Structural Calculations

Project #240104

DTC WELDING TECH & FABRICATION BUILDING

600 E 300 S, Kaysville, UT, 84037

Prepared For:

CRSA Architects
175 S Main Street STE 300, Salt Lake City, UT, 84111

PROFESSIONAL STRUCTURAL ENGINEER
GREGORY S. DUNN
08/30/2024
9027257
STATE OF UTAH

DUNN ASSOCIATES, INC
Consulting Structural Engineers
Enabling Great Design™

Structural Calculations

Project #240104

DTECH Welding Center

INDEX

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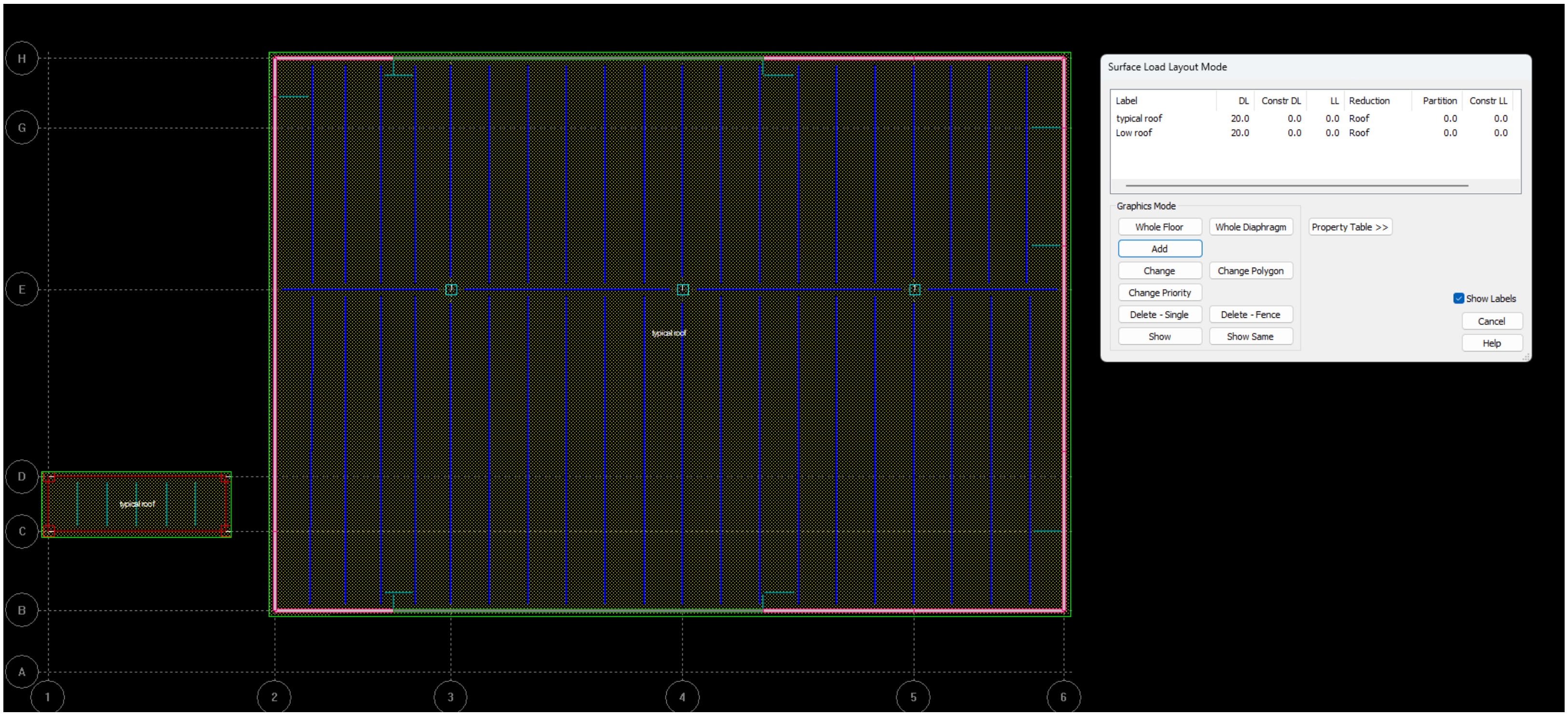
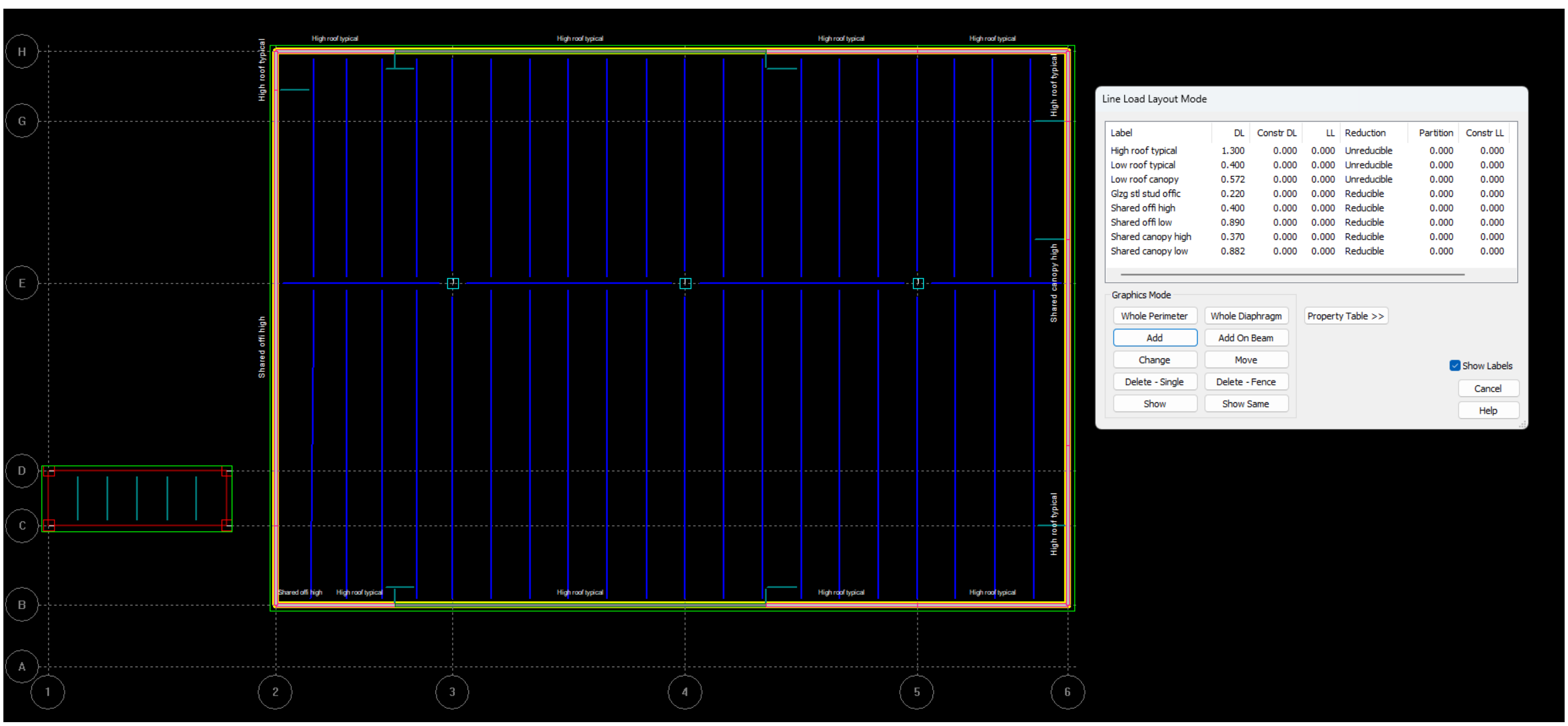
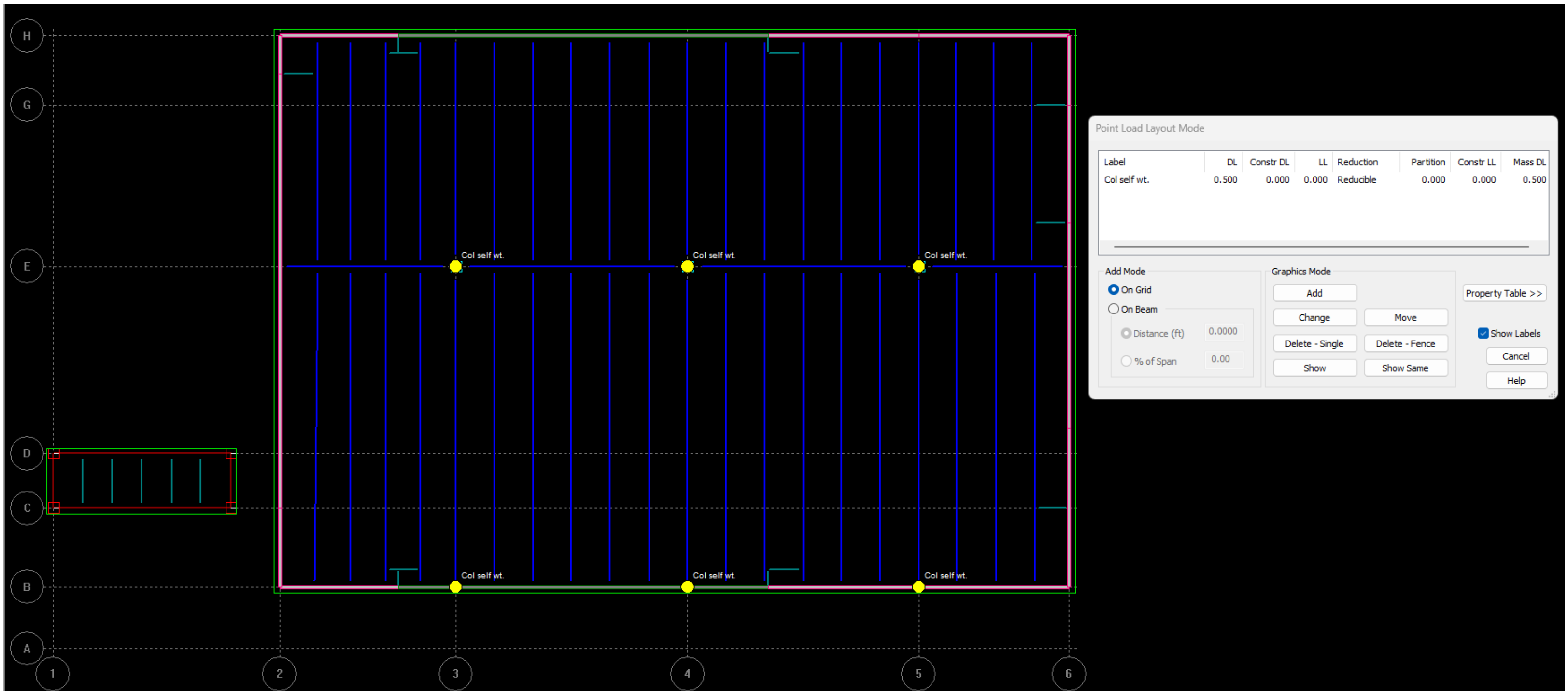
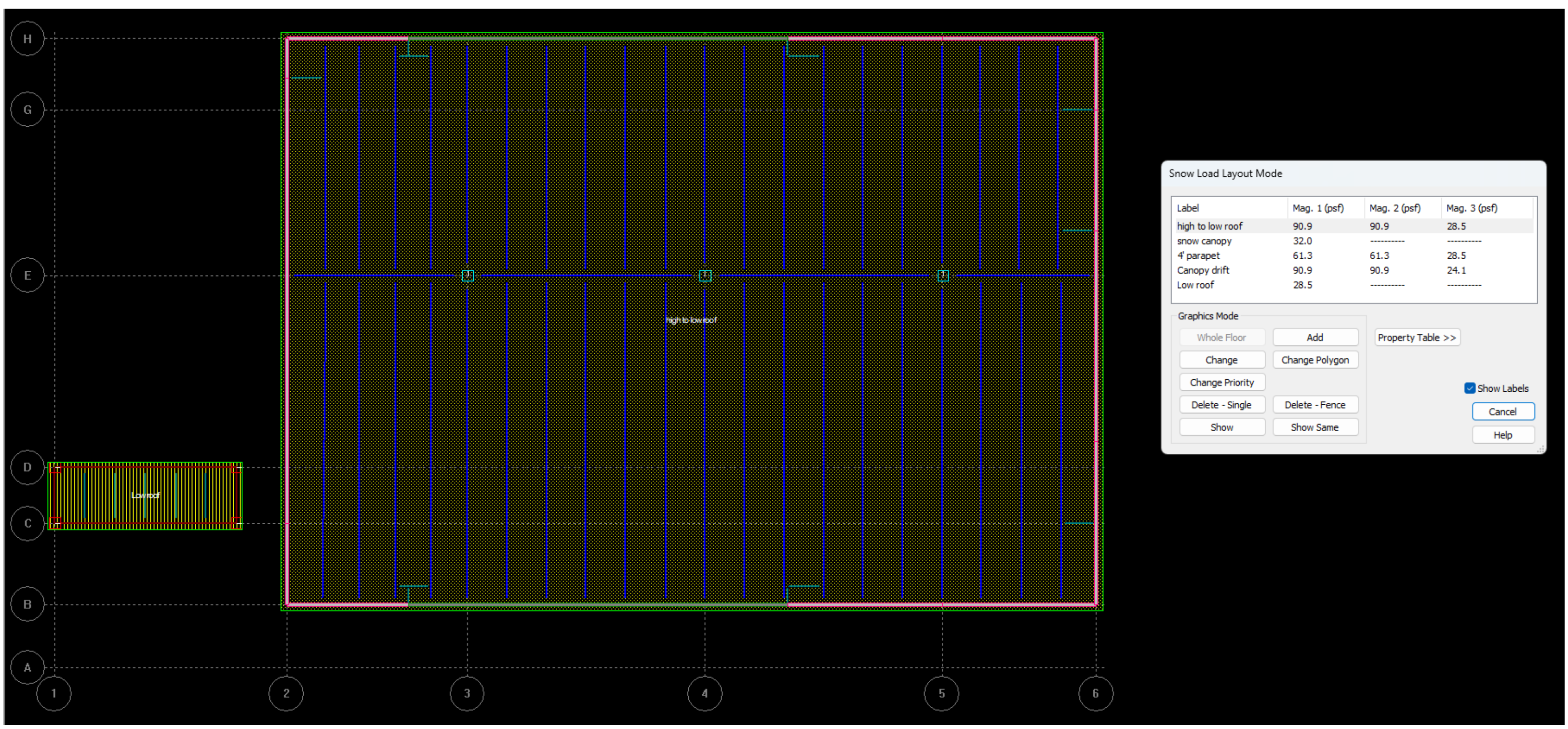
High Roof Loading Plans



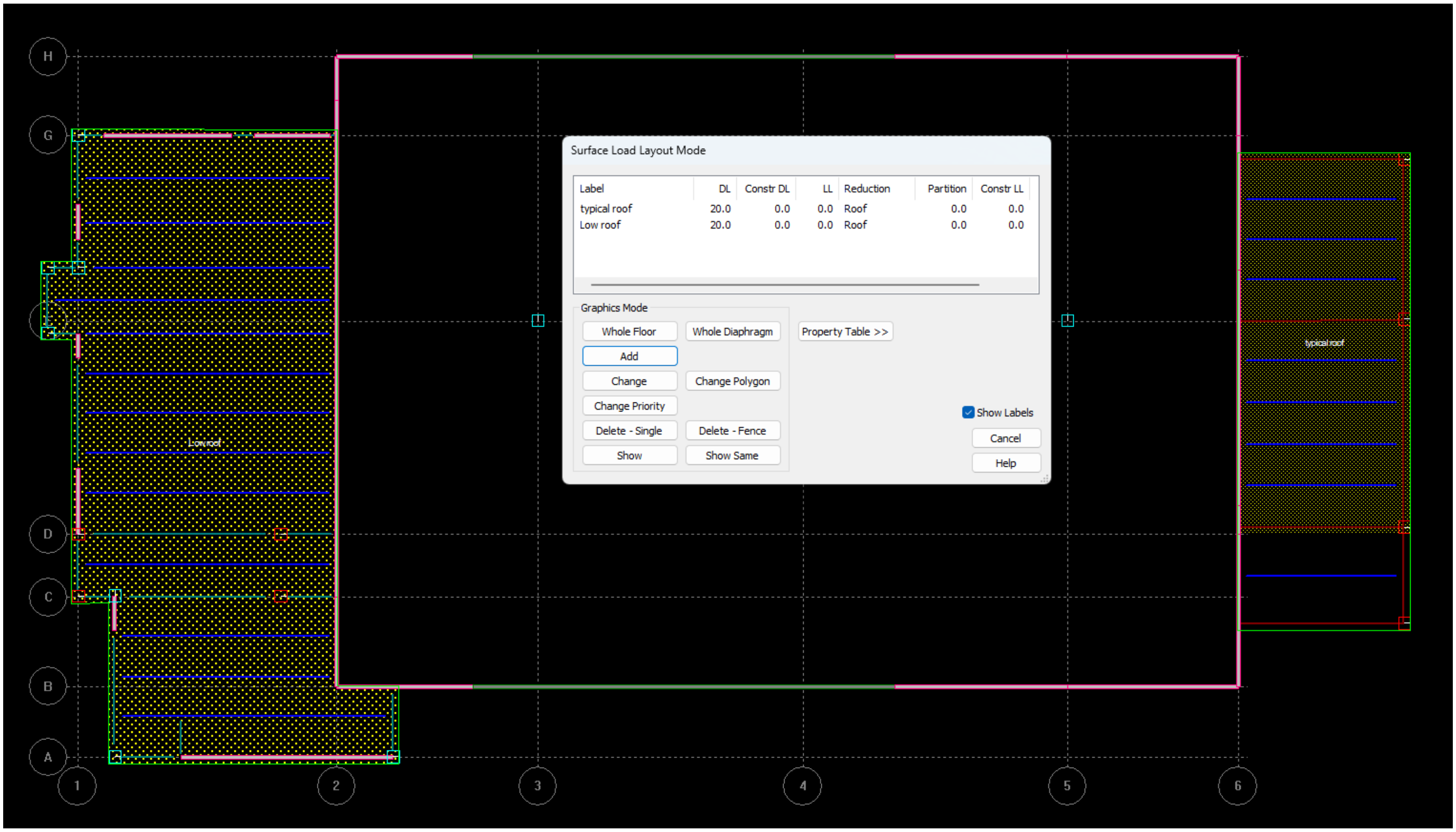


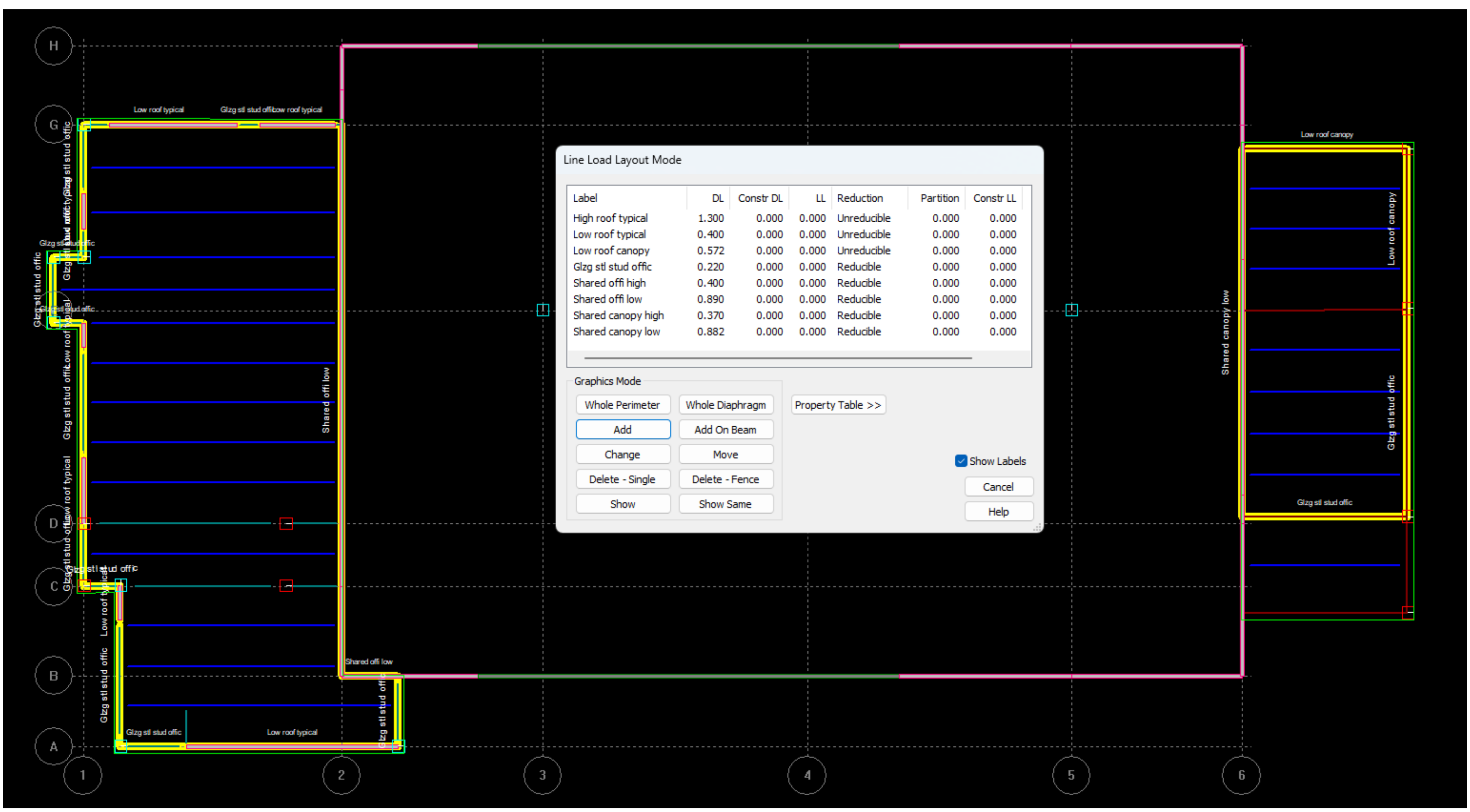
High Roof Loading Plans (Continued)





Low Roof Loading Plans





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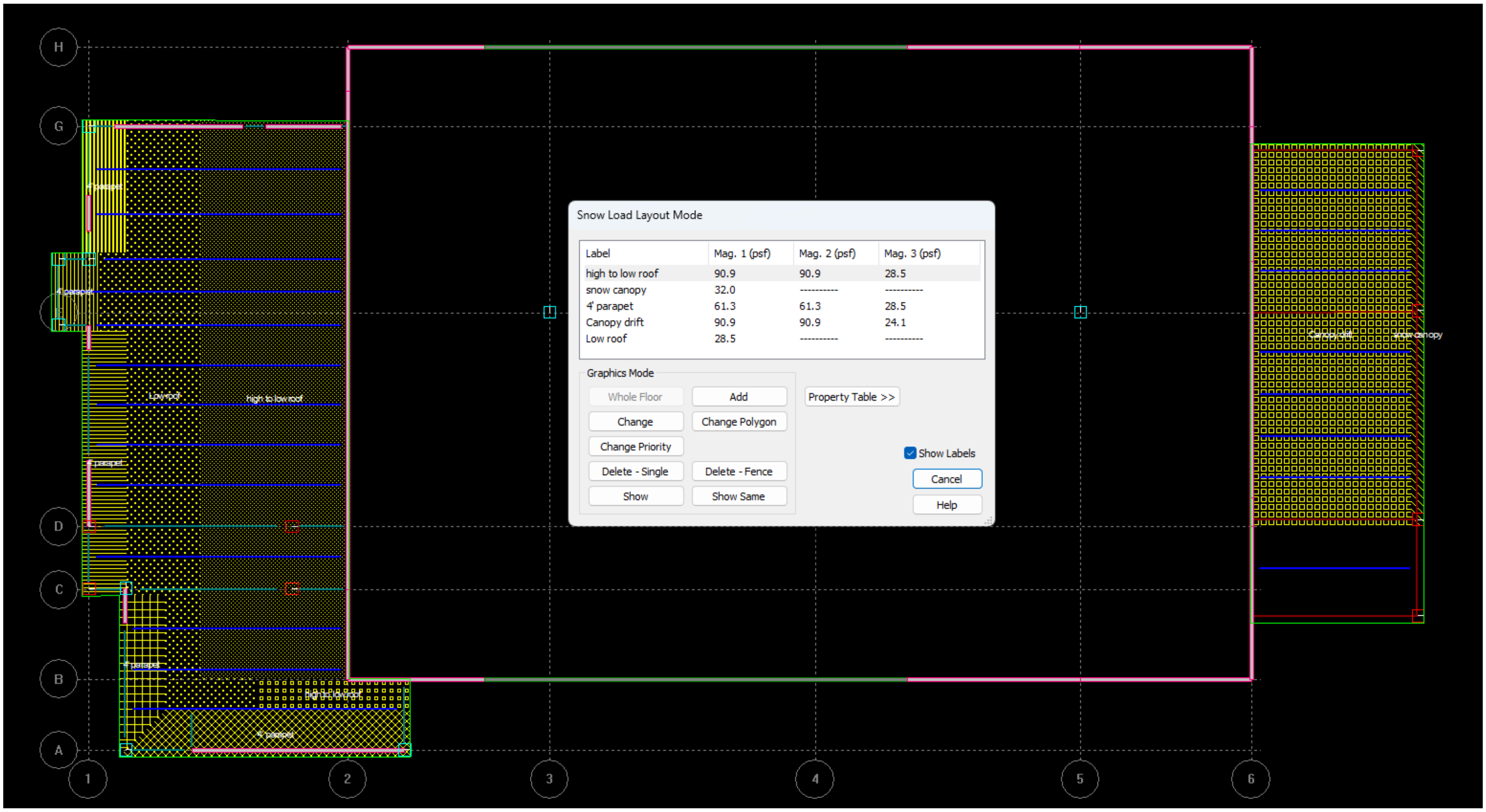

Design Criteria

Design Criteria for 1 & 2 Family Dwellings & Town Homes

- The 2021 IRC as adopted by the State of Utah Title 15A https://le.utah.gov/xcode/Title15A/C15A_1800010118000101.pdf
- Balcony/deck live load: 40 pounds per square foot pressure (psf)
- Floor live load: 40 psf - Bedrooms: 30 psf
- Frost depth: 30 inches
- Ground snow loads: as found on https://utahsnowload.usu.edu/
- Seismic Zone D 2
- Wind speed: Occupancy Category II, 140 V, ASCE-7 Exposure (Site specific: Most of Kaysville is classified as Exposure B)

Design Criteria for Commercial

- The 2021 IBC, IMC, IFC, IPC, IFGC, IECC, Etc, and the 2020 NEC as adopted by the State of Utah
- https://le.utah.gov/xcode/Title15A/C15A_1800010118000101.pdf
- Frost depth: 30 inches
- Ground and Live snow loads: as found on https://utahsnowload.usu.edu/
- Seismic Zone D 2
- Wind speed: Occupancy Category II, 140 V, ASCE-7 Exposure (Site specific: Most of Kaysville is classified as Exposure B)

Sht Number:	GD-
Job Number:	240104
Date:	8/22/2024
By:	GN

DUNN ASSOCIATES, INC
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Rain Load Based on ASCE 7-16 and IBC 2021

Project: **Project name here**
Description: **Rain Load Calculation**

GENERAL INPUT AND OUTPUT:

https://asce7hazardtool.online

15-min Rainfall intensity of 100-yr event, i_{15}:	**5.55 in/hr**	This input is for secondary drain sizing and rain load. From ASCE Online Hazard Tool link above.
60-min Rainfall intensity of 100-yr event, i_{60}:	**2.31 in/hr**	This input is used for primary drain sizing. Note units of both i15 and i60 are already in in/hr.
Area tributary to drain:	**6460.0 ft²**	Area should include 1/2 of wall areas above low roof drains if applicable.
Height from roof to secondary drain, static head, ds:	**2.00 in**	Typically 2" for internal secondary drains, or height to bottom of scupper. (Assumes clogged primary drain)
Secondary Drain Flow rate, $Q_{15} = 0.0104 \cdot A \cdot i_{15}$:	**372.9 gal/min**	Conversion factor is 144in²/1ft²*1gal/231in³*1hr/60 min = 0.0104*ft²*in/hr
Primary Drain Flow rate, $Q_{60} = 0.0104 \cdot A \cdot i_{60}$:	**155.2 gal/min**	See table 1106.2 from IPC to estimate primary drain size, which will match the secondary size.
Height above secondary drain, dynamic head, dh:	**2.00 in**	See tables below. Enter value based on required flow rate (Q_{15}) & drain size.
Total head, ds+dh:	**4.00 in**	
Design Rain Load R = 5.2*(ds+dh):	**20.8 psf**	Verify load effect is less than snow/roof live, or increase secondary drain size or increase member strength.

