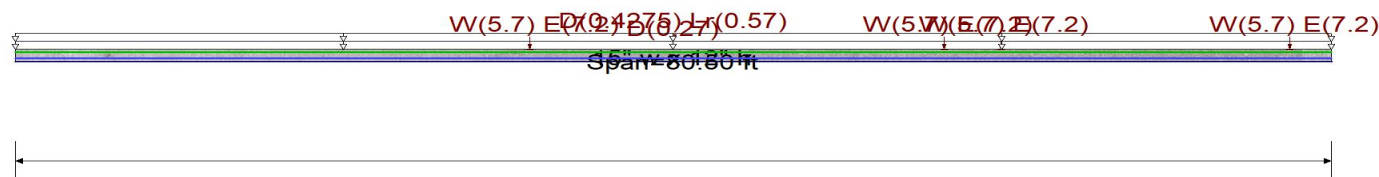
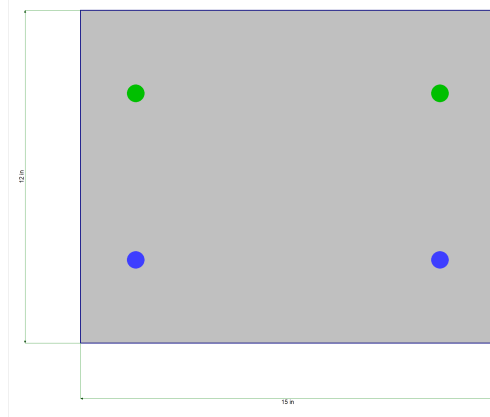
Load Combinations Used : ASCE 7-16

Material Properties

f'_c	=	4.50 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = f'_c^{1/2}$	=	503.12 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.8250
λ Lt Wt Factor	=	1.0			
Elastic Modulus	=	3,823.68 ksi			
Soil Subgrade Modulus	=	150.0 psi / (inch deflection)			
Load Combination	ASCE 7-16				

f_y - Main Rebar	=	60.0 ksi	F_y - Stirrups	=	40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=	29,000.0 ksi
			Stirrup Bar Size #	=	# 3
			Number of Resisting Legs Per Stirrup	=	2

Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 15.0 in, Height = 12.0 in

Span #1 Reinforcing....

2-#5 at 3.0 in from Bottom, from 0.0 to 80.50 ft in this span

2-#5 at 3.0 in from Top, from 0.0 to 80.50 ft in this span

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads

Point Load : W = 5.70, E = 7.20 k @ 31.50 ft

Point Load : W = 5.70, E = 7.20 k @ 56.830 ft

Point Load : W = 5.70, E = 7.20 k @ 60.330 ft

Point Load : W = 5.70, E = 7.20 k @ 78.0 ft

Uniform Load : D = 0.0150 ksf, Tributary Width = 18.0 ft, (wall)

Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 28.50 ft, (roof)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.337 : 1
Section used for this span	Typical Section
Mu : Applied	10.059 k-ft
Mn * Phi : Allowable	29.862 k-ft
Load Combination	+0.90D+E
Location of maximum on span	56.824 ft
Span # where maximum occurs	Span # 1

Maximum Deflection	
Max Downward L+Lr+S Deflection	0.000 in
Max Upward L+Lr+S Deflection	0.000 in
Max Downward Total Deflection	0.069 in
Max Upward Total Deflection	0.007 in

Maximum Soil Pressure =	1.493 ksf	at	80.50 ft	LdComb: +D+0.70E
Allowable Soil Pressure =	2.660 ksf	OK		

Shear Stirrup Requirements

Between 0.00 to 54.93 ft, Ties Not Req'd, Stirrups are not required.

Between 55.88 to 56.82 ft, Max spacing per 9.7.6.2.2, use #3 stirrups spaced at 3 in

Between 57.77 to 76.71 ft, Ties Not Req'd, Stirrups are not required.

Between 77.66 to 77.66 ft, Max spacing per 9.7.6.2.2, use #3 stirrups spaced at 3 in

Between 78.61 to 78.61 ft, Ties Not Req'd, Stirrups are not required.

CITY OF PERRIS PERMIT
 NUMBER:
 BCOM-25-00416

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: FS.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL 7 12"Dx15"W

Maximum Forces & Stresses for Load Combination

Load Combination			Bending Stress Results (k-ft)		
Segment Length	Span #	Location (ft) in Span	Mu : Max	Phi*Mnx	Stress Ratio
Maximum Bending Envelope					
Span # 1	1	56.824	10.06	29.86	0.34
+1.40D					
Span # 1	1	79.553	-0.00	29.86	0.00
+1.20D+0.50Lr					
Span # 1	1	79.553	-0.00	29.86	0.00
+1.20D					
Span # 1	1	79.553	-0.00	29.86	0.00
+1.20D+1.60Lr					
Span # 1	1	79.553	-0.00	29.86	0.00
+1.20D+1.60Lr+0.50W					
Span # 1	1	56.824	3.86	29.86	0.13
+1.20D+0.50W					
Span # 1	1	56.824	3.93	29.86	0.13
+1.20D+0.50Lr+W					
Span # 1	1	56.824	7.91	29.86	0.26
+1.20D+W					
Span # 1	1	56.824	7.93	29.86	0.27
+0.90D+W					
Span # 1	1	56.824	7.95	29.86	0.27
+1.20D+E					
Span # 1	1	56.824	10.04	29.86	0.34
+0.90D+E					
Span # 1	1	56.824	10.06	29.86	0.34

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0691	80.500		0.0000	0.000

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k)	Av, min Req'd?	Spacing Req'd (in)	Φ Vc (k)	Φ Vs (k)	Φ Vn (k)	Vu / Φ Vn	Vc Eqn (T22.5.5.1)	Spacing Provision
+1.20D+1.60Lr+0.50W	1	0.00	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	0.95	6.00	0.91	No	N/A	8.68	0.00	8.68	0.104	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	1.89	6.00	0.90	No	N/A	8.68	0.00	8.68	0.104	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	2.84	6.00	0.90	No	N/A	8.68	0.00	8.68	0.104	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	3.79	6.00	0.90	No	N/A	8.68	0.00	8.68	0.104	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	4.74	6.00	0.90	No	N/A	8.68	0.00	8.68	0.104	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	5.68	6.00	0.90	No	N/A	8.68	0.00	8.68	0.104	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	6.63	6.00	0.90	No	N/A	8.68	0.00	8.68	0.104	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	7.58	6.00	0.90	No	N/A	8.68	0.00	8.68	0.104	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	8.52	6.00	0.90	No	N/A	8.68	0.00	8.68	0.104	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	9.47	6.00	0.91	No	N/A	8.68	0.00	8.68	0.104	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	10.42	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	11.36	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	12.31	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	13.26	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	14.21	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	15.15	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	16.10	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	17.05	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	17.99	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	18.94	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	19.89	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	20.84	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	21.78	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	22.73	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	23.68	6.00	0.97	No	N/A	8.68	0.00	8.68	0.111	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	24.62	6.00	1.05	No	N/A	8.68	0.00	8.68	0.121	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	25.57	6.00	1.16	No	N/A	8.68	0.00	8.68	0.134	Eqn (b)	Ties Not Req'd
+1.20D+E	1	26.52	6.00	1.46	No	N/A	8.68	0.00	8.68	0.168	Eqn (b)	Ties Not Req'd
+1.20D+E	1	27.46	6.00	1.89	No	N/A	8.68	0.00	8.68	0.217	Eqn (b)	Ties Not Req'd
+1.20D+E	1	28.41	6.00	2.39	No	N/A	8.68	0.00	8.68	0.276	Eqn (b)	Ties Not Req'd
+1.20D+E	1	29.36	6.00	2.97	No	N/A	8.68	0.00	8.68	0.342	Eqn (b)	Ties Not Req'd
+1.20D+E	1	30.31	6.00	3.60	No	N/A	8.68	0.00	8.68	0.414	Eqn (b)	Ties Not Req'd
+1.20D+E	1	31.25	6.00	4.25	No	N/A	8.68	0.00	8.68	0.490	Eqn (b)	Ties Not Req'd
+0.90D+E	1	32.20	6.00	-2.40	No	N/A	8.68	0.00	8.68	0.276	Eqn (b)	Ties Not Req'd

CITY OF CHICAGO PERMIT NUMBER:

BCOM-25-00416

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: FS.ec6

LIC#: KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL 7 12"Dx15"W

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k)	Av, min Req'd?	Spacing Req'd (in)	ϕV_c (k)	ϕV_s (k)	ϕV_n (k)	Vu / ϕV_n	Vc Eqn (T22.5.5.1)	Spacing Provision
+0.90D+E	1	33.15	6.00	-1.80	No	N/A	8.68	0.00	8.68	0.207	Eqn (b)	Ties Not Req'd
+0.90D+E	1	34.09	6.00	-1.27	No	N/A	8.68	0.00	8.68	0.146	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	35.04	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	35.99	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	36.94	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	37.88	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	38.83	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	39.78	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	40.72	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	41.67	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	42.62	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	43.56	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	44.51	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	45.46	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	46.41	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	47.35	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	48.30	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	49.25	6.00	0.94	No	N/A	8.68	0.00	8.68	0.108	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	50.19	6.00	1.04	No	N/A	8.68	0.00	8.68	0.120	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	51.14	6.00	1.19	No	N/A	8.68	0.00	8.68	0.136	Eqn (b)	Ties Not Req'd
+1.20D+E	1	52.09	6.00	1.65	No	N/A	8.68	0.00	8.68	0.190	Eqn (b)	Ties Not Req'd
+1.20D+E	1	53.04	6.00	2.27	No	N/A	8.68	0.00	8.68	0.261	Eqn (b)	Ties Not Req'd
+1.20D+E	1	53.98	6.00	3.02	No	N/A	8.68	0.00	8.68	0.348	Eqn (b)	Ties Not Req'd
+1.20D+E	1	54.93	6.00	3.91	No	N/A	8.68	0.00	8.68	0.451	Eqn (b)	Ties Not Req'd
+1.20D+E	1	55.88	6.00	4.93	Yes	3.00	9.06	13.20	22.26	0.222	Eqn (a)	Max spacing per 9.7.6.2.2
+1.20D+E	1	56.82	6.00	6.05	Yes	3.00	9.06	13.20	22.26	0.272	Eqn (a)	Max spacing per 9.7.6.2.2
+1.20D+1.60Lr	1	57.77	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	58.72	6.00	1.19	No	N/A	8.68	0.00	8.68	0.137	Eqn (b)	Ties Not Req'd
+1.20D+E	1	59.66	6.00	2.33	No	N/A	8.68	0.00	8.68	0.268	Eqn (b)	Ties Not Req'd
+0.90D+E	1	60.61	6.00	-3.90	No	N/A	8.68	0.00	8.68	0.449	Eqn (b)	Ties Not Req'd
+0.90D+E	1	61.56	6.00	-2.95	No	N/A	8.68	0.00	8.68	0.339	Eqn (b)	Ties Not Req'd
+0.90D+E	1	62.51	6.00	-2.13	No	N/A	8.68	0.00	8.68	0.245	Eqn (b)	Ties Not Req'd
+0.90D+E	1	63.45	6.00	-1.45	No	N/A	8.68	0.00	8.68	0.167	Eqn (b)	Ties Not Req'd
+0.90D+E	1	64.40	6.00	-0.92	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	65.35	6.00	0.91	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	66.29	6.00	0.92	No	N/A	8.68	0.00	8.68	0.105	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	67.24	6.00	0.92	No	N/A	8.68	0.00	8.68	0.106	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	68.19	6.00	0.92	No	N/A	8.68	0.00	8.68	0.106	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	69.14	6.00	0.92	No	N/A	8.68	0.00	8.68	0.106	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	70.08	6.00	0.94	No	N/A	8.68	0.00	8.68	0.108	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	71.03	6.00	1.00	No	N/A	8.68	0.00	8.68	0.116	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	71.98	6.00	1.09	No	N/A	8.68	0.00	8.68	0.125	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	72.92	6.00	1.20	No	N/A	8.68	0.00	8.68	0.139	Eqn (b)	Ties Not Req'd
+1.20D+E	1	73.87	6.00	1.58	No	N/A	8.68	0.00	8.68	0.182	Eqn (b)	Ties Not Req'd
+1.20D+E	1	74.82	6.00	2.11	No	N/A	8.68	0.00	8.68	0.243	Eqn (b)	Ties Not Req'd
+1.20D+E	1	75.76	6.00	2.79	No	N/A	8.68	0.00	8.68	0.321	Eqn (b)	Ties Not Req'd
+1.20D+E	1	76.71	6.00	3.62	No	N/A	8.68	0.00	8.68	0.417	Eqn (b)	Ties Not Req'd
+1.20D+E	1	77.66	6.00	4.60	Yes	3.00	9.06	13.20	22.26	0.207	Eqn (a)	Max spacing per 9.7.6.2.2
+0.90D+E	1	78.61	6.00	-1.57	No	N/A	8.68	0.00	8.68	0.180	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	79.55	6.00	0.92	No	N/A	8.68	0.00	8.68	0.106	Eqn (b)	Ties Not Req'd

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: FS.ec6

LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL 6 12"Dx15"W

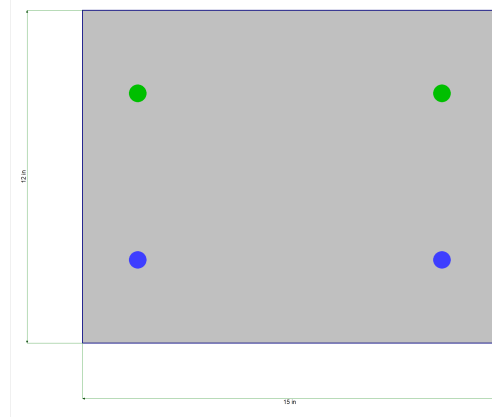
CODE REFERENCES

Calculations per ACI 318-19, IBC 2021, SDPWS 2021

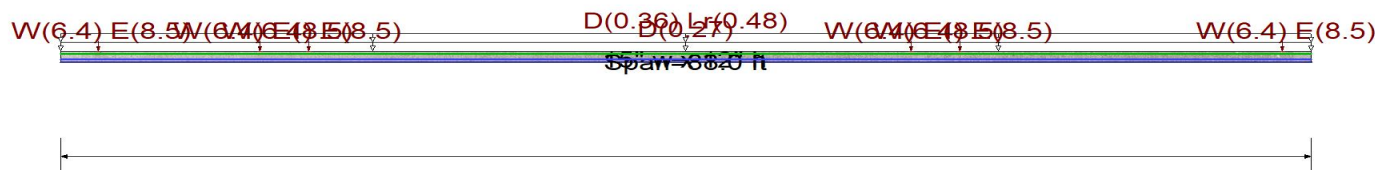
Load Combinations Used : ASCE 7-16

Material Properties

f'_c	=	4.50 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = f'_c^{1/2}$	=	503.12 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.8250
λ Lt Wt Factor	=	1.0			
Elastic Modulus	=	3,823.68 ksi			
Soil Subgrade Modulus	=	150.0 psi / (inch deflection)			
Load Combination	ASCE 7-16				
f_y - Main Rebar	=	60.0 ksi	F_y - Stirrups	=	40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=	29,000.0 ksi
			Stirrup Bar Size #	=	# 3
			Number of Resisting Legs Per Stirrup	=	2



Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 15.0 in, Height = 12.0 in

Span #1 Reinforcing....

2-#5 at 3.0 in from Bottom, from 0.0 to 88.0 ft in this span

2-#5 at 3.0 in from Top, from 0.0 to 88.0 ft in this span

Service loads entered. Load Factors will be applied for calculations.

Applied Loads

Beam self weight calculated and added to loads

Point Load : W = 6.40, E = 8.50 k @ 86.0 ft
 Point Load : W = 6.40, E = 8.50 k @ 2.670 ft
 Point Load : W = 6.40, E = 8.50 k @ 14.0 ft
 Point Load : W = 6.40, E = 8.50 k @ 17.50 ft
 Uniform Load : D = 0.0150 ksf, Tributary Width = 18.0 ft, (wall)
 Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 24.0 ft, (roof)
 Point Load : W = 6.40, E = 8.50 k @ 59.830 ft
 Point Load : W = 6.40, E = 8.50 k @ 63.330 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =		0.382: 1	Maximum Deflection		
Section used for this span		Typical Section	Max Downward L+Lr+S Deflection		0.000 in
Mu : Applied		11.40 k-ft	Max Upward L+Lr+S Deflection		0.000 in
Mn * Phi : Allowable		29.862 k-ft	Max Downward Total Deflection		0.081 in
Load Combination		+0.90D+E	Max Upward Total Deflection		0.007 in
Location of maximum on span		63.153 ft			
Span # where maximum occurs		Span # 1			
Maximum Soil Pressure =		1.758 ksf	at	88.00 ft	LdComb: +D+0.70E
Allowable Soil Pressure =		2.660 ksf	OK		

Cross Section Strength & Inertia

		Phi*Mn (k-ft)		Moment of Inertia (in^4)		
Cross Section Bar Layout Description		Btm Tension	Top Tension	I gross	I cr - Btm Tension	I cr - Top Tension
Section 1	2- #5 @ d=9", 2- #5 @ d=3",	29.86	29.86	2,160.00	302.80	302.80

City of Boston Permit
 BCOM-25-00416

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: FS.ec6

LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL 6 12"Dx15"W

Shear Stirrup Requirements

Entire Beam Span Length : $V_u < \Phi V_c/2$, Req'd Vs = Not Req'd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combination

Load Combination			Bending Stress Results (k-ft)		
Segment Length	Span #	Location (ft) in Span	Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	63.153	11.40	29.86	0.38
+1.40D					
Span # 1	1	86.965	-0.00	29.86	0.00
+1.20D+0.50Lr					
Span # 1	1	86.965	-0.00	29.86	0.00
+1.20D					
Span # 1	1	86.965	-0.00	29.86	0.00
+1.20D+1.60Lr					
Span # 1	1	86.965	-0.01	29.86	0.00
+1.20D+1.60Lr+0.50W					
Span # 1	1	63.153	4.16	29.86	0.14
+1.20D+0.50W					
Span # 1	1	63.153	4.23	29.86	0.14
+1.20D+0.50Lr+W					
Span # 1	1	63.153	8.53	29.86	0.29
+1.20D+W					
Span # 1	1	63.153	8.55	29.86	0.29
+0.90D+W					
Span # 1	1	63.153	8.57	29.86	0.29
+1.20D+E					
Span # 1	1	63.153	11.38	29.86	0.38
+0.90D+E					
Span # 1	1	63.153	11.40	29.86	0.38

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0814	88.000		0.0000	0.000

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: FS.ec6

LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL 2 12"Dx15"W

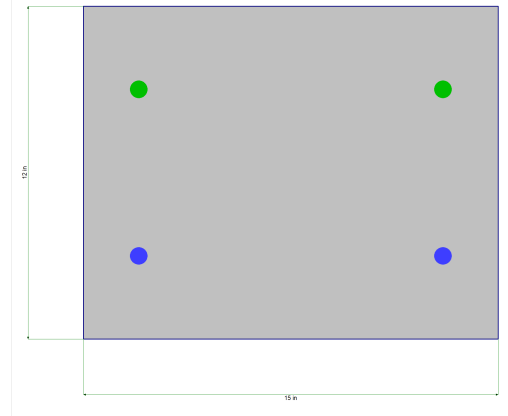
CODE REFERENCES

Calculations per ACI 318-19, IBC 2021, SDPWS 2021

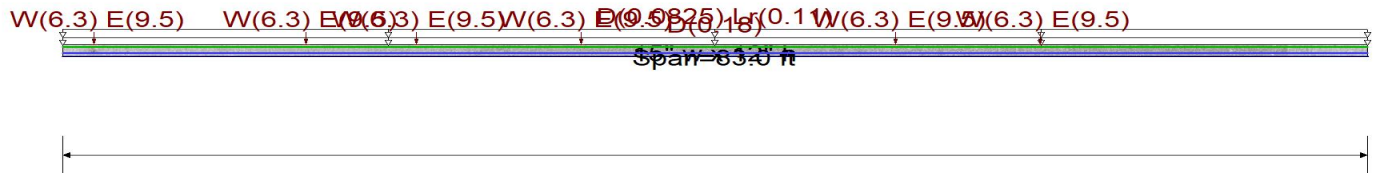
Load Combinations Used : ASCE 7-16

Material Properties

f'_c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = f'_c^{1/2}$	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ Lt Wt Factor	=	1.0			
Elastic Modulus	=	3,122.02 ksi			
Soil Subgrade Modulus	=	150.0 psi / (inch deflection)			
Load Combination	ASCE 7-16				
f_y - Main Rebar	=	60.0 ksi	F_y - Stirrups	=	40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=	29,000.0 ksi
			Stirrup Bar Size #	=	# 3
			Number of Resisting Legs Per Stirrup	=	2



Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 15.0 in, Height = 12.0 in

Span #1 Reinforcing....

2-#5 at 3.0 in from Bottom, from 0.0 to 83.0 ft in this span

2-#5 at 3.0 in from Top, from 0.0 to 83.0 ft in this span

Service loads entered. Load Factors will be applied for calculations.

Applied Loads

Beam self weight calculated and added to loads

Point Load : W = 6.30, E = 9.50 k @ 2.0 ft
 Point Load : W = 6.30, E = 9.50 k @ 15.50 ft
 Uniform Load : D = 0.0150 ksf, Tributary Width = 12.0 ft, (wall)
 Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 5.50 ft, (roof)
 Point Load : W = 6.30, E = 9.50 k @ 22.50 ft
 Point Load : W = 6.30, E = 9.50 k @ 33.0 ft
 Point Load : W = 6.30, E = 9.50 k @ 53.0 ft
 Point Load : W = 6.30, E = 9.50 k @ 62.20 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.321 : 1	Maximum Deflection	
Section used for this span	Typical Section	Max Downward L+Lr+S Deflection	0.000 in
Mu : Applied	8.717 k-ft	Max Upward L+Lr+S Deflection	0.000 in
Mn * Phi : Allowable	27.188 k-ft	Max Downward Total Deflection	0.071 in
Load Combination	+0.90D+E	Max Upward Total Deflection	0.007 in
Location of maximum on span	33.200 ft		
Span # where maximum occurs	Span # 1		
Maximum Soil Pressure =	1.537 ksf	at	0.00 ft
Allowable Soil Pressure =	2.660 ksf	OK	LdComb: +D+0.70E

Cross Section Strength & Inertia

		Phi*Mn (k-ft)		Moment of Inertia (in^4)		
Cross Section Bar Layout Description		Btm Tension	Top Tension	I gross	I cr - Btm Tension	I cr - Top Tension
Section 1	2- #5 @ d=9", 2- #5 @ d=3",	27.19	27.19	2,160.00	302.80	302.80

City of Kansas Permit
 27-19
 BCOM-25-00416

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: FS.ec6

LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL 2 12"Dx15"W

Shear Stirrup Requirements

Entire Beam Span Length : $V_u < \Phi V_c/2$, Req'd Vs = Not Req'd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combination

Load Combination			Bending Stress Results (k-ft)		
Segment Length	Span #	Location (ft) in Span	Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	33.200	8.72	27.19	0.32
+1.40D					
Span # 1	1	82.024	-0.00	27.19	0.00
+1.20D+0.50Lr					
Span # 1	1	82.024	-0.00	27.19	0.00
+1.20D					
Span # 1	1	82.024	-0.00	27.19	0.00
+1.20D+1.60Lr					
Span # 1	1	82.024	-0.00	27.19	0.00
+1.20D+1.60Lr+0.50W					
Span # 1	1	33.200	2.85	27.19	0.10
+1.20D+0.50W					
Span # 1	1	33.200	2.86	27.19	0.11
+1.20D+0.50Lr+W					
Span # 1	1	33.200	5.76	27.19	0.21
+1.20D+W					
Span # 1	1	33.200	5.76	27.19	0.21
+0.90D+W					
Span # 1	1	33.200	5.77	27.19	0.21
+1.20D+E					
Span # 1	1	33.200	8.71	27.19	0.32
+0.90D+E					
Span # 1	1	33.200	8.72	27.19	0.32

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0712	0.000		0.0000	0.000

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: FS.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL G 12"Dx15"W

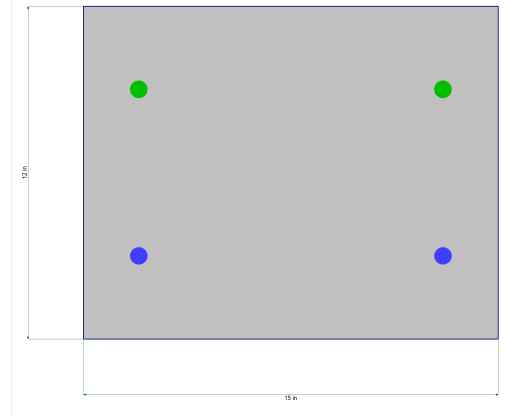
CODE REFERENCES

Calculations per ACI 318-19, IBC 2021

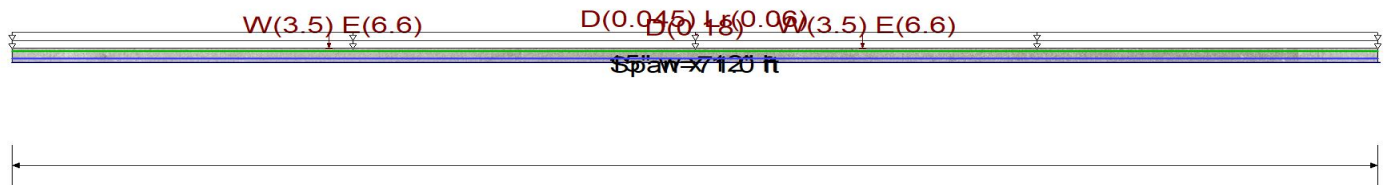
Load Combinations Used : ASCE 7-16

Material Properties

f'_c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = f'_c^{1/2}$	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ Lt Wt Factor	=	1.0			
Elastic Modulus	=	3,122.02 ksi			
Soil Subgrade Modulus	=	150.0 psi / (inch deflection)			
Load Combination	ASCE 7-16				
f_y - Main Rebar	=	60.0 ksi	F_y - Stirrups	=	40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=	29,000.0 ksi
			Stirrup Bar Size #	=	# 3
			Number of Resisting Legs Per Stirrup	=	2



Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 15.0 in, Height = 12.0 in

Span #1 Reinforcing....

2-#5 at 3.0 in from Bottom, from 0.0 to 71.0 ft in this span

2-#5 at 3.0 in from Top, from 0.0 to 71.0 ft in this span

Service loads entered. Load Factors will be applied for calculations.

Applied Loads

Beam self weight calculated and added to loads

Point Load : W = 3.50, E = 6.60 k @ 44.20 ft

Point Load : W = 3.50, E = 6.60 k @ 16.50 ft

Uniform Load : D = 0.0150 ksf, Tributary Width = 12.0 ft, (wall)

Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 3.0 ft, (ROOF)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =		0.288: 1	Maximum Deflection		
Section used for this span	Typical Section		Max Downward L+Lr+S Deflection		0.000 in
Mu : Applied	7.837 k-ft		Max Upward L+Lr+S Deflection		0.000 in
Mn * Phi : Allowable	27.188 k-ft		Max Downward Total Deflection		0.032 in
Load Combination	+0.90D+E		Max Upward Total Deflection		0.007 in
Location of maximum on span	44.271 ft				
Span # where maximum occurs	Span # 1				
Maximum Soil Pressure =	0.694 ksf	at	16.57 ft	LdComb: +D+0.70E	
Allowable Soil Pressure =	2.660 ksf	OK			

Shear Stirrup Requirements

Entire Beam Span Length : Ties Not Req'd, Stirrups are not required.

Maximum Forces & Stresses for Load Combination

Load Combination			Bending Stress Results (k-ft)		
Segment Length	Span #	Location (ft) in Span	Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	44.271	7.84	27.19	0.29
+1.40D					

CITY OF PEORIS PERMIT
 NUMBER:
 BCOM-25-00416

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: FS.ec6

LIC#: KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL G 12"Dx15"W

Load Combination			Bending Stress Results (k-ft		
Segment Length	Span #	Location (ft) in Span	Mu : Max	Phi*Mnx	Stress Ratio
Span # 1	1	70.165	-0.00	27.19	0.00
+1.20D+0.50Lr					
Span # 1	1	70.165	-0.00	27.19	0.00
+1.20D					
Span # 1	1	70.165	-0.00	27.19	0.00
+1.20D+1.60Lr					
Span # 1	1	70.165	-0.00	27.19	0.00
+1.20D+1.60Lr+0.50W					
Span # 1	1	44.271	2.05	27.19	0.08
+1.20D+0.50W					
Span # 1	1	44.271	2.06	27.19	0.08
+1.20D+0.50Lr+W					
Span # 1	1	44.271	4.14	27.19	0.15
+1.20D+W					
Span # 1	1	44.271	4.14	27.19	0.15
+0.90D+W					
Span # 1	1	44.271	4.15	27.19	0.15
+1.20D+E					
Span # 1	1	44.271	7.83	27.19	0.29
+0.90D+E					
Span # 1	1	44.271	7.84	27.19	0.29

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0322	16.567		0.0000	0.000

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k)	Av, min Req'd?	Spacing Req'd (in)	Φ Vc (k)	Φ Vs (k)	Φ Vn (k)	Vu / Φ Vn	Vc Eqn (T22.5.5.1)	Spacing Provision
+1.20D+1.60Lr	1	0.00	6.00	0.23	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	0.84	6.00	0.23	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	1.67	6.00	0.23	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	2.51	6.00	0.22	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	3.34	6.00	0.22	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	4.18	6.00	0.22	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	5.01	6.00	0.22	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	5.85	6.00	0.23	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	6.68	6.00	0.23	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	7.52	6.00	0.23	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	8.35	6.00	0.23	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+E	1	9.19	6.00	0.29	No	N/A	7.09	0.00	7.09	0.041	Eqn (b)	Ties Not Req'd
+1.20D+E	1	10.02	6.00	0.48	No	N/A	7.09	0.00	7.09	0.067	Eqn (b)	Ties Not Req'd
+1.20D+E	1	10.86	6.00	0.72	No	N/A	7.09	0.00	7.09	0.101	Eqn (b)	Ties Not Req'd
+1.20D+E	1	11.69	6.00	1.02	No	N/A	7.09	0.00	7.09	0.143	Eqn (b)	Ties Not Req'd
+1.20D+E	1	12.53	6.00	1.37	No	N/A	7.09	0.00	7.09	0.194	Eqn (b)	Ties Not Req'd
+1.20D+E	1	13.36	6.00	1.79	No	N/A	7.09	0.00	7.09	0.253	Eqn (b)	Ties Not Req'd
+1.20D+E	1	14.20	6.00	2.27	No	N/A	7.09	0.00	7.09	0.320	Eqn (b)	Ties Not Req'd
+1.20D+E	1	15.04	6.00	2.80	No	N/A	7.09	0.00	7.09	0.394	Eqn (b)	Ties Not Req'd
+1.20D+E	1	15.87	6.00	3.35	No	N/A	7.09	0.00	7.09	0.473	Eqn (b)	Ties Not Req'd
+0.90D+E	1	16.71	6.00	-2.71	No	N/A	7.09	0.00	7.09	0.383	Eqn (b)	Ties Not Req'd
+0.90D+E	1	17.54	6.00	-2.17	No	N/A	7.09	0.00	7.09	0.306	Eqn (b)	Ties Not Req'd
+0.90D+E	1	18.38	6.00	-1.67	No	N/A	7.09	0.00	7.09	0.236	Eqn (b)	Ties Not Req'd
+0.90D+E	1	19.21	6.00	-1.23	No	N/A	7.09	0.00	7.09	0.173	Eqn (b)	Ties Not Req'd
+0.90D+E	1	20.05	6.00	-0.85	No	N/A	7.09	0.00	7.09	0.119	Eqn (b)	Ties Not Req'd
+0.90D+E	1	20.88	6.00	-0.53	No	N/A	7.09	0.00	7.09	0.075	Eqn (b)	Ties Not Req'd
+0.90D+E	1	21.72	6.00	-0.27	No	N/A	7.09	0.00	7.09	0.038	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	22.55	6.00	0.23	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	23.39	6.00	0.23	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	24.22	6.00	0.23	No	N/A	7.09	0.00	7.09	0.033	Eqn (b)	Ties Not Req'd
+1.20D+E	1	25.06	6.00	0.27	No	N/A	7.09	0.00	7.09	0.038	Eqn (b)	Ties Not Req'd
+1.20D+E	1	25.89	6.00	0.30	No	N/A	7.09	0.00	7.09	0.043	Eqn (b)	Ties Not Req'd
+1.20D+E	1	26.73	6.00	0.31	No	N/A	7.09	0.00	7.09	0.043	Eqn (b)	Ties Not Req'd
+1.20D+E	1	27.56	6.00	0.29	No	N/A	7.09	0.00	7.09	0.041	Eqn (b)	Ties Not Req'd
+1.20D+E	1	28.40	6.00	0.26	No	N/A	7.09	0.00	7.09	0.037	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	29.24	6.00	0.24	No	N/A	7.09	0.00	7.09	0.034	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	30.07	6.00	0.23	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	30.91	6.00	0.23	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	31.74	6.00	0.23	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	32.58	6.00	0.23	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: FS.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL G 12"Dx15"W

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k)	Av, min Req'd?	Spacing Req'd (in)	ϕV_c (k)	ϕV_s (k)	ϕV_n (k)	Vu / ϕV_n	Vc Eqn (T22.5.5.1)	Spacing Provision
+1.20D+1.60Lr	1	33.41	6.00	0.23	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	34.25	6.00	0.23	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	35.08	6.00	0.23	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	35.92	6.00	0.23	No	N/A	7.09	0.00	7.09	0.033	Eqn (b)	Ties Not Req'd
+1.20D+E	1	36.75	6.00	0.32	No	N/A	7.09	0.00	7.09	0.045	Eqn (b)	Ties Not Req'd
+1.20D+E	1	37.59	6.00	0.48	No	N/A	7.09	0.00	7.09	0.068	Eqn (b)	Ties Not Req'd
+1.20D+E	1	38.42	6.00	0.70	No	N/A	7.09	0.00	7.09	0.099	Eqn (b)	Ties Not Req'd
+1.20D+E	1	39.26	6.00	0.98	No	N/A	7.09	0.00	7.09	0.138	Eqn (b)	Ties Not Req'd
+1.20D+E	1	40.09	6.00	1.32	No	N/A	7.09	0.00	7.09	0.186	Eqn (b)	Ties Not Req'd
+1.20D+E	1	40.93	6.00	1.72	No	N/A	7.09	0.00	7.09	0.243	Eqn (b)	Ties Not Req'd
+1.20D+E	1	41.76	6.00	2.18	No	N/A	7.09	0.00	7.09	0.308	Eqn (b)	Ties Not Req'd
+1.20D+E	1	42.60	6.00	2.70	No	N/A	7.09	0.00	7.09	0.380	Eqn (b)	Ties Not Req'd
+1.20D+E	1	43.44	6.00	3.25	No	N/A	7.09	0.00	7.09	0.458	Eqn (b)	Ties Not Req'd
+0.90D+E	1	44.27	6.00	-2.82	No	N/A	7.09	0.00	7.09	0.398	Eqn (b)	Ties Not Req'd
+0.90D+E	1	45.11	6.00	-2.27	No	N/A	7.09	0.00	7.09	0.321	Eqn (b)	Ties Not Req'd
+0.90D+E	1	45.94	6.00	-1.77	No	N/A	7.09	0.00	7.09	0.249	Eqn (b)	Ties Not Req'd
+0.90D+E	1	46.78	6.00	-1.31	No	N/A	7.09	0.00	7.09	0.185	Eqn (b)	Ties Not Req'd
+0.90D+E	1	47.61	6.00	-0.92	No	N/A	7.09	0.00	7.09	0.129	Eqn (b)	Ties Not Req'd
+0.90D+E	1	48.45	6.00	-0.58	No	N/A	7.09	0.00	7.09	0.082	Eqn (b)	Ties Not Req'd
+0.90D+E	1	49.28	6.00	-0.31	No	N/A	7.09	0.00	7.09	0.043	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	50.12	6.00	0.23	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	50.95	6.00	0.23	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	51.79	6.00	0.24	No	N/A	7.09	0.00	7.09	0.034	Eqn (b)	Ties Not Req'd
+1.20D+E	1	52.62	6.00	0.31	No	N/A	7.09	0.00	7.09	0.044	Eqn (b)	Ties Not Req'd
+1.20D+E	1	53.46	6.00	0.37	No	N/A	7.09	0.00	7.09	0.052	Eqn (b)	Ties Not Req'd
+1.20D+E	1	54.29	6.00	0.40	No	N/A	7.09	0.00	7.09	0.056	Eqn (b)	Ties Not Req'd
+1.20D+E	1	55.13	6.00	0.41	No	N/A	7.09	0.00	7.09	0.058	Eqn (b)	Ties Not Req'd
+1.20D+E	1	55.96	6.00	0.41	No	N/A	7.09	0.00	7.09	0.057	Eqn (b)	Ties Not Req'd
+1.20D+E	1	56.80	6.00	0.39	No	N/A	7.09	0.00	7.09	0.055	Eqn (b)	Ties Not Req'd
+1.20D+E	1	57.64	6.00	0.37	No	N/A	7.09	0.00	7.09	0.053	Eqn (b)	Ties Not Req'd
+1.20D+E	1	58.47	6.00	0.35	No	N/A	7.09	0.00	7.09	0.049	Eqn (b)	Ties Not Req'd
+1.20D+E	1	59.31	6.00	0.33	No	N/A	7.09	0.00	7.09	0.046	Eqn (b)	Ties Not Req'd
+1.20D+E	1	60.14	6.00	0.30	No	N/A	7.09	0.00	7.09	0.043	Eqn (b)	Ties Not Req'd
+1.20D+E	1	60.98	6.00	0.28	No	N/A	7.09	0.00	7.09	0.039	Eqn (b)	Ties Not Req'd
+1.20D+E	1	61.81	6.00	0.26	No	N/A	7.09	0.00	7.09	0.036	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	62.65	6.00	0.24	No	N/A	7.09	0.00	7.09	0.034	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	63.48	6.00	0.24	No	N/A	7.09	0.00	7.09	0.034	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	64.32	6.00	0.24	No	N/A	7.09	0.00	7.09	0.033	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	65.15	6.00	0.23	No	N/A	7.09	0.00	7.09	0.033	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	65.99	6.00	0.23	No	N/A	7.09	0.00	7.09	0.033	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	66.82	6.00	0.23	No	N/A	7.09	0.00	7.09	0.033	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	67.66	6.00	0.23	No	N/A	7.09	0.00	7.09	0.033	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	68.49	6.00	0.23	No	N/A	7.09	0.00	7.09	0.033	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	69.33	6.00	0.23	No	N/A	7.09	0.00	7.09	0.033	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	70.16	6.00	0.23	No	N/A	7.09	0.00	7.09	0.032	Eqn (b)	Ties Not Req'd

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: FS.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL C 12"Dx15"W

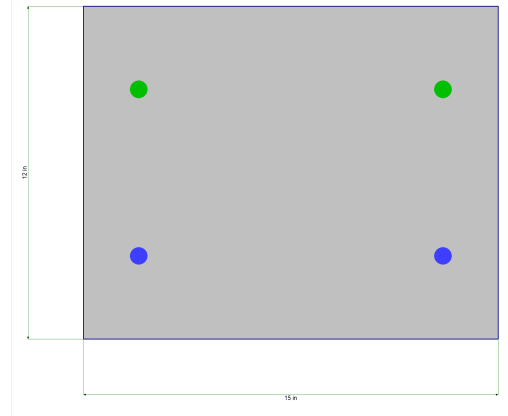
CODE REFERENCES

Calculations per ACI 318-19, IBC 2021

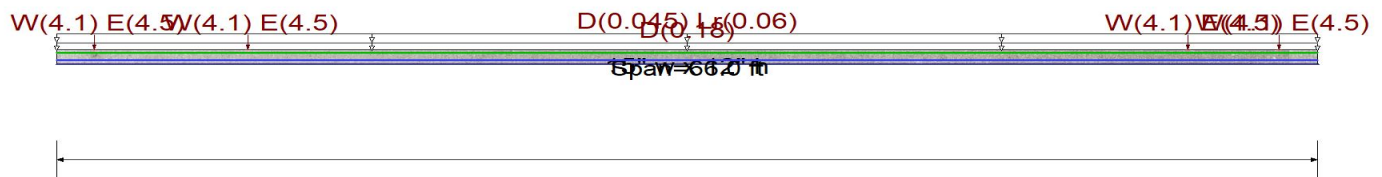
Load Combinations Used : ASCE 7-16

Material Properties

f'_c	=	4.50 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = f'_c^{1/2}$	=	7.50		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.8250
λ Lt Wt Factor	=	1.0			
Elastic Modulus	=	3,823.68 ksi			
Soil Subgrade Modulus	=	150.0 psi / (inch deflection)			
Load Combination	ASCE 7-16				
f_y - Main Rebar	=	60.0 ksi	F_y - Stirrups	=	40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=	29,000.0 ksi
			Stirrup Bar Size #	=	# 3
			Number of Resisting Legs Per Stirrup	=	2



Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 15.0 in, Height = 12.0 in

Span #1 Reinforcing....

2-#5 at 3.0 in from Bottom, from 0.0 to 66.0 ft in this span

2-#5 at 3.0 in from Top, from 0.0 to 66.0 ft in this span

Service loads entered. Load Factors will be applied for calculations.

Applied Loads

Beam self weight calculated and added to loads

Point Load : W = 4.10, E = 4.50 k @ 10.0 ft

Point Load : W = 4.10, E = 4.50 k @ 2.0 ft

Uniform Load : D = 0.0150 ksf, Tributary Width = 12.0 ft, (wall)

Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 3.0 ft, (ROOF)

Point Load : W = 4.10, E = 4.50 k @ 59.250 ft

Point Load : W = 4.10, E = 4.50 k @ 64.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.114 : 1
Section used for this span	Typical Section
Mu : Applied	3.391 k-ft
Mn * Phi : Allowable	29.862 k-ft
Load Combination	+0.90D+E
Location of maximum on span	10.094 ft
Span # where maximum occurs	Span # 1

Maximum Deflection	
Max Downward L+Lr+S Deflection	0.000 in
Max Upward L+Lr+S Deflection	0.000 in
Max Downward Total Deflection	0.046 in
Max Upward Total Deflection	0.007 in

Maximum Soil Pressure =	0.992 ksf	at	66.00 ft	LdComb: +D+0.70E
Allowable Soil Pressure =	2.660 ksf	OK		

Shear Stirrup Requirements

Entire Beam Span Length : Ties Not Req'd, Stirrups are not required.

Maximum Forces & Stresses for Load Combination

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: FS.ec6

LIC#: KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL C 12"Dx15"W

Load Combination			Bending Stress Results (k-ft)		
Segment Length	Span #	Location (ft) in Span	Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	10.094	3.39	29.86	0.11
+1.40D					
Span # 1	1	65.224	-0.00	29.86	0.00
+1.20D+0.50Lr					
Span # 1	1	65.224	-0.00	29.86	0.00
+1.20D					
Span # 1	1	65.224	-0.00	29.86	0.00
+1.20D+1.60Lr					
Span # 1	1	65.224	-0.00	29.86	0.00
+1.20D+1.60Lr+0.50W					
Span # 1	1	10.094	1.53	29.86	0.05
+1.20D+0.50W					
Span # 1	1	10.094	1.53	29.86	0.05
+1.20D+0.50Lr+W					
Span # 1	1	10.094	3.08	29.86	0.10
+1.20D+W					
Span # 1	1	10.094	3.08	29.86	0.10
+0.90D+W					
Span # 1	1	10.094	3.09	29.86	0.10
+1.20D+E					
Span # 1	1	10.094	3.39	29.86	0.11
+0.90D+E					
Span # 1	1	10.094	3.39	29.86	0.11

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0459	66.000		0.0000	0.000

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k)	Av, min Req'd?	Spacing Req'd (in)	Φ Vc (k)	Φ Vs (k)	Φ Vn (k)	Vu / Φ Vn	Vc Eqn (T22.5.5.1)	Spacing Provision
+1.20D+E	1	0.00	6.00	0.56	No	N/A	8.68	0.00	8.68	0.065	Eqn (b)	Ties Not Req'd
+1.20D+E	1	0.78	6.00	1.30	No	N/A	8.68	0.00	8.68	0.150	Eqn (b)	Ties Not Req'd
+1.20D+E	1	1.55	6.00	2.00	No	N/A	8.68	0.00	8.68	0.231	Eqn (b)	Ties Not Req'd
+0.90D+E	1	2.33	6.00	-1.86	No	N/A	8.68	0.00	8.68	0.214	Eqn (b)	Ties Not Req'd
+0.90D+E	1	3.11	6.00	-1.24	No	N/A	8.68	0.00	8.68	0.143	Eqn (b)	Ties Not Req'd
+0.90D+E	1	3.88	6.00	-0.67	No	N/A	8.68	0.00	8.68	0.077	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	4.66	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+E	1	5.44	6.00	0.39	No	N/A	8.68	0.00	8.68	0.045	Eqn (b)	Ties Not Req'd
+1.20D+E	1	6.21	6.00	0.86	No	N/A	8.68	0.00	8.68	0.099	Eqn (b)	Ties Not Req'd
+1.20D+E	1	6.99	6.00	1.31	No	N/A	8.68	0.00	8.68	0.151	Eqn (b)	Ties Not Req'd
+1.20D+E	1	7.76	6.00	1.75	No	N/A	8.68	0.00	8.68	0.201	Eqn (b)	Ties Not Req'd
+1.20D+E	1	8.54	6.00	2.16	No	N/A	8.68	0.00	8.68	0.249	Eqn (b)	Ties Not Req'd
+1.20D+E	1	9.32	6.00	2.56	No	N/A	8.68	0.00	8.68	0.295	Eqn (b)	Ties Not Req'd
+0.90D+E	1	10.09	6.00	-1.58	No	N/A	8.68	0.00	8.68	0.183	Eqn (b)	Ties Not Req'd
+0.90D+E	1	10.87	6.00	-1.24	No	N/A	8.68	0.00	8.68	0.143	Eqn (b)	Ties Not Req'd
+0.90D+E	1	11.65	6.00	-0.93	No	N/A	8.68	0.00	8.68	0.107	Eqn (b)	Ties Not Req'd
+0.90D+E	1	12.42	6.00	-0.66	No	N/A	8.68	0.00	8.68	0.075	Eqn (b)	Ties Not Req'd
+0.90D+E	1	13.20	6.00	-0.42	No	N/A	8.68	0.00	8.68	0.049	Eqn (b)	Ties Not Req'd
+0.90D+E	1	13.98	6.00	-0.23	No	N/A	8.68	0.00	8.68	0.026	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	14.75	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	15.53	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	16.31	6.00	0.21	No	N/A	8.68	0.00	8.68	0.025	Eqn (b)	Ties Not Req'd
+1.20D+0.50Lr+W	1	17.08	6.00	0.26	No	N/A	8.68	0.00	8.68	0.029	Eqn (b)	Ties Not Req'd
+1.20D+0.50Lr+W	1	17.86	6.00	0.30	No	N/A	8.68	0.00	8.68	0.035	Eqn (b)	Ties Not Req'd
+1.20D+E	1	18.64	6.00	0.33	No	N/A	8.68	0.00	8.68	0.038	Eqn (b)	Ties Not Req'd
+1.20D+E	1	19.41	6.00	0.35	No	N/A	8.68	0.00	8.68	0.040	Eqn (b)	Ties Not Req'd
+1.20D+E	1	20.19	6.00	0.36	No	N/A	8.68	0.00	8.68	0.041	Eqn (b)	Ties Not Req'd
+1.20D+E	1	20.96	6.00	0.35	No	N/A	8.68	0.00	8.68	0.041	Eqn (b)	Ties Not Req'd
+1.20D+E	1	21.74	6.00	0.35	No	N/A	8.68	0.00	8.68	0.040	Eqn (b)	Ties Not Req'd
+1.20D+E	1	22.52	6.00	0.33	No	N/A	8.68	0.00	8.68	0.038	Eqn (b)	Ties Not Req'd
+1.20D+E	1	23.29	6.00	0.32	No	N/A	8.68	0.00	8.68	0.037	Eqn (b)	Ties Not Req'd
+1.20D+0.50Lr+W	1	24.07	6.00	0.30	No	N/A	8.68	0.00	8.68	0.035	Eqn (b)	Ties Not Req'd
+1.20D+0.50Lr+W	1	24.85	6.00	0.29	No	N/A	8.68	0.00	8.68	0.033	Eqn (b)	Ties Not Req'd
+1.20D+0.50Lr+W	1	25.62	6.00	0.27	No	N/A	8.68	0.00	8.68	0.031	Eqn (b)	Ties Not Req'd
+1.20D+0.50Lr+W	1	26.40	6.00	0.26	No	N/A	8.68	0.00	8.68	0.030	Eqn (b)	Ties Not Req'd
+1.20D+0.50Lr+W	1	27.18	6.00	0.24	No	N/A	8.68	0.00	8.68	0.028	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	27.95	6.00	0.24	No	N/A	8.68	0.00	8.68	0.027	Eqn (b)	Ties Not Req'd

CITY OF PEORIA PERMIT
 8-68
 BCOM-25-00416

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: FS.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL C 12"Dx15"W

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k)	Av, min Req'd?	Spacing Req'd (in)	ϕV_c (k)	ϕV_s (k)	ϕV_n (k)	Vu / ϕV_n	Vc Eqn (T22.5.5.1)	Spacing Provision
+1.20D+1.60Lr+0.50W	1	28.73	6.00	0.23	No	N/A	8.68	0.00	8.68	0.027	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	29.51	6.00	0.23	No	N/A	8.68	0.00	8.68	0.026	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	30.28	6.00	0.22	No	N/A	8.68	0.00	8.68	0.026	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	31.06	6.00	0.22	No	N/A	8.68	0.00	8.68	0.026	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	31.84	6.00	0.22	No	N/A	8.68	0.00	8.68	0.025	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	32.61	6.00	0.22	No	N/A	8.68	0.00	8.68	0.025	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	33.39	6.00	0.22	No	N/A	8.68	0.00	8.68	0.025	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	34.16	6.00	0.22	No	N/A	8.68	0.00	8.68	0.025	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	34.94	6.00	0.21	No	N/A	8.68	0.00	8.68	0.025	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr+0.50W	1	35.72	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	36.49	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	37.27	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	38.05	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	38.82	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	39.60	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	40.38	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	41.15	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	41.93	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	42.71	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	43.48	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	44.26	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	45.04	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	45.81	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	46.59	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	47.36	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	48.14	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	48.92	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	49.69	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	50.47	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	51.25	6.00	0.21	No	N/A	8.68	0.00	8.68	0.024	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	52.02	6.00	0.21	No	N/A	8.68	0.00	8.68	0.025	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	52.80	6.00	0.21	No	N/A	8.68	0.00	8.68	0.025	Eqn (b)	Ties Not Req'd
+1.20D+0.50Lr+W	1	53.58	6.00	0.24	No	N/A	8.68	0.00	8.68	0.028	Eqn (b)	Ties Not Req'd
+1.20D+E	1	54.35	6.00	0.41	No	N/A	8.68	0.00	8.68	0.047	Eqn (b)	Ties Not Req'd
+1.20D+E	1	55.13	6.00	0.64	No	N/A	8.68	0.00	8.68	0.074	Eqn (b)	Ties Not Req'd
+1.20D+E	1	55.91	6.00	0.92	No	N/A	8.68	0.00	8.68	0.106	Eqn (b)	Ties Not Req'd
+1.20D+E	1	56.68	6.00	1.27	No	N/A	8.68	0.00	8.68	0.146	Eqn (b)	Ties Not Req'd
+1.20D+E	1	57.46	6.00	1.67	No	N/A	8.68	0.00	8.68	0.193	Eqn (b)	Ties Not Req'd
+1.20D+E	1	58.24	6.00	2.14	No	N/A	8.68	0.00	8.68	0.247	Eqn (b)	Ties Not Req'd
+1.20D+E	1	59.01	6.00	2.68	No	N/A	8.68	0.00	8.68	0.308	Eqn (b)	Ties Not Req'd
+0.90D+E	1	59.79	6.00	-1.26	No	N/A	8.68	0.00	8.68	0.145	Eqn (b)	Ties Not Req'd
+0.90D+E	1	60.56	6.00	-0.62	No	N/A	8.68	0.00	8.68	0.072	Eqn (b)	Ties Not Req'd
+1.20D+1.60Lr	1	61.34	6.00	0.22	No	N/A	8.68	0.00	8.68	0.025	Eqn (b)	Ties Not Req'd
+1.20D+E	1	62.12	6.00	0.82	No	N/A	8.68	0.00	8.68	0.095	Eqn (b)	Ties Not Req'd
+1.20D+E	1	62.89	6.00	1.61	No	N/A	8.68	0.00	8.68	0.185	Eqn (b)	Ties Not Req'd
+1.20D+E	1	63.67	6.00	2.43	No	N/A	8.68	0.00	8.68	0.280	Eqn (b)	Ties Not Req'd
+0.90D+E	1	64.45	6.00	-1.23	No	N/A	8.68	0.00	8.68	0.141	Eqn (b)	Ties Not Req'd
+0.90D+E	1	65.22	6.00	-0.32	No	N/A	8.68	0.00	8.68	0.037	Eqn (b)	Ties Not Req'd



ADMIN BUILDING GRAVITY DESIGN



STRUCTURAL
ENGINEERS

PROJECT DEAD LOAD ANALYSIS

ROOF TYPES

R1	Main Sloped Roof:		
	Lightweight Tile/Membrane:	5.0	psf
	15/32" Sheathing:	2.5	psf
	Roof Framing (Trusses at 24" o.c.):	3.0	psf
	Insulation (Batt):	0.5	psf
	(1) Layer 5/8" Drywall at Ceiling:	2.5	psf
	Mech/Elec/Plumbing:	1.5	psf
	Ceiling Framing:	0.0	psf
	Total Dead Load =	15.0	psf

WALL TYPES

W1	2x6 Wood Stud Exterior Wall		
	7/8" Plaster/Stucco	8.0	psf
	15/32" Sheathing:	1.5	psf
	Wall Framing (2x6 at 16" o.c.):	1.5	psf
	Insulation (Batt):	0.5	psf
	(1) Layer 5/8" Drywall:	3.0	psf
	Mech/Elec/Plumbing:	0.5	psf
	Total Dead Load =	15.0	psf

W2	2x4 Wood Stud Interior Wall		
	15/32" Sheathing:	1.5	psf
	Wall Framing (2x4 at 16" o.c.):	1.5	psf
	Insulation (Batt):	0.5	psf
	(1) Layer 5/8" Drywall each side:	6.0	psf
	Mech/Elec/Plumbing:	0.5	psf
	Total Dead Load =	10.0	psf

W3	2x6 Wood Stud Exterior Wall w/ Stone Veneer		
	7/8" Plaster/Stucco	8.0	psf
	15/32" Sheathing:	1.5	psf
	Wall Framing (2x6 at 16" o.c.):	1.5	psf
	Insulation (Batt):	0.5	psf
	(1) Layer 5/8" Drywall:	3.0	psf
	Stone Veneer:	50.0	psf
	Mech/Elec/Plumbing:	0.5	psf
	Total Dead Load =	65.0	psf

Level			
Member Name	Results (Max UTIL %)	Current Solution	Comments
H1	Passed (97% M)	1 piece(s) 6 x 8 DF No.1	
H4	Passed (71% R)	1 piece(s) 5 1/4" x 11 7/8" 2.0E Parallam® PSL	
B1 Roof Drop Beam	Passed (84% M)	1 piece(s) 6 x 6 DF No.1	
H3 Tower	Passed (45% B/C)	1 piece(s) 6 x 8 DF No.1	
H3.1 Tower	Passed (37% B/C)	1 piece(s) 6 x 8 DF No.1	
H5 Tower	Passed (74% M)	1 piece(s) 6 x 14 DF No.1	
H6 Tower	Passed (71% M)	1 piece(s) 6 x 6 DF No.1	
B2 Roof Drop Beam	Passed (50% M)	1 piece(s) 6 x 8 DF No.1	
B3 Roof Drop Beam	Passed (45% M)	1 piece(s) 6 x 8 DF No.1	
Tower Low Roof Joists	Passed (84% M)	1 piece(s) 2 x 12 DF No.2 @ 24" OC	

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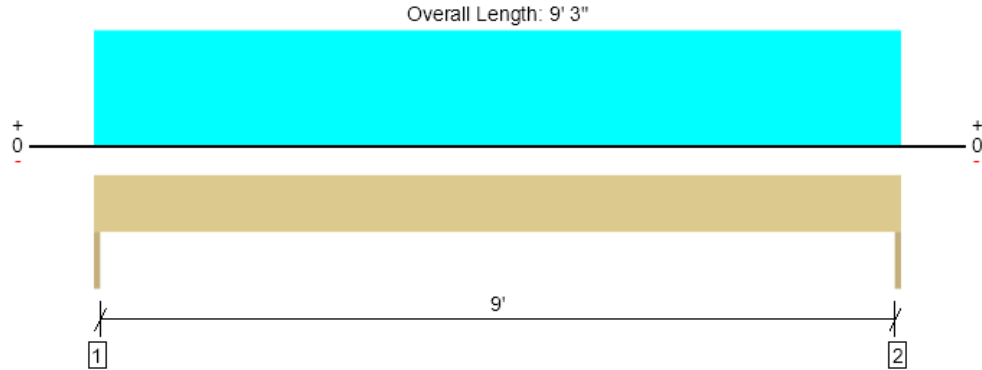
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Level, H1

1 piece(s) 6 x 8 DF No.1


Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2713 @ 0	5156 (1.50")	Passed (53%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	2273 @ 9"	5844	Passed (39%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	6275 @ 4' 7 1/2"	6445	Passed (97%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.173 @ 4' 7 1/2"	0.308	Passed (L/641)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.312 @ 4' 7 1/2"	0.463	Passed (L/355)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	613 @ 9' 3"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	536 @ 7"	7480	Passed (7%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	1418 @ mid-span	6050	Passed (23%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.092 @ mid-span	0.308	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.83	1.00	Passed (83%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 9' 3"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Wall deflection criteria: TL (L/360)
- Moment capacity has been adjusted by a factor of 0.89 to account for the beam stability and/or volume/size factors.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	1210	1503	2713	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	1210	1503	2713	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

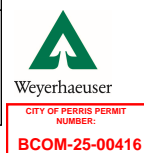
Lateral Connections						
Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	7	
Right	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	7	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 9' 3"	N/A	10.4	--	
1 - Uniform (PSF)	0 to 9' 3"	16' 3"	15.5	20.0	Roof

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	7' 6"	29.5	wind

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (20' 4 1/16"), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(IV), Wind Zone (4), GCpl (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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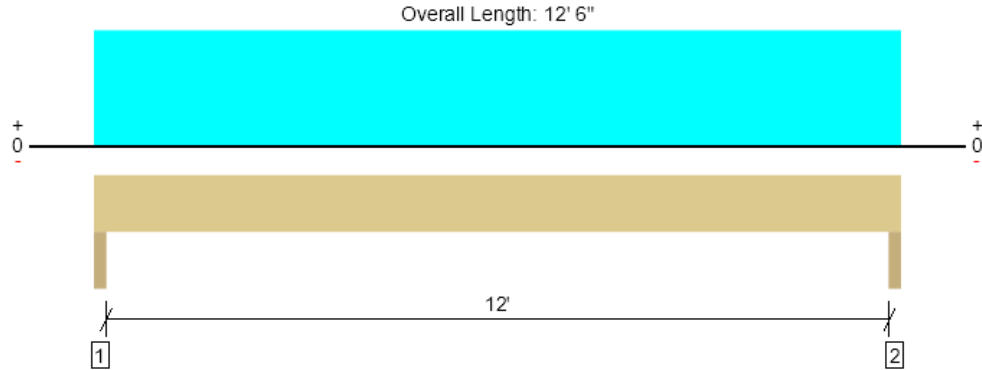
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Level, H4

1 piece(s) 5 1/4" x 11 7/8" 2.0E Parallam® PSL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	6993 @ 1 1/2"	9844 (3.00")	Passed (71%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	5606 @ 1' 2 7/8"	15066	Passed (37%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	20986 @ 6' 3"	37317	Passed (56%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.236 @ 6' 3"	0.408	Passed (L/623)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.426 @ 6' 3"	0.613	Passed (L/345)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	442 @ 12' 4 1/2"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	401 @ 8 1/4"	13965	Passed (3%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	1353 @ mid-span	21127	Passed (6%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.091 @ mid-span	0.408	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.43	1.00	Passed (43%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

- Deflection criteria: LL (L/360) and TL (L/240).
- Wall deflection criteria: TL (L/360)
- Initial eccentricity applied as per ESR-1387.

Member Length : 12' 6"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	3.00"	3.00"	2.13"	3118	3875	6993	None
2 - Trimmer - DF	3.00"	3.00"	2.13"	3118	3875	6993	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

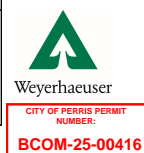
Lateral Connections						
Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	5	
Right	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	5	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 12' 6"	N/A	19.5	--	
1 - Uniform (PSF)	0 to 12' 6"	31'	15.5	20.0	Roof

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	4'	30.0	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (20' 4 1/16"), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(IV), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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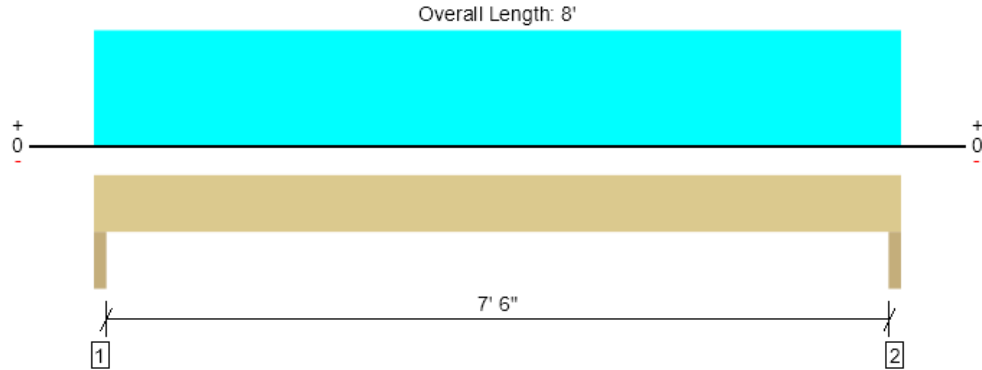
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
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Level, B1 Roof Drop Beam
1 piece(s) 6 x 6 DF No.1



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1545 @ 1 1/2"	10313 (3.00")	Passed (15%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	1272 @ 8 1/2"	4285	Passed (30%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	2901 @ 4'	3466	Passed (84%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.094 @ 4'	0.258	Passed (L/987)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.257 @ 4'	0.313	Passed (L/362)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	322 @ 7' 10 1/2"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	274 @ 8 1/2"	5485	Passed (5%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	624 @ mid-span	4437	Passed (14%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.039 @ mid-span	0.258	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.70	1.00	Passed (70%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 8'
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (5/16").
- Wall deflection criteria: TL (L/360)
- Moment capacity has been adjusted by a factor of 0.89 to account for the beam stability and/or volume/size factors.
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	3.00"	3.00"	1.50"	979	567	1545	None
2 - Trimmer - DF	3.00"	3.00"	1.50"	979	567	1545	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

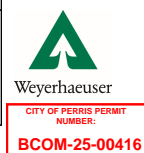
Lateral Connections						
Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	4	
Right	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	4	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 8'	N/A	7.7	--	
1 - Uniform (PSF)	0 to 8'	7' 1"	15.5	20.0	Roof
2 - Uniform (PSF)	0 to 8'	8' 6"	15.0	--	Exterior wall above

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	4' 6"	30.8	

• ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (20' 4 1/16"), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(IV), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.

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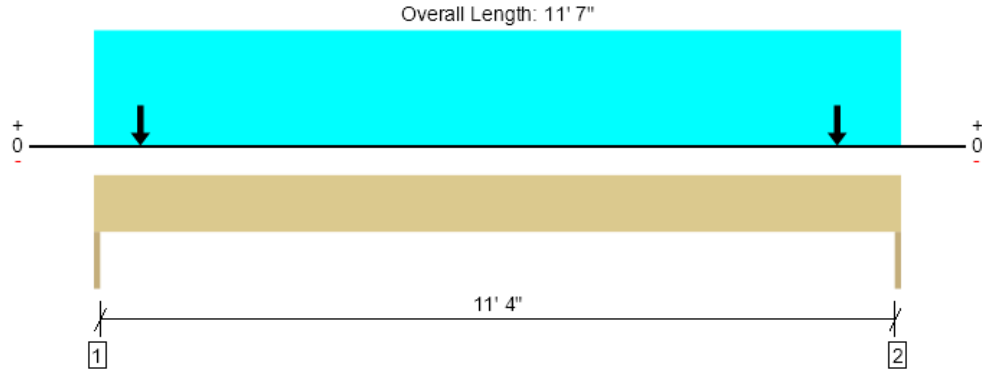
Member Notes
B1 Roof Drop Beam Max Span 7'-6"

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Level, H3 Tower
1 piece(s) 6 x 8 DF No.1



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1616 @ 0	5156 (1.50")	Passed (31%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	1491 @ 10' 10"	5844	Passed (26%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	2622 @ 5' 11 11/16"	6445	Passed (41%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.092 @ 5' 10 3/16"	0.386	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.216 @ 5' 10"	0.579	Passed (L/644)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	470 @ 11' 7"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	422 @ 7"	7480	Passed (6%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	1360 @ mid-span	6050	Passed (22%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.138 @ mid-span	0.386	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.45	1.00	Passed (45%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 11' 7"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Wall deflection criteria: TL (L/360)
- Moment capacity has been adjusted by a factor of 0.89 to account for the beam stability and/or volume/size factors.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	832	783	1616	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	815	760	1575	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

Lateral Connections						
Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	5	
Right	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	5	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 11' 7"	N/A	10.4	--	
1 - Uniform (PSF)	0 to 11' 7"	2'	15.5	20.0	Roof
2 - Uniform (PSF)	0 to 11' 7"	2'	15.0	--	Exterior wall above
3 - Point (lb)	8"	N/A	410	540	GT reaction
4 - Point (lb)	10' 8"	N/A	410	540	GT reaction

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	4' 6"	30.0	

ForteWEB Software Operator	Job Notes
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Member Notes

H3 Tower Max Span 11'-4"

Weyerhaeuser Notes

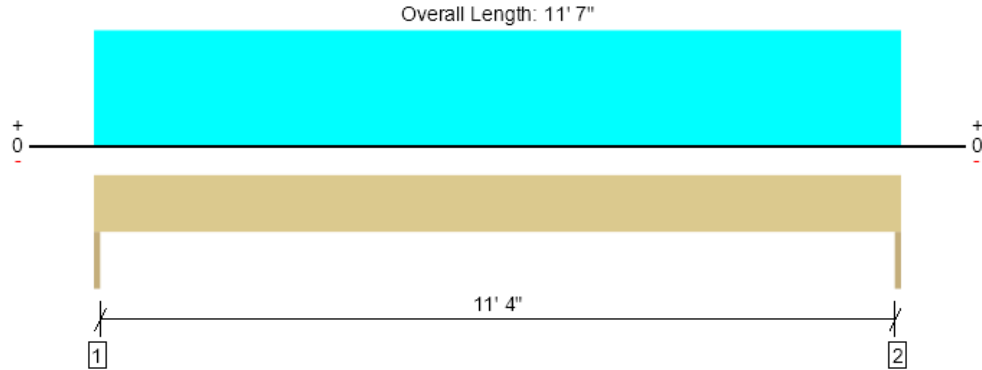
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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Level, H3.1 Tower
1 piece(s) 6 x 8 DF No.1



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	645 @ 0	5156 (1.50")	Passed (13%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	562 @ 9"	5844	Passed (10%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	1868 @ 5' 9 1/2"	6445	Passed (29%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.052 @ 5' 9 1/2"	0.386	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.146 @ 5' 9 1/2"	0.579	Passed (L/953)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	470 @ 11' 7"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	422 @ 7"	7480	Passed (6%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	1360 @ mid-span	6050	Passed (22%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.138 @ mid-span	0.386	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.37	1.00	Passed (37%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 11' 7"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Wall deflection criteria: TL (L/360)
- Moment capacity has been adjusted by a factor of 0.89 to account for the beam stability and/or volume/size factors.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	413	232	645	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	413	232	645	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

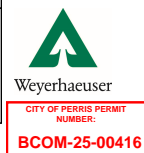
Lateral Connections						
Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	5	
Right	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	5	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 11' 7"	N/A	10.4	--	
1 - Uniform (PSF)	0 to 11' 7"	2'	15.5	20.0	Roof
2 - Uniform (PSF)	0 to 11' 7"	2'	15.0	--	Exterior wall above

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	4' 6"	30.0	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (20' 4 1/16"), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(IV), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

ForteWEB Software Operator	Job Notes
Sandy Fong Innovative Structural Engineering (951) 600-0032 SANDY@ISEENGINEERS.COM	



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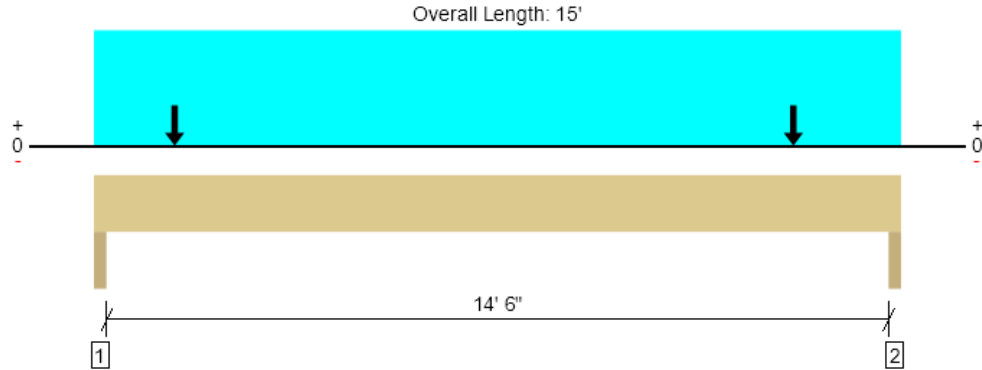
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Sandy Fong Innovative Structural Engineering (951) 600-0032 SANDY@ISEENGINEERS.COM	



Level, H5 Tower
1 piece(s) 6 x 14 DF No.1



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5641 @ 1' 1/2"	10313 (3.00")	Passed (55%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	4900 @ 1' 4 1/2"	10519	Passed (47%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	17164 @ 7' 7 3/16"	23188	Passed (74%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.149 @ 7' 6 5/16"	0.492	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.382 @ 7' 6 1/4"	0.738	Passed (L/463)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	584 @ 14' 10 1/2"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	538 @ 8 1/2"	13464	Passed (4%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	2153 @ mid-span	8948	Passed (24%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.197 @ mid-span	0.492	Passed (L/898)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.70	1.00	Passed (70%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 15'
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Wall deflection criteria: TL (L/360)
- Moment capacity has been adjusted by a factor of 0.99 to account for the beam stability and/or volume/size factors.
- Lumber grading provisions must be extended over the length of the member per NDS 4.2.5.5.
- Applicable calculations are based on NDS.

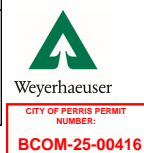
Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	3.00"	3.00"	1.64"	3365	2275	5641	None
2 - Trimmer - DF	3.00"	3.00"	1.61"	3311	2225	5536	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

Lateral Connections						
Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	6	
Right	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	6	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 15'	N/A	18.8	--	
1 - Uniform (PSF)	0 to 15'	10'	15.5	20.0	Roof
2 - Uniform (PSF)	0 to 15'	11'	15.0	--	Exterior wall above
3 - Point (lb)	1' 6"	N/A	800	750	Trimmer from above
4 - Point (lb)	13'	N/A	800	750	Trimmer from above

FortewEB Software Operator	Job Notes
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Lateral Load	Location	Tributary Width	Wind (1.60)	Page 147 of 375 Comments
1 - Uniform (PSF)	Full Length	4' 6"	29.3	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (20' 4 1/16"), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(IV), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

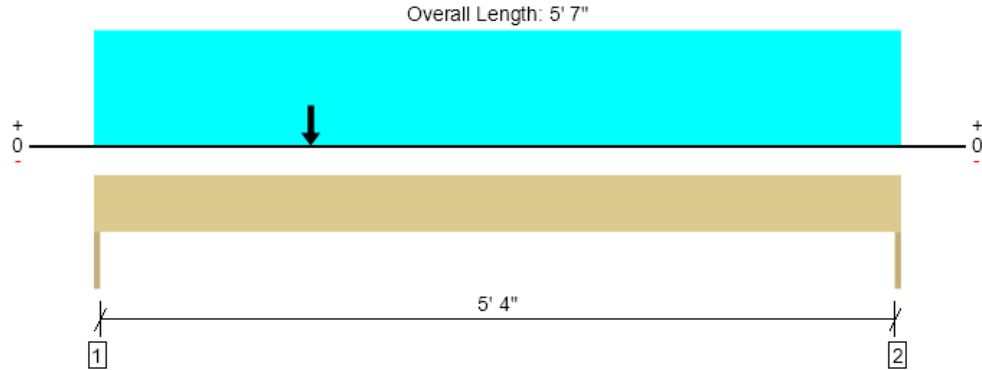
Member Notes
H5 Lower Tower Max Span 14'-6"

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ForteWEB Software Operator	Job Notes
Sandy Fong Innovative Structural Engineering (951) 600-0032 SANDY@ISEENGINEERS.COM	



Level, H6 Tower
1 piece(s) 6 x 6 DF No.1



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1814 @ 0	5156 (1.50")	Passed (35%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	1672 @ 7"	4285	Passed (39%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	2446 @ 1' 6"	3466	Passed (71%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.036 @ 2' 6 15/16"	0.186	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.102 @ 2' 7 9/16"	0.279	Passed (L/656)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	237 @ 5' 7"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	188 @ 7"	5485	Passed (3%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	331 @ mid-span	4437	Passed (7%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.011 @ mid-span	0.186	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.55	1.00	Passed (55%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 5' 7"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Wall deflection criteria: TL (L/360)
- Moment capacity has been adjusted by a factor of 0.89 to account for the beam stability and/or volume/size factors.
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	1153	660	1814	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	783	313	1096	None

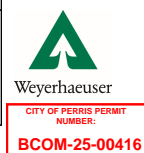
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

Lateral Connections						
Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	3	
Right	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	3	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 5' 7"	N/A	7.7	--	
1 - Uniform (PSF)	0 to 5' 7"	2'	15.5	20.0	Roof
2 - Uniform (PSF)	0 to 5' 7"	11'	15.0	--	Exterior wall above
3 - Point (lb)	1' 6"	N/A	800	750	Trimmer from above

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	4' 6"	31.5	

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Member Notes

H6 Lower Tower Max Span 5'-4"

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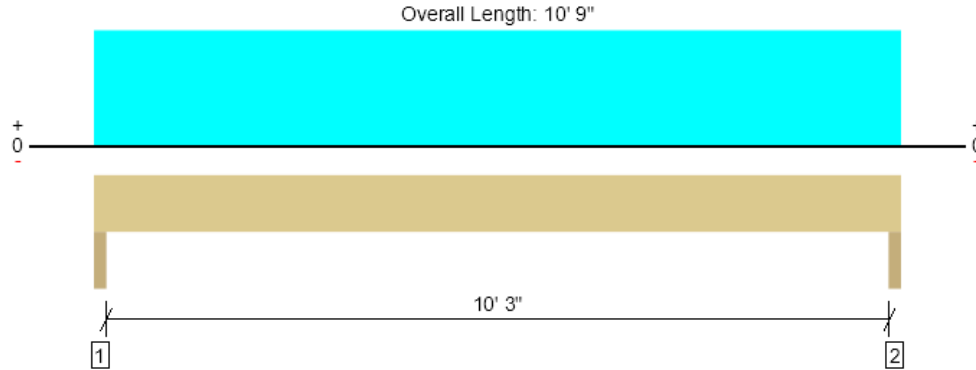
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Sandy Fong Innovative Structural Engineering (951) 600-0032 SANDY@ISEENGINEERS.COM	



Level, B2 Roof Drop Beam
1 piece(s) 6 x 8 DF No.1



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1123 @ 1 1/2"	10313 (3.00")	Passed (11%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	760 @ 10 1/2"	4208	Passed (18%)	0.90	1.0 D (All Spans)
Moment (Ft-lbs)	2327 @ 5' 4 1/2"	4641	Passed (50%)	0.90	1.0 D (All Spans)
Vert Live Load Defl. (in)	0.035 @ 5' 4 1/2"	0.350	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.185 @ 5' 4 1/2"	0.525	Passed (L/682)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	428 @ 10' 7 1/2"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	380 @ 8 1/2"	7480	Passed (5%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	1123 @ mid-span	6050	Passed (19%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.094 @ mid-span	0.350	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.47	1.00	Passed (47%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 10' 9"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Wall deflection criteria: TL (L/360)
- Moment capacity has been adjusted by a factor of 0.89 to account for the beam stability and/or volume/size factors.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	3.00"	3.00"	1.50"	908	215	1123	None
2 - Trimmer - DF	3.00"	3.00"	1.50"	908	215	1123	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

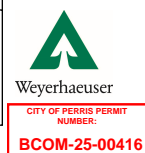
Lateral Connections						
Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	5	
Right	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	5	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 10' 9"	N/A	10.4	--	
1 - Uniform (PSF)	0 to 10' 9"	2'	15.5	20.0	Roof
2 - Uniform (PSF)	0 to 10' 9"	8' 6"	15.0	--	Exterior wall above

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	4' 6"	30.2	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (20' 4 1/16"), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(IV), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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Sandy Fong Innovative Structural Engineering (951) 600-0032 SANDY@ISEENGINEERS.COM	



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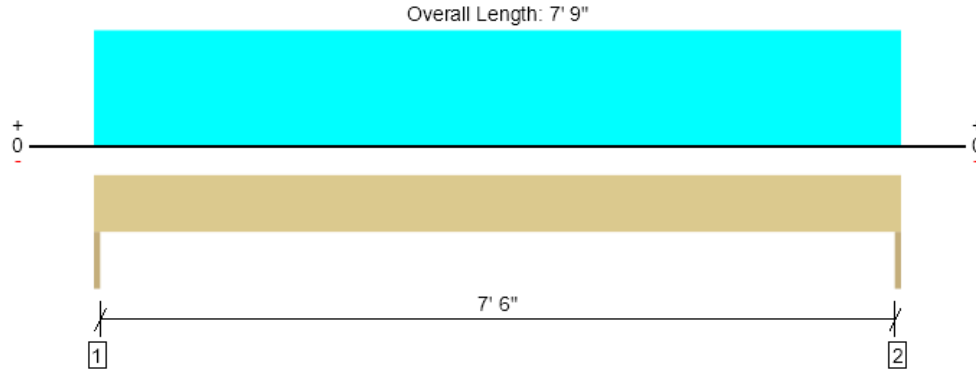
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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Sandy Fong Innovative Structural Engineering (951) 600-0032 SANDY@ISEENGINEERS.COM	



Level, B3 Roof Drop Beam
1 piece(s) 6 x 8 DF No.1



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1508 @ 0	5156 (1.50")	Passed (29%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	1216 @ 9"	5844	Passed (21%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	2922 @ 3' 10 1/2"	6445	Passed (45%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.037 @ 3' 10 1/2"	0.258	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.102 @ 3' 10 1/2"	0.387	Passed (L/911)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	323 @ 7' 9"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	274 @ 7"	7480	Passed (4%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	625 @ mid-span	6050	Passed (10%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.028 @ mid-span	0.258	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.40	1.00	Passed (40%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 7' 9"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Wall deflection criteria: TL (L/360)
- Moment capacity has been adjusted by a factor of 0.89 to account for the beam stability and/or volume/size factors.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	959	549	1508	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	959	549	1508	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

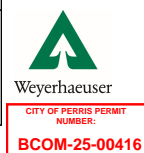
Lateral Connections						
Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	4	
Right	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	4	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 7' 9"	N/A	10.4	--	
1 - Uniform (PSF)	0 to 7' 9"	7' 1"	15.5	20.0	Roof
2 - Uniform (PSF)	0 to 7' 9"	8' 6"	15.0	--	Exterior wall above

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	4' 6"	30.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (20' 4 1/16"), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(IV), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

FortewEB Software Operator	Job Notes
Sandy Fong Innovative Structural Engineering (951) 600-0032 SANDY@ISEENGINEERS.COM	



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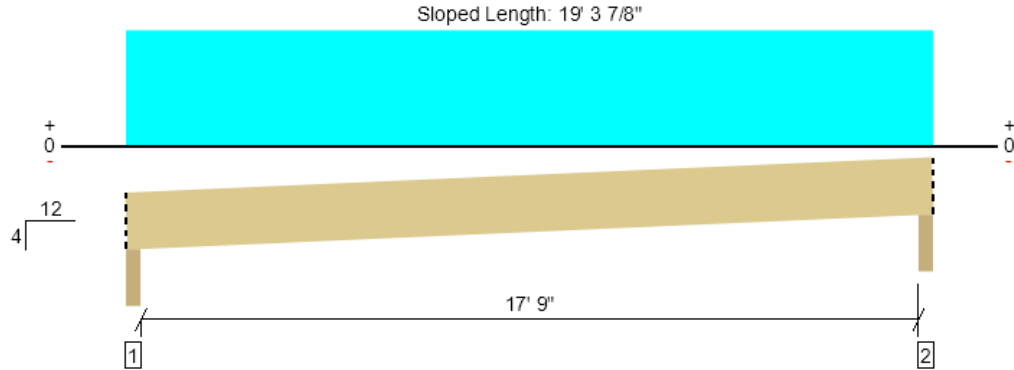
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Sandy Fong Innovative Structural Engineering (951) 600-0032 SANDY@ISEENGINEERS.COM	



Level, Tower Low Roof Joists
1 piece(s) 2 x 12 DF No.2 @ 24" OC



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	657 @ 2 1/2"	3281 (3.50")	Passed (20%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	572 @ 1' 2 3/16"	2531	Passed (23%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	2874 @ 9' 2"	3411	Passed (84%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.362 @ 9' 2"	0.630	Passed (L/626)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.648 @ 9' 2"	0.944	Passed (L/350)	--	1.0 D + 1.0 Lr (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

Member Length : 19' 7 5/8"
System : Roof
Member Type : Joist
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 4/12

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Beveled Plate - DF	3.50"	3.50"	1.50"	290	367	657	Blocking
2 - Beveled Plate - DF	3.50"	3.50"	1.50"	290	367	657	Blocking

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 1" o/c	
Bottom Edge (Lu)	19' 4" o/c	

- Maximum allowable bracing intervals based on applied load.
- Dimensions for lateral bracing intervals are measured along the length of the member for sloped conditions.

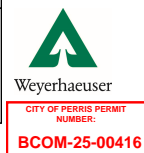
Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (1.25)	Comments
1 - Uniform (PSF)	0 to 18' 4"	24"	15.0	20.0	Default Load

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Sandy Fong Innovative Structural Engineering (951) 600-0032 SANDY@ISEENGINEERS.COM	



11/25/2025 7:20:06 AM UTC
ForteWEB v3.9, Engine: V8.4.3.94, Data: V8.1.7.3
File Name: Admin

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Wood Beam

Project File: Admin.ec6

LIC#: KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: H2 Header 5'-0" Span

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, SDPWS 2021

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : ASCE 7-16

Wood Species : Douglas Fir-Larch

Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb + 1350 psi

Fb - 1350 psi

Fc - Prll 925 psi

Fc - Perp 625 psi

Fv 170 psi

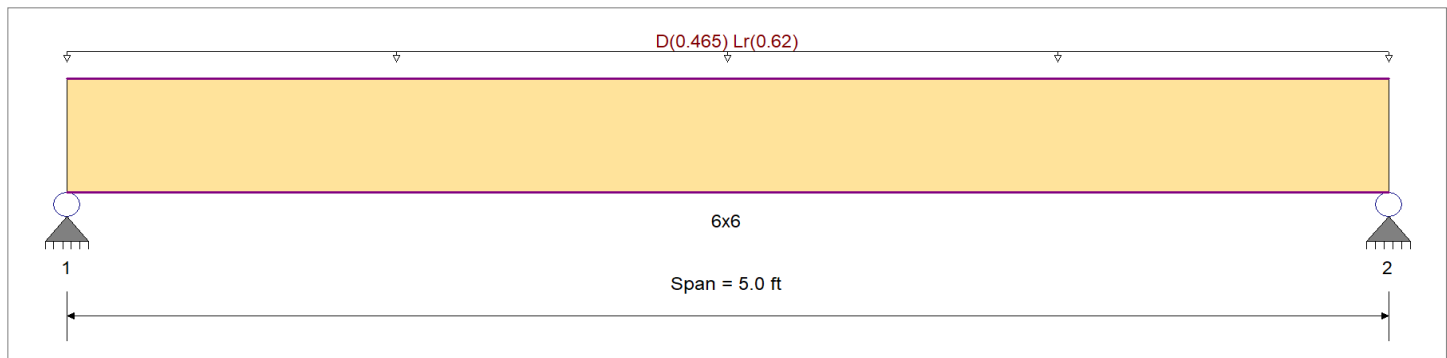
Ft 675 psi

E : Modulus of Elasticity

Ebend- xx 1600ksi

Eminbend - xx 580ksi

Density 31.21pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading

Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 31.0 ft, (Roof)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio				Maximum Shear Stress Ratio			
Section used for this span				Section used for this span			
= 0.875 : 1				= 0.521 : 1			
6x6				6x6			
fb: Actual	=	1,476.18psi		fv: Actual	=	110.62 psi	
F'b	=	1,687.50psi		F'v	=	212.50 psi	
Load Combination		+D+Lr		Load Combination		+D+Lr	
Location of maximum on span	=	2.500ft		Location of maximum on span	=	0.000ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection	0.072 in	Ratio =	834 >=360	Span: 1 : Lr Only			
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a			
Max Downward Total Deflection	0.127 in	Ratio =	474 >=180	Span: 1 : +D+Lr			
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.525	0.312	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.47	637.7	1,215.0	0.96	47.8	153.0
+D+Lr														0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.875	0.521	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.41	1,476.2	1,687.5	2.23	110.6	212.5
+D+0.750Lr														0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.751	0.447	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.93	1,266.6	1,687.5	1.91	94.9	212.5
+0.60D														0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.177	0.105	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.88	382.6	2,160.0	0.58	28.7	272.0

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Wood Beam

Project File: Admin.ec6

LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

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DESCRIPTION: H2 Header 5'-0" Span

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	0.1265	2.518		0.0000	0.000

Vertical Reactions


Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	2.729	2.729
Max Upward from Load Combinations	2.729	2.729
Max Upward from Load Cases	1.550	1.550
D Only	1.179	1.179
+D+Lr	2.729	2.729
+D+0.750Lr	2.341	2.341
+0.60D	0.707	0.707
Lr Only	1.550	1.550



ADMIN BUILDING LATERAL DESIGN

 STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

SEISMIC DESIGN LOAD - EQUIVALENT LATERAL FORCE PROCEDURE

Structure: Admin Building

Building Seismic Design Criteria

(ASCE - Chapter 11)

Risk Category of Building or Structure:	IV	Table 1.5-1
Short-Period Spectral Response Acceleration, S_s :	1.422	Per ASCE 7 Hazard Tool
Long-Period Spectral Response Acceleration, S_1 :	0.526	Per ASCE 7 Hazard Tool
Average Height of Building Roof, h_n :	26.33	ft

Site-specific ground motion analysis provided?	Yes	11.4.8
Analytical procedure (Limit per Table 12.6-1)	ELF	Equivalent Lateral Force 12.8
Structural irregularities per 12.3.2?	Yes	12.8.1.3 - Item 1
Exceed 5 story above base/grade including mezzanines?	No	12.8.1.3 - Item 2

Site Class

11.4.3 & 11.4.4

Soil Site Class:	D	Per Geotech Report
------------------	---	--------------------

Site Coefficients & Spectral Response Acceleration Parameters

11.4.4

	Table 11.4-1 & 11.4-2	11.4.8 Exceptions	Site-specific analysis per Geotech Report	Calculation Warnings/Notes
Site Coefficient, F_a :	1.00	N/A	1.20	
Site Coefficient, F_v :	Site Specific	1.77	1.77	

$S_{MS} = F_a * S_s$:	1.48	Equation 11.4-1
$S_{M1} = F_v * S_1$:	1.05	Equation 11.4-2
$S_{DS} = 2/3 * S_{MS}$:	0.99	Equation 11.4-3
$S_{D1} = 2/3 * S_{M1}$:	0.70	Equation 11.4-4
$T_s = S_{D1} / S_{DS}$:	0.71	11.4.6
Seismic Design Category (SDC):	D	11.6 & Table 11.6-1 & 2

Seismic Equivalent Lateral Force Procedure

Section 12.8

Importance Factor, I_e :	1.50	Table 1.5-2
Response Modification Factor, R : Table 12.2-1	6.50	Light Framed Shear Walls
Overstrength Amplification factor, Ω_o :	2.5	Table 12.2-1
Approximate Period Values: Table 12.8-2:	C_t : 0.02	All other systems
	x : 0.75	
Approximate Fundamental Period, $T_a = C_t (h_n)^x$:	0.23	s
Long Period Transition Period, T_L :	8	

Equation 12.8-7

Figure 22 (14-17)

 STRUCTURAL ENGINEERS	www.ISEngineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

Seismic Response Coefficient, C_s :

$$C_s = S_{DS} / (R / I_e):$$

0.228

Equation 12.8-2

Maximum C_s :

MAX

$$C_s = S_{D1} / T_a (R / I_e): \quad T \leq T_L$$

0.696

Equation 12.8-3

$$C_s = S_{D1} T_L / T_a^2 (R / I_e): \quad T > T_L$$

23.958

Equation 12.8-4

Minimum C_s :

MIN

$$C_s = 0.044 S_{DS} I_e: \quad \geq 0.01$$

0.065

Equation 12.8-5

$$C_s = 0.5 S_1 / (R / I_e): \quad \text{for } S_1 \geq 0.6$$

N/A

Equation 12.8-6

$$\text{Seismic Base Shear, } V = C_s W:$$

0.228

W

Equation 12.8-1

Building Structure - Horizontal Seismic Load Effect, E_h

$$\text{Redundancy Factor, } \rho:$$

1.00

Section 12.3.4.2

$$(\text{Strength Level}) \quad 1.0 E_h = \rho Q_e:$$

0.228

W

Equation 12.4-3

$$(\text{ASD Level}) \quad 0.7 E_h = \rho Q_e:$$

0.159

W

Equation 12.4-3

Diaphragm Design Forces per 12.10.1

$$F_{px} = 0.2 S_{DS} I_e w_{px} =$$

0.296

W (Min)

Section 12.10

Equation 12.10-2

$$F_{px} = 0.4 S_{DS} I_e w_{px} =$$

0.592

W (Max)

Equation 12.10-3

$$F_{px} = w_{px} * \Sigma F_i / \Sigma w_i$$

Equation 12.10-1



SEISMIC BASE SHEAR ANALYSIS - FLEXIBLE DIAPHRAGM

STRUCTURE:			Perris Fire Station																													
Wall 2 (upper 1/2)	1	12		0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	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	
Wall 3 (upper 1/2)	1	12		0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall 4 (upper 1/2)	1	12		0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall 5 (upper 1/2)	1	12		0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.7	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	
Wall 7 (upper 1/2)	1	12		0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.7	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall 8 (upper 1/2)	1	12		0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.5	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	
Int. Walls (upper 1/2)	1	12		0.0	0.1	0.6	1.6	2.2	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.8	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Tower Roof	TU	24.415		0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.3	0.0				0.0	0.0	0.0	1.3	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall 1T (upper 1/2)	TU	24.415		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0			0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall 4T (upper 1/2)	TU	24.415		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0		0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall ET (upper 1/2)	TU	24.415		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0			0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall HT (upper 1/2)	TU	24.415		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall 1T (Lower 1/2)	1	12		0.2	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	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall 4T (Lower 1/2)	1	12		0.0	0.0	0.0	0.2	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	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall ET (Lower 1/2)	1	12		0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall HT (Lower 1/2)	1	12		0.1	0.0	0.0	0.1	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	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall 1 (upper 1/2)	1	12		0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.1	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall 4 (upper 1/2)	1	12		0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.1	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall E (upper 1/2)	1	12		0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.2	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall H (upper 1/2)	1	12		0.3	0.0	0.0	0.3	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	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

[illegible]

 STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16

SEISMIC BASE SHEAR ANALYSIS - UNIT AREA METHOD - FLEXIBLE DIAPHRAGM

Vertical Distribution of Seismic Forces

$$F_x = C_{vx} V$$

Lateral seismic force at any level

Equation 12.8-11

$$C_{vx} = w_x h_x^k / \sum w_i h_i^k$$

Vertical distribution factor

Equation 12.8-12

Structural period Factor, k :

1.00

Building Weight Summary - Projected Horizontal Plan Weight

Roof Weight:	15.0	psf
Top Floor Wall Weight:	15.0	psf (Upper Half)
Floor Weight:		psf
Mid Floor Wall Weight:		psf

1-Story Building - Vertical Distribution (F_x) & Diaphragm Forces (F_{px})												
Building Info				Distribution			1.0E (Strength Level)			0.7E (ASD Level)		
Level	h (ft)	Wi (psf)	$\sum w_i$ (psf)	$W_i h_i^k$	$\sum W_i h_i^k$	C_{vx}	F_x (psf)		F_{px} (psf)	F_x (psf)		F_{px} (psf)
							F_x	$\sum F_x$		F_x	$\sum F_x$	
1	17.5	30.0	30.0	525	525	1.00	6.83	6.83	8.88	4.78	4.78	6.22
0	-			-	525	1.00	6.83	6.83	-	4.78	4.78	-

 STRUCTURAL ENGINEERS	Sheet:	Wind Analysis
	Date:	--
	Project ID:	--
	Version:	2022 CBC / ASCE 7-16

Chapter 27 - Wind Loads on Buildings: Main Wind Force Resisting System (Directional Procedure)
Enclosed & Partially Enclosed Structures - Gable, Hip, Monoslope, & Mansard Roof

Structure: **Admin Building - Multipurpose**

Building Data:

Type of Roof:	Mansard	
Horiz building dimension parallel to wind, L:	33.3	ft
Horiz building dimension normal to wind, B:	60.0	ft
h/L:	0.68	
L/B:	0.56	
Roof Pitch, Θ :	slope ratio: 3 :12 =	14.0 degrees
Ground Elevation, Zg:		1,415 ft, above sea level

General Wind Load Requirements:

Risk category:	IV	(ASCE 7-16) Table 1.5-1
V, Basic wind speed (3-s gust): mph	110	ASCE 7 Hazard Tool & Fig 26.5-1A, B, C, & D
$V_{asd} = V\sqrt{0.6}$: mph	85	Where exceptions 4 & 5 of Sec. 16.9.1.1 apply
Wind directionality factor, K_d	0.85	Section 26.6 & Table 26.6-1
Exposure category:	C	Section 26.7
Topographic factor, K_{zt} :	1.0	Section 26.8 & Fig 26.8-1
Ground elevation factor, K_e :	0.95	Section 26.9
Gust-effect factor, G_f :	0.85	Section 26.11
Enclosure classification:	Enclosed	
Internal pressure coefficient, +/- GC_{pi}	0.18	Section 26.13 & Table 26.13-1
Velocity pressure exposure coefficient, K_z or K_h	0.90	Table 26.10-1
Minimum design wind loading, ASD	8.0	psf Section 27.1.5

Determine Velocity Pressure: $q_z = 0.00256 K_z K_{zt} K_d K_e V^2$, psf

Section 26.10.2

1-Story Building Wind Analysis			
Level	Height (ft)	K_z or K_h	q_z (psf)
Ridge Height	22.67	0.92	23.05
Mean Roof, h	20.34	0.90	22.58
1st Level	18.00	0.88	22.01

= q_h

Pressure on Building By Component (Roof Loads Normal to Roof Surface)								
Surface	Level (ft)	C_p	q_h or q_z	q (psf)	External Pressure, $q(GC_p)$ (psf)	Internal Pressure, $q_h(+/-GC_{pi})$	(psf)	
							$+(GC_{pi})$	$-(GC_{pi})$
Windward Roof - ($-C_p$)	22.67	-0.85	q_h	23.05	-16.72	4.1	-12.57	-20.87
Windward Roof - ($+C_p$)	22.67	-0.22	q_h	23.05	-4.37	4.1	-0.22	-8.52
Leeward Roof	22.67	-0.54	q_h	23.05	-10.64	4.1	-6.49	-14.79
Windward Wall	18.00	0.8	q_z	22.01	14.97	4.1	19.12	10.82
Leeward Wall	18.00	-0.50	q_h	23.05	-9.80	4.1	-5.65	-13.94

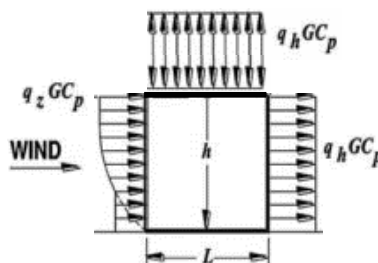
Wind Loading - Horizontal Components

 STRUCTURAL ENGINEERS	Sheet:	Wind Analysis
	Date:	--
	Project ID:	--
	Version:	2022 CBC / ASCE 7-16

Surface	Level (ft)	+Internal	-Internal	Design (psf)	Min. (psf)
		psf			
Windward Roof	22.67	-0.05	-2.07	1.52	8
Leeward Roof	22.67	-1.57	-3.59		
Windward Wall	18.00	19.12	10.82	24.76	16
Leeward Wall	18.00	-5.65	-13.94		

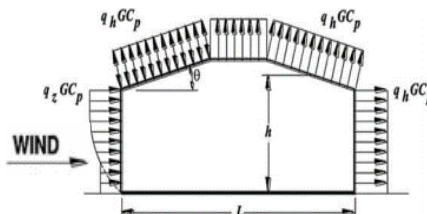
Wind Load Normal to Gable End Roof

Level	1.0W (Strength)	0.6W (ASD)
1st Flr	300 plf	180 plf



Wind Load Normal to Mansard Roof

Level	1.0W (Strength)	0.6W (ASD)
1st Flr	260 plf	156 plf



 STRUCTURAL ENGINEERS	Sheet:	Wind Analysis
	Date:	--
	Project ID:	--
	Version:	2022 CBC / ASCE 7-16

Chapter 27 - Wind Loads on Buildings: Main Wind Force Resisting System (Directional Procedure)
Enclosed & Partially Enclosed Structures - Gable, Hip, Monoslope, & Mansard Roof

Structure: **Admin Building - Low roof**

Building Data:

Type of Roof:	Mansard	
Horiz building dimension parallel to wind, L:	62.0	ft
Horiz building dimension normal to wind, B:	80.0	ft
h/L:	0.33	
L/B:	0.78	
Roof Pitch, Θ :	slope ratio: 3 :12 =	14.0 degrees
Ground Elevation, Zg:		1,415 ft, above sea level

General Wind Load Requirements:

Risk category:	IV	(ASCE 7-16) Table 1.5-1
V, Basic wind speed (3-s gust): mph	110	ASCE 7 Hazard Tool & Fig 26.5-1A, B, C, & D
$V_{asd} = V\sqrt{0.6}$: mph	85	Where exceptions 4 & 5 of Sec. 16.9.1.1 apply
Wind directionality factor, K_d	0.85	Section 26.6 & Table 26.6-1
Exposure category:	C	Section 26.7
Topographic factor, K_{zt} :	1.0	Section 26.8 & Fig 26.8-1
Ground elevation factor, K_e :	0.95	Section 26.9
Gust-effect factor, G_f :	0.85	Section 26.11
Enclosure classification:	Enclosed	
Internal pressure coefficient, +/- GC_{pi}	0.18	Section 26.13 & Table 26.13-1
Velocity pressure exposure coefficient, K_z or K_h	0.86	Table 26.10-1
Minimum design wind loading, ASD	8.0	psf Section 27.1.5

Determine Velocity Pressure: $q_z = 0.00256 K_z K_{zt} K_d K_e V^2$, psf

Section 26.10.2

1-Story Building Wind Analysis			
Level	Height (ft)	K_z or K_h	q_z (psf)
Ridge Height	20.50	0.90	22.61
Mean Roof, h	16.25	0.86	21.58
1st Level	12.00	0.85	21.26

= q_h

Pressure on Building By Component (Roof Loads Normal to Roof Surface)								
Surface	Level (ft)	C_p	q_h or q_z	q (psf)	External Pressure, $q(GC_p)$ (psf)	Internal Pressure, $q_h(+/-GC_{pi})$	(psf)	
							$+(GC_{pi})$	$-(GC_{pi})$
Windward Roof - (- C_p)	20.50	-0.60	q_h	22.61	-11.59	4.1	-7.52	-15.66
Windward Roof - (+ C_p)	20.50	-0.08	q_h	22.61	-1.57	4.1	2.50	-5.64
Leeward Roof	20.50	-0.47	q_h	22.61	-9.11	4.1	-5.04	-13.18
Windward Wall	12.00	0.8	q_z	21.26	14.46	4.1	18.53	10.39
Leeward Wall	12.00	-0.50	q_h	22.61	-9.61	4.1	-5.54	-13.68

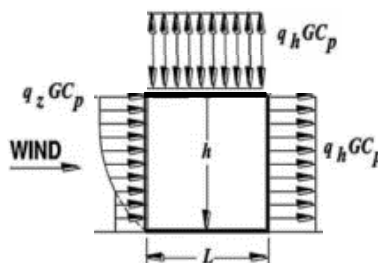
Wind Loading - Horizontal Components

 STRUCTURAL ENGINEERS	Sheet:	Wind Analysis
	Date:	--
	Project ID:	--
	Version:	2022 CBC / ASCE 7-16

Surface	Level (ft)	+Internal	-Internal	Design (psf)	Min. (psf)
		psf			
Windward Roof	20.50	0.61	-1.37	1.83	8
Leeward Roof	20.50	-1.22	-3.20		
Windward Wall	12.00	18.53	10.39	24.07	16
Leeward Wall	12.00	-5.54	-13.68		

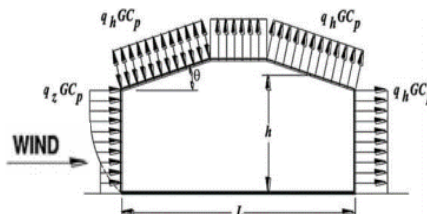
Wind Load Normal to Gable End Roof

Level	1.0W (Strength)	0.6W (ASD)
1st Flr	281 plf	169 plf



Wind Load Normal to Mansard Roof

Level	1.0W (Strength)	0.6W (ASD)
1st Flr	212 plf	127 plf



 STRUCTURAL ENGINEERS	Sheet:	Wind Analysis
	Date:	--
	Project ID:	--
	Version:	2022 CBC / ASCE 7-16

Chapter 27 - Wind Loads on Buildings: Main Wind Force Resisting System (Directional Procedure)
Enclosed & Partially Enclosed Structures - Gable, Hip, Monoslope, & Mansard Roof

Structure: **Tower**

Building Data:

Type of Roof:	Gable	
Horiz building dimension parallel to wind, L:	20.0	ft
Horiz building dimension normal to wind, B:	20.0	ft
h/L:	1.29	
L/B:	1.00	
Roof Pitch, Θ :	slope ratio: 3 :12 =	14.0 degrees
Ground Elevation, Zg:		1,415 ft, above sea level

General Wind Load Requirements:

Risk category:	IV	(ASCE 7-16) Table 1.5-1
V, Basic wind speed (3-s gust): mph	110	ASCE 7 Hazard Tool & Fig 26.5-1A, B, C, & D
$V_{asd} = V\sqrt{0.6}$: mph	85	Where exceptions 4 & 5 of Sec. 16.9.1.1 apply
Wind directionality factor, K_d	0.85	Section 26.6 & Table 26.6-1
Exposure category:	C	Section 26.7
Topographic factor, K_{zt} :	1.0	Section 26.8 & Fig 26.8-1
Ground elevation factor, K_e :	0.95	Section 26.9
Gust-effect factor, G_f :	0.85	Section 26.11
Enclosure classification:	Enclosed	
Internal pressure coefficient, +/- GC_{pi}	0.18	Section 26.13 & Table 26.13-1
Velocity pressure exposure coefficient, K_z or K_h	0.94	Table 26.10-1
Minimum design wind loading, ASD	8.0	psf Section 27.1.5

Determine Velocity Pressure: $q_z = 0.00256 K_z K_{zt} K_d K_e V^2$, psf

Section 26.10.2

1-Story Building Wind Analysis			
Level	Height (ft)	K_z or K_h	q_z (psf)
Ridge Height	25.83	0.95	23.68
Mean Roof, h	24.42	0.94	23.40
1st Level	23.00	0.92	23.11

= q_h

Pressure on Building By Component (Roof Loads Normal to Roof Surface)								
Surface	Level (ft)	C_p	q_h or q_z	q (psf)	External Pressure, $q(GC_p)$ (psf)	Internal Pressure, $q_h(+/-GC_{pi})$	(psf)	
							$+(GC_{pi})$	$-(GC_{pi})$
Windward Roof - ($-C_p$)	25.83	-1.06	q_h	23.68	-21.29	4.3	-17.03	-25.55
Windward Roof - ($+C_p$)	25.83	-0.30	q_h	23.68	-6.03	4.3	-1.77	-10.29
Leeward Roof	25.83	-0.62	q_h	23.68	-12.46	4.3	-8.20	-16.73
Windward Wall	23.00	0.8	q_z	23.11	15.72	4.3	19.98	11.45
Leeward Wall	23.00	-0.50	q_h	23.68	-10.06	4.3	-5.80	-14.33

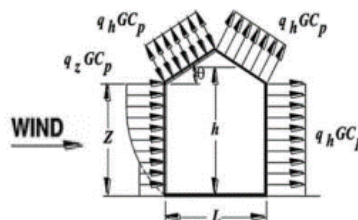
Wind Loading - Horizontal Components

 STRUCTURAL ENGINEERS	Sheet:	Wind Analysis
	Date:	--
	Project ID:	--
	Version:	2022 CBC / ASCE 7-16

Surface	Level (ft)	+Internal	-Internal	Design (psf)	Min. (psf)
		psf			
Windward Roof	25.83	-0.43	-2.50	1.56	8
Leeward Roof	25.83	-1.99	-4.06		
Windward Wall	23.00	19.98	11.45	25.78	16
Leeward Wall	23.00	-5.80	-14.33		

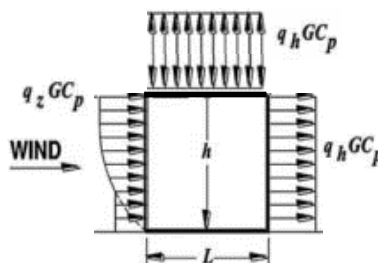
Wind Load Normal to Gable, Hip Roof

Level	1.0W (Strength)	0.6W (ASD)
1st Flr	319 plf	191 plf



Wind Load Normal to Gable End Roof

Level	1.0W (Strength)	0.6W (ASD)
1st Flr	345 plf	207 plf





Sheet:	CC-Walls
Date:	11/25/2025
#:	-
Version:	2

ASCE 7-16 Chapter 30 Component and Cladding -Part I Low Rise Buildings ($h \leq 60$ ft.)

Walls

Basic Wind Speed	$V = 110$ mph	ASCE Hazard Tool
Nominal Wind Speed ($\sqrt{.6} V_{ult}$)	$V_{nom} = 85$ mph	
Ground elevation above sea level	$z_g = 1415$ ft.	ASCE Hazard Tool
Risk Category Factor	$= IV$	Table 1.5-1
Surface Roughness	$= C$	26.7.2
Exposure Category	$= C$	26.7.3
Mean roof height of building or height of structure h	$= 20.34$ ft.	
Enclosure Classification	$= \text{Enclosed}$	Table 26.13-1
Roof Slope	$= 3 : 12 \rightarrow \theta = 14.04^\circ$	

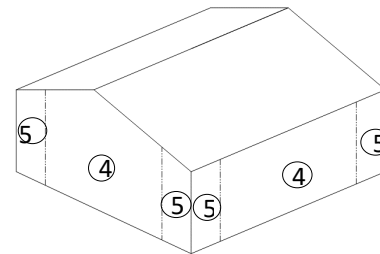
Wind Load Parameters:

K_z Velocity pressure exposure coefficient	$= 0.9027$	Table 26.10-1
K_d Wind load directionality factor	$= 0.85$	Table 26.6-1
K_e Ground Elevation Factor	$= 0.9501$	Table 26.9-1
K_{zt} Topographic Factor	$= 1$	(26.8.2)

Velocity Pressure: $q_z = .00256 K_z K_{zt} K_d K_e V^2 = 22.58$ psf ASD : $q_z = 13.55$ psf (26.10-1)

G Gust effect factor	$= 0.85$	30.3.2
G_{cpi} Internal pressure coefficient	$= +/- 0.18$	30.3.2
G_{cp} Product of external pressure coefficient and gust-effect factor		

G_{cp} coefficients							
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-) Away	4	-1.10	-1.05	-0.95	-0.92	-0.87	-0.80
	5	-1.40	-1.29	-1.15	-1.04	-0.94	-0.80
(+) Toward 4&5	ALL	1	0.94	0.88	0.82	0.77	0.7



ELEVATION

Table 26.13-1

Figure 30.3-1

$G_{cp}^* - G_{cpi}$							
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-) Away	4	-1.28	-1.23	-1.13	-1.10	-1.05	-0.98
	5	-1.58	-1.47	-1.33	-1.22	-1.12	-0.98
(+) Toward ALL	ALL	0.82	0.76	0.70	0.64	0.59	0.52

* G_{cp} reduction NOT applied

Net Surface Pressures ($G_{cp} - G_{cpi}$)							
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-) Away	4	-28.9	-27.8	-25.5	-24.8	-23.7	-22.1
	5	-35.7	-33.2	-30.0	-27.5	-25.3	-22.1
(+) Toward ALL	ALL	18.5	17.2	15.8	14.5	13.3	11.7

$G_{cp}^* + G_{cpi}$							
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-) Away	4	-0.92	-0.87	-0.77	-0.74	-0.69	-0.62
	5	-1.22	-1.11	-0.97	-0.86	-0.76	-0.62
(+) Toward ALL	ALL	1.18	1.12	1.06	1	0.95	0.88

* G_{cp} reduction NOT applied

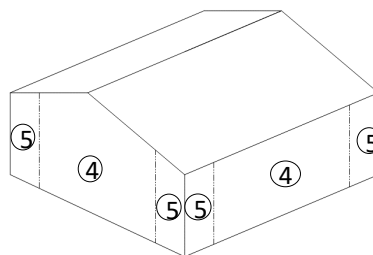
Net Surface Pressures ($G_{cp} + G_{cpi}$)							
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-) Away	4	-20.8	-19.6	-17.4	-16.7	-15.6	-14.0
	5	-27.5	-25.1	-21.9	-19.4	-17.2	-14.0
(+) Toward ALL	ALL	26.6	25.3	23.9	22.6	21.5	19.9

Design Wind Surface Pressures																	
Governing GC_p +/- GC_{pi} Factors								Max Net Surface Pressures (psf) $p = q_h[(GC_p - (GC_{pi}))]$									
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf	Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf		
(-)	Away	4	-1.28	-1.23	-1.13	-1.10	-1.05	-0.98	(-)	Away	4	-28.90	-27.77	-25.52	-24.84	-23.71	-22.13
		5	-1.58	-1.47	-1.33	-1.22	-1.12	-0.98			5	-35.68	-33.19	-30.03	-27.55	-25.29	-22.13
(+)	Toward	ALL	1.18	1.12	1.06	1.00	0.95	0.88	(+)	Toward	ALL	26.64	25.29	23.94	22.58	21.45	19.87

Tributary Areas (sq ft) - User Input					
Area	10 < x < 20	20 < x < 50	50 < x < 100	100 < x < 200	200 < x < 500
	20	33	68	150	250

Strength (1.0W) - Effective Wind Pressure at "h" (psf)						
		10 < x < 20	20 < x < 50	50 < x < 100	100 < x < 200	200 < x < 500
	A	20 sq ft	33 sq ft	68 sq ft	150.0 sq ft	250.0 sq ft
(-)	4	-27.75	-26.80	-25.27	-24.27	-23.45
	5	-33.14	-31.82	-29.14	-26.42	-24.76
(+)	ALL	25.26	24.70	23.45	22.02	21.19

ASD (.6W) - Effective Wind Pressure at "h" (psf)						
		10< x <20	20< x <50	50< x <100	100< x <200	200< x < 500
	A	20 sq ft	33.0 sq ft	68.0 sq ft	150.0 sq ft	250.0 sq ft
(-)	4	-16.65	-16.08	-15.16	-14.56	-14.07
	5	-19.88	-19.09	-17.48	-15.85	-14.86
(+)	ALL	15.16	14.82	14.07	13.21	12.71



ELEVATION

Figure 30.3-1

WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level:	1
SW ID:	2
Grid Reference	2

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
S.G.	=	0.5
Adjustment Factor	=	1.00

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	α_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	16.00 in.
² Fire Treated Lumber Condition?		=	No
² Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	1.00	1.0	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Panel Data Table

Segments				Openings					
	ft.	in.	h_o/L_i	ft.	in.	h_a (in.)	h_g (in.)	h_b (in.)	
L ₁	2	11	P ₁ 1.03 :1	O ₁	12	3	72	36	30
L ₂	2	11	P ₂ 1.03 :1	O ₂			72	36	30
L ₃			P ₃	O ₃			72	36	30
L ₄			P ₄	O ₄			72	36	30
L ₅			P ₅	O ₅			72	36	30
L ₆			P ₆						
ΣL	18'	1"	18.08 ft.						

1

138

138

=

of Panel Sides

= H_{OTM} (in.)

11'-6"

= H_{ASPECT} (in.)

11'-6"

Resisting Dead Load Data Table

[illegible]

Total M_D : **38.01 ft-kips**

Shear Aspect Ratio Adjustment Factor

(WSP) = 1.25-0.125 h/b
Average Wall Pier WSP = 1.0000

Notes:

4.3.3.2 1. Apply All Dead Load At 1st Level
2. Input Additional Concentrated Dead Load As Occurs Per
Plan in Overturning Design Section Below

ASD Seismic Loading Data Table

Load Description	F_x (psf)	A_{t1} (ft ²)	A_{t2} (ft ²)	% _{Trib}	Load (lbs)
LINE Loads (lbs)					
Roof	514				514
					0

Total $V_{(E)}$: 514 lbs

ASD Wind Loading Data Table

[illegible]

Total $V_{(w)}$: 273.9 lbs

WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION

Shear Panel Design:							Apply 10d Nail Strength Reduction Factor Per Note 1 Above				Yes
Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	514.3	514	88.2	260.7	6	8d	6 in. o.c.	3/8	E	0.3382	6
Wind:	273.9	-	46.9	365.0	6	8d	6 in. o.c.	3/8		0.1286	

ASD Tension Load Combinations:										
Seismic:	0.6D -.7E _v +.7E _h = (.6-.14S _{DS})D +.7E _h					=	0.46 D -.7ρQ _E		ASCE 2.4.5	
Wind:	0.6D -.6W =					=	0.6 D -.6W		ASCE 2.4.1	
ASD Compression Load Combinations:						Compression Post Demand				
Seismic:	1.0D +.7E _v +.7E _h = (1.0+.14S _{DS})D +.7E _h					=	1.14 D +.7ρQ _E	=	352.8 + 481.9	= 835 lbs ASCE 2.4.5
Wind:	1.0D +.6W =					=	1.0 D +.6W	=	310.0 + 299.3	= 609 lbs ASCE 2.4.1
Overturning Design:										
Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7ρE & .6W (lbs)		Uplift 1.0ρE & 1.0W	
							HD	Strap	HD	Strap
Seismic:	-5.92	38.01	11.64	210.4	215.5	output:	0	0	-481.9	-470.5
Wind:	-3.15	38.01	19.66	210.4	215.5	output:	0	0	-299.3	-292.3
No Net Uplift From This Level										
Apply Omega (η)?										No
Include Uplift F.A.in Omega?										No
Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs)		Point Load D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0E Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0	Yes	-1727	-518.2		-1727.4	-1727.4	-2612.3	-2608.9
Wind:		0		-1336	-400.7		-1335.7	-1335.7	-	-
1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.) 2. (-) indicates uplift 3. F.A. indicates From Above 4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section 5. Orthogonal uplift should be the net uplift from the other direction										


Hold Down Design:
Wood to Wood Connection
Post to Conc. Connection

Type Hardware Capacity U.C.

Design Strap Min. Design Post Design HD Min. Design Post

HD: HTT4 3610 **0.4785**
STRAP: 1-CS14 2490 **0.6938**
OUTPUT HOLDOWN SUMMARY:
1-CS14
2x6
HTT4
4x6
Shear Wall Type: 6
Required Strap Force: 236 lbs
Strap Above & Below Opening: CS14

V _{c1} =	V _{a1}	V _{c2} =	V _{a1}	V _{c3} =	V _{a1}	V _{c4} =	V _{a1}	V _{c5} =	V _{a1}	V _{c6} =
7	38	7								
CS14										
V ₁ =	O ₁	V ₂ =	O ₂	V ₃ =	O ₃	V ₄ =	O ₄	V ₅ =	O ₅	V ₆ =
88		88		0		0		0		0
CS14										
V _{c1} =	V _{b1} =	V _{c2} =	V _{b2} =	V _{c3} =	V _{b3} =	V _{c4} =	V _{b4} =	V _{c5} =	V _{b5} =	V _{c6} =
7	38	7								
L ₁ =	L ₂ =	L ₃ =	L ₄ =	L ₅ =	L ₅ =					
2' 11"	2' ###	0' 0"	0' 0"	0' 0"	0' 0"					



WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION																		
FTAO Tension Strap Design (Horizontal Strap Across Opening)																		
Load	T (lbs)	Unit Shear Above & Below Opening				Total Force Above & Below Openings (lbs)		Corner Forces (lbs)										
Seismic:	327	1st Opening	V_{a1}	=	V_{b1}	=	38 plf	O_1	=	471	F_1	=	236	F_6	=			
		2nd Opening	V_{a2}	=	V_{b2}	=	38 plf	O_2	=	0	F_2	=	236	F_7	=			
		3rd Opening	V_{a3}	=	V_{b3}	=	38 plf	O_3	=	0	F_3	=	0	F_8	=			
		4th Opening	V_{a4}	=	V_{b4}	=	38 plf	O_4	=	0.0	F_4	=		F_9	=			
							O_5	=	0.0	F_5	=		F_{10}	=				
Wind:	174	1st Opening	V_{a1}	=	V_{b1}	=	20 plf	O_1	=	251	F_1	=	125	F_6	=			
		2nd Opening	V_{a2}	=	V_{b2}	=	20 plf	O_2	=	0	F_2	=	125	F_7	=			
		3rd Opening	V_{a3}	=	V_{b3}	=	20 plf	O_3	=	0	F_3	=	0	F_8	=			
		4th Opening	V_{a4}	=	V_{b4}	=	20 plf	O_4	=	0	F_4	=		F_9	=			
							O_5	=	0	F_5	=		F_{10}	=				
Load	Tributary Length of Internal Shear Lines (in.)				Unit Shear Besides Openings (plf)				Resistance to Corner Forces (lbs)									
Seismic:	T_1	=	73.5	T_6	=	V_1	=	88	V_4	=	0	R_1	=	257	R_4	=	0	
	T_2	=	73.5	T_7	=	0.0	V_2	=	88	V_5	=	0	R_2	=	257	R_5	=	0
	T_3	=	0.0	T_8	=	0.0	V_3	=	0	V_6	=	0	R_3	=	0	R_6	=	0
	T_4	=	0.0	T_9	=	0.0	V_{total}				=	514	V_{total}				=	514
	T_5	=		T_{10}	=	0												
Wind:	T_1	=	73.5	T_6	=	V_1	=	47	V_4	=	0	R_1	=	137	R_4	=	0	
	T_2	=	73.5	T_7	=	0.0	V_2	=	47	V_5	=	0	R_2	=	137	R_5	=	0
	T_3	=	0.0	T_8	=	0.0	V_3	=	0	V_6	=	0	R_3	=	0	R_6	=	0
	T_4	=	0.0	T_9	=	0.0	V_{total}				=	274	V_{total}				=	274
	T_5	=		T_{10}	=	0												
Load	Net Corner Forces (lbs)				Unit Net Shear In Corner Zones (lbs)													
Seismic	$R_1 - F_1$	=	21	VC_1	=	7												
	$R_2 - F_2 - F_3$	=	21	VC_2	=	7												
	$R_3 - F_4 - F_5$	=	0	VC_3	=	0												
	$R_4 - F_6 - F_7$	=	0	VC_4	=	0												
	$R_5 - F_8 - F_9$	=	0	VC_5	=	0												
	$R_6 - F_{10}$	=	0	VC_6	=	0												
Wind	$R_1 - F_1$	=	11	VC_1	=	4												
	$R_2 - F_2 - F_3$	=	11	VC_2	=	4												
	$R_3 - F_4 - F_5$	=	0	VC_3	=	0												
	$R_4 - F_6 - F_7$	=	0	VC_4	=	0												
	$R_5 - F_8 - F_9$	=	0	VC_5	=	0												
	$R_6 - F_{10}$	=	0	VC_6	=	0												


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION
Applicable Code Reference: 2021 SDPWS

Level: 1
SW ID: 3
Grid Reference: 3

Shear Wall Input Data:

Wood Species = **DF**
 Wall Size = **2x6**
 # of Panel Sides = **1**

S.G. = 0.5
 S.G. Adjustment Factor = 1.00
 L_{total} = **240 in. 20'-0"**
 L_{min} = **94 in. 7'-10"**

General Data Inputs

Redundancy Factor ρ = **1**
Overstrength Factor Ω_o = **2.5**
 Discontinuous Lateral System? (Beam Below Strap) = **No**
 Beam Depth = **11.875 in.**

²Fire Treated Lumber Condition? = **No**
⁴Reduction to Allowable Capacity = **1.0**

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.0	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

ft. in.
 H_{OTM} (in.) = **11 6**
 H_{ASPECT} (in.) = **11 6**

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Length		% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
ft	in.				
7 ft.	10 in.	39%	1.47 :1	1.00	OK
12 ft.	2 in.	61%	0.95 :1	1.00	OK

 ΣL = **20.00 ft.** Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Roof	15.00	8	120.00	3.68
Wall	15.00	12	180.00	5.52
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 9.20 ft-kips
ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft ²)	A_{t2} (ft ²)	% _{Trib}	Load (lbs)
Line Loads(lbs)					
Roof		2334 lbs.			2334
					0

Total $V_{(E)}$: 2334 lbs
ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	% _{Trib}	Load (lbs)
Roof	169	16	50	1348

Total $V_{(w)}$: 1348.2 lbs


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	2333.8	2333.8116	116.7	260.7	6	8d	6 in. o.c.	3/8	E	0.4476	6
Wind:	1348.2	-	67.4	365.0	6	8d	6 in. o.c.	3/8		0.1847	

ASD Tension Load Combinations:

 Seismic: $0.6D - 0.7E_v + 0.7E_h = (0.6 - 1.4S_{DS})D + 0.7E_h = \mathbf{0.46 D - 0.7pQ_E}$ ASCE 2.4.5

 Wind: $0.6D + 0.7W = \mathbf{0.6 D - 0.6W}$ ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W (lbs)	
							HD	Strap	HD	Strap
Seismic:	-10.51	4.25	-6.26	88.8	92.5	output:	-846.5	-812.2	-2030.5	-1948.1
Wind:	-6.07	5.52	-0.55	88.8	92.5	output:	-74.4	-71.4	-1368.5	-1313.0

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A. ³ (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0			0.0		-846.5	-812.2	-2030.5	-1948.1
Wind:		0.0			0.0		-74.4	-71.4	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	STHD14	3815	0.2219	OUTPUT HOLDOWN SUMMARY:	CS14	2x6	STHD14	4x6
STRAP:	CS14	2490	0.3262				ALT: HTT4	

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level: 1

SW ID: 4

Grid Reference 4

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L _{total}	=	257 in. 21'-5"
L _{min}	=	83 in. 6'-11"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	11.875 in.
² Fire Treated Lumber Condition?		=	No
⁴ Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

Height:		ft.	in.
H_{OTM} (in.)	=	11	6
H_{ASPECT} (in.)	=	11	6

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

[illegible]

ΣL = **21.42 ft.** Weighted Average: **1.00**

Resisting Dead Load Data Table

[illegible]

Total M_D : 4.69 ft-kips

ASD Seismic Loading Data Table

Load Description	F _{x1} (psf)	A _{t1} (ft ²)	A _{t2} (ft ²)	% _{Trib}	Load (lbs)
Line Loads(lbs)					
	5190 lbs.				5190
					0

Total $V_{(E)}$: 5190 lbs

ASD Wind Loading Data Table

[illegible]

Total $V_{(w)}$: 2864.9 lbs


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	5190.4	5190.3931	242.4	260.7	6	8d	6 in. o.c.	3/8	E	0.9296	6
Wind:	2864.9	-	133.8	365.0	6	8d	6 in. o.c.	3/8		0.3665	

ASD Tension Load Combinations:

 Seismic: $0.6D + 0.7E_v + 0.7E_h = (0.6 - 1.4S_{DS})D + 0.7E_h$ = **0.46 D - 0.7pQ_E** ASCE 2.4.5

 Wind: $0.6D + 0.7W$ = **0.6 D - 0.6W** ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)	Net Uplift 0.7pE & 0.6W (lbs)	Uplift 1.0pE & 1.0W (lbs)
						HD	Strap
Seismic:	-19.28	2.17	-17.11	77.8	81.5	output:	output:
						HD	Strap
Wind:	-10.64	2.82	-7.82	77.8	81.5	output:	output:
						HD	Strap

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴	30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵	Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift	1.0pE Tension Uplift
	100%	30%	100%	30%	HD	STRAP
Seismic:	-636	-190.8		0.0	-3276.6	-3155.1
					HD	STRAP
Wind:	-736	-220.8		0.0	-1943.5	-1888.0
					HD	STRAP

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.	Wood to Wood Connection Design Strap	Min. Design Post	Post to Conc. Connection Design HD	Min. Design Post
HD:	STHD14	3815	0.8589	2-CS14	2-2x6	STHD14	4x6
STRAP:	2-CS14	4980	0.6336			ALT: HTT4	

OUTPUT HOLDOWN SUMMARY:

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level: 1

SW ID: 7

Grid Reference 7

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x4
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L _{total}	=	442 in. 36'-10"
L _{min}	=	194 in. 16'-2"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	11.875 in.
² Fire Treated Lumber Condition?		=	No
⁴ Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
4	3/8	CD	8d	4 in. o.c.	2x	1065	2	2.8	0.00	1.00	1.0	-	350	533

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

Height:		ft.	in.
H_{OTM} (in.)	=	18	0
H_{ASPECT} (in.)	=	18	0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

[illegible]

ΣL = **36.83 ft.** Weighted Average: **1.00**

Resisting Dead Load Data Table

[illegible]

Total M_D : 37.24 ft-kips

ASD Seismic Loading Data Table

Load Description	F _{x1} (psf)	A _{t1} (ft ²)	A _{t2} (ft ²)	% _{Trib}	Load (lbs)
Line Loads(lbs)					
Roof	9648 lbs.				9648

Total $V_{(F)}$: 9648 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	% _{Trib}	Load (lbs)
Roof low	169	22.5	50	1896
Roof MP	180	45.58	50	4102

Total $V_{(w)}$: 5998.3 lbs


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	9648.0	9647.9677	261.9	350.0	4	8d	4 in. o.c.	3/8	E	0.7484	4
Wind:	5998.3	-	162.9	365.0	6	8d	6 in. o.c.	3/8		0.4462	

ASD Tension Load Combinations:

 Seismic: $0.6D + 0.7E_v + 0.7E_h = (0.6 - 1.4S_{DS})D + 0.7E_h$ = **0.46 D - 0.7pQ_E** ASCE 2.4.5

 Wind: $0.6D + 0.7W$ = **0.6 D - 0.6W** ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W (lbs)	
							HD	Strap	HD	Strap
Seismic:	-76.22	17.20	-59.02	194.0	192.5	output:	-3650.8	-3679.3	-6735.5	-6788.0
Wind:	-47.39	22.35	-25.04	194.0	192.5	output:	-1549.1	-1561.1	-4885.5	-4923.6

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0			0.0		-3650.8	-3679.3	-6735.5	-6788.0
Wind:		0.0			0.0		-1549.1	-1561.1	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	STHD14	3815	0.9570	OUTPUT HOLDOWN SUMMARY:	2-CS14	2-2x4	STHD14	4x4
STRAP:	2-CS14	4980	0.7388				ALT: HTT4	

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level: 1

SW ID: 7

Grid Reference 7

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L _{total}	=	320 in. 26'-8"
L _{min}	=	152 in. 12'-8"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	11.875 in.
² Fire Treated Lumber Condition?		=	No
⁴ Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	'Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
4	3/8	CD	8d	4 in. o.c.	2x	1065	2	2.8	0.00	1.00	1.0	-	350	533

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

Height:		ft.	in.
H _{OTM} (in.)	=	18	0
H _{ASPECT} (in.)	=	18	0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

[illegible]

ΣL = 26.67 ft. Weighted Average: 1.00

Resisting Dead Load Data Table

[illegible]

Total M_D : 22.86 ft-kips

ASD Seismic Loading Data Table

Load Description	F_{x1} (psf)	A_{t1} (ft ²)	A_{t2} (ft ²)	% _{Trib}	Load (lbs)
Line Loads(lbs)					
Roof	7658 lbs.				7658

Total $V_{(E)}$: 7658 lbs

ASD Wind Loading Data Table

[illegible]

Total $V_{(w)}$: 5400.3 lbs


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	7657.6	7657.6342	287.2	350.0	4	8d	4 in. o.c.	3/8	E	0.8205	4
Wind:	5400.3	-	202.5	365.0	6	8d	6 in. o.c.	3/8		0.5548	