TABLES FOR HYDRAULIC HEAD Dh, ASCE 7 CHAPTER 8 COMMENTARY AND IBC 1611.1(2) COMMENTARY

Table C8.3-1 Flow Rate (Q) in Gallons per Minute for Secondary (Overflow) Roof Drains at Various Hydraulic Heads (d_h) above the Dam or Standpipe, in Inches

	Hydraulic Head (in.) above Dam or Standpipe						
	Overflow Dam 8 in. Diameter			Overflow Dam 12.75 in. Diameter		Overflow Dam 17 in. Diameter	Overflow Standpipe 6 in. Diameter
	Drain Outlet Size (in.)						
	3	4	6	6	8	10	4
	Drain Bowl Depth (in.)						
Flow rate (gal./min)	2	2	2	2	3.25	4.25	2
50	0.5	0.5	0.5	0.5	0.5	—	1.0
75	1.0	—	·	—	—	—	—
100	1.5	1.0	1.0	1.0	0.5	1.0	1.5
125	2.0	—	—	—	—	—	—
150	2.0	1.5	1.5	1.0	—	—	2.5
175	3.0	—	—	—	—	—	—
200	—	2.0	2.0	1.5	1.5	1.5	2.5
225	—	—	—	—	—	—	—
250	—	2.5	2.5	1.5	—	—	2.5
300	—	3.0	3.0	2.0	2.0	1.5	3.0
350	—	3.5	3.5	2.5	—	—	3.5
400	—	5.5	3.5	3.0	2.5	2.0	—
450	—	—	4.0	3.0	—	—	—
500	—	—	5.0	3.5	3.0	2.5	—
550	—	—	5.5	4.0	—	—	—
600	—	—	6.0	5.5	3.5	2.5	—
650	—	—	—	—	—	—	—
700	—	—	—	—	3.5	3.0	—
800	—	—	—	—	4.5	3.0	—
900	—	—	—	—	5.0	3.5	—
1,000	—	—	—	—	5.5	3.5	—
1,100	—	—	—	—	—	4.0	—
1,200	—	—	—	—	—	4.5	—

Notes:

1. Assume that the flow regime is either weir flow or transition flow, except where the hydraulic head values are in shaded cells below the heavy line that designates orifice flow.
2. To determine total head, add the depth of water (static head, d_s) above the roof surface to the secondary drain inlet (which is the height of the dam or standpipe above the roof surface) to the hydraulic head listed in this table.
3. Linear interpolation for flow rate and hydraulic head is appropriate for approximations.
4. Extrapolation is not appropriate.

Source: Adapted from FM Global (2012).

Table C8.3-3 Flow Rate, Q, in Gallons Per Minute for Scuppers at Various Hydraulic Heads (d_h) in Inches

	Hydraulic Head, d_h, in.									
Drainage System	1	2	2.5	3	3.5	4	4.5	5	7	8
6-in. wide channel scupper[a]	18	50	[b]	90	[b]	140	[b]	194	321	393
24-in. wide channel scupper	72	200	[b]	360	[b]	560	[b]	776	1,284	1,572
6-in. wide, 4-in. high, closed scupper[a]	18	50	[b]	90	[b]	140	[b]	177	231	253
24-in. wide, 4-in. high, closed scupper	72	200	[b]	360	[b]	560	[b]	708	924	1,012
6-in. wide, 6-in. high, closed scupper	18	50	[b]	90	[b]	140	[b]	194	303	343
24-in. wide, 6-in. high, closed scupper	72	200	[b]	360	[b]	560	[b]	776	1,212	1,372

[a]Channel scuppers are open-topped (i.e., three-sided). Closed scuppers are four-sided.
[b]Interpolation is appropriate, including between widths of each scupper.
Source: Adapted from FM Global (2012).

Table C8.3-5 Flow Rate (Q) in Gallons per Minute, for Circular Scuppers at Various Hydraulic Heads (d_h) in Inches

	Scupper Flow (gal./min)						
	Scupper Diameter (in.)						
d_h (in.)	5	6	8	10	12	14	16
1	6	7	8	8	10	10	10
2	25	25	30	35	40	40	45
3	50	55	65	75	75	90	95
4	80	90	110	130	140	155	160
5	115	135	165	190	220	240	260
6	155	185	230	270	300	325	360
7	190	230	300	350	410	440	480
8	220	280	375	445	510	570	610

Notes:
1. Hydraulic head (d_h) is taken above the scupper invert (design water level above base of scupper opening).
2. Linear interpolation is appropriate for approximations.
3. Extrapolation is not appropriate.

Source: Data from Carter (1957) and Bodhaine (1968).

DRAINAGE SYSTEM	FLOW RATE (gpm)									
	Depth of water above drain inlet (hydraulic head) (inches)									
	1	2	2.5	3	3.5	4	4.5	5	7	8
4-inch-diameter drain	80	170	180							
6-inch-diameter drain	100	190	270	380	540					
8-inch-diameter drain	125	230	340	560	850	1,100	1,170			
6-inch-wide, open-top scupper	18	50	*	90	*	140	**	194	321	393
24-inch-wide, open-top scupper	72	200	*	360	*	560	*	776	1,284	1,572
6-inch-wide, 4-inch-high, closed-top scupper	18	50	*	90	*	140	*	177	231	253
24-inch-wide, 4-inch-high, closed-top scupper	72	200	*	360	*	560	*	708	924	1,012
6-inch-wide, 6-inch-high, closed-top scupper	18	50	*	90	*	140	*	194	303	343
24-inch-wide, 6-inch-high, closed-top scupper	72	200	*	360	*	560	*	776	1,212	1,372

For SI: 1 inch = 25.4 mm, 1 gallon per minute = 3.785 L/m.
Source: Factory Mutual Engineering Corp. Loss Prevention Data 1-54.

Commentary Figure 1611.1(2)
FLOW RATE, IN GALLONS PER MINUTE, OF VARIOUS ROOF DRAINS AT VARIOUS WATER DEPTHS AT DRAIN INLETS (INCHES)

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Consulting Structural Engineers

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Leeward and Windward Snow Drift Based on ASCE 7-16

Sht Number:	**GD-**
Job Number:	**240104**
Date:	**8/22/2024**
By:	**GN**

Project: **Davis Applied Technology Center**
Description: **Typical Snow Load and Drift**

GENERAL INPUT AND OUTPUT:

		Load Factors:		
City	**Kaysville**	DL	SL	
Is project in Utah?	**Yes**	**1.00**	**1.00**	
Elevation at Site:	**4446 ft**			
p_g (SEAU Ground Snow Load)	37.0 psf	**37 psf**	*<---Manual Entry*	
C_e (Exposure Factor):	**1.0**			
C_t (Thermal Factor):	**1.0**	**May be set to 1.0, see comment**		
I_s (Importance Factor):	**1.1**			
Roof Slope:	**0:12**	*0.00 °*		
	Lower Roof	*Upper Roof*		
L_u (Length of Roof):	**39.2 ft**	**0.0 ft**		
Elevation Difference:	**3.42 ft**			
P_m (Minimum Snow for Low-Slope Roofs)	**22.0 psf**			
P_f (Roof Snow, Service Level):	**28.5 psf**			
Additional Seismic Snow Weight:	**0.0 psf**			

Snow Load Density γ:			18.81 pcf
h_b (Snow Depth):			1.51 ft
h_c (Roof to Snow):			1.90 ft
	Windward	Leeward	Controlling
h_d (Potential Drift Height):	1.74 ft	1.56 ft	1.74 ft
Maximum Drift Height:	1.74 ft	1.56 ft	1.74 ft
Drift Width:	6.97 ft	6.22 ft	6.97 ft
Controlling Drift			*Windward*
Max Snow Load (Uniform and Drift, Service Level):			**61.3 psf**
Maximum Drift Weight (Service Level):			**32.8 psf**
Drift Width:			**6.97 ft**

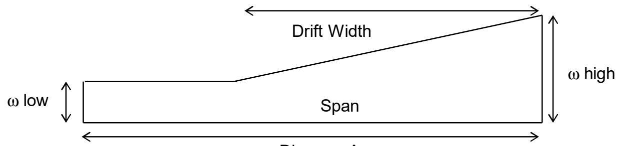


Diagram A

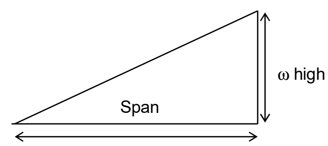


Diagram B

Description: **Joist Perpendicular to Wall**

Equivalent Uniform Snow Load (Increased Per Load Factors Given Above)

INPUT:

Typ. Member Span =	**6.7 ft**	Additional Max Drift =	32.8 psf	Roof Uniform DL =	**0.0 psf**
Roof Uniform Snow =	28.5 psf	Drift Length =	7.0 ft	DL Increased for LF =	**0.0 psf**

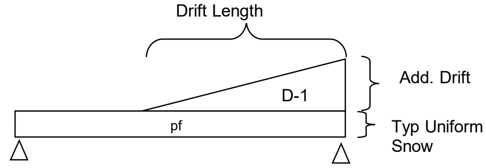
OUTPUT:

For Typ. Uniform Roof Snow + DL Load: **1.00 Ft Trib**

Moment =	158.0 lb-ft
Max Shear React. =	94.9 lbs

For Add. Drift Loading:

Max Add. Shear React.= 72.77 lbs *Drift Side* 36.4 lbs *Other Side*

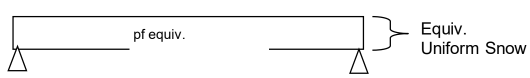


Max Loading for Typ Uniform + Add. Drift

Max Total Moment =	0.250 k-ft	
Max Shear Reaction =	0.168 kips	*Drift Side*
Min Shear Reaction =	0.131 kips	*Other Side*

Equivalent Uniform Snow Load

For V =	50.3 plf
For M =	45.0 plf



Equivalent Uniform Snow Load For Design = **50 plf** *See Diagram 'B' Above*

D-1 Parapet

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Leeward and Windward Snow Drift Based on ASCE 7-16

Sht Number:	**GD-**
Job Number:	**240104**
Date:	**8/22/2024**
By:	**GN**

Project: **Davis Applied Technology Center**
Description: **Typical Snow Load and Drift**

GENERAL INPUT AND OUTPUT:

City	**Kaysville**		
Is project in Utah?	**Yes**		
Elevation at Site:	**4446 ft**		
p_g (SEAU Ground Snow Load)	37.0 psf	**37 psf**	*<---Manual Entry*
C_e (Exposure Factor):	**1.0**		
C_t (Thermal Factor):	**1.0**	**May be set to 1.0, see comment**	
I_s (Importance Factor):	**1.1**		
Roof Slope:	**0:12**	*0.00 °*	
	Lower Roof	*Upper Roof*	
L_u (Length of Roof):	**39.2 ft**	**136.0 ft**	
Elevation Difference:	**4.83 ft**		
P_m (Minimum Snow for Low-Slope Roofs)	**22.0 psf**		
P_f (Roof Snow, Service Level):	**28.5 psf**		
Additional Seismic Snow Weight:	**0.0 psf**		

Load Factors:

DL	SL
1.00	**1.00**

Snow Load Density γ:	18.81 pcf
h_b (Snow Depth):	1.51 ft
h_c (Roof to Snow):	3.32 ft

	Windward	Leeward	Controlling
h_d (Potential Drift Height):	1.74 ft	4.29 ft	4.29 ft
Maximum Drift Height:	1.74 ft	3.32 ft	3.32 ft
Drift Width:	6.97 ft	22.18 ft	22.18 ft
		Controlling Drift	*Leeward*

Max Snow Load (Uniform and Drift, Service Level):	**90.9 psf**
Maximum Drift Weight (Service Level):	**62.4 psf**
Drift Width:	**22.18 ft**

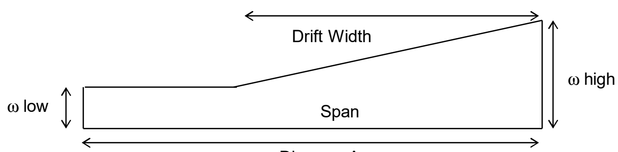


Diagram A

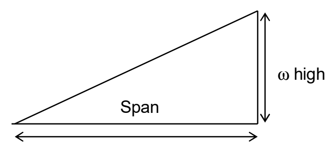


Diagram B

Description: **Joist Perpendicular to Wall**

Equivalent Uniform Snow Load (Increased Per Load Factors Given Above)

INPUT:

Typ. Member Span =	**6.7 ft**	Additional Max Drift =	62.4 psf	Roof Uniform DL =	**0.0 psf**
Roof Uniform Snow =	28.5 psf	Drift Length =	22.2 ft	DL Increased for LF =	**0.0 psf**

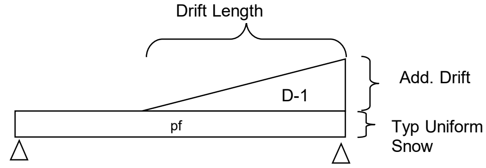
OUTPUT:

For Typ. Uniform Roof Snow + DL Load: **1.00 Ft Trib**

Moment =	158.0 lb-ft
Max Shear React. =	94.9 lbs

For Add. Drift Loading:

Max Add. Shear React.= 138.57 lbs *Drift Side* 69.3 lbs *Other Side*

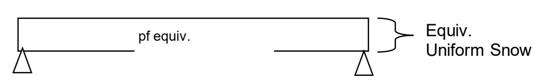


Max Loading for Typ Uniform + Add. Drift

Max Total Moment =	0.333 k-ft
Max Shear Reaction =	0.233 kips *Drift Side*
Min Shear Reaction =	0.164 kips *Other Side*

Equivalent Uniform Snow Load

For V =	70.1 plf
For M =	60.1 plf



Equivalent Uniform Snow Load For Design = **70 plf** *See Diagram 'B' Above*

D-2 High to low roof

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Consulting Structural Engineers

Leeward and Windward Snow Drift Based on ASCE 7-16

Sht Number:	GD-
Job Number:	240104
Date:	8/22/2024
By:	GN

Project: Davis Applied Technology Center
Description: Typical Snow Load and Drift

GENERAL INPUT AND OUTPUT:

City	**Kaysville**	Load Factors:	DL	SL
Is project in Utah?	**Yes**		**1.00**	**1.00**
Elevation at Site:	**4446 ft**			
p_g (SEAU Ground Snow Load)	37.0 psf	**37 psf**	*<---Manual Entry*	

Snow Load Density γ:	18.81 pcf
h_b (Snow Depth):	1.82 ft
h_c (Roof to Snow):	3.02 ft

C_e (Exposure Factor):	**1.0**					
				Windward	Leeward	Controlling
C_t (Thermal Factor):	**1.2**	**May be set to 1.0, see comment**	h_d (Potential Drift Height):	1.74 ft	4.29 ft	4.29 ft
I_s (Importance Factor):	**1.1**		Maximum Drift Height:	1.74 ft	3.02 ft	3.02 ft
Roof Slope:	**0:12**	*0.00 °*	Drift Width:	6.97 ft	24.12 ft	24.12 ft
			Controlling Drift			*Leeward*

	Lower Roof	Upper Roof
L_u (Length of Roof):	**39.2 ft**	**136.0 ft**
Elevation Difference:	**4.83 ft**	
P_m (Minimum Snow for Low-Slope Roofs)	**22.0 psf**	
P_f (Roof Snow, Service Level):	**34.2 psf**	
Additional Seismic Snow Weight:	**6.8 psf**	

Max Snow Load (Uniform and Drift, Service Level):	**90.9 psf**
Maximum Drift Weight (Service Level):	**56.7 psf**
Drift Width:	**24.12 ft**

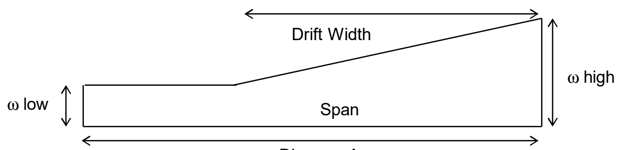


Diagram A

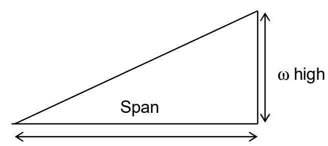


Diagram B

Description: Joist Perpendicular to Wall

Equivalent Uniform Snow Load (Increased Per Load Factors Given Above)

INPUT:

Typ. Member Span =	**6.0 ft**	Additional Max Drift =	56.7 psf	Roof Uniform DL =	**0.0 psf**
Roof Uniform Snow =	34.2 psf	Drift Length =	24.1 ft	DL Increased for LF =	**0.0 psf**

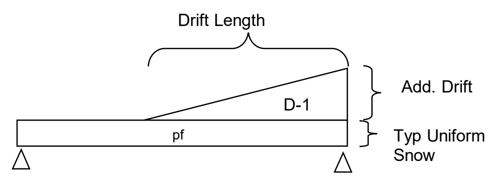
OUTPUT:

For Typ. Uniform Roof Snow + DL Load: **1.00 Ft Trib**

Moment =	153.8 lb-ft
Max Shear React. =	102.6 lbs

For Add. Drift Loading:

Max Add. Shear React.= 113.44 lbs *Drift Side* 56.7 lbs *Other Side*

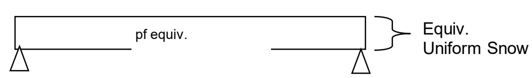


Max Loading for Typ Uniform + Add. Drift

Max Total Moment =	0.283 k-ft	
Max Shear Reaction =	0.216 kips	*Drift Side*
Min Shear Reaction =	0.159 kips	*Other Side*

Equivalent Uniform Snow Load

For V =	72.0 plf
For M =	62.9 plf



Equivalent Uniform Snow Load For Design = **72 plf** *See Diagram 'B' Above*

D-3 Roof to canopy

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Hip and Gable Roof Snow Loads Based on ASCE 7-16

Sht Number:	**GD-**
Job Number:	**240104**
Date:	**8/22/2024**
By:	**GN**

Project: **Project name here**
Description: **Load at 4:12 Shed Roof**

GENERAL INPUT AND OUTPUT:

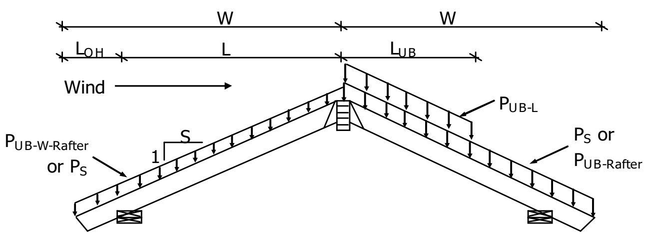
City	**Salt Lake City**		
Is project in Utah?	**Yes**		
Elevation at Site:	**4200 ft**		
p_g (SEAU Ground Snow Load)	28.0 psf		*<---Manual Entry*
Roof Slope:	**4:12**	*18.43 °*	
L (Horiz Dist Support to Ridge)	**25.0 ft**		
L_{OH} (Horiz Dist Eave to Support)	**1.0 ft**		
C_e (Exposure Factor):	**1.00**		
C_t (Thermal Factor):	**1.00**		
C_s (Roof Slope Factor):	1.00		*<---Manual Entry*
I_s (Importance Factor):	**1.00**		
P_f (Flat Roof Snow Load)	**19.6 psf**		
P_s (Sloped Roof Snow):	**19.6 psf**		*<---Additional Snow to Apply*
Additional Seismic Snow Weight:	**0.0 psf**		

Load Factors:

DL	SL
1.00	**1.00**

W (Eave to Ridge):	26.00 feet
Snow Load Density g:	17.64 pcf
S (Roof Slope):	3
h_b (Snow Depth):	1.11 feet
P_{UB-W} (Windward Unbal. Snow):	**5.9 psf**
$P_{UB-W-Rafter}$ (Windward Unbal. Snow):	**5.9 psf**
h_{d-L} (Leeward Drift Height):	1.66 feet
L_{UB} (Unbalanced Surcharge Length):	7.68 feet
P_{UB-L} (Leeward Unbal. Snow Surcharge):	**16.9 psf**
$P_{UB-L-Rafter}$ (Leeward Unbal. Snow Surcharge):	**16.9 psf**
$P_{UB-Rafter}$ (Rafter Unbal. Roof Snow):	**19.6 psf**
P_{Eave} (Eave Sloped Roof Snow):	**19.6 psf**

ROOF RAFTER SYSTEM



Roof Uniform DL =	**20.0 psf**
DL Increased for Slope and LF =	**21.1 psf**

1.00 Ft Trib

P_{SL} (Sliding Snow Load):	--
$W_{Upper\ Roof\ Sliding}$:	
$W_{Upper\ Roof\ Drift}$:	
Elevation Difference:	

R_L =	364.5 lbs	R_C =	954.3 lbs	R_R =	570.0 lbs	<-- Case 1: Unbalanced Load
R_L =	305.0 lbs	R_C =	525.4 lbs	R_R =	305.0 lbs	<-- Case 2: 2x P_f at Eaves Only
R_L =	550.0 lbs	R_C =	1015.4 lbs	R_R =	550.0 lbs	<-- Case 3: P_s Across Entire Spa

☐ Check Sliding Snow and Drift

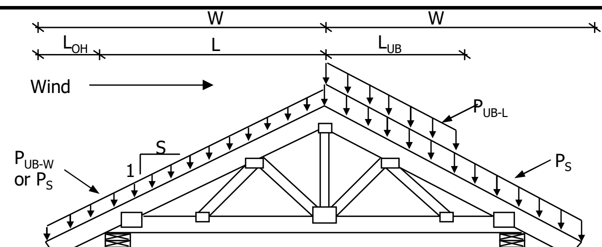
V_{max} =	508.5 lbs	@ 1.0' from Left: Case 3	V_{max} =	616.6 lbs	@ 0.0' from Left of Ridge: Case 1
M_{max} =	3168 lb-ft	@ 13.5' from Left: Case 3	M_{max} =	3423 lb-ft	@ 12.0' from Left of Ridge: Case 1

Equivalent Uniform Snow Load

For V =	40.6 plf	For V =	49.2 plf
For M =	40.7 plf	For M =	44.0 plf

Equivalent Uniform Load For Rafter Design = 49.25 PSF R_{MAX} = 1015.4 lbs R_{MIN} = 305.0 lbs

ROOF TRUSS SYSTEM



Roof Uniform DL =	**20.0 psf**
DL Increased for Slope and LF =	**21.1 psf**

1.00 Ft Trib

R_L =	841.6 lbs	R_R =	1047.1 lbs	<-- Case 1: Unbalanced Load
R_L =	567.7 lbs	R_R =	567.7 lbs	<-- Case 2: 2x P_f at Eaves Only
R_L =	1057.7 lbs	R_R =	1057.7 lbs	<-- Case 3: P_s Across Entire Span

V_{max} =	1017.0 lbs	@ 51.0' from Left of Ridge: Case 3
M_{max} =	12693 lb-ft	@ 26.0' from Left of Ridge: Case 3

Equivalent Uniform Snow Load

For V =	40.7 plf
For M =	40.7 plf

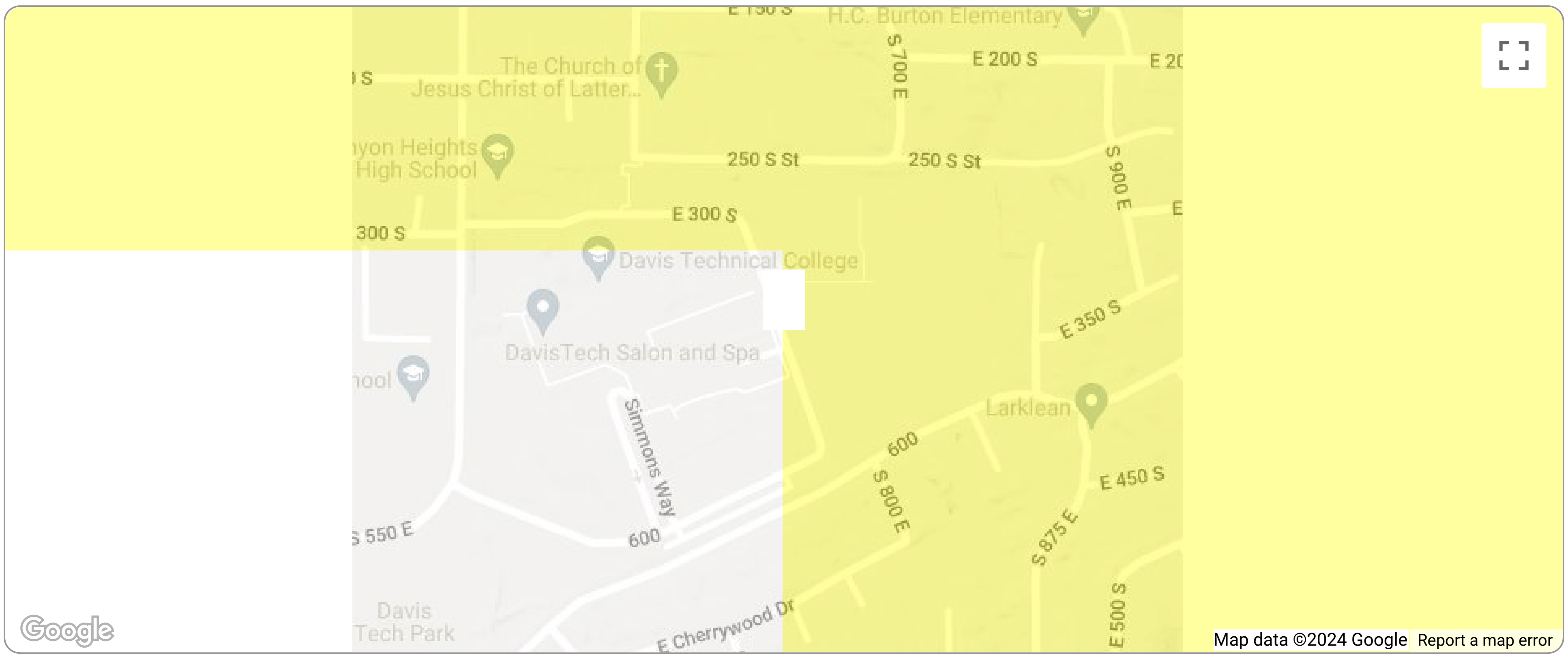
Equivalent Uniform Load For Truss Design = 40.68 PSF R_{MAX} = 1057.7 lbs R_{MIN} = 567.7 lbs

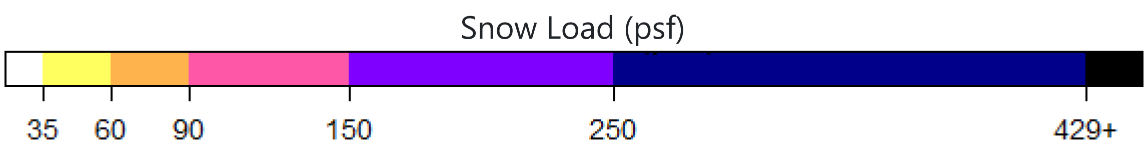
Utah Ground Snow Load Map

Latitude: 41.029
Longitude: -111.923
Elevation: 4,446 ft

Ground Snow Load:
37 psf / 1.78 kPa

*This document is not legally binding. The user is urged to verify ground snow load values with the local authority having jurisdiction.