ASD Tension Load Combinations:

 Seismic: $0.6D + 0.7E_v + 0.7E_h = (0.6 - 1.4S_{DS})D + 0.7E_h$ = **0.46 D - 0.7pQ_E** ASCE 2.4.5

 Wind: $0.6D + 0.7W$ = **0.6 D - 0.6W** ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W (lbs)	
							HD	Strap	HD	Strap
Seismic:	-65.47	10.56	-54.91	146.8	150.5	output:	-4490.3	-4378.4	-7648.3	-7457.7
Wind:	-46.17	13.72	-32.45	146.8	150.5	output:	-2653.8	-2587.7	-6292.7	-6135.9

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹	Orthogonal (-) Uplift (lbs) ⁵		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%	?	100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0	Yes	-3167	-950.1		-5440.4	-5328.5	-9005.6	-8815.0
Wind:		0.0		-1054	-316.3		-2970.2	-2904.1	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.	Wood to Wood Connection Design Strap	Min. Design Post	Post to Conc. Connection Design HD	Min. Design Post
HD:	HDU5	5645	0.9638	CMST14	2-2x6	HDU5	4x6
STRAP:	CMST14	6475	0.8229				

OUTPUT HOLDOWN SUMMARY:

 STRUCTURAL ENGINEERS			Project	ISE
			Project #:	
			Date:	11/15/2024
			Designer:	-

WOOD SHEAR WALL DESIGN WITH FORCE TRANSFER AT DOOR OPENING PER THE DIEKMANN METHOD

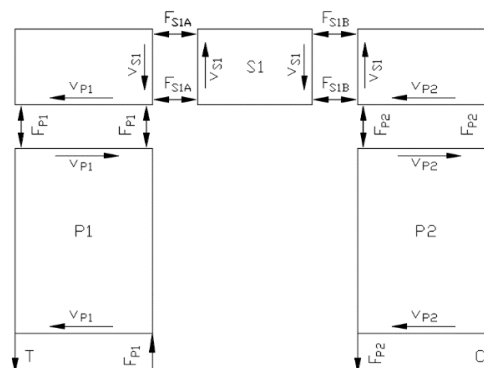
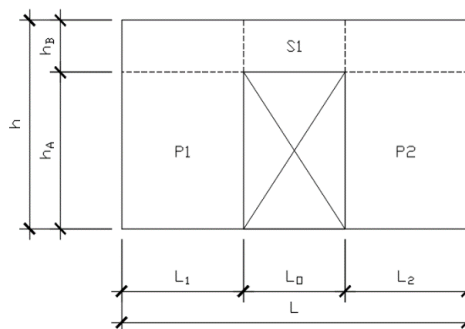
SW8	ROOF FRAMING PLAN - ALONG GRID 8
-----	----------------------------------

Roof DL =	15.0	psf
Floor DL =	0.0	psf
Wall DL =	15.0	psf

S_{DS} =	0.99
C_d =	4.0
FRT	N

WALL INFORMATION	Story	L (ft)	L_1 (ft)	L_O (ft)	L_2 (ft)	h (ft)	h_A (ft)	h_B (ft)
	1	12.50	2.50	7.50	2.50	18.00	8.67	9.33

WALL INFORMATION	Story	DL Trib. Width (ft)	Trib. P_{DL} (lb)	Max L/h Ratio	Aspect Ratio Factor	ΣL_i (ft)
	1	6.00	563	3.47	0.58	5.00



WIND ANALYSIS	Story	WL (plf)	B_{trib} (ft)	F (lb)	V (lb)	OM_w (lb-ft)	$v_{P1} = v_{P2}$ (plf)	v_{S1} (plf)	T = C (lb)	T_{net} (lb)	$F_{P1} = F_{P2}$ (lb)	F_{S1A} (lb)	F_{S1B} (lb)	Δ_i (in)	$\Sigma \Delta_{wi}$ (in)
	1	180	7.25	1,305	1,305	23,491	261	153	1,879	1,542	1,131	573	573	0.511	0.511

EQ ANALYSIS	Story	EL (plf)	A_{trib} (ft)	F (lb)	V (lb)	OM_w (lb-ft)	$v_{P1} = v_{P2}$ (plf)	v_{S1} (plf)	T = C (lb)	T_{net} (lb)	$F_{P1} = F_{P2}$ (lb)	F_{S1A} (lb)	F_{S1B} (lb)	Δ_i (in)	$\Sigma \Delta_{wi}$ (in)
	1	1,592	1	1,592	1,592	28,665	318	187	2,293	2,033	1,381	700	700	1.024	1.024

WALL DESIGN	Story	Shear Wall Type	Dbl. Sided	Post Size	End Post Strap/HD	Door Jamb Strap/HD	Force Transfer Strap	Allowable Shear		End Post Capacity (lb)	End Post Strap/HD Capacity (lb)	Jamb Strap/HD Capacity (lb)	F.T. Strap Capacity (lb)	D/C Check
								Wind (plf)	Seismic (in)					
	1	2	N	4x6	HTT4	HTT4	1-CS14	516.15	369	12,030	3,610	3,610	2,490	OK


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION
Applicable Code Reference: 2021 SDPWS

Level: 1
SW ID: A
Grid Reference: A

Shear Wall Input Data:

Wood Species = **DF**
 Wall Size = **2x6**
 # of Panel Sides = **1**

S.G. = 0.5
 S.G. Adjustment Factor = 1.00
 L_{total} = **153 in. 12'-9"**
 L_{min} = **73 in. 6'-1"**

General Data Inputs

Redundancy Factor ρ = **1**
Overstrength Factor Ω_o = **2.5**
 Discontinuous Lateral System? (Beam Below Strap) = **No**
 Beam Depth = **11.875 in.**

²Fire Treated Lumber Condition? = **No**
⁴Reduction to Allowable Capacity = **1.0**

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
3	3/8	CD	8d	3 in. o.c.	3x	1370	2	2.8	0.00	0.90	1.0	-	439	614

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

ft. in.
 H_{OTM} (in.) = **18 0**
 H_{ASPECT} (in.) = **18 0**

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Length		% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
ft	in.				
6 ft.	1 in.	48%	2.96 :1	0.88	OK
6 ft.	8 in.	52%	2.70 :1	0.91	OK

 ΣL = **12.75 ft.** Weighted Average: 0.90

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Roof	15.00	4	60.00	1.11
Wall	15.00	12	180.00	3.33
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 4.44 ft-kips
ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft ²)	A_{t2} (ft ²)	% _{Trib}	Load (lbs)
Line Loads(lbs)					
Roof		4690 lbs.			4690
					0

Total $V_{(E)}$: 4690 lbs
ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	% _{Trib}	Load (lbs)
Roof	180	34	50	3060

Total $V_{(w)}$: 3060.2 lbs


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	4690.0	4690.0362	367.8	438.9	3	8d	3 in. o.c.	3/8	E	0.8381	3
Wind:	3060.2	-	240.0	327.4	6	8d	6 in. o.c.	3/8		0.7330	

ASD Tension Load Combinations:

 Seismic: $0.6D + 0.7E_v + 0.7E_h = (0.6 - 1.4S_{DS})D + 0.7E_h$ = **0.46 D - 0.7pQ_E** ASCE 2.4.5

 Wind: $0.6D + 0.7W$ = **0.6 D - 0.6W** ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)	Net Uplift 0.7pE & 0.6W (lbs)	Uplift 1.0pE & 1.0W (lbs)
						HD	Strap
Seismic:	-40.28	2.05	-38.23	67.8	71.5	output:	output:
						HD	Strap
Wind:	-26.28	2.66	-23.62	67.8	71.5	output:	output:
						HD	Strap

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴	30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵	Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift	1.0pE Tension Uplift
	100%	30%	100%	30%	HD	STRAP
Seismic:		0.0		0.0	-6771.0	-6415.9
					HD	STRAP
Wind:		0.0		0.0	-4183.1	-3963.7
					HD	STRAP

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.	Wood to Wood Connection	Post to Conc. Connection
				Design Strap	Design HD
				Min. Design Post	Min. Design Post
HD:	HDU8	7870	0.86	CMST14	2-2x6
STRAP:	CMST14	6475	0.99		

OUTPUT HOLDOWN SUMMARY:
CMST14 2-2x6 HDU8 4x6

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level:	1
SW ID:	B
Grid Reference	B

Shear Wall Input Data:

Wood Species	=	DF	
Wall Size	=	2x6	
# of Panel Sides	=	1	
S.G.	=	0.5	
S.G. Adjustment Factor	=	1.00	
L_{total}	=	225 in.	18'-9"
L_{min}	=	65 in.	5'-5"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	11.875 in.
² Fire Treated Lumber Condition?		=	No
⁴ Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	0.98	1.0	-	257	359

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

Height:		ft.	in.
H_{OTM} (in.)	=	12	0
H_{ASPECT} (in.)	=	12	0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

[illegible]

ΣL = **18.75 ft.** Weighted Average: **0.98**

Resisting Dead Load Data Table

[illegible]

Total M_D : 3.52 ft-kips

ASD Seismic Loading Data Table

Load Description	F _{x1} (psf)	A _{t1} (ft ²)	A _{t2} (ft ²)	% _{Trib}	Load (lbs)
					0
Line Loads(lbs)					
Roof	2950 lbs.				2950
					0

Total $V_{(F)}$: 2950 lbs

ASD Wind Loading Data Table

[illegible]

Total $V_{(w)}$: 2527.9 lbs


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	2950.2	2950.2123	157.3	256.7	6	8d	6 in. o.c.	3/8	E	0.6131	6
Wind:	2527.9	-	134.8	359.3	6	8d	6 in. o.c.	3/8		0.3752	

ASD Tension Load Combinations:

 Seismic: $0.6D - 0.7E_v + 0.7E_h = (0.6 - 1.4S_{DS})D + 0.7E_h = 0.46 D - 0.7pQ_E$ ASCE 2.4.5

 Wind: $0.6D + 0.7W = 0.6 D - 0.6W$ ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W (lbs)	
							HD	Strap	HD	Strap
Seismic:	-10.23	1.63	-8.60	59.8	63.5	output:	-1727.4	-1625.4	-2934.3	-2761.1
Wind:	-8.76	2.11	-6.65	59.8	63.5	output:	-1335.7	-1256.9	-2933.3	-2760.1

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A. ³ (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0	Yes	0	0.0		-1727.4	-1625.4	-2934.3	-2761.1
Wind:		0.0		0	0.0		-1335.7	-1256.9	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	STHD14	3815	0.45	OUTPUT HOLDOWN SUMMARY:	CS14	2x6	STHD14	4x6
STRAP:	CS14	2490	0.65				ALT: HTT4	

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level:	1
SW ID:	D
Grid Reference	D

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L _{total}	=	466 in. 38'-10"
L _{min}	=	127 in. 10'-7"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	11.875 in.
² Fire Treated Lumber Condition?		=	No
⁴ Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
4	3/8	CD	8d	4 in. o.c.	2x	1065	2	2.8	0.00	1.00	1.0	-	350	533

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

Height:		ft.	in.
H_{OTM} (in.)	=	18	0
H_{ASPECT} (in.)	=	18	0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

[illegible]

ΣL = **38.83 ft.** Weighted Average: **1.00**

Resisting Dead Load Data Table

[illegible]

Total M_n : 28.56 ft-kips

ASD Seismic Loading Data Table

Load Description	F _{xi} (psf)	A _{t1} (ft ²)	A _{t2} (ft ²)	% _{Trib}	Load (lbs)
Line Loads(lbs)					
Roof	12126 lbs.				12126

Total $V_{(F)}$: 12126 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	% _{Trib}	Load (lbs)
Roof MP	180	32	50	2880
Roof low	169	32.5	50	2739

Total $V_{(w)}$: 5618.7 lbs


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	12126.0	12125.994	312.3	350.0	4	8d	4 in. o.c.	3/8	E	0.8922	4
Wind:	5618.7	-	144.7	365.0	6	8d	6 in. o.c.	3/8		0.3964	

ASD Tension Load Combinations:

 Seismic: $0.6D + 0.7E_v + 0.7E_h = (0.6 - 1.4S_{DS})D + 0.7E_h$ = **0.46 D - 0.7pQ_E** ASCE 2.4.5

 Wind: $0.6D + 0.7W$ = **0.6 D - 0.6W** ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift 0.7pE & 0.6W (lbs)		Uplift 1.0pE & 1.0W (lbs)	
							HD	Strap	HD	Strap
Seismic:	-59.49	13.19	-46.29	121.8	125.5	output:	-4562.8	-4426.5	-8375.7	-8125.4
Wind:	-27.56	17.14	-10.43	121.8	125.5	output:	-1027.6	-996.9	-4527.8	-4392.5
										Apply Omega (Ω)? No
										Include Uplift F.A.? No
Load Type	ASD Uplift F.A. ³ (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0	Yes	-2641	-792.2		-5355.0	-5218.6	-9507.4	-9257.1
Wind:		0.0		-1208	-362.3		-1515.8	-1506.6	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	HDU5	5645	0.95	OUTPUT HOLDOWN SUMMARY:	CMST14	2-2x6	HDU5	4x6
STRAP:	CMST14	6475	0.81					


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION
Applicable Code Reference: 2021 SDPWS

Level: 1
SW ID: G
Grid Reference: G

Shear Wall Input Data:

Wood Species = **DF**
 Wall Size = **2x6**
 # of Panel Sides = **1**

S.G. = 0.5
 S.G. Adjustment Factor = 1.00
 L_{total} = **326 in. 27'-2"**
 L_{min} = **64 in. 5'-4"**

General Data Inputs

Redundancy Factor ρ = **1**
 Overstrength Factor Ω_o = **2.5**
 Discontinuous Lateral System? (Beam Below Strap) = **No**
 Beam Depth = **11.875 in.**

²Fire Treated Lumber Condition? = **No**
⁴Reduction to Allowable Capacity = **1.0**

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
4	3/8	CD	8d	4 in. o.c.	2x	1065	2	2.8	0.00	0.99	1.0	-	350	529

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

	ft.	in.
H_{OTM} (in.)	12	0
H_{ASPECT} (in.)	12	0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Length		% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
ft	in.				
14 ft.	8 in.	54%	0.82 :1	1.00	OK
7 ft.	2 in.	26%	1.67 :1	1.00	OK
5 ft.	4 in.	20%	2.25 :1	0.97	OK

 ΣL = 27.17 ft. Weighted Average: 0.99

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Roof	15.00	3.5	52.50	0.75
Wall	15.00	12	180.00	2.56
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 3.31 ft-kips
ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft ²)	A_{t2} (ft ²)	% _{Trib}	Load (lbs)
Roof	4.78	3024		50	7230
Line Loads(lbs)					0
					0

Total $V_{(E)}$: 7230 lbs
ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	% _{Trib}	Load (lbs)
Roof	169	36	50	3033

Total $V_{(w)}$: 3033.5 lbs


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	7229.7	7229.6862	266.1	350.0	4	8d	4 in. o.c.	3/8	E	0.7604	4
Wind:	3033.5	-	111.7	362.8	6	8d	6 in. o.c.	3/8		0.3078	

ASD Tension Load Combinations:

 Seismic: $0.6D + 0.7E_v + 0.7E_h = (0.6 - 14S_{DS})D + 0.7E_h$ = **0.46 D - 0.7pQ_E** ASCE 2.4.5

 Wind: $0.6D + 0.7W$ = **0.6 D - 0.6W** ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W (lbs)	
							HD	Strap	HD	Strap
Seismic:	-17.03	1.53	-15.50	58.8	62.5	output:	-3166.9	-2976.9	-4969.8	-4671.6
Wind:	-7.15	1.98	-5.16	58.8	62.5	output:	-1054.4	-991.2	-2432.8	-2286.8

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0	Yes	-4490	-1347.1		-5440.4	-5383.4	-7905.7	-7816.2
Wind:		0.0		-2654	-796.2		-2970.2	-2951.2	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.	Wood to Wood Connection Design Strap	Min. Design Post	Post to Conc. Connection Design HD	Min. Design Post
HD:	HDU5	5645	0.96	CMST14	2-2x6	HDU5	4x6
STRAP:	CMST14	6475	0.83				

OUTPUT HOLDOWN SUMMARY:

WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION

Applicable Code Reference: 2021 SDPWS

Level: T
SW ID: 4
Grid Reference: 4

Shear Wall Input Data:

Wood Species = DF
Wall Size = 2x6
S.G. = 0.5
Adjustment Factor = 1.00

General Data Inputs

Redundancy Factor ρ = 1
Overstrength Factor Ω_o = 2.5
Discontinuous Lateral System? (Beam Below Strap) = No
Beam Depth = 16.00 in.
²Fire Treated Lumber Condition? = No
²Reduction to Allowable Capacity = 1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	1.00	1.0	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Panel Data Table

Segments					Openings					
	ft.	in.	h_o/L_i		ft.	in.	h_a (in.)	h_o (in.)	h_b (in.)	
L ₁	3	2	P ₁	1.00 :1	O ₁	11	7	11	38	44
L ₂	3	2	P ₂	1.00 :1	O ₂			11	38	44
L ₃			P ₃		O ₃			11	38	44
L ₄			P ₄		O ₄			11	38	44
L ₅			P ₅		O ₅			11	38	44
L ₆			P ₆							
ΣL 17' ### 17.92 ft.							# of Panel Sides			
					1		=	H _{OTM} (in.)	7'-9"	
					93		=	H _{ASPECT} (in.)	6'-5"	
					76		=			

Resisting Dead Load Data Table

Level	psf	L _{trib} (ft.)	Uniform plf	M _{resisting} (ft-kips)
Roof	15.00	2	30.00	4.82
Wall	15.00	6.33	94.95	15.24
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 20.05 ft-kips

Shear Aspect Ratio Adjustment Factor

(WSP) = 1.25-0.125 h/b
Average Wall Pier WSP = 1.0000

Notes:

4.3.3.2

1. Apply All Dead Load At 1st Level
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

ASD Seismic Loading Data Table

Load Description	F _s (psf)	A ₁₁ (ft ²)	A ₁₂ (ft ²)	% _{Trib}	Load (lbs)
LINE Loads (lbs)					
Roof		1398			1398
					0

Total V_(E) : 1398 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	% _{Trib}	Load (lbs)
Tower	207	16	50	1657

Total V_(w) : 1656.7 lbs


WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	1397.6	1398	220.7	260.7	6	8d	6 in. o.c.	3/8	W	0.8464	6
Wind:	1656.7	-	261.6	365.0	6	8d	6 in. o.c.	3/8		0.7167	

ASD Tension Load Combinations:

Seismic: $0.6D - 0.7E_v + 0.7E_h = (0.6 - 1.4S_{DS})D + 0.7E_h = \mathbf{0.46 D - 0.7pQ_E}$ ASCE 2.4.5
 Wind: $0.6D - 0.6W = \mathbf{0.6 D - 0.6W}$ ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W	
							HD	Strap	HD	Strap
Seismic:	-10.83	20.05	-1.57	208.4	213.5	output:	-90	-88	-890.7	-869.6
Wind:	-12.84	20.05	-0.81	208.4	213.5	output:	-46	-45	-1231.8	-1202.6

 Apply Omega (Ω)? **No**

 Include Uplift F.A.in Omega? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs)		Point Load D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0E Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0	Yes	-90	-27.1		-117.4	-116.7	-929.4	-908.3
Wind:		0		-46	-13.9		-60.3	-60.0	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction


Hold Down Design:
Wood to Wood Connection
Post to Conc. Connection

Type Hardware Capacity U.C.

Design Strap Min. Design Post Design HD Min. Design Post

HD: HTT4 3610 0.0325

STRAP: 1-CS14 2490 0.0471

OUTPUT HOLDOWN SUMMARY:
1-CS14
2x6
HTT4
4x6
Shear Wall Type: 6
Required Strap Force: 764 lbs
Strap Above & Below Opening: CS14

$V_{c1} =$	V_{a1}	$V_{c2} =$	V_{a1}	$V_{c3} =$	V_{a1}	$V_{c4} =$	V_{a1}	$V_{c5} =$	V_{a1}	$V_{c6} =$
-21	156	-21								
CS14										
$V_1 =$	O_1	$V_2 =$	O_2	$V_3 =$	O_3	$V_4 =$	O_4	$V_5 =$	O_5	$V_6 =$
262		262		0		0		0		0
CS14										
$V_{c1} =$	$V_{b1} =$	$V_{c2} =$	$V_{b2} =$	$V_{c3} =$	$V_{b3} =$	$V_{c4} =$	$V_{b4} =$	$V_{c5} =$	$V_{b5} =$	$V_{c6} =$
-21	156	-21								
$L_1 =$	$L_2 =$	$L_3 =$	$L_4 =$	$L_5 =$	$L_5 =$					
3' 2"	3' 2"	0' 0"	0' 0"	0' 0"	0' 0"					



WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION												
FTAO Tension Strap Design (Horizontal Strap Across Opening)												
Load		T (lbs)		Unit Shear Above & Below Opening				Total Force Above & Below Openings (lbs)		Corner Forces (lbs)		
Seismic:	604	1st Opening	$V_{a1} = V_{b1}$	=	132	plf	$O_1 =$	1528	$F_1 =$	764	$F_6 =$	
		2nd Opening	$V_{a2} = V_{b2}$	=	132	plf	$O_2 =$	0	$F_2 =$	764	$F_7 =$	
		3rd Opening	$V_{a3} = V_{b3}$	=	132	plf	$O_3 =$	0	$F_3 =$	0	$F_8 =$	
		4th Opening	$V_{a4} = V_{b4}$	=	132	plf	$O_4 =$	0.0	$F_4 =$		$F_9 =$	
						$O_5 =$	0.0	$F_5 =$		$F_{10} =$		
Wind:	717	1st Opening	$V_{a1} = V_{b1}$	=	156	plf	$O_1 =$	1811	$F_1 =$	906	$F_6 =$	
		2nd Opening	$V_{a2} = V_{b2}$	=	156	plf	$O_2 =$	0	$F_2 =$	906	$F_7 =$	
		3rd Opening	$V_{a3} = V_{b3}$	=	156	plf	$O_3 =$	0	$F_3 =$	0	$F_8 =$	
		4th Opening	$V_{a4} = V_{b4}$	=	156	plf	$O_4 =$	0	$F_4 =$		$F_9 =$	
						$O_5 =$	0	$F_5 =$		$F_{10} =$		
Load		Tributary Length of Internal Shear Lines (in.)		Unit Shear Besides Openings (plf)				Resistance to Corner Forces (lbs)				
Seismic:	$T_1 =$	69.5	$T_6 =$		$V_1 =$	221	$V_4 =$	0	$R_1 =$	699	$R_4 =$	0
	$T_2 =$	69.5	$T_7 =$	0.0	$V_2 =$	221	$V_5 =$	0	$R_2 =$	699	$R_5 =$	0
	$T_3 =$	0.0	$T_8 =$	0.0	$V_3 =$	0	$V_6 =$	0	$R_3 =$	0	$R_6 =$	0
	$T_4 =$	0.0	$T_9 =$	0.0	$V_{total} =$		1398	$V_{total} =$		1398		
	$T_5 =$		$T_{10} =$	0								
Wind:	$T_1 =$	69.5	$T_6 =$		$V_1 =$	262	$V_4 =$	0	$R_1 =$	828	$R_4 =$	0
	$T_2 =$	69.5	$T_7 =$	0.0	$V_2 =$	262	$V_5 =$	0	$R_2 =$	828	$R_5 =$	0
	$T_3 =$	0.0	$T_8 =$	0.0	$V_3 =$	0	$V_6 =$	0	$R_3 =$	0	$R_6 =$	0
	$T_4 =$	0.0	$T_9 =$	0.0	$V_{total} =$		1657	$V_{total} =$		1657		
	$T_5 =$		$T_{10} =$	0								
Load		Net Corner Forces (lbs)		Unit Net Shear In Corner Zones (lbs)								
Seismic	$R_1 - F_1$	=	-65	VC_1	=	-21						
	$R_2 - F_2 - F_3$	=	-65	VC_2	=	-21						
	$R_3 - F_4 - F_5$	=	0	VC_3	=	0						
	$R_4 - F_6 - F_7$	=	0	VC_4	=	0						
	$R_5 - F_8 - F_9$	=	0	VC_5	=	0						
	$R_6 - F_{10}$	=	0	VC_6	=	0						
Wind	$R_1 - F_1$	=	-77	VC_1	=	-24						
	$R_2 - F_2 - F_3$	=	-77	VC_2	=	-24						
	$R_3 - F_4 - F_5$	=	0	VC_3	=	0						
	$R_4 - F_6 - F_7$	=	0	VC_4	=	0						
	$R_5 - F_8 - F_9$	=	0	VC_5	=	0						
	$R_6 - F_{10}$	=	0	VC_6	=	0						

WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION

Applicable Code Reference: 2021 SDPWS

Level: T
SW ID: 1
Grid Reference: 1

Shear Wall Input Data:

Wood Species = DF
Wall Size = 2x6
S.G. = 0.5
Adjustment Factor = 1.00

General Data Inputs

Redundancy Factor ρ = 1
Overstrength Factor Ω_o = 2.5
Discontinuous Lateral System? (Beam Below Strap) = No
Beam Depth = 16.00 in.
²Fire Treated Lumber Condition? = No
²Reduction to Allowable Capacity = 1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	1.00	1.0	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Panel Data Table

Segments					Openings					
	ft.	in.	h_o/L_i		ft.	in.	h_a (in.)	h_o (in.)	h_b (in.)	
L ₁	3	2	P ₁	1.00 :1	O ₁	11	7	11	38	44
L ₂	3	2	P ₂	1.00 :1	O ₂			11	38	44
L ₃			P ₃		O ₃			11	38	44
L ₄			P ₄		O ₄			11	38	44
L ₅			P ₅		O ₅			11	38	44
L ₆			P ₆							
ΣL 17' ### 17.92 ft.							# of Panel Sides			
								= H _{OTM} (in.) 7'-9"		
								= H _{ASPECT} (in.) 6'-6"		

Resisting Dead Load Data Table

Level	psf	L _{trib} (ft.)	Uniform plf	M _{resisting} (ft-kips)
Roof	15.00	2	30.00	4.82
Wall	15.00	6.33	94.95	15.24
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 20.05 ft-kips

Shear Aspect Ratio Adjustment Factor

(WSP) = 1.25-0.125 h/b
Average Wall Pier WSP = 1.0000

Notes:

- 4.3.3.2
1. Apply All Dead Load At 1st Level
 2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

ASD Seismic Loading Data Table

Load Description	F _s (psf)	A ₁₁ (ft ²)	A ₁₂ (ft ²)	% _{Trib}	Load (lbs)
LINE Loads (lbs)					
Roof		1398			1398
					0

Total V_(E) : 1398 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	% _{Trib}	Load (lbs)
Tower	207	16	50	1657

Total V_(w) : 1656.7 lbs


WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	1397.6	1398	220.7	260.7	6	8d	6 in. o.c.	3/8	W	0.8464	6
Wind:	1656.7	-	261.6	365.0	6	8d	6 in. o.c.	3/8		0.7167	

ASD Tension Load Combinations:

 Seismic: $0.6D - 0.7E_v + 0.7E_h = (0.6 - 1.4S_{DS})D + 0.7E_h = \mathbf{0.46 D - 0.7pQ_E}$ ASCE 2.4.5

 Wind: $0.6D - 0.6W = \mathbf{0.6 D - 0.6W}$ ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W	
							HD	Strap	HD	Strap
Seismic:	-10.83	20.05	-1.57	208.4	213.5	output:	-90	-88	-890.8	-869.7
Wind:	-12.84	20.05	-0.81	208.4	213.5	output:	-46	-45	-1232.0	-1202.8

 Apply Omega (Ω)? **No**

 Include Uplift F.A.in Omega? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs)		Point Load D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0E Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0	Yes	-90	-27.1		-117.4	-116.8	-929.5	-908.4
Wind:		0		-46	-13.9		-60.4	-60.0	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

Wood to Wood Connection

Post to Conc. Connection

Type Hardware Capacity U.C.

Design Strap Min. Design Post

Design HD

Min. Design Post

HD: HTT4 3610 0.0325

STRAP: 1-CS14 2490 0.0472

OUTPUT HOLDOWN SUMMARY:

1-CS14

2x6

HTT4

4x6

Shear Wall Type: 6

Required Strap Force: 764 lbs

Strap Above & Below Opening: CS14

$V_{c1} =$	V_{a1}	$V_{c2} =$	V_{a1}	$V_{c3} =$	V_{a1}	$V_{c4} =$	V_{a1}	$V_{c5} =$	V_{a1}	$V_{c6} =$
-21	156	-21								
CS14										
$V_1 =$	O_1	$V_2 =$	O_2	$V_3 =$	O_3	$V_4 =$	O_4	$V_5 =$	O_5	$V_6 =$
262		262		0		0		0		0
CS14										
$V_{c1} =$	$V_{b1} =$	$V_{c2} =$	$V_{b2} =$	$V_{c3} =$	$V_{b3} =$	$V_{c4} =$	$V_{b4} =$	$V_{c5} =$	$V_{b5} =$	$V_{c6} =$
-21	156	-21								
$L_1 =$	$L_2 =$	$L_3 =$	$L_4 =$	$L_5 =$	$L_5 =$					
3' 2"	3' 2"	0' 0"	0' 0"	0' 0"	0' 0"					



WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION												
FTAO Tension Strap Design (Horizontal Strap Across Opening)												
Load		T (lbs)		Unit Shear Above & Below Opening				Total Force Above & Below Openings (lbs)		Corner Forces (lbs)		
Seismic:	605	1st Opening	$V_{a1} = V_{b1}$	=	132	plf	$O_1 =$	1528	$F_1 =$	764	$F_6 =$	
		2nd Opening	$V_{a2} = V_{b2}$	=	132	plf	$O_2 =$	0	$F_2 =$	764	$F_7 =$	
		3rd Opening	$V_{a3} = V_{b3}$	=	132	plf	$O_3 =$	0	$F_3 =$	0	$F_8 =$	
		4th Opening	$V_{a4} = V_{b4}$	=	132	plf	$O_4 =$	0.0	$F_4 =$		$F_9 =$	
						$O_5 =$	0.0	$F_5 =$		$F_{10} =$		
Wind:	717	1st Opening	$V_{a1} = V_{b1}$	=	156	plf	$O_1 =$	1811	$F_1 =$	906	$F_6 =$	
		2nd Opening	$V_{a2} = V_{b2}$	=	156	plf	$O_2 =$	0	$F_2 =$	906	$F_7 =$	
		3rd Opening	$V_{a3} = V_{b3}$	=	156	plf	$O_3 =$	0	$F_3 =$	0	$F_8 =$	
		4th Opening	$V_{a4} = V_{b4}$	=	156	plf	$O_4 =$	0	$F_4 =$		$F_9 =$	
						$O_5 =$	0	$F_5 =$		$F_{10} =$		
Load		Tributary Length of Internal Shear Lines (in.)		Unit Shear Besides Openings (plf)				Resistance to Corner Forces (lbs)				
Seismic:	$T_1 =$	69.5	$T_6 =$		$V_1 =$	221	$V_4 =$	0	$R_1 =$	699	$R_4 =$	0
	$T_2 =$	69.5	$T_7 =$	0.0	$V_2 =$	221	$V_5 =$	0	$R_2 =$	699	$R_5 =$	0
	$T_3 =$	0.0	$T_8 =$	0.0	$V_3 =$	0	$V_6 =$	0	$R_3 =$	0	$R_6 =$	0
	$T_4 =$	0.0	$T_9 =$	0.0	$V_{total} =$		1398	$V_{total} =$		1398		
	$T_5 =$		$T_{10} =$	0								
Wind:	$T_1 =$	69.5	$T_6 =$		$V_1 =$	262	$V_4 =$	0	$R_1 =$	828	$R_4 =$	0
	$T_2 =$	69.5	$T_7 =$	0.0	$V_2 =$	262	$V_5 =$	0	$R_2 =$	828	$R_5 =$	0
	$T_3 =$	0.0	$T_8 =$	0.0	$V_3 =$	0	$V_6 =$	0	$R_3 =$	0	$R_6 =$	0
	$T_4 =$	0.0	$T_9 =$	0.0	$V_{total} =$		1657	$V_{total} =$		1657		
	$T_5 =$		$T_{10} =$	0								
Load		Net Corner Forces (lbs)		Unit Net Shear In Corner Zones (lbs)								
Seismic	$R_1 - F_1$	=	-65	VC_1	=	-21						
	$R_2 - F_2 - F_3$	=	-65	VC_2	=	-21						
	$R_3 - F_4 - F_5$	=	0	VC_3	=	0						
	$R_4 - F_6 - F_7$	=	0	VC_4	=	0						
	$R_5 - F_8 - F_9$	=	0	VC_5	=	0						
	$R_6 - F_{10}$	=	0	VC_6	=	0						
Wind	$R_1 - F_1$	=	-77	VC_1	=	-24						
	$R_2 - F_2 - F_3$	=	-77	VC_2	=	-24						
	$R_3 - F_4 - F_5$	=	0	VC_3	=	0						
	$R_4 - F_6 - F_7$	=	0	VC_4	=	0						
	$R_5 - F_8 - F_9$	=	0	VC_5	=	0						
	$R_6 - F_{10}$	=	0	VC_6	=	0						


WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION
Applicable Code Reference: 2021 SDPWS

Level: T
SW ID: E
Grid Reference: E

Shear Wall Input Data:

Wood Species = DF
Wall Size = 2x6
S.G. = 0.5
Adjustment Factor = 1.00

General Data Inputs

Redundancy Factor ρ = 1
Overstrength Factor Ω_o = 2.5
Discontinuous Lateral System? (Beam Below Strap) = No
Beam Depth = 16.00 in.
²Fire Treated Lumber Condition? = No
²Reduction to Allowable Capacity = 1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	1.00	1.0	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Panel Data Table

Segments				Openings				
	ft.	in.	h_o/L_i	ft.	in.	h_a (in.)	h_o (in.)	h_b (in.)
L ₁	3	2	P ₁	1.00 :1	O ₁	11	38	44
L ₂	3	2	P ₂	1.00 :1	O ₂			
L ₃			P ₃		O ₃			
L ₄			P ₄		O ₄			
L ₅			P ₅		O ₅			
L ₆			P ₆					
ΣL	17'	###	17.92 ft.					

Resisting Dead Load Data Table

Level	psf	L _{trib} (ft.)	Uniform plf	M _{resisting} (ft-kips)
Roof	15.00	2	30.00	4.82
Wall	15.00	6.33	94.95	15.24
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 20.05 ft-kips

Shear Aspect Ratio Adjustment Factor

(WSP) = 1.25-0.125 h/b
Average Wall Pier WSP = 1.0000

Notes:

- 4.3.3.2
1. Apply All Dead Load At 1st Level
 2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

ASD Seismic Loading Data Table

Load Description	F _s (psf)	A ₁₁ (ft ²)	A ₁₂ (ft ²)	% _{Trib}	Load (lbs)
LINE Loads (lbs)					
Roof		1398			1398
					0

Total V_(E) : 1398 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	% _{Trib}	Load (lbs)
Tower	207	16	50	1657

Total V_(w) : 1656.7 lbs


WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	1397.6	1398	220.7	260.7	6	8d	6 in. o.c.	3/8	W	0.8464	6
Wind:	1656.7	-	261.6	365.0	6	8d	6 in. o.c.	3/8		0.7167	

ASD Tension Load Combinations:

 Seismic: $0.6D - 7E_v + 7E_h = (.6 - .14S_{DS})D + 7E_h = \mathbf{0.46 D - 7pQ_E}$ ASCE 2.4.5

 Wind: $0.6D - .6W = \mathbf{0.6 D - .6W}$ ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W	
							HD	Strap	HD	Strap
Seismic:	-10.83	20.05	-1.57	208.4	213.5	output:	-90	-88	-890.8	-869.7
Wind:	-12.84	20.05	-0.81	208.4	213.5	output:	-46	-45	-1232.0	-1202.8

 Apply Omega (n)? **No**

 Include Uplift F.A.in Omega? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs)		Point Load D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0E Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0	Yes	-90	-27.1		-117.4	-116.8	-929.5	-908.4
Wind:		0		-46	-13.9		-60.4	-60.0	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction


Hold Down Design:
Wood to Wood Connection
Post to Conc. Connection

Type Hardware Capacity U.C.

Design Strap Min. Design Post Design HD Min. Design Post

HD: HTT4 3610 0.0325

STRAP: 1-CS14 2490 0.0472

OUTPUT HOLDOWN SUMMARY:
1-CS14
2x6
HTT4
4x6
Shear Wall Type: 6
Required Strap Force: 764 lbs
Strap Above & Below Opening: CS14

$V_{c1} =$	V_{a1}	$V_{c2} =$	V_{a1}	$V_{c3} =$	V_{a1}	$V_{c4} =$	V_{a1}	$V_{c5} =$	V_{a1}	$V_{c6} =$
-21	156	-21								
CS14										
$V_1 =$	O_1	$V_2 =$	O_2	$V_3 =$	O_3	$V_4 =$	O_4	$V_5 =$	O_5	$V_6 =$
262		262		0		0		0		0
CS14										
$V_{c1} =$	$V_{b1} =$	$V_{c2} =$	$V_{b2} =$	$V_{c3} =$	$V_{b3} =$	$V_{c4} =$	$V_{b4} =$	$V_{c5} =$	$V_{b5} =$	$V_{c6} =$
-21	156	-21								
$L_1 =$	$L_2 =$	$L_3 =$	$L_4 =$	$L_5 =$	$L_5 =$					
3' 2"	3' 2"	0' 0"	0' 0"	0' 0"	0' 0"					



WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION												
FTAO Tension Strap Design (Horizontal Strap Across Opening)												
Load		T (lbs)		Unit Shear Above & Below Opening		Total Force Above & Below Openings (lbs)		Corner Forces (lbs)				
Seismic:	605	1st Opening	V_{a1}	=	V_{b1}	=	132 plf	O_1	1528	F_1	764	F_6
		2nd Opening	V_{a2}	=	V_{b2}	=	132 plf	O_2	0	F_2	764	F_7
		3rd Opening	V_{a3}	=	V_{b3}	=	132 plf	O_3	0	F_3	0	F_8
		4th Opening	V_{a4}	=	V_{b4}	=	132 plf	O_4	0.0	F_4		F_9
							O_5	0.0	F_5		F_{10}	
Wind:	717	1st Opening	V_{a1}	=	V_{b1}	=	156 plf	O_1	1811	F_1	906	F_6
		2nd Opening	V_{a2}	=	V_{b2}	=	156 plf	O_2	0	F_2	906	F_7
		3rd Opening	V_{a3}	=	V_{b3}	=	156 plf	O_3	0	F_3	0	F_8
		4th Opening	V_{a4}	=	V_{b4}	=	156 plf	O_4	0	F_4		F_9
							O_5	0	F_5		F_{10}	
Load		Tributary Length of Internal Shear Lines (in.)		Unit Shear Besides Openings (plf)		Resistance to Corner Forces (lbs)						
Seismic:	T_1	69.5	T_6		V_1	221	V_4	0	R_1	699	R_4	0
	T_2	69.5	T_7	0.0	V_2	221	V_5	0	R_2	699	R_5	0
	T_3	0.0	T_8	0.0	V_3	0	V_6	0	R_3	0	R_6	0
	T_4	0.0	T_9	0.0	V_{total}		1398	V_{total}		1398		
	T_5		T_{10}	0								
Wind:	T_1	69.5	T_6		V_1	262	V_4	0	R_1	828	R_4	0
	T_2	69.5	T_7	0.0	V_2	262	V_5	0	R_2	828	R_5	0
	T_3	0.0	T_8	0.0	V_3	0	V_6	0	R_3	0	R_6	0
	T_4	0.0	T_9	0.0	V_{total}		1657	V_{total}		1657		
	T_5		T_{10}	0								
Load		Net Corner Forces (lbs)		Unit Net Shear In Corner Zones (lbs)								
Seismic	$R_1 - F_1$	=	-65	VC_1	=	-21						
	$R_2 - F_2 - F_3$	=	-65	VC_2	=	-21						
	$R_3 - F_4 - F_5$	=	0	VC_3	=	0						
	$R_4 - F_6 - F_7$	=	0	VC_4	=	0						
	$R_5 - F_8 - F_9$	=	0	VC_5	=	0						
	$R_6 - F_{10}$	=	0	VC_6	=	0						
Wind	$R_1 - F_1$	=	-77	VC_1	=	-24						
	$R_2 - F_2 - F_3$	=	-77	VC_2	=	-24						
	$R_3 - F_4 - F_5$	=	0	VC_3	=	0						
	$R_4 - F_6 - F_7$	=	0	VC_4	=	0						
	$R_5 - F_8 - F_9$	=	0	VC_5	=	0						
	$R_6 - F_{10}$	=	0	VC_6	=	0						


WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION
Applicable Code Reference: 2021 SDPWS

Level: T
SW ID: H
Grid Reference: H

Shear Wall Input Data:

Wood Species = DF
Wall Size = 2x6
S.G. = 0.5
Adjustment Factor = 1.00

General Data Inputs

Redundancy Factor ρ = 1
Overstrength Factor Ω_o = 2.5
Discontinuous Lateral System? (Beam Below Strap) = No
Beam Depth = 16.00 in.
²Fire Treated Lumber Condition? = No
²Reduction to Allowable Capacity = 1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	1.00	1.0	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Panel Data Table

Segments					Openings					
	ft.	in.	h_o/L_i		ft.	in.	h_s (in.)	h_o (in.)	h_b (in.)	
L ₁	3	2	P ₁	1.00 :1	O ₁	11	7	11	38	44
L ₂	3	2	P ₂	1.00 :1	O ₂			11	38	44
L ₃			P ₃		O ₃			11	38	44
L ₄			P ₄		O ₄			11	38	44
L ₅			P ₅		O ₅			11	38	44
L ₆			P ₆							
ΣL 17' ### 17.92 ft.							# of Panel Sides			
							= H _{OTM} (in.)		7'-9"	
							= H _{ASPECT} (in.)		6'-6"	

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	$M_{resisting}$ (ft-kips)
Roof	15.00	2	30.00	4.82
Wall	15.00	6.33	94.95	15.24
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 20.05 ft-kips

Shear Aspect Ratio Adjustment Factor

(WSP) = 1.25-0.125 h/b
Average Wall Pier WSP = 1.0000

Notes:

- 4.3.3.2
1. Apply All Dead Load At 1st Level
 2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

ASD Seismic Loading Data Table

Load Description	F_{s1} (psf)	A_{11} (ft ²)	A_{12} (ft ²)	% _{Trib}	Load (lbs)
LINE Loads (lbs)					
Roof		1398			1398
					0

Total $V_{(E)}$: 1398 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	% _{Trib}	Load (lbs)
Tower	207	16	50	1657

Total $V_{(w)}$: 1656.7 lbs


WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	1397.6	1398	220.7	260.7	6	8d	6 in. o.c.	3/8	W	0.8464	6
Wind:	1656.7	-	261.6	365.0	6	8d	6 in. o.c.	3/8		0.7167	

ASD Tension Load Combinations:

 Seismic: $0.6D - 7E_v + 7E_h = (.6 - .14S_{DS})D + 7E_h = \mathbf{0.46 D - 7pQ_E}$ ASCE 2.4.5

 Wind: $0.6D - .6W = \mathbf{0.6 D - .6W}$ ASCE 2.4.1

Overturning Design:

Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W	
							HD	Strap	HD	Strap
Seismic:	-10.83	20.05	-1.57	208.4	213.5	output:	-90	-88	-890.8	-869.7
Wind:	-12.84	20.05	-0.81	208.4	213.5	output:	-46	-45	-1232.0	-1202.8

 Apply Omega (n)? **No**

 Include Uplift F.A.in Omega? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs)		Point Load D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0E Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0	Yes	-90	-27.1		-117.4	-116.8	-929.5	-908.4
Wind:		0		-46	-13.9		-60.4	-60.0	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

Wood to Wood Connection

Post to Conc. Connection

Type Hardware Capacity U.C.

Design Strap Min. Design Post

Design HD

Min. Design Post

HD: HTT4 3610 0.0325

STRAP: 1-CS14 2490 0.0472

OUTPUT HOLDOWN SUMMARY:

1-CS14

2x6

HTT4

4x6

Shear Wall Type: 6

Required Strap Force: 764 lbs

Strap Above & Below Opening: CS14

$V_{c1} =$	V_{a1}	$V_{c2} =$	V_{a1}	$V_{c3} =$	V_{a1}	$V_{c4} =$	V_{a1}	$V_{c5} =$	V_{a1}	$V_{c6} =$
-21	156	-21								
CS14										
$V_1 =$	O_1	$V_2 =$	O_2	$V_3 =$	O_3	$V_4 =$	O_4	$V_5 =$	O_5	$V_6 =$
262		262		0		0		0		0
CS14										
$V_{c1} =$	$V_{b1} =$	$V_{c2} =$	$V_{b2} =$	$V_{c3} =$	$V_{b3} =$	$V_{c4} =$	$V_{b4} =$	$V_{c5} =$	$V_{b5} =$	$V_{c6} =$
-21	156	-21								
$L_1 =$	$L_2 =$	$L_3 =$	$L_4 =$	$L_5 =$	$L_5 =$					
3' 2"	3' 2"	0' 0"	0' 0"	0' 0"	0' 0"					



WOOD SHEAR PANEL DESIGN FOR FORCE TRANSFER AROUND OPENINGS (FTAO) - SITE CONSTRUCTION												
FTAO Tension Strap Design (Horizontal Strap Across Opening)												
Load		T (lbs)		Unit Shear Above & Below Opening				Total Force Above & Below Openings (lbs)		Corner Forces (lbs)		
Seismic:	605	1st Opening	$V_{a1} = V_{b1}$	=	132	plf	$O_1 =$	1528	$F_1 =$	764	$F_6 =$	
		2nd Opening	$V_{a2} = V_{b2}$	=	132	plf	$O_2 =$	0	$F_2 =$	764	$F_7 =$	
		3rd Opening	$V_{a3} = V_{b3}$	=	132	plf	$O_3 =$	0	$F_3 =$	0	$F_8 =$	
		4th Opening	$V_{a4} = V_{b4}$	=	132	plf	$O_4 =$	0.0	$F_4 =$		$F_9 =$	
						$O_5 =$	0.0	$F_5 =$		$F_{10} =$		
Wind:	717	1st Opening	$V_{a1} = V_{b1}$	=	156	plf	$O_1 =$	1811	$F_1 =$	906	$F_6 =$	
		2nd Opening	$V_{a2} = V_{b2}$	=	156	plf	$O_2 =$	0	$F_2 =$	906	$F_7 =$	
		3rd Opening	$V_{a3} = V_{b3}$	=	156	plf	$O_3 =$	0	$F_3 =$	0	$F_8 =$	
		4th Opening	$V_{a4} = V_{b4}$	=	156	plf	$O_4 =$	0	$F_4 =$		$F_9 =$	
						$O_5 =$	0	$F_5 =$		$F_{10} =$		
Load		Tributary Length of Internal Shear Lines (in.)				Unit Shear Besides Openings (plf)		Resistance to Corner Forces (lbs)				
Seismic:	$T_1 =$	69.5	$T_6 =$		$V_1 =$	221	$V_4 =$	0	$R_1 =$	699	$R_4 =$	0
	$T_2 =$	69.5	$T_7 =$	0.0	$V_2 =$	221	$V_5 =$	0	$R_2 =$	699	$R_5 =$	0
	$T_3 =$	0.0	$T_8 =$	0.0	$V_3 =$	0	$V_6 =$	0	$R_3 =$	0	$R_6 =$	0
	$T_4 =$	0.0	$T_9 =$	0.0	$V_{total} =$		1398	$V_{total} =$		1398		
	$T_5 =$		$T_{10} =$	0								
Wind:	$T_1 =$	69.5	$T_6 =$		$V_1 =$	262	$V_4 =$	0	$R_1 =$	828	$R_4 =$	0
	$T_2 =$	69.5	$T_7 =$	0.0	$V_2 =$	262	$V_5 =$	0	$R_2 =$	828	$R_5 =$	0
	$T_3 =$	0.0	$T_8 =$	0.0	$V_3 =$	0	$V_6 =$	0	$R_3 =$	0	$R_6 =$	0
	$T_4 =$	0.0	$T_9 =$	0.0	$V_{total} =$		1657	$V_{total} =$		1657		
	$T_5 =$		$T_{10} =$	0								
Load		Net Corner Forces (lbs)				Unit Net Shear In Corner Zones (lbs)						
Seismic	$R_1 - F_1$	=	-65	VC_1		=	-21					
	$R_2 - F_2 - F_3$	=	-65	VC_2		=	-21					
	$R_3 - F_4 - F_5$	=	0	VC_3		=	0					
	$R_4 - F_6 - F_7$	=	0	VC_4		=	0					
	$R_5 - F_8 - F_9$	=	0	VC_5		=	0					
	$R_6 - F_{10}$	=	0	VC_6		=	0					
Wind	$R_1 - F_1$	=	-77	VC_1		=	-24					
	$R_2 - F_2 - F_3$	=	-77	VC_2		=	-24					
	$R_3 - F_4 - F_5$	=	0	VC_3		=	0					
	$R_4 - F_6 - F_7$	=	0	VC_4		=	0					
	$R_5 - F_8 - F_9$	=	0	VC_5		=	0					
	$R_6 - F_{10}$	=	0	VC_6		=	0					

 STRUCTURAL ENGINEERS	Project	ISE
	Project #:	
	Date:	11/15/2024
	Designer:	-

WOOD SHEAR WALL DESIGN WITH FORCE TRANSFER AT DOOR OPENING PER THE DIEKMANN METHOD

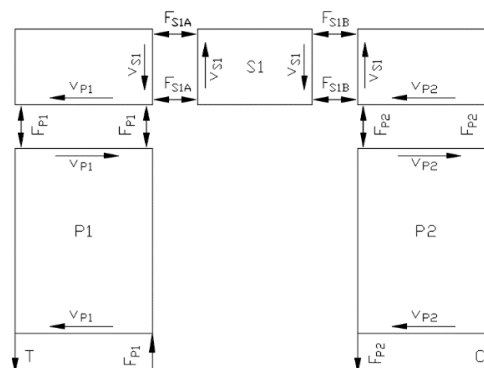
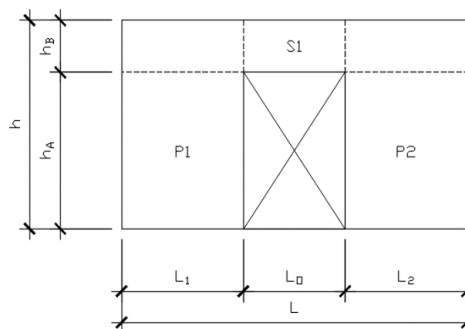
SW1	ROOF FRAMING PLAN - ALONG GRID 1
-----	----------------------------------

Roof DL =	15.0	psf
Floor DL =	0.0	psf
Wall DL =	15.0	psf

S_{DS} =	0.99
C_d =	4.0
FRT	N

WALL INFORMATION	Story	L (ft)	L_1 (ft)	L_O (ft)	L_2 (ft)	h (ft)	h_A (ft)	h_B (ft)
	1	20.34	2.92	14.50	2.92	16.67	9.33	7.34

WALL INFORMATION	Story	DL Trib. Width (ft)	Trib. P_{DL} (lb)	Max L/h Ratio	Aspect Ratio Factor	ΣL_i (ft)
	1	62.00	9,458	3.20	0.63	5.84



WIND ANALYSIS	Story	WL (plf)	B_{trib} (ft)	F (lb)	V (lb)	OM_w (lb-ft)	$v_{P1} = v_{P2}$ (plf)	v_{S1} (plf)	T = C (lb)	T_{net} (lb)	$F_{P1} = F_{P2}$ (lb)	F_{S1A} (lb)	F_{S1B} (lb)	Δ_i (in)	$\Sigma \Delta_{wi}$ (in)
	1	207	8.00	1,657	1,657	27,618	284	133	1,358	-4,317	1,323	966	966	0.264	0.264

EQ ANALYSIS	Story	EL (plf)	A_{trib} (ft)	F (lb)	V (lb)	OM_w (lb-ft)	$v_{P1} = v_{P2}$ (plf)	v_{S1} (plf)	T = C (lb)	T_{net} (lb)	$F_{P1} = F_{P2}$ (lb)	F_{S1A} (lb)	F_{S1B} (lb)	Δ_i (in)	$\Sigma \Delta_{wi}$ (in)
	1	2,358	1	2,358	2,358	39,310	404	190	1,933	-2,436	1,884	1,375	1,375	0.759	0.759

WALL DESIGN	Story	Shear Wall Type	Dbl. Sided	Post Size	End Post Strap/HD	Door Jamb Strap/HD	Force Transfer Strap	Allowable Shear		End Post Capacity (lb)	End Post Strap/HD Capacity (lb)	Jamb Strap/HD Capacity (lb)	F.T. Strap Capacity (lb)	D/C Check
								Wind (plf)	Seismic (in)					
	1	2A	N	4x6	HTT4	HTT4	1-CS14	640.02	457.2	12,030	3,610	3,610	2,490	OK

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
----------------------------	------	-------

Level:	1
SW ID:	HL
Grid Reference	HL

Shear Wall Input Data:

Wood Species	=	DF	
Wall Size	=	2x6	
# of Panel Sides	=	2	
S.G.	=	0.5	
S.G. Adjustment Factor	=	1.00	
L _{total}	=	35 in.	2'-11"
L _{min}	=	35 in.	2'-11"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	11.875 in.
² Fire Treated Lumber Condition?		=	No
⁴ Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity-2-Panels (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
2	3/8	CD	8d	2 in. o.c.	3x	3580	2	2.8	0.00	1.00	1.0	-	1279	1790

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

Height:		ft.	in.
H _{OTM} (in.)	=	16	8
H _{ASPECT} (in.)	=	16	8

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

[illegible]

ΣL = **2.92 ft.** Weighted Average: **1.00**

Resisting Dead Load Data Table

[illegible]

Total M_D : 0.99 ft-kips

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft ²)	A_{t2} (ft ²)	% _{Trib}	Load (lbs)
					0
Line Loads(lbs)					
Roof	1614 lbs.				1614
H1T	1398 lbs.				1398

Total $V_{(E)}$: 3011 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	% _{Trib}	Load (lbs)
Roof	180	36	50	3240
Total V_(w) :				3240.2 lbs

Total $V_{(w)}$: 3240.2 lbs


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED

Shear Panel Design:		Double Sided Shear Wall			Apply 10d Nail Strength Reduction Factor Per Note 1 Above =							Yes
Load Type	V (lbs)	pV (E) (lbs)	v _{req.} (plf)	v _{ava.} (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type	
Seismic:	3011.3	3011.3126	1032.5	1278.6	2	8d	2 in. o.c.	3/8	W	0.8075	2	
Wind:	3240.2	-	1110.9	1370.0	3	8d	3 in. o.c.	3/8		0.8109		

ASD Tension Load Combinations:										
Seismic:	$0.6D + .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h$					=	0.46 D - .7pQ _E		ASCE 2.4.5	
Wind:	$0.6D + .7W =$					=	0.6 D - .6W		ASCE 2.4.1	
Overturning Design:										
Load Type	M _{OT} (ft-kips)	M _D (ft-kips)	M _{net} (ft-kips)	HD b _{eff} (in.)	Strap b _{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W (lbs)	
							HD	Strap	HD	Strap
Seismic:	-50.19	0.46	-49.73	29.8	33.5	output:	-20059.9	-17814.4	-28920.2	-25682.8
Wind:	-54.00	0.59	-53.41	29.8	33.5	output:	-21543.3	-19131.7	-36304.4	-32240.5
									Apply Omega (α)?	No
									Include Uplift F.A.?	No
Load Type	ASD Uplift F.A ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0			0.0		-20059.9	-17814.4	-28920.2	-25682.8
Wind:		0.0			0.0		-21543.3	-19131.7	-	-
1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)										
2. (-) indicates uplift										
3. F.A. indicates From Above										
4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section										
5. Orthogonal uplift should be the net uplift from the other direction										

Hold Down Design:				Foundation Type: Slab On Grade			
				Wood to Wood Connection		Post to Conc. Connection	
Type	Hardware	Capacity	U.C.	Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	#N/A	#N/A	#N/A	OUTPUT HOLDOWN SUMMARY:	#VALUE!	#N/A	#N/A
STRAP:	-	-	#VALUE!				