These ground snow load values represent 50-year ground snow load estimated value at a 2% probability of exceedance for the location given. The grid used in the map is 3350ft by 3350ft. Elevations for these grid cells were estimated by aggregating data from 100ft by 100ft USGS digital elevation models and may not coincide with the actual site elevation. These predictions are calculated using the process outlined in The Utah Snow Load Study.[1]

Final predictions given are bounded at a lower limit for a minimum ground snow load of 21 psf to meet ASCE 7. Estimated values for snow loads at elevations significantly higher than all nearby stations lead to unreasonably high snow load estimates, therefore, the predictions in the map are not allowed to extend beyond the highest 50-year station ground snow load of 429 psf. Elevations over 9,000 ft are also considered less accurate due to the limited number of stations at these elevations. The results shown in this report have included a warning if the results have reached or exceeded the upper limit.

While great efforts have been made to ensure these predictions are as accurate as possible, designers must use expert judgement to ensure that such predictions are appropriate for their particular project. The SEAU and the authors cannot accept responsibility for prediction errors or any consequences resulting therefrom.

1 Bean, Brennan; Maguire, Marc; and Sun, Yan, "The Utah Snow Load Study" (2018). Civil and Environmental Engineering Faculty Publications. Paper 3589.

MecaWind v2478

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Calculations Prepared by:
Date: Aug 22, 2024
File Location: K:\2024\240104\Davis county defaults for GSN.wnd

General:

Wind Load Standard	=	ASCE 7-16	Basic Wind Speed	=	103.0 mph
Exposure Classification	=	C	Risk Category	=	III
Structure Type	=	Building	Design Basis for Wind Pressures	=	LRFD
MWFRS Analysis Method	=	Ch 27 Pt 1	C&C Analysis Method	=	Ch 30 Pt 1
Dynamic Type of Structure	=	Rigid	Show Advanced Options	=	True
Reset Advanced Options to Default Values	=	Defaults	Simple Diaphragm Building	=	False
Show Base Reactions in Output	=	None	Altitude above Sea Level	=	4200.000 ft
Base Elevation Of Structure	=	0.000 ft	MWFRS Pressure Elevations	=	Mean Ht
Topographic Effects	=	None	Override Directionality Factor K_d	=	False
Override the Gust Factor G	=	False	Override Minimum Pressure	=	False

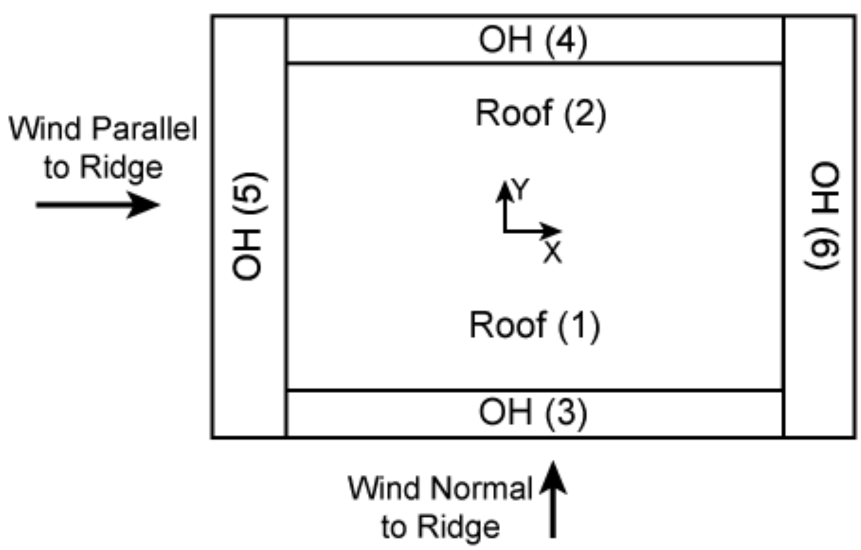
Building:

Roof	=	Roof Type	=	Flat	Encl	=	Enclosure Classification	=	Enclosed
Help	=	Help on Building Roof Type	=	Help	RfHt	=	Roof Height	=	17.500 ft
W	=	Building Width	=	96.000 ft	L	=	Building Length	=	137.000 ft
OH	=	Type of Overhang	=	None	Par	=	Parapet	=	GCPi= ±0.55
P_{ht}	=	Parapet Height	=	4.0 ft	HT_{over}	=	Override Mean Roof Height	=	False
Ht_{man}	=	Mean Roof Height	=	17.500 ft	RA_{over}	=	Override Roof Area	=	False
GC_{pi_o}	=	Override GC_{pi} value	=	False		=			

Exposure Constants [Tbl 26.11-1]:

α = 3-s Gust-speed exponent	= 9.500	Z_g = Nominal Ht of Boundary Layer	=	900.000 ft
$\hat{a}$ = Reciprocal of α	= 0.105	b = 3 sec gust speed factor	=	1.000
α_m = Mean hourly Wind-Speed Exponent	= 0.154	b_m = Mean hourly Windspeed Exponent	=	0.650
c = Turbulence Intensity Factor	= 0.200	ε = Integral Length Scale Exponent	=	0.2000

Main Wind Force Resisting System (MWFRS) Wind Calculations per Ch 27 Pt1



h	=	Mean structure height	=	17.500 ft
h_{grade}	=	Elevation from Grade to Top of Structure	=	17.500 ft
K_h	=	$2.01 \cdot (h_{grade}/Z_g)^{2/\alpha}$ [Tbl 26.10-1]	=	0.877
K_{zt}	=	No Topographic feature specified	=	1.000
K_d	=	Wind Directionality Factor per Tbl 26.6-1	=	0.85
$+GC_{pi}$	=	Enclosed Positive Internal Pressure Tbl 26.13-1	=	+0.18
$-GC_{pi}$	=	Enclosed Negative Internal Pressure Tbl 26.13-1	=	-0.18

LF	=	Load Factor based upon STRENGTH Design	=	1.00
K_e	=	Ground Elev Factor [Tbl 26.9-1]	=	0.859
q_h	=	$0.00256 \cdot K_h \cdot K_{zt} \cdot K_d \cdot K_e \cdot V^2 * LF$ [Eq 26.10-1]	=	17.39 psf
RA	=	Roof Area	=	13152.00 ft^2
q_h	=	$0.00256 \cdot K_h \cdot K_{zt} \cdot K_d \cdot K_e \cdot V^2 * LF$ [Eq 26.10-1]	=	17.39 psf
q_p	=	$0.00256 \cdot K_z \cdot K_{zt} \cdot K_d \cdot K_e \cdot V^2 * LF$ [Eq 26.10-1]	=	18.16 psf
q_{in}	=	Negative Internal Pressure: $q_h \cdot LF$	=	17.39 psf
q_{ip}	=	Positive Internal Pressure: $q_h \cdot LF$	=	17.39 psf

MWFRS Wind Loads [Normal to Ridge]

h	=	Mean Roof Height Of Building	=	17.500 ft
hp	=	Height To the top Of the Parapet	=	21.500 ft
RHt	=	Ridge Height Of Roof	=	17.500 ft
B	=	Horizontal Dimension Of Building Normal To Wind Direction	=	137.000 ft
L	=	Horizontal Dimension Of building Parallel To Wind Direction	=	96.000 ft
L/B	=	Ratio Of L/B used For Cp determination	=	0.701
h/L	=	Ratio Of h/L used For Cp determination	=	0.182
Slope	=	Slope Of Roof	=	0.0 Deg

Gust Factor Calculation for Wind: [Normal to Ridge]

Gust Factor Category I Rigid Structures - Simplified Method

G_1	=	Simplified: For Rigid Structures can use 0.85	=	0.85

Gust Factor Category II Rigid Structures - Complete Analysis

Z_m	=	Equiv Struc Height: $Max(0.6 \cdot h, Z_{min})$	=	15.000 ft
I_{zm}	=	Turbulence Intensity: $c \cdot (33/Z_m)^{1/6}$ [Eq 26.11-1]	=	0.228
L_{zm}	=	Turbulence Integral Length Scale: $\ell \cdot (Z_m/33)^{\varepsilon}$ [Eq 26.11-9]	=	427.057 ft
B	=	Building Width Width Normal to Wind Direction	=	137.000 ft
Q	=	$[1/(1+0.63 \cdot [(B+h)/L_{zm}]^{0.63})]^{0.5}$ [Eq 26.11-8]	=	0.866
G_2	=	Detailed: $0.925 \cdot [(1+1.7 \cdot g_q \cdot I_{zm} \cdot Q)/(1+1.7 \cdot g_v \cdot I_{zm})]$ [Eq 26.11-6]	=	0.855

Gust Factor Used in Analysis

G	=	Gust Factor: $Min(G_1, G_2)$	=	0.850
Cp_{WW}	=	Windward Wall Coefficient (All L/B Values)	=	0.800
Cp_{LW}	=	Leeward Wall Coefficient using L/B	=	-0.500
Cp_{SW}	=	Side Wall Coefficient (All L/B values)	=	-0.700
GC_{pn_ww}	=	Parapet Combined Net Pressure Coefficient (Windward Parapet)	=	1.500
GC_{pn_lw}	=	Parapet Combined Net Pressure Coefficient (Leeward Parapet)	=	-1.000

Wind Pressures [Normal to Ridge]
All wind pressures include a Load Factor (LF) of 1.0

Elev ft	GC_{pi}	q_i psf	K_z	K_{zt}	q_z psf	Windward Press psf	Leeward Press psf	Side Press psf	Total Press psf	Minimum Pressure* psf
21.500	Parapet	17.39	0.916	1.000	18.16	27.24	-18.16	0.00	45.39	16.00
17.500	+0.18	17.39	0.877	1.000	17.39	8.69	-10.52	-13.48	19.21	16.00
21.500	Parapet	17.39	0.916	1.000	18.16	27.24	-18.16	0.00	45.39	16.00
17.500	-0.18	17.39	0.877	1.000	17.39	14.95	-4.26	-7.22	19.21	16.00

K_z	*= $2.01 \cdot (z_{grade}/Z_g)^{2/\alpha}$ [Tbl 26.10-1]*	*K_{zt}*	*= No Topographic feature specified*
GC_{pi}	*= Enclosed Internal Pressure Tbl 26.13-1*	*q_z*	*= $0.00256 \cdot K_z \cdot K_{zt} \cdot K_d \cdot K_e \cdot V^2 * LF$ [Eq 26.10-1]*
q_{ip}	*= Positive Internal Pressure: $q_h \cdot LF$*	*q_{in}*	*= Negative Internal Pressure: $q_h \cdot LF$*
Side	*= $q_h \cdot G \cdot Cp_{SW} - q_{ip} \cdot (+GC_{pi})$ [Eq 27.3-1]*	*Leeward*	*= $q_h \cdot G \cdot Cp_{LW} - q_{ip} \cdot (+GC_{pi})$ [Eq 27.3-1]*
Windward	*= $q_z \cdot G \cdot Cp_{WW} - q_{ip} \cdot (+GC_{pi})$ [Eq 27.3-1]*	*Total*	*= Windward - Leeward*
p_p	*= Windward : $q_p \cdot (GC_{pn\_ww})$ Eq 27.3-3*	*p_p*	*= Leeward : $q_p \cdot (GC_{pn\_lw})$ Eq 27.3-3*

- *Minimum Pressure: § 27.1.5 no less than 16.00 psf (Incl LF) applied to Walls*
- *Positive Pressures Act TOWARD Surface and Negative Pressures Act AWAY from Surface*

Roof Wind Pressures [Normal to Ridge]
All wind pressures include a Load Factor (LF) of 1.0

Component	Description	Location	Start ft	End ft	GC_{pi}	C_{pMin}	C_{pMax}	$P_{C_{pMin}}$ psf	$P_{C_{pMax}}$ psf	P_{min} psf
Roof	Roof (0 to h)	All	0.000	17.500	+0.18	-0.900	-0.180	-16.43	-5.79	8.00
Roof	Roof (h to 2*h)	All	17.500	35.000	+0.18	-0.500	-0.180	-10.52	-5.79	8.00
Roof	Roof (>= 2*h)	All	35.000	96.000	+0.18	-0.300	-0.180	-7.56	-5.79	8.00
Roof	Roof (0 to h)	All	0.000	17.500	-0.18	-0.900	-0.180	-10.17	0.47	8.00
Roof	Roof (h to 2*h)	All	17.500	35.000	-0.18	-0.500	-0.180	-4.26	0.47	8.00
Roof	Roof (>= 2*h)	All	35.000	96.000	-0.18	-0.300	-0.180	-1.30	0.47	8.00

Roof Pressures based upon Ch 27 Pt1:

Component = The building component for pressures	*Location = Reference Graphic in Output for Values*
Start = Start Dist from Windward Edge	*End = End Dist from Windward Edge*
C_{pMin} = Smallest Coefficient Magnitude	*C_{pMax} = Largest Coefficient Magnitude*
P_{CpMin} = $q_h \cdot G \cdot C_{pMin} - q_{ip} \cdot GC_{pi}$ [Eq 27.3-1]	*P_{CpMax} = $q_h \cdot G \cdot C_{pMax} - q_{in} \cdot GC_{pi}$ [Eq 27.3-1]*

P_{min} = Min Press projected on vertical plane [§ 27.1.5]

- *No reduction factor was applicable*
- *The smaller uplift pressures due to C_{pMin} can become critical when wind is combined with roof live load or snow load; load combinations are given in ASCE 7*
- *Positive Pressures Act TOWARD Surface and Negative Pressures Act AWAY from Surface*

MWFRS Wind Loads [Parallel to Ridge]

h	=	Mean Roof Height Of Building	= 17.500 ft
hp	=	Height To the top Of the Parapet	= 21.500 ft
RHt	=	Ridge Height Of Roof	= 17.500 ft
B	=	Horizontal Dimension Of Building Normal To Wind Direction	= 96.000 ft
L	=	Horizontal Dimension Of building Parallel To Wind Direction	= 137.000 ft
L/B	=	Ratio Of L/B used For Cp determination	= 1.427
h/L	=	Ratio Of h/L used For Cp determination	= 0.128
Slope	=	Slope Of Roof	= 0.0 Deg

Gust Factor Calculation for Wind: [Parallel to Ridge]

Gust Factor Category I Rigid Structures - Simplified Method

G_1	=	Simplified: For Rigid Structures can use 0.85	= 0.85

Gust Factor Category II Rigid Structures - Complete Analysis

Z_m	=	Equiv Struc Height: Max$(0.6 \cdot h, Z_{min})$	= 15.000 ft
I_{zm}	=	Turbulence Intensity: $c \cdot (33/Z_m)^{1/6}$ [Eq 26.11-1]	= 0.228
L_{zm}	=	Turbulence Integral Length Scale: $\ell \cdot (Z_m/33)^{\varepsilon}$ [Eq 26.11-9]	= 427.057 ft
B	=	Building Width Width Normal to Wind Direction	= 96.000 ft
Q	=	$[1/(1+0.63 \cdot [(B+h)/L_{zm}]^{0.63})]^{0.5}$ [Eq 26.11-8]	= 0.886
G_2	=	Detailed: $0.925 \cdot [(1+1.7 \cdot g_q \cdot I_{zm} \cdot Q)/(1+1.7 \cdot g_v \cdot I_{zm})]$ [Eq 26.11-6]	= 0.865

Gust Factor Used in Analysis

G	=	Gust Factor: Min(G_1, G_2)	= 0.850

Cp_{WW}	=	Windward Wall Coefficient (All L/B Values)	= 0.800
Cp_{LW}	=	Leeward Wall Coefficient using L/B	= -0.415
Cp_{SW}	=	Side Wall Coefficient (All L/B values)	= -0.700
GC_{pn_ww}	=	Parapet Combined Net Pressure Coefficient (Windward Parapet)	= 1.500
GC_{pn_lw}	=	Parapet Combined Net Pressure Coefficient (Leeward Parapet)	= -1.000

Wind Pressures [Parallel to Ridge]
All wind pressures include a Load Factor (LF) of 1.0

Elev ft	GC_{pi}	q_i psf	K_z	K_{zt}	q_z psf	Windward Press psf	Leeward Press psf	Side Press psf	Total Press psf	Minimum Pressure* psf
21.500	Parapet	17.39	0.916	1.000	18.16	27.24	-18.16	0.00	45.39	16.00
17.500	+0.18	17.39	0.877	1.000	17.39	8.69	-9.26	-13.48	17.95	16.00
21.500	Parapet	17.39	0.916	1.000	18.16	27.24	-18.16	0.00	45.39	16.00
17.500	-0.18	17.39	0.877	1.000	17.39	14.95	-3.00	-7.22	17.95	16.00

K_z = $2.01 \cdot (z_{grade}/Z_g)^{2/\alpha}$ [Tbl 26.10-1]	*K_{zt} = No Topographic feature specified*
GC_{pi} = Enclosed Internal Pressure Tbl 26.13-1	*q_z = $0.00256 \cdot K_z \cdot K_{zt} \cdot K_d \cdot K_e \cdot V^2 \cdot LF$ [Eq 26.10-1]*
q_{ip} = Positive Internal Pressure: $q_h \cdot LF$	*q_{in} = Negative Internal Pressure: $q_h \cdot LF$*
Side = $q_h \cdot G \cdot Cp_{SW} - q_{ip} \cdot (+GC_{pi})$ [Eq 27.3-1]	*Leeward = $q_h \cdot G \cdot Cp_{LW} - q_{ip} \cdot (+GC_{pi})$ [Eq 27.3-1]*
Windward = $q_z \cdot G \cdot Cp_{WW} - q_{ip} \cdot (+GC_{pi})$ [Eq 27.3-1]	*Total = Windward - Leeward*
p_p = Windward : $q_p \cdot (GC_{pn\_ww})$ Eq 27.3-3	*p_p = Leeward : $q_p \cdot (GC_{pn\_lw})$ Eq 27.3-3*

- *Minimum Pressure: § 27.1.5 no less than 16.00 psf (Incl LF) applied to Walls*
- *Positive Pressures Act TOWARD Surface and Negative Pressures Act AWAY from Surface*

Roof Wind Pressures [Parallel to Ridge]
All wind pressures include a Load Factor (LF) of 1.0

Component	Description	Location	Start ft	End ft	GC_{pi}	C_{pMin}	C_{pMax}	P_{CpMin} psf	P_{CpMax} psf	P_{min} psf
Roof	Roof (0 to h)	All	0.000	17.500	+0.18	-0.900	-0.180	-16.43	-5.79	8.00
Roof	Roof (h to 2*h)	All	17.500	35.000	+0.18	-0.500	-0.180	-10.52	-5.79	8.00
Roof	Roof (>= 2*h)	All	35.000	137.000	+0.18	-0.300	-0.180	-7.56	-5.79	8.00
Roof	Roof (0 to h)	All	0.000	17.500	-0.18	-0.900	-0.180	-10.17	0.47	8.00
Roof	Roof (h to 2*h)	All	17.500	35.000	-0.18	-0.500	-0.180	-4.26	0.47	8.00
Roof	Roof (>= 2*h)	All	35.000	137.000	-0.18	-0.300	-0.180	-1.30	0.47	8.00

Roof Pressures based upon Ch 27 Pt1:

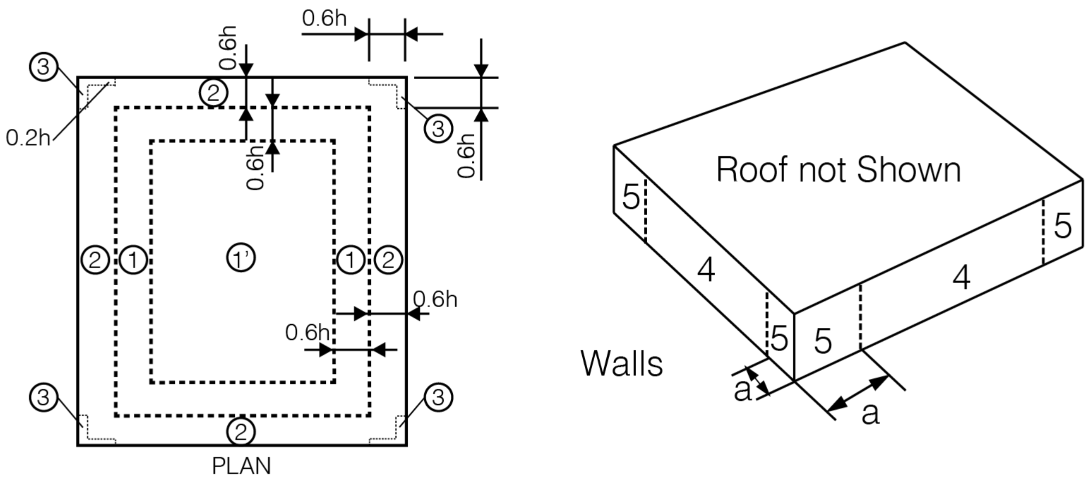
Component = *The building component for pressures*
Start = *Start Dist from Windward Edge*
C_{pMin} = *Smallest Coefficient Magnitude*
P_{CpMin} = $q_h \cdot G \cdot C_{pMin} - q_{ip} \cdot GC_{pi}$ *[Eq 27.3-1]*

Location = *Reference Graphic in Output for Values*
End = *End Dist from Windward Edge*
C_{pMax} = *Largest Coefficient Magnitude*
P_{CpMax} = $q_h \cdot G \cdot C_{pMax} - q_{in} \cdot GC_{pi}$ *[Eq 27.3-1]*

P_{min} = *Min Press projected on vertical plane [§ 27.1.5]*

- *No reduction factor was applicable*
- *The smaller uplift pressures due to C_{pMin} can become critical when wind is combined with roof live load or snow load; load combinations are given in ASCE 7*
- *Positive Pressures Act TOWARD Surface and Negative Pressures Act AWAY from Surface*

Components and Cladding (C&C) Wind Loads per Ch 30 Part 1 Roof & Wall



h/W	=	Ratio of mean roof height to building width	= 0.182
h/L	=	Ratio of mean roof height to building length	= 0.128
h	=	Mean structure height	= 17.500 ft
h_{grade}	=	Elevation from Grade to Top of Structure	= 17.500 ft
K_h	=	$2.01 \cdot (h_{grade}/Z_g)^{2/\alpha}$ [Tbl 26.10-1]	= 0.877
K_{zt}	=	No Topographic feature specified	= 1.000
K_d	=	Wind Directionality Factor per Tbl 26.6-1	= 0.85
$+GC_{pi}$	=	Enclosed Positive Internal Pressure Tbl 26.13-1	= +0.18
$-GC_{pi}$	=	Enclosed Negative Internal Pressure Tbl 26.13-1	= -0.18
LF	=	Load Factor based upon STRENGTH Design	= 1.00
K_e	=	Ground Elev Factor [Tbl 26.9-1]	= 0.859
q_h	=	$0.00256 \cdot K_h \cdot K_{zt} \cdot K_d \cdot K_e \cdot V^2 * LF$ [Eq 26.10-1]	= 17.39 psf
LHD	=	Least Horizontal Dimension: Min(B, L)	= 96.000 ft
a_1	=	Min(0.1•LHD, 0.4•h)	= 7.000 ft
a	=	Max(a_1, 0.04•LHD, 3 ft [0.9 m])	= 7.000 ft
h/B	=	Ratio of mean roof height to least horizontal dim: h/B	= 0.182
0.2*h	=	Parameter used to define Zone 3	= 3.500 ft
0.6*h	=	Parameter used to define Zones 1 and 2	= 10.500 ft

Wind Pressures for C&C Ch 30 Pt 1 Roof & Wall
All wind pressures include a Load Factor (LF) of 1.0

Description	Zone	Width ft	Span ft	Area ft^2	1/3 Rule	Figure	GCp Max	GCp Min	p Max psf	p Min psf
	4	3.162	3.162	10.00	No	30.3-1	0.900	-0.990	18.78	-20.34
	4	4.472	4.472	20.00	No	30.3-1	0.852	-0.942	17.95	-19.51
	4	7.071	7.071	50.00	No	30.3-1	0.789	-0.879	16.85	-18.41
	4	10.000	10.000	100.00	No	30.3-1	0.741	-0.831	16.02	-17.58
	4	14.142	14.142	200.00	No	30.3-1	0.693	-0.783	16.00	-16.75
	4	22.360	22.360	499.97	No	30.3-1	0.630	-0.720	16.00	-16.00
	4	31.600	31.600	998.56	No	30.3-1	0.630	-0.720	16.00	-16.00
	4	1.000	1.000	1.00	No	30.3-1	0.900	-0.990	18.78	-20.34
	4	3.162	1.000	3.16	No	30.3-1	0.900	-0.990	18.78	-20.34
	4	4.472	1.000	4.47	No	30.3-1	0.900	-0.990	18.78	-20.34
	4	7.071	1.000	7.07	No	30.3-1	0.900	-0.990	18.78	-20.34
	4	10.000	1.000	10.00	No	30.3-1	0.900	-0.990	18.78	-20.34
	4	14.142	1.000	14.14	No	30.3-1	0.876	-0.966	18.36	-19.93
	4	22.360	1.000	22.36	No	30.3-1	0.844	-0.934	17.81	-19.38
	4	31.600	1.000	31.60	No	30.3-1	0.821	-0.911	17.40	-18.96
	4	31.600	1.000	31.60	No	30.3-1	0.821	-0.911	17.40	-18.96

Area = Span Length x Effective Width
1/3 Rule = Effective width need not be less than 1/3 of the span length

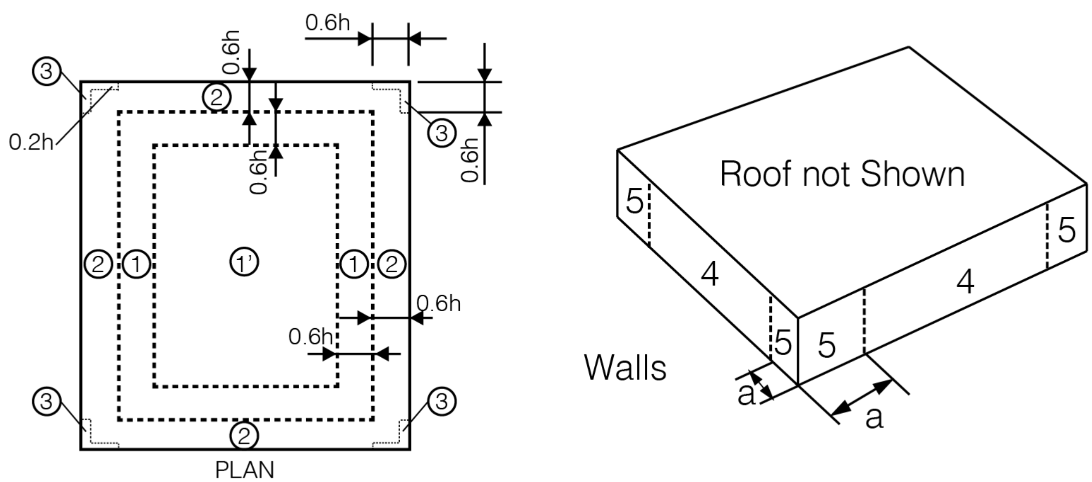
GCp = External Pressure Coefficients taken from Figures 30.3-1 through 30.3-7
p = Wind Pressure: $q_h \cdot [GC_p - GC_{pi}]$ [[Eq 30.3-1]]
** Per § 30.2.2 the Minimum Pressure for C&C is 16.00 psf [0.766 kPa] {Includes LF}*
Since Roof Slope <= 10°, the Wall GCp values for Zone 4 & 5 are reduced by 10%

Parapet Components and Cladding (C&C) Wind Loads per Ch 30 Pt 6:

There were no Components and Cladding entered with the Parapet Zone specified

Components and Cladding (C&C) Zone Summary per Ch 30 Pt 1:

h/W	=	Ratio of mean roof height to building width	=	0.182
h/L	=	Ratio of mean roof height to building length	=	0.128
h	=	Mean structure height	=	17.500 ft
h_{grade}	=	Elevation from Grade to Top of Structure	=	17.500 ft
K_h	=	$2.01 \cdot (h_{grade}/Z_g)^{2/\alpha}$ [Tbl 26.10-1]	=	0.877
K_{zt}	=	No Topographic feature specified	=	1.000
K_d	=	Wind Directionality Factor per Tbl 26.6-1	=	0.85
$+GC_{pi}$	=	Enclosed Positive Internal Pressure Tbl 26.13-1	=	+0.18
$-GC_{pi}$	=	Enclosed Negative Internal Pressure Tbl 26.13-1	=	-0.18
LF	=	Load Factor based upon STRENGTH Design	=	1.00
K_e	=	Ground Elev Factor [Tbl 26.9-1]	=	0.859
q_h	=	$0.00256 \cdot K_h \cdot K_{zt} \cdot K_d \cdot K_e \cdot V^2 * LF$ [Eq 26.10-1]	=	17.39 psf
LHD	=	Least Horizontal Dimension: Min(B, L)	=	96.000 ft
a_1	=	$Min(0.1 \cdot LHD, 0.4 \cdot h)$	=	7.000 ft
a	=	$Max(a_1, 0.04 \cdot LHD, 3\ ft\ [0.9\ m])$	=	7.000 ft
h/B	=	Ratio of mean roof height to least horizontal dim: h/B	=	0.182
0.2*h	=	Parameter used to define Zone 3	=	3.500 ft
0.6*h	=	Parameter used to define Zones 1 and 2	=	10.500 ft



Wind Pressure Summary for C&C Zones based Upon Areas Ch 30 Pt 1 (Table 1 of 2)
All wind pressures include a Load Factor (LF) of 1.0

Zone	Figure	Pos A ≤ 10 ft² psf	Neg A ≤ 10 ft² psf	Pos A = 20 ft² psf	Neg A = 20 ft² psf	Pos A = 50 ft² psf	Neg A = 50 ft² psf	Pos A = 100 ft² psf	Neg A = 100 ft² psf
1'	30.3-2A	16.00	-18.78	16.00	-18.78	16.00	-18.78	16.00	-18.78
1	30.3-2A	16.00	-32.69	16.00	-30.53	16.00	-27.68	16.00	-25.53
2	30.3-2A/30.3-1	18.78	-43.12	17.95	-40.35	16.85	-36.68	16.02	-33.91
3	30.3-2A/30.3-1	18.78	-43.12	17.95	-40.35	16.85	-36.68	16.02	-33.91
4	30.3-1	18.78	-20.34	17.95	-19.51	16.85	-18.41	16.02	-17.58
4_P (P1/P4)	30.3-1/30.3-2A	26.33	-27.96	25.46	-27.09	24.31	-25.95	23.44	-25.08
4_P (P3/P2)	30.3-1/30.3-2A	26.33	-51.75	25.46	-48.85	24.31	-45.03	23.44	-42.13
4_P (P1-P2)/(P3-P4)	30.3-1/30.3-2A	78.08	54.29	74.31	52.55	69.34	50.26	65.57	48.52
5	30.3-1	18.78	-25.04	17.95	-23.37	16.85	-21.18	16.02	-19.51
5_P (P1/P4)	30.3-1/30.3-2A	26.33	-32.87	25.46	-31.13	24.31	-28.83	23.44	-27.09
5_P (P3/P2)	30.3-1/30.3-2A	26.33	-51.75	25.46	-48.85	24.31	-45.03	23.44	-42.13
5_P (P1-P2)/(P3-P4)	30.3-1/30.3-2A	78.08	59.19	74.31	56.59	69.34	53.14	65.57	50.54

Wind Pressure Summary for C&C Zones based Upon Areas Ch 30 Pt 1 (Table 2 of 2)
All wind pressures include a Load Factor (LF) of 1.0

Zone	Figure	Pos A = 200 ft² psf	Neg A = 200 ft² psf	Pos A = 500 ft² psf	Neg A = 500 ft² psf	Pos A > 1000 ft² psf	Neg A > 1000 ft² psf

1'	30.3-2A	16.00	-16.16	16.00	-16.00	16.00	-16.00
1	30.3-2A	16.00	-23.37	16.00	-20.52	16.00	-20.52
2	30.3-2A/30.3-1	16.00	-31.14	16.00	-27.47	16.00	-27.47
3	30.3-2A/30.3-1	16.00	-31.14	16.00	-27.47	16.00	-27.47
4	30.3-1	16.00	-16.75	16.00	-16.00	16.00	-16.00
4_P (P1/P4)	30.3-1/30.3-2A	22.57	-24.21	21.43	-23.06	21.43	-23.06
4_P (P3/P2)	30.3-1/30.3-2A	22.57	-39.24	21.43	-35.41	21.43	-35.41
4_P (P1-P2)/(P3-P4)	30.3-1/30.3-2A	61.81	46.78	56.83	44.49	56.83	44.49
5	30.3-1	16.00	-17.85	16.00	-16.00	16.00	-16.00
5_P (P1/P4)	30.3-1/30.3-2A	22.57	-25.36	21.43	-23.06	21.43	-23.06
5_P (P3/P2)	30.3-1/30.3-2A	22.57	-39.24	21.43	-35.41	21.43	-35.41
5_P (P1-P2)/(P3-P4)	30.3-1/30.3-2A	61.81	47.93	56.83	44.49	56.83	44.49

** A is effective wind area for C&C: Span Length * Effective Width*
** Effective width need not be less than 1/3 of the span length*
** Maximum and minimum values of pressure shown.*
** + Pressures acting toward surface, - Pressures acting away from surface*
** Per § 30.2.2 the Minimum Pressure for C&C is 16.00 psf [0.766 kPa] {Includes LF}*
_P represents a zone on the parapet
Parapet C&C Surface (P1/P4) - Maximum Positive and Negative Pressures on Exterior Parapet Surfaces
Parapet C&C Surface (P3/P2) - Maximum Positive and Negative Pressures on Interior Parapet Surfaces
Parapet Net Pressure (P1-P2) - Net Pressure Acting on Upwind Parapet (Exterior + Interior)
Parapet Net Pressure (P3-P4) - Net Pressure Acting on Downwind Parapet (Exterior + Interior)
** Interpolation can be used for values of A that are between those values shown.*

Beam Design Criteria

TABLES SELECTED:

Master Steel Table:	ramaisc
Default Steel Table:	ramaisc
Alternate Steel Table:	ramaisc

UNBRACED LENGTH:

Check Unbraced Length
Do Not Consider Point of Inflection as Brace Point
Noncomposite/Precomposite Beam Design:
Deck Perpendicular to Beam Braces flange
Deck Parallel to Beam does not Brace flange
Use Cb=1 for all Simple Span Beams
Use Cb=1 for all Cantilevers

SPAN/DEPTH CRITERIA:

Maximum Span/Depth Ratio (ft/ft): 24.00

COMPOSITE IEFF:

Do Not Reduce Ieff per AISC 360 Commentary

DEMAND/CAPACITY LIMITS:

	Strength	Deflection
Steel Beam:	0.960	1.000
C-Beams:	0.960	1.000

DEFLECTION CRITERIA:

Default Criteria	L/d	Δ (in)
Unshored		
Initial (Construction Load):	300.0	0.0
Post Composite		
Live Load:	480.0	0.0
Total Superimposed:	480.0	0.0
Total (Init+Superimp-Camber):	360.0	0.0
Shored		
Dead Load:	0.0	0.0
Live Load:	480.0	0.0
Total Load:	360.0	0.0
Noncomposite		
Dead Load:	360.0	0.0
Live Load:	600.0	0.0
Total Load:	360.0	0.0

Perimeter w/ Glazing Criteria	L/d	Δ (in)
Unshored		
Initial (Construction Load):	300.0	0.0
Post Composite		
Live Load:	600.0	0.4
Total Superimposed:	480.0	0.5
Total (Init+Superimp-Camber):	360.0	0.0
Shored		
Dead Load:	0.0	0.0
Live Load:	600.0	0.4
Total Load:	480.0	0.5
Noncomposite		
Dead Load:	360.0	0.0
Live Load:	600.0	0.4
Total Load:	480.0	0.5

Roof Framing Criteria	L/d	Δ (in)
Unshored		
Initial (Construction Load):	300.0	0.0
Post Composite		
Live Load:	480.0	0.0
Total Superimposed:	480.0	0.0
Total (Init+Superimp-Camber):	360.0	0.0
Shored		
Dead Load:	0.0	0.0
Live Load:	360.0	0.0
Total Load:	240.0	0.0
Noncomposite		
Dead Load:	240.0	0.0
Live Load:	360.0	0.0
Total Load:	240.0	0.0

Note: 0.0 indicates No Limit

CAMBER CRITERIA FOR COMPOSITE BEAMS:

Do not Camber Beams with Span < 24.0 ft
Do not Camber Beams with Weight < 27.0 lbs/ft
Do not Camber Beams with Weight > 200.0 lbs/ft
Do not Camber Beams with Depth < 14.0 in
Do not Camber Beams with Depth > 36.0 in
Do not Camber Beams with Cantilevers

Percent of Dead Load used for Camber: 75.00
(For Unshored Composite the specified % of Construction DL is used)
Camber Increment (in): 0.250
Minimum Camber (in): 0.500
Maximum Camber (in): 2.500

CAMBER CRITERIA FOR NONCOMPOSITE BEAMS:
Do not Camber

STUD CRITERIA:
Stud Distribution: Use Optimum
Maximum % of Full Composite Allowed: 75.00
Minimum % of Full Composite Allowed - Short Span: 30.00
Minimum % of Full Composite Allowed - Long Span: 50.00
Long Span Defined as Span Greater Than: 30.00 ft
Maximum Rows of Studs Allowed: 2
Minimum Flange Width for 2 Rows of Studs (in): 5.500
Minimum Flange Width for 3 Rows of Studs (in): 8.500
Maximum Stud Spacing - Deck Parallel: Per Code
Maximum Stud Spacing - Deck Not Parallel: Per Code
Ductility of Shear Connection:
Enforce AISC 360-16 Commentary I3.2d(1) for Spans greater than 30'

WEB OPENING CRITERIA:
Stiffener Fy (ksi): 36.000
Stiffener Dimensions
Minimum Width (in): 1.000
Minimum Thickness (in): 0.250
Increment of Width (in): 0.250
Increment of Thickness (in): 0.125
Increment of Length (in): 1.000
Allow Stiffeners on One Side of web
Allow Stiffeners on Two Sides of web

Beam Design Criteria

TABLES SELECTED:

Master Steel Table: ramaisc
Default Steel Table: ramaisc
Alternate Steel Table: ramaisc

UNBRACED LENGTH:

Check Unbraced Length
Do Not Consider Point of Inflection as Brace Point
Noncomposite/Precomposite Beam Design:
Deck Perpendicular to Beam Braces flange
Deck Parallel to Beam does not Brace flange
Use Cb=1 for all Simple Span Beams
Use Cb=1 for all Cantilevers

SPAN/DEPTH CRITERIA:

Maximum Span/Depth Ratio (ft/ft): 24.00

COMPOSITE IEFF:

Do Not Reduce Ieff per AISC 360 Commentary

DEMAND/CAPACITY LIMITS:

	Strength	Deflection
Steel Beam:	0.960	1.000
C-Beams:	0.960	1.000

DEFLECTION CRITERIA:

Default Criteria	L/d	Δ (in)
Unshored		
Initial (Construction Load):	300.0	0.0
Post Composite		
Live Load:	480.0	0.0
Total Superimposed:	480.0	0.0
Total (Init+Superimp-Camber):	360.0	0.0
Shored		
Dead Load:	0.0	0.0
Live Load:	480.0	0.0
Total Load:	360.0	0.0
Noncomposite		
Dead Load:	360.0	0.0
Live Load:	600.0	0.0
Total Load:	360.0	0.0

Beam Design Criteria

Perimeter w/ Glazing Criteria	L/d	Δ (in)
Unshored		
Initial (Construction Load):	300.0	0.0
Post Composite		
Live Load:	600.0	0.4
Total Superimposed:	480.0	0.5
Total (Init+Superimp-Camber):	360.0	0.0
Shored		
Dead Load:	0.0	0.0
Live Load:	600.0	0.4
Total Load:	480.0	0.5
Noncomposite		
Dead Load:	360.0	0.0
Live Load:	600.0	0.4
Total Load:	480.0	0.5

Roof Framing Criteria	L/d	Δ (in)
Unshored		
Initial (Construction Load):	300.0	0.0
Post Composite		
Live Load:	480.0	0.0
Total Superimposed:	480.0	0.0
Total (Init+Superimp-Camber):	360.0	0.0
Shored		
Dead Load:	0.0	0.0
Live Load:	360.0	0.0
Total Load:	240.0	0.0
Noncomposite		
Dead Load:	240.0	0.0
Live Load:	360.0	0.0
Total Load:	240.0	0.0

Note: 0.0 indicates No Limit

CAMBER CRITERIA FOR COMPOSITE BEAMS:

Do not Camber Beams with Span < 24.0 ft
Do not Camber Beams with Weight < 27.0 lbs/ft
Do not Camber Beams with Weight > 200.0 lbs/ft
Do not Camber Beams with Depth < 14.0 in
Do not Camber Beams with Depth > 36.0 in
Do not Camber Beams with Cantilevers

Percent of Dead Load used for Camber: 75.00
(For Unshored Composite the specified % of Construction DL is used)

Camber Increment (in): 0.250

Minimum Camber (in): 0.500

Maximum Camber (in): 2.500

CAMBER CRITERIA FOR NONCOMPOSITE BEAMS:

Do not Camber

STUD CRITERIA:

Stud Distribution: Use Optimum

Maximum % of Full Composite Allowed: 75.00

Minimum % of Full Composite Allowed - Short Span: 30.00

Minimum % of Full Composite Allowed - Long Span: 50.00

Long Span Defined as Span Greater Than: 30.00 ft

Maximum Rows of Studs Allowed: 2

Minimum Flange Width for 2 Rows of Studs (in): 5.500

Minimum Flange Width for 3 Rows of Studs (in): 8.500

Maximum Stud Spacing - Deck Parallel: Per Code

Maximum Stud Spacing - Deck Not Parallel: Per Code

Ductility of Shear Connection:

Enforce AISC 360-16 Commentary I3.2d(1) for Spans greater than 30'

WEB OPENING CRITERIA:

Stiffener Fy (ksi): 36.000

Stiffener Dimensions

Minimum Width (in): 1.000

Minimum Thickness (in): 0.250

Increment of Width (in): 0.250

Increment of Thickness (in): 0.125

Increment of Length (in): 1.000

Allow Stiffeners on One Side of web

Allow Stiffeners on Two Sides of web

Joist Design Criteria

DEFAULT JOIST CRITERIA:

Joists with Uniform Loads:

Select from Standard Table: ramsji

Tolerance for Variation of Uniform Load: 5.00 %

Joists with Non-uniform Loads:

Use Equivalent Uniform Load Method

Maximum concentrated Loads (kips): 0.60

Tolerance for Variation of Loads: 5.00 %

ALTERNATE JOIST CRITERIA:

Joists with Uniform Loads:

Select from Standard Table: ramsji

Tolerance for Variation of Uniform Load: 5.00 %

Joists with Non-uniform Loads:

Use Equivalent Uniform Load Method

Maximum concentrated Loads (kips): 0.60

Tolerance for Variation of Loads: 5.00 %

JOIST GIRDERS:

Tolerance for Variation of Point Loads: 5.00 %

Tolerance for Spacing of Point Loads (in): 6.00

Maximum Uniform Load to Lump (k/ft): 0.10

JOIST SELECTION:

Allowable Stress Ratio: 0.96

Deflection Interaction Limit: 1.00

DEFLECTION CRITERIA:

Default Criteria	L/d	Δ (in)
Dead Load:	360.0	0.0
Live Load:	600.0	0.0
Total Load:	360.0	0.0

Alternate Criteria	L/d	Δ (in)
Dead Load:	360.0	0.0
Live Load:	600.0	0.4
Total Load:	480.0	0.5

Alternate Criteria	L/d	Δ (in)
Dead Load:	240.0	0.0
Live Load:	360.0	0.0
Total Load:	240.0	0.0

Note: 0.0 indicates No Limit

DEFAULT JOIST CRITERIA:

Joists with Uniform Loads:

Select from Standard Table: ramsji

Tolerance for Variation of Uniform Load: 5.00 %

Joists with Non-uniform Loads:

Use Equivalent Uniform Load Method

Maximum concentrated Loads (kips): 0.60

Tolerance for Variation of Loads: 5.00 %

ALTERNATE JOIST CRITERIA:

Joists with Uniform Loads:

Select from Standard Table: ramsji

Tolerance for Variation of Uniform Load: 5.00 %

Joists with Non-uniform Loads:

Use Equivalent Uniform Load Method

Maximum concentrated Loads (kips): 0.60

Tolerance for Variation of Loads: 5.00 %

JOIST GIRDERS:

Tolerance for Variation of Point Loads: 5.00 %

Tolerance for Spacing of Point Loads (in): 6.00

Maximum Uniform Load to Lump (k/ft): 0.10

JOIST SELECTION:

Allowable Stress Ratio: 0.96

Deflection Interaction Limit: 1.00

DEFLECTION CRITERIA:

Default Criteria	L/d	Δ (in)
Dead Load:	360.0	0.0
Live Load:	600.0	0.0
Total Load:	360.0	0.0

Alternate Criteria	L/d	Δ (in)
Dead Load:	360.0	0.0
Live Load:	600.0	0.4
Total Load:	480.0	0.5

Alternate Criteria	L/d	Δ (in)
Dead Load:	240.0	0.0
Live Load:	360.0	0.0
Total Load:	240.0	0.0

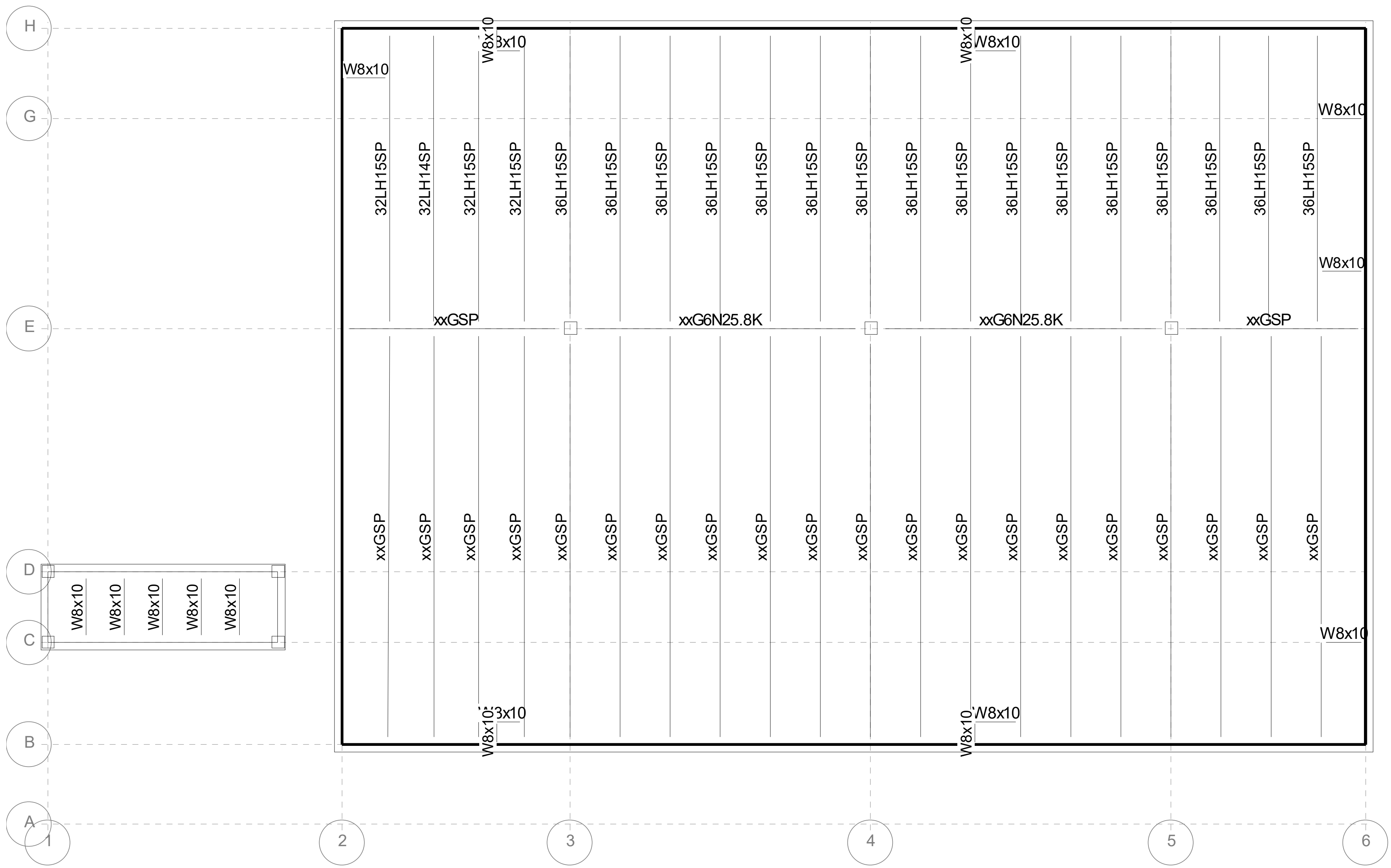
Note: 0.0 indicates No Limit

Floor Map

RAM Steel 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/22/24 11:03:38
Steel Code: AISC360-16 LRFD