STRUCTURAL
ENGINEERS

Sheet:	TRAIN/MULTIPURP
Date:	-
#:	-
Δ :	-

**SHEAR TRANSFER LOAD CHECK - DIAPHRAGM, HARDWARE, TOP PLATE, COLLECTORS & CHORDS AT SITE BUILT WOOD STUD WALL
FRAMED BUILDINGS - DF LUMBER**

HARDWARE LOADS	
ITEM	LBS
A34	515
A35	695
LTP4	670
LTP5	620
LS50	730
LS70	915
RBC	435
SDS	-

ALLOWABLE DIAPHRAGM LOADS		
TYPE	DIAPHRAGM	(PLF)
ROOF 1	UNBLOCKED - 15/32" SHEATHING W/ 8d AT 6" O.C. E.N.	180
ROOF 2	2x BLOCKED - 15/32" SHEATHING W/ 8d AT 4" O.C. E.N.	360
ROOF 3	-	-
ROOF 4	-	-
FLOOR 1	-	-
FLOOR 2	-	-
FLOOR 3	-	-
FLOOR 4	-	-

STRAP LOADS	
ITEM	LBS
CS16	1705
2-CS16	3410
CMSTC16	4585
CMST14	6490
CMST12	9215

ALLOWABLE TOP PLATE NAIL LOADS (Cd = 1.6)		
TYPE	NAIL SIZE	(LBS)
16d SHORT	16d SHORT - 0.131" x 3.25"	155
-	-	-

GRID		3	4	5	B	D	G	7		
Fx (0.7E) SHEAR LOAD (LBS)		2334	5190	5708	2950	9099	7230	3810		
DIAPHRAGM	Fpx (0.7E) SHEAR (LBS)	2447	5442	5985	3093	9541	7581	3995		
	DIAPHRAGM TYPE	ROOF 1	ROOF 1	ROOF 1	ROOF 1	ROOF 1	ROOF 1	ROOF 1		
	EDGE LENGTH (FT)	62	62.0	62.0	37	80	80	68		
	EDGE STRESS (PLF)	39	88	97	84	119	95	59		
	ALLOW STRESS (PLF)	180	180	180	180	180	180	180		
TOP PLATE CLIPS	WALL LENGTH (FT)	62	62	62	37	80	80	68		
	HARDWARE USED	A35	A35	A35	A35	A35	A35	A35		
	MAX. SPACING (IN) O.C.	48.0	48.0	48	48	48.0	48.0	48.0		
TOP PLATE SPLICE	TRIB SPLICE LENGTH (FT)	11	11	16	6.5	10	12	7		
	SPLICE LOAD (LBS)	414	921	1473	518	1137	1084	392		
	#16d SHORT NAILS	3	6	10	4	8	7	3		
	ALT. STRAP	CS16	CS16	CS16	CS16	CS16	CS16	CS16		
CHORD	Perp. - Fpx (0.7E) SHEAR (PLF)	142.7	188.3	274.2	227.9	217.0	219	363		
	PARALLEL LENGTH (FT)	30	30	29	37	46	46	33		
	PERP. WIDTH (FT)	11.75	22.2	22	29	33	33	46		
	CHORD TENSION (LBS)	1366	954	1310	1345	1739	1746	1075		
	STRAP AT CHORD BREAK	CS16	CS16	CS16	CS16	2-CS16	2-CS16	CS16		



STRUCTURAL
ENGINEERS

Sheet:	DRAG (3)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (3)	Drag at Grid 3
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	2,334						
V_{WIND} , lbs:	1,348						
Start:	0.00						
Length:	61.50						
End:	61.50	0.00	0.00	0.00	0.00	0.00	0.00

$v_{SEISMIC}$, plf:	37.95	0.00	0.00	0.00	0.00	0.00	0.00
v_{WIND} , plf:	21.92	0.00	0.00	0.00	0.00	0.00	0.00

DRAG (3) Cont.	Drag at Grid 3
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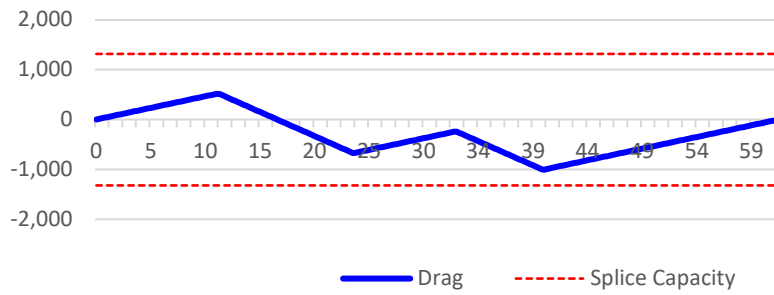
SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	11.00	32.42					
Length:	12.17	7.83					
End:	23.17	40.25	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{SW}
End:	0.00	0.00	0.00	0.00	0.00	0.00	20.00

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	2,333.8	116.7
V_{WIND}	1,348.2	67.4

Design Summary

Drag Load



Total Line Length (ft):	61.50
Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
514.9	11.1	Plate Splice OK
-1003.5	40.3	Plate Splice OK
296.9	13.5	Plate Splice OK
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



STRUCTURAL
ENGINEERS

Sheet:	DRAG (4)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (4)	Drag at Grid 4
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	5,190						
V_{WIND} , lbs:	2,865						
Start:	0.00						
Length:	61.50						
End:	61.50	0.00	0.00	0.00	0.00	0.00	0.00

$v_{SEISMIC}$, plf:	84.40	0.00	0.00	0.00	0.00	0.00	0.00
v_{WIND} , plf:	46.58	0.00	0.00	0.00	0.00	0.00	0.00

DRAG (4) Cont.	Drag at Grid 4
----------------	----------------

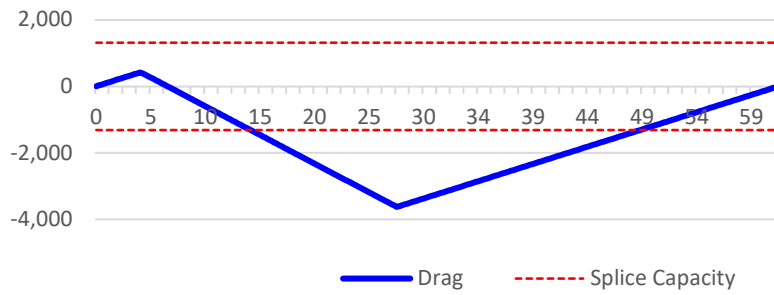
SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	4.00	10.92					
Length:	6.92	16.17					
End:	10.92	27.09	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{SW}
End:	0.00	0.00	0.00	0.00	0.00	0.00	23.09

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	5,190.4	224.8
V_{WIND}	2,864.9	124.1

Design Summary

Drag Load



Total Line Length (ft):	61.50
Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
415.2	3.9	Plate Splice OK
-3625.7	27.1	CMSTC16
-1207.6	13.5	Plate Splice OK
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



STRUCTURAL
ENGINEERS

Sheet:	DRAG (SLOW)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (SLOW)	Drag at Grid 5 Low Roof
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	5,708						
V_{WIND} , lbs:	1,896						
Start:	0.00						
Length:	62.00						
End:	62.00	0.00	0.00	0.00	0.00	0.00	0.00

$v_{SEISMIC}$, plf:	92.06	0.00	0.00	0.00	0.00	0.00	0.00
v_{WIND} , plf:	30.58	0.00	0.00	0.00	0.00	0.00	0.00

DRAG (SLOW) Cont.	Drag at Grid 5 Low Roof
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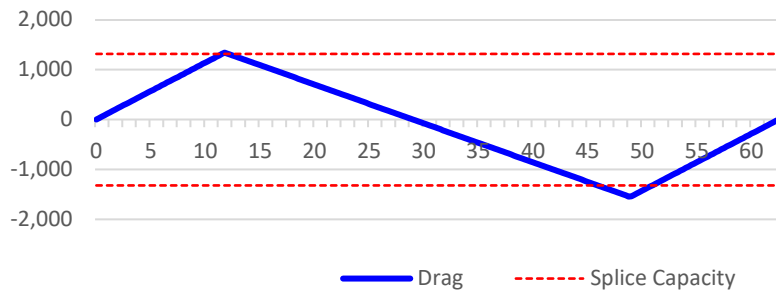
SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	11.67	32.34					
Length:	20.67	16.17					
End:	32.34	48.51	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{SW}
End:	0.00	0.00	0.00	0.00	0.00	0.00	36.84

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	5,707.8	154.9
V_{WIND}	1,895.9	51.5

Design Summary

Drag Load



Total Line Length (ft):	62.00
Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
1341.3	11.7	CS16
-1541.2	48.4	CS16
1207.6	13.5	Plate Splice OK
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



STRUCTURAL
ENGINEERS

Sheet:	DRAG (B)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (B)	Drag at Grid B
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	2,950						
V_{WIND} , lbs:	2,528						
Start:	0.00						
Length:	37.00						
End:	37.00	0.00	0.00	0.00	0.00	0.00	0.00

$v_{SEISMIC}$, plf:	79.74	0.00	0.00	0.00	0.00	0.00	0.00
v_{WIND} , plf:	68.32	0.00	0.00	0.00	0.00	0.00	0.00

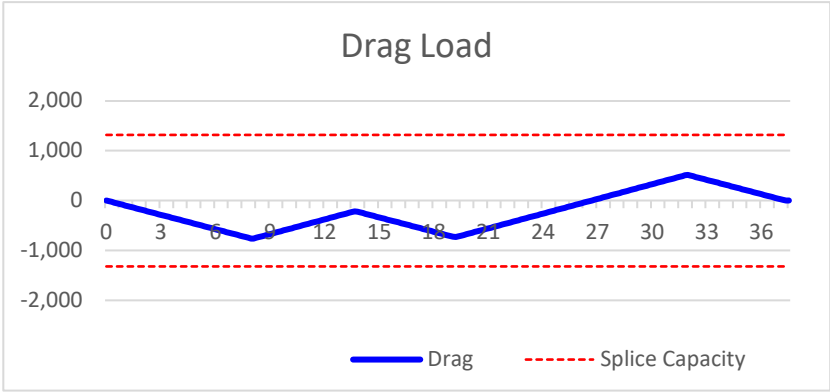
DRAG (B) Cont.	Drag at Grid B
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SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	0.00	13.50	31.50				
Length:	7.92	5.41	5.41				
End:	7.92	18.91	36.91	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{SW}
End:	0.00	0.00	0.00	0.00	0.00	0.00	18.74

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	2,950.2	157.4
V_{WIND}	2,527.9	134.9

Design Summary



Total Line Length (ft):	37.00
Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
514.1	31.5	Plate Splice OK
-762.0	8.0	Plate Splice OK
-216.2	13.5	Plate Splice OK
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



STRUCTURAL
ENGINEERS

Sheet:	DRAG (G) (2)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (G) (2)	Drag at Grid G
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	7,230						
V_{WIND} , lbs:	3,033						
Start:	0.00						
Length:	79.50						
End:	79.50	0.00	0.00	0.00	0.00	0.00	0.00

$V_{SEISMIC}$, plf:	90.94	0.00	0.00	0.00	0.00	0.00	0.00
V_{WIND} , plf:	38.16	0.00	0.00	0.00	0.00	0.00	0.00

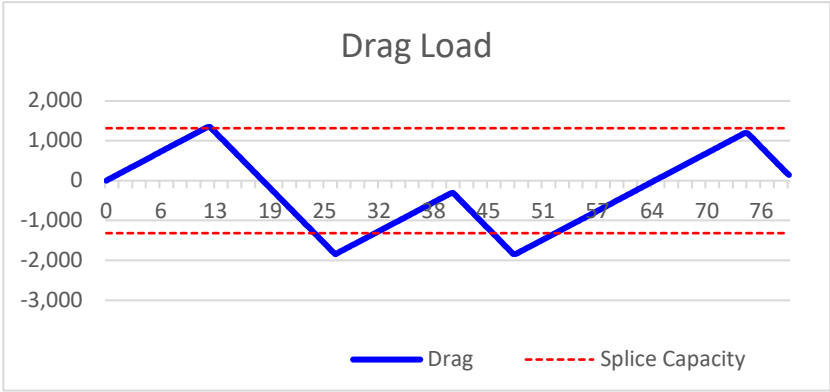
DRAG (G) (2) Cont.	Drag at Grid G
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SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	12.00	40.34	74.59				
Length:	14.67	7.17	5.33				
End:	26.67	47.51	79.92	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{SW}
End:	0.00	0.00	0.00	0.00	0.00	0.00	27.17

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	7,229.7	266.1
V_{WIND}	3,033.5	111.7

Design Summary



Total Line Length (ft):	79.50
Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
1345.7	12.1	CS16
-1843.5	26.7	2-CS16
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



STRUCTURAL
ENGINEERS

Sheet:	DRAG (DLOW)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (DLOW)	Drag at Grid D - low roof
-------------	---------------------------

DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	9,541						
V_{WIND} , lbs:	5,619						
Start:	0.00						
Length:	80.00						
End:	80.00	0.00	0.00	0.00	0.00	0.00	0.00

$v_{SEISMIC}$, plf:	119.26	0.00	0.00	0.00	0.00	0.00	0.00
v_{WIND} , plf:	70.23	0.00	0.00	0.00	0.00	0.00	0.00

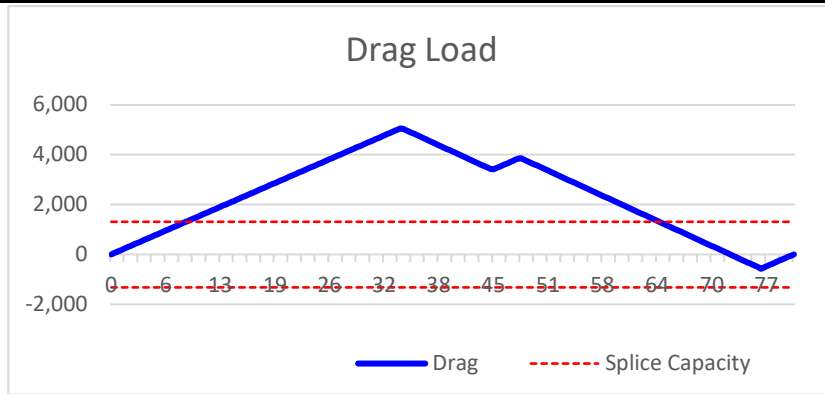
DRAG (DLOW) Cont.	Drag at Grid D - low roof
-------------------	---------------------------

SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	34.00	47.92					
Length:	10.67	28.25					
End:	44.67	76.17	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{SW}
End:	0.00	0.00	0.00	0.00	0.00	0.00	38.92

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	9,540.7	245.1
V_{WIND}	5,618.7	144.4

Design Summary



Total Line Length (ft):	80.00
Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
5056.6	33.9	CMST14
-569.4	76.2	Plate Splice OK
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



STRUCTURAL
ENGINEERS

Sheet:	TRAIN/MULTIPURP
Date:	-
#:	-
Δ :	-

**SHEAR TRANSFER LOAD CHECK - DIAPHRAGM, HARDWARE, TOP PLATE, COLLECTORS & CHORDS AT SITE BUILT WOOD STUD WALL
FRAMED BUILDINGS - DF LUMBER**

HARDWARE LOADS	
ITEM	LBS
A34	515
A35	695
LTP4	670
LTP5	620
LS50	730
LS70	915
RBC	435
-	-

ALLOWABLE DIAPHRAGM LOADS		
TYPE	DIAPHRAGM	(PLF)
ROOF 1	UNBLOCKED - 15/32" SHEATHING W/ 8d AT 6" O.C. E.N.	180
ROOF 2	2x BLOCKED - 15/32" SHEATHING W/ 8d AT 4" O.C. E.N.	360
ROOF 3	-	-
ROOF 4	-	-
FLOOR 1	-	-
FLOOR 2	-	-
FLOOR 3	-	-
FLOOR 4	-	-

STRAP LOADS	
ITEM	LBS
CS16	1705
2-CS16	3410
CMSTC16	4585
CMST14	6490
CMST12	9215

ALLOWABLE TOP PLATE NAIL LOADS (Cd = 1.6)		
TYPE	NAIL SIZE	(LBS)
16d SHORT	16d SHORT - 0.131" x 3.25"	155
-	-	-

GRID		5	7	8	A	D				
Fx (0.7E) SHEAR LOAD (LBS)		2935	2917	936	3726	3958				
DIAPHRAGM	Fpx (0.7E) SHEAR (LBS)	3077	3059	981	3907	4150				
	DIAPHRAGM TYPE	ROOF 1	ROOF 1	ROOF 1	ROOF 1	ROOF 1				
	EDGE LENGTH (FT)	32.5	32.5	32.5	60	60				
	EDGE STRESS (PLF)	95	94	30	65	69				
	ALLOW STRESS (PLF)	180	180	180	180	180				
TOP PLATE CLIPS	WALL LENGTH (FT)	32.5	33	33	60	60				
	HARDWARE USED	A35	A35	A35	A35	A35				
	MAX. SPACING (IN) O.C.	48.0	48.0	48	48	48.0				
TOP PLATE SPLICE	TRIB SPLICE LENGTH (FT)	11.5	10	4	18	18				
	SPLICE LOAD (LBS)	1038	898	115	1118	1187				
	#16d SHORT NAILS	7	6	1	8	8				
	ALT. STRAP	CS16	CS16	CS16	CS16	CS16				
CHORD	Perp. - Fpx (0.7E) SHEAR (PLF)	248	82	82	89	135				
	PARALLEL LENGTH (FT)	32.5	32.5	32.5	45.5	46				
	PERP. WIDTH (FT)	45.5	14	14	32.5	32				
	CHORD TENSION (LBS)	719	772	772	707	1091				
	STRAP AT CHORD BREAK	CS16	CS16	CS16	CS16	CS16				



STRUCTURAL
ENGINEERS

Sheet:	DRAG (5)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (5)	Drag at Grid 5
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	3,077						
V_{WIND} , lbs:	4,102						
Start:	0.00						
Length:	62.00						
End:	62.00	0.00	0.00	0.00	0.00	0.00	0.00

$v_{SEISMIC}$, plf:	49.63	0.00	0.00	0.00	0.00	0.00	0.00
v_{WIND} , plf:	66.17	0.00	0.00	0.00	0.00	0.00	0.00

DRAG (5) Cont.	Drag at Grid 5
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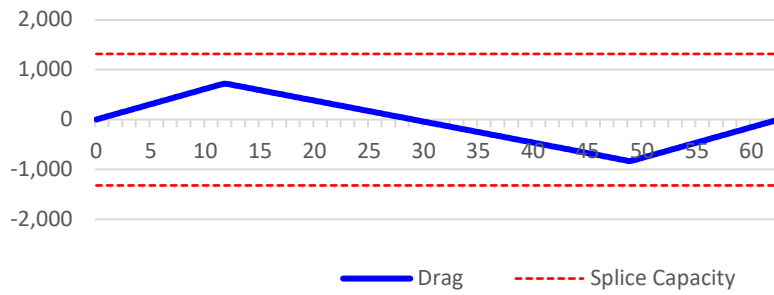
SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	11.67	32.34					
Length:	20.67	16.17					
End:	32.34	48.51	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{SW}
End:	0.00	0.00	0.00	0.00	0.00	0.00	36.84

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	3,077.2	83.5
V_{WIND}	4,102.4	111.4

Design Summary

Drag Load



Total Line Length (ft):	62.00
Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
723.1	11.7	Plate Splice OK
-830.9	48.4	Plate Splice OK
651.0	13.5	Plate Splice OK
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



STRUCTURAL
ENGINEERS

Sheet:	DRAG (7)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (7)	Drag at Grid 7
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
V _{SEISMIC} , lbs:	3,059						
V _{WIND} , lbs:	5,400						
Start:	0.00						
Length:	68.00						
End:	68.00	0.00	0.00	0.00	0.00	0.00	0.00

V _{SEISMIC} , plf:	44.99	0.00	0.00	0.00	0.00	0.00	0.00
V _{WIND} , plf:	79.42	0.00	0.00	0.00	0.00	0.00	0.00

DRAG (7) Cont.	Drag at Grid 7
----------------	----------------

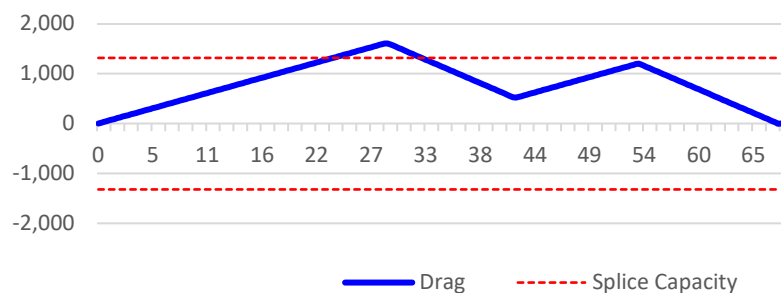
SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	28.75	53.83					
Length:	12.75	14.00					
End:	41.50	67.83	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L _{sw}
End:	0.00	0.00	0.00	0.00	0.00	0.00	26.75

Shear Line Below	V _{total} (lbs.)	v _{total} (plf)
V _{SEISMIC}	3,059.2	114.4
V _{WIND}	5,400.3	201.9

Design Summary

Drag Load



Total Line Length (ft):	68.00
Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
1609.6	28.8	CS16
-0.7	67.7	Plate Splice OK
780.1	14.0	Plate Splice OK
1468.4	26.3	CS16
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



STRUCTURAL
ENGINEERS

Sheet:	DRAG (8)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (8)	Drag at Grid 8
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	1,592						
V_{WIND} , lbs:	1,305						
Start:	0.00						
Length:	32.50						
End:	32.50	0.00	0.00	0.00	0.00	0.00	0.00

$v_{SEISMIC}$, plf:	49.00	0.00	0.00	0.00	0.00	0.00	0.00
v_{WIND} , plf:	40.16	0.00	0.00	0.00	0.00	0.00	0.00

DRAG (8) Cont.	Drag at Grid 8
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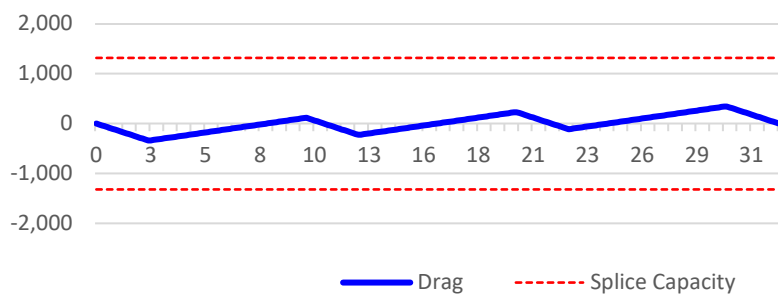
SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	0.00	10.00	20.00	30.00			
Length:	2.50	2.50	2.50	2.50			
End:	2.50	12.50	22.50	32.50	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{SW}
End:	0.00	0.00	0.00	0.00	0.00	0.00	10.00

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	1,592.5	159.2
V_{WIND}	1,305.1	130.5

Design Summary

Drag Load



Total Line Length (ft):	32.50
Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
340.4	30.0	Plate Splice OK
-340.4	2.5	Plate Splice OK
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



STRUCTURAL
ENGINEERS

Sheet:	DRAG (A)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (A)	Drag at Grid A
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	4,690						
V_{WIND} , lbs:	3,060						
Start:	0.00						
Length:	60.00						
End:	60.00	0.00	0.00	0.00	0.00	0.00	0.00

$v_{SEISMIC}$, plf:	78.17	0.00	0.00	0.00	0.00	0.00	0.00
v_{WIND} , plf:	51.00	0.00	0.00	0.00	0.00	0.00	0.00

DRAG (A) Cont.	Drag at Grid A
----------------	----------------

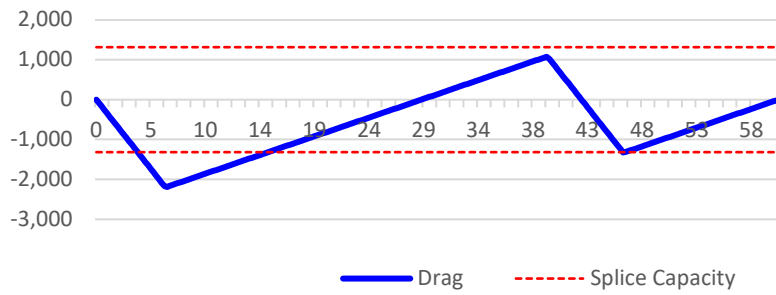
SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	0.00	39.67					
Length:	6.08	6.67					
End:	6.08	46.34	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{SW}
End:	0.00	0.00	0.00	0.00	0.00	0.00	12.75

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	4,690.0	367.8
V_{WIND}	3,060.2	240.0

Design Summary

Drag Load



Total Line Length (ft):	60.00
Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
1073.7	39.6	Plate Splice OK
-2185.9	6.2	2-CS16
-1242.9	47.5	Plate Splice OK
-445.6	55.5	Plate Splice OK
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



STRUCTURAL
ENGINEERS

Sheet:	DRAG (D)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (D)	Drag at Grid D
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	4,150						
V_{WIND} , lbs:	2,880						
Start:	0.00						
Length:	94.00						
End:	94.00	0.00	0.00	0.00	0.00	0.00	0.00

$v_{SEISMIC}$, plf:	44.15	0.00	0.00	0.00	0.00	0.00	0.00
v_{WIND} , plf:	30.64	0.00	0.00	0.00	0.00	0.00	0.00

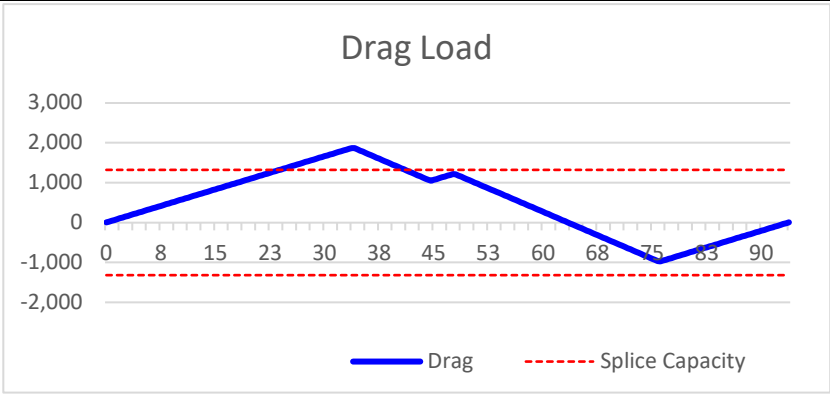
DRAG (D) Cont.	Drag at Grid D
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SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	34.00	47.92					
Length:	10.67	28.25					
End:	44.67	76.17	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{SW}
End:	0.00	0.00	0.00	0.00	0.00	0.00	38.92

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	4,150.4	106.6
V_{WIND}	2,880.1	74.0

Design Summary



Total Line Length (ft):	94.00
Load Case:	Seismic
Seismic Drag Factor	1.25

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
1867.7	33.8	2-CS16
-975.3	76.3	Plate Splice OK
622.6	11.5	Plate Splice OK
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



STRUCTURAL
ENGINEERS

Sheet:	TOWER
Date:	-
#:	-
Δ :	-

**SHEAR TRANSFER LOAD CHECK - DIAPHRAGM, HARDWARE, TOP PLATE, COLLECTORS & CHORDS AT SITE BUILT WOOD STUD WALL
FRAMED BUILDINGS - DF LUMBER**

HARDWARE LOADS	
ITEM	LBS
A34	515
A35	695
LTP4	670
LTP5	620
LS50	730
LS70	915
RBC	435
-	-

ALLOWABLE DIAPHRAGM LOADS		
TYPE	DIAPHRAGM	(PLF)
ROOF 1	UNBLOCKED - 15/32" SHEATHING W/ 8d AT 6" O.C. E.N.	180
ROOF 2	2x BLOCKED - 15/32" SHEATHING W/ 8d AT 4" O.C. E.N.	360
ROOF 3	-	-
ROOF 4	-	-
FLOOR 1	-	-
FLOOR 2	-	-
FLOOR 3	-	-
FLOOR 4	-	-

STRAP LOADS	
ITEM	LBS
CS16	1705
2-CS16	3410
CMSTC16	4585
CMST14	6490
CMST12	9215

ALLOWABLE TOP PLATE NAIL LOADS (Cd = 1.6)		
TYPE	NAIL SIZE	(LBS)
16d SHORT	16d SHORT - 0.131" x 3.25"	155
-	-	-

GRID		1	4	E	H					
Fx (0.7E) SHEAR LOAD (LBS)		1398	1398	1398	1398					
DIAPHRAGM	Fpx (0.7E) SHEAR (LBS)	1817	1817	1817	1817					
	DIAPHRAGM TYPE	ROOF 1	ROOF 1	ROOF 1	ROOF 1					
	EDGE LENGTH (FT)	18	18	18	18					
	EDGE STRESS (PLF)	101	101	101	101					
	ALLOW STRESS (PLF)	180	180	180	180					
TOP PLATE CLIPS	WALL LENGTH (FT)	18	18	18	18					
	HARDWARE USED	A35	A35	A35	A35					
	MAX. SPACING (IN) O.C.	48	48	48	48					
TOP PLATE SPLICE	TRIB SPLICE LENGTH (FT)	16	16	16	16					
	SPLICE LOAD (LBS)	1242	1242	1242	1242					
	#16d SHORT NAILS	9	9	9	9					
	ALT. STRAP	CS16	CS16	CS16	CS16					
CHORD	Perp. - Fpx (0.7E) SHEAR (PLF)	201.878	201.878	201.878	201.878					
	PARALLEL LENGTH (FT)	18	18	18	18					
	PERP. WIDTH (FT)	18	18	18	18					
	CHORD TENSION (LBS)	454.225	454.225	454.225	454.225					
	STRAP AT CHORD BREAK	CS16	CS16	CS16	CS16					



STRUCTURAL
ENGINEERS

Sheet:	DRAG (T1)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (T1)	Drag at Grid 1
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DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	1,398						
V_{WIND} , lbs:	1,657						
Start:	0.00						
Length:	16.00						
End:	16.00	0.00	0.00	0.00	0.00	0.00	0.00

$V_{SEISMIC}$, plf:	87.35	0.00	0.00	0.00	0.00	0.00	0.00
V_{WIND} , plf:	103.55	0.00	0.00	0.00	0.00	0.00	0.00

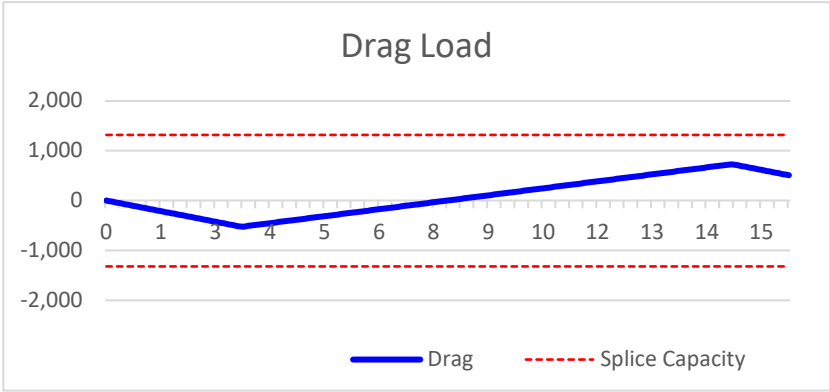
DRAG (T1) Cont.	Drag at Grid 1
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SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	0.00	14.67					
Length:	3.17	3.17					
End:	3.17	17.84	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{SW}
End:	0.00	0.00	0.00	0.00	0.00	0.00	6.33

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	1,397.6	220.7
V_{WIND}	1,656.7	261.6

Design Summary



Total Line Length (ft):	16.00
Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
726.8	14.7	Plate Splice OK
-524.1	3.2	Plate Splice OK
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4



ADMIN BUILDING FOUNDATION DESIGN


STRUCTURAL
ENGINEERS

Sheet: Cont. & Spread Footing

Date: --

Project ID: --

Version: 2022 CBC / ASCE 7-16

Conventional Footing & Spread Footing Design - Bearing wall footings (Non-Retaining)
Design Values:

 Allowable Soil Bearing Pressure (psf) = **2,000**

 Soils Report by: **Inland Foundation Engineering, Inc.**

 Job Number: **S168-196**

 Date: **September 23, 2025**
Max. Conventional Footing Load:

Roof DL=	15	psf * (	48	/ 2 +	0	) ft	=	360.0	plf
Roof LL=	20	psf * (	48	/ 2 +	0	) ft	=	480.0	plf
Exterior Wall =	15	psf * (	18	+	0	) ft	=	270.0	plf
Ceiling =	10	psf * (	48	/ 2 +	0	) ft	=	240.0	plf
		psf * (	0	/ 2 +	0	) ft	=	0.0	plf
		psf * (	0	/ 2 +	0	) ft	=	0.0	plf
							w =	1350.0	plf

 Required Footing Width= $1350 / (2000 - 50) =$ **0.69** ft

 Use Footing: **15** Wide " x **12** " Deep w/ Steel Reinforcing Per Plans

Allowable Point Load at Footing: (Soil Governed)

Bearing Length at Point Load = 2 x (Depth + Slab Edge Thickness) + Post Width

 Slab Edge Thickness: **8** in (Depth of slab and subgrade)

 Post Width: **3** in

Footing Size (in)		Allowable Point Load, P (lbs)	Longitudinal Rebar Size	# Longitudinal Bar T & B
Width	Depth			
15	12	8,958	4	2

Spread Footing: (Soil Governed)

 $P = \text{Width}^2 / \text{S.B.P.}$

Spread Ftg Size (in)		Allowable Point Load, P (k)	Rebar Size	# Bar
Width (SQ)	Depth			
24	18	7.1	5	3
30	18	11.1	5	4
36	18	16.0	5	4
42	18	21.7	5	5
48	18	28.4	5	6

Stone Veneer Pilar Weight =

2.5' Width x 4 Sides x 9.5' Height

 95 sf x 65.0 psf = **6.2 k**

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: Admin.ec6

LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL A 18"Wx12"D

CODE REFERENCES

Calculations per ACI 318-19, IBC 2021, SDPWS 2021

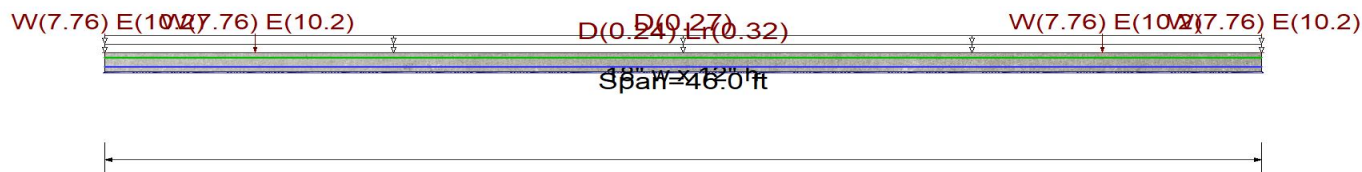
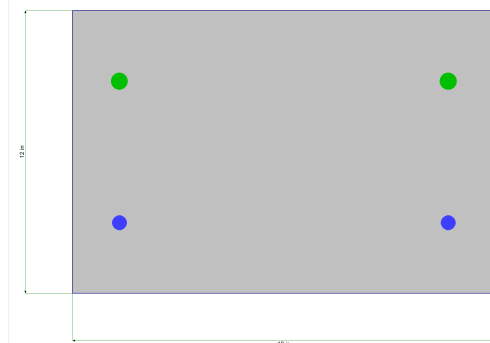
Load Combinations Used : ASCE 7-16

Material Properties

f'_c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = f'_c^{1/2}$	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ Lt Wt Factor	=	1.0			
Elastic Modulus	=	3,122.02 ksi			
Soil Subgrade Modulus	=	150.0 psi / (inch deflection)			
Load Combination	ASCE 7-16				

f_y - Main Rebar	=	60.0 ksi	F_y - Stirrups	=	40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=	29,000.0 ksi
			Stirrup Bar Size #	=	# 3
			Number of Resisting Legs Per Stirrup	=	2

Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 18.0 in, Height = 12.0 in

Span #1 Reinforcing....

2-#5 at 3.0 in from Bottom, from 0.0 to 46.0 ft in this span

2-#6 at 3.0 in from Top, from 0.0 to 46.0 ft in this span

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads

Point Load : W = 7.760, E = 10.20 k @ 39.670 ft

Point Load : W = 7.760, E = 10.20 k @ 6.0 ft

Point Load : W = 7.760, E = 10.20 k @ 0.0 ft

Point Load : W = 7.760, E = 10.20 k @ 46.0 ft

Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 16.0 ft, (Roof load)

Uniform Load : D = 0.0150 ksf, Tributary Width = 18.0 ft, (Wall)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.407 : 1
Section used for this span	Typical Section
Mu : Applied	11.903 k-ft
Mn * Phi : Allowable	29.222 k-ft
Load Combination	+0.90D+E
Location of maximum on span	39.506 ft
Span # where maximum occurs	Span # 1

Maximum Deflection	
Max Downward L+Lr+S Deflection	0.000 in
Max Upward L+Lr+S Deflection	0.000 in
Max Downward Total Deflection	0.120 in
Max Upward Total Deflection	0.007 in

Maximum Soil Pressure =	2.591 ksf	at	0.00 ft	LdComb: +D+0.70E
Allowable Soil Pressure =	2.660 ksf	OK		

Cross Section Strength & Inertia

		Phi*Mn (k-ft)		Moment of Inertia (in^4)		
Cross Section Bar Layout Description		Btm Tension	Top Tension	I gross	Icr - Btm Tension	Icr - Top Tension
Section 1	2- #5 @ d=9", 2- #6 @ d=3",	29.22	36.43	2,592.00	315.25	414.50

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: Admin.ec6

LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL A 18"Wx12"D

Shear Stirrup Requirements

Entire Beam Span Length : $V_u < \Phi V_c/2$, Req'd Vs = Not Req'd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combination

Load Combination	Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft)		
				Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope						
Span # 1		1	39.506	11.90	29.22	0.41
+1.40D						
Span # 1		1	45.459	-0.00	29.22	0.00
+1.20D+0.50Lr						
Span # 1		1	45.459	-0.00	29.22	0.00
+1.20D						
Span # 1		1	45.459	-0.00	29.22	0.00
+1.20D+1.60Lr						
Span # 1		1	45.459	-0.00	29.22	0.00
+1.20D+1.60Lr+0.50W						
Span # 1		1	39.506	4.51	29.22	0.15
+1.20D+0.50W						
Span # 1		1	39.506	4.52	29.22	0.15
+1.20D+0.50Lr+W						
Span # 1		1	39.506	9.05	29.22	0.31
+1.20D+W						
Span # 1		1	39.506	9.05	29.22	0.31
+0.90D+W						
Span # 1		1	39.506	9.05	29.22	0.31
+1.20D+E						
Span # 1		1	39.506	11.90	29.22	0.41
+0.90D+E						
Span # 1		1	39.506	11.90	29.22	0.41

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.1199	0.000		0.0000	0.000

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: Admin.ec6

LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL D 18"Wx12"D

CODE REFERENCES

Calculations per ACI 318-19, IBC 2021, SDPWS 2021

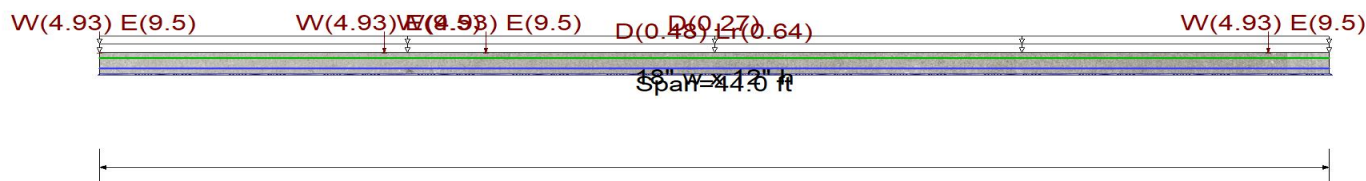
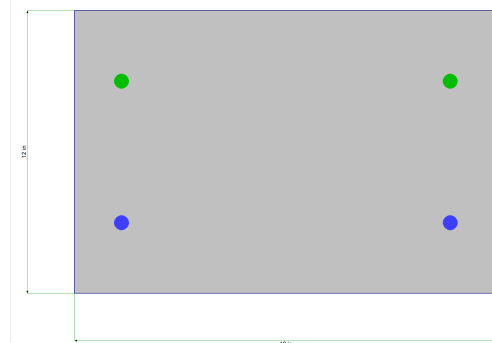
Load Combinations Used : ASCE 7-16

Material Properties

f'_c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = f'_c^{1/2}$	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ Lt Wt Factor	=	1.0			
Elastic Modulus	=	3,122.02 ksi			
Soil Subgrade Modulus	=	150.0 psi / (inch deflection)			
Load Combination	ASCE 7-16				

f_y - Main Rebar	=	60.0 ksi	F_y - Stirrups	=	40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=	29,000.0 ksi
			Stirrup Bar Size #	=	# 3
			Number of Resisting Legs Per Stirrup	=	2

Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 18.0 in, Height = 12.0 in

Span #1 Reinforcing....

2-#5 at 3.0 in from Bottom, from 0.0 to 44.0 ft in this span

2-#5 at 3.0 in from Top, from 0.0 to 44.0 ft in this span

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads

Point Load : W = 4.930, E = 9.50 k @ 13.830 ft

Point Load : W = 4.930, E = 9.50 k @ 10.20 ft

Point Load : W = 4.930, E = 9.50 k @ 0.0 ft

Point Load : W = 4.930, E = 9.50 k @ 41.790 ft

Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 32.0 ft, (Roof load)

Uniform Load : D = 0.0150 ksf, Tributary Width = 18.0 ft, (Wall)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.577 : 1
Section used for this span	Typical Section
Mu : Applied	-16.540 k-ft
Mn * Phi : Allowable	28.654 k-ft
Load Combination	+1.20D+E
Location of maximum on span	4.141 ft
Span # where maximum occurs	Span # 1

Maximum Deflection	
Max Downward L+Lr+S Deflection	0.000 in
Max Upward L+Lr+S Deflection	0.000 in
Max Downward Total Deflection	0.103 in
Max Upward Total Deflection	0.007 in

Maximum Soil Pressure =	2.217 ksf	at	0.00 ft	LdComb: +D+0.70E
Allowable Soil Pressure =	2.660 ksf	OK		

Cross Section Strength & Inertia

		Phi*Mn (k-ft)		Moment of Inertia (in^4)		
Cross Section Bar Layout Description		Btm Tension	Top Tension	I gross	Icr - Btm Tension	Icr - Top Tension
Section 1	2- #5 @ d=9", 2- #5 @ d=3",	28.65	28.65	2,592.00	313.66	313.66

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: Admin.ec6

LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL D 18"Wx12"D

Shear Stirrup Requirements

Between 0.00 to 9.32 ft, $V_u < \Phi V_c/2$, Req'd Vs = Not Req'd, use stirrups spaced at 0.000 in
 Between 9.84 to 9.84 ft, $\Phi V_c/2 < V_u \leq \Phi V_c$, Req'd Vs = Min 9.6.3.1, use stirrups spaced at 4.500 in
 Between 10.35 to 42.96 ft, $V_u < \Phi V_c/2$, Req'd Vs = Not Req'd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combination

Load Combination			Bending Stress Results (k-ft)		
Segment Length	Span #	Location (ft) in Span	Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	13.976	10.24	28.65	0.36
+1.40D					
Span # 1	1	43.482	-0.00	28.65	0.00
+1.20D+0.50Lr					
Span # 1	1	43.482	-0.00	28.65	0.00
+1.20D					
Span # 1	1	43.482	-0.00	28.65	0.00
+1.20D+1.60Lr					
Span # 1	1	43.482	-0.00	28.65	0.00
+1.20D+1.60Lr+0.50W					
Span # 1	1	13.976	2.61	28.65	0.09
+1.20D+0.50W					
Span # 1	1	13.976	2.64	28.65	0.09
+1.20D+0.50Lr+W					
Span # 1	1	13.976	5.29	28.65	0.18
+1.20D+W					
Span # 1	1	13.976	5.30	28.65	0.18
+0.90D+W					
Span # 1	1	13.976	5.30	28.65	0.19
+1.20D+E					
Span # 1	1	13.976	10.23	28.65	0.36
+0.90D+E					
Span # 1	1	13.976	10.24	28.65	0.36

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.1026	0.000		0.0000	0.000

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: Admin.ec6

LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL B 18"Wx12"D

CODE REFERENCES

Calculations per ACI 318-19, IBC 2021, SDPWS 2021

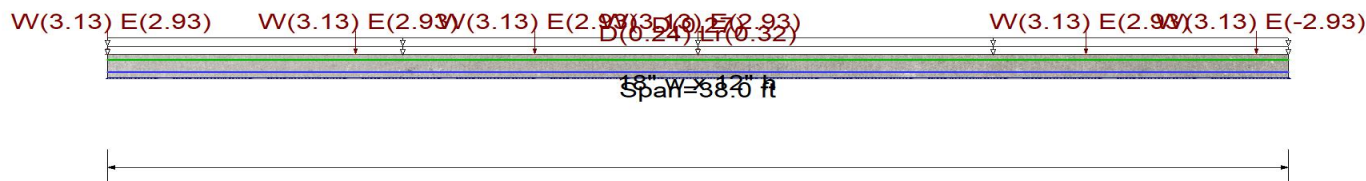
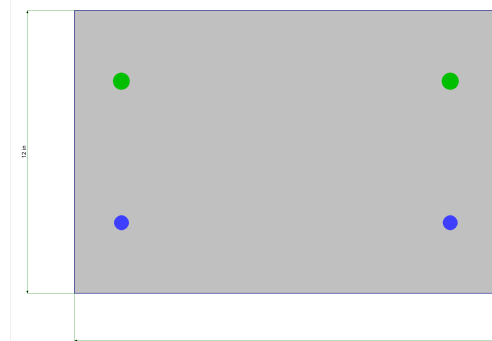
Load Combinations Used : ASCE 7-16

Material Properties

f'_c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = f'_c^{1/2}$	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ Lt Wt Factor	=	1.0			
Elastic Modulus	=	3,122.02 ksi			
Soil Subgrade Modulus	=	150.0 psi / (inch deflection)			
Load Combination	ASCE 7-16				

f_y - Main Rebar	=	60.0 ksi	F_y - Stirrups	=	40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=	29,000.0 ksi
			Stirrup Bar Size #	=	# 3
			Number of Resisting Legs Per Stirrup	=	2

Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 18.0 in, Height = 12.0 in

Span #1 Reinforcing....

2-#5 at 3.0 in from Bottom, from 0.0 to 38.0 ft in this span

2-#6 at 3.0 in from Top, from 0.0 to 38.0 ft in this span

Service loads entered. Load Factors will be applied for calculations.

Applied Loads

Beam self weight calculated and added to loads

Point Load : W = 3.130, E = 2.930 k @ 13.750 ft
 Point Load : W = 3.130, E = 2.930 k @ 8.0 ft
 Point Load : W = 3.130, E = 2.930 k @ 0.0 ft
 Point Load : W = 3.130, E = 2.930 k @ 19.0 ft
 Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 16.0 ft, (Roof load)
 Uniform Load : D = 0.0150 ksf, Tributary Width = 18.0 ft, (Wall)
 Point Load : W = 3.130, E = 2.930 k @ 31.50 ft
 Point Load : W = 3.130, E = -2.930 k @ 37.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =		0.199: 1	Maximum Deflection		
Section used for this span	Typical Section		Max Downward L+Lr+S Deflection		0.000 in
Mu : Applied	5.805 k-ft		Max Upward L+Lr+S Deflection		0.000 in
Mn * Phi : Allowable	29.222 k-ft		Max Downward Total Deflection		0.046 in
Load Combination	+0.90D+E		Max Upward Total Deflection		-0.003 in
Location of maximum on span	31.741 ft				
Span # where maximum occurs	Span # 1				
Maximum Soil Pressure =	0.990 ksf	at	0.00 ft	LdComb: +D+0.70E	
Allowable Soil Pressure =	2.660 ksf	OK			

Cross Section Strength & Inertia

		Phi*Mn (k-ft)		Moment of Inertia (in^4)		
Cross Section Bar Layout Description		Btm Tension	Top Tension	I gross	I cr - Btm Tension	I cr - Top Tension
Section 1	2- #5 @ d=9", 2- #6 @ d=3",	29.22	36.43	2,592.00	335.34	440.56

BCOM-25-00416

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: Admin.ec6

LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL B 18"Wx12"D

Shear Stirrup Requirements

Entire Beam Span Length : $V_u < \Phi V_c/2$, Req'd Vs = Not Req'd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combination

Load Combination			Bending Stress Results (k-ft)		
Segment Length	Span #	Location (ft) in Span	Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	31.741	5.80	29.22	0.20
+1.40D					
Span # 1	1	37.553	-0.00	29.22	0.00
+1.20D+0.50Lr					
Span # 1	1	37.553	-0.00	29.22	0.00
+1.20D					
Span # 1	1	37.553	-0.00	29.22	0.00
+1.20D+1.60Lr					
Span # 1	1	37.553	-0.00	29.22	0.00
+1.20D+1.60Lr+0.50W					
Span # 1	1	18.776	1.13	29.22	0.04
+1.20D+0.50W					
Span # 1	1	18.776	1.14	29.22	0.04
+1.20D+0.50Lr+W					
Span # 1	1	18.776	2.30	29.22	0.08
+1.20D+W					
Span # 1	1	18.776	2.30	29.22	0.08
+0.90D+W					
Span # 1	1	18.776	2.30	29.22	0.08
+1.20D+E					
Span # 1	1	31.741	5.80	29.22	0.20
+0.90D+E					
Span # 1	1	31.741	5.80	29.22	0.20

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0458	0.000		0.0000	0.000

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: Admin.ec6

LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL G 15"Wx12"D

CODE REFERENCES

Calculations per ACI 318-19, IBC 2021, SDPWS 2021

Load Combinations Used : ASCE 7-16

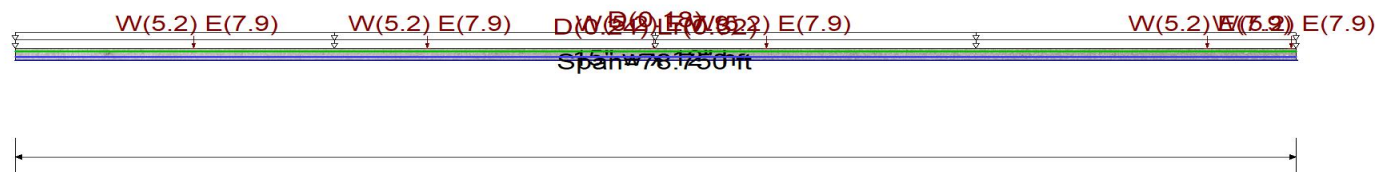
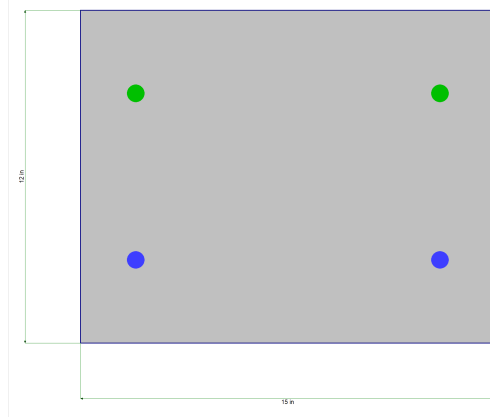
Material Properties

f'_c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = f'_c^{1/2}$	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ Lt Wt Factor	=	1.0			
Elastic Modulus	=	3,122.02 ksi			
Soil Subgrade Modulus	=	150.0 psi / (inch deflection)			

Load Combination ASCE 7-16

f_y - Main Rebar	=	60.0 ksi	F_y - Stirrups	=	40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=	29,000.0 ksi
			Stirrup Bar Size #	=	# 3
			Number of Resisting Legs Per Stirrup	=	2

Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 15.0 in, Height = 12.0 in

Span #1 Reinforcing....

2-#5 at 3.0 in from Bottom, from 0.0 to 78.75 ft in this span

2-#5 at 3.0 in from Top, from 0.0 to 78.75 ft in this span

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads

Point Load : W = 5.20, E = 7.90 k @ 39.250 ft

Point Load : W = 5.20, E = 7.90 k @ 25.330 ft

Point Load : W = 5.20, E = 7.90 k @ 11.0 ft

Point Load : W = 5.20, E = 7.90 k @ 73.250 ft

Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 16.0 ft, (Roof load)

Uniform Load : D = 0.0150 ksf, Tributary Width = 12.0 ft, (Wall)

Point Load : W = 5.20, E = 7.90 k @ 46.20 ft

Point Load : W = 5.20, E = 7.90 k @ 78.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.318 : 1
Section used for this span	Typical Section
Mu : Applied	8.637 k-ft
Mn * Phi : Allowable	27.188 k-ft
Load Combination	+0.90D+E
Location of maximum on span	11.118 ft
Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward L+Lr+S Deflection	0.000 in
Max Upward L+Lr+S Deflection	0.000 in
Max Downward Total Deflection	0.110 in
Max Upward Total Deflection	0.007 in

Maximum Soil Pressure =	2.374 ksf	at	78.75 ft	LdComb: +D+0.70E
Allowable Soil Pressure =	2.660 ksf	OK		

Cross Section Strength & Inertia

		Phi*Mn (k-ft)		Moment of Inertia (in^4)		
		Btm Tension	Top Tension	I gross	Icr - Btm Tension	Icr - Top Tension
Cross Section Bar Layout Description						
Section 1	2- #5 @ d=9", 2- #5 @ d=3"	27.19	27.19	2,160.00	302.80	302.80

City of Boca Raton
 BCOM-25-00416

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: Admin.ec6

LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL G 15"Wx12"D

Shear Stirrup Requirements

Between 0.00 to 76.90 ft, $V_u < \Phi V_c/2$, Req'd Vs = Not Req'd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combination

Load Combination			Bending Stress Results (k-ft)		
Segment Length	Span #	Location (ft) in Span	Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	11.118	8.64	27.19	0.32
+1.40D					
Span # 1	1	77.824	-0.00	27.19	0.00
+1.20D+0.50Lr					
Span # 1	1	77.824	-0.00	27.19	0.00
+1.20D					
Span # 1	1	77.824	-0.00	27.19	0.00
+1.20D+1.60Lr					
Span # 1	1	77.824	-0.00	27.19	0.00
+1.20D+1.60Lr+0.50W					
Span # 1	1	11.118	2.77	27.19	0.10
+1.20D+0.50W					
Span # 1	1	11.118	2.81	27.19	0.10
+1.20D+0.50Lr+W					
Span # 1	1	11.118	5.65	27.19	0.21
+1.20D+W					
Span # 1	1	11.118	5.66	27.19	0.21
+0.90D+W					
Span # 1	1	11.118	5.67	27.19	0.21
+1.20D+E					
Span # 1	1	11.118	8.63	27.19	0.32
+0.90D+E					
Span # 1	1	11.118	8.64	27.19	0.32

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.1099	78.750		0.0000	0.000

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: Admin.ec6

LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL 4 15"Wx12"D

CODE REFERENCES

Calculations per ACI 318-19, IBC 2021, SDPWS 2021

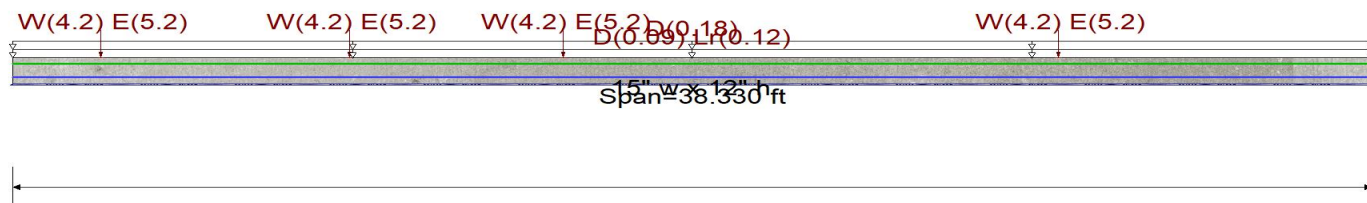
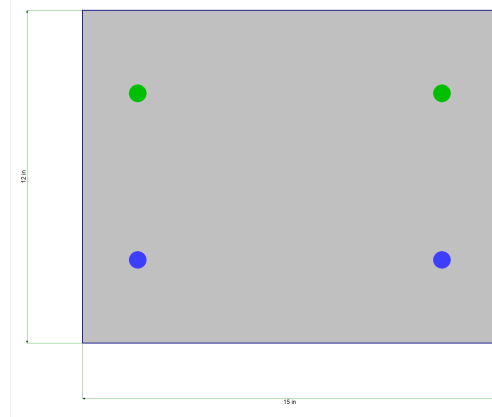
Load Combinations Used : ASCE 7-16

Material Properties

f'_c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = f'_c^{1/2}$	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ Lt Wt Factor	=	1.0			
Elastic Modulus	=	3,122.02 ksi			
Soil Subgrade Modulus	=	150.0 psi / (inch deflection)			
Load Combination	ASCE 7-16				

f_y - Main Rebar	=	60.0 ksi	F_y - Stirrups	=	40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=	29,000.0 ksi
			Stirrup Bar Size #	=	# 3
			Number of Resisting Legs Per Stirrup	=	2

Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 15.0 in, Height = 12.0 in

Span #1 Reinforcing....

2-#5 at 3.0 in from Bottom, from 0.0 to 38.330 ft in this span

2-#5 at 3.0 in from Top, from 0.0 to 38.330 ft in this spa

Service loads entered. Load Factors will be applied for calculations.

Applied Loads

Beam self weight calculated and added to loads

Point Load : W = 4.20, E = 5.20 k @ 29.50 ft

Point Load : W = 4.20, E = 5.20 k @ 2.50 ft

Point Load : W = 4.20, E = 5.20 k @ 15.525 ft

Point Load : W = 4.20, E = 5.20 k @ 9.50 ft

Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 6.0 ft, (Roof load)

Uniform Load : D = 0.0150 ksf, Tributary Width = 12.0 ft, (Wall)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =		0.208	1	Maximum Deflection	
Section used for this span		Typical Section		Max Downward L+Lr+S Deflection	0.000 in
Mu : Applied		5.651	k-ft	Max Upward L+Lr+S Deflection	0.000 in
Mn * Phi : Allowable		27.188	k-ft	Max Downward Total Deflection	0.040 in
Load Combination		+0.90D+E		Max Upward Total Deflection	0.007 in
Location of maximum on span		29.311	ft		
Span # where maximum occurs		Span # 1			
Maximum Soil Pressure =	0.871	ksf	at	0.00 ft	LdComb: +D+0.70E
Allowable Soil Pressure =	2.660	ksf	OK		

Cross Section Strength & Inertia

		Phi*Mn (k-ft)		Moment of Inertia (in^4)		
Cross Section Bar Layout Description		Btm Tension	Top Tension	I gross	Icr - Btm Tension	Icr - Top Tension
Section 1	2- #5 @ d=9", 2- #5 @ d=3",	27.19	27.19	2,160.00	302.80	302.80

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: Admin.ec6

LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL 4 15"Wx12"D

Shear Stirrup Requirements

Entire Beam Span Length : $V_u < \Phi V_c/2$, Req'd Vs = Not Req'd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combination

Load Combination	Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft)		
				Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope						
Span # 1		1	29.311	5.65	27.19	0.21
+1.40D						
Span # 1		1	37.879	-0.00	27.19	0.00
+1.20D+0.50Lr						
Span # 1		1	37.879	-0.00	27.19	0.00
+1.20D						
Span # 1		1	37.879	-0.00	27.19	0.00
+1.20D+1.60Lr						
Span # 1		1	37.879	-0.00	27.19	0.00
+1.20D+1.60Lr+0.50W						
Span # 1		1	29.311	2.27	27.19	0.08
+1.20D+0.50W						
Span # 1		1	29.311	2.28	27.19	0.08
+1.20D+0.50Lr+W						
Span # 1		1	29.311	4.56	27.19	0.17
+1.20D+W						
Span # 1		1	29.311	4.56	27.19	0.17
+0.90D+W						
Span # 1		1	29.311	4.56	27.19	0.17
+1.20D+E						
Span # 1		1	29.311	5.65	27.19	0.21
+0.90D+E						
Span # 1		1	29.311	5.65	27.19	0.21

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0403	0.000		0.0000	0.000

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: Admin.ec6

LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

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DESCRIPTION: Strength - Grade Beam Along GL 5 15"Wx12"D

CODE REFERENCES

Calculations per ACI 318-19, IBC 2021, SDPWS 2021

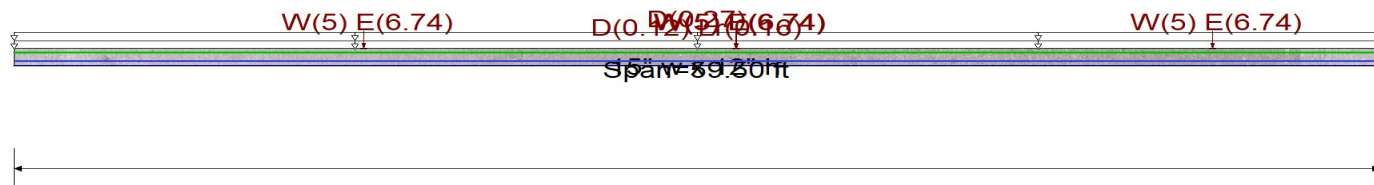
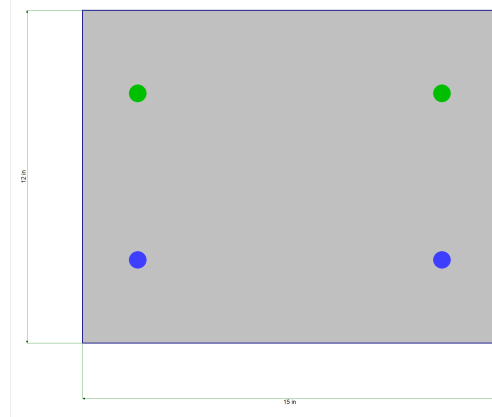
Load Combinations Used : ASCE 7-16

Material Properties

f'_c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = f'_c^{1/2}$	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ Lt Wt Factor	=	1.0			
Elastic Modulus	=	3,122.02 ksi			
Soil Subgrade Modulus	=	150.0 psi / (inch deflection)			
Load Combination	ASCE 7-16				

f_y - Main Rebar	=	60.0 ksi	F_y - Stirrups	=	40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=	29,000.0 ksi
			Stirrup Bar Size #	=	# 3
			Number of Resisting Legs Per Stirrup	=	2

Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 15.0 in, Height = 12.0 in

Span #1 Reinforcing....

2-#5 at 3.0 in from Bottom, from 0.0 to 59.50 ft in this span

2-#5 at 3.0 in from Top, from 0.0 to 59.50 ft in this span

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads

Point Load : W = 5.0, E = 6.740 k @ 52.20 ft

Point Load : W = 5.0, E = 6.740 k @ 31.50 ft

Point Load : W = 5.0, E = 6.740 k @ 31.450 ft

Point Load : W = 5.0, E = 6.740 k @ 15.250 ft

Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 8.0 ft, (Roof load)

Uniform Load : D = 0.0150 ksf, Tributary Width = 18.0 ft, (Wall)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.592: 1
Section used for this span	Typical Section
Mu : Applied	16.090 k-ft
Mn * Phi : Allowable	27.188 k-ft
Load Combination	+0.90D+E
Location of maximum on span	31.500 ft
Span # where maximum occurs	Span # 1

Maximum Deflection	
Max Downward L+Lr+S Deflection	0.000 in
Max Upward L+Lr+S Deflection	0.000 in
Max Downward Total Deflection	0.055 in
Max Upward Total Deflection	0.007 in

Maximum Soil Pressure =	1.187 ksf	at	31.07 ft	LdComb: +D+0.70E
Allowable Soil Pressure =	2.660 ksf	OK		

Cross Section Strength & Inertia

		Phi*Mn (k-ft)		Moment of Inertia (in^4)		
Cross Section Bar Layout Description		Btm Tension	Top Tension	I gross	Icr - Btm Tension	Icr - Top Tension
Section 1	2- #5 @ d=9", 2- #5 @ d=3",	27.19	27.19	2,160.00	302.80	302.80

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: Admin.ec6

LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL 5 15"Wx12"D

Shear Stirrup Requirements

Between 0.00 to 30.10 ft, $V_u < \Phi V_c/2$, Req'd Vs = Not Req'd, use stirrups spaced at 0.000 in
 Between 30.80 to 30.80 ft, $\Phi V_c/2 < V_u \leq \Phi V_c$, Req'd Vs = Min 9.6.3.1, use stirrups spaced at 4.500 in
 Between 31.50 to 58.10 ft, $V_u < \Phi V_c/2$, Req'd Vs = Not Req'd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combination

Load Combination			Bending Stress Results (k-ft)		
Segment Length	Span #	Location (ft) in Span	Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	31.500	16.09	27.19	0.59
+1.40D					
Span # 1	1	58.800	-0.00	27.19	0.00
+1.20D+0.50Lr					
Span # 1	1	58.800	-0.00	27.19	0.00
+1.20D					
Span # 1	1	58.800	-0.00	27.19	0.00
+1.20D+1.60Lr					
Span # 1	1	58.800	-0.00	27.19	0.00
+1.20D+1.60Lr+0.50W					
Span # 1	1	31.500	5.94	27.19	0.22
+1.20D+0.50W					
Span # 1	1	31.500	5.95	27.19	0.22
+1.20D+0.50Lr+W					
Span # 1	1	31.500	11.92	27.19	0.44
+1.20D+W					
Span # 1	1	31.500	11.93	27.19	0.44
+0.90D+W					
Span # 1	1	31.500	11.93	27.19	0.44
+1.20D+E					
Span # 1	1	31.500	16.08	27.19	0.59
+0.90D+E					
Span # 1	1	31.500	16.09	27.19	0.59

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0549	31.072		0.0000	0.000

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: Admin.ec6

LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL 7 18"Wx12"D

CODE REFERENCES

Calculations per ACI 318-19, IBC 2021, SDPWS 2021

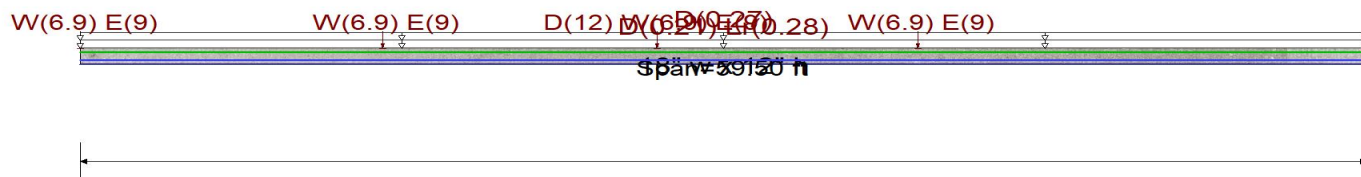
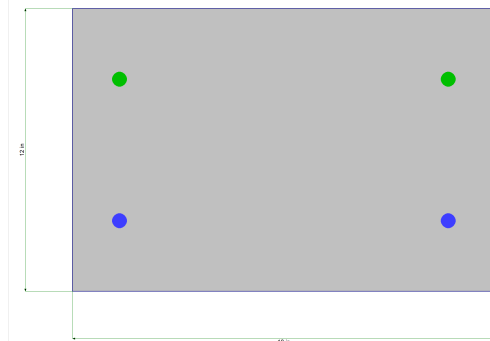
Load Combinations Used : ASCE 7-16

Material Properties

f'_c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = f'_c^{1/2}$	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ Lt Wt Factor	=	1.0			
Elastic Modulus	=	3,372.17 ksi			
Soil Subgrade Modulus	=	150.0 psi / (inch deflection)			
Load Combination	ASCE 7-16				

f_y - Main Rebar	=	60.0 ksi	F_y - Stirrups	=	40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=	29,000.0 ksi
			Stirrup Bar Size #	=	# 3
			Number of Resisting Legs Per Stirrup	=	2

Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 18.0 in, Height = 12.0 in

Span #1 Reinforcing....

2-#5 at 3.0 in from Bottom, from 0.0 to 59.50 ft in this span

2-#5 at 3.0 in from Top, from 0.0 to 59.50 ft in this span

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads

Point Load : W = 6.90, E = 9.0 k @ 38.750 ft

Point Load : D = 12.0, W = 6.90, E = 9.0 k @ 26.670 ft

Point Load : W = 6.90, E = 9.0 k @ 14.0 ft

Point Load : W = 6.90, E = 9.0 k @ 0.0 ft

Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 14.0 ft, (Roof load)

Uniform Load : D = 0.0150 ksf, Tributary Width = 18.0 ft, (Wall)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.901 : 1
Section used for this span	Typical Section
Mu : Applied	25.820 k-ft
Mn * Phi : Allowable	28.654 k-ft
Load Combination	+1.20D+E
Location of maximum on span	26.600 ft
Span # where maximum occurs	Span # 1

Maximum Deflection	
Max Downward L+Lr+S Deflection	0.000 in
Max Upward L+Lr+S Deflection	0.000 in
Max Downward Total Deflection	0.094 in
Max Upward Total Deflection	0.007 in

Maximum Soil Pressure =	2.022 ksf	at	0.00 ft	LdComb: +D+0.70E
Allowable Soil Pressure =	2.660 ksf	OK		

Cross Section Strength & Inertia

		Phi*Mn (k-ft)		Moment of Inertia (in^4)	
Cross Section Bar Layout Description		Btm Tension	Top Tension	I gross	Icr - Btm Tension / Icr - Top Tension
Section 1	2- #5 @ d=9", 2- #5 @ d=3",	28.65	28.65	2,592.00	313.66 / 313.66

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Beam on Elastic Foundation

Project File: Admin.ec6

LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Strength - Grade Beam Along GL 7 18"Wx12"D

Shear Stirrup Requirements

Between 0.00 to 23.80 ft, $V_u < \Phi V_c/2$, Req'd Vs = Not Req'd, use stirrups spaced at 0.000 in
 Between 24.50 to 28.00 ft, $\Phi V_c/2 < V_u \leq \Phi V_c$, Req'd Vs = Min 9.6.3.1, use stirrups spaced at 4.500 in
 Between 28.70 to 58.10 ft, $V_u < \Phi V_c/2$, Req'd Vs = Not Req'd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combination

Load Combination			Bending Stress Results (k-ft)		
Segment Length	Span #	Location (ft) in Span	Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	26.600	25.82	28.65	0.90
+1.40D					
Span # 1	1	26.600	20.31	28.65	0.71
+1.20D+0.50Lr					
Span # 1	1	26.600	17.40	28.65	0.61
+1.20D					
Span # 1	1	26.600	17.40	28.65	0.61
+1.20D+1.60Lr					
Span # 1	1	26.600	17.39	28.65	0.61
+1.20D+1.60Lr+0.50W					
Span # 1	1	26.600	20.61	28.65	0.72
+1.20D+0.50W					
Span # 1	1	26.600	20.63	28.65	0.72
+1.20D+0.50Lr+W					
Span # 1	1	26.600	23.85	28.65	0.83
+1.20D+W					
Span # 1	1	26.600	23.86	28.65	0.83
+0.90D+W					
Span # 1	1	26.600	19.50	28.65	0.68
+1.20D+E					
Span # 1	1	26.600	25.82	28.65	0.90
+0.90D+E					
Span # 1	1	26.600	21.47	28.65	0.75

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0936	0.000		0.0000	0.000

Project Title:
 Engineer:
 Project ID:
 Project Descr:

General Footing

Project File: Admin.ec6

LIC#: KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: F63 along Grid 8

Code References

Calculations per ACI 318-19, IBC 2021, SDPWS 2021

Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.50 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,372.17 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1

Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	2.660 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	200.0 pcf
Soil/Concrete Friction Coeff.	=	0.350

Increases based on footing Depth

Footing base depth below soil surface	=	1.50 ft
Allow press. increase per foot of depth when footing base is below	=	0.50 ksf
	=	1.0 ft

Increases based on footing plan dimension

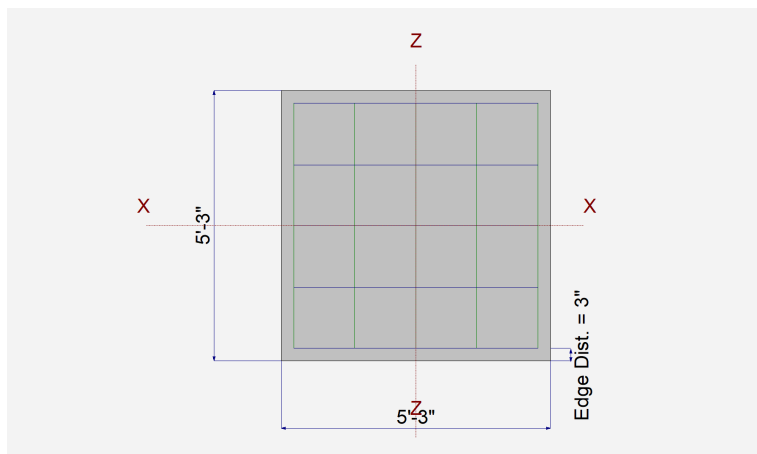
Allowable pressure increase per foot of depth when max. length or width is greater than	=	0.20 ksf
	=	1.0 ft

Dimensions

Width parallel to X-X Axis	=	5.250 ft
Length parallel to Z-Z Axis	=	5.250 ft
Footing Thickness	=	18.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in
Rebar Centerline to Edge of Concrete... at Bottom of footing	=	3.0 in



Reinforcing

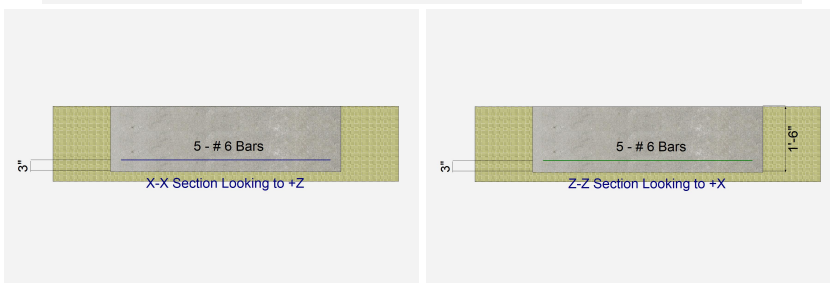
Bars parallel to X-X Axis	=	5.0
Number of Bars	=	# 6
Reinforcing Bar Size	=	# 6

Bars parallel to Z-Z Axis	=	5.0
Number of Bars	=	# 6
Reinforcing Bar Size	=	# 6

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation

# Bars required within zone	n/a
# Bars required on each side of zone	n/a



Applied Loads

	D	Lr	L	S	W	E	H
P : Column Load	=	8.110	0.820		2.720	3.30	k
OB : Overburden	=						ksf
M-xx	=						k-ft
M-zz	=				16.980	20.50	k-ft
V-x	=				0.9430	1.137	k
V-z	=						k

Project Title:
 Engineer:
 Project ID:
 Project Descr:

General Footing

Project File: Admin.ec6

LIC#: KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

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DESCRIPTION: F63 along Grid 8

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.4120	Soil Bearing	1.236 ksf	3.0 ksf	+D+0.70E about Z-Z axis
PASS	n/a	Overturing - X-X	0.0 k-ft	0.0 k-ft	No Overturing
PASS	1.819	Overturing - Z-Z	15.544 k-ft	28.279 k-ft	+0.60D+0.70E
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.1371	Z Flexure (+X)	3.788 k-ft/ft	27.622 k-ft/ft	+1.20D+E
PASS	0.05138	Z Flexure (-X)	1.419 k-ft/ft	27.622 k-ft/ft	+1.40D
PASS	0.05898	X Flexure (+Z)	1.629 k-ft/ft	27.622 k-ft/ft	+1.20D+E
PASS	0.05898	X Flexure (-Z)	1.629 k-ft/ft	27.622 k-ft/ft	+1.20D+E
PASS	0.1886	1-way Shear (+X)	8.875 psi	47.045 psi	+1.20D+E
PASS	0.06640	1-way Shear (-X)	3.124 psi	47.045 psi	+1.40D
PASS	0.07621	1-way Shear (+Z)	3.586 psi	47.045 psi	+1.20D+E
PASS	0.07621	1-way Shear (-Z)	3.586 psi	47.045 psi	+1.20D+E
PASS	0.07704	2-way Punching	13.673 psi	177.482 psi	+1.20D+E



Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc (in)	Actual Soil Bearing Stress @ Location				Actual / Allow Ratio
				Bottom, -Z	Top, +Z	Left, -X	Right, +X	
X-X, D Only	3.0	n/a	0.0	0.5117	0.5117	n/a	n/a	0.171
X-X, +D+Lr	3.0	n/a	0.0	0.5415	0.5415	n/a	n/a	0.181
X-X, +D+0.750Lr	3.0	n/a	0.0	0.5341	0.5341	n/a	n/a	0.178
X-X, +D+0.60W	3.0	n/a	0.0	0.5710	0.5710	n/a	n/a	0.190
X-X, +D+0.750Lr+0.450W	3.0	n/a	0.0	0.5785	0.5785	n/a	n/a	0.193
X-X, +D+0.450W	3.0	n/a	0.0	0.5561	0.5561	n/a	n/a	0.185
X-X, +0.60D+0.60W	3.0	n/a	0.0	0.3663	0.3663	n/a	n/a	0.122
X-X, +D+0.70E	3.0	n/a	0.0	0.5956	0.5956	n/a	n/a	0.199
X-X, +D+0.5250E	3.0	n/a	0.0	0.5746	0.5746	n/a	n/a	0.192
X-X, +0.60D+0.70E	3.0	n/a	0.0	0.3909	0.3909	n/a	n/a	0.130
Z-Z, D Only	3.0	0.0	n/a	n/a	n/a	0.5117	0.5117	0.171
Z-Z, +D+Lr	3.0	0.0	n/a	n/a	n/a	0.5415	0.5415	0.181
Z-Z, +D+0.750Lr	3.0	0.0	n/a	n/a	n/a	0.5341	0.5341	0.178
Z-Z, +D+0.60W	3.0	8.416	n/a	n/a	n/a	0.1179	1.024	0.341
Z-Z, +D+0.750Lr+0.450W	3.0	6.230	n/a	n/a	n/a	0.2387	0.9183	0.306
Z-Z, +D+0.450W	3.0	6.480	n/a	n/a	n/a	0.2164	0.8959	0.299
Z-Z, +0.60D+0.60W	3.0	13.120	n/a	n/a	n/a	0.0	0.8321	0.277
Z-Z, +D+0.70E	3.0	11.363	n/a	n/a	n/a	0.0	1.236	0.412
Z-Z, +D+0.5250E	3.0	8.833	n/a	n/a	n/a	0.09605	1.053	0.351
Z-Z, +0.60D+0.70E	3.0	17.314	n/a	n/a	n/a	0.0	1.149	0.383

Overturing Stability

Rotation Axis & Load Combination...	Overturing Moment	Resisting Moment	Stability Ratio	Status
X-X, D Only	None	0.0 k-ft	Infinity	OK
X-X, +D+Lr	None	0.0 k-ft	Infinity	OK
X-X, +D+0.750Lr	None	0.0 k-ft	Infinity	OK
X-X, +D+0.60W	None	0.0 k-ft	Infinity	OK
X-X, +D+0.750Lr+0.450W	None	0.0 k-ft	Infinity	OK
X-X, +D+0.450W	None	0.0 k-ft	Infinity	OK
X-X, +0.60D+0.60W	None	0.0 k-ft	Infinity	OK
X-X, +D+0.70E	None	0.0 k-ft	Infinity	OK
X-X, +D+0.5250E	None	0.0 k-ft	Infinity	OK
X-X, +0.60D+0.70E	None	0.0 k-ft	Infinity	OK
Z-Z, D Only	None	0.0 k-ft	Infinity	OK
Z-Z, +D+Lr	None	0.0 k-ft	Infinity	OK

Project Title:
 Engineer:
 Project ID:
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General Footing

Project File: Admin.ec6

LIC#: KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

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DESCRIPTION: F63 along Grid 8

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Z-Z, +D+0.750Lr	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.60W	11.037 k-ft	41.309 k-ft	3.743	OK
Z-Z, +D+0.750Lr+0.450W	8.278 k-ft	41.853 k-ft	5.056	OK
Z-Z, +D+0.450W	8.278 k-ft	40.238 k-ft	4.861	OK
Z-Z, +0.60D+0.60W	11.037 k-ft	26.499 k-ft	2.401	OK
Z-Z, +D+0.70E	15.544 k-ft	43.089 k-ft	2.772	OK
Z-Z, +D+0.5250E	11.658 k-ft	41.573 k-ft	3.566	OK
Z-Z, +0.60D+0.70E	15.544 k-ft	28.279 k-ft	1.819	OK

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	1.419	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +1.40D	1.419	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +1.20D+0.50Lr	1.268	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +1.20D+0.50Lr	1.268	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +1.20D	1.217	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +1.20D	1.217	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +1.20D+1.60Lr	1.381	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +1.20D+1.60Lr	1.381	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +1.20D+1.60Lr+0.50W	1.551	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +1.20D+1.60Lr+0.50W	1.551	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +1.20D+0.50W	1.387	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +1.20D+0.50W	1.387	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +1.20D+0.50Lr+W	1.608	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +1.20D+0.50Lr+W	1.608	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +1.20D+W	1.557	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +1.20D+W	1.557	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +0.90D+W	1.252	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +0.90D+W	1.252	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +1.20D+E	1.629	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +1.20D+E	1.629	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +0.90D+E	1.325	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
X-X, +0.90D+E	1.325	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +1.40D	1.419	-X	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +1.40D	1.419	+X	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +1.20D+0.50Lr	1.268	-X	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +1.20D+0.50Lr	1.268	+X	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +1.20D	1.217	-X	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +1.20D	1.217	+X	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +1.20D+1.60Lr	1.381	-X	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +1.20D+1.60Lr	1.381	+X	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +1.20D+1.60Lr+0.50W	0.6747	-X	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +1.20D+1.60Lr+0.50W	2.426	+X	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +1.20D+0.50W	0.5107	-X	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +1.20D+0.50W	2.262	+X	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +1.20D+0.50Lr+W	0.1426	-X	Top	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +1.20D+0.50Lr+W	3.361	+X	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +1.20D+W	0.1924	-X	Top	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +1.20D+W	3.311	+X	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +0.90D+W	0.4272	-X	Top	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +0.90D+W	3.076	+X	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +1.20D+E	0.4410	-X	Top	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +1.20D+E	3.788	+X	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +0.90D+E	0.5801	-X	Top	0.3888	ACI 7.6.1.1	0.4190	27.622	OK
Z-Z, +0.90D+E	3.649	+X	Bottom	0.3888	ACI 7.6.1.1	0.4190	27.622	OK

One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	3.12 psi	3.12 psi	3.12 psi	47.05 psi	0.07	OK
+1.20D+0.50Lr	2.79 psi	2.79 psi	2.79 psi	47.05 psi	0.06	OK
+1.20D	2.68 psi	2.68 psi	2.68 psi	47.05 psi	0.06	OK
+1.20D+1.60Lr	3.04 psi	3.04 psi	3.04 psi	47.05 psi	0.06	OK

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LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

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DESCRIPTION: F63 along Grid 8

One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.20D+1.60Lr+0.50W	1.27 psi	5.55 psi	5.55 psi	47.05 psi	0.12	OK
+1.20D+0.50W	0.91 psi	5.19 psi	5.19 psi	47.05 psi	0.11	OK
+1.20D+0.50Lr+W	0.74 psi	7.82 psi	7.82 psi	47.05 psi	0.17	OK
+1.20D+W	0.85 psi	7.71 psi	7.71 psi	47.05 psi	0.16	OK
+0.90D+W	1.34 psi	7.24 psi	7.24 psi	47.05 psi	0.15	OK
+1.20D+E	1.49 psi	8.88 psi	8.88 psi	47.05 psi	0.19	OK
+0.90D+E	1.48 psi	8.68 psi	8.68 psi	47.05 psi	0.18	OK

One Way Shear Z

Load Combination...	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	3.12 psi	3.12 psi	3.12 psi	47.05 psi	0.07	OK
+1.20D+0.50Lr	2.79 psi	2.79 psi	2.79 psi	47.05 psi	0.06	OK
+1.20D	2.68 psi	2.68 psi	2.68 psi	47.05 psi	0.06	OK
+1.20D+1.60Lr	3.04 psi	3.04 psi	3.04 psi	47.05 psi	0.06	OK
+1.20D+1.60Lr+0.50W	3.41 psi	3.41 psi	3.41 psi	47.05 psi	0.07	OK
+1.20D+0.50W	3.05 psi	3.05 psi	3.05 psi	47.05 psi	0.06	OK
+1.20D+0.50Lr+W	3.54 psi	3.54 psi	3.54 psi	47.05 psi	0.08	OK
+1.20D+W	3.43 psi	3.43 psi	3.43 psi	47.05 psi	0.07	OK
+0.90D+W	2.76 psi	2.76 psi	2.76 psi	47.05 psi	0.06	OK
+1.20D+E	3.59 psi	3.59 psi	3.59 psi	47.05 psi	0.08	OK
+0.90D+E	2.92 psi	2.92 psi	2.92 psi	47.05 psi	0.06	OK

All units k

Two-Way "Punching" Shear

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	11.89 psi	177.48psi	0.06699	OK
+1.20D+0.50Lr	10.62 psi	177.48psi	0.05984	OK
+1.20D	10.19 psi	177.48psi	0.05742	OK
+1.20D+1.60Lr	11.56 psi	177.48psi	0.06516	OK
+1.20D+1.60Lr+0.50W	12.99 psi	177.48psi	0.07318	OK
+1.20D+0.50W	11.62 psi	177.48psi	0.06544	OK
+1.20D+0.50Lr+W	13.47 psi	177.48psi	0.07589	OK
+1.20D+W	13.04 psi	177.48psi	0.07347	OK
+0.90D+W	10.54 psi	177.48psi	0.05938	OK
+1.20D+E	13.67 psi	177.48psi	0.07704	OK
+0.90D+E	11.27 psi	177.48psi	0.06352	OK

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LIC#: KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

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DESCRIPTION: F69 along Grid 1

Code References

Calculations per ACI 318-19, IBC 2021, SDPWS 2021

Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.50 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,372.17 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1

Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	2.660 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	200.0 pcf
Soil/Concrete Friction Coeff.	=	0.350

Increases based on footing Depth

Footing base depth below soil surface	=	1.50 ft
Allow press. increase per foot of depth when footing base is below	=	0.50 ksf
	=	1.0 ft

Increases based on footing plan dimension

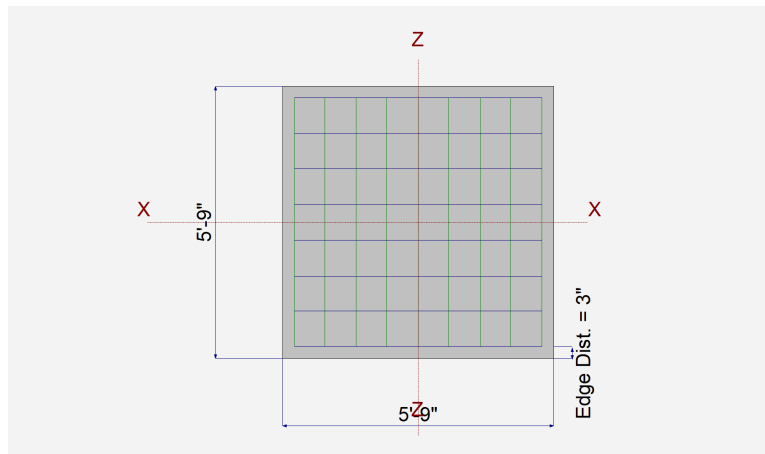
Allowable pressure increase per foot of depth when max. length or width is greater than	=	0.20 ksf
	=	1.0 ft

Dimensions

Width parallel to X-X Axis	=	5.750 ft
Length parallel to Z-Z Axis	=	5.750 ft
Footing Thickness	=	18.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in
Rebar Centerline to Edge of Concrete... at Bottom of footing	=	3.0 in



Reinforcing

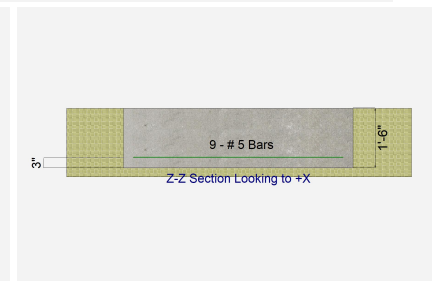
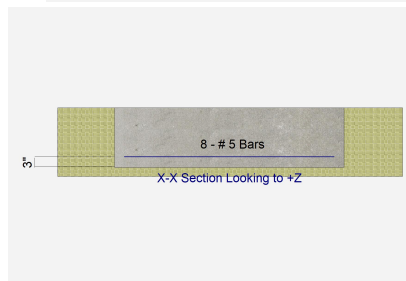
Bars parallel to X-X Axis	=	8.0
Number of Bars	=	# 5
Reinforcing Bar Size	=	# 5

Bars parallel to Z-Z Axis	=	9.0
Number of Bars	=	# 5
Reinforcing Bar Size	=	# 5

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation

# Bars required within zone	n/a
# Bars required on each side of zone	n/a



Applied Loads

	D	Lr	L	S	W	E	H
P : Column Load	=	9.80	1.760		2.660	2.860	k
OB : Overburden	=						ksf
M-xx	=						k-ft
M-zz	=				23.015	28.080	k-ft
V-x	=				1.380	1.680	k
V-z	=						k

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LIC#: KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

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DESCRIPTION: F69 along Grid 1

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.4177	Soil Bearing	1.253 ksf	3.0 ksf	+0.60D+0.70E about Z-Z axis
PASS	n/a	Overturing - X-X	0.0 k-ft	0.0 k-ft	No Overturing
PASS	1.637	Overturing - Z-Z	21.420 k-ft	35.065 k-ft	+0.60D+0.70E
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.1620	Z Flexure (+X)	4.603 k-ft/ft	28.410 k-ft/ft	+1.20D+E
PASS	0.06413	Z Flexure (-X)	1.822 k-ft/ft	28.410 k-ft/ft	+1.20D+1.60Lr
PASS	0.06240	X Flexure (+Z)	1.988 k-ft/ft	31.862 k-ft/ft	+1.20D+1.60Lr+0.50W
PASS	0.06240	X Flexure (-Z)	1.988 k-ft/ft	31.862 k-ft/ft	+1.20D+1.60Lr+0.50W
PASS	0.2212	1-way Shear (+X)	10.506 psi	47.50 psi	+0.90D+E
PASS	0.08302	1-way Shear (-X)	3.943 psi	47.50 psi	+1.20D+1.60Lr
PASS	0.08710	1-way Shear (+Z)	4.303 psi	49.401 psi	+1.20D+1.60Lr+0.50W
PASS	0.08710	1-way Shear (-Z)	4.303 psi	49.401 psi	+1.20D+1.60Lr+0.50W
PASS	0.09476	2-way Punching	16.818 psi	177.482 psi	+1.20D+1.60Lr+0.50W



Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc (in)	Actual Soil Bearing Stress @ Location				Actual / Allow Ratio
				Bottom, -Z	Top, +Z	Left, -X	Right, +X	
X-X, D Only	3.0	n/a	0.0	0.5139	0.5139	n/a	n/a	0.171
X-X, +D+Lr	3.0	n/a	0.0	0.5671	0.5671	n/a	n/a	0.189
X-X, +D+0.750Lr	3.0	n/a	0.0	0.5538	0.5538	n/a	n/a	0.185
X-X, +D+0.60W	3.0	n/a	0.0	0.5622	0.5622	n/a	n/a	0.187
X-X, +D+0.750Lr+0.450W	3.0	n/a	0.0	0.590	0.590	n/a	n/a	0.197
X-X, +D+0.450W	3.0	n/a	0.0	0.5501	0.5501	n/a	n/a	0.183
X-X, +0.60D+0.60W	3.0	n/a	0.0	0.3566	0.3566	n/a	n/a	0.119
X-X, +D+0.70E	3.0	n/a	0.0	0.5745	0.5745	n/a	n/a	0.192
X-X, +D+0.5250E	3.0	n/a	0.0	0.5593	0.5593	n/a	n/a	0.186
X-X, +0.60D+0.70E	3.0	n/a	0.0	0.3689	0.3689	n/a	n/a	0.123
Z-Z, D Only	3.0	0.0	n/a	n/a	n/a	0.5139	0.5139	0.171
Z-Z, +D+Lr	3.0	0.0	n/a	n/a	n/a	0.5671	0.5671	0.189
Z-Z, +D+0.750Lr	3.0	0.0	n/a	n/a	n/a	0.5538	0.5538	0.185
Z-Z, +D+0.60W	3.0	9.717	n/a	n/a	n/a	0.09191	1.032	0.344
Z-Z, +D+0.750Lr+0.450W	3.0	6.944	n/a	n/a	n/a	0.2373	0.9427	0.314
Z-Z, +D+0.450W	3.0	7.448	n/a	n/a	n/a	0.1974	0.9028	0.301
Z-Z, +0.60D+0.60W	3.0	15.318	n/a	n/a	n/a	0.0	0.8501	0.283
Z-Z, +D+0.70E	3.0	13.533	n/a	n/a	n/a	0.0	1.253	0.418
Z-Z, +D+0.5250E	3.0	10.425	n/a	n/a	n/a	0.05737	1.061	0.354
Z-Z, +0.60D+0.70E	3.0	21.075	n/a	n/a	n/a	0.0	1.253	0.418

Overturing Stability

Rotation Axis & Load Combination...	Overturing Moment	Resisting Moment	Stability Ratio	Status
X-X, D Only	None	0.0 k-ft	Infinity	OK
X-X, +D+Lr	None	0.0 k-ft	Infinity	OK
X-X, +D+0.750Lr	None	0.0 k-ft	Infinity	OK
X-X, +D+0.60W	None	0.0 k-ft	Infinity	OK
X-X, +D+0.750Lr+0.450W	None	0.0 k-ft	Infinity	OK
X-X, +D+0.450W	None	0.0 k-ft	Infinity	OK
X-X, +0.60D+0.60W	None	0.0 k-ft	Infinity	OK
X-X, +D+0.70E	None	0.0 k-ft	Infinity	OK
X-X, +D+0.5250E	None	0.0 k-ft	Infinity	OK
X-X, +0.60D+0.70E	None	0.0 k-ft	Infinity	OK
Z-Z, D Only	None	0.0 k-ft	Infinity	OK
Z-Z, +D+Lr	None	0.0 k-ft	Infinity	OK

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 Project Descr:

General Footing

Project File: Admin.ec6

LIC#: KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: F69 along Grid 1

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Z-Z, +D+0.750Lr	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.60W	15.051 k-ft	53.438 k-ft	3.550	OK
Z-Z, +D+0.750Lr+0.450W	11.288 k-ft	56.086 k-ft	4.969	OK
Z-Z, +D+0.450W	11.288 k-ft	52.291 k-ft	4.632	OK
Z-Z, +0.60D+0.60W	15.051 k-ft	33.898 k-ft	2.252	OK
Z-Z, +D+0.70E	21.420 k-ft	54.605 k-ft	2.549	OK
Z-Z, +D+0.5250E	16.065 k-ft	53.166 k-ft	3.309	OK
Z-Z, +0.60D+0.70E	21.420 k-ft	35.065 k-ft	1.637	OK

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	1.715	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +1.40D	1.715	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +1.20D+0.50Lr	1.580	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +1.20D+0.50Lr	1.580	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +1.20D	1.470	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +1.20D	1.470	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +1.20D+1.60Lr	1.822	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +1.20D+1.60Lr	1.822	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +1.20D+1.60Lr+0.50W	1.988	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +1.20D+1.60Lr+0.50W	1.988	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +1.20D+0.50W	1.636	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +1.20D+0.50W	1.636	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +1.20D+0.50Lr+W	1.913	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +1.20D+0.50Lr+W	1.913	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +1.20D+W	1.803	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +1.20D+W	1.803	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +0.90D+W	1.435	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +0.90D+W	1.435	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +1.20D+E	1.828	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +1.20D+E	1.828	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +0.90D+E	1.460	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
X-X, +0.90D+E	1.460	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4852	31.862	OK
Z-Z, +1.40D	1.715	-X	Bottom	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +1.40D	1.715	+X	Bottom	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +1.20D+0.50Lr	1.580	-X	Bottom	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +1.20D+0.50Lr	1.580	+X	Bottom	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +1.20D	1.470	-X	Bottom	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +1.20D	1.470	+X	Bottom	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +1.20D+1.60Lr	1.822	-X	Bottom	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +1.20D+1.60Lr	1.822	+X	Bottom	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +1.20D+1.60Lr+0.50W	0.8977	-X	Bottom	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +1.20D+1.60Lr+0.50W	3.079	+X	Bottom	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +1.20D+0.50W	0.5457	-X	Bottom	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +1.20D+0.50W	2.727	+X	Bottom	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +1.20D+0.50Lr+W	0.2619	-X	Top	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +1.20D+0.50Lr+W	4.10	+X	Bottom	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +1.20D+W	0.3648	-X	Top	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +1.20D+W	3.997	+X	Bottom	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +0.90D+W	0.6086	-X	Top	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +0.90D+W	3.754	+X	Bottom	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +1.20D+E	0.7183	-X	Top	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +1.20D+E	4.603	+X	Bottom	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +0.90D+E	0.7814	-X	Top	0.3888	ACI 7.6.1.1	0.4313	28.410	OK
Z-Z, +0.90D+E	4.540	+X	Bottom	0.3888	ACI 7.6.1.1	0.4313	28.410	OK

One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	3.71 psi	3.71 psi	3.71 psi	47.50 psi	0.08	OK
+1.20D+0.50Lr	3.42 psi	3.42 psi	3.42 psi	47.50 psi	0.07	OK
+1.20D	3.18 psi	3.18 psi	3.18 psi	47.50 psi	0.07	OK
+1.20D+1.60Lr	3.94 psi	3.94 psi	3.94 psi	47.50 psi	0.08	OK

Project Title:
 Engineer:
 Project ID:
 Project Descr:

General Footing

Project File: Admin.ec6

LIC# : KW-06014215, Build:20.24.10.03

Innovative Structural Engineering, Inc. (IS

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DESCRIPTION: F69 along Grid 1

One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.20D+1.60Lr+0.50W	1.75 psi	6.85 psi	6.85 psi	47.50 psi	0.14	OK
+1.20D+0.50W	0.99 psi	6.09 psi	6.09 psi	47.50 psi	0.13	OK
+1.20D+0.50Lr+W	0.95 psi	9.26 psi	9.26 psi	47.50 psi	0.19	OK
+1.20D+W	1.18 psi	9.04 psi	9.04 psi	47.50 psi	0.19	OK
+0.90D+W	1.68 psi	8.56 psi	8.56 psi	47.50 psi	0.18	OK
+1.20D+E	2.04 psi	10.47 psi	10.47 psi	47.50 psi	0.22	OK
+0.90D+E	1.75 psi	10.51 psi	10.51 psi	47.50 psi	0.22	OK

One Way Shear Z

Load Combination...	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	3.71 psi	3.71 psi	3.71 psi	49.40 psi	0.08	OK
+1.20D+0.50Lr	3.42 psi	3.42 psi	3.42 psi	49.40 psi	0.07	OK
+1.20D	3.18 psi	3.18 psi	3.18 psi	49.40 psi	0.06	OK
+1.20D+1.60Lr	3.94 psi	3.94 psi	3.94 psi	49.40 psi	0.08	OK
+1.20D+1.60Lr+0.50W	4.30 psi	4.30 psi	4.30 psi	49.40 psi	0.09	OK
+1.20D+0.50W	3.54 psi	3.54 psi	3.54 psi	49.40 psi	0.07	OK
+1.20D+0.50Lr+W	4.14 psi	4.14 psi	4.14 psi	49.40 psi	0.08	OK
+1.20D+W	3.90 psi	3.90 psi	3.90 psi	49.40 psi	0.08	OK
+0.90D+W	3.11 psi	3.11 psi	3.11 psi	49.40 psi	0.06	OK
+1.20D+E	3.96 psi	3.96 psi	3.96 psi	49.40 psi	0.08	OK
+0.90D+E	3.16 psi	3.16 psi	3.16 psi	49.40 psi	0.06	OK

All units k

Two-Way "Punching" Shear

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	14.51 psi	177.48psi	0.08174	OK
+1.20D+0.50Lr	13.37 psi	177.48psi	0.0753	OK
+1.20D	12.43 psi	177.48psi	0.07006	OK
+1.20D+1.60Lr	15.41 psi	177.48psi	0.08684	OK
+1.20D+1.60Lr+0.50W	16.82 psi	177.48psi	0.09476	OK
+1.20D+0.50W	13.84 psi	177.48psi	0.07798	OK
+1.20D+0.50Lr+W	16.18 psi	177.48psi	0.09116	OK
+1.20D+W	15.25 psi	177.48psi	0.08594	OK
+0.90D+W	12.22 psi	177.48psi	0.06887	OK
+1.20D+E	15.52 psi	177.48psi	0.08747	OK
+0.90D+E	12.72 psi	177.48psi	0.07164	OK



SITE STRUCTURES



STRUCTURAL
ENGINEERS

STRUCTURAL DESIGN CRITERIA

Project: San Bernardino County, Fire Station 227 - Site Structures
 Project Manager: Sandy Fong
 Engineer: Valeria Gallardo

General

Governing Building Code(s): 2022 California Building Code, ASCE 7-16
 Building Risk Category: II (CBC Table 1604.5)
 Construction Fire Resistance Type: Type V-B (CBC Chapter 6)

Building Description: Project site structures include 2 storage buildings, trash enclosure, and fuel tank/generator canopy. The storage buildings are conventional solid-sawn roof, wood stud wall, and slab on grade construction. The trash enclosure has a metal deck roof supported by steel framing enclosed by CMU wall on a conventional slab on grade foundation with continuous wall footings. The fuel tank/generator canopy has a similar metal roof deck assembly supported on steel ordinary moment frames on a conventional slab on grade foundation.

Building System:	Storage Bldg	Fuel Canopy
Roof Shape	Gable/Hip	Monoslope
Roof Framing System	Wood Truss/Rafter	Other
Roof Diaphragm System	Wood Sheathed	N/A
Floor Framing System	N/A	N/A
Floor Diaphragm System	N/A	N/A
Wall Framing System	Wood Stud	N/A
Build Method	Site Built	Site Built

Foundation System:		
Slab on Grade	Conventional Rebar	N/A
Footings/Grade Beams	Conventional Rebar	N/A
Curbs/Stemwalls	N/A	Concrete
Deep Foundation Members	N/A	Drilled Piers



STRUCTURAL
ENGINEERS

STRUCTURAL DESIGN CRITERIA

Building System:

	Trash Enclosure
Roof Shape	Monoslope
Roof Framing System	Other
Roof Diaphragm System	Metal Deck
Floor Framing System	N/A
Floor Diaphragm System	N/A
Wall Framing System	Masonry
Build Method	Site Built

Foundation System:

Slab on Grade	Conventional Rebar
Footings/Grade Beams	Conventional Rebar
Curbs/Stemwalls	Concrete
Deep Foundation Members	Drilled Piers

Design Live Loads

(CBC Table 1607.1)

Roofs:

Uniform load:	20	psf
Reducible?	Yes	

(CBC 1607.13.2.1)

Deflection Criteria

(CBC, Table 1604.3)

	L	E, S, W	D+L
Roof:	L/ 360	L/ 360	L/ 240
Floor:	L/ 600		L/ 240
Exterior Walls:		L/ 360	
Interior Walls:	L/ 240		

Load Combinations

(CBC, Section 1605)

Strength Design or Load and Resistance Factor Design (LRFD)

(CBC, Section 1605.2)

Alternate ASD Load Combinations

(CBC, Section 1605.3.2)



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STRUCTURAL DESIGN CRITERIA

Seismic Design Criteria

(ASCE 7-16, Chapter 11 & 12)

Site Factors:

Spectral acceleration for short period buildings (S_s):	1.422	g
Spectral acceleration for 1-sec period buildings (S_1):	0.526	g
Soil Site Class:	D	
Seismic Importance Factor, Storage Building & Trash Enclosure: (I_E)	1.00	
Seismic Importance Factor, Fuel Tank/Generator Canopy: (I_E)	1.50	
Effective Seismic Weight:	Dead	(ASCE 12.7.2)

Narrative of Design to resist Seismic Loads:

Wood framed, storage building with wood sheathed shear walls and a wood sheathed flexible diaphragm. Trash enclosure with combined reinforced masonry shear walls and steel ordinary moment frame system supporting a metal deck, flexible diaphragm. Fuel tank/generator canopy with steel ordinary moment frame system supporting a metal deck, flexible diaphragm.

Lateral Resisting System Parameters:

(ASCE Table 12.2-1, Table 12.12-1)

Description	R	Ω_o	Cd	Allowable Drift, Δ_a
Light Framed Wood Sheathed Shear Walls	6.5	2.5	4.0	0.025h
Steel Ordinary Moment Frames	3.5	2.5	3.0	0.025h
Special Reinforced Masonry Shear Walls	5.0	2.0	3.5	0.025h

Redundancy Factor, p : 1.30 With exceptions per ASCE 12.3.4

Seismic Analysis Procedure:

Equivalent Lateral Force Procedure, Section 12.8

(ASCE Table 12.6-1)

Structural Irregularities:

Horizontal Structural Irregularities:

(ASCE Table 12.3-1)

Type	Description	Location
Type 1a	Torsional Irregularity	
Type 1b	Extreme Torsional Irregularity	
Type 2	Reentrant Corner Irregularity	
Type 3	Diaphragm Discontinuity Irregularity	
Type 4	Out-of-Plane Offset Irregularity	
Type 5	Nonparallel System Irregularity	



STRUCTURAL
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STRUCTURAL DESIGN CRITERIA

Type	Description	Location	(ASCE Table 12.3-2)
Type 1a	Stiffness-Soft Story Irregularity		
Type 1b	Stiffness-Extreme Soft Story Irregularity		
Type 2	Weight (Mass) Irregularity		
Type 3	Vertical Geometry Irregularity		
Type 4	In-Plane Discontinuity VLFR Element		
Type 5a	Discontinuity in Lateral - Weak Story		
Type 5b	Discont. in Lat. - Extreme Weak Story		

Wind Design Criteria

(ASCE 7-16, Chapter 26)

Basic Wind Speed:	110	mph (3s Gust)	(ASCE 26.5)
Special Wind Region	Yes	Source: City of Perris	
Surface Roughness Category:	C		(ASCE 26.7.2)
Exposure Category:	C		(ASCE 26.7.3)
Enclosure Classification	Enclosed		(ASCE 26.12)
Design procedure for Main Wind Force Resisting System (MWFRS):	Directional Procedure, Ch. 27		
Design procedure for Component & Cladding Wind Loads (C&C):	Component & Cladding, Ch. 30		



STRUCTURAL
ENGINEERS

STRUCTURAL DESIGN CRITERIA

Geotechnical Design Criteria & Foundation Type

Geotechnical Report:

Prepared by:	Inland Foundation Engineering, Inc.
Report Number:	S168-193
Date:	September 23, 2025

Expansive Soil:	Non-expansive
Static Settlement:	<1"
Liquefaction Settlement:	Not significant
Seismic Hazards:	None
Corrosive Soil:	Not corrosive

Trash Enclosure and Storage Building Foundation Type:	Conventional slab on grade with Shallow grade beam footings
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Fuel Canopy Foundation Type:	Drilled pier footings
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PROJECT DEAD LOAD ANALYSIS

ROOF TYPES

R1	Main Sloped Roof, Storage Building:		
	Standing Seam Metal Roof:	2.0	psf
	15/32" Sheathing:	2.5	psf
	Roof Framing (2x Rafters at X" o.c.):	3.5	psf
	Insulation (Batt):	0.5	psf
	(1) Layer 5/8" Drywall at Ceiling:	3.5	psf
	Misc/Mech/Elec/Plumbing:	1.0	psf
	Ceiling Framing:	0.0	psf
	Total Dead Load =	13.0	psf

R2	Main Sloped Roof, Trash Enclosure/Fuel Canopy:		
	Standing Seam Metal Roof:	2.0	psf
	Rigid Insulation:	1.5	psf
	HSB 36-SS Metal Deck, 20 gage:	3.0	psf
	Misc/Mech/Elec/Plumbing:	0.5	psf
	-	0.0	psf
	-	0.0	psf
	-	0.0	psf
	Total Dead Load =	7.0	psf

WALL TYPES

W1	2x6 Wood Stud Exterior Wall, Storage Building		
	7/8" Plaster/Stucco	8.0	psf
	15/32" Sheathing:	1.5	psf
	Wall Framing (2x6 at 16" o.c.):	1.5	psf
	Insulation (Batt):	0.5	psf
	(1) Layer 5/8" Drywall:	3.0	psf
	Mech/Elec/Plumbing:	0.5	psf
	Total Dead Load =	15.0	psf

W2	8" CMU Block Wall, Trash Enclosure		
	8" CMU Block Wall	84.0	psf
	x	0.0	psf
	x	0.0	psf
	x	0.0	psf
	x	0.0	psf
	Total Dead Load =	84.0	psf



STORAGE BUILDING 1

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Wood Beam

Project File: Storage Bldg 1.ecb

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

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DESCRIPTION: H1 Header

Code References

Governing Code : IBC 2021

Referenced Design Standard(s) : NDS 2018

Load Combination Set : ASCE 7-22 / IBC 2024

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : ASCE 7-22 / IBC 2024

Wood Species : Douglas Fir-Larch

Wood Grade : No.1

Beam Bracing : Completely Unbraced

Fb + 1,350.0 psi

Fb - 1,350.0 psi

Fc - Prll 925.0 psi

Fc - Perp 625.0 psi

Fv 170.0 psi

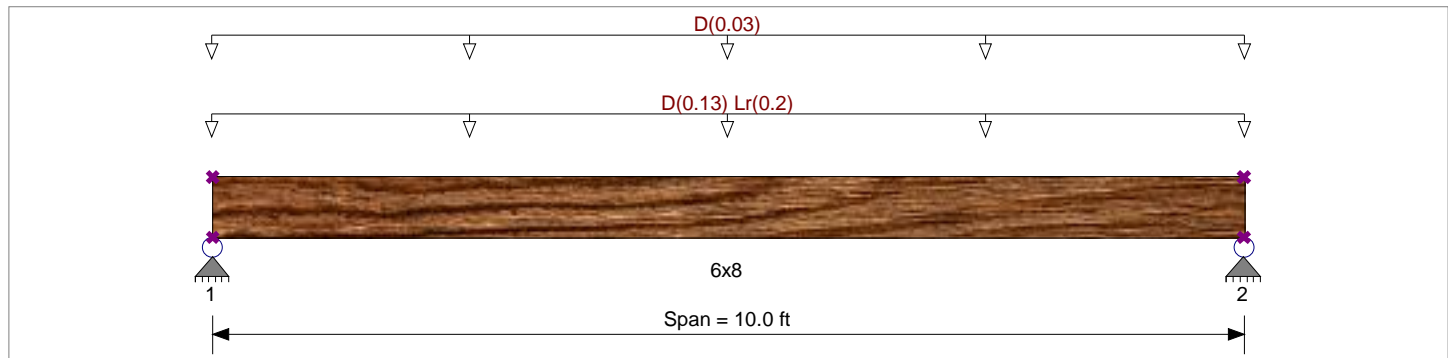
Ft 675.0 psi

E : Modulus of Elasticity

Ebend- xx 1,600.0ksi

Eminbend - xx 580.0ksi

Density 31.210pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading

Uniform Load : D = 0.0130, Lr = 0.020 ksf, Tributary Width = 10.0 ft

Uniform Load : D = 0.0150 ksf, Tributary Width = 2.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio				Maximum Shear Stress Ratio			
Section used for this span				Section used for this span			
fb: Actual = 1,073.28psi				fv: Actual = 58.76 psi			
F'b = 1,674.80psi				F'v = 212.50 psi			
Load Combination				Load Combination			
Location of maximum on span = 5.000ft				Location of maximum on span = 0.000 ft			
Span # where maximum occurs = Span # 1				Span # where maximum occurs = Span # 1			
Maximum Deflection				Maximum Deflection			
Max Downward Transient Deflection 0.146 in				Max Downward Transient Deflection 0 in			
Ratio = 820 >= 360				Ratio = 0 < 360			
Span: 1 : Lr Only				Span: 1 : +D+Lr			
Max Upward Transient Deflection 0 in				Max Upward Transient Deflection 0 in			
Ratio = 444 >= 180				Ratio = 0 < 180			
Span: 1 : +D+Lr				Span: 1 : +D+Lr			
Max Downward Total Deflection 0.270 in				Max Downward Total Deflection 0 in			
Ratio = 444 >= 180				Ratio = 0 < 180			
Span: 1 : +D+Lr				Span: 1 : +D+Lr			
Max Upward Total Deflection 0 in				Max Upward Total Deflection 0 in			
Ratio = 0 < 180				Ratio = 0 < 180			
Span: 1 : +D+Lr				Span: 1 : +D+Lr			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
D Only														0.0			
Length = 10.0 ft	1	0.407	0.176	0.90	1.00	1.00	0.99	1.000	1.00	1.00	1.00	2.11	491.5	1,208.7	0.74	26.9	153.0
+D+Lr														0.0			
Length = 10.0 ft	1	0.641	0.277	1.25	1.00	1.00	0.99	1.000	1.00	1.00	1.00	4.61	1,073.3	1,674.8	1.62	58.8	212.5
+D+0.750Lr														0.0			
Length = 10.0 ft	1	0.554	0.239	1.25	1.00	1.00	0.99	1.000	1.00	1.00	1.00	3.99	927.8	1,674.8	1.40	50.8	212.5
+0.60D														0.0			
														0.0			

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Wood Beam

Project File: Storage Bldg 1.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

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DESCRIPTION: H1 Header

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
Length = 10.0 ft	1	0.138	0.059	1.60	1.00	1.00	0.99	1.000	1.00	1.00	1.00	1.27	294.9	2,138.4	0.44	16.1	272.0

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
1	+D+Lr	0.2699	5.036		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	1.845	1.845
Max Upward from Load Combinations	1.845	1.845
Max Upward from Load Cases	1.000	1.000
D Only	0.845	0.845
+D+Lr	1.845	1.845
+D+0.750Lr	1.595	1.595
+0.60D	0.507	0.507
Lr Only	1.000	1.000

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Wood Beam

Project File: Storage Bldg 1.ec6

LIC# : KW-06014215, Build:20.25.06.16

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DESCRIPTION: H2 Header

Code References

Governing Code : IBC 2021

Referenced Design Standard(s) : NDS 2018

Load Combination Set : ASCE 7-22 / IBC 2024

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : ASCE 7-22 / IBC 2024

Wood Species : Douglas Fir-Larch

Wood Grade : No.1

Beam Bracing : Completely Unbraced

Fb + 1,350.0 psi

Fb - 1,350.0 psi

Fc - Prll 925.0 psi

Fc - Perp 625.0 psi

Fv 170.0 psi

Ft 675.0 psi

E : Modulus of Elasticity

Ebend- xx 1,600.0ksi

Eminbend - xx 580.0ksi

Density 31.210pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading

Uniform Load : D = 0.0130, Lr = 0.020 ksf, Tributary Width = 3.0 ft

Uniform Load : D = 0.0150 ksf, Tributary Width = 3.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio				Maximum Shear Stress Ratio			
Section used for this span				Section used for this span			
fb: Actual				fv: Actual			
F'b				F'v			
Load Combination				Load Combination			
Location of maximum on span				Location of maximum on span			
Span # where maximum occurs				Span # where maximum occurs			
Maximum Deflection				Maximum Deflection			
Max Downward Transient Deflection				Max Downward Transient Deflection			
Max Upward Transient Deflection				Max Upward Transient Deflection			
Max Downward Total Deflection				Max Downward Total Deflection			
Max Upward Total Deflection				Max Upward Total Deflection			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 6.0 ft	1	0.145	0.075	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.41	176.3	1,215.0	0.23	11.5	153.0
+D+Lr														0.0	0.00	0.0	0.0
Length = 6.0 ft	1	0.174	0.090	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.68	293.2	1,687.5	0.39	19.1	212.5
+D+0.750Lr														0.0	0.00	0.0	0.0
Length = 6.0 ft	1	0.156	0.081	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.61	264.0	1,687.5	0.35	17.2	212.5
+0.60D														0.0	0.00	0.0	0.0

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Wood Beam

Project File: Storage Bldg 1.ec6

LIC# : KW-06014215, Build:20.25.06.16

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DESCRIPTION: H2 Header

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
Length = 6.0 ft	1	0.049	0.025	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.24	105.8	2,160.0	0.14	6.9	272.0

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
1	+D+Lr	0.0362	3.022		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.452	0.452
Max Upward from Load Combinations	0.452	0.452
Max Upward from Load Cases	0.272	0.272
D Only	0.272	0.272
+D+Lr	0.452	0.452
+D+0.750Lr	0.407	0.407
+0.60D	0.163	0.163
Lr Only	0.180	0.180

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Wood Beam

Project File: Storage Bldg 1.ecb

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

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DESCRIPTION: H3 Header

Code References

Governing Code : IBC 2021

Referenced Design Standard(s) : NDS 2018

Load Combination Set : ASCE 7-22 / IBC 2024

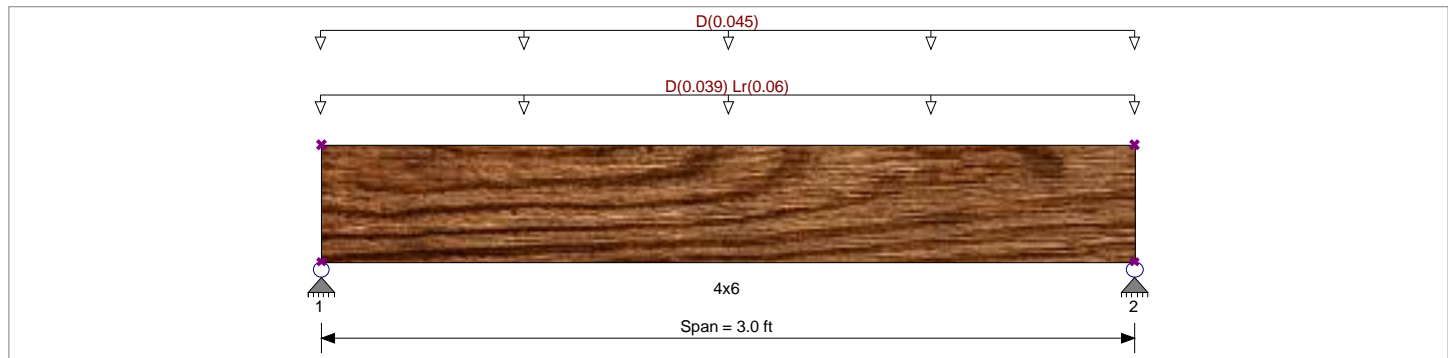
Material Properties

Analysis Method : Allowable Stress Design
 Load Combination : ASCE 7-22 / IBC 2024

Wood Species : Douglas Fir-Larch
 Wood Grade : No.2

Beam Bracing : Completely Unbraced

Fb +	875.0 psi	E : Modulus of Elasticity	
Fb -	875.0 psi	Ebend- xx	1,300.0ksi
Fc - Prll	600.0 psi	Eminbend - xx	470.0ksi
Fc - Perp	625.0 psi		
Fv	170.0 psi		
Ft	425.0 psi	Density	31.210pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading

Uniform Load : D = 0.0130, Lr = 0.020 ksf, Tributary Width = 3.0 ft

Uniform Load : D = 0.0150 ksf, Tributary Width = 3.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio				Maximum Shear Stress Ratio			
Section used for this span				Section used for this span			
fb: Actual				fv: Actual			
F'b				F'v			
Load Combination				Load Combination			
Location of maximum on span				Location of maximum on span			
Span # where maximum occurs				Span # where maximum occurs			
Maximum Deflection				Maximum Deflection			
Max Downward Transient Deflection				Max Downward Transient Deflection			
Max Upward Transient Deflection				Max Upward Transient Deflection			
Max Downward Total Deflection				Max Downward Total Deflection			
Max Upward Total Deflection				Max Upward Total Deflection			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 3.0 ft	1	0.104	0.047	0.90	1.00	1.00	1.00	1.300	1.00	1.00	1.00	0.10	106.0	1,023.8	0.09	7.2	153.0
+D+Lr														0.0	0.00	0.0	0.0
Length = 3.0 ft	1	0.125	0.057	1.25	1.00	1.00	1.00	1.300	1.00	1.00	1.00	0.17	178.1	1,421.9	0.16	12.1	212.5
+D+0.750Lr														0.0	0.00	0.0	0.0
Length = 3.0 ft	1	0.113	0.051	1.25	1.00	1.00	1.00	1.300	1.00	1.00	1.00	0.15	160.1	1,421.9	0.14	10.9	212.5
+0.60D														0.0	0.00	0.0	0.0

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Wood Beam

Project File: Storage Bldg 1.ec6

LIC# : KW-06014215, Build:20.25.06.16

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DESCRIPTION: H3 Header

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
Length = 3.0 ft	1	0.035	0.016	1.60	1.00	1.00	1.00	1.300	1.00	1.00	1.00	0.06	63.6	1,820.0	0.06	4.3	272.0

Overall Maximum Deflections


Span	Load Combination	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
1	+D+Lr	0.0106	1.511		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.222	0.222
Max Upward from Load Combinations	0.222	0.222
Max Upward from Load Cases	0.132	0.132
D Only	0.132	0.132
+D+Lr	0.222	0.222
+D+0.750Lr	0.200	0.200
+0.60D	0.079	0.079
Lr Only	0.090	0.090

 STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

SEISMIC DESIGN LOAD - EQUIVALENT LATERAL FORCE PROCEDURE

Structure: Storage Building 1

Building Seismic Design Criteria

(ASCE - Chapter 11)

Risk Category of Building or Structure:

II

Table 1.5-1

Short-Period Spectral Response Acceleration, S_s :

1.422

Per ASCE 7 Hazard Tool

Long-Period Spectral Response Acceleration, S_1 :

0.526

Per ASCE 7 Hazard Tool

Average Height of Building Roof, h_n :

12.00

ft

Site-specific ground motion analysis provided?

Yes

11.4.8

Analytical procedure (Limit per Table 12.6-1)

ELF

Equivalent Lateral Force

12.8

Structural irregularities per 12.3.2?

No

12.8.1.3 - Item 1

Exceed 5 story above base/grade including mezzanines?

No

12.8.1.3 - Item 2

Site Class

11.4.3 & 11.4.4

Soil Site Class:

D

Per Geotech Report

Site Coefficients & Spectral Response Acceleration Parameters

11.4.4

	Table 11.4-1 & 11.4-2	11.4.8 Exceptions	Site-specific analysis per Geotech Report	Calculation Warnings/Notes
Site Coefficient, F_a :	1.00	N/A	1.20	
Site Coefficient, F_v :	Site Specific	1.77	1.77	

$S_{MS} = F_a * S_s$:

1.48

Equation 11.4-1

$S_{M1} = F_v * S_1$:

1.05

Equation 11.4-2

$S_{DS} = 2/3 * S_{MS}$:

0.99

Equation 11.4-3

$S_{D1} = 2/3 * S_{M1}$:

0.70

Equation 11.4-4

$T_s = S_{D1} / S_{DS}$

0.71

11.4.6

Seismic Design Category (SDC):

D

11.6 & Table 11.6-1 & 2

Seismic Equivalent Lateral Force Procedure

Section 12.8

Importance Factor, I_e :

1.00

Table 1.5-2

Response Modification Factor, R : Table 12.2-1

6.50

Light Framed Shear Walls

Overstrength Amplification factor, Ω_o :

2.5

Table 12.2-1

Approximate Period Values: Table 12.8-2:

C_t :

0.02

All other systems

x :

0.75

Approximate Fundamental Period, $T_a = C_t (h_n)^x$:

0.13

s

Equation 12.8-7

Long Period Transition Period, T_L :

8

Figure 22 (14-17)

 STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
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Seismic Response Coefficient, C_s :

$$C_s = S_{DS} / (R / I_e):$$

0.152

Equation 12.8-2

Maximum C_s :

MAX

$$C_s = S_{D1} / T_a (R / I_e): \quad T \leq T_L$$

0.835

Equation 12.8-3

$$C_s = S_{D1} T_L / T_a^2 (R / I_e): \quad T > T_L$$

51.813

Equation 12.8-4

Minimum C_s :

MIN

$$C_s = 0.044 S_{DS} I_e: \quad \geq 0.01$$

0.043

Equation 12.8-5

$$C_s = 0.5 S_1 / (R / I_e): \quad \text{for } S_1 \geq 0.6$$

N/A

Equation 12.8-6

$$\text{Seismic Base Shear, } V = C_s W:$$

0.152

W

Equation 12.8-1

Building Structure - Horizontal Seismic Load Effect, E_h

$$\text{Redundancy Factor, } \rho:$$

1.30

Section 12.3.4.2

$$(\text{Strength Level}) \quad 1.0E_h = \rho Q_e:$$

0.197

W

Equation 12.4-3

$$(\text{ASD Level}) \quad 0.7E_h = \rho Q_e:$$

0.138

W

Equation 12.4-3

Diaphragm Design Forces per 12.10.1

$$F_{px} = 0.2S_{DS}I_e w_{px} =$$

0.197

W (Min)

Section 12.10

Equation 12.10-2

$$F_{px} = 0.4S_{DS}I_e w_{px} =$$

0.395

W (Max)

Equation 12.10-3

$$F_{px} = w_{px} * \Sigma F_i / \Sigma w_i$$

Equation 12.10-1


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Sheet:	Seismic Base Shear - FLEXIBLE
Date:	--
Project ID:	--
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SEISMIC BASE SHEAR ANALYSIS - FLEXIBLE DIAPHRAGM

STRUCTURE: Storage Building 1

Structural period Factor, k: 1.00

VERTICAL DISTRIBUTION OF SEISMIC FORCES															
Level	Height from Base (ft)	Weight Summary (k)	Floor Plan Area (ft ²)	ΣW_i (k)	$W_i h_i^k$	$\Sigma W_i h_i^k$	C_{vx}	Level Forces - 1.0E Strength Level			Alternate ASD 0.7E		Diaphragm F_{px} (k) - 1.0E		
								Force (k)		Unit Force (psf)	Unit Force (psf)		F_{px}	ΩF_{px}	
								F_x	ΣF_x	$1.0 E_h = \rho F_x$	F_x	$1.0 E_h = \rho F_x$			
		0.0		0.0	0	0	0.000	0.0	0.0	0.0			0.0	0.0	
		0.0		0.0	0	0	0.000	0.0	0.0	0.0			0.0	0.0	
1	12.00	16.9	726	16.9	203	203	1.000	2.6	2.6	3.3	3.54	4.60	2.48	3.22	8.4
Building Weight, W =		16.9	726	Base Shear, V = $C_s \cdot W$ = 3.34 k											

BUILDING WEIGHT & SEISMIC TRIBUTARY ANALYSIS																									
Building Mass Element	Type	Level	Unit weight (psf)	Area (sf)	Weight (k)	↔ Dir.										↕ Dir.									
						% Distribution to resistance gridlines										% Distribution to resistance gridlines									
						Gridlines										Gridlines									
Wes	Est										Check	North	South									Check			
Roof	R1	1	13.0	726	9.44	50%	50%						100%	50%	50%								100%		
West Wall (upper 1/2)	W1	1	15.0	100	1.50	100%	0%						100%	50%	50%								100%		
East Wall (upper 1/2)	W1	1	15.0	100	1.50	0%	100%						100%	50%	50%								100%		
North Wall (upper 1/2)	W1	1	15.0	150	2.25	50%	50%						100%	100%	0%								100%		
South Wall (upper 1/2)	W1	1	15.0	150	2.25	50%	50%						100%	0%	100%								100%		
					0.00								0%										0%		
					0.00								0%										0%		
					0.00								0%										0%		
					0.00								0%										0%		
ΣWi=					16.9	8.5	8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0		8.5	8.5	0.0	0.0	0.0	0.0	0.0	0.0		

SEISMIC LOAD SUMMARY BY ELEMENT																									
Building Mass Element	Level	Height (ft)	Notes	\leftrightarrow Dir. % Distribution to resistance gridlines										\updownarrow Dir. % Distribution to resistance gridlines											
				Gridlines										Gridlines											
				West	East									North	South										
Roof	1	12		0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
West Wall (upper 1/2)	1	12		0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
East Wall (upper 1/2)	1	12		0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
North Wall (upper 1/2)	1	12		0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
South Wall (upper 1/2)	1	12		0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Σ				1.7	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SUMMARY OF SEISMIC LOADING BY GRIDLINE (KIPS - 1.0E STRENGTH LEVEL)																											
Level	1.0 E _N = pF _x	↔ Direction										↕ Direction															
		Gridlines										Check	Gridlines														Check
		Wes t	East										Nort h	Sout h													
1	3.3	1.7	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%	1.7	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%		
Base	3.34	1.7	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%	1.7	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%		

 STRUCTURAL ENGINEERS	Sheet:	Wind Analysis
	Date:	--
	Project ID:	--
	Version:	2022 CBC / ASCE 7-16

Chapter 27 - Wind Loads on Buildings: Main Wind Force Resisting System (Directional Procedure)
Enclosed & Partially Enclosed Structures - Gable, Hip, Monoslope, & Mansard Roof

Structure: **Storage Building 1**

Building Data:

Type of Roof:	Hip	
Horiz building dimension parallel to wind, L:	30.0	ft
Horiz building dimension normal to wind, B:	20.0	ft
h/L:	0.43	
L/B:	1.50	
Roof Pitch, Θ :	slope ratio: 3 :12 =	14.0 degrees
Ground Elevation, Zg:	1,415	ft, above sea level

General Wind Load Requirements:

Risk category:	II	(ASCE 7-16) Table 1.5-1
V, Basic wind speed (3-s gust): mph	110	ASCE 7 Hazard Tool & Fig 26.5-1A, B, C, & D
$V_{asd} = V\sqrt{0.6}$: mph	85	Where exceptions 4 & 5 of Sec. 16.9.1.1 apply
Wind directionality factor, K_d	0.85	Section 26.6 & Table 26.6-1
Exposure category:	C	Section 26.7
Topographic factor, K_{zt} :	1.0	Section 26.8 & Fig 26.8-1
Ground elevation factor, K_e :	0.95	Section 26.9
Gust-effect factor, G_f :	0.85	Section 26.11
Enclosure classification:	Enclosed	
Internal pressure coefficient, +/- GCpi	0.18	Section 26.13 & Table 26.13-1
Velocity pressure exposure coefficient, K_z or K_h	0.85	Table 26.10-1
Minimum design wind loading, ASD	8.0	psf Section 27.1.5

Determine Velocity Pressure: $q_z = 0.00256 K_z K_{zt} K_d K_e V^2$, psf

Section 26.10.2

1-Story Building Wind Analysis			
Level	Height (ft)	K_z or K_h	q_z (psf)
Ridge Height	13.00	0.85	21.26
Mean Roof, h	11.50	0.85	21.26
1st Level	10.00	0.85	21.26

= q_h

Pressure on Building By Component (Roof Loads Normal to Roof Surface)								
Surface	Level (ft)	C_p	q_h or q_z	q (psf)	External Pressure, $q(GC_p)$ (psf)	Internal Pressure, $q_h(+/-GC_{pi})$	(psf)	
							+(GC _{pi})	-(GC _{pi})
Windward Roof - (-C _p)	13.00	-0.69	q_h	21.26	-12.38	3.8	-8.56	-16.21
Windward Roof - (+C _p)	13.00	-0.14	q_h	21.26	-2.55	3.8	1.27	-6.38
Leeward Roof	13.00	-0.49	q_h	21.26	-8.85	3.8	-5.02	-12.68
Windward Wall	10.00	0.8	q_z	21.26	14.46	3.8	18.29	10.63
Leeward Wall	10.00	-0.40	q_h	21.26	-7.23	3.8	-3.40	-11.06

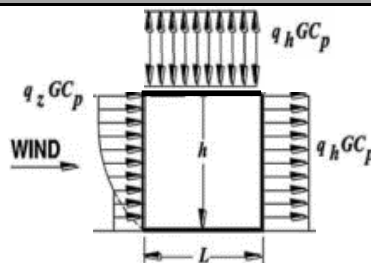
Wind Loading - Horizontal Components

 STRUCTURAL ENGINEERS	Sheet:	Wind Analysis
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Surface	Level (ft)	+Internal	-Internal	Design (psf)	Min. (psf)
		psf			
Windward Roof	13.00	0.31	-1.55	1.53	8
Leeward Roof	13.00	-1.22	-3.07		
Windward Wall	10.00	18.29	10.63	21.69	16
Leeward Wall	10.00	-3.40	-11.06		

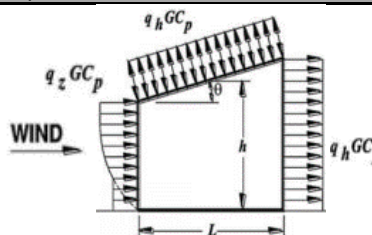
Wind Load Normal to Gable End Roof

Level	1.0W (Strength)	0.6W (ASD)
1st Flr	152 plf	91 plf



Wind Load Normal to Monoslope Roof

Level	1.0W (Strength)	0.6W (ASD)
1st Flr	132 plf	79 plf




STRUCTURAL
ENGINEERS

Sheet:	CC-Walls
Date:	11/24/2025
#:	-
Version:	2

ASCE 7-16 Chapter 30 Component and Cladding -Part I Low Rise Buildings ($h \leq 60$ ft.)
Walls

Basic Wind Speed	$V =$	110 mph	ASCE Hazard Tool
Nominal Wind Speed ($\sqrt{.6}V_{ult}$)	$V_{nom} =$	85.206 mph	
Ground elevation above sea level	$z_g =$	1415 ft.	ASCE Hazard Tool
Risk Category Factor	$=$	II	Table 1.5-1
Surface Roughness	$=$	C	26.7.2
Exposure Category	$=$	C	26.7.3
Mean roof height of building or height of structure	$h =$	12.00 ft.	
Enclosure Classification	$=$	Enclosed	Table 26.13-1
Roof Slope	$=$	3 :12 $\rightarrow \theta = 14.04^\circ$	

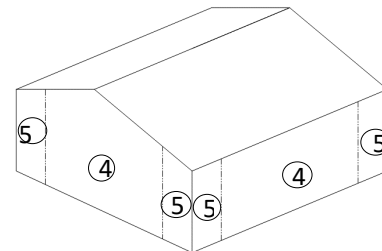
Wind Load Parameters:

K_z Velocity pressure exposure coefficient	$=$	0.85	Table 26.10-1
K_d Wind load directionality factor	$=$	0.85	Table 26.6-1
K_e Ground Elevation Factor	$=$	0.9501	Table 26.9-1
K_{zt} Topographic Factor	$=$	1	(26.8.2)

Velocity Pressure: $q_z = .00256K_zK_{zt}K_dK_eV^2$	$=$	21.26 psf	ASD : $q_z =$	12.76 psf	(26.10-1)
---	-----	-----------	---------------	-----------	-----------

G Gust effect factor	$=$	0.85	30.3.2
G_{cpi} Internal pressure coefficient	$=$	+/- 0.18	30.3.2
G_{cp} Product of external pressure coefficient and gust-effect factor			

G_{cp} coefficients							
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-) Away	4	-1.10	-1.05	-0.95	-0.92	-0.87	-0.80
	5	-1.40	-1.29	-1.15	-1.04	-0.94	-0.80
(+) Toward	4&5	1	0.94	0.88	0.82	0.77	0.7


ELEVATION
Figure 30.3-1

$G_{cp}^* - G_{cpi}$							
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-) Away	4	-1.28	-1.23	-1.13	-1.10	-1.05	-0.98
	5	-1.58	-1.47	-1.33	-1.22	-1.12	-0.98
(+) Toward	ALL	0.82	0.76	0.70	0.64	0.59	0.52

 * G_{cp} reduction NOT applied

Net Surface Pressures ($G_{cp} - G_{cpi}$)							
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-) Away	4	-27.2	-26.2	-24.0	-23.4	-22.3	-20.8
	5	-33.6	-31.3	-28.3	-25.9	-23.8	-20.8
(+) Toward	ALL	17.4	16.2	14.9	13.6	12.5	11.1

$G_{cp}^* + G_{cpi}$							
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-) Away	4	-0.92	-0.87	-0.77	-0.74	-0.69	-0.62
	5	-1.22	-1.11	-0.97	-0.86	-0.76	-0.62
(+) Toward	ALL	1.18	1.12	1.06	1	0.95	0.88

 * G_{cp} reduction NOT applied

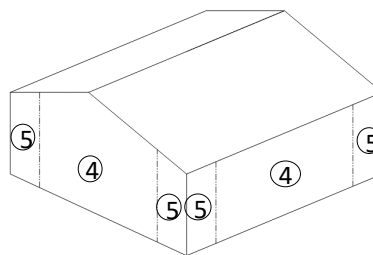
Net Surface Pressures ($G_{cp} + G_{cpi}$)							
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-) Away	4	-19.6	-18.5	-16.4	-15.7	-14.7	-13.2
	5	-25.9	-23.6	-20.6	-18.3	-16.2	-13.2
(+) Toward	ALL	25.1	23.8	22.5	21.3	20.2	18.7

Design Wind Surface Pressures																	
Governing GC_p +/- GC_{pi} Factors								Max Net Surface Pressures (psf) $p = q_h[(GC_p - (GC_{pi}))]$									
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf	Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf		
(-)	Away	4	-1.28	-1.23	-1.13	-1.10	-1.05	-0.98	(-)	Away	4	-27.22	-26.15	-24.03	-23.39	-22.33	-20.84
		5	-1.58	-1.47	-1.33	-1.22	-1.12	-0.98			5	-33.59	-31.26	-28.28	-25.94	-23.81	-20.84
(+)	Toward	ALL	1.18	1.12	1.06	1.00	0.95	0.88	(+)	Toward	ALL	25.09	23.81	22.54	21.26	20.20	18.71

Tributary Areas (sq ft) - User Input					
Area	10 < x < 20	20 < x < 50	50 < x < 100	100 < x < 200	200 < x < 500
	16	33	56	150	250

Strength (1.0W) - Effective Wind Pressure at "h" (psf)						
		10 < x < 20	20 < x < 50	50 < x < 100	100 < x < 200	200 < x < 500
	A	16.3 sq ft	33.0 sq ft	56.0 sq ft	150.0 sq ft	250.0 sq ft
(-)	4	-26.54	-25.23	-23.95	-22.86	-22.08
	5	-32.11	-29.97	-28.00	-24.88	-23.32
(+)	ALL	24.28	23.26	22.39	20.73	19.95

ASD (.6W) - Effective Wind Pressure at "h" (psf)						
		10< x <20	20< x <50	50< x <100	100< x <200	200< x< 500
	A	16.3 sq ft	33.0 sq ft	56.0 sq ft	150.0 sq ft	250.0 sq ft
(-)	4	-15.93	-15.14	-14.37	-13.71	-13.25
	5	-19.27	-17.98	-16.80	-14.93	-13.99
(+)	ALL	14.57	13.96	13.43	12.44	11.97