Floor Type: High Roof **Beam Designs**

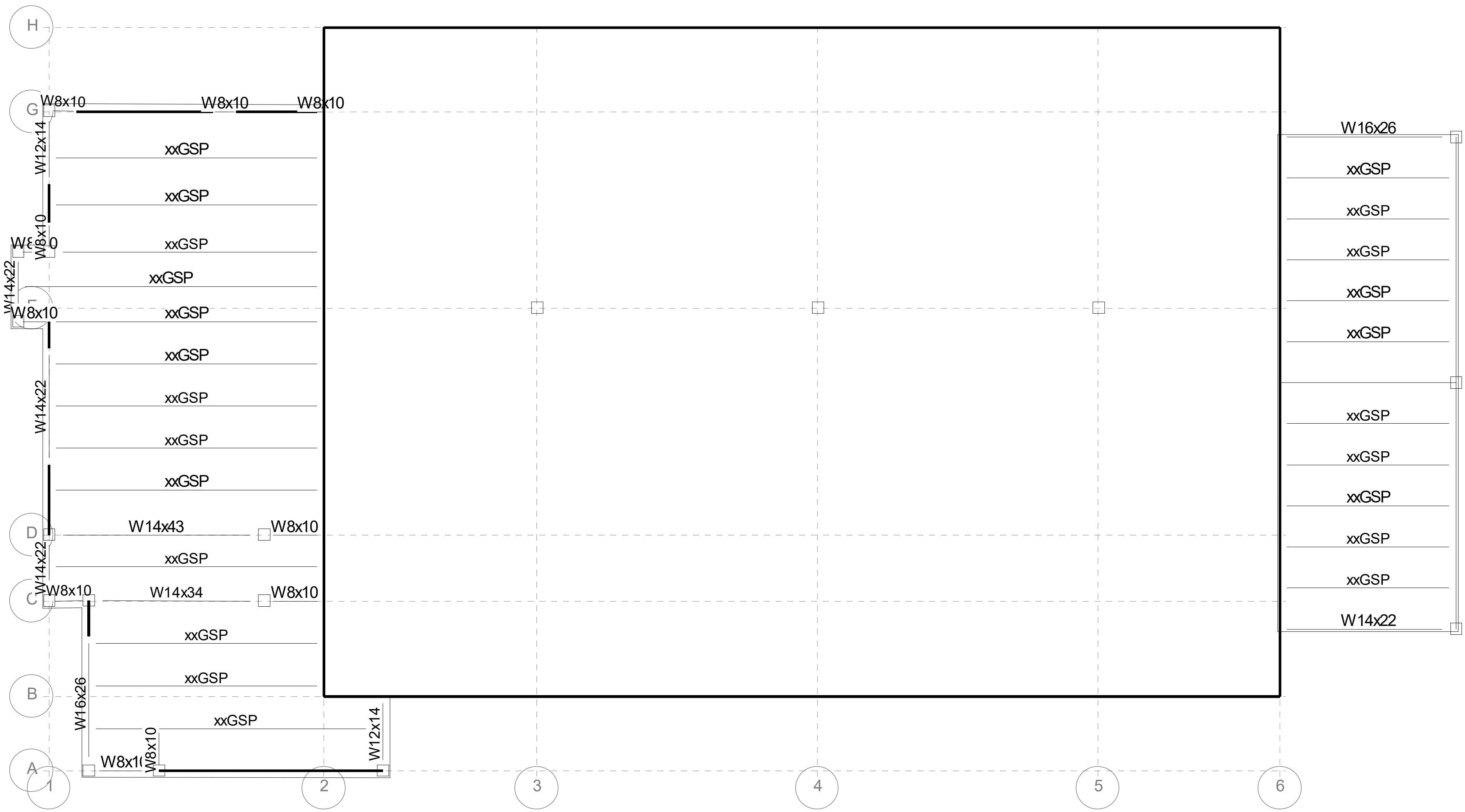


Floor Map

RAM Steel 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/30/24 12:34:50
Steel Code: AISC360-16 LRFD

Floor Type: Low Roof2 **Beam Designs**

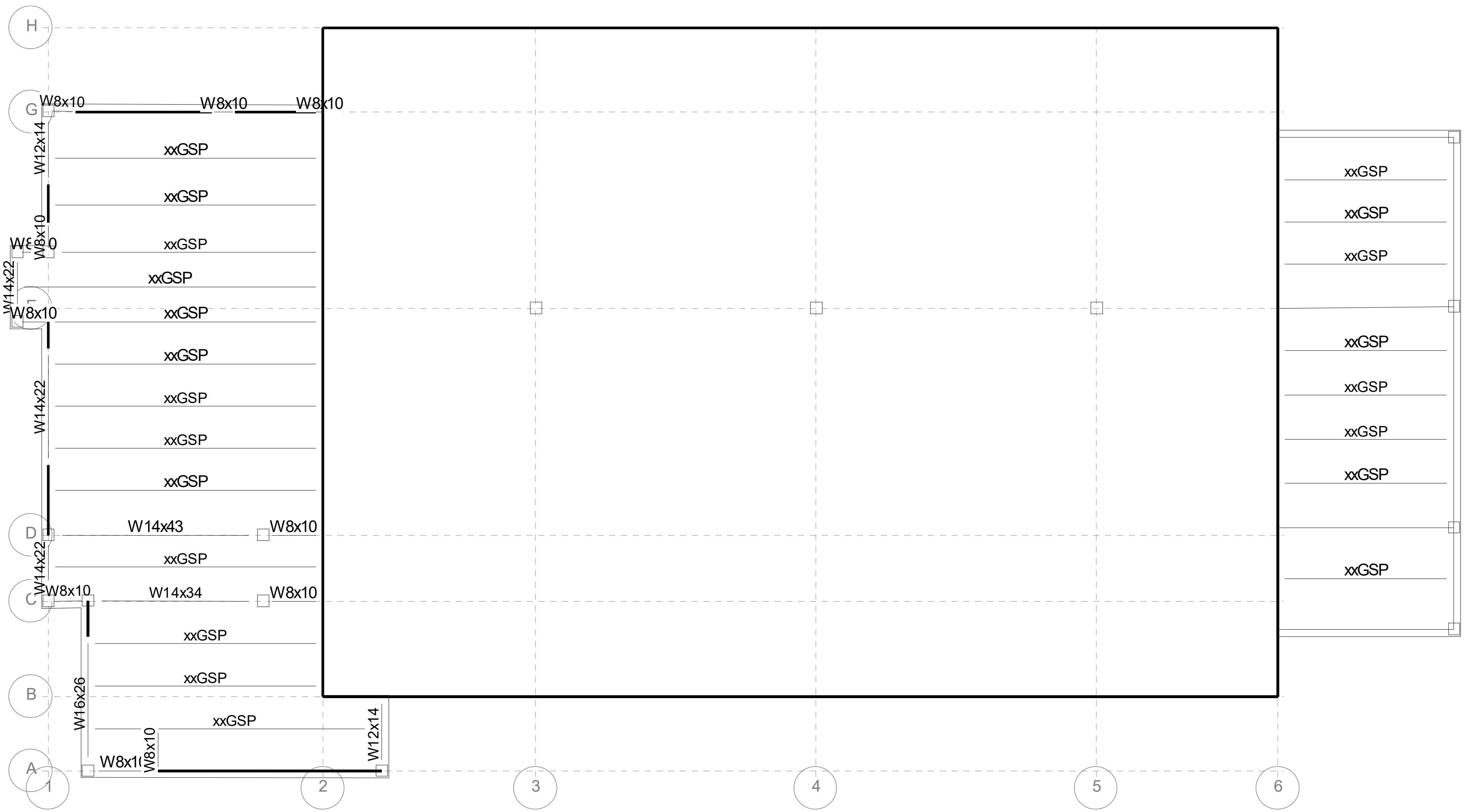


Floor Map

RAM Steel 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/22/24 11:03:38
Steel Code: AISC360-16 LRFD

Floor Type: Low Roof2 **Beam Designs**



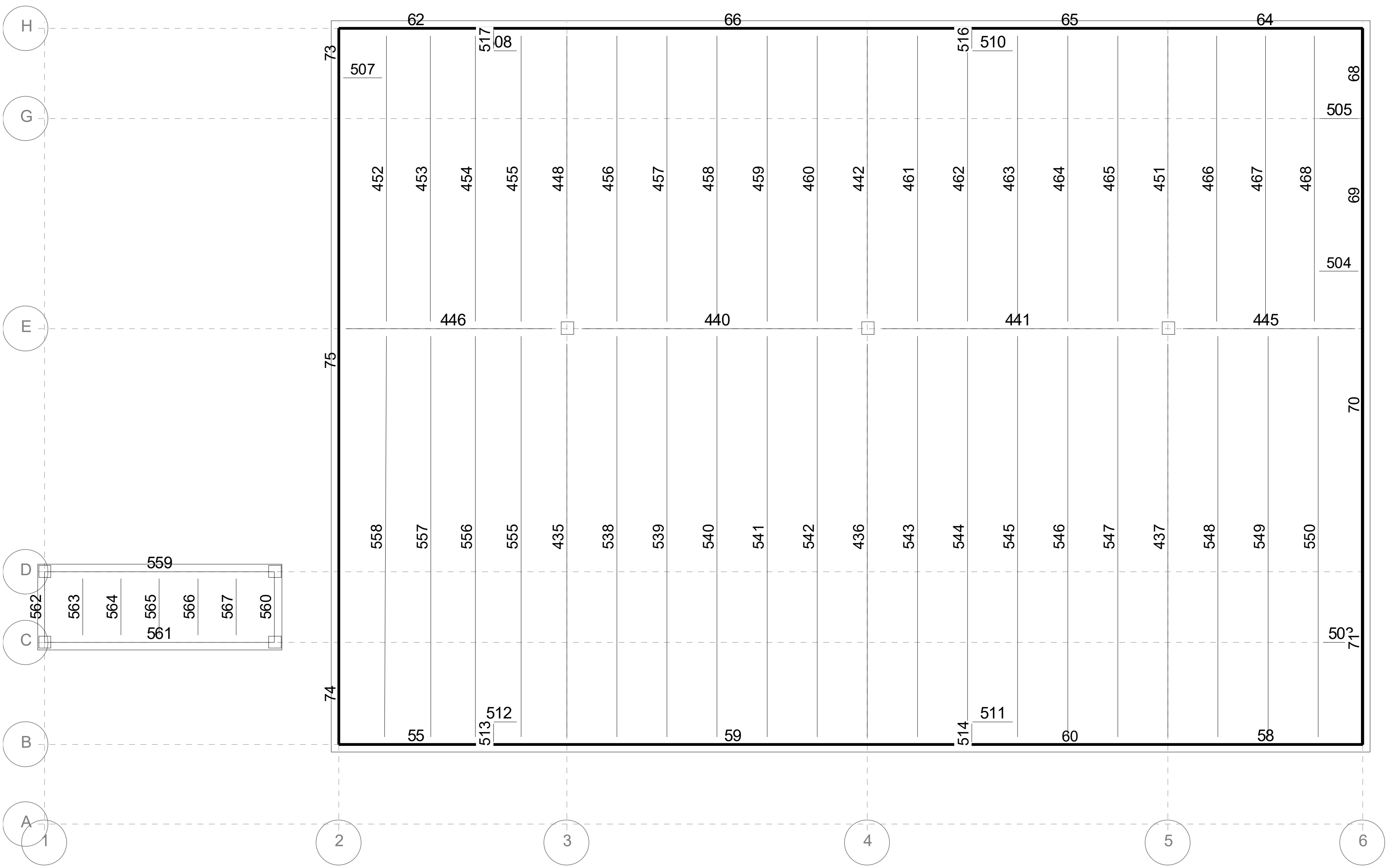
Floor Map

R-12

RAM Steel 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/22/24 11:03:38
Steel Code: AISC360-16 LRFD

Floor Type: High Roof **Beam Numbers**

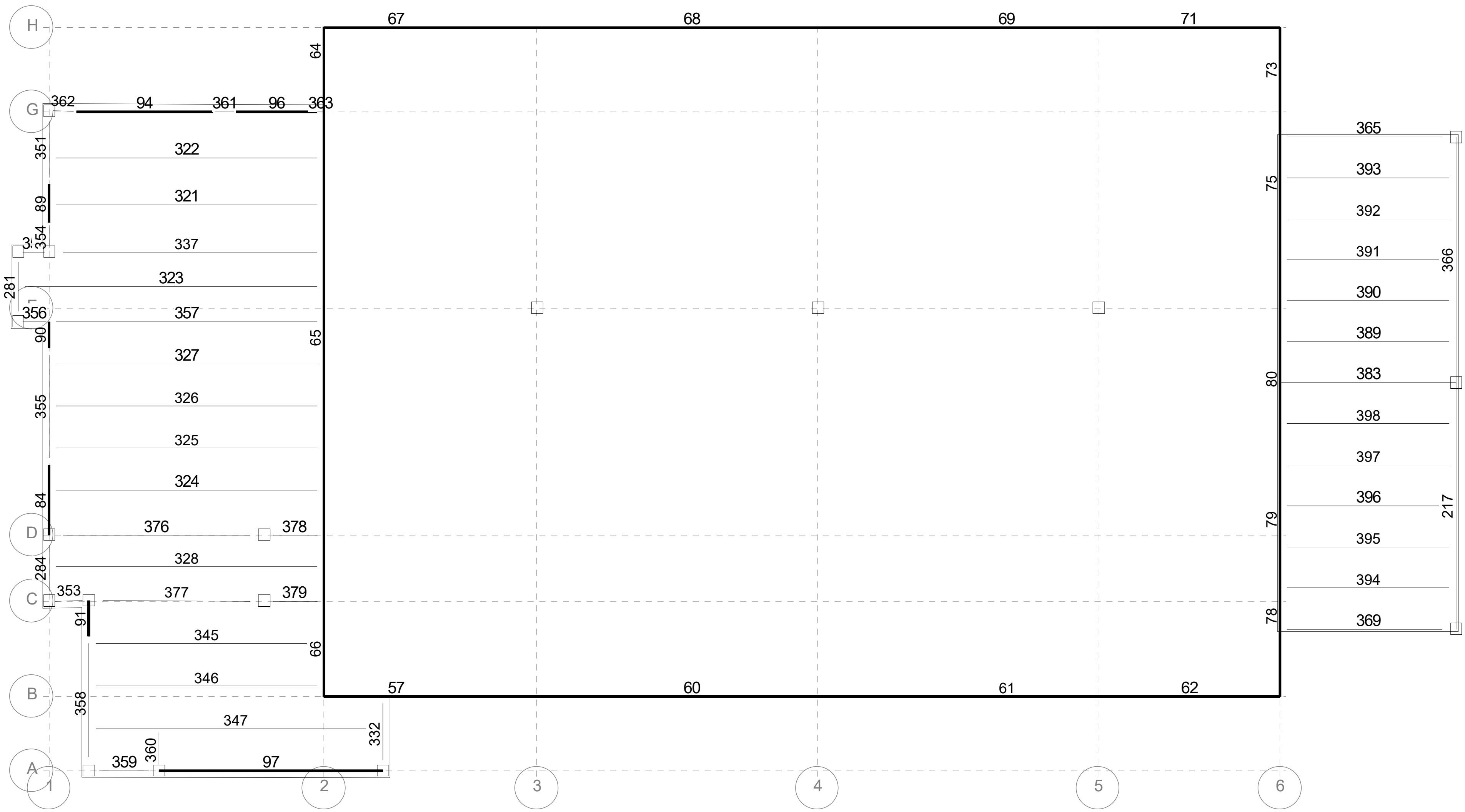


Floor Map

RAM Steel 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/30/24 12:34:50
Steel Code: AISC360-16 LRFD

Floor Type: Low Roof2 **Beam Numbers**

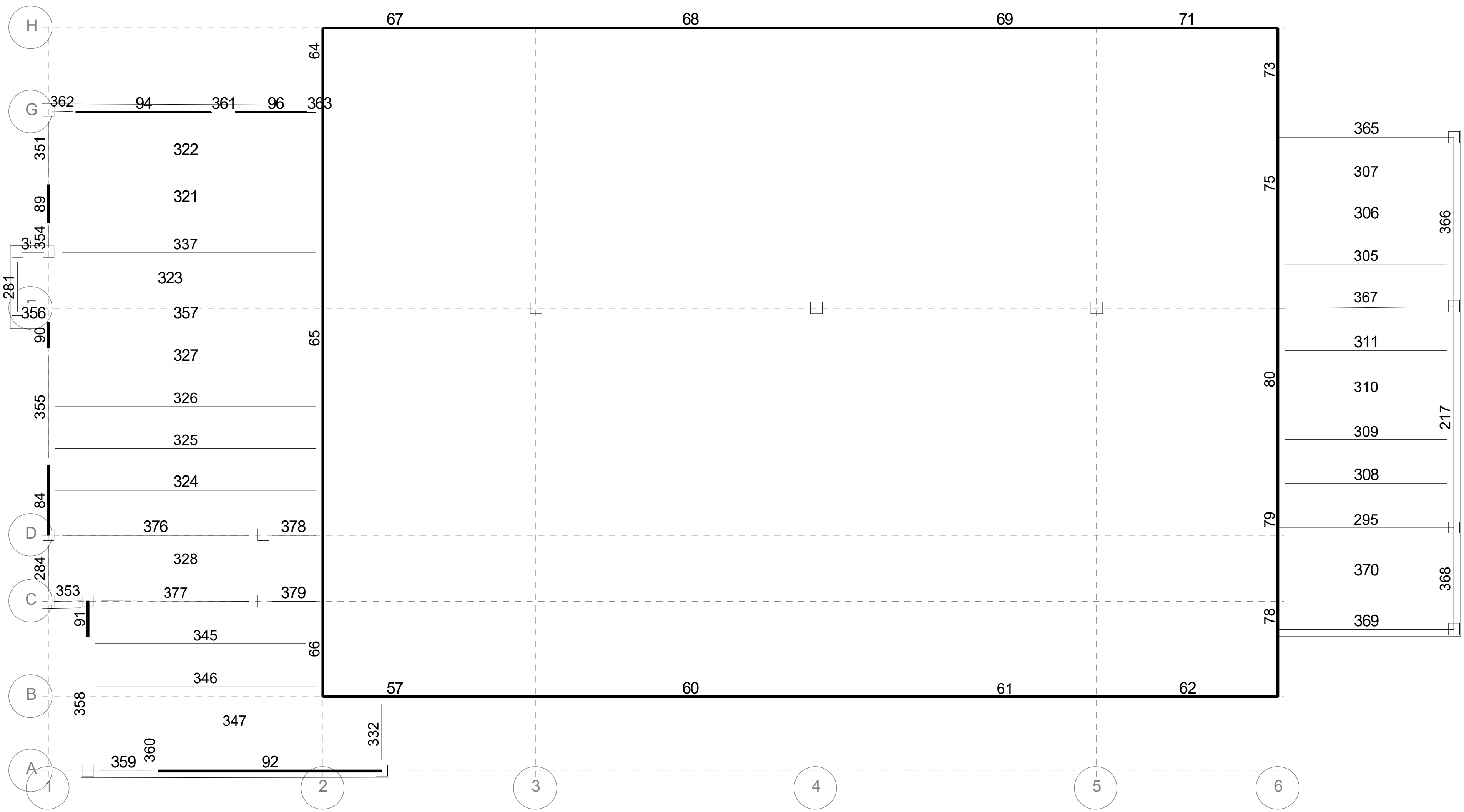


Floor Map

RAM Steel 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/22/24 11:03:38
Steel Code: AISC360-16 LRFD

Floor Type: Low Roof2 **Beam Numbers**



Beam Summary

RAM Steel 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/30/24 12:34:50
Steel Code: AISC360-16 LRFD

STEEL BEAM DESIGN SUMMARY:
Demand/Capacity Limits for: Strength: 0.960 Deflection: 1.000

Floor Type: High Roof

Beam #	Length ft	+Mu kip-ft	-Mu kip-ft	ΦMn kip-ft	Fy ksi	Beam Size		Studs
503	5.92	0.0	0.0	32.9	50.0	W8X10		
504	6.48	0.0	0.0	32.9	50.0	W8X10		
505	6.48	0.0	0.0	32.9	50.0	W8X10		
507	6.42	0.0	0.0	32.9	50.0	W8X10		
508	6.08	0.5	0.0	31.5	50.0	W8X10		
510	6.67	0.2	0.0	26.2	50.0	W8X10		
511	6.67	0.2	0.0	26.2	50.0	W8X10		
512	6.08	0.5	0.0	31.5	50.0	W8X10		
513	3.00	0.2	0.0	32.9	50.0	W8X10		
514	3.00	0.3	0.0	32.9	50.0	W8X10		
516	3.00	0.3	0.0	32.9	50.0	W8X10		
517	3.00	0.2	0.0	32.9	50.0	W8X10		
563	9.42	3.9	0.0	32.9	50.0	W8X10		
564	9.42	3.9	0.0	32.9	50.0	W8X10		
565	9.42	3.9	0.0	32.9	50.0	W8X10		
566	9.42	3.9	0.0	32.9	50.0	W8X10		
567	9.42	3.9	0.0	32.9	50.0	W8X10		

Floor Type: Low Roof2

Beam #	Length ft	+Mu kip-ft	-Mu kip-ft	ΦMn kip-ft	Fy ksi	Beam Size		Studs
281	9.92	27.2	0.0	115.3	50.0	W14X22	u	
284	9.42	22.9	0.0	115.4	50.0	W14X22	u	
332	10.67	35.6	0.0	47.6	50.0	W12X14		
351	10.50	32.1	0.0	44.4	50.0	W12X14		
352	4.47	1.5	0.0	32.9	50.0	W8X10		
353	5.67	2.3	0.0	32.9	50.0	W8X10		
354	4.21	0.8	0.0	30.4	50.0	W8X10		
355	16.68	79.3	0.0	107.7	50.0	W14X22		
356	4.47	1.5	0.0	32.9	50.0	W8X10		
358	19.23	86.8	0.0	146.6	50.0	W16X26		
359	10.00	8.6	0.0	32.9	50.0	W8X10		
360	6.08	0.0	0.0	32.9	50.0	W8X10		

Beam Summary

361	3.38	1.0	0.0	32.9	50.0	W8X10	
362	3.96	1.8	0.0	32.9	50.0	W8X10	
363	1.00	0.1	0.0	32.9	50.0	W8X10	
365	25.05	82.4	0.0	165.8	50.0	W16X26	
369	25.05	4.2	0.0	124.5	50.0	W14X22	
376	30.67	50.2	0.0	261.0	50.0	W14X43	u
377	25.00	35.1	0.0	204.8	50.0	W14X34	u
378	8.50	7.2	0.0	32.9	50.0	W8X10	
379	8.50	7.2	0.0	32.9	50.0	W8X10	

* after Size denotes beam failed stress/capacity criteria.
# after Size denotes beam failed deflection criteria.
u after Size denotes this size has been assigned by the User.

JOIST SELECTION SUMMARY:

Demand/Capacity Limits for: Strength: 0.960 Deflection: 1.000

Floor Type: High Roof

Standard Joists:

Joist #	Length ft	WDL lbs/ft	WLL lbs/ft	WTL lbs/ft	Joist
435	55.33	127.5	181.7	309.2	40LH11
436	55.33	133.3	190.0	323.3	40LH11
437	55.33	133.3	190.0	323.3	40LH11
442	40.00	133.3	190.0	323.3	32LH07
448	40.00	127.5	181.7	309.2	32LH06
451	40.00	131.5	187.3	318.8	32LH06
452	40.00	121.7	173.4	295.0	32LH06
453	40.00	118.3	168.6	287.0	32LH06
454	40.00	121.7	173.4	303.1	32LH06
455	40.00	121.7	173.4	300.0	32LH06
456	40.00	133.3	190.0	323.3	32LH07
457	40.00	133.3	190.0	323.3	32LH07
458	40.00	133.3	190.0	323.3	32LH07
459	40.00	133.3	190.0	323.3	32LH07
460	40.00	133.3	190.0	323.3	32LH07
461	40.00	133.3	190.0	323.3	32LH07
462	40.00	133.3	190.0	336.4	32LH07
463	40.00	133.3	190.0	324.6	32LH07
464	40.00	133.3	190.0	323.3	32LH07
465	40.00	133.3	190.0	323.3	32LH07
466	40.00	129.6	184.7	314.2	32LH06
467	40.00	129.6	184.7	314.2	32LH06
468	40.00	129.6	184.7	314.2	32LH06
538	55.33	133.3	190.0	323.3	40LH11
539	55.33	133.3	190.0	323.3	40LH11
540	55.33	133.3	190.0	323.3	40LH11
541	55.33	133.3	190.0	323.3	40LH11
542	55.33	133.3	190.0	323.3	40LH11
543	55.33	133.3	190.0	323.3	40LH11
544	55.33	133.3	190.0	332.3	40LH11
545	55.33	133.3	190.0	324.2	40LH11

546	55.33	133.3	190.0	323.3	40LH11
547	55.33	133.3	190.0	323.3	40LH11
548	55.33	133.3	190.0	323.3	40LH11
549	55.33	133.3	190.0	323.3	40LH11
550	55.33	125.8	179.3	305.2	40LH11
555	55.33	121.7	173.4	298.5	40LH10
556	55.33	120.5	171.7	297.7	40LH10
557	55.33	121.7	173.4	295.0	40LH10
558	55.33	122.8	175.0	297.9	40LH10

Joist Girders:

Joist #	Length	#Panels	PDL	PLL	PTL	Joist
440	40.00	6	6.4	9.1	15.4	XXG6N15.5K
441	40.00	6	6.4	9.1	15.4	XXG6N15.5K

Special Joists:

Joist #	Length	+M	-M	Joist Size
445	25.92	192.8	0.0	XXGSP
446	30.42	257.7	0.0	XXGSP

Floor Type: Low Roof2

Special Joists:

Joist #	Length	+M	-M	Joist Size
321	39.17	80.0	0.0	XXGSP
322	39.17	79.4	0.0	XXGSP
323	43.64	70.4	0.0	XXGSP
324	39.17	73.9	0.0	XXGSP
325	39.17	71.8	0.0	XXGSP
326	39.17	71.8	0.0	XXGSP
327	39.17	71.8	0.0	XXGSP
328	39.17	56.0	0.0	XXGSP
337	39.17	69.3	0.0	XXGSP
345	33.50	56.4	0.0	XXGSP
346	33.50	53.3	0.0	XXGSP
347	41.94	77.3	0.0	XXGSP
357	39.17	65.2	0.0	XXGSP
389	25.05	34.4	0.0	XXGSP
390	25.05	34.4	0.0	XXGSP
391	25.05	34.4	0.0	XXGSP
392	25.05	34.4	0.0	XXGSP

Beam Summary

393	25.05	34.4	0.0	XXGSP
394	25.05	11.3	0.0	XXGSP
395	25.05	15.6	0.0	XXGSP
396	25.05	33.2	0.0	XXGSP
397	25.05	34.6	0.0	XXGSP
398	25.05	34.6	0.0	XXGSP

* after Size denotes joist is inadequate.
u after Size denotes this size has been assigned by the User.