ELEVATION

Figure 30.3-1


FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION
Applicable Code Reference: 2021 SDPWS

Level: 1
SW ID: SW1
Grid Reference: 1

Shear Wall Input Data:

Wood Species = DF
 Wall Size = 2x6
 # of Panel Sides = 1

S.G. = 0.5
 S.G. Adjustment Factor = 1.00
 L_{total} = 96 in. 8'-0"
 L_{min} = 96 in. 8'-0"

General Data Inputs

Redundancy Factor ρ = 1
 Overstrength Factor Ω_o = 2.5
 Discontinuous Lateral System? (Beam Below Strap) = No
 Beam Depth =
²Fire Treated Lumber Condition? = No
⁴Reduction to Allowable Capacity = 1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote ¹ 0d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

ft. in.
 H_{OTM} (in.) = 10 0
 H_{ASPECT} (in.) = 10 0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Length ft in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
8 ft. 0 in.	100%	1.25 :1	1.00	OK

 ΣL = 8.00 ft. Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Roof	13.00	3	39.00	1.25
Wall	15.00	10	150.00	4.80
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 6.05 ft-kips
ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft ²)	A_{t2} (ft ²)	% _{Trib}	Load (lbs)
Roof	1169.85	1		100	1170

Line Loads(lbs)

	0
	0

Total $V_{(E)}$: 1170 lbs
ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	% _{Trib}	Load (lbs)
Roof	91	20	50	911

Total $V_{(W)}$: 911.0 lbs

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **No**

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	1169.9	1169.8512	146.2	260.7	6	8d	6 in. o.c.	3/8	E	0.5609	6
Wind:	911.0	-	113.9	365.0	6	8d	6 in. o.c.	3/8		0.3120	

ASD Tension Load Combinations:

 Seismic: $0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h = \mathbf{0.5 D - .7\rho Q_E}$ ASCE 2.4.5

 Wind: $0.6D + .7W = \mathbf{0.6 D - .6W}$ ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift $.7\rho E$ & $.6W$ (lbs)		Uplift $1.0\rho E$ & $1.0W$ (lbs)	
							HD	Strap	HD	Strap
Seismic:	-11.70	2.79	-8.91	90.8	94.5	output:	-1177.9	-1131.2	-2209.9	-2122.2
Wind:	-9.11	3.63	-5.48	90.8	94.5	output:	-724.8	-696.1	-2007.8	-1928.1

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0	Yes	-1000	-300.1		-1478.0	-1431.2	-2638.5	-2550.9
Wind:		0.0			0.0		-724.8	-696.1	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

 4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift $1.0\rho E$ & $1.0W$ (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	STHD14	3815	0.3874	OUTPUT HOLDOWN SUMMARY:	CS14	2x6	STHD14	4x6
STRAP:	CS14	2490	0.5748				ALT: HTT4	

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level:	1
SW ID:	SW2
Grid Reference	East

Shear Wall Input Data:

Wood Species	=	DF	
Wall Size	=	2x6	
# of Panel Sides	=	1	
S.G.	=	0.5	
S.G. Adjustment Factor	=	1.00	
L _{total}	=	96 in.	8'-0"
L _{min}	=	96 in.	8'-0"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	
² Fire Treated Lumber Condition?		=	No
⁴ Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size, ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

Height:		ft.	in.
H _{OTM} (in.)	=	10	0
H _{ASPECT} (in.)	=	10	0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

[illegible]

ΣL = 8.00 ft. Weighted Average: 1.00

Resisting Dead Load Data Table

[illegible]

Total M_D : 6.05 ft-kips

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft ²)	A_{t2} (ft ²)	% _{Trib}	Load (lbs)
Roof	1169.9	1		100	1170
Line Loads(lbs)					
					0
					0

Total $V_{(F)}$: 1170 lbs

ASD Wind Loading Data Table

[illegible]

Total $V_{(w)}$: 911.0 lbs

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **No**

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	1169.9	1169.8512	146.2	260.7	6	8d	6 in. o.c.	3/8	E	0.5609	6
Wind:	911.0	-	113.9	365.0	6	8d	6 in. o.c.	3/8		0.3120	

ASD Tension Load Combinations:

 Seismic: $0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h = \mathbf{0.5 D - .7\rho Q_E}$ ASCE 2.4.5

 Wind: $0.6D + .7W = \mathbf{0.6 D - .6W}$ ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift $.7\rho E$ & $.6W$ (lbs)		Uplift $1.0\rho E$ & $1.0W$ (lbs)	
							HD	Strap	HD	Strap
Seismic:	-11.70	2.79	-8.91	90.8	94.5	output:	-1177.9	-1131.2	-2209.9	-2122.2
Wind:	-9.11	3.63	-5.48	90.8	94.5	output:	-724.8	-696.1	-2007.8	-1928.1

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0	No	0.0			-1177.9	-1131.2	-2209.9	-2122.2
Wind:		0.0		0.0			-724.8	-696.1	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

 4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift $1.0\rho E$ & $1.0W$ (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	STHD14	3815	0.3088	OUTPUT HOLDOWN SUMMARY:	CS14	2x6	STHD14	4x6
STRAP:	CS14	2490	0.4543				ALT: HTT4	

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level:	1
SW ID:	SW3
Grid Reference	North

Shear Wall Input Data:

Wood Species	=	DF	
Wall Size	=	2x6	
# of Panel Sides	=	1	
S.G.	=	0.5	
S.G. Adjustment Factor	=	1.00	
L _{total}	=	96 in.	8'-0"
L _{min}	=	96 in.	8'-0"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	
² Fire Treated Lumber Condition?		=	No
⁴ Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

Height:		ft.	in.
H _{OTM} (in.)	=	10	0
H _{ASPECT} (in.)	=	10	0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

[illegible]

ΣL = 8.00 ft. Weighted Average: 1.00

Resisting Dead Load Data Table

[illegible]

Total M_D : 8.96 ft-kips

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft ²)	A_{t2} (ft ²)	% _{Trib}	Load (lbs)
Roof	1169.9	1		100	1170
Line Loads(lbs)					
					0
					0

Total $V_{(F)}$: 1170 lbs

ASD Wind Loading Data Table

[illegible]

Total $V_{(w)}$: 1366.5 lbs

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **No**

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	1169.9	1169.8512	146.2	260.7	6	8d	6 in. o.c.	3/8	W	0.5609	6
Wind:	1366.5	-	170.8	365.0	6	8d	6 in. o.c.	3/8		0.4680	

ASD Tension Load Combinations:

 Seismic: $0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h = \mathbf{0.5 D - .7\rho Q_E}$ ASCE 2.4.5

 Wind: $0.6D + .7W = \mathbf{0.6 D - .6W}$ ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W (lbs)	
							HD	Strap	HD	Strap
Seismic:	-11.70	4.13	-7.56	90.8	94.5	output:	-1000.2	-960.6	-2209.9	-2122.2
Wind:	-13.67	5.38	-8.29	90.8	94.5	output:	-1096.1	-1052.6	-3011.6	-2892.1

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0	No	0.0			-1000.2	-960.6	-2209.9	-2122.2
Wind:		0.0		0.0			-1096.1	-1052.6	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	STHD14	3815	0.2873	OUTPUT HOLDOWN SUMMARY:	CS14	2x6	STHD14	4x6
STRAP:	CS14	2490	0.4227				ALT: HTT4	

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level:	1
SW ID:	SW4
Grid Reference	Sourh

Shear Wall Input Data:

Wood Species	=	DF	
Wall Size	=	2x6	
# of Panel Sides	=	1	
S.G.	=	0.5	
S.G. Adjustment Factor	=	1.00	
L _{total}	=	96 in.	8'-0"
L _{min}	=	96 in.	8'-0"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	
² Fire Treated Lumber Condition?		=	No
⁴ Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

Height:		ft.	in.
H _{OTM} (in.)	=	10	0
H _{ASPECT} (in.)	=	10	0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

[illegible]

$\Sigma L =$ **8.00 ft.** Weighted Average: **1.00**

Resisting Dead Load Data Table

[illegible]

Total M_D : 8.96 ft-kips

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft ²)	A_{t2} (ft ²)	% _{Trib}	Load (lbs)
Roof	1169.9	1		100	1170
Line Loads(lbs)					
					0
					0

Total $V_{(F)}$: 1170 lbs

ASD Wind Loading Data Table

[illegible]

Total $V_{(w)}$: 1366.5 lbs

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **No**

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	1169.9	1169.8512	146.2	260.7	6	8d	6 in. o.c.	3/8	W	0.5609	6
Wind:	1366.5	-	170.8	365.0	6	8d	6 in. o.c.	3/8		0.4680	

ASD Tension Load Combinations:

 Seismic: $0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h = \mathbf{0.5 D - .7\rho Q_E}$ ASCE 2.4.5

 Wind: $0.6D + .7W = \mathbf{0.6 D - .6W}$ ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W (lbs)	
							HD	Strap	HD	Strap
Seismic:	-11.70	4.13	-7.56	90.8	94.5	output:	-1000.2	-960.6	-2209.9	-2122.2
Wind:	-13.67	5.38	-8.29	90.8	94.5	output:	-1096.1	-1052.6	-3011.6	-2892.1

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0	Yes	-1178	-353.4		-1478.0	-1466.1	-2714.7	-2627.0
Wind:		0.0			0.0		-1096.1	-1052.6	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	STHD14	3815	0.3874	OUTPUT HOLDOWN SUMMARY:	CS14	2x6	STHD14	4x6
STRAP:	CS14	2490	0.5888				ALT: HTT4	



STRUCTURAL
ENGINEERS

Sheet:	DIAPH 1
Date:	-
#:	-
Δ :	-

**SHEAR TRANSFER LOAD CHECK - DIAPHRAGM, HARDWARE, TOP PLATE, COLLECTORS & CHORDS AT SITE BUILT WOOD STUD WALL
FRAMED BUILDINGS - DF LUMBER**

HARDWARE LOADS	
ITEM	LBS
A34	515
A35	695
LTP4	670
LTP5	620
LS50	730
LS70	915
RBC	435
-	-

ALLOWABLE DIAPHRAGM LOADS		
TYPE	DIAPHRAGM	(PLF)
ROOF 1	UNBLOCKED - 15/32" SHEATHING W/ 8d AT 6" O.C. E.N.	180
ROOF 2	2x BLOCKED - 15/32" SHEATHING W/ 8d AT 4" O.C. E.N.	360
ROOF 3	-	-
ROOF 4	-	-
FLOOR 1	UNBLOCKED - 23/32" SHEATHING W/ 10d AT 6" O.C.	215
FLOOR 2	2x BLOCKED - 23/32" SHEATHING W/ 10d AT 6" O.C.	320
FLOOR 3	-	-
FLOOR 4	-	-

STRAP LOADS	
ITEM	LBS
CS16	1705
2-CS16	3410
CMSTC16	4585
CMST14	6490
CMST12	9215

ALLOWABLE TOP PLATE NAIL LOADS (Cd = 1.6)		
TYPE	NAIL SIZE	(LBS)
16d SHORT	16d SHORT - 0.131" x 3.25"	155
-	-	-

SHEAR WALL		W1	W2	W3	W4					
Fx (0.7E) SHEAR LOAD (LBS)		1169.85	1170	1170	1170					
DIAPHRAGM	Fpx (0.7E) SHEAR (LBS)	1520.81	1520.81	1520.81	1520.81					
	DIAPHRAGM TYPE	ROOF 1	ROOF 1	ROOF 1	ROOF 1					
	EDGE LENGTH (FT)	20	20	30	30					
	EDGE STRESS (PLF)	76.0403	76.0403	50.6936	50.6936					
	ALLOW STRESS (PLF)	180	180	180	180					
TOP PLATE CLIPS	WALL LENGTH (FT)	20	20	20	20					
	HARDWARE USED	RBC	RBC	RBC	RBC					
	MAX. SPACING (IN) O.C.	48	48	48	48					
CHORD	Perp. - Fpx (0.7E) SHEAR (PLF)	152	152	101	101					
	PARALLEL LENGTH (FT)	20	20	30	30					
	PERP. WIDTH (FT)	30	30	20	20					
	CHORD TENSION (LBS)	253.47	253.47	570.30	570.30					
	STRAP AT CHORD BREAK	CS16	CS16	CS16	CS16					



STRUCTURAL
ENGINEERS

Sheet:	DRAG (2)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (2)	Drag along West and East Wall
----------	-------------------------------

DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	1,521						
Start:	0.00						
Length:	20.00						
End:	20.00	0.00	0.00	0.00	0.00	0.00	0.00

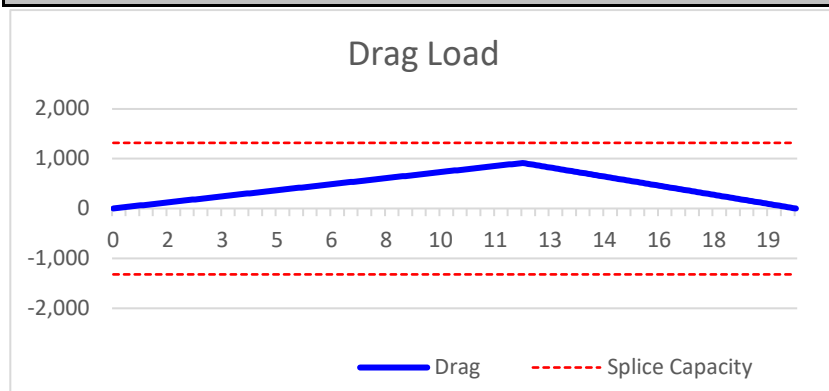
$V_{SEISMIC}$, plf:	76.04	0.00	0.00	0.00	0.00	0.00	0.00
----------------------	-------	------	------	------	------	------	------

SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	12.00						
Length:	8.00						
End:	20.00	0.00	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{SW}
End:	0.00	0.00	0.00	0.00	0.00	0.00	8.00

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	1,520.8	190.1

Design Summary



Total Line Length (ft):	20.00
Load Case:	Seismic
Seismic Drag Factor	1.00

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
912.5	12.0	Plate Splice OK
0.0	0.0	
0.0	0.0	
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215



STRUCTURAL
ENGINEERS

Sheet:	DRAG (4)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (4)	Drag along wall 4
----------	-------------------

DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	1,521						
Start:	0.00						
Length:	30.00						
End:	30.00	0.00	0.00	0.00	0.00	0.00	0.00

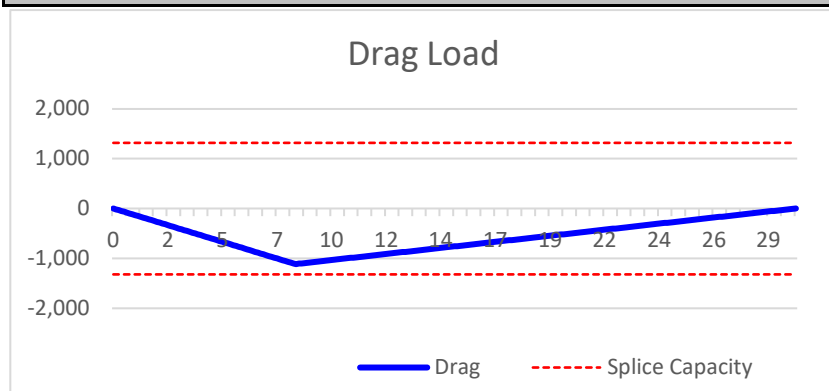
$V_{SEISMIC}$, plf:	50.69	0.00	0.00	0.00	0.00	0.00	0.00
----------------------	-------	------	------	------	------	------	------

SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	0.00						
Length:	8.00						
End:	8.00	0.00	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{SW}
End:	0.00	0.00	0.00	0.00	0.00	0.00	8.00

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	1,520.8	190.1

Design Summary



Total Line Length (ft):	30.00
Load Case:	Seismic
Seismic Drag Factor	1.00

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
0.0	30.0	Plate Splice OK
-1113.2	8.0	Plate Splice OK
0.0	0.0	
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215


STRUCTURAL
ENGINEERS

Sheet: Cont. & Spread Footing

Date: --

Project ID: --

Version: 2022 CBC / ASCE 7-16

Conventional Footing & Spread Footing Design - Bearing wall footings (Non-Retaining)
Design Values:

 Allowable Soil Bearing Pressure (psf) = **2,000**

 Soils Report by: **Inland Foundation Engineering, Inc.**

 Job Number: **S168-193**

 Date: **September 6, 2024**
Max. Conventional Footing Load:

Roof =	13	psf * (	30	/ 2 +	0	) ft	=	195.0 plf
2x6 Wall =	15	psf * (	10	/ 2 +	0	) ft	=	75.0 plf
		psf * (	9	+	0	) ft	=	0.0
		psf * (	0	/ 2 +	0	) ft	=	0.0
		psf * (	0	/ 2 +	0	) ft	=	0.0
		psf * (	0	/ 2 +	0	) ft	=	0.0
							w =	270.0 plf

 Required Footing Width = $270 / (2000 - 50) =$ **0.14** ft

 Use Footing: **12** Wide " x **18** " Deep w/ Steel Reinforcing Per Plans

Allowable Point Load at Footing: (Soil Governed)

Bearing Length at Point Load = 2 x (Depth + Slab Edge Thickness) + Post Width

 Slab Edge Thickness: **8** in (Depth of slab and subgrade)

 Post Width: **3.5** in

Footing Size (in)		Allowable Point Load, P (lbs)	Longitudinal Rebar Size	# Longitudinal Bar T & B
Width	Depth			
12	18	9,250	4	2

Spread Footing: (Soil Governed)

 $P = \text{Width}^2 / \text{S.B.P.}$

Spread Ftg Size (in)		Allowable Point Load, P (k)	Rebar Size	# Bar
Width (SQ)	Depth			
24	18	7.1	4	4
30	18	11.1	4	5
36	18	16.0	4	6
42	18	21.7	4	7
48	18	28.4	4	8

*0.0018 - Grade 60 rebar



STORAGE BUILDING 2

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Wood Beam

Project File: Storage Bldg 2.ec6

LIC#: KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

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DESCRIPTION: H1 Header

Code References

Governing Code : IBC 2021

Referenced Design Standard(s) : NDS 2018

Load Combination Set : ASCE 7-22 / IBC 2024

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : ASCE 7-22 / IBC 2024

Wood Species : Douglas Fir-Larch

Wood Grade : No.1

Beam Bracing : Completely Unbraced

Fb + 1,350.0 psi

Fb - 1,350.0 psi

Fc - Prll 925.0 psi

Fc - Perp 625.0 psi

Fv 170.0 psi

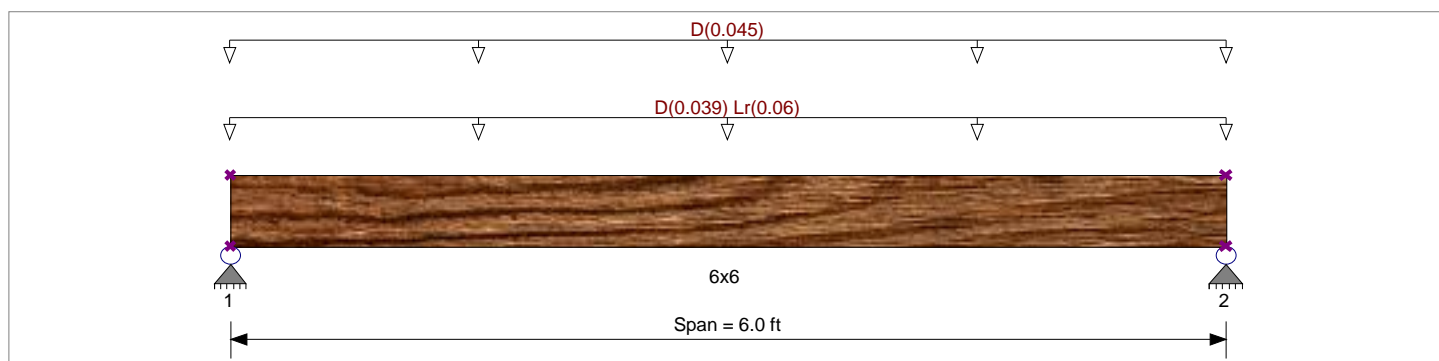
Ft 675.0 psi

E : Modulus of Elasticity

Ebend- xx 1,600.0ksi

Eminbend - xx 580.0ksi

Density 31.210pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading

Uniform Load : D = 0.0130, Lr = 0.020 ksf, Tributary Width = 3.0 ft

Uniform Load : D = 0.0150 ksf, Tributary Width = 3.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio				Maximum Shear Stress Ratio			
Section used for this span				Section used for this span			
fb: Actual				fv: Actual			
F'b				F'v			
Load Combination				Load Combination			
Location of maximum on span				Location of maximum on span			
Span # where maximum occurs				Span # where maximum occurs			
Maximum Deflection				Maximum Deflection			
Max Downward Transient Deflection				Max Downward Transient Deflection			
Max Upward Transient Deflection				Max Upward Transient Deflection			
Max Downward Total Deflection				Max Downward Total Deflection			
Max Upward Total Deflection				Max Upward Total Deflection			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 6.0 ft	1	0.145	0.075	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.41	176.3	1,215.0	0.23	11.5	153.0
+D+Lr														0.0	0.00	0.0	0.0
Length = 6.0 ft	1	0.174	0.090	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.68	293.2	1,687.5	0.39	19.1	212.5
+D+0.750Lr														0.0	0.00	0.0	0.0
Length = 6.0 ft	1	0.156	0.081	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.61	264.0	1,687.5	0.35	17.2	212.5
+0.60D														0.0	0.00	0.0	0.0

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Wood Beam

Project File: Storage Bldg 2.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

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DESCRIPTION: H1 Header

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
Length = 6.0 ft	1	0.049	0.025	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.24	105.8	2,160.0	0.14	6.9	272.0

Overall Maximum Deflections


Span	Load Combination	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
1	+D+Lr	0.0362	3.022		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.452	0.452
Max Upward from Load Combinations	0.452	0.452
Max Upward from Load Cases	0.272	0.272
D Only	0.272	0.272
+D+Lr	0.452	0.452
+D+0.750Lr	0.407	0.407
+0.60D	0.163	0.163
Lr Only	0.180	0.180

 STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

SEISMIC DESIGN LOAD - EQUIVALENT LATERAL FORCE PROCEDURE

Structure: Storage Building 2

Building Seismic Design Criteria

(ASCE - Chapter 11)

Risk Category of Building or Structure:

II

Table 1.5-1

Short-Period Spectral Response Acceleration, S_s :

1.422

Per ASCE 7 Hazard Tool

Long-Period Spectral Response Acceleration, S_1 :

0.526

Per ASCE 7 Hazard Tool

Average Height of Building Roof, h_n :

12.00

ft

Site-specific ground motion analysis provided?

Yes

11.4.8

Analytical procedure (Limit per Table 12.6-1)

ELF

Equivalent Lateral Force

12.8

Structural irregularities per 12.3.2?

No

12.8.1.3 - Item 1

Exceed 5 story above base/grade including mezzanines?

No

12.8.1.3 - Item 2

Site Class

11.4.3 & 11.4.4

Soil Site Class:

D

Per Geotech Report

Site Coefficients & Spectral Response Acceleration Parameters

11.4.4

	Table 11.4-1 & 11.4-2	11.4.8 Exceptions	Site-specific analysis per Geotech Report	Calculation Warnings/Notes
Site Coefficient, F_a :	1.00	N/A	1.20	
Site Coefficient, F_v :	Site Specific	1.77	1.77	

$S_{MS} = F_a * S_s$:

1.48

Equation 11.4-1

$S_{M1} = F_v * S_1$:

1.05

Equation 11.4-2

$S_{DS} = 2/3 * S_{MS}$:

0.99

Equation 11.4-3

$S_{D1} = 2/3 * S_{M1}$:

0.70

Equation 11.4-4

$T_s = S_{D1} / S_{DS}$

0.71

11.4.6

Seismic Design Category (SDC):

D

11.6 & Table 11.6-1 & 2

Seismic Equivalent Lateral Force Procedure

Section 12.8

Importance Factor, I_e :

1.00

Table 1.5-2

Response Modification Factor, R : Table 12.2-1

6.50

Light Framed Shear Walls

Overstrength Amplification factor, Ω_o :

2.5

Table 12.2-1

Approximate Period Values: Table 12.8-2:

C_t :

0.02

All other systems

x :

0.75

Approximate Fundamental Period, $T_a = C_t (h_n)^x$:

0.13

s

Equation 12.8-7

Long Period Transition Period, T_L :

8

Figure 22 (14-17)

 STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

Seismic Response Coefficient, C_s :

$$C_s = S_{DS} / (R / I_e):$$

0.152

Equation 12.8-2

Maximum C_s :

MAX

$$C_s = S_{D1} / T_a (R / I_e): \quad T \leq T_L$$

0.835

Equation 12.8-3

$$C_s = S_{D1} T_L / T_a^2 (R / I_e): \quad T > T_L$$

51.813

Equation 12.8-4

Minimum C_s :

MIN

$$C_s = 0.044 S_{DS} I_e: \quad \geq 0.01$$

0.043

Equation 12.8-5

$$C_s = 0.5 S_1 / (R / I_e): \quad \text{for } S_1 \geq 0.6$$

N/A

Equation 12.8-6

$$\text{Seismic Base Shear, } V = C_s W:$$

0.152

W

Equation 12.8-1

Building Structure - Horizontal Seismic Load Effect, E_h Redundancy Factor, ρ :

1.30

Section 12.3.4.2

(Strength Level) $1.0E_h = \rho Q_e$:

0.197

W

Equation 12.4-3

(ASD Level) $0.7E_h = \rho Q_e$:

0.138

W

Equation 12.4-3

Diaphragm Design Forces per 12.10.1

$$F_{px} = 0.2 S_{DS} I_e w_{px} =$$

0.197

W (Min)

Section 12.10

Equation 12.10-2

$$F_{px} = 0.4 S_{DS} I_e w_{px} =$$

0.395

W (Max)

Equation 12.10-3

$$F_{px} = w_{px} * \Sigma F_i / \Sigma w_i$$

Equation 12.10-1


STRUCTURAL
ENGINEERS

www.ISEngineers.com

Sheet:	Seismic Base Shear - FLEXIBLE
Date:	--
Project ID:	--
Version:	2022 CBC / ASCE 7-16

SEISMIC BASE SHEAR ANALYSIS - FLEXIBLE DIAPHRAGM

STRUCTURE: Storage Building 2

Structural period Factor, k: 1.00

VERTICAL DISTRIBUTION OF SEISMIC FORCES																
Level	Height from Base (ft)	Weight Summary (k)	Floor Plan Area (ft ²)	ΣWi (k)	Wi hi ^k	ΣWi hi ^k	C _{vx}	Level Forces - 1.0E Strength Level				Alternate ASD 0.7E		Diaphragm F _{px} (k) - 1.0E		
								Force (k)			Unit Force (psf)	Unit Force (psf)		F _{px}	ΩF _{px}	
								F _x	ΣF _x	1.0 E _h = ρF _x	F _x	1.0 E _h = ρF _x	F _x			0.7 E _h = ρF _x
		0.0		0.0	0	0	0.000	0.0	0.0	0.0				0.0	0.0	
		0.0		0.0	0	0	0.000	0.0	0.0	0.0				0.0	0.0	
1	12.00	12.9	529	12.9	155	155	1.000	2.0	2.0	2.5	3.70	4.80	2.59	3.36	2.5	6.4
Building Weight, W =		12.9	529	Base Shear, V = C _s *W = 2.54 k												

BUILDING WEIGHT & SEISMIC TRIBUTARY ANALYSIS																													
Building Mass Element	Type	Level	Unit weight (psf)	Area (sf)	Weight (k)	↔ Dir.		% Distribution to resistance gridlines										↕ Dir.		% Distribution to resistance gridlines									
						Gridlines										Check	Gridlines										Check		
						West	East										North	South											
Roof	R1	1	13.0	529	6.88	50%	50%									100%	50%	50%								100%			
West Wall (upper 1/2)	W1	1	15.0	100	1.50	100%	0%									100%	50%	50%								100%			
East Wall (upper 1/2)	W1	1	15.0	100	1.50	0%	100%									100%	50%	50%								100%			
North Wall (upper 1/2)	W1	1	15.0	100	1.50	50%	50%									100%	100%	0%								100%			
South Wall (upper 1/2)	W1	1	15.0	100	1.50	50%	50%									100%	0%	100%								100%			
					0.00											0%										0%			
					0.00											0%										0%			
					0.00											0%										0%			
					0.00											0%										0%			
ΣWi=					12.9	6.4	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		6.4	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			

				SEISMIC LOAD SUMMARY BY ELEMENT																				
Building Mass Element	Level	Height (ft)	Notes	↕ Dir.		% Distribution to resistance gridlines								↔ Dir.		% Distribution to resistance gridlines								
				Gridlines									Gridlines											
				West	East										North	South								
Roof	1	12		0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
West Wall (upper 1/2)	1	12		0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
East Wall (upper 1/2)	1	12		0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North Wall (upper 1/2)	1	12		0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
South Wall (upper 1/2)	1	12		0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				Σ	1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0		1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SUMMARY OF SEISMIC LOADING BY GRIDLINE (KIPS - 1.0E STRENGTH LEVEL)																					
Level	$1.0 E_h = \rho F_x$	\leftrightarrow Direction										\updownarrow Direction									
		Gridlines										Gridlines									
		West	East								Check	North	South								Check
1	2.5	1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%	1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%
Base	2.54	1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%	1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%

 STRUCTURAL ENGINEERS	Sheet:	Wind Analysis
	Date:	--
	Project ID:	--
	Version:	2022 CBC / ASCE 7-16

Chapter 27 - Wind Loads on Buildings: Main Wind Force Resisting System (Directional Procedure)
Enclosed & Partially Enclosed Structures - Gable, Hip, Monoslope, & Mansard Roof

Structure: **Storage Building 2**

Building Data:

Type of Roof:	Hip	
Horiz building dimension parallel to wind, L:	20.0	ft
Horiz building dimension normal to wind, B:	20.0	ft
h/L:	0.65	
L/B:	1.00	
Roof Pitch, Θ :	slope ratio: 3 :12 =	14.0 degrees
Ground Elevation, Zg:		1,415 ft, above sea level

General Wind Load Requirements:

Risk category:	II	(ASCE 7-16) Table 1.5-1
V, Basic wind speed (3-s gust): mph	110	ASCE 7 Hazard Tool & Fig 26.5-1A, B, C, & D
$V_{asd} = V\sqrt{0.6}$: mph	85	Where exceptions 4 & 5 of Sec. 16.9.1.1 apply
Wind directionality factor, K_d	0.85	Section 26.6 & Table 26.6-1
Exposure category:	C	Section 26.7
Topographic factor, K_{zt} :	1.0	Section 26.8 & Fig 26.8-1
Ground elevation factor, K_e :	0.95	Section 26.9
Gust-effect factor, G_f :	0.85	Section 26.11
Enclosure classification:	Enclosed	
Internal pressure coefficient, +/- GC_{pi}	0.18	Section 26.13 & Table 26.13-1
Velocity pressure exposure coefficient, K_z or K_h	0.85	Table 26.10-1
Minimum design wind loading, ASD	8.0	psf Section 27.1.5

Determine Velocity Pressure: $q_z = 0.00256 K_z K_{zt} K_d K_e V^2$, psf

Section 26.10.2

1-Story Building Wind Analysis			
Level	Height (ft)	K_z or K_h	q_z (psf)
Ridge Height	13.00	0.85	21.26
Mean Roof, h	11.50	0.85	21.26
1st Level	10.00	0.85	21.26

= q_h

Pressure on Building By Component (Roof Loads Normal to Roof Surface)								
Surface	Level (ft)	C_p	q_h or q_z	q (psf)	External Pressure, $q(GC_p)$ (psf)	Internal Pressure, $q_h(+/-GC_{pi})$	(psf)	
							$+(GC_{pi})$	$-(GC_{pi})$
Windward Roof - ($-C_p$)	13.00	-0.83	q_h	21.26	-15.08	3.8	-11.25	-18.91
Windward Roof - ($+C_p$)	13.00	-0.22	q_h	21.26	-3.90	3.8	-0.07	-7.73
Leeward Roof	13.00	-0.54	q_h	21.26	-9.68	3.8	-5.86	-13.51
Windward Wall	10.00	0.8	q_z	21.26	14.46	3.8	18.29	10.63
Leeward Wall	10.00	-0.50	q_h	21.26	-9.04	3.8	-5.21	-12.86

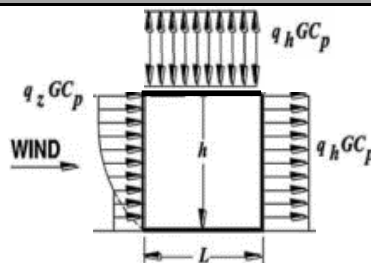
Wind Loading - Horizontal Components

 STRUCTURAL ENGINEERS	Sheet:	Wind Analysis
	Date:	--
	Project ID:	--
	Version:	2022 CBC / ASCE 7-16

Surface	Level (ft)	+Internal	-Internal	Design (psf)	Min. (psf)
		psf			
Windward Roof	13.00	-0.02	-1.87	1.40	8
Leeward Roof	13.00	-1.42	-3.28		
Windward Wall	10.00	18.29	10.63	23.50	16
Leeward Wall	10.00	-5.21	-12.86		

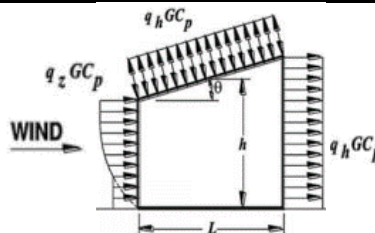
Wind Load Normal to Gable End Roof

Level	1.0W (Strength)	0.6W (ASD)
1st Flr	164 plf	99 plf



Wind Load Normal to Monoslope Roof

Level	1.0W (Strength)	0.6W (ASD)
1st Flr	141 plf	85 plf




STRUCTURAL
ENGINEERS

Sheet:	CC-Walls
Date:	11/24/2025
#:	-
Version:	2

ASCE 7-16 Chapter 30 Component and Cladding -Part I Low Rise Buildings ($h \leq 60$ ft.)
Walls

Basic Wind Speed	$V =$	110 mph	ASCE Hazard Tool
Nominal Wind Speed ($\sqrt{.6})V_{ult.}$	$V_{nom} =$	85.206 mph	
Ground elevation above sea level	$z_g =$	1415 ft.	ASCE Hazard Tool
Risk Category Factor	$=$	II	Table 1.5-1
Surface Roughness	$=$	C	26.7.2
Exposure Category	$=$	C	26.7.3
Mean roof height of building or height of structure	$h =$	12.00 ft.	
Enclosure Classification	$=$	Enclosed	Table 26.13-1
Roof Slope	$=$	3 :12 $\rightarrow \theta = 14.04^\circ$	

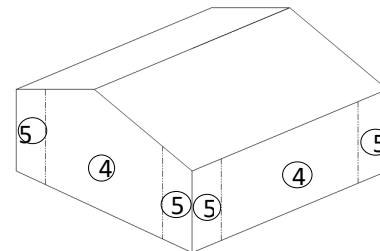
Wind Load Parameters:

K_z Velocity pressure exposure coefficient	$=$	0.85	Table 26.10-1
K_d Wind load directionality factor	$=$	0.85	Table 26.6-1
K_e Ground Elevation Factor	$=$	0.9501	Table 26.9-1
K_{zt} Topographic Factor	$=$	1	(26.8.2)

Velocity Pressure: $q_z = .00256K_zK_{zt}K_dK_eV^2$	$=$	21.26 psf	ASD : $q_z =$	12.76 psf	(26.10-1)
---	-----	-----------	---------------	-----------	-----------

G Gust effect factor	$=$	0.85	30.3.2
G_{cpi} Internal pressure coefficient	$=$	+/- 0.18	30.3.2
G_{cp} Product of external pressure coefficient and gust-effect factor			

G_{cp} coefficients							
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-) Away	4	-1.10	-1.05	-0.95	-0.92	-0.87	-0.80
	5	-1.40	-1.29	-1.15	-1.04	-0.94	-0.80
(+) Toward 4&5		1	0.94	0.88	0.82	0.77	0.7


ELEVATION
Figure 30.3-1

$G_{cp}^* - G_{cpi}$							
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-) Away	4	-1.28	-1.23	-1.13	-1.10	-1.05	-0.98
	5	-1.58	-1.47	-1.33	-1.22	-1.12	-0.98
(+) Toward ALL		0.82	0.76	0.70	0.64	0.59	0.52

 *G_{cp} reduction NOT applied

Net Surface Pressures ($G_{cp} - G_{cpi}$)							
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-) Away	4	-27.2	-26.2	-24.0	-23.4	-22.3	-20.8
	5	-33.6	-31.3	-28.3	-25.9	-23.8	-20.8
(+) Toward ALL		17.4	16.2	14.9	13.6	12.5	11.1

$G_{cp}^* + G_{cpi}$							
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-) Away	4	-0.92	-0.87	-0.77	-0.74	-0.69	-0.62
	5	-1.22	-1.11	-0.97	-0.86	-0.76	-0.62
(+) Toward ALL		1.18	1.12	1.06	1	0.95	0.88

 *G_{cp} reduction NOT applied

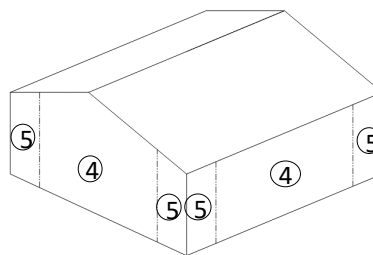
Net Surface Pressures ($G_{cp} + G_{cpi}$)							
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-) Away	4	-19.6	-18.5	-16.4	-15.7	-14.7	-13.2
	5	-25.9	-23.6	-20.6	-18.3	-16.2	-13.2
(+) Toward ALL		25.1	23.8	22.5	21.3	20.2	18.7

Design Wind Surface Pressures																	
Governing GC_p +/- GC_{pi} Factors								Max Net Surface Pressures (psf) $p = q_h[(GC_p - (GC_{pi}))]$									
Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf	Direction	Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf		
(-)	Away	4	-1.28	-1.23	-1.13	-1.10	-1.05	-0.98	(-)	Away	4	-27.22	-26.15	-24.03	-23.39	-22.33	-20.84
		5	-1.58	-1.47	-1.33	-1.22	-1.12	-0.98			5	-33.59	-31.26	-28.28	-25.94	-23.81	-20.84
(+)	Toward	ALL	1.18	1.12	1.06	1.00	0.95	0.88	(+)	Toward	ALL	25.09	23.81	22.54	21.26	20.20	18.71

Tributary Areas (sq ft) - User Input					
Area	10 < x < 20	20 < x < 50	50 < x < 100	100 < x < 200	200 < x < 500
	16	33	56	150	250

Strength (1.0W) - Effective Wind Pressure at "h" (psf)						
		10 < x < 20	20 < x < 50	50 < x < 100	100 < x < 200	200 < x < 500
	A	16.3 sq ft	33.0 sq ft	56.0 sq ft	150.0 sq ft	250.0 sq ft
(-)	4	-26.54	-25.23	-23.95	-22.86	-22.08
	5	-32.11	-29.97	-28.00	-24.88	-23.32
(+)	ALL	24.28	23.26	22.39	20.73	19.95

ASD (.6W) - Effective Wind Pressure at "h" (psf)						
		10< x <20	20< x <50	50< x <100	100< x <200	200< x< 500
	A	16.3 sq ft	33.0 sq ft	56.0 sq ft	150.0 sq ft	250.0 sq ft
(-)	4	-15.93	-15.14	-14.37	-13.71	-13.25
	5	-19.27	-17.98	-16.80	-14.93	-13.99
(+)	ALL	14.57	13.96	13.43	12.44	11.97



ELEVATION

Figure 30.3-1

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
-----------------------------------	-------------	--------------

Level: 1

SW ID: SW1

Grid Reference 1

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1

S.G.	=	0.5	
S.G. Adjustment Factor	=	1.00	
L _{total}	=	96 in.	8'-0"
L _{min}	=	96 in.	8'-0"

General Data Inputs

Redundancy Factor $\rho = 1$

Overstrength Factor $\Omega_o = 2.5$

Discontinuous Lateral System? (Beam Below Strap) = No

Beam Depth =

²Fire Treated Lumber Condition? = **No**

Reduction to Allowable Capacity = 1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

Height:		ft.	in.
H _{OTM} (in.)	=	10	0
H _{ASPECT} (in.)	=	10	0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

[illegible]

ΣL = 8.00 ft. Weighted Average: 1.00

Resisting Dead Load Data Table

[illegible]

Total M_D : 8.96 ft-kips

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft ²)	A_{t2} (ft ²)	% _{Trib}	Load (lbs)
Roof	889.37	1		100	889

Line Loads(lbs)

0

Total $V_{(E)}$: 889 lbs

ASD Wind Loading Data Table

[illegible]

Total $V_{(w)}$: 986.9 lbs

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **No**

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	889.4	889.371467	111.2	260.7	6	8d	6 in. o.c.	3/8	W	0.4264	6
Wind:	986.9	-	123.4	365.0	6	8d	6 in. o.c.	3/8		0.3380	

ASD Tension Load Combinations:

 Seismic: $0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h = \mathbf{0.5 D - .7\rho Q_E}$ ASCE 2.4.5

 Wind: $0.6D + .7W = \mathbf{0.6 D - .6W}$ ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift $.7\rho E$ & $.6W$ (lbs)		Uplift $1.0\rho E$ & $1.0W$ (lbs)	
							HD	Strap	HD	Strap
Seismic:	-8.89	4.13	-4.76	90.8	94.5	output:	-629.4	-604.4	-1680.0	-1613.4
Wind:	-9.87	5.38	-4.49	90.8	94.5	output:	-594.2	-570.6	-2175.1	-2088.8

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0	Yes	-807	-242.1		-995.8	-988.3	-2025.9	-1959.2
Wind:		0.0			0.0		-594.2	-570.6	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

 4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift $1.0\rho E$ & $1.0W$ (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	STHD14	3815	0.2610	OUTPUT HOLDOWN SUMMARY:	CS14	2x6	STHD14	4x6
STRAP:	CS14	2490	0.3969				ALT: HTT4	

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level:	1
SW ID:	SW2
Grid Reference	East

Shear Wall Input Data:

Wood Species	=	DF	
Wall Size	=	2x6	
# of Panel Sides	=	1	
S.G.	=	0.5	
S.G. Adjustment Factor	=	1.00	
L _{total}	=	96 in.	8'-0"
L _{min}	=	96 in.	8'-0"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	
² Fire Treated Lumber Condition?		=	No
⁴ Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size, ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

Height:		ft.	in.
H_{OTM} (in.)	=	10	0
H_{ASPECT} (in.)	=	10	0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

[illegible]

ΣL = 8.00 ft. Weighted Average: 1.00

Resisting Dead Load Data Table

[illegible]

Total M_D : 8.96 ft-kips

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft ²)	A_{t2} (ft ²)	% _{Trib}	Load (lbs)
Roof	889.4	1		100	889
Line Loads(lbs)					
					0
					0

Total $V_{(E)}$: 889 lbs

ASD Wind Loading Data Table

[illegible]

Total $V_{(w)}$: 986.9 lbs

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **No**

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	889.4	889.371467	111.2	260.7	6	8d	6 in. o.c.	3/8	W	0.4264	6
Wind:	986.9	-	123.4	365.0	6	8d	6 in. o.c.	3/8		0.3380	

ASD Tension Load Combinations:

 Seismic: $0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h = \mathbf{0.5 D - .7\rho Q_E}$ ASCE 2.4.5

 Wind: $0.6D + .7W = \mathbf{0.6 D - .6W}$ ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift $.7\rho E$ & $.6W$ (lbs)		Uplift $1.0\rho E$ & $1.0W$ (lbs)	
							HD	Strap	HD	Strap
Seismic:	-8.89	4.13	-4.76	90.8	94.5	output:	-629.4	-604.4	-1680.0	-1613.4
Wind:	-9.87	5.38	-4.49	90.8	94.5	output:	-594.2	-570.6	-2175.1	-2088.8

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0	Yes	-1094	-328.3		-1283.0	-1275.5	-2149.0	-2082.3
Wind:		0.0			0.0		-594.2	-570.6	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	STHD14	3815	0.3363	OUTPUT HOLDOWN SUMMARY:	CS14	2x6	STHD14	4x6
STRAP:	CS14	2490	0.5123				ALT: HTT4	

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference:	2021	SDPWS
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Level:	1
SW ID:	SW3
Grid Reference	North

Shear Wall Input Data:

Wood Species	=	DF	
Wall Size	=	2x6	
# of Panel Sides	=	1	
S.G.	=	0.5	
S.G. Adjustment Factor	=	1.00	
L _{total}	=	81 in.	6'-9"
L _{min}	=	81 in.	6'-9"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	
² Fire Treated Lumber Condition?		=	No
⁴ Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

Height:		ft.	in.
H _{OTM} (in.)	=	10	0
H _{ASPECT} (in.)	=	10	0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

[illegible]

$\Sigma L =$ **6.75 ft.** Weighted Average: **1.00**

Resisting Dead Load Data Table

[illegible]

Total M_D : 4.31 ft-kips

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft ²)	A_{t2} (ft ²)	% _{Trib}	Load (lbs)
Roof	889.4	1		100	889
Line Loads(lbs)					
					0
					0

Total $V_{(E)}$: 889 lbs

ASD Wind Loading Data Table

[illegible]

Total $V_{(w)}$: 986.9 lbs

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **No**

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	889.4	889.371467	131.8	260.7	6	8d	6 in. o.c.	3/8	W	0.5054	6
Wind:	986.9	-	146.2	365.0	6	8d	6 in. o.c.	3/8		0.4006	

ASD Tension Load Combinations:

 Seismic: $0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h = \mathbf{0.5 D - .7\rho Q_E}$ ASCE 2.4.5

 Wind: $0.6D + .7W = \mathbf{0.6 D - .6W}$ ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W (lbs)	
							HD	Strap	HD	Strap
Seismic:	-8.89	1.99	-6.91	75.8	79.5	output:	-1094.2	-1042.6	-2012.7	-1917.8
Wind:	-9.87	2.58	-7.29	75.8	79.5	output:	-1154.2	-1099.8	-2605.8	-2482.9

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0	Yes	-629	-188.8		-1283.0	-1231.4	-2282.4	-2187.5
Wind:		0.0		0.0			-1154.2	-1099.8	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	STHD14	3815	0.3363	OUTPUT HOLDOWN SUMMARY:	CS14	2x6	STHD14	4x6
STRAP:	CS14	2490	0.4945				ALT: HTT4	

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference: 2021 SDPWS

Level: 1
SW ID: SW4
Grid Reference: South

Shear Wall Input Data:

Wood Species = DF
 Wall Size = 2x6
 # of Panel Sides = 1

S.G. = 0.5
 S.G. Adjustment Factor = 1.00
 L_{total} = 96 in. 8'-0"
 L_{min} = 96 in. 8'-0"

General Data Inputs

Redundancy Factor ρ = 1
 Overstrength Factor Ω_o = 2.5
 Discontinuous Lateral System? (Beam Below Strap) = No
 Beam Depth =
²Fire Treated Lumber Condition? = No
⁴Reduction to Allowable Capacity = 1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size ¹	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	¹ Fire Treated Factor	¹ Table 4.3A Footnote ¹ 0d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

ft. in.
 H_{OTM} (in.) = 10 0
 H_{ASPECT} (in.) = 10 0

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Length ft in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
8 ft. 0 in.	100%	1.25 :1	1.00	OK

 ΣL = 8.00 ft. Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Roof	13.00	3	39.00	1.25
Wall	15.00	10	150.00	4.80
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 6.05 ft-kips

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft ²)	A_{t2} (ft ²)	% _{Trib}	Load (lbs)
Roof	889.4	1		100	889
Line Loads(lbs)					0
					0

Total $V_{(E)}$: 889 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	% _{Trib}	Load (lbs)
Roof	99	20	50	987

Total $V_{(W)}$: 986.9 lbs

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED
Shear Panel Design:

 Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **No**

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seismic:	889.4	889.371467	111.2	260.7	6	8d	6 in. o.c.	3/8	W	0.4264	6
Wind:	986.9	-	123.4	365.0	6	8d	6 in. o.c.	3/8		0.3380	

ASD Tension Load Combinations:

 Seismic: $0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h = \mathbf{0.5 D - .7\rho Q_E}$ ASCE 2.4.5

 Wind: $0.6D + .7W = \mathbf{0.6 D - .6W}$ ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift .7pE & .6W (lbs)		Uplift 1.0pE & 1.0W (lbs)	
							HD	Strap	HD	Strap
Seismic:	-8.89	2.79	-6.10	90.8	94.5	output:	-807.0	-775.0	-1680.0	-1613.4
Wind:	-9.87	3.63	-6.24	90.8	94.5	output:	-825.2	-792.5	-2175.1	-2088.8

 Apply Omega (Ω)? **No**

 Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A. ³ . (-) (lbs) ⁴		30% Ortho. Increase ¹ ?	Orthogonal (-) Uplift (lbs) ⁵		Point Load 1.0D _L (+) (lbs)	Total Net ASD Tension Uplift		1.0pE Tension Uplift	
	100%	30%		100%	30%		HD	STRAP	HD	STRAP
Seismic:		0.0		-629	-188.8		-995.8	-963.8	-1949.8	-1883.1
Wind:		0.0	Yes		0.0		-825.2	-792.5	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0pE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

 Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection		Post to Conc. Connection	
					Design Strap	Min. Design Post	Design HD	Min. Design Post
HD:	STHD14	3815	0.2610	OUTPUT HOLDOWN SUMMARY:	CS14	2x6	STHD14	4x6
STRAP:	CS14	2490	0.3871				ALT: HTT4	



STRUCTURAL
ENGINEERS

Sheet:	DIAPH 1
Date:	-
#:	-
Δ :	-

**SHEAR TRANSFER LOAD CHECK - DIAPHRAGM, HARDWARE, TOP PLATE, COLLECTORS & CHORDS AT SITE BUILT WOOD STUD WALL
FRAMED BUILDINGS - DF LUMBER**

HARDWARE LOADS	
ITEM	LBS
A34	515
A35	695
LTP4	670
LTP5	620
LS50	730
LS70	915
RBC	435
-	-

ALLOWABLE DIAPHRAGM LOADS		
TYPE	DIAPHRAGM	(PLF)
ROOF 1	UNBLOCKED - 15/32" SHEATHING W/ 8d AT 6" O.C. E.N.	180
ROOF 2	2x BLOCKED - 15/32" SHEATHING W/ 8d AT 4" O.C. E.N.	360
ROOF 3	-	-
ROOF 4	-	-
FLOOR 1	UNBLOCKED - 23/32" SHEATHING W/ 10d AT 6" O.C.	215
FLOOR 2	2x BLOCKED - 23/32" SHEATHING W/ 10d AT 6" O.C.	320
FLOOR 3	-	-
FLOOR 4	-	-

STRAP LOADS	
ITEM	LBS
CS16	1705
2-CS16	3410
CMSTC16	4585
CMST14	6490
CMST12	9215

ALLOWABLE TOP PLATE NAIL LOADS (Cd = 1.6)		
TYPE	NAIL SIZE	(LBS)
16d SHORT	16d SHORT - 0.131" x 3.25"	155
-	-	-

SHEAR WALL		W1	W2	W3	W4					
Fx (0.7E) SHEAR LOAD (LBS)		889.371	889	889	889					
DIAPHRAGM	Fpx (0.7E) SHEAR (LBS)	1156.18	1156.18	1156.18	1156.18					
	DIAPHRAGM TYPE	ROOF 1	ROOF 1	ROOF 1	ROOF 1					
	EDGE LENGTH (FT)	20	20	20	20					
	EDGE STRESS (PLF)	57.8091	57.8091	57.8091	57.8091					
	ALLOW STRESS (PLF)	180	180	180	180					
TOP PLATE CLIPS	WALL LENGTH (FT)	20	20	20	20					
	HARDWARE USED	RBC	RBC	RBC	RBC					
	MAX. SPACING (IN) O.C.	48	48	48	48					
CHORD	Perp. - Fpx (0.7E) SHEAR (PLF)	116	116	116	116					
	PARALLEL LENGTH (FT)	20	20	20	20					
	PERP. WIDTH (FT)	20	20	20	20					
	CHORD TENSION (LBS)	289.05	289.05	289.05	289.05					
	STRAP AT CHORD BREAK	CS16	CS16	CS16	CS16					



STRUCTURAL
ENGINEERS

Sheet:	DRAG (2)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (2)	Drag along West and East Wall
----------	-------------------------------

DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	1,156						
Start:	0.00						
Length:	20.00						
End:	20.00	0.00	0.00	0.00	0.00	0.00	0.00

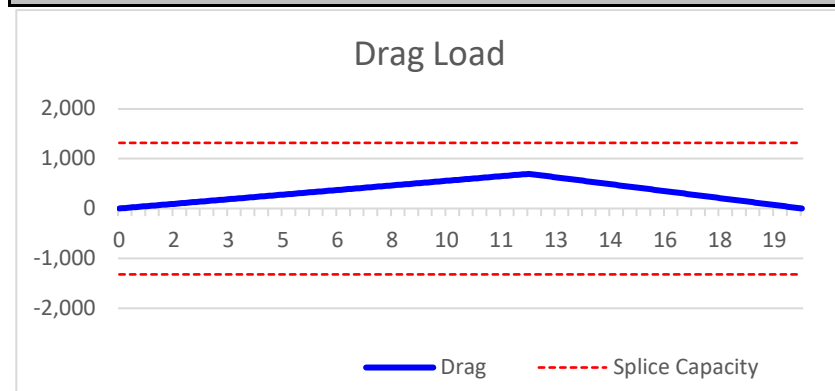
$V_{SEISMIC}$, plf:	57.81	0.00	0.00	0.00	0.00	0.00	0.00
----------------------	-------	------	------	------	------	------	------

SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	12.00						
Length:	8.00						
End:	20.00	0.00	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{SW}
End:	0.00	0.00	0.00	0.00	0.00	0.00	8.00

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	1,156.2	144.5

Design Summary



Total Line Length (ft):	20.00
Load Case:	Seismic
Seismic Drag Factor	1.00

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
693.7	12.0	Plate Splice OK
0.0	20.0	Plate Splice OK
0.0	0.0	
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215



STRUCTURAL
ENGINEERS

Sheet:	DRAG (4)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (4)	Drag along North Wall
----------	-----------------------

DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	1,156						
Start:	0.00						
Length:	20.00						
End:	20.00	0.00	0.00	0.00	0.00	0.00	0.00

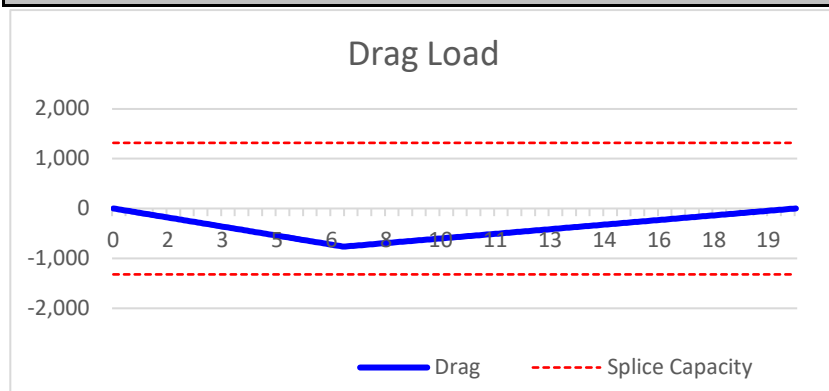
$V_{SEISMIC}$, plf:	57.81	0.00	0.00	0.00	0.00	0.00	0.00
----------------------	-------	------	------	------	------	------	------

SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	0.00						
Length:	6.75						
End:	6.75	0.00	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{SW}
End:	0.00	0.00	0.00	0.00	0.00	0.00	6.75

Shear Line Below	V_{total} (lbs.)	v_{total} (plf)
$V_{SEISMIC}$	1,156.2	171.3

Design Summary



Total Line Length (ft):	20.00
Load Case:	Seismic
Seismic Drag Factor	1.00

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
0.0	20.0	Plate Splice OK
-763.1	6.8	Plate Splice OK
0.0	0.0	
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215


STRUCTURAL
ENGINEERS

Sheet: Cont. & Spread Footing

Date: --

Project ID: --

Version: 2022 CBC / ASCE 7-16

Conventional Footing & Spread Footing Design - Bearing wall footings (Non-Retaining)
Design Values:

 Allowable Soil Bearing Pressure (psf) = **2,000**

 Soils Report by: **Inland Foundation Engineering, Inc.**

 Job Number: **S168-193**

 Date: **September 6, 2024**
Max. Conventional Footing Load:

Roof =	13	psf * (	20	/ 2 +	0	) ft	=	130.0 plf
2x6 Wall =	15	psf * (	10	/ 2 +	0	) ft	=	75.0 plf
		psf * (	9	+	0	) ft	=	0.0
		psf * (	0	/ 2 +	0	) ft	=	0.0
		psf * (	0	/ 2 +	0	) ft	=	0.0
		psf * (	0	/ 2 +	0	) ft	=	0.0
							w =	205.0 plf

 Required Footing Width = $205 / (2000 - 50) =$ **0.11** ft

 Use Footing: **12** Wide " x **18** " Deep w/ Steel Reinforcing Per Plans

Allowable Point Load at Footing: (Soil Governed)

Bearing Length at Point Load = 2 x (Depth + Slab Edge Thickness) + Post Width

 Slab Edge Thickness: **8** in (Depth of slab and subgrade)

 Post Width: **3.5** in

Footing Size (in)		Allowable Point Load, P (lbs)	Longitudinal Rebar Size	# Longitudinal Bar T & B
Width	Depth			
12	18	9,250	4	2

Spread Footing: (Soil Governed)


 $P = \text{Width}^2 / \text{S.B.P.}$

Spread Ftg Size (in)		Allowable Point Load, P (k)	Rebar Size	# Bar
Width (SQ)	Depth			
24	18	7.1	4	4
30	18	11.1	4	5
36	18	16.0	4	6
42	18	21.7	4	7
48	18	28.4	4	8

*0.0018 - Grade 60 rebar



SITE STRUCTURES - TRASH ENCLOSURE

 STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

SEISMIC DESIGN LOAD - EQUIVALENT LATERAL FORCE PROCEDURE

Structure: Trash Enclosure - Steel Ordinary Moment Frames

Building Seismic Design Criteria

(ASCE - Chapter 11)

Risk Category of Building or Structure:	II	Table 1.5-1
Short-Period Spectral Response Acceleration, S_s :	1.422	Per ASCE 7 Hazard Tool
Long-Period Spectral Response Acceleration, S_1 :	0.526	Per ASCE 7 Hazard Tool
Average Height of Building Roof, h_n :	9.50	ft
Site-specific ground motion analysis provided?	Yes	11.4.8
Analytical procedure (Limit per Table 12.6-1)	ELF	Equivalent Lateral Force 12.8
Structural irregularities per 12.3.2?	No	12.8.1.3 - Item 1
Exceed 5 story above base/grade including mezzanines?	No	12.8.1.3 - Item 2

Site Class

11.4.3 & 11.4.4

Soil Site Class: D Per Geotech Report

Site Coefficients & Spectral Response Acceleration Parameters

11.4.4

	Table 11.4-1 & 11.4-2	11.4.8 Exceptions	Site-specific analysis per Geotech Report	Calculation Warnings/Notes
Site Coefficient, F_a :	1.00	N/A	1.20	
Site Coefficient, F_v :	Site Specific	1.77	1.77	

$S_{MS} = F_a * S_s$:	1.48	Equation 11.4-1
$S_{M1} = F_v * S_1$:	1.05	Equation 11.4-2
$S_{DS} = 2/3 * S_{MS}$:	0.99	Equation 11.4-3
$S_{D1} = 2/3 * S_{M1}$:	0.70	Equation 11.4-4
$T_s = S_{D1} / S_{DS}$:	0.71	11.4.6
Seismic Design Category (SDC):	D	11.6 & Table 11.6-1 & 2

Seismic Equivalent Lateral Force Procedure

Section 12.8

Importance Factor, I_e :	1.00	Table 1.5-2
Response Modification Factor, R : Table 12.2-1	3.50	Steel Ordinary Moment Frames
Overstrength Amplification factor, Ω_o :	2.5	Table 12.2-1
Approximate Period Values: Table 12.8-2:	C_t : 0.02	All other systems
	x : 0.75	
Approximate Fundamental Period, $T_a = C_t (h_n)^x$:	0.11	s
Long Period Transition Period, T_L :	8	

Equation 12.8-7

Figure 22 (14-17)

 STRUCTURAL ENGINEERS	www.ISEngineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

Seismic Response Coefficient, C_s :

$$C_s = S_{DS} / (R / I_e):$$

0.282

Equation 12.8-2

Maximum C_s :

MAX

$$C_s = S_{D1} / T_a (R / I_e): \quad T \leq T_L$$

1.852

Equation 12.8-3

$$C_s = S_{D1} T_L / T_a^2 (R / I_e): \quad T > T_L$$

136.868

Equation 12.8-4

Minimum C_s :

MIN

$$C_s = 0.044 S_{DS} I_e: \quad \geq 0.01$$

0.043

Equation 12.8-5

$$C_s = 0.5 S_1 / (R / I_e): \quad \text{for } S_1 \geq 0.6$$

N/A

Equation 12.8-6

$$\text{Seismic Base Shear, } V = C_s W:$$

0.282

W

Equation 12.8-1

Building Structure - Horizontal Seismic Load Effect, E_h

$$\text{Redundancy Factor, } \rho:$$

1.30

Section 12.3.4.2

$$(\text{Strength Level}) \quad 1.0 E_h = \rho Q_e:$$

0.366

W

Equation 12.4-3

$$(\text{ASD Level}) \quad 0.7 E_h = \rho Q_e:$$

0.257

W

Equation 12.4-3

Diaphragm Design Forces per 12.10.1

$$F_{px} = 0.2 S_{DS} I_e w_{px} =$$

0.197

W (Min)

Section 12.10

Equation 12.10-2

$$F_{px} = 0.4 S_{DS} I_e w_{px} =$$

0.395

W (Max)

Equation 12.10-3

$$F_{px} = w_{px} * \Sigma F_i / \Sigma w_i$$

Equation 12.10-1


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ENGINEERS

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Sheet:	Seismic Base Shear - FLEXIBLE
Date:	--
Project ID:	--
Version:	2022 CBC / ASCE 7-16

SEISMIC BASE SHEAR ANALYSIS - FLEXIBLE DIAPHRAGM

STRUCTURE: Trash Enclosure - Steel Ordinary Moment Frames


Structural period Factor, k: 1.00

VERTICAL DISTRIBUTION OF SEISMIC FORCES																
Level	Height from Base (ft)	Weight Summary (k)	Floor Plan Area (ft²)	ΣWi (k)	Wi hi ^k	ΣWi hi ^k	C _{vx}	Level Forces - 1.0E Strength Level				Alternate ASD 0.7E		Diaphragm F _{px} (k) - 1.0E		
								Force (k)			Unit Force (psf)		Unit Force (psf)			
								F _x	ΣF _x	1.0 E _h = ρF _x	F _x	1.0 E _h = ρF _x	F _x	0.7 E _h = ρF _x	F _{px}	ΩF _{px}
		0.0		0.0	0	0	0.000	0.0	0.0	0.0				0.0	0.0	
		0.0		0.0	0	0	0.000	0.0	0.0	0.0				0.0	0.0	
1	9.50	1.7	217	1.7	16	16	1.000	0.5	0.5	0.6	2.24	2.92	1.57	2.04	0.5	1.2
Building Weight, W =		1.7	217	Base Shear, V = C _s *W = 0.63 k												

BUILDING WEIGHT & SEISMIC TRIBUTARY ANALYSIS																													
Building Mass Element	Type	Level	Unit weight (psf)	Area (sf)	Weight (k)	↔ Dir.		% Distribution to resistance gridlines										↕ Dir.		% Distribution to resistance gridlines									
						Gridlines										Check	Gridlines										Check		
						TE-1	TE-2										TE-A	TE-B											
Roof	R1	1	7.0	217	1.52	50%	50%									100%	50%	50%							100%				
NW Col (upper 1/2)	-	1	12.2	4	0.05	100%										100%	100%								100%				
SW Col (upper 1/2)	-	1	12.2	4	0.05	100%										100%		100%							100%				
NE Col (upper 1/2)	-	1	12.2	4	0.05		100%									100%	100%								100%				
SE Col (upper 1/2)	-	1	12.2	4	0.05		100%									100%	100%	100%							100%				
					0.00											0%									0%				
					0.00											0%									0%				
					0.00											0%									0%				
					0.00											0%									0%				
ΣWi=					1.7	0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0				