Beam Summary

STEEL BEAM DESIGN SUMMARY:

Demand/Capacity Limits for: Strength: 0.960 Deflection: 1.000

Floor Type: High Roof

Beam #	Length ft	+Mu kip-ft	-Mu kip-ft	ΦMn kip-ft	Fy ksi	Beam Size	Studs
503	5.92	0.0	0.0	32.9	50.0	W8X10	
504	6.48	0.0	0.0	32.9	50.0	W8X10	
505	6.48	0.0	0.0	32.9	50.0	W8X10	
507	6.42	0.0	0.0	32.9	50.0	W8X10	
508	6.08	1.1	0.0	31.5	50.0	W8X10	
510	6.67	0.4	0.0	26.2	50.0	W8X10	
511	6.67	0.2	0.0	26.2	50.0	W8X10	
512	6.08	0.5	0.0	31.5	50.0	W8X10	
513	3.00	0.3	0.0	32.9	50.0	W8X10	
514	3.00	0.3	0.0	32.9	50.0	W8X10	
516	3.00	0.6	0.0	32.9	50.0	W8X10	
517	3.00	0.6	0.0	32.9	50.0	W8X10	
563	9.42	3.9	0.0	32.9	50.0	W8X10	
564	9.42	3.9	0.0	32.9	50.0	W8X10	
565	9.42	3.9	0.0	32.9	50.0	W8X10	
566	9.42	3.9	0.0	32.9	50.0	W8X10	
567	9.42	3.9	0.0	32.9	50.0	W8X10	

Floor Type: Low Roof2

Beam #	Length ft	+Mu kip-ft	-Mu kip-ft	ΦMn kip-ft	Fy ksi	Beam Size		Studs
281	9.92	27.2	0.0	115.3	50.0	W14X22	u	
284	9.42	22.9	0.0	115.4	50.0	W14X22	u	
332	10.67	35.6	0.0	47.6	50.0	W12X14		
351	10.50	32.1	0.0	44.4	50.0	W12X14		
352	4.47	1.5	0.0	32.9	50.0	W8X10		
353	5.67	2.3	0.0	32.9	50.0	W8X10		
354	4.21	0.8	0.0	30.4	50.0	W8X10		
355	16.68	79.3	0.0	107.7	50.0	W14X22		
356	4.47	1.5	0.0	32.9	50.0	W8X10		
358	19.23	86.8	0.0	146.6	50.0	W16X26		
359	10.00	8.6	0.0	32.9	50.0	W8X10		
360	6.08	0.0	0.0	32.9	50.0	W8X10		

Beam Summary

361	3.38	1.0	0.0	32.9	50.0	W8X10	
362	3.96	1.8	0.0	32.9	50.0	W8X10	
363	1.00	0.1	0.0	32.9	50.0	W8X10	
376	30.67	50.2	0.0	261.0	50.0	W14X43	u
377	25.00	35.1	0.0	204.8	50.0	W14X34	u
378	8.50	7.2	0.0	32.9	50.0	W8X10	
379	8.50	7.2	0.0	32.9	50.0	W8X10	

* after Size denotes beam failed stress/capacity criteria.
# after Size denotes beam failed deflection criteria.
u after Size denotes this size has been assigned by the User.

JOIST SELECTION SUMMARY:

Demand/Capacity Limits for: Strength: 0.960 Deflection: 1.000

Floor Type: High Roof

Standard Joists:

Joist #	Length ft	WDL lbs/ft	WLL lbs/ft	WTL lbs/ft	Joist
442	40.00	133.3	504.6	663.7	36LH15SP
448	40.00	127.5	482.5	634.7	36LH15SP
451	40.00	131.5	497.5	654.4	36LH15SP
452	40.00	121.7	460.4	605.6	32LH15SP
453	40.00	118.3	447.8	589.1	32LH14SP
454	40.00	121.7	460.4	590.6	32LH15SP
455	40.00	121.7	460.4	596.3	32LH15SP
456	40.00	133.3	504.6	663.7	36LH15SP
457	40.00	133.3	504.6	663.7	36LH15SP
458	40.00	133.3	504.6	663.7	36LH15SP
459	40.00	133.3	504.6	663.7	36LH15SP
460	40.00	133.3	504.6	663.7	36LH15SP
461	40.00	133.3	504.6	663.7	36LH15SP
462	40.00	133.3	504.6	639.4	36LH15SP
463	40.00	133.3	504.6	661.4	36LH15SP
464	40.00	133.3	504.6	663.7	36LH15SP
465	40.00	133.3	504.6	663.7	36LH15SP
466	40.00	129.6	490.4	645.1	36LH15SP
467	40.00	129.6	490.4	645.1	36LH15SP
468	40.00	129.6	490.4	645.1	36LH15SP

Joist Girders:

Joist #	Length	#Panels	PDL	PLL	PTL	Joist
440	40.00	6	6.4	19.4	25.8	XXG6N25.8K
441	40.00	6	6.4	19.4	25.8	XXG6N25.8K

Special Joists:

Joist #	Length	+M	-M	Joist Size
435	55.33	166.1	0.0	XXGSP
436	55.33	173.7	0.0	XXGSP
437	55.33	173.7	0.0	XXGSP
445	25.92	322.1	0.0	XXGSP

446	30.42	430.5	0.0	XXGSP
538	55.33	173.7	0.0	XXGSP
539	55.33	173.7	0.0	XXGSP
540	55.33	173.7	0.0	XXGSP
541	55.33	173.7	0.0	XXGSP
542	55.33	173.7	0.0	XXGSP
543	55.33	173.7	0.0	XXGSP
544	55.33	173.7	0.0	XXGSP
545	55.33	173.7	0.0	XXGSP
546	55.33	173.7	0.0	XXGSP
547	55.33	173.7	0.0	XXGSP
548	55.33	173.7	0.0	XXGSP
549	55.33	173.7	0.0	XXGSP
550	55.33	163.9	0.0	XXGSP
555	55.33	158.5	0.0	XXGSP
556	55.33	157.0	0.0	XXGSP
557	55.33	156.1	0.0	XXGSP
558	55.33	160.0	0.0	XXGSP

Floor Type: Low Roof2

Special Joists:

Joist #	Length	+M	-M	Joist Size
305	25.05	36.0	0.0	XXGSP
306	25.05	35.6	0.0	XXGSP
307	25.05	35.6	0.0	XXGSP
308	25.05	37.2	0.0	XXGSP
309	25.05	37.2	0.0	XXGSP
310	25.05	37.2	0.0	XXGSP
311	25.05	36.8	0.0	XXGSP
321	39.17	80.0	0.0	XXGSP
322	39.17	79.4	0.0	XXGSP
323	43.64	70.4	0.0	XXGSP
324	39.17	73.9	0.0	XXGSP
325	39.17	71.8	0.0	XXGSP
326	39.17	71.8	0.0	XXGSP
327	39.17	71.8	0.0	XXGSP
328	39.17	56.0	0.0	XXGSP
337	39.17	69.3	0.0	XXGSP
345	33.50	56.4	0.0	XXGSP

346	33.50	53.3	0.0	XXGSP
347	41.94	77.3	0.0	XXGSP
357	39.17	65.2	0.0	XXGSP
370	25.05	0.0	0.0	XXGSP

* after Size denotes joist is inadequate.
u after Size denotes this size has been assigned by the User.

Beam Connection Check

RAM Steel 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/30/24 12:34:50
Steel Code: AISC360-16 LRFD

Connection Table File Name: C:\\ProgramData\\Bentley\\Engineering\\RAM Structural System\\Tables\\\\SPA325N78LRFD.con

Shear tab connection factored load capacities using 7/8" A325N bolts
Shear tabs: A36
Beams A992 50 ksi

User Defined Allowable Connection Values - Factored (kips):

Size	Capacity	Comments
W8	9.70	2 Bolts
W10	16.50	2 Bolts
W12	32.10	3 Bolts
W14	41.00	3 Bolts
W16	67.20	4 Bolts
W18	94.30	5 Bolts
W21	120.30	6 Bolts
W24	120.30	6 Bolts
W27	145.00	7 Bolts
W30	173.00	8 Bolts
W33	195.00	9 Bolts
W36	219.00	10 Bolts
W40	245.00	11 Bolts
W44	268.00	12 Bolts

Load Combinations:

1	1.4DL
2	1.2DL+1.6LL

Floor Type: High Roof

Number of Warnings = 0

Floor Type: Low Roof2

Number of Warnings = 0

Notes:
Beams with cantilevers are not checked at supports under cantilevers.
Frame beams are not checked.

Beam Connection Check

Connection Table File Name: C:\\ProgramData\\Bentley\\Engineering\\RAM Structural System\\Tables\\\\SPA325N78LRFD.con

Shear tab connection factored load capacities using 7/8" A325N bolts
Shear tabs: A36
Beams A992 50 ksi

User Defined Allowable Connection Values - Factored (kips):

Size	Capacity	Comments
W8	9.70	2 Bolts
W10	16.50	2 Bolts
W12	32.10	3 Bolts
W14	41.00	3 Bolts
W16	67.20	4 Bolts
W18	94.30	5 Bolts
W21	120.30	6 Bolts
W24	120.30	6 Bolts
W27	145.00	7 Bolts
W30	173.00	8 Bolts
W33	195.00	9 Bolts
W36	219.00	10 Bolts
W40	245.00	11 Bolts
W44	268.00	12 Bolts

Load Combinations:

1	1.4DL
2	1.2DL+1.6LL

Floor Type: High Roof

Number of Warnings = 0

Floor Type: Low Roof2

Number of Warnings = 0

Notes:
Beams with cantilevers are not checked at supports under cantilevers.
Frame beams are not checked.

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Consulting Structural Engineers

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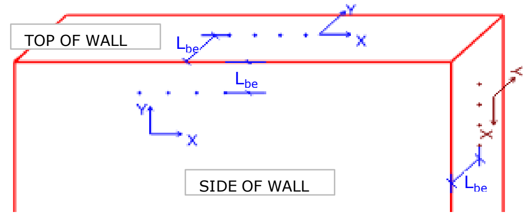
Cast in Place Embeds in Masonry

(Note: This sheet and calucation is applicable only for Cast-in-Place Embeds)
Capacity of Masonry anchors in shear per 2016 Masonry code, Sections 8.1.3. and 9.1.6 **[Page 1 of 2]**

Single row of anchors along X axis



EDGE = TOP OF WALL ROTATED

Inputs

Design Method	**LRFD**		
Anchor Type	**Headed Bolt**		
Anchor Location	**Side of Wall**		
d_b	**3/4**	in	Anchor bolt diameter
L_b	**10**	in	Embedment depth of anchor, 6" min for floor joists and floor diaphragms A.8.3.5 (a)
e_b	**0**	in	Projected leg extension of bent-bar anchor, measured from inside edge of anchor at bend to farthest point of anchor in the plane of the hook, in.
L_{be}	**3.8125**	in	Edge distance to wall, 2'' min or 4db min
f'_m	**2500**	psi	Unit strength of masonry
f_y	**36000**	psi	ASTM108 doesn't list fy (for HSA), use 36000 (conservative), ASTM A307
nx	**2**		Number of bolts in X axis
s	**1**	in	Spacing of anchors, Enter 0 if nx=1
t	**7.625**	in	Wall thickness (7.625" for 8" nominal wall)

Demand inputs

	Factored (LRFD)		
Shear (Vy)	**1167**	lb	(bau)
Tension	**0**	lb	(bvu)

Output

Ab	**0.44**	in²	Bolt Area	
x	**-19.00**		Overlapping distance of breakout cones for A_{pt}	(negative means overlap)
A_{pt}	**168.71**	in²	Projected Area for Tension	
A_{pv}	**26.63**	in²		

LRFD Design

Tensile Strength of Headed Bolts

ϕB_{anb} =	**16871**	lbf	breakout	Eq 9-1	$\phi B_{anb} = \phi*4A_{pt}*(f'_m)^{0.5}$	ϕ =	**0.5** *per 9.1.4.1*
ϕB_{ans} =	**14314**	lbf	steel yielding	Eq 9-2	$\phi B_{ans} = \phi*A_b*f_y$	ϕ =	**0.9** *per 9.1.4.1*
=	**28627.8**	lbf	steel yielding	for 2 Anchors			

Tensile Strength of Bent Bar Anchor Bolts

ϕB_{anb} =	**N/A**	lbf	axial breakout	Eq 9-3	$\phi B_{anb} = \phi*4A_{pt}*(f'_m)^{0.5}$	ϕ =	**0.5** *per 9.1.4.1*
ϕB_{anp} =	**N/A**	lbf	axial pullout	Eq 9-4	$\phi B_{anp} = \phi*1.5*f'_m*e_b*d_b + 300\pi*(L_b + e_b + d_b)d_b$	ϕ =	**0.65** *per 9.1.4.1*
ϕB_{ans} =	**N/A**	lbf	steel yielding	Eq 9-5	$\phi B_{ans} = \phi*A_b*f_y$	ϕ =	**0.9** *per 9.1.4.1*
=	**N/A**	lbf	steel yielding	for 2 Anchors			

Shear Strength of Headed and Bent Bar Anchor Bolts

ϕB_{vnb} =	**2663**	lbf	breakout shear	Eq 9-6	$B_{vnb} = \phi*4A_{pv}(f'_m)^{0.5}$	ϕ =	**0.5** *per 9.1.4.1*
ϕB_{vnc} =	**5044**	lbf	crushing shear	Eq 9-7	$B_{vnc} = \phi*1750(f'_m*A_b)^{0.25}$	ϕ =	**0.5** *per 9.1.4.1*
=	**10088**	lbf	crushing shear	for 2 Anchors			
ϕB_{vnpry} =	**33742.45**	lbf	pryout	Eq 9-8	$B_{vnpry} = \phi*8*A_{pt}(f'_m)^{0.5}$	ϕ =	**0.5** *per 9.1.4.1*
ϕB_{vns} =	**8588.33**	lbf	shear steel yielding	Eq 9-9	$B_{vns} = \phi*0.6*A_b*f_y$	ϕ =	**0.9** *per 9.1.4.1*
=	**17176.66**	lbf	shear steel yielding	for 2 Anchors			

Anchorage Check LRFD

Headed Bolts

Combined	0.25	**OK! Anchor capacity sufficient**	EQ 9-10 $(b_{au}/\phi B_{an})$^5/3 + $(b_{an}/\phi B_{vn})$^5/3
Shear	0.44	**OK! Anchor capacity sufficient**	
Tension	0.00	**OK! Anchor capacity sufficient**	

Bent Bar Anchor Bolts

Combined	N/A	**N/A**	EQ 9-10 $(b_{au}/\phi B_{an})$^5/3 + $(b_{an}/\phi B_{vn})$^5/3
Shear	N/A	**N/A**	
Tension	N/A	**N/A**	

Sheet #:	FS-
Job #:	240104
Date:	8/22/2024
By:	GN

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Cast in Place Embeds in Masonry

Capacity of Masonry anchors in shear per 2016 Masonry code, Sections 8.1.3. and 9.1.6 [Continued] [Page 2 of 2]

ASD Design **LRFD Design Method Selected. Proceed to LRFD Section for Results**

Tensile Strength of Headed Bolts

B_{ab} =	**10545**	lbf	breakout	Eq 8-1	$B_{ab} = 1.25*A_{pt}*(f'_m)^{0.5}$	
Bas =	**9543**	lbf	steel yielding	Eq 8-2	$Bas = 0.6*A_b*f_y$	(for 1 Anchor)
=	**19085**	lbf	steel yielding	for 2 Anchors		

Tensile Strength of Bent Bar Anchor Bolts

B_{ab} =	**N/A**	lbf	axial breakout	Eq 8-3	$B_{ab} = 1.25*A_{pt}*(f'_m)^{0.5}$
B_{ap} =	**N/A**	lbf	axial pryout	Eq 8-4	$B_{ap} = 0.6*f'_m*e_b*d_b + 120\pi*(L_b + e_b + d_b)d_b$
Bas =	**N/A**	lbf	steel yielding	Eq 8-5	$Bas = 0.6*A_b*f_y$
=	**N/A**	lbf	steel yielding	for 2 Anchors	

Shear Strength of Headed and Bent Bar Anchor Bolts

B_{vb} =	**1665**	lbf	breakout shear	Eq 8-6	$B_{vb} = 1.25*A_{pv}*(f'_m)^{0.5}$
B_{vc} =	**3344**	lbf	crushing shear	Eq 8-7	$B_{vc} = 580*(f'_m*A_b)^{0.25}$
=	**6687**	lbf	crushing shear	for 2 Anchors	
B_{vpry} =	**21089**	lbf	pryout	Eq 8-8	$B_{vpry} = 2.5*A_{pt}(f'_m)^{0.5}$
B_{vs} =	**5726**	lbf	shear/steel yielding	Eq 8-9	$B_{vs} = 0.36*A_b*f_y$
=	**11451**	lbf	shear/steel yielding	for 2 Anchors	

Anchorage Check ASD

Headed Bolts

Combined	**N/A**	**N/A**	EQ 8-10 (b_a/B_a)^5/3 + (b_v/B_v)^5/3
Shear	**N/A**	**N/A**	
Tension	**N/A**	**N/A**	

Bent Bar Anchor Bolts

Combined	**N/A**	**N/A**	EQ 8-10 (b_a/B_a)^5/3 + (b_v/B_v)^5/3
Shear	**N/A**	**N/A**	
Tension	**N/A**	**N/A**	

Notes:
This calculation makes following assumptior
1) Masonry cells are grouted around anchor such that no projected area (A_{pt} or A_{pv}) lies outside the grout.
If any projected area lies outside grout, such area shall be deducted or apporpriate case can be appiled, if applicable
2) Tensile Anchor at top of wall, for (3) or more Anchor, Z shall be out to out distance (See Figure 2)
3) Anchors are equally spaced
4) Only (1) row of bolts applicable at the top of wal
5) If Anchor Bolts are at the end of the wall, Lbe parallel to X axis does not contro

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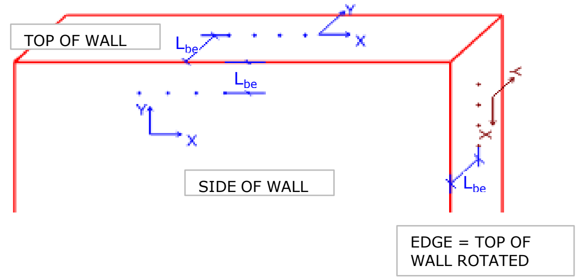
Cast in Place Embeds in Masonry

(Note: This sheet and calucation is applicable only for Cast-in-Place Embeds)
Capacity of Masonry anchors in shear per 2016 Masonry code, Sections 8.1.3. and 9.1.6

Single row of anchors along X axis



Inputs

Design Method	**LRFD**	
Anchor Type	**Headed Bolt**	
Anchor Location	**Side of Wall**	
d_b	**3/4** in	Anchor bolt diameter
L_b	**5** in	Embedment depth of anchor, 6" min for floor joists and floor diaphragms A.8.3.5 (a)
e_b	**0** in	Projected leg extension of bent-bar anchor, measured from inside edge of anchor at bend to farthest point of anchor in the plane of the hook, in.
L_{be}	**8** in	Edge distance to wall, 2'' min or 4db min
f'_m	**2000** psi	Unit strength of masonry
f_y	**36000** psi	ASTM108 doesn't list fy (for HSA), use 36000 (conservative), ASTM A307
nx	**2**	Number of bolts in X axis
s	**8** in	Spacing of anchors, Enter 0 if nx=1
t	**7.625** in	Wall thickness (7.625" for 8" nominal wall)

Demand inputs

	Factored (LRFD)	
Shear (Vy)	**753** lb (bau)	3
Tension	**350** lb (bvu)	

Output

Ab	**0.44** in²	Bolt Area	
x	**-2.00**	Overlapping distance of breakout cones for A_{pt}	(negative means overlap)
A_{pt}	**148.90** in²	Projected Area for Tension	
A_{pv}	**122.00** in²		

LRFD Design

Tensile Strength of Headed Bolts

ϕB_{anb} =	**13318** lbf	breakout	Eq 9-1	$\phi B_{anb} = \phi*4A_{pt}*(f'_m)^{0.5}$	ϕ =	**0.5** *per 9.1.4.1*
ϕB_{ans} =	**14314** lbf	steel yielding	Eq 9-2	$\phi B_{ans} = \phi*A_b*f_y$	ϕ =	**0.9** *per 9.1.4.1*
=	**28627.8** lbf	steel yielding	for 2 Anchors			

Tensile Strength of Bent Bar Anchor Bolts

ϕB_{anb} =	**N/A** lbf	axial breakout	Eq 9-3	$\phi B_{anb} = \phi*4A_{pt}*(f'_m)^{0.5}$	ϕ =	**0.5** *per 9.1.4.1*
ϕB_{anp} =	**N/A** lbf	axial pullout	Eq 9-4	$\phi B_{anp} = \phi*1.5*f'_m*e_b*d_b + 300\pi*(L_b + e_b + d_b)d_b$	ϕ =	**0.65** *per 9.1.4.1*
ϕB_{ans} =	**N/A** lbf	steel yielding	Eq 9-5	$\phi B_{ans} = \phi*A_b*f_y$	ϕ =	**0.9** *per 9.1.4.1*
=	**N/A** lbf	steel yielding	for 2 Anchors			

Shear Strength of Headed and Bent Bar Anchor Bolts

ϕB_{vnb} =	**10912** lbf	breakout shear	Eq 9-6	$B_{vnb} = \phi*4A_{pv}(f'_m)^{0.5}$	ϕ =	**0.5** *per 9.1.4.1*
ϕB_{vnc} =	**4771** lbf	crushing shear	Eq 9-7	$B_{vnc} = \phi*1750(f'_m*A_b)^{0.25}$	ϕ =	**0.5** *per 9.1.4.1*
=	**9541** lbf	crushing shear	for 2 Anchors			
ϕB_{vnpry} =	**26636.86** lbf	pryout	Eq 9-8	$B_{vnpry} = \phi*8*A_{pt}(f'_m)^{0.5}$	ϕ =	**0.5** *per 9.1.4.1*
ϕB_{vns} =	**8588.33** lbf	shear steel yielding	Eq 9-9	$B_{vns} = \phi*0.6*A_b*f_y$	ϕ =	**0.9** *per 9.1.4.1*
=	**17176.66** lbf	shear steel yielding	for 2 Anchors			

Anchorage Check LRFD

Headed Bolts

Combined	0.02	**OK! Anchor capacity sufficient**	EQ 9-10 $(b_{au}/\phi B_{an})$^5/3 + $(b_{an}/\phi B_{vn})$^5/3
Shear	0.08	**OK! Anchor capacity sufficient**	
Tension	0.03	**OK! Anchor capacity sufficient**	

Bent Bar Anchor Bolts

Combined	N/A	**N/A**	EQ 9-10 $(b_{au}/\phi B_{an})$^5/3 + $(b_{an}/\phi B_{vn})$^5/3
Shear	N/A	**N/A**	
Tension	N/A	**N/A**	

Sheet #:	FS-
Job #:	240104
Date:	8/22/2024
By:	GN

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Cast in Place Embeds in Masonry

Capacity of Masonry anchors in shear per 2016 Masonry code, Sections 8.1.3. and 9.1.6 [Continued] [Page 2 of 2]

ASD Design **LRFD Design Method Selected. Proceed to LRFD Section for Results**

Tensile Strength of Headed Bolts

B_{ab} =	**8324**	lbf	breakout	Eq 8-1	$B_{ab} = 1.25*A_{pt}*(f'_m)^{0.5}$	
Bas =	**9543**	lbf	steel yielding	Eq 8-2	$Bas = 0.6*A_b*f_y$	(for 1 Anchor)
=	**19085**	lbf	steel yielding	for 2 Anchors		

Tensile Strength of Bent Bar Anchor Bolts

B_{ab} =	**N/A**	lbf	axial breakout	Eq 8-3	$B_{ab} = 1.25*A_{pt}*(f'_m)^{0.5}$
B_{ap} =	**N/A**	lbf	axial pryout	Eq 8-4	$B_{ap} = 0.6*f'_m*e_b*d_b + 120\pi*(L_b + e_b + d_b)d_b$
Bas =	**N/A**	lbf	steel yielding	Eq 8-5	$Bas = 0.6*A_b*f_y$
=	**N/A**	lbf	steel yielding	for 2 Anchors	

Shear Strength of Headed and Bent Bar Anchor Bolts

B_{vb} =	**6820**	lbf	breakout shear	Eq 8-6	$B_{vb} = 1.25*A_{pv}*(f'_m)^{0.5}$
B_{vc} =	**3162**	lbf	crushing shear	Eq 8-7	$B_{vc} = 580*(f'_m*A_b)^{0.25}$
=	**6324**	lbf	crushing shear	for 2 Anchors	
B_{vpry} =	**16648**	lbf	pryout	Eq 8-8	$B_{vpry} = 2.5*A_{pt}(f'_m)^{0.5}$
B_{vs} =	**5726**	lbf	shear/steel yielding	Eq 8-9	$B_{vs} = 0.36*A_b*f_y$
=	**11451**	lbf	shear/steel yielding	for 2 Anchors	

Anchorage Check ASD

Headed Bolts

Combined	**N/A**	**N/A**	EQ 8-10 (b_a/B_a)^5/3 + (b_v/B_v)^5/3
Shear	**N/A**	**N/A**	
Tension	**N/A**	**N/A**	

Bent Bar Anchor Bolts

Combined	**N/A**	**N/A**	EQ 8-10 (b_a/B_a)^5/3 + (b_v/B_v)^5/3
Shear	**N/A**	**N/A**	
Tension	**N/A**	**N/A**	

Notes:
This calculation makes following assumptior
1) Masonry cells are grouted around anchor such that no projected area (A_{pt} or A_{pv}) lies outside the grout.
If any projected area lies outside grout, such area shall be deducted or apporpriate case can be appiled, if applicable
2) Tensile Anchor at top of wall, for (3) or more Anchor, Z shall be out to out distance (See Figure 2)
3) Anchors are equally spaced
4) Only (1) row of bolts applicable at the top of wal
5) If Anchor Bolts are at the end of the wall, Lbe parallel to X axis does not contro

Sheet #:	FS-
Job #:	240104
Date:	8/22/2024
By:	GN

R-31

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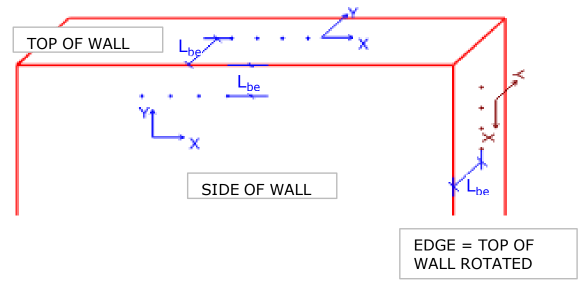
Cast in Place Embeds in Masonry

(Note: This sheet and calucation is applicable only for Cast-in-Place Embeds)
Capacity of Masonry anchors in shear per 2016 Masonry code, Sections 8.1.3. and 9.1.6 **[Page 1 of 2]**

Single row of anchors along X axis



Inputs

Design Method	LRFD		
Anchor Type	Headed Bolt		
Anchor Location	Side of Wall		
d_b	3/4	in	Anchor bolt diameter
L_b	5	in	Embedment depth of anchor, 6" min for floor joists and floor diaphragms A.8.3.5 (a)
e_b	0	in	Projected leg extension of bent-bar anchor, measured from inside edge of anchor at bend to farthest point of anchor in the plane of the hook, in.
L_{be}	8	in	Edge distance to wall, 2'' min or 4db min
f'_m	2000	psi	Unit strength of masonry
f_y	36000	psi	ASTM108 doesn't list fy (for HSA), use 36000 (conservative), ASTM A307
nx	2		Number of bolts in X axis
s	4	in	Spacing of anchors, Enter 0 if nx=1
t	7.625	in	Wall thickness (7.625" for 8" nominal wall)

Demand inputs

	Factored (LRFD)		
Shear (Vy)	8000	lb	(bau)
Tension	1400	lb	(bvu)

Output

Ab	0.44	in²	Bolt Area
x	-6.00		Overlapping distance of breakout cones for A_{pt} (negative means overlap)
A_{pt}	117.45	in²	Projected Area for Tension
A_{pv}	91.50	in²	

LRFD Design

Tensile Strength of Headed Bolts

ϕB_{anb} =	10505	lbf	breakout	Eq 9-1	$\phi B_{anb} = \phi*4A_{pt}*(f'_m)^{0.5}$	ϕ =	**0.5** *per 9.1.4.1*
ϕB_{ans} =	14314	lbf	steel yielding	Eq 9-2	$\phi B_{ans} = \phi*A_b*f_y$	ϕ =	**0.9** *per 9.1.4.1*
=	28627.8	lbf	steel yielding	for 2 Anchors			

Tensile Strength of Bent Bar Anchor Bolts

ϕB_{anb} =	N/A	lbf	axial breakout	Eq 9-3	$\phi B_{anb} = \phi*4A_{pt}*(f'_m)^{0.5}$	ϕ =	**0.5** *per 9.1.4.1*
ϕB_{anp} =	N/A	lbf	axial pullout	Eq 9-4	$\phi B_{anp} = \phi*1.5*f'_m*e_b*d_b + 300\pi*(L_b + e_b + d_b)d_b$	ϕ =	**0.65** *per 9.1.4.1*
ϕB_{ans} =	N/A	lbf	steel yielding	Eq 9-5	$\phi B_{ans} = \phi*A_b*f_y$	ϕ =	**0.9** *per 9.1.4.1*
=	N/A	lbf	steel yielding	for 2 Anchors			

Shear Strength of Headed and Bent Bar Anchor Bolts

ϕB_{vnb} =	8184	lbf	breakout shear	Eq 9-6	$B_{vnb} = \phi*4A_{pv}(f'_m)^{0.5}$	ϕ =	**0.5** *per 9.1.4.1*
ϕB_{vnc} =	4771	lbf	crushing shear	Eq 9-7	$B_{vnc} = \phi*1750(f'_m*A_b)^{0.25}$	ϕ =	**0.5** *per 9.1.4.1*
=	9541	lbf	crushing shear	for 2 Anchors			
ϕB_{vnpry} =	21009.37	lbf	pryout	Eq 9-8	$B_{vnpry} = \phi*8*A_{pt}(f'_m)^{0.5}$	ϕ =	**0.5** *per 9.1.4.1*
ϕB_{vns} =	8588.33	lbf	shear steel yielding	Eq 9-9	$B_{vns} = \phi*0.6*A_b*f_y$	ϕ =	**0.9** *per 9.1.4.1*
=	17176.66	lbf	shear steel yielding	for 2 Anchors			

Anchorage Check LRFD

Headed Bolts

Combined	1.00	**OK! Anchor capacity sufficient**	EQ 9-10 $(b_{au}/\phi B_{an})$^5/3 + $(b_{an}/\phi B_{vn})$^5/3
Shear	0.98	**OK! Anchor capacity sufficient**	
Tension	0.13	**OK! Anchor capacity sufficient**	

Bent Bar Anchor Bolts

Combined	N/A	**N/A**	EQ 9-10 $(b_{au}/\phi B_{an})$^5/3 + $(b_{an}/\phi B_{vn})$^5/3
Shear	N/A	**N/A**	
Tension	N/A	**N/A**	

Sheet #:	FS-
Job #:	240104
Date:	8/22/2024
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Cast in Place Embeds in Masonry

Capacity of Masonry anchors in shear per 2016 Masonry code, Sections 8.1.3. and 9.1.6 [Continued] [Page 2 of 2]

ASD Design **LRFD Design Method Selected. Proceed to LRFD Section for Results**

Tensile Strength of Headed Bolts

B_{ab} =	**6565**	lbf	breakout	Eq 8-1	$B_{ab} = 1.25*A_{pt}*(f'_m)^{0.5}$	
Bas =	**9543**	lbf	steel yielding	Eq 8-2	$Bas = 0.6*A_b*f_y$	(for 1 Anchor)
=	**19085**	lbf	steel yielding	for 2 Anchors		

Tensile Strength of Bent Bar Anchor Bolts

B_{ab} =	**N/A**	lbf	axial breakout	Eq 8-3	$B_{ab} = 1.25*A_{pt}*(f'_m)^{0.5}$
B_{ap} =	**N/A**	lbf	axial pryout	Eq 8-4	$B_{ap} = 0.6*f'_m*e_b*d_b + 120\pi*(L_b + e_b + d_b)d_b$
Bas =	**N/A**	lbf	steel yielding	Eq 8-5	$Bas = 0.6*A_b*f_y$
=	**N/A**	lbf	steel yielding	for 2 Anchors	

Shear Strength of Headed and Bent Bar Anchor Bolts

B_{vb} =	**5115**	lbf	breakout shear	Eq 8-6	$B_{vb} = 1.25*A_{pv}*(f'_m)^{0.5}$
B_{vc} =	**3162**	lbf	crushing shear	Eq 8-7	$B_{vc} = 580*(f'_m*A_b)^{0.25}$
=	**6324**	lbf	crushing shear	for 2 Anchors	
B_{vpry} =	**13131**	lbf	pryout	Eq 8-8	$B_{vpry} = 2.5*A_{pt}(f'_m)^{0.5}$
B_{vs} =	**5726**	lbf	shear/steel yielding	Eq 8-9	$B_{vs} = 0.36*A_b*f_y$
=	**11451**	lbf	shear/steel yielding	for 2 Anchors	

Anchorage Check ASD

Headed Bolts

Combined	**N/A**	**N/A**	EQ 8-10 $(b_a/B_a)^{5/3} + (b_v/B_v)^{5/3}$
Shear	**N/A**	**N/A**	
Tension	**N/A**	**N/A**	

Bent Bar Anchor Bolts

Combined	**N/A**	**N/A**	EQ 8-10 $(b_a/B_a)^{5/3} + (b_v/B_v)^{5/3}$
Shear	**N/A**	**N/A**	
Tension	**N/A**	**N/A**	

Notes:
This calculation makes following assumptior
1) Masonry cells are grouted around anchor such that no projected area (A_{pt} or A_{pv}) lies outside the grout.
If any projected area lies outside grout, such area shall be deducted or apporpriate case can be appiled, if applicable
2) Tensile Anchor at top of wall, for (3) or more Anchor, Z shall be out to out distance (See Figure 2)
3) Anchors are equally spaced
4) Only (1) row of bolts applicable at the top of wal
5) If Anchor Bolts are at the end of the wall, Lbe parallel to X axis does not contro

Gravity Column Design Criteria

DEFAULT SPLICE LEVELS:

Level	Splice
High Roof	N
Low Roof	N

DEMAND/CAPACITY LIMIT FOR STRENGTH:

Columns: 0.860
Baseplates: 1.000

DESIGN DEFAULTS:

Maximum Angle from column axis at which beam reaction is not split between column sides for calculating unbalanced moments: 30.0 deg.
Skip-load the Live Load around Column

STANDARD COLUMN TRIAL GROUPS:

	Trial Group 1	Trial Group 2	Trial Group 3
I Section	W14	W12	W10
Rect. HSS	HSS10X10	HSS8X8	HSS6X6
Round HSS	HSS10	HSS8.625	HSS6

HANGING COLUMN TRIAL GROUPS:

	Trial Group 1	Trial Group 2	Trial Group 3
I Section	W12	W10	W8
Rect. HSS	HSS10X10	HSS8X8	HSS6X6
Round HSS	HSS10	HSS7.625	HSS6
Channel	C12	C12	C12
Tee	WT22	WT20X16	WT20X12
Flat Bar	FlatBar	FlatBar	FlatBar
Round Bar	RoundBar	RoundBar	RoundBar
Single Angle	L8X8	L6X6	L4X4
Double Angle	2L8X8	2L6X6	2L4X4

COLUMN BRACING:

Deck Does Not Brace Column
Maximum Angle from column axis for which beam braces column: 45.0 deg.

BASE PLATES:

Design Code: AISC360-16 LRFD

Plate Fy (ksi)	36.000
Minimum Dimension From Face of Column to Edge of Plate (in)	3.000
Minimum Dimension From Side of Column to Edge of Plate (in)	0.500
Increment of Plate Dimensions (in)	0.500
Increment of Plate Thickness (in)	0.250
Minimum Footing Dimension Parallel to Web (ft)	2.00
Minimum Footing Dimension Perpendicular to Web (ft)	2.00

Gravity Column Design Criteria

Keep Base Plate Square:.. N

Gravity Column Design Criteria

RAM Steel 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/22/24 11:13:12
Steel Code: AISC360-16 LRFD

DEFAULT SPLICE LEVELS:

Level	Splice
High Roof	N
Low Roof	N

DEMAND/CAPACITY LIMIT FOR STRENGTH:

Columns: 0.860
Baseplates: 1.000

DESIGN DEFAULTS:

Maximum Angle from column axis at which beam reaction is not split between column sides for calculating unbalanced moments: 30.0 deg.
Skip-load the Live Load around Column

STANDARD COLUMN TRIAL GROUPS:

	Trial Group 1	Trial Group 2	Trial Group 3
I Section	W14	W12	W10
Rect. HSS	HSS10X10	HSS8X8	HSS6X6
Round HSS	HSS10	HSS8.625	HSS6

HANGING COLUMN TRIAL GROUPS:

	Trial Group 1	Trial Group 2	Trial Group 3
I Section	W12	W10	W8
Rect. HSS	HSS10X10	HSS8X8	HSS6X6
Round HSS	HSS10	HSS7.625	HSS6
Channel	C12	C12	C12
Tee	WT22	WT20X16	WT20X12
Flat Bar	FlatBar	FlatBar	FlatBar
Round Bar	RoundBar	RoundBar	RoundBar
Single Angle	L8X8	L6X6	L4X4
Double Angle	2L8X8	2L6X6	2L4X4

COLUMN BRACING:

Deck Does Not Brace Column
Maximum Angle from column axis for which beam braces column: 45.0 deg.

BASE PLATES:

Design Code: AISC360-16 LRFD

Plate Fy (ksi)	36.000
Minimum Dimension From Face of Column to Edge of Plate (in)	3.000
Minimum Dimension From Side of Column to Edge of Plate (in)	0.500
Increment of Plate Dimensions (in)	0.500
Increment of Plate Thickness (in)	0.250
Minimum Footing Dimension Parallel to Web (ft)	2.00
Minimum Footing Dimension Perpendicular to Web (ft)	2.00

Keep Base Plate Square:...	N

Gravity Column Design Summary

RAM Steel 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/30/24 14:58:54
Steel Code: AISC360-16 LRFD

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

Column Line -4.47ft-64.08ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
Low Roof	7.8	0.6	-2.7	1	0.15 Eq H1-1b	0.0	50	HSS5X5X1/4

Column Line -4.47ft-74.00ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
Low Roof	7.8	0.6	2.7	1	0.11 Eq H1-1b	0.0	50	HSS5X5X3/8

Column Line 0.00ft-74.00ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
Low Roof	11.0	3.6	-0.3	8	0.18 Eq H1-1b	0.0	50	HSS5X5X1/4

Column Line 0.00ft-94.11ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
Low Roof	7.9	0.8	2.5	1	0.11 Eq H1-1b	0.0	50	HSS5X5X3/8

Column Line 5.67ft-0.00ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
Low Roof	18.3	1.5	-6.2	1	0.25 Eq H1-1b	0.0	50	HSS5X5X3/8

Column Line 5.67ft-24.30ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
Low Roof	6.4	0.0	1.9	6	0.07 Eq H1-1b	90.0	50	HSS5X5X3/8

Column Line 15.67ft--0.00ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
Low Roof	3.4	-1.4	0.0	1	0.05 Eq H1-1b	0.0	50	HSS5X5X3/8

Column Line 47.61ft-0.00ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
Low Roof	7.0	0.0	-2.9	1	0.09 Eq H1-1b	0.0	50	HSS5X5X3/8

Column Line 3-E

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
High Roof	85.2	-5.0	22.4	15	0.71 Eq H1-1a	90.0	50	HSS8X8X1/4
Low Roof	85.2	-3.9	17.5	15	0.63 Eq H1-1a	90.0	50	HSS8X8X1/4

Column Line 4-E

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
High Roof	91.0	-6.0	22.6	15	0.85 Eq H1-1a	90.0	50	HSS10X10X3/16
Low Roof	91.0	-4.7	17.7	15	0.77 Eq H1-1a	90.0	50	HSS10X10X3/16

Gravity Column Design Summary

Column Line 5-E

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
High Roof	82.9	-5.2	-24.0	16	0.72 Eq H1-1a	90.0	50	HSS8X8X1/4
Low Roof	82.9	-4.1	-18.8	16	0.64 Eq H1-1a	90.0	50	HSS8X8X1/4

Gravity Column Design Summary

RAM Steel 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/22/24 11:13:57
Steel Code: AISC360-16 LRFD

DEMAND/CAPACITY LIMIT FOR STRENGTH : 0.860

Column Line -4.47ft-64.08ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
Low Roof	7.8	0.6	-2.7	1	0.15 Eq H1-1b	0.0	50	HSS5X5X1/4

Column Line -4.47ft-74.00ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
Low Roof	7.8	0.6	2.7	1	0.11 Eq H1-1b	0.0	50	HSS5X5X3/8

Column Line 0.00ft-74.00ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
Low Roof	11.0	3.6	-0.3	8	0.18 Eq H1-1b	0.0	50	HSS5X5X1/4

Column Line 0.00ft-94.11ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
Low Roof	7.9	0.8	2.5	1	0.11 Eq H1-1b	0.0	50	HSS5X5X3/8

Column Line 5.67ft-0.00ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
Low Roof	18.3	1.5	-6.2	1	0.25 Eq H1-1b	0.0	50	HSS5X5X3/8

Column Line 5.67ft-24.30ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
Low Roof	6.4	0.0	1.9	6	0.07 Eq H1-1b	90.0	50	HSS5X5X3/8

Column Line 47.61ft-0.00ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
Low Roof	7.0	0.0	-2.9	1	0.09 Eq H1-1b	0.0	50	HSS5X5X3/8

Column Line 3-E

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
High Roof	133.6	-8.8	44.8	15	0.82 Eq H1-1a	90.0	50	HSS8X8X3/8
Low Roof	133.6	-6.9	35.1	15	0.73 Eq H1-1a	90.0	50	HSS8X8X3/8

Column Line 4-E

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
High Roof	139.7	-9.2	42.1	15	0.82 Eq H1-1a	90.0	50	HSS8X8X3/8
Low Roof	139.7	-7.2	32.9	15	0.73 Eq H1-1a	90.0	50	HSS8X8X3/8

Column Line 5-E

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
High Roof	131.7	-9.2	-46.4	16	0.83 Eq H1-1a	90.0	50	HSS8X8X3/8

Gravity Column Design Summary

Low Roof	131.7	-7.2	-36.3	16	0.74	Eq H1-1a	90.0	50 HSS8X8X3/8

Base Plate Design Summary

BASE PLATES:

Design Code: AISC360-16 LRFD

Plate Fy (ksi)	36.000
Minimum Dimension From Face of Column to Edge of Plate (in)	3.000
Minimum Dimension From Side of Column to Edge of Plate (in)	3.000
Increment of Plate Dimensions (in)	0.500
Increment of Plate Thickness (in)	0.250
Minimum Footing Dimension Parallel to Web (ft)	2.00
Minimum Footing Dimension Perpendicular to Web (ft)	2.00
Keep Base Plate Square:	Y

Column Line	Column Size	Fy (ksi)	N (in)	B (in)	tp (in)
-4.47ft-64.08ft	HSS5X5X1/4	36	11.00	11.00	0.250
-4.47ft-74.00ft	HSS5X5X3/8	36	11.00	11.00	0.250
0.00ft-74.00ft	HSS5X5X1/4	36	11.00	11.00	0.250
0.00ft-94.11ft	HSS5X5X3/8	36	11.00	11.00	0.250
5.67ft-0.00ft	HSS5X5X3/8	36	11.00	11.00	0.500
5.67ft-24.30ft	HSS5X5X3/8	36	11.00	11.00	0.250
15.67ft--0.00ft	HSS5X5X3/8	36	11.00	11.00	0.250
47.61ft-0.00ft	HSS5X5X3/8	36	11.00	11.00	0.250
3-E	HSS8X8X1/4	36	14.00	14.00	0.750
4-E	HSS10X10X3/16	36	16.00	16.00	0.750
5-E	HSS8X8X1/4	36	14.00	14.00	0.750

Base Plate Design Summary

RAM Steel 24.00.00.160	Page 1/1
Dunn Associates, Inc.	08/30/24 14:59:09
DataBase: 2024.08.19 DTC Welding	Steel Code: AISC360-16 ASD
Building Code: IBC	

BASE PLATES:

Design Code: AISC360-16 LRFD

Plate Fy (ksi)	36.000
Minimum Dimension From Face of Column to Edge of Plate (in)	3.000
Minimum Dimension From Side of Column to Edge of Plate (in)	0.500
Increment of Plate Dimensions (in)	0.500
Increment of Plate Thickness (in)	0.250
Minimum Footing Dimension Parallel to Web (ft)	2.00
Minimum Footing Dimension Perpendicular to Web (ft)	2.00
Keep Base Plate Square:	N

Column Line	Column Size	Fy (ksi)	N (in)	B (in)	tp (in)
-4.47ft-64.08ft	HSS5X5X1/4	36	11.00	6.00	0.500
-4.47ft-74.00ft	HSS5X5X3/8	36	11.00	6.00	0.500
0.00ft-74.00ft	HSS5X5X1/4	36	11.00	6.00	0.500
0.00ft-94.11ft	HSS5X5X3/8	36	11.00	6.00	0.500
5.67ft-0.00ft	HSS5X5X3/8	36	11.00	6.00	0.500
5.67ft-24.30ft	HSS5X5X3/8	36	11.00	6.00	0.500
15.67ft--0.00ft	HSS5X5X3/8	36	11.00	6.00	0.250
47.61ft-0.00ft	HSS5X5X3/8	36	11.00	6.00	0.500
3-E	HSS8X8X1/4	36	14.00	9.00	1.000
4-E	HSS10X10X3/16	36	16.00	11.00	0.750
5-E	HSS8X8X1/4	36	14.00	9.00	0.750

Base Plate Design Summary

RAM Steel 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/22/24 11:14:29
Steel Code: AISC360-16 ASD

BASE PLATES:

Design Code: AISC360-16 LRFD

Plate Fy (ksi)	36.000
Minimum Dimension From Face of Column to Edge of Plate (in)	3.000
Minimum Dimension From Side of Column to Edge of Plate (in)	0.500
Increment of Plate Dimensions (in)	0.500
Increment of Plate Thickness (in)	0.250
Minimum Footing Dimension Parallel to Web (ft)	2.00
Minimum Footing Dimension Perpendicular to Web (ft)	2.00
Keep Base Plate Square:	N

Column Line	Column Size	Fy (ksi)	N (in)	B (in)	tp (in)
-4.47ft-64.08ft	HSS5X5X1/4	36	11.00	6.00	0.500
-4.47ft-74.00ft	HSS5X5X3/8	36	11.00	6.00	0.500
0.00ft-74.00ft	HSS5X5X1/4	36	11.00	6.00	0.500
0.00ft-94.11ft	HSS5X5X3/8	36	11.00	6.00	0.500
5.67ft-0.00ft	HSS5X5X3/8	36	11.00	6.00	0.500
5.67ft-24.30ft	HSS5X5X3/8	36	11.00	6.00	0.500
47.61ft-0.00ft	HSS5X5X3/8	36	11.00	6.00	0.500
3-E	HSS8X8X3/8	36	14.00	9.00	1.250
4-E	HSS8X8X3/8	36	14.00	9.00	1.250
5-E	HSS8X8X3/8	36	14.00	9.00	1.000

Criteria, Mass and Exposure Data

W-1

CRITERIA:

Rigid End Zones: Ignore Effects

Member Force Output: At Face of Joint

P-Delta: Yes Scale Factor (DL): 1.20 Scale Factor (LL): 1.00

Scale Factor (Roof): 1.00 Scale Factor (Snow): 0.70

Ground Level: Base

Mesh Criteria :

Max. Distance Between Nodes on Mesh Line (ft) : 8.00

Merge Node Tolerance (in) : 0.0100

Geometry Tolerance (in) : 0.0010

Walls Out-of-plane Stiffness Included in Analysis.

Use Reduced Stiffness for Steel Members (AISC 360): τb = 1.00

Sign considered for Dynamic Load Case Results.

Rigid Links Included at Fixed Beam-to-Wall Locations

Eigenvalue Analysis : Eigen Vectors (Subspace Iteration)

DIAPHRAGM DATA:

Story	Diaph #	Diaph Type
High Roof	1	Pseudo - Flexible
	2	Rigid
Low Roof	1	Pseudo - Flexible
	2	Pseudo - Flexible

Disconnect Internal Nodes of Beams: Yes

Disconnect Nodes outside Slab Boundary: Yes

STORY MASS DATA:

Includes Self Mass of:

Self masses not automatically included.

Calculated Values:

Story	Diaph #	Weight kips	Mass k-s2/ft	MMI ft-k-s2	Xm ft	Ym ft	EccX ft	EccY ft
High Roof	1	734.73	22.82	80816	110.58	58.59	6.92	4.87
	2	7.46	0.23	23	15.33	28.94	1.63	0.57
Low Roof	1	219.70	6.82	7969	25.68	47.31	2.70	4.81
	2	142.76	4.43	2212	187.02	65.74	1.29	3.54

Story	Diaph #	Combine
High Roof	1	None
	2	None
Low Roof	1	None
	2	None

WIND EXPOSURE DATA:

Calculated Values:

Story	Diaph #	Building Extents (ft)				Expose	Parapet
		Min X	Max X	Min Y	Max Y		ft
High Roof	1	38.17	176.50	9.67	107.00	Full	0.00
	2	-1.00	31.67	23.23	34.65	Full	0.00
Low Roof	1	-5.47	48.61	-1.00	95.11	Full	0.00
	2	175.17	200.88	19.90	90.69	Full	0.00

STORY GRAVITY LOADS DATA:

Includes Weight of:

Weight not automatically included.

Live Load Reduction (Calculated)

Reducible : 0.00 %

Storage : 0.00 %

Calculated Values:

Story	Diaph #	Dead kips	Xc ft	Yc ft	Live kips	Xc ft	Yc ft
High Roof	1	734.73	110.58	58.59	0.00	0.00	0.00
	2	7.46	15.33	28.94	0.00	0.00	0.00
Low Roof	1	219.70	25.68	47.31	0.00	0.00	0.00
	2	126.56	185.94	63.90	0.00	0.00	0.00

Story	Diaph #	Snow kips	Xc ft	Yc ft	Combine
High Roof	1	383.74	107.33	58.33	None
	2	10.63	15.33	28.94	None
Low Roof	1	188.85	22.21	47.32	None
	2	82.37	187.74	62.20	None

Criteria, Mass and Exposure Data

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes — Scale Factor (DL): 1.20 — Scale Factor (LL): 1.00
Scale Factor (Roof): 1.00 Scale Factor (Snow): 0.70
Ground Level: Base
Mesh Criteria :
Max. Distance Between Nodes on Mesh Line (ft) : 8.00
Merge Node Tolerance (in) : 0.0100
Geometry Tolerance (in) : 0.0010
Walls Out-of-plane Stiffness Included in Analysis.
Use Reduced Stiffness for Steel Members (AISC 360): τb = 1.00
Sign considered for Dynamic Load Case Results.
Rigid Links Included at Fixed Beam-to-Wall Locations
Eigenvalue Analysis : Eigen Vectors (Subspace Iteration)

DIAPHRAGM DATA:

Story	Diaph #	Diaph Type
High Roof	1	Pseudo - Flexible
	2	Rigid
Low Roof	1	Pseudo - Flexible
	2	Pseudo - Flexible

Disconnect Internal Nodes of Beams: Yes
Disconnect Nodes outside Slab Boundary: Yes

STORY MASS DATA:

Includes Self Mass of:
Self masses not automatically included.

Calculated Values:

Story	Diaph #	Weight kips	Mass k-s2/ft	MMI ft-k-s2	Xm ft	Ym ft	EccX ft	EccY ft
High Roof	1	734.73	22.82	80816	110.58	58.59	6.92	4.87
	2	7.46	0.23	23	15.33	28.94	1.63	0.57
Low Roof	1	132.85	4.13	1872	186.10	67.50	1.31	3.61
	2	219.70	6.82	7969	25.68	47.31	2.70	4.81

Story	Diaph #	Combine
High Roof	1	None
	2	None
Low Roof	1	None
	2	None

WIND EXPOSURE DATA:

Calculated Values:

Story	Diaph #	Building Extents (ft)				Expose	Parapet
		Min X	Max X	Min Y	Max Y		ft
High Roof	1	38.17	176.50	9.67	107.00	Full	0.00
	2	-1.00	31.67	23.23	34.65	Full	0.00
Low Roof	1	175.33	201.55	19.23	91.36	Full	0.00
	2	-5.47	48.61	-1.00	95.11	Full	0.00

STORY GRAVITY LOADS DATA:

Includes Weight of:

Weight not automatically included.