SEISMIC LOAD SUMMARY BY ELEMENT																							
Building Mass Element	Level	Height (ft)	Notes	\leftrightarrow Dir. % Distribution to resistance gridlines										\updownarrow Dir. % Distribution to resistance gridlines									
				Gridlines										Gridlines									
				TE-1	TE-2									TE-A	TE-B								
Roof	1	9.5		0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW Col (upper 1/2)	1	9.5		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	0.0	0.0	0.0	0.0	0.0
SW Col (upper 1/2)	1	9.5		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	0.0	0.0	0.0	0.0	0.0
NE Col (upper 1/2)	1	9.5		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	0.0	0.0	0.0	0.0	0.0
SE Col (upper 1/2)	1	9.5		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	0.0	0.0	0.0	0.0	0.0
Σ				0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SUMMARY OF SEISMIC LOADING BY GRIDLINE (KIPS - 1.0E STRENGTH LEVEL)																							
Level	1.0 E _h = pF _x	↔ Direction												↕ Direction									
		Gridlines										Check	Gridlines										Check
		TE-1	TE-2										TE-A	TE-B									
1	0.6	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%
Base	0.63	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%

 STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

SEISMIC DESIGN LOAD - EQUIVALENT LATERAL FORCE PROCEDURE

Structure: Trash Enclosure - Special Reinforced Masonry Shear Walls

Building Seismic Design Criteria

(ASCE - Chapter 11)

Risk Category of Building or Structure:	II	Table 1.5-1
Short-Period Spectral Response Acceleration, S_s :	1.422	Per ASCE 7 Hazard Tool
Long-Period Spectral Response Acceleration, S_1 :	0.526	Per ASCE 7 Hazard Tool
Average Height of Building Roof, h_n :	9.50	ft
Site-specific ground motion analysis provided?	Yes	11.4.8
Analytical procedure (Limit per Table 12.6-1)	ELF	Equivalent Lateral Force 12.8
Structural irregularities per 12.3.2?	No	12.8.1.3 - Item 1
Exceed 5 story above base/grade including mezzanines?	No	12.8.1.3 - Item 2

Site Class

11.4.3 & 11.4.4

Soil Site Class: D Per Geotech Report

Site Coefficients & Spectral Response Acceleration Parameters

11.4.4

	Table 11.4-1 & 11.4-2	11.4.8 Exceptions	Site-specific analysis per Geotech Report	Calculation Warnings/Notes
Site Coefficient, F_a :	1.00	N/A	1.20	
Site Coefficient, F_v :	Site Specific	1.77	1.77	

$S_{MS} = F_a * S_s$:	1.48	Equation 11.4-1
$S_{M1} = F_v * S_1$:	1.05	Equation 11.4-2
$S_{DS} = 2/3 * S_{MS}$:	0.99	Equation 11.4-3
$S_{D1} = 2/3 * S_{M1}$:	0.70	Equation 11.4-4
$T_s = S_{D1} / S_{DS}$:	0.71	11.4.6
Seismic Design Category (SDC):	D	11.6 & Table 11.6-1 & 2

Seismic Equivalent Lateral Force Procedure

Section 12.8

Importance Factor, I_e :	1.00	Table 1.5-2
Response Modification Factor, R : Table 12.2-1	5.00	Special Reinforced Masonry SW
Overstrength Amplification factor, Ω_o :	2.0	Table 12.2-1
Approximate Period Values: Table 12.8-2:	C_t : 0.02	All other systems
	x : 0.75	
Approximate Fundamental Period, $T_a = C_t (h_n)^x$:	0.11	s
Long Period Transition Period, T_L :	8	

Equation 12.8-7

Figure 22 (14-17)

 STRUCTURAL ENGINEERS	www.ISEngineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

Seismic Response Coefficient, C_s :

$$C_s = S_{DS} / (R / I_e):$$

0.197

Equation 12.8-2

Maximum C_s :

MAX

$$C_s = S_{D1} / T_a (R / I_e): \quad T \leq T_L$$

1.296

Equation 12.8-3

$$C_s = S_{D1} T_L / T_a^2 (R / I_e): \quad T > T_L$$

95.807

Equation 12.8-4

Minimum C_s :

MIN

$$C_s = 0.044 S_{DS} I_e: \quad \geq 0.01$$

0.043

Equation 12.8-5

$$C_s = 0.5 S_1 / (R / I_e): \quad \text{for } S_1 \geq 0.6$$

N/A

Equation 12.8-6

$$\text{Seismic Base Shear, } V = C_s W:$$

0.197

W

Equation 12.8-1

Building Structure - Horizontal Seismic Load Effect, E_h

$$\text{Redundancy Factor, } \rho:$$

1.30

Section 12.3.4.2

$$(\text{Strength Level}) \quad 1.0E_h = \rho Q_e:$$

0.257

W

Equation 12.4-3

$$(\text{ASD Level}) \quad 0.7E_h = \rho Q_e:$$

0.180

W

Equation 12.4-3

Diaphragm Design Forces per 12.10.1

$$F_{px} = 0.2S_{DS}I_e w_{px} =$$

0.197

W (Min)

Section 12.10

Equation 12.10-2

$$F_{px} = 0.4S_{DS}I_e w_{px} =$$

0.395

W (Max)

Equation 12.10-3

$$F_{px} = w_{px} * \Sigma F_i / \Sigma w_i$$

Equation 12.10-1



STRUCTURAL
ENGINEERS

27369 Via Industria
Temecula, CA 92590
(951) 600-0032, (951) 600-0036 Fax

Sheet: Wind on Wall
Job #: 24-8400.32
Date: 11/26/2024
Δ : -
Designer: VG

SOLID FREE STANDING WALLS AND SIGNS (ASCE 7-16 SECTION 29.3)

Trash Enclosure - Special Reinforced Masonry Shear Walls

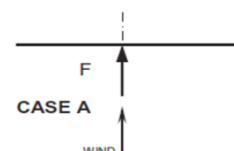
	II	Risk / Occupancy Category	Table 1.5-1
	C	Exposure Category	Figure 26.5
h	= 6.667	ft. Height above ground surface	
s	= 6.667	ft. Vertical dimension of wall or sign	
B	= 13.67	ft. Horizontal dimension of wall or sign	
L_r	= 10	ft. Horizontal dimension of return corner	Figure 29.3-1
s/h	= 1	Clearance ratio	Figure 29.3-1
B/s	= 2.05	Aspect ratio	Figure 29.3-1
L_r/s	= 1.5	Return corner aspect ratio	Figure 29.3-1
A_s	= 91.14	ft ² Gross area of solid free standing wall or sign	Figure 29.3-1
V	= 110	mph Basic wind speed	Figure 26.5-1A
K_z	= 0.85	velocity exposure coefficient	Table 29.3-1
K_{zt}	= 1	$= (1 + K_1 K_2 K_3)_2$ directionality Factor	(26.8-1)
K_d	= 0.85		Table 26.6-1
G	= 0.85	gust-effect factor	
h'	= 3.67	ft. Resultant location of load above ground surface	
q_h	= 22.38	psf pressure at height h $q_h = .00256 K_z K_{zt} K_d V^2$	

LOAD CASES

CASE A RESULTANT FORCE THROUGH THE GEOMETRIC CENTER

Figure 29.4-1

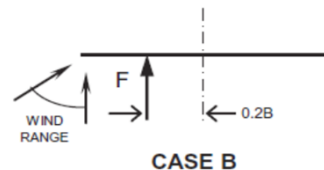
s/h	= 1	Clearance ratio	
C_f	= 1.4	net force coefficient (pg. 323)	
q_h	= 22.38	psf velocity pressure at height, h	
P	= 26.6	psf $= q_h G C_f$ pressure at height h	



CASE B RESULTANT FORCE at .2B FROM GEOMETRIC CENTER

Figure 29.4-1

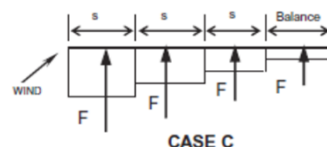
s/h	= 1	Clearance ratio	
C_f	= 1.4	net force coefficient	
q_h	= 22.38	psf velocity pressure at height, h	
P	= 26.6	psf pressure at height h	



CASE C RESULTANT FORCE AT GEOMETRIC CENTER OF REGIONS ALONG WALL OR SIGN

Figure 29.4-1

s/h	= 1	Clearance ratio	
RF_1	= 0.68	Reduction Factor for Case C for $C_f > 3.0$	
RF_2	= 0.80	Reduction Factor for Case C	
Reduction Factor where $s/h > .8 = 0.80$ Reduction Factor Applied			



C_f coefficients shall be multiplied by the following reduction factor when a return corner is present

L_r/s	Reduction Factor
0.3	0.9
1	0.75
≥ 2	0.6

$$B/s = 2.05$$

Case C must be considered

FOR B/s > 2 CASE C MUST BE CONSIDERED

Aspect Ratio B/s ≤ 10 (2.051)							Aspect Ratio B/s > 10 (2.051)						
Region	Dist	A _i	C _F	P _i (psf)	F (lbs)	M (kip-ft)	Region	Dist	A _i	C _F	P _i (psf)	F (lbs)	M (kip-ft)
0 to s	6.667	44.45	2.25	34.24	1522	5.58	0 to s	6.667	44.45		0.0	0	0
s to 2s	13.33	44.45	1.5	22.83	1015	3.72	s to 2s	13.33	44.45		0.0	0	0
2s to 3s	20	44.45		0.00	0	0.00	2s to 3s		44.45		0.0	0	0
3s to 10s	26.67	44.45		0.00	0	0.00	3s to 4s		44.45		0.0	0	0
max =	34.2	psf		Σ	2537	9.30	4s to 5s		44.45		0.0	0	0
							5s to 6s		44.45		0.0	0	0
							>10s	13.67	44.45		0.0	0	0
							max =	0.0	psf		Σ	0	0

DESIGN SUMMARY RESULTS

Design Summary:

	Strength	ASD
Max horizontal wind pressure =	34.2 psf	20.5 psf
Max horizontal force at centroid =	2.4 kips	1.5 kps
Max overturning moment =	8.9 p-ft	5.3 p-ft
Max torsion at centroid =	-6.6 kip-ft	-4.0 p-ft

Masonry Shear Wall

Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

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DESCRIPTION: Trash Enclosure - CMU Shear Wall

Code References

Calculations per TMS 402-16, IBC 2018, CBC 2019
Load Combinations Used : ASCE 7-22 / IBC 2024

General Information

Wall Material	MASONRY	f'm	1.50 ksi	Block Class	
Total Wall Height	6.0 ft	Fy - Rebar	60.0 ksi	Concrete Density	150.0 pcf
Base Wall Length	10.0 ft	Fy - HJR	70.0 ksi	Min. Bending As %	0.00180
R: Resp. Mod Factor		Em	3,120.0 ksi		
Ie: Seismic Import. Factor	1.0	Phi - Shear	0.80	Phi : Axial & Flexure	0.90

Wall Data

Bottom

Analysis Height	0.00 ft
Wall Offset	(datum) ft
Wall Length	10.0 ft
Effective Length 'd'	112.0 in
Nominal Block Thickness	8 in
Solid Grout?	Solid Grouted

Reinforcing in Field of Wall

Vertical Bar Size #	4
Vertical Bar Spacing	24 in
Horiz. joint reinf. area (HJR)	0.55 in
HJR Spacing	24 in
Bond beam reinf. area	0.4 in
Spacing of bond beams	24 in

In each chord cell:

Vertical rebar size #	4
# Chord Cells @ Each End	2

Masonry Shear Wall

Project File: 8400.67 - Trash Enclosure.ec6

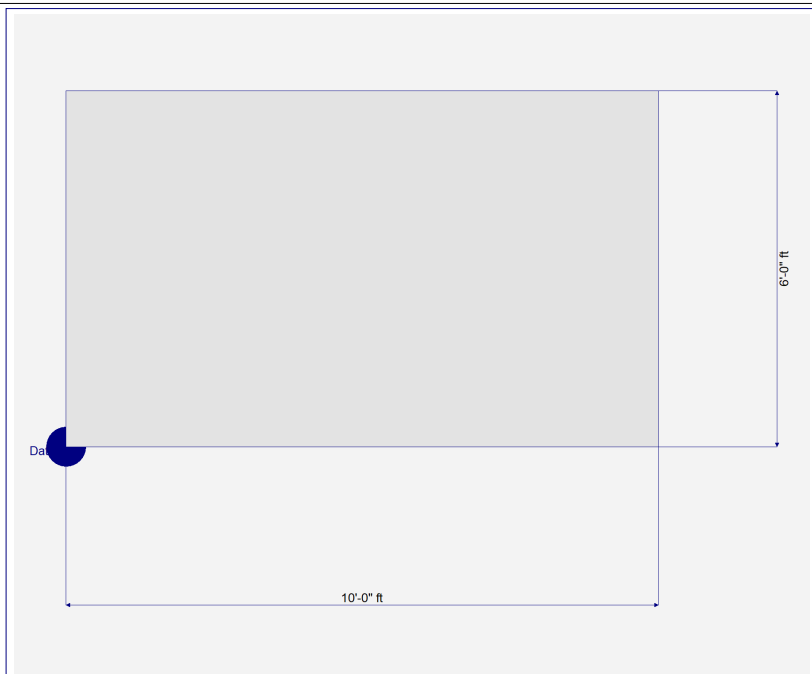
LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

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DESCRIPTION: Trash Enclosure - CMU Shear Wall

Wall Sketch



SHEAR ANALYSIS

Bottom Level

Special Boundary Elements Req'd?	Not Req'd k
Vu : Story Shear	3.498
for Load Combination	+1.20D+W
Anv	915.0 in^2
Controlling Mu/(Vud)	0.30
Vn Masonry	124.952 k
Vn Steel	75.0 k
Vn Masonry + Vn Steel	199.952 k
Vn Max	207.902 k
Phi Vn	159.962 k
Ratio: Vu/PhiVn (controlling)	0.02187
Vertical As >= Av/3	OK
Vertical Bar Spacing <= 96"	OK

AXIAL ANALYSIS

Bottom Level

H / d Ratio	0.64
Pu	7.224 k
for Load Combination	+1.40D
Phi Pn	+1.40D k
Ratio: Pu/PhiPn (controlling)	0.006979

Masonry Shear Wall

Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

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DESCRIPTION: Trash Enclosure - CMU Shear Wall

BENDING ANALYSIS

Bottom Level

"a" : Flexural compression	2.62 in
Length of defined chord zone is >= the "a" dimension of the masonry (the compression zone)	OK
"d" : Eff depth to tension reinforcement	112.0
Pu	5.160 k
for Load Combination	+D+0.75L+0.525E
As-Flex	0.400 in^2
As-max	6.010 in^2
As-flex < As-max ?	OK
Mu	10.494 k
for Load Combination	+1.20D+W
Phi Mn	199.239 k
Ratio: Mu/PhiMn (controlling)	0.05267

Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Masonry Shear Wall

Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16

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DESCRIPTION: Trash Enclosure - CMU Shear Wall

Force Summary

Load Combination Wall Level	Values for Wall section			Resultant Ecc (ft)	Overturning Ratio	Uplift (k)	
	Vu (k)	Mu (k)	Pu (k)			Left	Right
+1.40D Wall Level : 1			7.224				
+1.20D Wall Level : 1			6.192				
+1.20D+0.50W Wall Level : 1	1.749	5.247	6.192	0.847	5.901		
+1.20D+W Wall Level : 1	3.498	10.494	6.192	1.695	2.950		
+0.90D+W Wall Level : 1	3.498	10.494	4.644	2.260	2.213		
+1.398D+1.30E Wall Level : 1	3.046	3.705	7.214	0.514	9.735		
+0.7020D+1.30E Wall Level : 1	3.046	3.705	3.622	1.023	4.888		

Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Cantilevered Retaining Wall

Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Trash Enclosure - Free Standing CMU Wall, Out of Plane Seismic Check

Code Reference

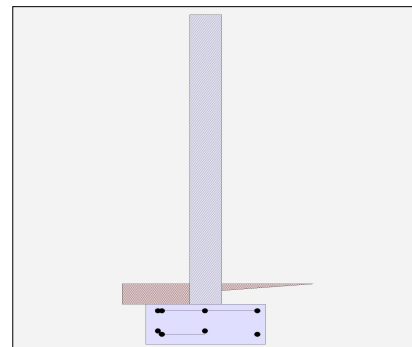
Calculations per IBC 2018, ACI 318-14, TMS 402-16

Criteria

Retained Height	=	0.50 ft
Wall height above soil	=	6.67 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	2,000.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	43.0 psf/ft
	=	
Passive Pressure	=	200.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	6.0 in

Stem Weight Seismic Load

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)

Wind on Exposed Stem = 0.0 psf
(Strength Level)

F_p / W_p Weight Multiplier = 0.395 g

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type	=	Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Added seismic base force 166.5 lbs

Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Cantilevered Retaining Wall

Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

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DESCRIPTION: Trash Enclosure - Free Standing CMU Wall, Out of Plane Seismic Check

Design Summary

Wall Stability Ratios

Overtuning	=	1.71	OK
Sliding	=	2.59	OK
Global Stability	=	2.92	

Total Bearing Load	=	1,097	lbs
...resultant ecc.	=	8.77	in

Eccentricity outside middle third

Soil Pressure @ Toe	=	1,384	psf	OK
Soil Pressure @ Heel	=	0	psf	OK
Allowable	=	2,000	psf	

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	1,938	psf	
ACI Factored @ Heel	=	0	psf	
Footing Shear @ Toe	=	9.9	psi	OK
Footing Shear @ Heel	=	2.0	psi	OK
Allowable	=	75.0	psi	

Sliding Calcs

Lateral Sliding Force	=	214.9	lbs
-----------------------	---	-------	-----

Vertical component of active lateral soil pressure
 IS NOT considered in the calculation of soil
 bearing pressures.

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

Design Height Above Ftg

ft =	0.00
Wall Material Above "Ht"	= Masonry
Design Method	= ASD
Thickness	= 8.00
Rebar Size	= # 4
Rebar Spacing	= 16.00
Rebar Placed at	= Center

Design Data

fb/FB + fa/Fa	=	0.699
---------------	---	-------

Total Force @ Section

Service Level	lbs =	171.9
Strength Level	lbs =	

Moment....Actual

Service Level	ft-# =	597.9
Strength Level	ft-# =	

Moment.....Allowable	=	854.2
----------------------	---	-------

Shear.....Actual

Service Level	psi =	1.9
Strength Level	psi =	

Shear.....Allowable	psi =	45.5
---------------------	-------	------

Anet (Masonry)	in2 =	91.50
----------------	-------	-------

Wall Weight	psf =	84.0
-------------	-------	------

Rebar Depth 'd'	in =	3.81
-----------------	------	------

Masonry Data

f'm	psi =	1,500
Fs	psi =	20,000
Solid Grouting	=	Yes
Modular Ratio 'n'	=	21.48
Equiv. Solid Thick.	in =	7.63
Masonry Block Type	=	Normal Weight
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	
Fy	psi =	

Summary of Sliding Forces

	FS = 1.0	FS = 1.5
Lateral Force @ Base of Footing	214.91 lbs	322.36 lbs
less 100% Passive Force	- 125.0 lbs	- 125.0 lbs
less 100% Friction Force	- 431.25 lbs	- 431.25 lbs
Added Resisting Force Required	0.0 lbs	
Added Resisting Force Required for 1.5 Factor of Safety		0.00 lbs

Sliding Factor of Safety = 2.588: 1.00

Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Cantilevered Retaining Wall

Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

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DESCRIPTION: Trash Enclosure - Free Standing CMU Wall, Out of Plane Seismic Check

Footing Data

Toe Width	=	0.92 ft
Heel Width	=	1.58
Total Footing Width	=	2.50
Footing Thickness	=	12.00 in

f'c = 2,500 psi Fy = 60,000 psi
 Footing Concrete Density = 150.00 pcf
 Min. As % = 0.0018
 Cover @ Top 2.00 @ Btm = 3.00 in

Footing Design Results

		<u>Toe</u>	<u>Heel</u>	
Factored Pressure	=	1,938	0	psf
Mu' : Upward	=	654	0	ft-#
Mu' : Downward	=	141	141	ft-#
Mu: Design	=	513	141	ft-#
ϕ Mn	=	9,777	10,944	ft-#
Actual 1-Way Shear	=	9.88	1.98	psi
Allow 1-Way Shear	=	75.00	75.00	psi
Toe Reinforcing	=	# 5 @ 14.35 in		
Heel Reinforcing	=	# 5 @ 14.35 in		
Key Reinforcing	=	None Spec'd		
Footing Torsion, Tu	=	0.00 ft-lbs		
Footing Allow. Torsion, ϕ Tn	=	0.00 ft-lbs		

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 9.25 in, #5@ 14.35 in, #6@ 18 in, #7@ 18 in, #8@ 18 in, #9@ 18 in, #10@ 18 in

Heel: #4@ 9.25 in, #5@ 14.35 in, #6@ 18 in, #7@ 18 in, #8@ 18 in, #9@ 18 in, #10@ 18 in

Key: No key defined

Min footing T&S reinf Area 0.65 in²
 Min footing T&S reinf Area per foot 0.26 in²/ft

If one layer of horizontal bars:

#4@ 9.26 in
 #5@ 14.35 in
 #6@ 20.37 in

If two layers of horizontal bars:

#4@ 18.52 in
 #5@ 28.70 in
 #6@ 40.74 in

Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Cantilevered Retaining Wall

Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Trash Enclosure - Free Standing CMU Wall, Out of Plane Seismic Check

Summary of Overturning & Resisting Forces & Moments

.....OVERTURNING.....				.....RESISTING.....			
Item	Force lbs	Distance ft	Moment ft-#		Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	48.4	0.50	24.2	Soil Over HL (ab. water tbl)	50.4	2.04	102.9
HL Act Pres (be water tbl)				Soil Over HL (bel. water tbl)		2.04	102.9
Hydrostatic Force				Water Table			
Buoyant Force =				Sloped Soil Over Heel =			
Surcharge over Heel =				Surcharge Over Heel =			
Surcharge Over Toe =				Adjacent Footing Load =			
Adjacent Footing Load =				Axial Dead Load on Stem =			
Added Lateral Load =				* Axial Live Load on Stem =			
Load @ Stem Above Soil =				Soil Over Toe =	50.4	0.46	23.1
				Surcharge Over Toe =			
Seismic Stem Self Wt	166.5	4.59	763.5	Stem Weight(s)	602.3	1.25	752.9
				Earth @ Stem Transitions =			
Total	= 214.9	O.T.M.	= 787.7	Footing Weight	375.0	1.25	468.8
				Key Weight			
				Vert. Component			
Resisting/Overturning Ratio		=	1.71	Total	1,078.1 lbs	R.M.	1,347.6
Vertical Loads used for Soil Pressure =		1,096.7	lbs				

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus 200.0 pci

Horizontal Defl @ Top of Wall (approximate only) 0.138 in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Cantilevered Retaining Wall

Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Trash Enclosure - Free Standing CMU Wall, Out of Plane Seismic Check

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom

Stem Design Height: 0.00 ft above top of footing

Calculated Rebar Stress, fs = 13999.58 psi

Lap Splice length for #4 bar specified in this stem design segment (25.4.2.3a) =

20.00 in

Development length for #4 bar specified in this stem design segment =

14.00 in

Hooked embedment length into footing for #4 bar specified in this stem design segment =

6.00 in

As Provided =

0.1500 in²/ft

As Required =

0.1055 in²/ft

Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Cantilevered Retaining Wall

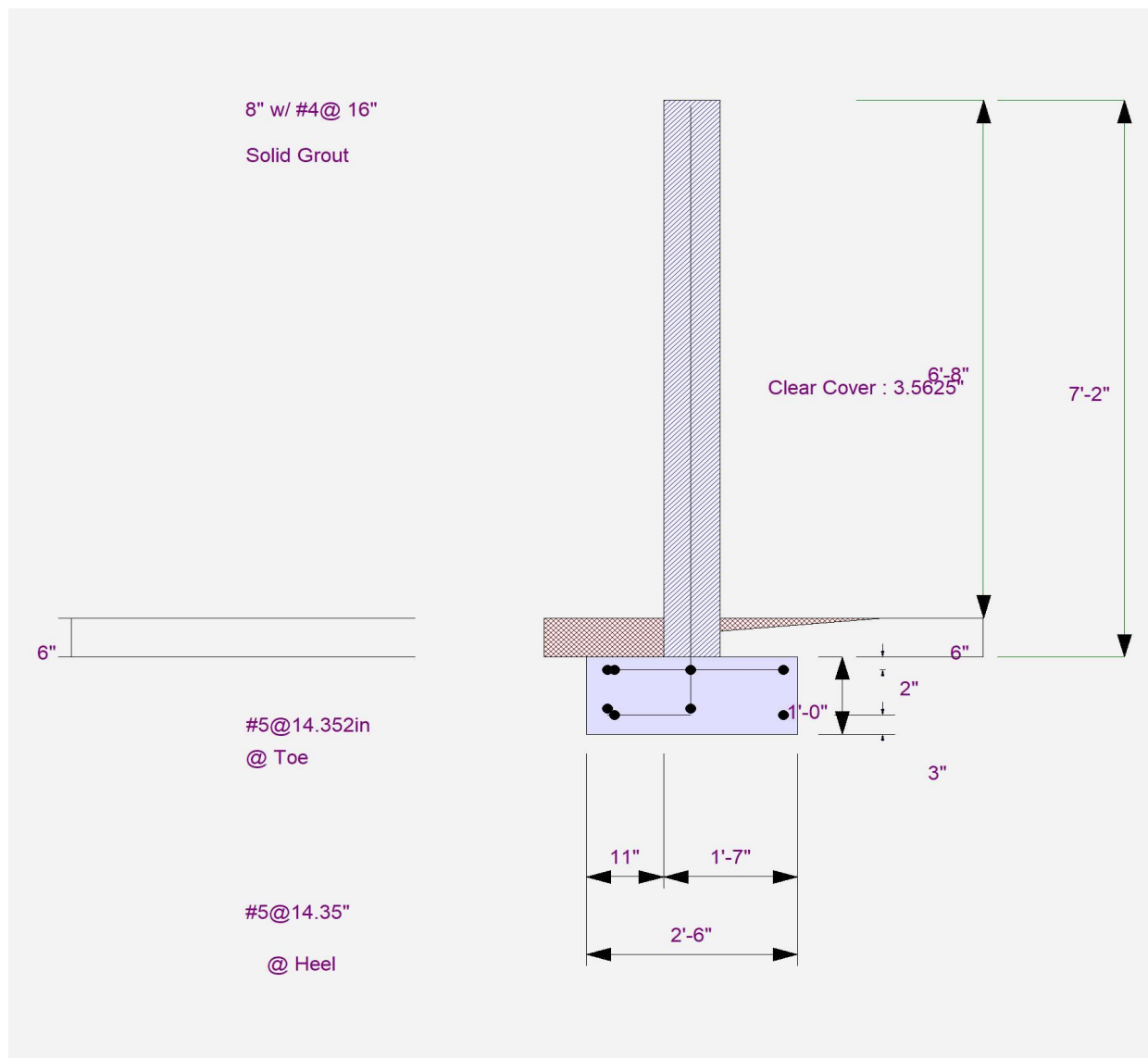
Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

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DESCRIPTION: Trash Enclosure - Free Standing CMU Wall, Out of Plane Seismic Check



Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
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Cantilevered Retaining Wall

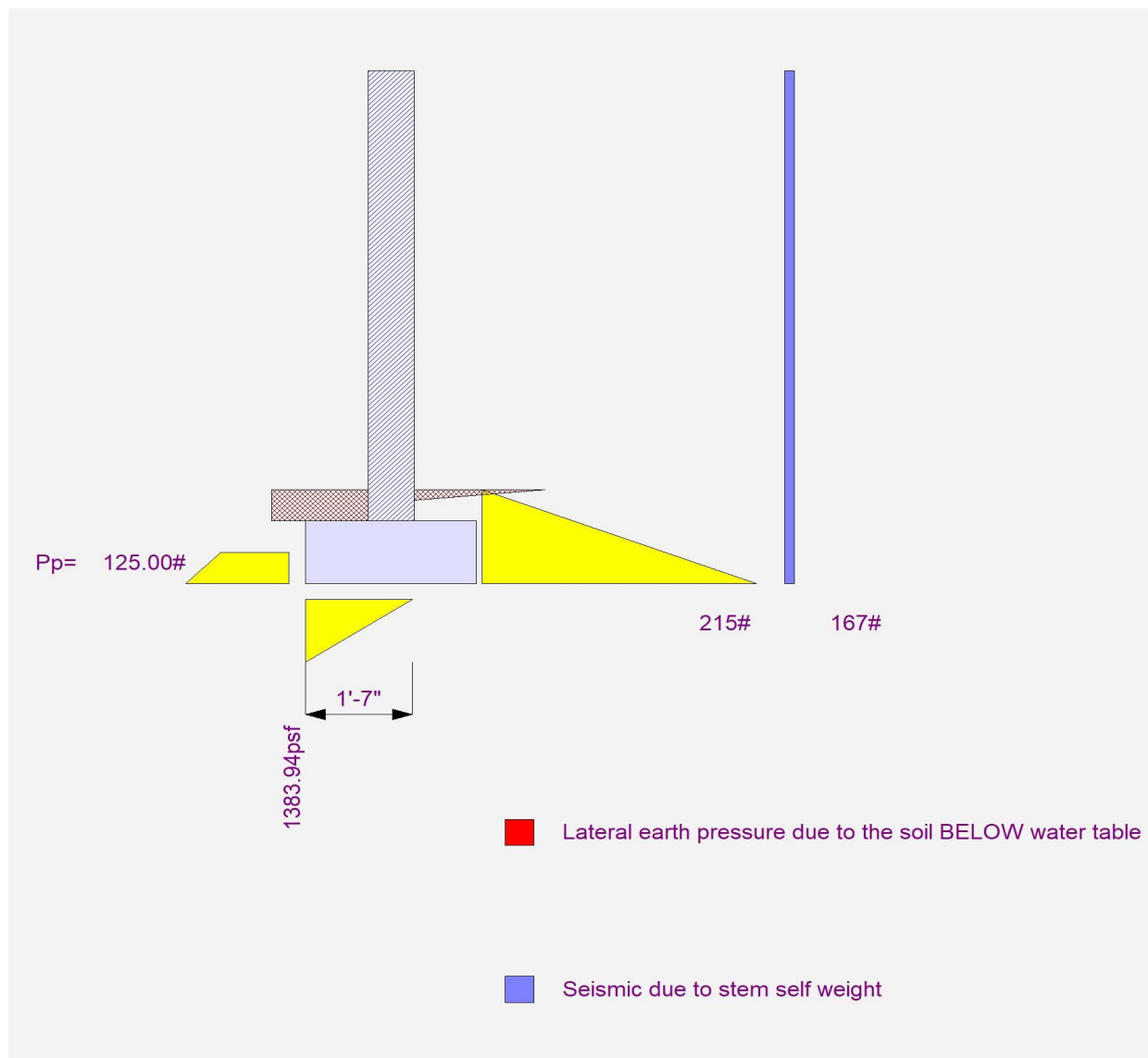
Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Trash Enclosure - Free Standing CMU Wall, Out of Plane Seismic Check



Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Cantilevered Retaining Wall

Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Typical, Free Standing CMU Wall, Wind Check - Trash Enclosure - Foundation Plan

Code Reference

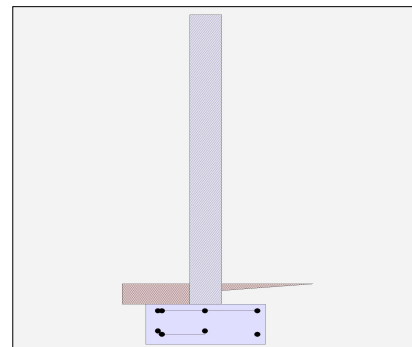
Calculations per IBC 2018, ACI 318-14, TMS 402-16

Criteria

Retained Height	=	0.50 ft
Wall height above soil	=	6.67 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	2,000.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	43.0 psf/ft
	=	
Passive Pressure	=	200.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem	=	34.2 psf (Strength Level)

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type	=	Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Cantilevered Retaining Wall

Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Typical, Free Standing CMU Wall, Wind Check - Trash Enclosure - Foundation Plan

Design Summary

Wall Stability Ratios

Overtuning	=	1.96	OK
Sliding	=	3.00	OK
Global Stability	=	2.92	
Total Bearing Load	=	1,097 lbs	
...resultant ecc.	=	7.63 in	
Eccentricity outside middle third			
Soil Pressure @ Toe	=	1,171 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	2,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,639 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	8.7 psi	OK
Footing Shear @ Heel	=	1.7 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	185.2 lbs
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Vertical component of active lateral soil pressure
 IS NOT considered in the calculation of soil
 bearing pressures.

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

Design Height Above Ftg

ft =	0.00
Wall Material Above "Ht"	= Masonry
Design Method	= ASD
Thickness	= 8.00
Rebar Size	= # 4
Rebar Spacing	= 16.00
Rebar Placed at	= Center

Design Data

fb/FB + fa/Fa	=	0.615
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Total Force @ Section

Service Level	lbs =	142.2
Strength Level	lbs =	

Moment....Actual

Service Level	ft-# =	525.8
Strength Level	ft-# =	

Moment.....Allowable	=	854.2
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Shear.....Actual

Service Level	psi =	1.6
Strength Level	psi =	

Shear.....Allowable	psi =	45.5
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Anet (Masonry)	in2 =	91.50
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Wall Weight	psf =	84.0
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Rebar Depth 'd'	in =	3.81
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Masonry Data

f'm	psi =	1,500
Fs	psi =	20,000
Solid Grouting	=	Yes
Modular Ratio 'n'	=	21.48
Equiv. Solid Thick.	in =	7.63
Masonry Block Type	=	Normal Weight
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	
Fy	psi =	

Summary of Sliding Forces

	FS = 1.0	FS = 1.5
Lateral Force @ Base of Footing	185.24 lbs	277.87 lbs
less 100% Passive Force	- 125.0 lbs	- 125.0 lbs
less 100% Friction Force	- 431.25 lbs	- 431.25 lbs
Added Resisting Force Required	0.0 lbs	
Added Resisting Force Required for 1.5 Factor of Safety		0.00 lbs

Sliding Factor of Safety = 3.003: 1.00

Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Cantilevered Retaining Wall

Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Typical, Free Standing CMU Wall, Wind Check - Trash Enclosure - Foundation Plan

Footing Data

Toe Width	=	0.92 ft
Heel Width	=	1.58
Total Footing Width	=	2.50
Footing Thickness	=	12.00 in

f'c = 2,500 psi Fy = 60,000 psi
 Footing Concrete Density = 150.00 pcf
 Min. As % = 0.0018
 Cover @ Top 2.00 @ Btm = 3.00 in

Footing Design Results

		<u>Toe</u>	<u>Heel</u>	
Factored Pressure	=	1,639	0	psf
Mu' : Upward	=	575	3	ft-#
Mu' : Downward	=	141	141	ft-#
Mu: Design	=	434	138	ft-#
ϕ Mn	=	11,610	13,005	ft-#
Actual 1-Way Shear	=	8.66	1.72	psi
Allow 1-Way Shear	=	75.00	75.00	psi
Toe Reinforcing	=	# 5 @ 12.00 in		
Heel Reinforcing	=	# 5 @ 12.00 in		
Key Reinforcing	=	None Spec'd		
Footing Torsion, Tu	=	0.00 ft-lbs		
Footing Allow. Torsion, ϕ Tn	=	0.00 ft-lbs		

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 9.25 in, #5@ 14.35 in, #6@ 18 in, #7@ 18 in, #8@ 18 in, #9@ 18 in, #10@ 18 in

Heel: #4@ 9.25 in, #5@ 14.35 in, #6@ 18 in, #7@ 18 in, #8@ 18 in, #9@ 18 in, #10@ 18 in

Key: No key defined

Min footing T&S reinf Area 0.65 in²
 Min footing T&S reinf Area per foot 0.26 in²/ft

If one layer of horizontal bars:

#4@ 9.26 in
 #5@ 14.35 in
 #6@ 20.37 in

If two layers of horizontal bars:

#4@ 18.52 in
 #5@ 28.70 in
 #6@ 40.74 in

Cantilevered Retaining Wall

Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Typical, Free Standing CMU Wall, Wind Check - Trash Enclosure - Foundation Plan

Summary of Overturning & Resisting Forces & Moments

.....OVERTURNING.....				.....RESISTING.....			
Item	Force lbs	Distance ft	Moment ft-#		Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	48.4	0.50	24.2	Soil Over HL (ab. water tbl)	50.4	2.04	102.9
HL Act Pres (be water tbl)				Soil Over HL (bel. water tbl)		2.04	102.9
Hydrostatic Force				Water Table			
Buoyant Force =				Sloped Soil Over Heel =			
Surcharge over Heel =				Surcharge Over Heel =			
Surcharge Over Toe =				Adjacent Footing Load =			
Adjacent Footing Load =				Axial Dead Load on Stem =			
Added Lateral Load =				* Axial Live Load on Stem =			
Load @ Stem Above Soil =	136.9	4.84	661.8	Soil Over Toe =	50.4	0.46	23.1
=				Surcharge Over Toe =			
				Stem Weight(s) =	602.3	1.25	752.9
				Earth @ Stem Transitions =			
				Footing Weight =	375.0	1.25	468.8
				Key Weight =			
				Vert. Component =			
Total	= 185.2	O.T.M. =	685.9	Total =	1,078.1 lbs	R.M. =	1,347.6
Resisting/Overturning Ratio		= 1.96		* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.			
Vertical Loads used for Soil Pressure =		1,096.7	lbs				

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	200.0	pci
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Horizontal Defl @ Top of Wall (approximate only)	0.117 in
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The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Cantilevered Retaining Wall

Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Typical, Free Standing CMU Wall, Wind Check - Trash Enclosure - Foundation Plan

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom

Stem Design Height: 0.00 ft above top of footing

Calculated Rebar Stress, fs = 12310.91 psi

Lap Splice length for #4 bar specified in this stem design segment (25.4.2.3a) = 20.00 in

Development length for #4 bar specified in this stem design segment = 12.31 in

Hooked embedment length into footing for #4 bar specified in this stem design segment = 6.00 in

As Provided = 0.1500 in²/ft

As Required = 0.0927 in²/ft

Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Cantilevered Retaining Wall

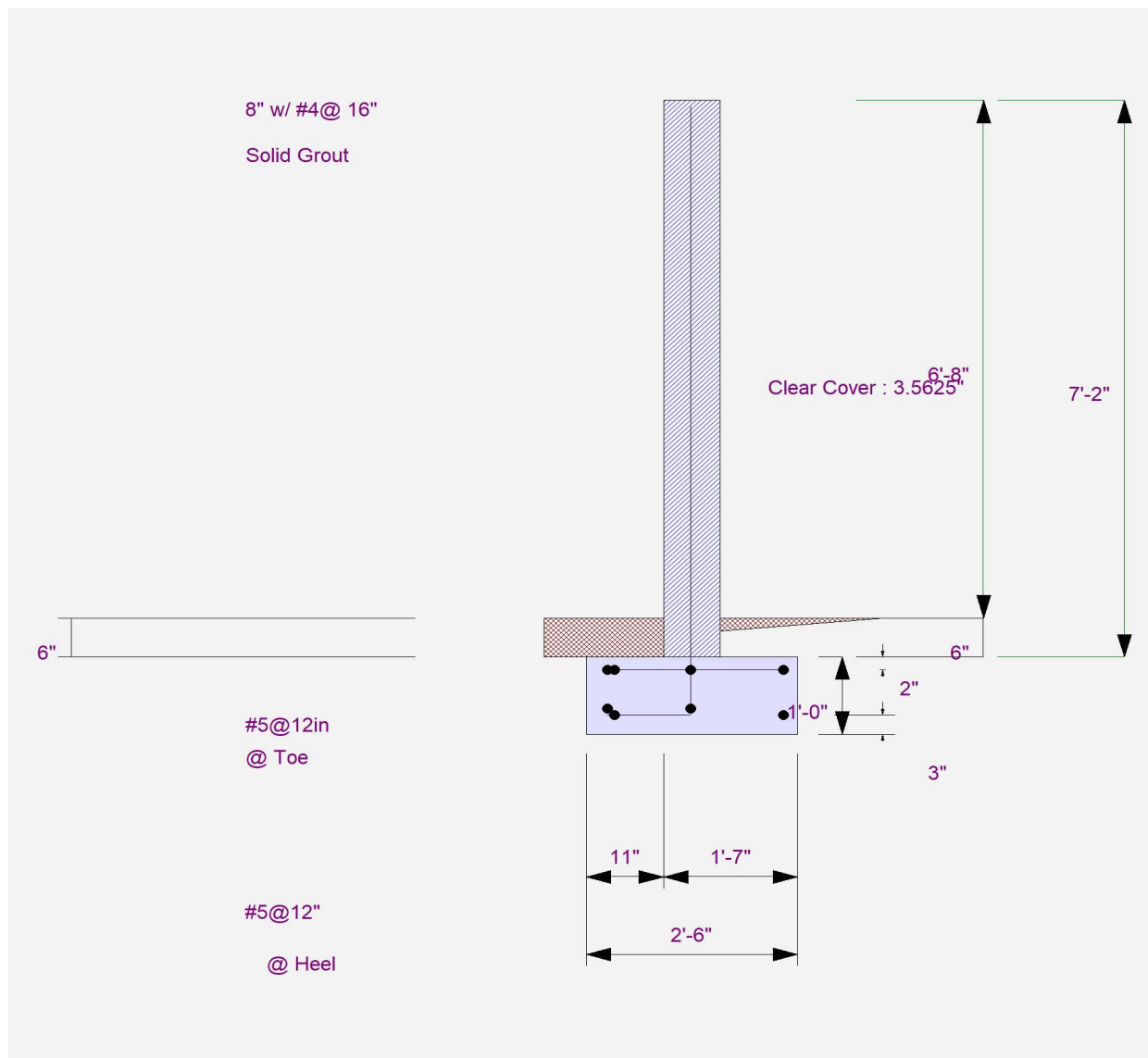
Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Typical, Free Standing CMU Wall, Wind Check - Trash Enclosure - Foundation Plan

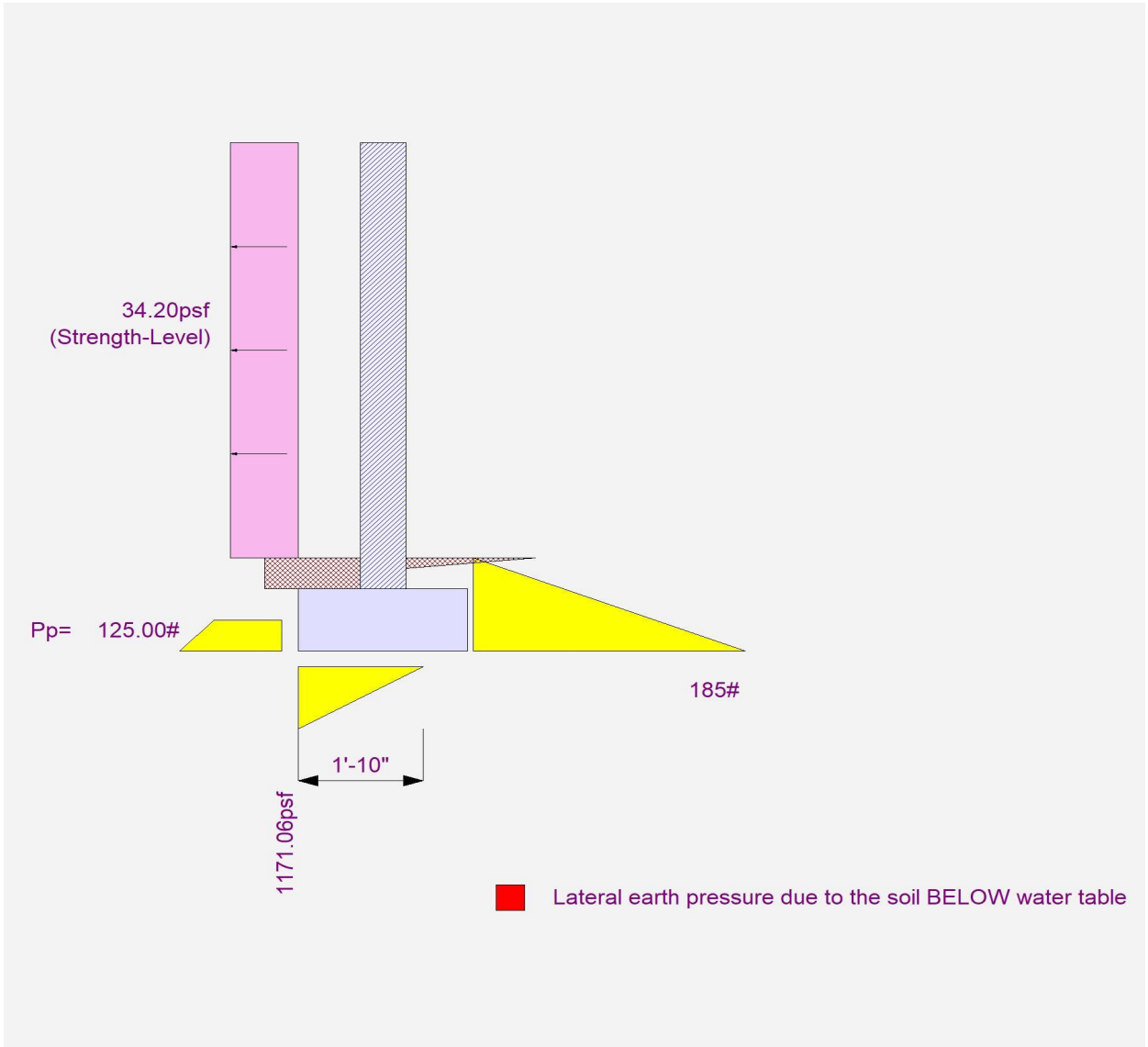


Cantilevered Retaining Wall

Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16
Innovative Structural Engineering, Inc. (IS
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DESCRIPTION: Typical, Free Standing CMU Wall, Wind Check - Trash Enclosure - Foundation Plan



Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Beam on Elastic Foundation

Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Trash Enclosure - CMU Wall Footing Check, In-Plane

CODE REFERENCES

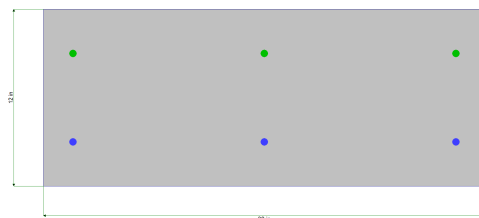
Calculations per ACI 318-14, IBC 2018, CBC 2019

Load Combinations Used : IBC 2018

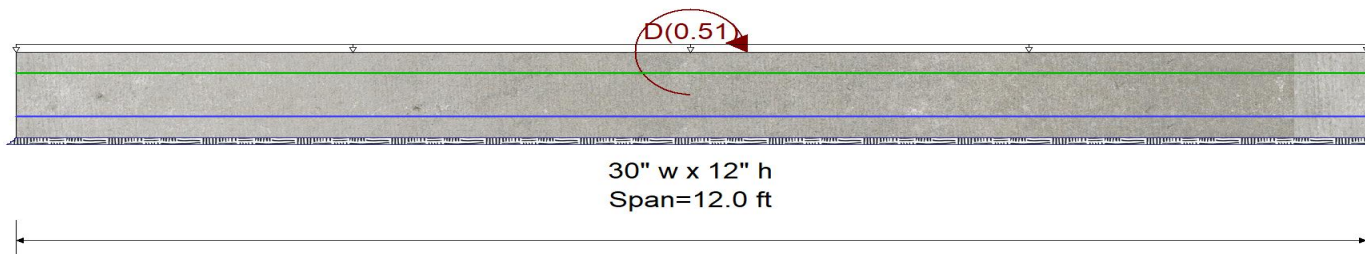
Material Properties

f'_c = 3.0 ksi ϕ Phi Values Flexure : 0.90
 $f_r = f'_c^{1/2} \cdot 7.50$ = 410.792 psi Shear : 0.750
 ψ Density = 145.0 pcf β_1 = 0.850
 λ Lt Wt Factor = 1.0
 Elastic Modulus = 2,850.0 ksi
 Soil Subgrade Modulus = 200.0 psi / (inch deflection)
 Load Combination IBC 2018

f_y - Main Rebar = 60.0 ksi F_y - Stirrups = 40.0 ksi
 E - Main Rebar = 29,000.0 ksi E - Stirrups = 29,000.0 ksi
 Stirrup Bar Size # = # 3
 Number of Resisting Legs Per Stirrup = 2



Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 30.0 in, Height = 12.0 in

Span #1 Reinforcing....

3-#4 at 3.0 in from Bottom, from 0.0 to 12.0 ft in this span

3-#4 at 3.0 in from Top, from 0.0 to 12.0 ft in this span

Service loads entered. Load Factors will be applied for calculations.

Applied Loads

Beam self weight calculated and added to loads

Load for Span Number 1

Moment : $W = 1.749$, $E = 16.219$ k-ft, Location = 6.0 ft from left end of this spanUniform Load : $D = 0.510$ k/ft, Tributary Width = 1.0 ft, (Wall)

DESIGN SUMMARY

			Design OK	
Maximum Bending Stress Ratio =	0.533: 1	Maximum Deflection		
Section used for this span	Typical Section	Max Downward L+Lr+S Deflection	0.000 in	
Mu : Applied	-15.911 k-ft	Max Upward L+Lr+S Deflection	0.000 in	
Mn * Phi : Allowable	29.859 k-ft	Max Downward Total Deflection	0.018 in	
Load Combination	+1.520D+2.0E	Max Upward Total Deflection	0.004 in	
Location of maximum on span	5.929 ft			
Span # where maximum occurs	Span # 1			

Maximum Soil Pressure = 0.507 ksf at 12.00 ft LdComb: +D+0.70E
 Allowable Soil Pressure = 2.0 ksf OK

Shear Stirrup Requirements

Entire Beam Span Length : $V_u < \phi V_c / 2$, Req'd Vs = Not Req'd per 9.6.3.1, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combination

Load Combination			Bending Stress Results (k-ft)		
Segment Length	Span #	Location (ft) in Span	Mu : Max	Phi*Mnx	Stress Ratio
Maximum Bending Envelope					
Span # 1	1	11.859	-0.01	29.86	0.00
+1.40D					
Span # 1	1	11.859	-0.00	29.86	0.00

CITY OF BEVERLY HILLS
 BCOM-25-00416

Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Beam on Elastic Foundation

Project File: 8400.67 - Trash Enclosure.ec6

LIC#: KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Trash Enclosure - CMU Wall Footing Check, In-Plane

Load Combination	Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft)		
				Mu : Max	Phi*Mnx	Stress Ratio
+1.20D						
Span # 1		1	11.859	-0.00	29.86	0.00
+1.20D+0.50W						
Span # 1		1	6.071	0.43	29.86	0.01
+1.20D-0.50W						
Span # 1		1	11.859	-0.00	29.86	0.00
+1.20D+W						
Span # 1		1	6.071	0.86	29.86	0.03
+1.20D-W						
Span # 1		1	11.859	-0.00	29.86	0.00
+1.520D+2.0E						
Span # 1		1	6.071	15.91	29.86	0.53
+1.520D-2.0E						
Span # 1		1	11.859	-0.01	29.86	0.00
+0.90D+W						
Span # 1		1	6.071	0.86	29.86	0.03
+0.90D-W						
Span # 1		1	11.859	-0.00	29.86	0.00
+0.580D+2.0E						
Span # 1		1	6.071	15.91	29.86	0.53
+0.580D-2.0E						
Span # 1		1	11.859	-0.01	29.86	0.00

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0176	12.000		0.0000	0.000

Detailed Shear Information

Load Combination	Span Number	Distance 'd'		Vu (k)		Mu (k-ft)	d*Vu/Mu Phi*Vc		Comment	Phi*Vs (k)	Spacing (in)	
		(ft)	(in)	Actual	Design			(k)			Req'd	Suggest
+1.520D-2.0E	1	0.00	6.00	0.16	0.16	0.00	1.00	16.30	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	0.14	6.00	0.32	0.32	0.01	1.00	16.30	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	0.28	6.00	0.47	0.47	0.04	1.00	16.30	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	0.42	6.00	0.63	0.63	0.10	1.00	16.30	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	0.56	6.00	0.78	0.78	0.18	1.00	16.30	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	0.71	6.00	0.93	0.93	0.28	1.00	16.30	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	0.85	6.00	1.08	1.08	0.40	1.00	16.30	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	0.99	6.00	1.23	1.23	0.54	1.00	16.30	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	1.13	6.00	1.37	1.37	0.70	0.98	16.25	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	1.27	6.00	1.51	1.51	0.88	0.86	15.98	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	1.41	6.00	1.65	1.65	1.08	0.76	15.76	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	1.55	6.00	1.79	1.79	1.31	0.69	15.59	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	1.69	6.00	1.93	1.93	1.55	0.62	15.45	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	1.84	6.00	2.06	2.06	1.81	0.57	15.33	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	1.98	6.00	2.19	2.19	2.09	0.53	15.23	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	2.12	6.00	2.32	2.32	2.39	0.49	15.14	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	2.26	6.00	2.45	2.45	2.70	0.45	15.07	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	2.40	6.00	2.58	2.58	3.04	0.42	15.00	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	2.54	6.00	2.70	2.70	3.39	0.40	14.94	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	2.68	6.00	2.82	2.82	3.76	0.37	14.89	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	2.82	6.00	2.93	2.93	4.15	0.35	14.85	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	2.96	6.00	3.05	3.05	4.55	0.34	14.80	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	3.11	6.00	3.16	3.16	4.97	0.32	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	3.25	6.00	3.27	3.27	5.40	0.30	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	3.39	6.00	3.37	3.37	5.85	0.29	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	3.53	6.00	3.48	3.48	6.32	0.28	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	3.67	6.00	3.57	3.57	6.80	0.26	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	3.81	6.00	3.67	3.67	7.29	0.25	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	3.95	6.00	3.76	3.76	7.80	0.24	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	4.09	6.00	3.85	3.85	8.32	0.23	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	4.24	6.00	3.93	3.93	8.85	0.22	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	4.38	6.00	4.00	4.00	9.39	0.21	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	4.52	6.00	4.08	4.08	9.95	0.20	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	4.66	6.00	4.14	4.14	10.51	0.20	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	4.80	6.00	4.21	4.21	11.08	0.19	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	4.94	6.00	4.26	4.26	11.67	0.18	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	5.08	6.00	4.31	4.31	12.26	0.18	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	5.22	6.00	4.35	4.35	12.85	0.17	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	5.36	6.00	4.39	4.39	13.46	0.16	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00

BCOM-25-00416

Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Beam on Elastic Foundation

Project File: 8400.67 - Trash Enclosure.ec6

LIC#: KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Trash Enclosure - CMU Wall Footing Check, In-Plane

Detailed Shear Information

Load Combination	Span Number	Distance 'd'		Vu (k)		Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Spacing (in)	
		(ft)	(in)	Actual	Design						Req'd	Suggest
+1.520D-2.0E	1	5.51	6.00	4.42	4.42	14.06	0.16	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	5.65	6.00	4.44	4.44	14.68	0.15	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	5.79	6.00	4.45	4.45	15.29	0.15	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	5.93	6.00	4.46	4.46	15.91	0.14	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	6.07	6.00	4.45	4.45	15.91	0.14	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	6.21	6.00	4.44	4.44	15.29	0.15	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	6.35	6.00	4.42	4.42	14.68	0.15	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	6.49	6.00	4.39	4.39	14.07	0.16	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	6.64	6.00	4.35	4.35	13.46	0.16	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	6.78	6.00	4.31	4.31	12.85	0.17	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	6.92	6.00	4.26	4.26	12.26	0.17	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	7.06	6.00	4.21	4.21	11.67	0.18	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	7.20	6.00	4.14	4.14	11.08	0.19	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	7.34	6.00	4.08	4.08	10.51	0.19	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	7.48	6.00	4.00	4.00	9.95	0.20	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	7.62	6.00	3.93	3.93	9.39	0.21	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	7.76	6.00	3.85	3.85	8.85	0.22	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	7.91	6.00	3.76	3.76	8.32	0.23	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	8.05	6.00	3.67	3.67	7.80	0.24	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	8.19	6.00	3.57	3.57	7.29	0.25	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	8.33	6.00	3.48	3.48	6.80	0.26	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	8.47	6.00	3.37	3.37	6.32	0.27	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	8.61	6.00	3.27	3.27	5.85	0.28	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	8.75	6.00	3.16	3.16	5.40	0.29	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	8.89	6.00	3.05	3.05	4.97	0.31	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	9.04	6.00	2.94	2.94	4.55	0.32	14.79	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	9.18	6.00	2.82	2.82	4.15	0.34	14.81	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	9.32	6.00	2.70	2.70	3.76	0.36	14.86	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	9.46	6.00	2.58	2.58	3.39	0.38	14.90	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	9.60	6.00	2.45	2.45	3.04	0.40	14.96	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	9.74	6.00	2.32	2.32	2.70	0.43	15.02	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	9.88	6.00	2.19	2.19	2.39	0.46	15.08	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	10.02	6.00	2.06	2.06	2.09	0.49	15.16	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	10.16	6.00	1.93	1.93	1.81	0.53	15.25	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	10.31	6.00	1.79	1.79	1.55	0.58	15.35	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	10.45	6.00	1.65	1.65	1.31	0.63	15.47	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	10.59	6.00	1.51	1.51	1.08	0.70	15.62	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	10.73	6.00	1.37	1.37	0.88	0.78	15.80	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	10.87	6.00	1.23	1.23	0.70	0.88	16.02	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	11.01	6.00	1.08	1.08	0.54	1.00	16.30	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	11.15	6.00	0.93	0.93	0.40	1.00	16.30	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	11.29	6.00	0.78	0.78	0.28	1.00	16.30	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	11.44	6.00	0.63	0.63	0.18	1.00	16.30	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	11.58	6.00	0.47	0.47	0.10	1.00	16.30	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	11.72	6.00	0.32	0.32	0.04	1.00	16.30	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00
+1.520D-2.0E	1	11.86	6.00	0.16	0.16	0.01	1.00	16.30	Vu < Phi*Vc / 2	Not Req'd per 9.6.3.1	0.00	0.00

Steel Beam

Project File: 8400.67 - Trash Enclosure.ec6

LIC#: KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: HSS Roof Beam

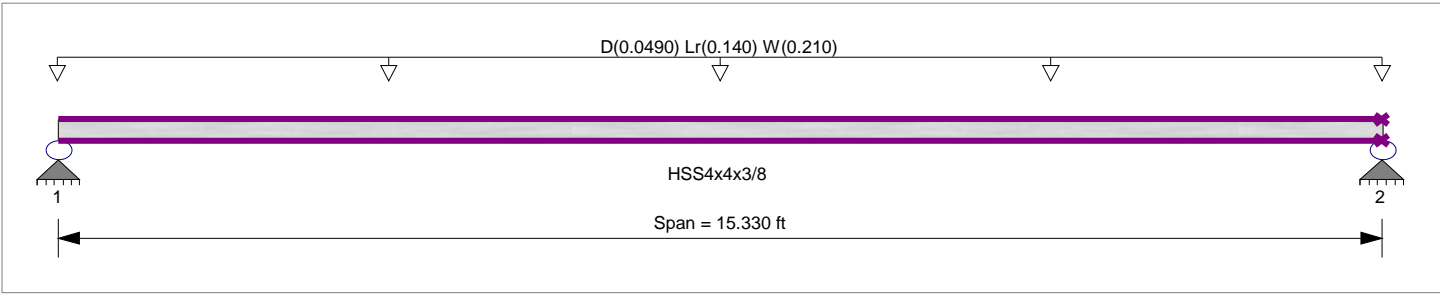
CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019
Load Combination Set : ASCE 7-22 / IBC 2024

Material Properties

Analysis Method Load Resistance Factor Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 46.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Uniform Load : D = 0.0070, Lr = 0.020, W = 0.030 ksf, Tributary Width = 7.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio = 0.517 : 1		Maximum Shear Stress Ratio = 0.058 : 1	
Section used for this span HSS4x4x3/8		Section used for this span HSS4x4x3/8	
Mu : Applied	11.392 k-ft	Vu : Applied	2.972 k
Mn * Phi : Allowable	22.046 k-ft	Vn * Phi : Allowable	51.20 k
Load Combination +1.20D+1.60Lr+0.50W		Load Combination +1.20D+1.60Lr+0.50W	
Span # where maximum occurs Span # 1		Location of maximum on span 0.000 ft	
Span # where maximum occurs Span # 1		Span # where maximum occurs Span # 1	
Maximum Deflection			
Max Downward Transient Deflection	0.584 in	Ratio = 314	>=240. Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio = 0	<240.0 n/a
Max Downward Total Deflection	0.790 in	Ratio = 233	>=180 Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio = 0	<180 n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	VuMax	Vnx	Phi*Vnx
+1.40D													
Dsgn. L = 15.29 ft	1	0.091	0.010	2.02		2.02	24.50	22.05	1.00	1.00	0.53	56.89	51.20
Dsgn. L = 0.04 ft	1		0.000	-0.00#####.##			24.50	22.05	1.00	1.00	-0.00	56.89	51.20
+1.20D+0.50Lr													
Dsgn. L = 15.29 ft	1	0.172	0.019	3.78		3.78	24.50	22.05	1.00	1.00	0.99	56.89	51.20
Dsgn. L = 0.04 ft	1		0.000	-0.00#####.##			24.50	22.05	1.00	1.00	-0.00	56.89	51.20
+1.20D													
Dsgn. L = 15.29 ft	1	0.078	0.009	1.73		1.73	24.50	22.05	1.00	1.00	0.45	56.89	51.20
Dsgn. L = 0.04 ft	1		0.000	-0.00#####.##			24.50	22.05	1.00	1.00	-0.00	56.89	51.20
+1.20D+1.60Lr													
Dsgn. L = 15.29 ft	1	0.377	0.042	8.31		8.31	24.50	22.05	1.00	1.00	2.17	56.89	51.20
Dsgn. L = 0.04 ft	1		0.000	-0.00#####.##			24.50	22.05	1.00	1.00	-0.00	56.89	51.20
+1.20D+1.60Lr+0.50W													
Dsgn. L = 15.29 ft	1	0.517	0.058	11.39		11.39	24.50	22.05	1.00	1.00	2.97	56.89	51.20
Dsgn. L = 0.04 ft	1		0.000	-0.00#####.##			24.50	22.05	1.00	1.00	-0.00	56.89	51.20
+1.20D+0.50W													
Dsgn. L = 15.29 ft	1	0.218	0.025	4.81		4.81	24.50	22.05	1.00	1.00	1.26	56.89	51.20
Dsgn. L = 0.04 ft	1		0.000	-0.00#####.##			24.50	22.05	1.00	1.00	-0.00	56.89	51.20
+1.20D+0.50Lr+W													
Dsgn. L = 15.29 ft	1	0.451	0.051	9.95		9.95	24.50	22.05	1.00	1.00	2.60	56.89	51.20
Dsgn. L = 0.04 ft	1		0.000	-0.00#####.##			24.50	22.05	1.00	1.00	-0.00	56.89	51.20
+1.20D+W													
Dsgn. L = 15.29 ft	1	0.358	0.040	7.90		7.90	24.50	22.05	1.00	1.00	2.06	56.89	51.20

CITY OF PERRIS PERMIT
NUMBER 7.90
BCOM-25-00416

Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Steel Beam

Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: HSS Roof Beam

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios			Summary of Moment Values						Summary of Shear Values		
Segment Length	Span #	M	V	max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	VuMax	Vnx	Phi*Vnx
Dsgn. L = 0.04 ft	1		0.000	-0.00#####.##			24.50	22.05	1.00	1.00	-0.00	56.89	51.20
+0.90D+W													
Dsgn. L = 15.29 ft	1	0.339	0.038	7.46		7.46	24.50	22.05	1.00	1.00	1.95	56.89	51.20
Dsgn. L = 0.04 ft	1		0.000	-0.00#####.##			24.50	22.05	1.00	1.00	-0.00	56.89	51.20
+0.90D													
Dsgn. L = 15.29 ft	1	0.059	0.007	1.30		1.30	24.50	22.05	1.00	1.00	0.34	56.89	51.20
Dsgn. L = 0.04 ft	1		0.000	-0.00#####.##			24.50	22.05	1.00	1.00	-0.00	56.89	51.20

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
1	+D+Lr	0.7899	7.709		0.0000	0.000

Vertical Reactions

Support notation : Far left is #'

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	1.905	1.905
Max Upward from Load Combinations	1.905	1.905
Max Upward from Load Cases	1.610	1.610
D Only	0.376	0.376
+D+Lr	1.449	1.449
+D+0.750Lr	1.180	1.180
+D+0.60W	1.341	1.341
+D+0.750Lr+0.450W	1.905	1.905
+D+0.450W	1.100	1.100
+0.60D+0.60W	1.191	1.191
+0.60D	0.225	0.225
Lr Only	1.073	1.073
W Only	1.610	1.610

Steel Column

Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: HSS Roof Post

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019
Load Combinations Used : ASCE 7-22 / IBC 2024

General Information

Steel Section Name : **HSS4x4x3/8**
Analysis Method : Load Resistance Factor
Steel Stress Grade
Fy : Steel Yield 46.0 ksi
E : Elastic Bending Modulus 29,000.0 ksi
Overall Column Height 3.5 ft
Top & Bottom Fixity Top Free, Bottom Fixed
Brace condition :
Unbraced Length for buckling ABOUT X-X Axis = 3.5 ft, K = 2.1
Unbraced Length for buckling ABOUT Y-Y Axis = 3.5 ft, K = 2.1

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 60.445 lbs * Dead Load Factor

AXIAL LOADS . . .

Axial Load at 3.50 ft, D = 0.380, LR = 1.070, W = 1.610 k

BENDING LOADS . . .

Lat. Point Load at 3.50 ft creating Mx-x, E = 0.30 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.04933** : 1
Load Combination +1.20D+E
Location of max.above base 0.0 ft
At maximum location values are . . .
Pu 0.5285 k
0.9 * Pn 155.331 k
Mu-x -1.050 k-ft
0.9 * Mn-x : 22.046 k-ft
Mu-y 0.0 k-ft
0.9 * Mn-y : 22.046 k-ft
Maximum Load Reactions . .
Top along X-X 0.0 k
Bottom along X-X 0.0 k
Top along Y-Y 0.0 k
Bottom along Y-Y 0.30 k
Maximum Load Deflections . . .
Along Y-Y 0.02468 in at 3.50ft above base
for load combination : E Only
Along X-X 0.0 in at 0.0ft above base
for load combination :
PASS Maximum Shear Stress Ratio = **0.007031** : 1
Load Combination +1.20D+E
Location of max.above base 0.0 ft
At maximum location values are . . .
Vu : Applied 0.30 k
Vn * Phi : Allowable 42.667 k

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios				Cbx	Cby	KxLx/Rx	KyLy/Ry	Maximum Shear Ratios		
	Stress Ratio	Status	Location						Stress Ratio	Status	Location
+1.40D	0.004	PASS	0.00 ft		1.67	1.00	60.00	60.00	0.000	PASS	0.00 ft
+1.20D+0.50Lr	0.007	PASS	0.00 ft		1.67	1.00	60.00	60.00	0.000	PASS	0.00 ft
+1.20D	0.003	PASS	0.00 ft		1.67	1.00	60.00	60.00	0.000	PASS	0.00 ft
+1.20D+1.60Lr	0.014	PASS	0.00 ft		1.67	1.00	60.00	60.00	0.000	PASS	0.00 ft
+1.20D+1.60Lr+0.50W	0.020	PASS	0.00 ft		1.67	1.00	60.00	60.00	0.000	PASS	0.00 ft
+1.20D+0.50W	0.009	PASS	0.00 ft		1.67	1.00	60.00	60.00	0.000	PASS	0.00 ft
+1.20D+0.50Lr+W	0.017	PASS	0.00 ft		1.67	1.00	60.00	60.00	0.000	PASS	0.00 ft
+1.20D+W	0.014	PASS	0.00 ft		1.67	1.00	60.00	60.00	0.000	PASS	0.00 ft
+0.90D+W	0.013	PASS	0.00 ft		1.67	1.00	60.00	60.00	0.000	PASS	0.00 ft
+1.20D+E	0.049	PASS	0.00 ft		1.67	1.00	60.00	60.00	0.007	PASS	0.00 ft
+0.90D+E	0.049	PASS	0.00 ft		1.67	1.00	60.00	60.00	0.007	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial (k)		Rx (k)		Ry (k)		Mx (k-ft)		My (k-ft)	
	@ Base		@ Base	@ Top	@ Base	@ Top	@ Base	@ Top	@ Base	@ Top
D Only	0.440									
+D+Lr	1.510									
+D+0.750Lr	1.243									

Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Steel Column

Project File: 8400.67 - Trash Enclosure.ec6

LIC#: KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: HSS Roof Post

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial (k)	Rx (k)		Ry (k)		Mx (k-ft)		My (k-ft)	
	@ Base	@ Base	@ Top	@ Base	@ Top	@ Base	@ Top	@ Base	@ Top
+D+0.60W	1.406								
+D+0.750Lr+0.450W	1.967								
+D+0.450W	1.165								
+0.60D+0.60W	1.230								
+D+0.70E	0.440				-0.210		0.735		
+D+0.5250E	0.440				-0.158		0.551		
+0.60D+0.70E	0.264				-0.210		0.735		
Lr Only	1.070								
W Only	1.610								
E Only					-0.300		1.050		

Extreme Reactions

Item	Extreme Value	Axial (k)	Rx (k)		Ry (k)		Mx (k-ft)		My (k-ft)	
		@ Base	@ Base	@ Top	@ Base	@ Top	@ Base	@ Top	@ Base	@ Top
Axial, Base Max		1.967								
Axial, Base Min										
Rx, Base Max										
Rx, Base Min										
Ry, Base Max										
Ry, Base Min						-0.300				
Mx, Base Max								1.050		
Mx, Base Min										
My, Base Max										
My, Base Min										

Maximum Deflections for Load Combinations

Load Combination	Max. Deflection in X dir		Distance	Max. Deflection in Y dir		Distance
D Only	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+Lr	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+0.750Lr	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+0.60W	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+0.750Lr+0.450W	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+0.450W	0.0000	in	0.000 ft	0.000	in	0.000 ft
+0.60D+0.60W	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+0.70E	0.0000	in	0.000 ft	0.017	in	3.500 ft
+D+0.5250E	0.0000	in	0.000 ft	0.013	in	3.500 ft
+0.60D+0.70E	0.0000	in	0.000 ft	0.017	in	3.500 ft
Lr Only	0.0000	in	0.000 ft	0.000	in	0.000 ft
W Only	0.0000	in	0.000 ft	0.000	in	0.000 ft
E Only	0.0000	in	0.000 ft	0.024	in	3.477 ft

Steel Section Properties : HSS4x4x3/8

Depth	=	4.000 in	I xx	=	10.30 in ⁴	J	=	17.500 in ⁴
Design Thick	=	0.349 in	S xx	=	5.13 in ³			
Width	=	4.000 in	R xx	=	1.470 in			
Wall Thick	=	0.375 in	Zx	=	6.390 in ³			
Area	=	4.780 in ²	I yy	=	10.300 in ⁴	C	=	9.140 in ³
Weight	=	17.270 plf	S yy	=	5.130 in ³			
			R yy	=	1.470 in			

Ycg = 0.000 in

Steel Column

Project File: 8400.67 - Trash Enclosure.ec6

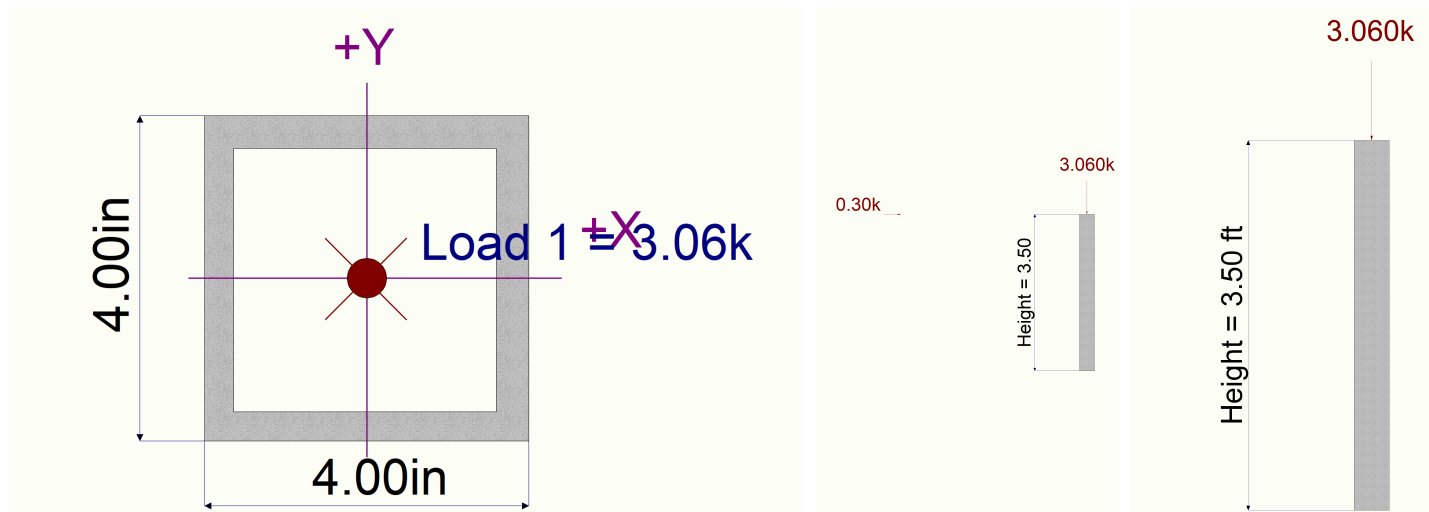
LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: HSS Roof Post

Sketches



Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Steel Column

Project File: 8400.67 - Trash Enclosure.ec6

LIC#: KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: HSS Gate Post

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019

Load Combinations Used : ASCE 7-22 / IBC 2024

General Information

Steel Section Name : HSS4x4x3/8

Analysis Method : Load Resistance Factor

Steel Stress Grade

Fy : Steel Yield 46.0 ksi

E : Elastic Bending Modulus 29,000.0 ksi

Overall Column Height

6 ft

Top & Bottom Fixity

Top Free, Bottom Fixed

Brace condition :

Unbraced Length for buckling ABOUT X-X Axis = 6 ft, K = 2.1

Unbraced Length for buckling ABOUT Y-Y Axis = 6 ft, K = 2.1

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 103.620 lbs * Dead Load Factor

BENDING LOADS . . .

Lat. Uniform Load creating Mx-x, W = 0.2050 k/ft

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =

Load Combination

0.1680 : 1

Location of max.above base

+1.20D+W

At maximum location values are . . .

Pu 0.1243 k

0.9 * Pn 97.130 k

Mu-x -3.690 k-ft

0.9 * Mn-x : 22.046 k-ft

Mu-y 0.0 k-ft

0.9 * Mn-y : 22.046 k-ft

Maximum Load Reactions . .

Top along X-X 0.0 k

Bottom along X-X 0.0 k

Top along Y-Y 0.0 k

Bottom along Y-Y 1.230 k

Maximum Load Deflections . . .

Along Y-Y 0.1913 in at 6.0ft above base
 for load combination : W Only

Along X-X 0.0 in at 0.0ft above base
 for load combination :

PASS Maximum Shear Stress Ratio

0.02883 : 1

Load Combination

+1.20D+W

Location of max.above base

0.0 ft

At maximum location values are . . .

Vu : Applied 1.230 k

Vn * Phi : Allowable 42.667 k

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios								Maximum Shear Ratios			
	Stress Ratio	Status	Location	Cbx	Cby	KxLx/Rx	KyLy/Ry		Stress Ratio	Status	Location	
+1.40D	0.001	PASS	0.00 ft	2.33	1.00	102.86	102.86		0.000	PASS	0.00 ft	
+1.20D	0.001	PASS	0.00 ft	2.33	1.00	102.86	102.86		0.000	PASS	0.00 ft	
+1.20D+0.50W	0.084	PASS	0.00 ft	2.33	1.00	102.86	102.86		0.014	PASS	0.00 ft	
+1.20D+W	0.168	PASS	0.00 ft	2.33	1.00	102.86	102.86		0.029	PASS	0.00 ft	
+0.90D+W	0.168	PASS	0.00 ft	2.33	1.00	102.86	102.86		0.029	PASS	0.00 ft	
+0.90D	0.001	PASS	0.00 ft	2.33	1.00	102.86	102.86		0.000	PASS	0.00 ft	

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial (k)		Rx (k)		Ry (k)		Mx (k-ft)		My (k-ft)	
	@ Base		@ Base	@ Top	@ Base	@ Top	@ Base	@ Top	@ Base	@ Top
D Only	0.104									
+D+0.60W	0.104				-0.738		2.214			
+D+0.450W	0.104				-0.554		1.661			
+0.60D+0.60W	0.062				-0.738		2.214			
+0.60D	0.062									
W Only					-1.230		3.690			

Extreme Reactions

Item	Extreme Value	Axial (k)		Rx (k)		Ry (k)		Mx (k-ft)		My (k-ft)	
		@ Base		@ Base	@ Top	@ Base	@ Top	@ Base	@ Top	@ Base	@ Top
Axial, Base Max		0.104									

Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Steel Column

Project File: 8400.67 - Trash Enclosure.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: HSS Gate Post

Extreme Reactions

Item	Extreme Value	Axial (k) @ Base	Rx (k) @ Base @ Top	Ry (k) @ Base @ Top	Mx (k-ft) @ Base @ Top	My (k-ft) @ Base @ Top
Axial, Base Min						
Rx, Base Max						
Rx, Base Min						
Ry, Base Max						
Ry, Base Min				-1.230		
Mx, Base Max					3.690	
Mx, Base Min						
My, Base Max						
My, Base Min						

Maximum Deflections for Load Combinations

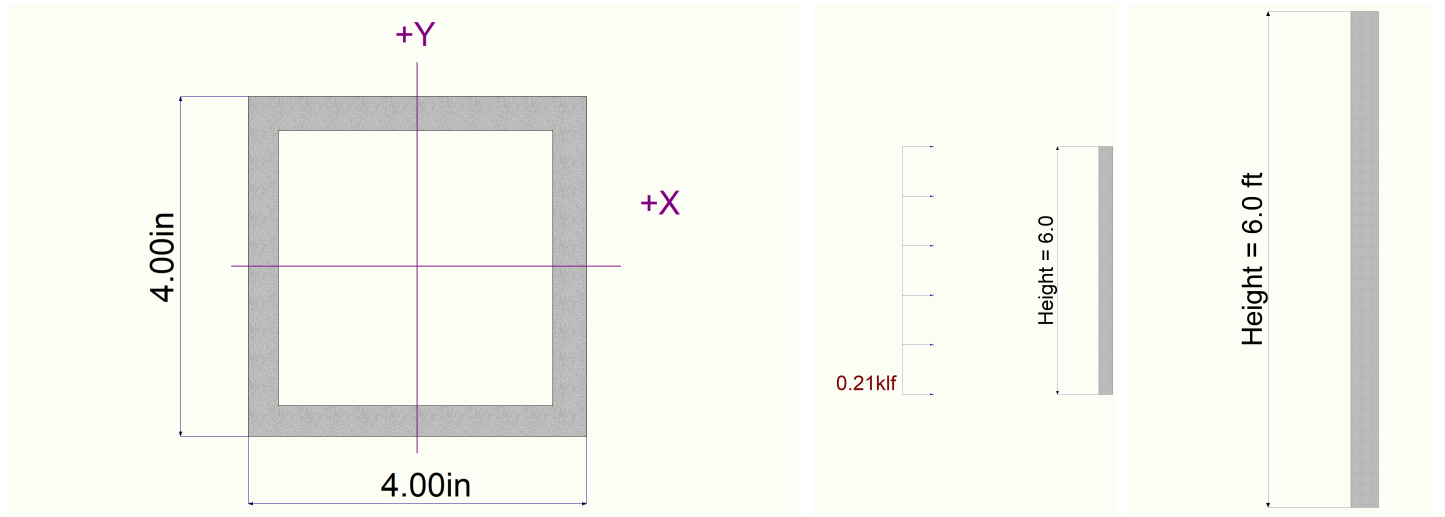
Load Combination	Max. Deflection in X dir	Distance	Max. Deflection in Y dir	Distance
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.60W	0.0000 in	0.000 ft	0.115 in	6.000 ft
+D+0.450W	0.0000 in	0.000 ft	0.086 in	6.000 ft
+0.60D+0.60W	0.0000 in	0.000 ft	0.115 in	6.000 ft
+0.60D	0.0000 in	0.000 ft	0.000 in	0.000 ft
W Only	0.0000 in	0.000 ft	0.190 in	5.960 ft

Steel Section Properties : HSS4x4x3/8

Depth	=	4.000 in	I xx	=	10.30 in^4	J	=	17.500 in^4
Design Thick	=	0.349 in	S xx	=	5.13 in^3			
Width	=	4.000 in	R xx	=	1.470 in			
Wall Thick	=	0.375 in	Zx	=	6.390 in^3			
Area	=	4.780 in^2	I yy	=	10.300 in^4	C	=	9.140 in^3
Weight	=	17.270 plf	S yy	=	5.130 in^3			
			R yy	=	1.470 in			

Ycg = 0.000 in

Sketches



Pole Footing Embedded in Soil

Project File: 8400.67 - Trash Enclosure.ec6

LIC#: KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: Gate Post Pier Footing

Code References

Calculations per IBC 2018 1807.3, CBC 2019

Load Combinations Used : IBC 2018

General Information

Pole Footing Shape Circular
Pole Footing Diameter 18.0 in
Calculate Min. Depth for Allowable Pressures
Lateral Restraint at Ground Surface
Allow Passive 200.0 pcf
Max Passive 1,500.0 psf

Controlling Values

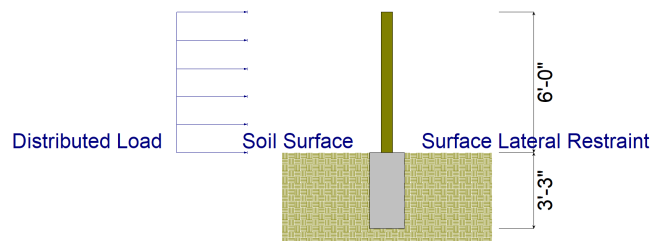
Governing Load Combination **+0.60W**
Lateral Load 0.7380 k
Moment 2.214 k-ft

Restraint @ Ground Surface

Pressure at Depth
Actual **593.89** psf
Allowable **650.0** psf
Surface Restraint Force 2,185.62 lbs

Minimum Required Depth 3.250 ft

Footing Base Area 1.767 ft²
Maximum Soil Pressure 0.0 ksf



Applied Loads

Lateral Concentrated Load (k)		Lateral Distributed Loads (k)		Applied Moment (kft)	Vertical Load (k)
D : Dead Load	k		k/ft	k-ft	k
Lr : Roof Live	k		k/ft	k-ft	k
L : Live	k		k/ft	k-ft	k
S : Snow	k		k/ft	k-ft	k
W : Wind	k	0.2050	k/ft	k-ft	k
E : Earthquake	k		k/ft	k-ft	k
H : Lateral Earth	k		k/ft	k-ft	k
Load distance above ground surface	1.0 ft	TOP of Load above ground surface			
		6.0	ft		
		BOTTOM of Load above ground surface			
			ft		

Load Combination Results

Load Combination	Forces @ Ground Surface		Required Depth - (ft)	Pressure at Depth		Soil Increase Factor
	Loads - (k)	Moments - (ft-k)		Actual - (psf)	Allow - (psf)	
	0.000	0.000	0.13	0.0	25.0	1.000
+0.60W	0.738	2.214	3.25	593.9	650.0	1.000
-0.60W	0.738	2.214	3.25	593.9	650.0	1.000
+0.450W	0.554	1.661	2.88	569.2	575.0	1.000
-0.450W	0.554	1.661	2.88	569.2	575.0	1.000

Sheet:	Wind on Open Roof
Date:	11/25/2025
#:	24-8400.32
Version:	-

ASCE 7-16 Chapter 27.3.2 - Design Wind Loads On Open Structure - Monoslope Free Roof
Trash Enclosure

Basic Wind Speed	$V = 110$ mph	ASCE Hazard Tool
Nominal Wind Speed ($\geq 0.6V_{ult}$)	$V_{nom} = 85$ mph	
Ground elevation above sea level	$z_g = 1415$ ft.	ASCE Hazard Tool
Risk Category Factor	II	Table 1.5-1
Surface Roughness	C	26.7.2
Exposure Category	C	26.7.3
Mean roof height of building or height of structure	$h = 9.50$ ft.	
Enclosure Classification	$= \text{Open}$	Table 26.13-1
Roof Slope	$= 1 : 12 \rightarrow \theta = 4.76^\circ$	
Gust effect factor	$G = 0.85$	26.11

Wind Load Parameters:

K_z Velocity pressure exposure coefficient	$= 0.85$	Table 26.10-1
K_d Wind load directionality factor	$= 0.85$	Table 26.6-1
K_e Ground Elevation Factor	$= 0.950067$	Table 26.9-1
K_{zt} Topographic Factor	$= 1$	(26.8.2)

Velocity Pressure: $q_h = .00256K_zK_{zt}K_dK_eV^2 = 21.26$ psf ASD : $.6W = 12.76$ psf (26.10-1)

Equation for Open Buildings with Monoslope, Pitched or Troughed Free Roofs $= p = q_hGC_n$ (27.3-2)

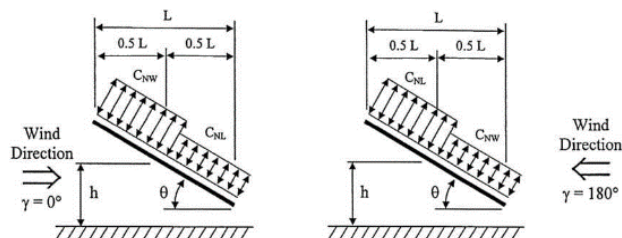
q_h = velocity pressure evaluated at mean roof height h

G = Gust effect Factor

C_n = Net Pressure Coefficient determined from Figures 27.3-4 through 27.3-7
Include contributions from top & bottom surfaces

Table 26.13-1

Interpolated Values									
		$\gamma = 0^\circ$				$\gamma = 180^\circ$			
θ	LC	Clear Flow		Obstructed		Clear Flow		Obstructed	
		C_{NW}	C_{NL}	C_{NW}	C_{NL}	C_{NW}	C_{NL}	C_{NW}	C_{NL}
$1:12 \rightarrow 4.76^\circ$	A								
	B								

Diagrams


Strength Level Wind Pressure (psf)			
$\gamma = 0^\circ$		$\gamma = 180^\circ$	
Clear Flow		Clear Flow	
C_{NW}	C_{NL}	C_{NW}	C_{NL}

Strength Level Wind Pressure (psf)	
C_{NW}	C_{NL}

Figure 27.3-4


STRUCTURAL
ENGINEERS

 27369 Via Industria
 Temecula, CA 92590
 (951)600-0032, (951)600-0036 Fax

Sht:	Drilled Pier Rebar
Date:	11/25/2025
#:	24-8400.32
Δ :	--

Cast In Place Deep Foundation Element Analysis & Design in Seismic Design Category D, E & F Per 2019 CBC 1810.1-1810.4

Trash Enclosure - Foundation Plan

Pier Design Parameters

Diameter, D	=	18	in.
Seismic Design Category	=	D	
Depth, H	=	3.25	ft.
f'_c	=	2500	psi
f_y	=	60	ksi
Clear spacing from outside edge of transverse reinforcement	=	3	in
$A_{g, \text{ Pier}}$	=	254.47	in ²
A_{ch}	=	113.10	in ²
Factored (ASD) Vertical Axial Load	=	2380	lbs


Seismic Longitudinal Reinforcement

A minimum of four longitudinal bars

Logitudinal Reinforcement Size	=	#5	bars					CBC 1810.3.9.4.2
# of bars	=	6		≥	4	Min	OK	CBC 1810.3.9.4.2
Bar Dia.	=	0.625	in.					
$A_s, \text{ provided}$	=	1.84	in ²					
$\rho_s \text{ long, min}$	=	0.005						CBC 1810.3.9.4.2
$\rho_s \text{ long, provided}$	=	0.007234		>	0.005		OK	CBC 1810.3.9.4.2



SITE STRUCTURES - FUEL CANOPY

 STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

SEISMIC DESIGN LOAD - EQUIVALENT LATERAL FORCE PROCEDURE

Structure: Fuel Tank/Generator Canopy - Steel Ordinary Moment Frames

Building Seismic Design Criteria

(ASCE - Chapter 11)

Risk Category of Building or Structure:	IV	Table 1.5-1
Short-Period Spectral Response Acceleration, S_s :	1.422	Per ASCE 7 Hazard Tool
Long-Period Spectral Response Acceleration, S_1 :	0.526	Per ASCE 7 Hazard Tool
Average Height of Building Roof, h_n :	14.00	ft
Site-specific ground motion analysis provided?	Yes	11.4.8
Analytical procedure (Limit per Table 12.6-1)	ELF	Equivalent Lateral Force 12.8
Structural irregularities per 12.3.2?	No	12.8.1.3 - Item 1
Exceed 5 story above base/grade including mezzanines?	No	12.8.1.3 - Item 2

Site Class

11.4.3 & 11.4.4

Soil Site Class: D Per Geotech Report

Site Coefficients & Spectral Response Acceleration Parameters

11.4.4

	Table 11.4-1 & 11.4-2	11.4.8 Exceptions	Site-specific analysis per Geotech Report	Calculation Warnings/Notes
Site Coefficient, F_a :	1.00	N/A	1.20	
Site Coefficient, F_v :	Site Specific	1.77	1.77	

$S_{MS} = F_a * S_s$:	1.48	Equation 11.4-1
$S_{M1} = F_v * S_1$:	1.05	Equation 11.4-2
$S_{DS} = 2/3 * S_{MS}$:	0.99	Equation 11.4-3
$S_{D1} = 2/3 * S_{M1}$:	0.70	Equation 11.4-4
$T_s = S_{D1} / S_{DS}$:	0.71	11.4.6
Seismic Design Category (SDC):	D	11.6 & Table 11.6-1 & 2


Seismic Equivalent Lateral Force Procedure

Section 12.8

Importance Factor, I_e :	1.50	Table 1.5-2
Response Modification Factor, R : Table 12.2-1	3.50	Steel Ordinary Moment Frames
Overstrength Amplification factor, Ω_o :	2.5	Table 12.2-1
Approximate Period Values: Table 12.8-2:	C_t : 0.02	All other systems
	x : 0.75	
Approximate Fundamental Period, $T_a = C_t (h_n)^x$:	0.14	s
Long Period Transition Period, T_L :	8	

Equation 12.8-7

Figure 22 (14-17)

 STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

Seismic Response Coefficient, C_s :

$$C_s = S_{DS} / (R / I_e):$$

0.423

Equation 12.8-2

Maximum C_s :

MAX

$$C_s = S_{D1} / T_a (R / I_e): \quad T \leq T_L$$

2.073

Equation 12.8-3

$$C_s = S_{D1} T_L / T_a^2 (R / I_e): \quad T > T_L$$

114.541

Equation 12.8-4

Minimum C_s :

MIN

$$C_s = 0.044 S_{DS} I_e: \quad \geq 0.01$$

0.065

Equation 12.8-5

$$C_s = 0.5 S_1 / (R / I_e): \quad \text{for } S_1 \geq 0.6$$

N/A

Equation 12.8-6

$$\text{Seismic Base Shear, } V = C_s W:$$

0.423

W

Equation 12.8-1

Building Structure - Horizontal Seismic Load Effect, E_h

$$\text{Redundancy Factor, } \rho:$$

1.30

Section 12.3.4.2

$$(\text{Strength Level}) \quad 1.0 E_h = \rho Q_e:$$

0.550

W

Equation 12.4-3

$$(\text{ASD Level}) \quad 0.7 E_h = \rho Q_e:$$

0.385

W

Equation 12.4-3

Diaphragm Design Forces per 12.10.1

$$F_{px} = 0.2 S_{DS} I_e w_{px} =$$

0.296

W (Min)

Section 12.10

Equation 12.10-2

$$F_{px} = 0.4 S_{DS} I_e w_{px} =$$

0.592

W (Max)

Equation 12.10-3

$$F_{px} = w_{px} * \Sigma F_i / \Sigma w_i$$

Equation 12.10-1


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Sheet:	Seismic Base Shear - FLEXIBLE
Date:	--
Project ID:	--
Version:	2022 CBC / ASCE 7-16

SEISMIC BASE SHEAR ANALYSIS - FLEXIBLE DIAPHRAGM

STRUCTURE: Fuel Tank/Generator Canopy - Steel Ordinary Moment Frames

Structural period Factor, k: 1.00

VERTICAL DISTRIBUTION OF SEISMIC FORCES																
Level	Height from Base (ft)	Weight Summary (k)	Floor Plan Area (ft ²)	ΣWi (k)	Wi hi ^k	ΣWi hi ^k	C _{vx}	Level Forces - 1.0E Strength Level				Alternate ASD 0.7E		Diaphragm F _{px} (k) - 1.0E		
								Force (k)			Unit Force (psf)		Unit Force (psf)			
								F _x	ΣF _x	1.0 E _h = ρF _x	F _x	1.0 E _h = ρF _x	F _x	0.7 E _h = ρF _x	F _{px}	ΩF _{px}
		0.0		0.0	0	0	0.000	0.0	0.0	0.0				0.0	0.0	
		0.0		0.0	0	0	0.000	0.0	0.0	0.0				0.0	0.0	
1	14.00	1.5	185	1.5	21	21	1.000	0.6	0.6	0.8	3.43	4.46	2.40	3.13	0.6	1.6
Building Weight, W =		1.5	185	Base Shear, V = C _s *W = 0.83 k												

BUILDING WEIGHT & SEISMIC TRIBUTARY ANALYSIS																													
Building Mass Element	Type	Level	Unit weight (psf)	Area (sf)		↔ Dir.		% Distribution to resistance gridlines										↕ Dir.		% Distribution to resistance gridlines									
						Gridlines										Check	Gridlines										Check		
						FC-1	FC-2										FC-A	FC-B											
Roof	R1	1	7.0	185	1.30	50%	50%									100%	50%	50%					100%						
NW Col (upper 1/2)	-	1	12.2	4	0.05	100%										100%	100%					100%							
SW Col (upper 1/2)	-	1	12.2	4	0.05	100%										100%		100%					100%						
NE Col (upper 1/2)	-	1	12.2	4	0.05		100%									100%	100%					100%							
SE Col (upper 1/2)	-	1	12.2	4	0.05		100%									100%		100%					100%						
					0.00											0%							0%						
					0.00											0%							0%						
					0.00											0%							0%						
					0.00											0%							0%						
ΣWi=					1.5	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0						

				SEISMIC LOAD SUMMARY BY ELEMENT																			
Building Mass Element	Level	Height (ft)	Notes	\updownarrow Dir.		% Distribution to resistance gridlines								\leftrightarrow Dir.		% Distribution to resistance gridlines							
				Gridlines										Gridlines									
				FC-1	FC-2									FC-A	FC-B								
Roof	1	14		0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW Col (upper 1/2)	1	14		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	0.0	0.0	0.0	0.0	
SW Col (upper 1/2)	1	14		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	0.0	0.0	0.0	0.0	
NE Col (upper 1/2)	1	14		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	0.0	0.0	0.0	0.0	
SE Col (upper 1/2)	1	14		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	0.0	0.0	0.0	0.0	

SUMMARY OF SEISMIC LOADING BY GRIDLINE (KIPS - 1.0E STRENGTH LEVEL)																							
Level	1.0 E _h = pF _x	↔ Direction											↕ Direction										
		Gridlines										Check	Gridlines										Check
		FC-1	FC-2										FC-A	FC-B									
1	0.8	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%	
Base	0.83	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%	

Sheet:	Wind on Open Roof
Date:	11/25/2025
#:	24-8400.32
Version:	-

ASCE 7-16 Chapter 27.3.2 - Design Wind Loads On Open Structure - Monoslope Free Roof
Fuel Tank/Generator Canopy

Basic Wind Speed	$V = 110$ mph	ASCE Hazard Tool
Nominal Wind Speed (v_{ult})	$V_{nom} = 85$ mph	
Ground elevation above sea level	$z_g = 1415$ ft.	ASCE Hazard Tool
Risk Category Factor	IV	Table 1.5-1
Surface Roughness	C	26.7.2
Exposure Category	C	26.7.3
Mean roof height of building or height of structure	$h = 14.00$ ft.	
Enclosure Classification	$= \text{Open}$	Table 26.13-1
Roof Slope	$= 1 : 12 \rightarrow \theta = 4.76^\circ$	
Gust effect factor	$G = 0.85$	26.11

Wind Load Parameters:

K_z Velocity pressure exposure coefficient	$= 0.85$	Table 26.10-1
K_d Wind load directionality factor	$= 0.85$	Table 26.6-1
K_e Ground Elevation Factor	$= 0.950067$	Table 26.9-1
K_{zt} Topographic Factor	$= 1$	(26.8.2)

Velocity Pressure: $q_h = .00256 K_z K_{zt} K_d K_e V^2 = 21.26$ psf ASD : .6W = 12.76 psf (26.10-1)

Equation for Open Buildings with Monoslope, Pitched or Troughed Free Roofs $= p = q_h G C_n$ (27.3-2)

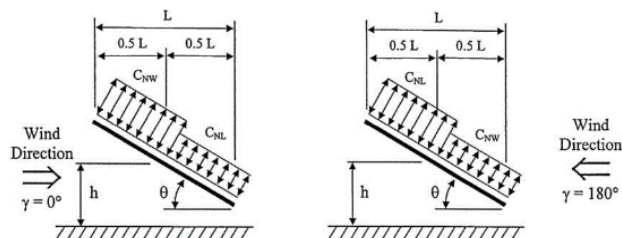
q_h = velocity pressure evaluated at mean roof height h

G = Gust effect Factor

C_n = Net Pressure Coefficient determined from Figures 27.3-4 through 27.3-7
Include contributions from top & bottom surfaces

Table 26.13-1

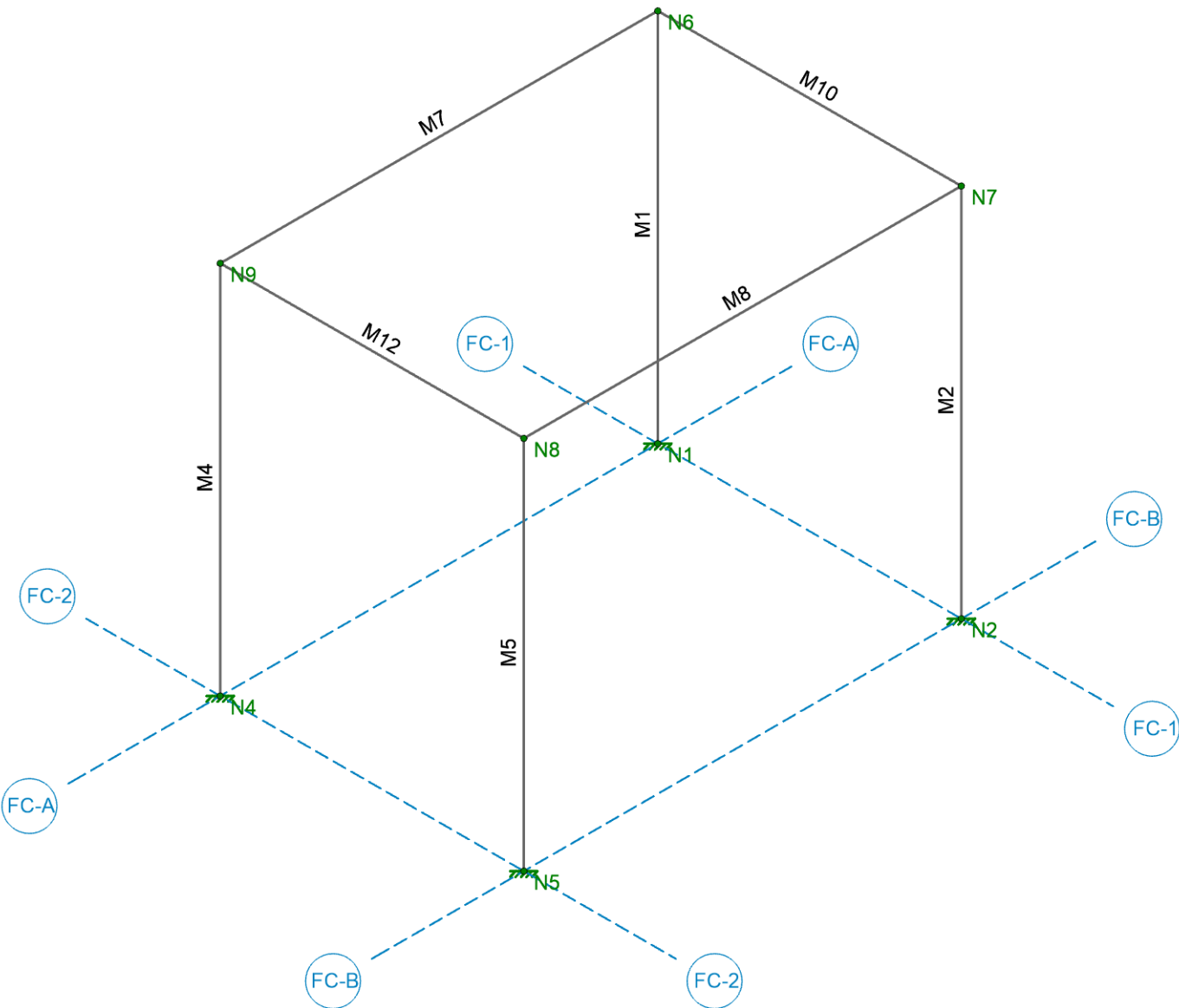
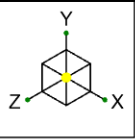
Interpolated Values									
		$\gamma = 0^\circ$				$\gamma = 180^\circ$			
θ	LC	Clear Flow		Obstructed		Clear Flow		Obstructed	
		C_{NW}	C_{NL}	C_{NW}	C_{NL}	C_{NW}	C_{NL}	C_{NW}	C_{NL}
		C_{NW}	C_{NL}	C_{NW}	C_{NL}	C_{NW}	C_{NL}	C_{NW}	C_{NL}
7.5°	A	0.06	-0.53	-0.82	-1.39	1.01	1.06	-0.31	-1.20
0°	B	-1.29	-0.04	-1.48	0.29	0.61	0.61	0.11	-0.41

Diagrams


Strength Level Wind Pressure (psf)			
$\gamma = 0^\circ$		$\gamma = 180^\circ$	
Clear Flow		Clear Flow	
C_{NW}	C_{NL}	C_{NW}	C_{NL}
1.03	-9.50	18.24	19.20
-23.32	-0.66	11.11	11.11

Strength Level Wind Pressure (psf)	
C_{NW}	C_{NL}
18.24	19.20
23.32	11.11

Figure 27.3-4



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Fuel Tank/Generator Canopy

SK-1

24-8400.32

Nov 25, 2025 at 02:01 PM

8400.67 - Fuel Canopy.r3d



Company : Innovative Structural Engineering
 Designer :
 Job Number : 24-8400.32
 Model Name : Fuel Tank/Generator Canopy

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Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	11.33	0	0	
3	N4	0	0	16.33	
4	N5	11.33	0	16.33	
5	N6	0	14	0	
6	N7	11.33	14	0	
7	N8	11.33	14	16.33	
8	N9	0	14	16.33	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot [k-ft/rad]	Y Rot [k-ft/rad]	Z Rot [k-ft/rad]
1	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N2	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N5	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	N4	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in ²]	I _{yy} [in ⁴]	I _{zz} [in ⁴]	J [in ⁴]
1	Column	HSS4X4X6	Column	Tube	A500 Gr.B Rect	Typical	4.78	10.3	10.3	17.5
2	Beam	HSS6X4X4	Beam	Tube	A500 Gr.B Rect	Typical	4.3	11.1	20.9	23.6
3	Rim	HSS6X2X4	Beam	Tube	A500 Gr.B Rect	Typical	3.37	2.21	13.1	6.55

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N6	Column	Column	Tube	A500 Gr.B Rect	Typical
2	M2	N2	N7	Column	Column	Tube	A500 Gr.B Rect	Typical
3	M4	N4	N9	Column	Column	Tube	A500 Gr.B Rect	Typical
4	M5	N5	N8	Column	Column	Tube	A500 Gr.B Rect	Typical
5	M10	N6	N7	Beam	Beam	Tube	A500 Gr.B Rect	Typical
6	M12	N9	N8	Beam	Beam	Tube	A500 Gr.B Rect	Typical
7	M7	N9	N6	Beam	Beam	Tube	A500 Gr.B Rect	Typical
8	M8	N8	N7	Beam	Beam	Tube	A500 Gr.B Rect	Typical

Hot Rolled Steel Design Parameters

	Label	Shape	Length [ft]	Lcomp top [ft]	Channel Conn.	a [ft]	Function
1	M1	Column	14	Lbyy	N/A	N/A	Lateral
2	M2	Column	14	Lbyy	N/A	N/A	Lateral
3	M4	Column	14	Lbyy	N/A	N/A	Lateral
4	M5	Column	14	Lbyy	N/A	N/A	Lateral
5	M10	Beam	11.33	Lbyy	N/A	N/A	Lateral
6	M12	Beam	11.33	Lbyy	N/A	N/A	Lateral
7	M7	Beam	16.33	Lbyy	N/A	N/A	Lateral
8	M8	Beam	16.33	Lbyy	N/A	N/A	Lateral



Company : Innovative Structural Engineering
 Designer :
 Job Number : 24-8400.32
 Model Name : Fuel Tank/Generator Canopy

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Basic Load Cases

	BLC Description	Category	Y Gravity	Distributed
1	DL	DL	-1	2
2	RLL	RLL		2
3	ELX	ELX		2
4	ELZ	ELZ		2
5	WL	WL		2

Member Distributed Loads (BLC 1 : DL)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M7	Y	-0.04	-0.04	0	%100
2	M8	Y	-0.04	-0.04	0	%100

Member Distributed Loads (BLC 2 : RLL)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M7	Y	-0.113	-0.113	0	%100
2	M8	Y	-0.113	-0.113	0	%100

Member Distributed Loads (BLC 3 : ELX)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M12	X	0.035	0.035	0	%100
2	M10	X	0.035	0.035	0	%100

Member Distributed Loads (BLC 4 : ELZ)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M7	Z	0.025	0.025	0	%100
2	M8	Z	0.025	0.025	0	%100

Member Distributed Loads (BLC 5 : WL)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M7	Y	-0.136	-0.136	0	%100
2	M8	Y	-0.136	-0.136	0	%100

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	Deflection 1	Yes	Y	DL	1								
2	Deflection 2	Yes	Y	RLL	1								
3	Deflection 3	Yes	Y	DL	1	RLL	1						
4	IBC 16-1	Yes	Y	DL	1.4								
5	IBC 16-2 (a)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6	RLL	0.5		
6	IBC 16-2 (b)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6				
7	IBC 16-3 (a)	Yes	Y	DL	1.2	RLL	1.6	LL	0.5	LLS	1		
8	IBC 16-5 (a)	Yes	Y	DL	1.2	Sds*DL	0.2	Rho*ELX	1	LL	0.5	LLS	1
9	IBC 16-5 (b)	Yes	Y	DL	1.2	Sds*DL	0.2	Rho*ELZ	1	LL	0.5	LLS	1
10	IBC 16-7 (a)	Yes	Y	DL	0.9	Sds*DL	-0.2	Rho*ELX	1				
11	IBC 16-7 (b)	Yes	Y	DL	0.9	Sds*DL	-0.2	Rho*ELZ	1				
12	IBC 16-5 (os-a)	Yes	Y	DL	1.2	Sds*DL	0.2	Om*ELX	1	LL	0.5	LLS	1
13	IBC 16-5 (os-b)	Yes	Y	DL	1.2	Sds*DL	0.2	Om*ELZ	1	LL	0.5	LLS	1



Company : Innovative Structural Engineering
 Designer :
 Job Number : 24-8400.32
 Model Name : Fuel Tank/Generator Canopy

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Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
14	IBC 16-7 (os-a)	Yes	Y	DL	0.9	Sds*DL	-0.2	Om*ELX	1				
15	IBC 16-7 (os-b)	Yes	Y	DL	0.9	Sds*DL	-0.2	Om*ELZ	1				
16	DL	Yes	Y	DL	1								
17	RLL	Yes	Y	RLL	1								
18	ELX	Yes	Y	ELX	1								
19	ELZ	Yes	Y	ELZ	1								
20	WLX	Yes	Y	WLX	1								
21	WLZ	Yes	Y	WLZ	1								
22	?*ELX	Yes	Y	Om*ELX	1								
23	?*ELZ	Yes	Y	Om*ELZ	1								
24	IBC 21/ASCE Strength 3 (b) (a)	Yes	Y	DL	1.2	RLL	1.6	WL	0.5				
25	IBC 21/ASCE Strength 3 (b) (b)	Yes	Y	DL	1.2	RLL	1.6	WL	-0.5				
26	IBC 21/ASCE Strength 3 (d) (a)	Yes	Y	DL	1.2	WL	0.5						
27	IBC 21/ASCE Strength 3 (d) (b)	Yes	Y	DL	1.2	WL	-0.5						
28	IBC 21/ASCE Strength 4 (a) (a)	Yes	Y	DL	1.2	WL	1	LL	0.5	LLS	1	RLL	0.5
29	IBC 21/ASCE Strength 4 (a) (b)	Yes	Y	DL	1.2	WL	-1	LL	0.5	LLS	1	RLL	0.5
30	IBC 21/ASCE Strength 4 (b) (a)	Yes	Y	DL	1.2	WL	1	LL	0.5	LLS	1		
31	IBC 21/ASCE Strength 4 (b) (b)	Yes	Y	DL	1.2	WL	-1	LL	0.5	LLS	1		
32	IBC 21/ASCE Strength 5 (a)	Yes	Y	DL	0.9	WL	1						
33	IBC 21/ASCE Strength 5 (b)	Yes	Y	DL	0.9	WL	-1						



Company : Innovative Structural Engineering
 Designer :
 Job Number : 24-8400.32
 Model Name : Fuel Tank/Generator Canopy

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Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

Member	Shape	Code Check	Loc[ft]	LC	Shear	Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	M1	HSS4X4X6	0.191	0	12*	0.01	14	z	23*	81.993	197.892	22.046	22.046	2.245	H1-1b
2	M2	HSS4X4X6	0.204	14	12*	0.01	14	z	12*	81.993	197.892	22.046	22.046	2.251	H1-1b
3	M4	HSS4X4X6	0.207	0	13*	0.012	14	z	13*	81.993	197.892	22.046	22.046	2.174	H1-1b
4	M5	HSS4X4X6	0.207	0	13*	0.012	14	z	13*	81.993	197.892	22.046	22.046	2.174	H1-1b
5	M10	HSS6X4X4	0.049	11.33	8	0.006	11.33	y	8	109.969	178.02	22.252	29.429	2.09	H1-1b
6	M12	HSS6X4X4	0.049	11.33	8	0.006	11.33	y	8	109.969	178.02	22.252	29.429	2.09	H1-1b
7	M7	HSS6X4X4	0.233	8.165	24	0.042	16.33	y	24	65.302	178.02	22.252	29.429	1.229	H1-1b
8	M8	HSS6X4X4	0.233	8.165	24	0.042	16.33	y	24	65.302	178.02	22.252	29.429	1.229	H1-1b

Envelope Z-Direction Story Drift - Strength

Story (Elevation)			Story Drift[in]	Loc (Z,X)	LC	Drift Ratio (%)	Loc (Z,X)	LC	2nd/1st Ratio	Loc (Z,X)	LC
1	14 ft	max	0.849	0, 0	9	0.505	0, 0	9	1.012	0, 0	9
2		min	0	16.33, 11.33	8	0	16.33, 11.33	27	1	0, 0	4

Envelope X-Direction Story Drift - Strength

Story (Elevation)		Story Drift[in]	Loc (Z,X)	LC	Drift Ratio (%)	Loc (Z,X)	LC	2nd/1st Ratio	Loc (Z,X)	LC	
1	14 ft	max	0.792	16.33, 0	8	0.471	16.33, 0	8	1.011	16.33, 0	8
2		min	0	0, 11.33	4	0	0, 11.33	32	1	0, 11.33	4

Envelope Node Reactions

Node Label			X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	0.011	4	2.978	24	0.401	24	1.867	24	0	8	1.476	18
2		min	-0.199	18	-0.4	33	-0.2	19	-1.524	19	0	9	-0.052	4
3	N2	max	0	19	2.978	24	0.401	24	1.867	24	0	8	1.544	8
4		min	-0.209	8	-0.4	33	-0.2	19	-1.524	19	0	19	0	19
5	N5	max	0	21	2.978	24	0.109	33	0.508	33	0	9	1.544	8
6		min	-0.209	8	-0.4	33	-0.401	24	-2.002	9	0	8	0	20
7	N4	max	0.011	4	2.978	24	0.109	33	0.508	33	0	33	1.476	18
8		min	-0.199	18	-0.4	33	-0.401	24	-2.002	9	0	8	-0.052	4
9	Totals:	max	0	9	11.914	24	0	7						
10		min	-0.793	8	-1.601	33	-0.8	9						



Company : Innovative Structural Engineering
 Designer :
 Job Number : 24-8400.32
 Model Name : Fuel Tank/Generator Canopy

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Node Reactions

	LC	Node Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N1	0.008	0.789	0.071	0.33	0	-0.037
2	1	N2	-0.008	0.789	0.071	0.33	0	0.037
3	1	N5	-0.008	0.789	-0.071	-0.33	0	0.037
4	1	N4	0.008	0.789	-0.071	-0.33	0	-0.037
5	1	Totals:	0	3.157	0			
6	1	COG (ft):	X: 5.665	Y: 11.828	Z: 8.165			
7	2	N1	0	0.923	0.144	0.668	0	0
8	2	N2	0	0.923	0.144	0.668	0	0
9	2	N5	0	0.923	-0.144	-0.668	0	0
10	2	N4	0	0.923	-0.144	-0.668	0	0
11	2	Totals:	0	3.691	0			
12	2	COG (ft):	X: 5.665	Y: 14	Z: 8.165			
13	3	N1	0.008	1.712	0.214	0.998	0	-0.037
14	3	N2	-0.008	1.712	0.214	0.998	0	0.037
15	3	N5	-0.008	1.712	-0.214	-0.998	0	0.037
16	3	N4	0.008	1.712	-0.214	-0.998	0	-0.037
17	3	Totals:	0	6.847	0			
18	3	COG (ft):	X: 5.665	Y: 12.999	Z: 8.165			
19	4	N1	0.011	1.105	0.099	0.461	0	-0.052
20	4	N2	-0.011	1.105	0.099	0.461	0	0.052
21	4	N5	-0.011	1.105	-0.099	-0.461	0	0.052
22	4	N4	0.011	1.105	-0.099	-0.461	0	-0.052
23	4	Totals:	0	4.419	0			
24	4	COG (ft):	X: 5.665	Y: 11.828	Z: 8.165			
25	5	N1	0.01	1.408	0.157	0.73	0	-0.045
26	5	N2	-0.01	1.408	0.157	0.73	0	0.045
27	5	N5	-0.01	1.408	-0.157	-0.73	0	0.045
28	5	N4	0.01	1.408	-0.157	-0.73	0	-0.045
29	5	Totals:	0	5.633	0			
30	5	COG (ft):	X: 5.665	Y: 12.539	Z: 8.165			
31	6	N1	0.01	0.947	0.085	0.396	0	-0.045
32	6	N2	-0.01	0.947	0.085	0.396	0	0.045
33	6	N5	-0.01	0.947	-0.085	-0.396	0	0.045
34	6	N4	0.01	0.947	-0.085	-0.396	0	-0.045
35	6	Totals:	0	3.788	0			
36	6	COG (ft):	X: 5.665	Y: 11.828	Z: 8.165			
37	7	N1	0.01	2.423	0.315	1.465	0	-0.045
38	7	N2	-0.01	2.423	0.315	1.465	0	0.045
39	7	N5	-0.01	2.423	-0.315	-1.465	0	0.045
40	7	N4	0.01	2.423	-0.315	-1.465	0	-0.045
41	7	Totals:	0	9.693	0			
42	7	COG (ft):	X: 5.665	Y: 13.151	Z: 8.165			
43	8	N1	-0.188	0.871	0.099	0.461	0	1.44
44	8	N2	-0.209	1.335	0.099	0.461	0	1.544
45	8	N5	-0.209	1.335	-0.099	-0.461	0	1.544
46	8	N4	-0.188	0.871	-0.099	-0.461	0	1.44
47	8	Totals:	-0.793	4.413	0			
48	8	COG (ft):	X: 5.665	Y: 11.828	Z: 8.165			
49	9	N1	0.011	0.945	-0.101	-1.081	0	-0.052
50	9	N2	-0.011	0.945	-0.101	-1.081	0	0.052
51	9	N5	-0.011	1.261	-0.299	-2.002	0	0.052
52	9	N4	0.011	1.261	-0.299	-2.002	0	-0.052
53	9	Totals:	0	4.413	-0.8			
54	9	COG (ft):	X: 5.665	Y: 11.828	Z: 8.165			
55	10	N1	-0.193	0.323	0.05	0.231	0	1.458



Company : Innovative Structural Engineering
 Designer :
 Job Number : 24-8400.32
 Model Name : Fuel Tank/Generator Canopy

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Node Reactions (Continued)

	LC	Node Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
56	10	N2	-0.203	0.785	0.05	0.231	0	1.51
57	10	N5	-0.203	0.785	-0.05	-0.231	0	1.51
58	10	N4	-0.193	0.323	-0.05	-0.231	0	1.458
59	10	Totals:	-0.793	2.216	0			
60	10	COG (ft):	X: 5.665	Y: 11.828	Z: 8.165			
61	11	N1	0.006	0.397	-0.151	-1.301	0	-0.026
62	11	N2	-0.006	0.397	-0.151	-1.301	0	0.026
63	11	N5	-0.006	0.711	-0.249	-1.764	0	0.026
64	11	N4	0.006	0.711	-0.249	-1.764	0	-0.026
65	11	Totals:	0	2.216	-0.8			
66	11	COG (ft):	X: 5.665	Y: 11.828	Z: 8.165			
67	16	N1	0.008	0.789	0.071	0.33	0	-0.037
68	16	N2	-0.008	0.789	0.071	0.33	0	0.037
69	16	N5	-0.008	0.789	-0.071	-0.33	0	0.037
70	16	N4	0.008	0.789	-0.071	-0.33	0	-0.037
71	16	Totals:	0	3.157	0			
72	16	COG (ft):	X: 5.665	Y: 11.828	Z: 8.165			
73	17	N1	0	0.923	0.144	0.668	0	0
74	17	N2	0	0.923	0.144	0.668	0	0
75	17	N5	0	0.923	-0.144	-0.668	0	0
76	17	N4	0	0.923	-0.144	-0.668	0	0
77	17	Totals:	0	3.691	0			
78	17	COG (ft):	X: 5.665	Y: 14	Z: 8.165			
79	18	N1	-0.199	-0.229	0	0	0	1.476
80	18	N2	-0.198	0.229	0	0	0	1.476
81	18	N5	-0.198	0.229	0	0	0	1.476
82	18	N4	-0.199	-0.229	0	0	0	1.476
83	18	Totals:	-0.793	0	0			
84	18	COG (ft):	NC	NC	NC			
85	19	N1	0	-0.156	-0.2	-1.524	0	0
86	19	N2	0	-0.156	-0.2	-1.524	0	0
87	19	N5	0	0.156	-0.2	-1.524	0	0
88	19	N4	0	0.156	-0.2	-1.524	0	0
89	19	Totals:	0	0	-0.8			
90	19	COG (ft):	NC	NC	NC			
91	20	N1	0	0	0	0	0	0
92	20	N2	0	0	0	0	0	0
93	20	N5	0	0	0	0	0	0
94	20	N4	0	0	0	0	0	0
95	20	Totals:	0	0	0			
96	20	COG (ft):	NC	NC	NC			
97	21	N1	0	0	0	0	0	0
98	21	N2	0	0	0	0	0	0
99	21	N5	0	0	0	0	0	0
100	21	N4	0	0	0	0	0	0
101	21	Totals:	0	0	0			
102	21	COG (ft):	NC	NC	NC			
103	24	N1	0.01	2.978	0.401	1.867	0	-0.045
104	24	N2	-0.01	2.978	0.401	1.867	0	0.045
105	24	N5	-0.01	2.978	-0.401	-1.867	0	0.045
106	24	N4	0.01	2.978	-0.401	-1.867	0	-0.045
107	24	Totals:	0	11.914	0			
108	24	COG (ft):	X: 5.665	Y: 13.309	Z: 8.165			
109	25	N1	0.01	1.868	0.228	1.063	0	-0.045
110	25	N2	-0.01	1.868	0.228	1.063	0	0.045



Company : Innovative Structural Engineering
 Designer :
 Job Number : 24-8400.32
 Model Name : Fuel Tank/Generator Canopy

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Node Reactions (Continued)

	LC	Node Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
111	25	N5	-0.01	1.868	-0.228	-1.063	0	0.045
112	25	N4	0.01	1.868	-0.228	-1.063	0	-0.045
113	25	Totals:	0	7.472	0			
114	25	COG (ft):	X: 5.665	Y: 12.899	Z: 8.165			
115	26	N1	0.01	1.502	0.171	0.798	0	-0.045
116	26	N2	-0.01	1.502	0.171	0.798	0	0.045
117	26	N5	-0.01	1.502	-0.171	-0.798	0	0.045
118	26	N4	0.01	1.502	-0.171	-0.798	0	-0.045
119	26	Totals:	0	6.009	0			
120	26	COG (ft):	X: 5.665	Y: 12.631	Z: 8.165			
121	27	N1	0.01	0.392	-0.001	-0.007	0	-0.045
122	27	N2	-0.01	0.392	-0.001	-0.007	0	0.045
123	27	N5	-0.01	0.392	0.001	0.007	0	0.045
124	27	N4	0.01	0.392	0.001	0.007	0	-0.045
125	27	Totals:	0	1.567	0			
126	27	COG (ft):	X: 5.665	Y: 8.749	Z: 8.165			
127	28	N1	0.01	2.519	0.329	1.534	0	-0.045
128	28	N2	-0.01	2.519	0.329	1.534	0	0.045
129	28	N5	-0.01	2.519	-0.329	-1.534	0	0.045
130	28	N4	0.01	2.519	-0.329	-1.534	0	-0.045
131	28	Totals:	0	10.075	0			
132	28	COG (ft):	X: 5.665	Y: 13.183	Z: 8.165			
133	29	N1	0.01	0.298	-0.016	-0.075	0	-0.045
134	29	N2	-0.01	0.298	-0.016	-0.075	0	0.045
135	29	N5	-0.01	0.298	0.016	0.075	0	0.045
136	29	N4	0.01	0.298	0.016	0.075	0	-0.045
137	29	Totals:	0	1.191	0			
138	29	COG (ft):	X: 5.665	Y: 7.093	Z: 8.165			
139	30	N1	0.01	2.057	0.258	1.2	0	-0.045
140	30	N2	-0.01	2.057	0.258	1.2	0	0.045
141	30	N5	-0.01	2.057	-0.258	-1.2	0	0.045
142	30	N4	0.01	2.057	-0.258	-1.2	0	-0.045
143	30	Totals:	0	8.23	0			
144	30	COG (ft):	X: 5.665	Y: 13	Z: 8.165			
145	31	N1	0.01	-0.163	-0.088	-0.409	0	-0.045
146	31	N2	-0.01	-0.163	-0.088	-0.409	0	0.045
147	31	N5	-0.01	-0.163	0.088	0.409	0	0.045
148	31	N4	0.01	-0.163	0.088	0.409	0	-0.045
149	31	Totals:	0	-0.654	0			
150	31	COG (ft):	X: 5.665	Y: 26.585	Z: 8.165			
151	32	N1	0.007	1.821	0.236	1.101	0	-0.033
152	32	N2	-0.007	1.821	0.236	1.101	0	0.033
153	32	N5	-0.007	1.821	-0.236	-1.101	0	0.033
154	32	N4	0.007	1.821	-0.236	-1.101	0	-0.033
155	32	Totals:	0	7.283	0			
156	32	COG (ft):	X: 5.665	Y: 13.153	Z: 8.165			
157	33	N1	0.007	-0.4	-0.109	-0.508	0	-0.033
158	33	N2	-0.007	-0.4	-0.109	-0.508	0	0.033
159	33	N5	-0.007	-0.4	0.109	0.508	0	0.033
160	33	N4	0.007	-0.4	0.109	0.508	0	-0.033
161	33	Totals:	0	-1.601	0			
162	33	COG (ft):	X: 5.665	Y: 17.855	Z: 8.165			

Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Pole Footing Embedded in Soil

Project File: 8400.67 - Fuel Canopy.ec6

LIC#: KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

(c) ENERCALC, LLC 1982-2025

DESCRIPTION: FUEL TANK/GENERATOR CANOPY - Post Footing

Code References

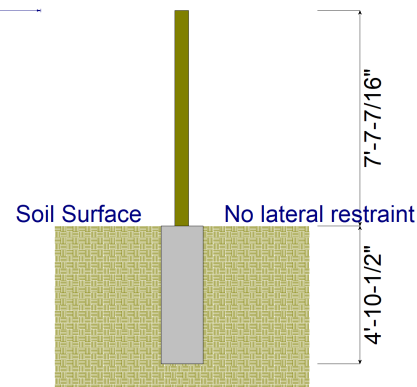
Calculations per IBC 2018 1807.3, CBC 2019

Load Combinations Used : IBC 2018

General Information

Pole Footing Shape Circular
 Pole Footing Diameter 18.0 in
 Calculate Min. Depth for Allowable Pressures
 No Lateral Restraint at Ground Surface
 Allow Passive 200.0 pcf
 Max Passive 1,500.0 pcf

Point Load



Controlling Values

Governing Load Combination 1.224D+1.750E
 Lateral Load 0.350 k
 Moment 2.667 k-ft

NO Ground Surface Restraint

Pressures at 1/3 Depth

Actual 315.577 psf
 Allowable 316.891 psf

Minimum Required Depth 4.875 ft

Footing Base Area 1.767 ft²
 Maximum Soil Pressure 0.9688 ksf

Applied Loads

Lateral Concentrated Load (k)		Lateral Distributed Loads (k)		Vertical Load (k)
D : Dead Load	k		k/ft	0.7890 k
Lr : Roof Live	k		k/ft	0.9230 k
L : Live	k		k/ft	k
S : Snow	k		k/ft	k
W : Wind	k		k/ft	k
E : Earthquake	0.20 k		k/ft	k
H : Lateral Earth	k		k/ft	k
Load distance above ground surface	7.620 ft	TOP of Load above ground surface	ft	
		BOTTOM of Load above ground surface	ft	

Load Combination Results

Load Combination	Forces @ Ground Surface		Required Depth - (ft)	Pressure at 1/3 Depth		Soil Increase Factor
	Loads - (k)	Moments - (ft-k)		Actual - (psf)	Allow - (psf)	
D Only	0.000	0.000	0.13	0.0	0.0	1.000
+D+Lr	0.000	0.000	0.13	0.0	0.0	1.000
+D+0.750Lr	0.000	0.000	0.13	0.0	0.0	1.000
+D+0.60W	0.000	0.000	0.13	0.0	0.0	1.000
+D-0.60W	0.000	0.000	0.13	0.0	0.0	1.000
+1.224D+1.750E	0.350	2.667	4.88	315.6	316.9	1.000
+1.224D-1.750E	0.350	2.667	4.88	315.6	316.9	1.000
+D+0.750Lr+0.450W	0.000	0.000	0.13	0.0	0.0	1.000
+D+0.750Lr-0.450W	0.000	0.000	0.13	0.0	0.0	1.000

Project Title: San Bernardino County, Fire Station 226 - Site Stru
 Engineer: SK
 Project ID: 22-7067
 Project Descr:

Pole Footing Embedded in Soil

Project File: 8400.67 - Fuel Canopy.ec6

LIC# : KW-06014215, Build:20.25.06.16

Innovative Structural Engineering, Inc. (IS

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DESCRIPTION: FUEL TANK/GENERATOR CANOPY - Post Footing

+D+0.450W	0.000	0.000	0.13	0.0	0.0	1.000
+D-0.450W	0.000	0.000	0.13	0.0	0.0	1.000
+1.168D+1.313E	0.263	2.000	4.38	283.8	283.9	1.000
+1.168D-1.313E	0.263	2.000	4.38	283.8	283.9	1.000
+0.60D+0.60W	0.000	0.000	0.13	0.0	0.0	1.000
+0.60D-0.60W	0.000	0.000	0.13	0.0	0.0	1.000
+0.3760D+1.750E	0.350	2.667	4.88	315.6	316.9	1.000
+0.3760D-1.750E	0.350	2.667	4.88	315.6	316.9	1.000


STRUCTURAL
ENGINEERS

 27369 Via Industria
Temecula, CA 92590
(951)600-0032, (951)600-0036 Fax

Sht:	Drilled Pier Rebar
Date:	11/25/2025
#:	24-8400.32
Δ :	--

Cast In Place Deep Foundation Element Analysis & Design in Seismic Design Category D, E & F Per 2019 CBC 1810.1-1810.4

Fuel Canopy - Foundation Plan

Pier Design Parameters

Diameter, D	=	18	in.
Seismic Design Category	=	D	
Depth, H	=	5.00	ft.
f'_c	=	2500	psi
f_y	=	60	ksi
Clear spacing from outside edge of transverse reinforcement	=	3	in
$A_{g, \text{ Pier}}$	=	254.47	in ²
A_{ch}	=	113.10	in ²
Factored (ASD) Vertical Axial Load	=	2380	lbs

Seismic Longitudinal Reinforcement

A minimum of four longitudinal bars

Logitudinal Reinforcement Size	=	#5	bars					CBC 1810.3.9.4.2
# of bars	=	6		≥	4	Min	OK	CBC 1810.3.9.4.2
Bar Dia.	=	0.625	in.					
$A_s, \text{ provided}$	=	1.84	in ²					
$\rho_s \text{ long, min}$	=	0.005						CBC 1810.3.9.4.2
$\rho_s \text{ long, provided}$	=	0.007234		>	0.005		OK	CBC 1810.3.9.4.2