Live Load Reduction (Calculated)

Reducible : 0.00 %

Storage : 0.00 %

Calculated Values:

Story	Diaph #	Dead kips	Xc ft	Yc ft	Live kips	Xc ft	Yc ft
High Roof	1	734.73	110.58	58.59	0.00	0.00	0.00
	2	7.46	15.33	28.94	0.00	0.00	0.00
Low Roof	1	119.61	185.19	65.63	0.00	0.00	0.00
	2	219.70	25.68	47.31	0.00	0.00	0.00

Story	Diaph #	Snow kips	Xc ft	Yc ft	Combine
High Roof	1	803.83	107.33	58.33	None
	2	10.63	15.33	28.94	None
Low Roof	1	84.01	188.02	62.53	None
	2	188.85	22.21	47.32	None

Loads and Applied Forces

LOAD CASE: MWFRS

ASCE 7-16
Exposure: B
Basic Wind Speed (mph): 140.0
Apply Directionality Factor, Kd = 0.85
Use Topography Factor, Kzt: 1.00
Ground Elevation Factor, Ke: 1.00
Use Calculated Frequency for X-Dir.
Use Calculated Frequency for Y-Dir.
Gust Factor for Rigid Structures, G: Use Calculated G for X-Dir.
Gust Factor for Rigid Structures, G: Use Calculated G for Y-Dir.
Damping Ratio for Flexible Structures= 0.01
Mean Roof Height in X-Dir. (ft): Top Story Height + Parapet = 17.03
Mean Roof Height in Y-Dir. (ft): Top Story Height + Parapet = 17.03
Ground Level for X-Dir.: Base
Ground Level for Y-Dir.: Base

WIND PRESSURES:

X-Direction: Natural Frequency = 1.724 Structure is Rigid
Y-Direction: Natural Frequency = 2.363 Structure is Rigid
CpWindward = 0.80
qLeeward (qh X-Dir.) = 25.42 psf
qLeeward (qh Y-Dir.) = 25.42 psf
GCpn (Parapet): Windward = 1.50 Leeward = -1.00

X-Direction:

Height (ft)	Kz	Kzt	qz (psf)	Gust Factor G	CpLeeward	Pressure (psf)
17.03	0.596	1.000	25.417	0.845	-0.335	24.394
17.03	0.596	1.000	25.417	0.845	-0.335	24.394
13.33	0.575	1.000	24.512	0.845	-0.294	22.895
13.33	0.575	1.000	24.512	0.845	-0.294	22.895
0.00	0.575	1.000	24.512	0.845	-0.294	22.895

Y-Direction:

Height (ft)	Kz	Kzt	qz (psf)	Gust Factor G	CpLeeward	Pressure (psf)
17.03	0.596	1.000	25.417	0.822	-0.500	27.149
17.03	0.596	1.000	25.417	0.822	-0.500	27.149
13.33	0.575	1.000	24.512	0.815	-0.500	26.330
13.33	0.575	1.000	24.512	0.815	-0.500	26.330
0.00	0.575	1.000	24.512	0.815	-0.500	26.330

Note : The model includes one or more Flexible or Pseudo-flexible diaphragm. Dynamic modes (Eigenmodes) may represent member local modes rather than story modes. Please confirm the validity of the periods selected for the analysis.

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_1_X

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	6.20	0.00	107.33	71.39
High Roof	2	17.03	0.50	0.00	15.33	28.94
Low Roof	1	13.33	18.36	0.00	21.57	48.13
Low Roof	2	13.33	13.87	0.00	188.02	55.29

APPLIED STORY FORCES

Type: Wind_ASCE716_1_X

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	6.70	0.00
Low Roof	13.33	32.23	0.00
		38.93	0.00

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_1_Y

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	0.00	29.55	110.83	58.33
High Roof	2	17.03	0.00	1.62	15.33	28.94
Low Roof	1	13.33	0.00	11.61	21.67	47.06
Low Roof	2	13.33	0.00	4.58	187.85	55.29

APPLIED STORY FORCES

Type: Wind_ASCE716_1_Y

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	0.00	31.17
Low Roof	13.33	0.00	16.19
		0.00	47.36

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_2_X+E

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	4.65	0.00	107.33	85.99
High Roof	2	17.03	0.38	0.00	15.33	30.65
Low Roof	1	13.33	13.77	0.00	21.57	62.55
Low Roof	2	13.33	10.40	0.00	188.02	65.91

APPLIED STORY FORCES

Type: Wind_ASCE716_2_X+E

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	5.03	0.00
Low Roof	13.33	24.17	0.00
		29.20	0.00

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_2_X-E

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	4.65	0.00	107.33	56.79
High Roof	2	17.03	0.38	0.00	15.33	27.22
Low Roof	1	13.33	13.77	0.00	21.57	33.71
Low Roof	2	13.33	10.40	0.00	188.02	44.67

APPLIED STORY FORCES

Type: Wind_ASCE716_2_X-E

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	5.03	0.00
Low Roof	13.33	24.17	0.00
		29.20	0.00

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_2_Y+E

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	0.00	22.16	131.58	58.33
High Roof	2	17.03	0.00	1.22	20.23	28.94

Low Roof	1	13.33	0.00	8.71	29.78	47.06
Low Roof	2	13.33	0.00	3.43	191.71	55.29

APPLIED STORY FORCES

Type: Wind_ASCE716_2_Y+E

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	0.00	23.38
Low Roof	13.33	0.00	12.14
		0.00	35.52

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_2_Y-E

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	0.00	22.16	90.08	58.33
High Roof	2	17.03	0.00	1.22	10.43	28.94
Low Roof	1	13.33	0.00	8.71	13.56	47.06
Low Roof	2	13.33	0.00	3.43	183.99	55.29

APPLIED STORY FORCES

Type: Wind_ASCE716_2_Y-E

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	0.00	23.38
Low Roof	13.33	0.00	12.14
		0.00	35.52

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_3_X+Y

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	4.65	22.16	110.83	71.39
High Roof	2	17.03	0.38	1.22	15.33	28.94
Low Roof	1	13.33	13.77	8.71	21.67	48.13
Low Roof	2	13.33	10.40	3.43	187.85	55.29

APPLIED STORY FORCES

Type: Wind_ASCE716_3_X+Y

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	5.03	23.38
Low Roof	13.33	24.17	12.14
		29.20	35.52

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_3_X-Y

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	4.65	-22.16	110.83	71.39
High Roof	2	17.03	0.38	-1.22	15.33	28.94
Low Roof	1	13.33	13.77	-8.71	21.67	48.13
Low Roof	2	13.33	10.40	-3.43	187.85	55.29

APPLIED STORY FORCES

Type: Wind_ASCE716_3_X-Y

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	5.03	-23.38
Low Roof	13.33	24.17	-12.14
		29.20	-35.52

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_4_X+Y_CW

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	3.49	16.62	90.08	85.99
High Roof	2	17.03	0.28	0.91	10.43	30.65
Low Roof	1	13.33	10.33	6.53	13.56	62.55
Low Roof	2	13.33	7.80	2.58	183.99	65.91

APPLIED STORY FORCES

Type: Wind_ASCE716_4_X+Y_CW

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	3.77	17.53
Low Roof	13.33	18.13	9.11

		21.90	26.64

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_4_X+Y_CCW

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	3.49	16.62	131.58	56.79
High Roof	2	17.03	0.28	0.91	20.23	27.22
Low Roof	1	13.33	10.33	6.53	29.78	33.71
Low Roof	2	13.33	7.80	2.58	191.71	44.67

APPLIED STORY FORCES

Type: Wind_ASCE716_4_X+Y_CCW

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	3.77	17.53
Low Roof	13.33	18.13	9.11
		21.90	26.64

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_4_X-Y_CW

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	3.49	-16.62	131.58	85.99
High Roof	2	17.03	0.28	-0.91	20.23	30.65
Low Roof	1	13.33	10.33	-6.53	29.78	62.55
Low Roof	2	13.33	7.80	-2.58	191.71	65.91

APPLIED STORY FORCES

Type: Wind_ASCE716_4_X-Y_CW

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	3.77	-17.53
Low Roof	13.33	18.13	-9.11
		21.90	-26.64

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_4_X-Y_CCW

Level	Diaph.#	Ht	Fx	Fy	X	Y

		ft	kips	kips	ft	ft
High Roof	1	17.03	3.49	-16.62	90.08	56.79
High Roof	2	17.03	0.28	-0.91	10.43	27.22
Low Roof	1	13.33	10.33	-6.53	13.56	33.71
Low Roof	2	13.33	7.80	-2.58	183.99	44.67

APPLIED STORY FORCES

Type: Wind_ASCE716_4_X-Y_CCW

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	3.77	-17.53
Low Roof	13.33	18.13	-9.11
		21.90	-26.64

LOAD CASE: ELF

Seismic ASCE 7-16 Equivalent Lateral Force
Importance Factor: 1.00 TL: 8.00 s
Site Class D: Stiff Soil, Default
Ss: 1.310 g S1: 0.483 g
Fa: 1.200 Fv: 1.817 SDs: 1.048 g SD1: 0.585 g
Risk Category: III Seismic Design Category: D
Provisions for: Force
Ground Level: Base

Dir	Eccent	R	Ta Equation	Building Period-T
X	+ And -	5.00	Std,Ct=0.020,x=0.75	Calculated
Y	+ And -	5.00	Std,Ct=0.020,x=0.75	Calculated

Dir	Ta	Cu	T	T - used	Cs Eq12.8-2	Cs - used	k
X	0.168	1.400	0.580	0.235	0.210	0.210	1.000

Dir	Ta	Cu	T	T - used	Cs Eq12.8-2	Cs - used	k
Y	0.168	1.400	0.423	0.235	0.210	0.210	1.000

Exception 2 per Section 11.4.8 is applied for site class D with S1 > 0.2

Total Building Weight (kips) = 1104.65
Note : The model includes one or more Flexible or Pseudo-flexible diaphragm. Dynamic modes (Eigenmodes) may represent member local modes rather than story modes. Please confirm the validity of the periods selected for the analysis.

APPLIED DIAPHRAGM FORCES

Type: EQ_ASCE716_X_+E_F

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	165.82	0.00	110.58	63.46
High Roof	2	17.03	1.68	0.00	15.33	29.51
Low Roof	1	13.33	38.81	0.00	25.68	52.12
Low Roof	2	13.33	25.22	0.00	187.02	69.28

APPLIED STORY FORCES

Type: EQ_ASCE716_X_+E_F

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	167.50	0.00
Low Roof	13.33	64.03	0.00
		231.53	0.00

APPLIED DIAPHRAGM FORCES

Type: EQ_ASCE716_X_-E_F

Level	Diaph.#	Ht ft	Fx kips	Fy kips	X ft	Y ft
High Roof	1	17.03	165.82	0.00	110.58	53.72
High Roof	2	17.03	1.68	0.00	15.33	28.37
Low Roof	1	13.33	38.81	0.00	25.68	42.51
Low Roof	2	13.33	25.22	0.00	187.02	62.20

APPLIED STORY FORCES

Type: EQ_ASCE716_X_-E_F

Level	Ht ft	Fx kips	Fy kips
High Roof	17.03	167.50	0.00
Low Roof	13.33	64.03	0.00
		231.53	0.00

APPLIED DIAPHRAGM FORCES

Type: EQ_ASCE716_Y_+E_F

Level	Diaph.#	Ht ft	Fx kips	Fy kips	X ft	Y ft
High Roof	1	17.03	0.00	165.82	117.49	58.59
High Roof	2	17.03	0.00	1.68	16.97	28.94
Low Roof	1	13.33	0.00	38.81	28.39	47.31
Low Roof	2	13.33	0.00	25.22	188.31	65.74

APPLIED STORY FORCES

Type: EQ_ASCE716_Y_+E_F

Level	Ht ft	Fx kips	Fy kips
High Roof	17.03	0.00	167.50
Low Roof	13.33	0.00	64.03
		0.00	231.53

APPLIED DIAPHRAGM FORCES

Type: EQ_ASCE716_Y_-E_F

Level	Diaph.#	Ht ft	Fx kips	Fy kips	X ft	Y ft

High Roof	1	17.03	0.00	165.82	103.66	58.59
High Roof	2	17.03	0.00	1.68	13.70	28.94
Low Roof	1	13.33	0.00	38.81	22.98	47.31
Low Roof	2	13.33	0.00	25.22	185.74	65.74

APPLIED STORY FORCES

Type: EQ_ASCE716_Y_-E_F

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	0.00	167.50
Low Roof	13.33	0.00	64.03
		0.00	231.53

LOAD CASE: MWFRS

ASCE 7-16
Exposure: B
Basic Wind Speed (mph): 140.0
Apply Directionality Factor, Kd = 0.85
Use Topography Factor, Kzt: 1.00
Ground Elevation Factor, Ke: 1.00
Use Calculated Frequency for X-Dir.
Use Calculated Frequency for Y-Dir.
Gust Factor for Rigid Structures, G: Use Calculated G for X-Dir.
Gust Factor for Rigid Structures, G: Use Calculated G for Y-Dir.
Damping Ratio for Flexible Structures= 0.01
Mean Roof Height in X-Dir. (ft): Top Story Height + Parapet = 17.03
Mean Roof Height in Y-Dir. (ft): Top Story Height + Parapet = 17.03
Ground Level for X-Dir.: Base
Ground Level for Y-Dir.: Base

WIND PRESSURES:

X-Direction: Natural Frequency = 1.908 Structure is Rigid
Y-Direction: Natural Frequency = 2.364 Structure is Rigid
CpWindward = 0.80
qLeeward (qh X-Dir.) = 25.42 psf
qLeeward (qh Y-Dir.) = 25.42 psf
GCpn (Parapet): Windward = 1.50 Leeward = -1.00

X-Direction:

Height (ft)	Kz	Kzt	qz (psf)	Gust Factor G	CpLeeward	Pressure (psf)
17.03	0.596	1.000	25.417	0.845	-0.335	24.394
17.03	0.596	1.000	25.417	0.845	-0.335	24.394
13.33	0.575	1.000	24.512	0.845	-0.294	22.888
13.33	0.575	1.000	24.512	0.845	-0.294	22.888
0.00	0.575	1.000	24.512	0.845	-0.294	22.888

Y-Direction:

Height (ft)	Kz	Kzt	qz (psf)	Gust Factor G	CpLeeward	Pressure (psf)
17.03	0.596	1.000	25.417	0.822	-0.500	27.149
17.03	0.596	1.000	25.417	0.822	-0.500	27.149
13.33	0.575	1.000	24.512	0.815	-0.500	26.325
13.33	0.575	1.000	24.512	0.815	-0.500	26.325
0.00	0.575	1.000	24.512	0.815	-0.500	26.325

Note : The model includes one or more Flexible or Pseudo-flexible diaphragm. Dynamic modes (Eigenmodes) may represent member local modes rather than story modes. Please confirm the validity of the periods selected for the analysis.

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_1_X

Level	Diaph.#	Ht ft	Fx kips	Fy kips	X ft	Y ft
High Roof	1	17.03	6.20	0.00	107.33	71.39
High Roof	2	17.03	0.50	0.00	15.33	28.94
Low Roof	1	13.33	14.12	0.00	188.44	55.29
Low Roof	2	13.33	18.36	0.00	21.57	48.13

APPLIED STORY FORCES

Type: Wind_ASCE716_1_X

Level	Ht ft	Fx kips	Fy kips
High Roof	17.03	6.70	0.00
Low Roof	13.33	32.48	0.00
		39.18	0.00

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_1_Y

Level	Diaph.#	Ht ft	Fx kips	Fy kips	X ft	Y ft
High Roof	1	17.03	0.00	29.58	110.89	58.33
High Roof	2	17.03	0.00	1.62	15.33	28.94
Low Roof	1	13.33	0.00	4.66	188.29	55.29
Low Roof	2	13.33	0.00	11.61	21.67	47.06

APPLIED STORY FORCES

Type: Wind_ASCE716_1_Y

Level	Ht ft	Fx kips	Fy kips
High Roof	17.03	0.00	31.20
Low Roof	13.33	0.00	16.27
		0.00	47.47

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_2_X+E

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	4.65	0.00	107.33	85.99
High Roof	2	17.03	0.38	0.00	15.33	30.65
Low Roof	1	13.33	10.59	0.00	188.44	66.11
Low Roof	2	13.33	13.77	0.00	21.57	62.55

APPLIED STORY FORCES

Type: Wind_ASCE716_2_X+E

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	5.02	0.00
Low Roof	13.33	24.36	0.00
		29.39	0.00

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_2_X-E

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	4.65	0.00	107.33	56.79
High Roof	2	17.03	0.38	0.00	15.33	27.22
Low Roof	1	13.33	10.59	0.00	188.44	44.47
Low Roof	2	13.33	13.77	0.00	21.57	33.71

APPLIED STORY FORCES

Type: Wind_ASCE716_2_X-E

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	5.02	0.00
Low Roof	13.33	24.36	0.00
		29.39	0.00

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_2_Y+E

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	0.00	22.18	131.64	58.33
High Roof	2	17.03	0.00	1.22	20.23	28.94

Low Roof	1	13.33	0.00	3.49	192.22	55.29
Low Roof	2	13.33	0.00	8.71	29.78	47.06

APPLIED STORY FORCES

Type: Wind_ASCE716_2_Y+E

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	0.00	23.40
Low Roof	13.33	0.00	12.20
		0.00	35.60

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_2_Y-E

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	0.00	22.18	90.14	58.33
High Roof	2	17.03	0.00	1.22	10.43	28.94
Low Roof	1	13.33	0.00	3.49	184.35	55.29
Low Roof	2	13.33	0.00	8.71	13.56	47.06

APPLIED STORY FORCES

Type: Wind_ASCE716_2_Y-E

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	0.00	23.40
Low Roof	13.33	0.00	12.20
		0.00	35.60

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_3_X+Y

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	4.65	22.18	110.89	71.39
High Roof	2	17.03	0.38	1.22	15.33	28.94
Low Roof	1	13.33	10.59	3.49	188.29	55.29
Low Roof	2	13.33	13.77	8.71	21.67	48.13

APPLIED STORY FORCES

Type: Wind_ASCE716_3_X+Y

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	5.02	23.40
Low Roof	13.33	24.36	12.20
		29.39	35.60

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_3_X-Y

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	4.65	-22.18	110.89	71.39
High Roof	2	17.03	0.38	-1.22	15.33	28.94
Low Roof	1	13.33	10.59	-3.49	188.29	55.29
Low Roof	2	13.33	13.77	-8.71	21.67	48.13

APPLIED STORY FORCES

Type: Wind_ASCE716_3_X-Y

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	5.02	-23.40
Low Roof	13.33	24.36	-12.20
		29.39	-35.60

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_4_X+Y_CW

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	3.48	16.64	90.14	85.99
High Roof	2	17.03	0.28	0.91	10.43	30.65
Low Roof	1	13.33	7.95	2.62	184.35	66.11
Low Roof	2	13.33	10.33	6.53	13.56	62.55

APPLIED STORY FORCES

Type: Wind_ASCE716_4_X+Y_CW

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	3.77	17.55
Low Roof	13.33	18.27	9.15

		22.04	26.70

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_4_X+Y_CCW

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	3.48	16.64	131.64	56.79
High Roof	2	17.03	0.28	0.91	20.23	27.22
Low Roof	1	13.33	7.95	2.62	192.22	44.47
Low Roof	2	13.33	10.33	6.53	29.78	33.71

APPLIED STORY FORCES

Type: Wind_ASCE716_4_X+Y_CCW

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	3.77	17.55
Low Roof	13.33	18.27	9.15
		22.04	26.70

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_4_X-Y_CW

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	3.48	-16.64	131.64	85.99
High Roof	2	17.03	0.28	-0.91	20.23	30.65
Low Roof	1	13.33	7.95	-2.62	192.22	66.11
Low Roof	2	13.33	10.33	-6.53	29.78	62.55

APPLIED STORY FORCES

Type: Wind_ASCE716_4_X-Y_CW

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	3.77	-17.55
Low Roof	13.33	18.27	-9.15
		22.04	-26.70

APPLIED DIAPHRAGM FORCES

Type: Wind_ASCE716_4_X-Y_CCW

Level	Diaph.#	Ht	Fx	Fy	X	Y

		ft	kips	kips	ft	ft
High Roof	1	17.03	3.48	-16.64	90.14	56.79
High Roof	2	17.03	0.28	-0.91	10.43	27.22
Low Roof	1	13.33	7.95	-2.62	184.35	44.47
Low Roof	2	13.33	10.33	-6.53	13.56	33.71

APPLIED STORY FORCES

Type: Wind_ASCE716_4_X-Y_CCW

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	3.77	-17.55
Low Roof	13.33	18.27	-9.15
		22.04	-26.70

LOAD CASE: ELF

Seismic ASCE 7-16 Equivalent Lateral Force

Importance Factor: 1.00 TL: 8.00 s

Site Class D: Stiff Soil, Default

Ss: 1.310 g S1: 0.483 g

Fa: 1.200 Fv: 1.817 SDs: 1.048 g SD1: 0.585 g

Risk Category: III Seismic Design Category: D

Provisions for: Force

Ground Level: Base

Dir	Eccent	R	Ta Equation	Building Period-T
X	+ And -	5.00	Std,Ct=0.020,x=0.75	Calculated
Y	+ And -	5.00	Std,Ct=0.020,x=0.75	Calculated

Dir	Ta	Cu	T	T - used	Cs Eq12.8-2	Cs - used	k
X	0.168	1.400	0.524	0.235	0.210	0.210	1.000

Dir	Ta	Cu	T	T - used	Cs Eq12.8-2	Cs - used	k
Y	0.168	1.400	0.423	0.235	0.210	0.210	1.000

Exception 2 per Section 11.4.8 is applied for site class D with S1 > 0.2

Total Building Weight (kips) = 1094.74

Note : The model includes one or more Flexible or Pseudo-flexible diaphragm. Dynamic modes (Eigenmodes) may represent member local modes rather than story modes. Please confirm the validity of the periods selected for the analysis.

APPLIED DIAPHRAGM FORCES

Type: EQ_ASCE716_X_+E_F

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	165.58	0.00	110.58	63.46
High Roof	2	17.03	1.68	0.00	15.33	29.51
Low Roof	1	13.33	23.44	0.00	186.10	71.11
Low Roof	2	13.33	38.76	0.00	25.68	52.12

APPLIED STORY FORCES

Type: EQ_ASCE716_X_+E_F

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	167.27	0.00
Low Roof	13.33	62.19	0.00
		229.46	0.00

APPLIED DIAPHRAGM FORCES

Type: EQ_ASCE716_X_-E_F

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	165.58	0.00	110.58	53.72
High Roof	2	17.03	1.68	0.00	15.33	28.37
Low Roof	1	13.33	23.44	0.00	186.10	63.90
Low Roof	2	13.33	38.76	0.00	25.68	42.51

APPLIED STORY FORCES

Type: EQ_ASCE716_X_-E_F

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	167.27	0.00
Low Roof	13.33	62.19	0.00
		229.46	0.00

APPLIED DIAPHRAGM FORCES

Type: EQ_ASCE716_Y_+E_F

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
High Roof	1	17.03	0.00	165.58	117.49	58.59
High Roof	2	17.03	0.00	1.68	16.97	28.94
Low Roof	1	13.33	0.00	23.44	187.41	67.50
Low Roof	2	13.33	0.00	38.76	28.39	47.31

APPLIED STORY FORCES

Type: EQ_ASCE716_Y_+E_F

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	0.00	167.27
Low Roof	13.33	0.00	62.19
		0.00	229.46

APPLIED DIAPHRAGM FORCES

Type: EQ_ASCE716_Y_-E_F

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft

High Roof	1	17.03	0.00	165.58	103.66	58.59
High Roof	2	17.03	0.00	1.68	13.70	28.94
Low Roof	1	13.33	0.00	23.44	184.79	67.50
Low Roof	2	13.33	0.00	38.76	22.98	47.31

APPLIED STORY FORCES

Type: EQ_ASCE716_Y_-E_F

Level	Ht	Fx	Fy
	ft	kips	kips
High Roof	17.03	0.00	167.27
Low Roof	13.33	0.00	62.19
		0.00	229.46

Drift

RAM Structural System 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/30/24 15:22:15
Steel Code: IBC

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes   Scale Factor (DL): 1.20   Scale Factor (LL): 1.00
Scale Factor (Roof): 1.00 Scale Factor (Snow): 0.70
Ground Level: Base

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Sp	PosSnowLoad	RAMUSER
E5	Drift	EQ_ASCE716_X_+E_Drft
E6	Drift	EQ_ASCE716_X_-E_Drft
E7	Drift	EQ_ASCE716_Y_+E_Drft
E8	Drift	EQ_ASCE716_Y_-E_Drft

Displacements for pseudo-flexible and flexible/none diaphragms are reported based on maximum nodal displacement within diaphragm boundary.

RESULTS:

Location (ft): (200.313, 38.200)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Low Roof	D	0.0068	-0.0372	0.0068	-0.0372	0.0000	0.0002
	Sp	0.0237	-0.0328	0.0237	-0.0328	0.0001	0.0002
	E5	0.0010	-0.0002	0.0010	-0.0002	0.0000	0.0000
	E6	0.0010	-0.0002	0.0010	-0.0002	0.0000	0.0000
	E7	-0.0008	0.6159	-0.0008	0.6159	0.0000	0.0039
	E8	-0.0008	0.6159	-0.0008	0.6159	0.0000	0.0039

Drift

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes Scale Factor (DL): 1.20 Scale Factor (LL): 1.00
Scale Factor (Roof): 1.00 Scale Factor (Snow): 0.70
Ground Level: Base
Use Reduced Stiffness for Steel Members (AISC 360): $\tau b = 1.00$

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Sp	PosSnowLoad	RAMUSER
E5	Drift	EQ_ASCE716_X_+E_Drft
E6	Drift	EQ_ASCE716_X_-E_Drft
E7	Drift	EQ_ASCE716_Y_+E_Drft
E8	Drift	EQ_ASCE716_Y_-E_Drft

Displacements for pseudo-flexible and flexible/none diaphragms are reported based on maximum nodal displacement within diaphragm boundary.

RESULTS:

Location (ft): (188.000, 20.500)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Low Roof	D	0.0203	0.0020	0.0203	0.0020	0.0001	0.0000
	Sp	0.0274	0.0015	0.0274	0.0015	0.0002	0.0000
	E5	0.2090	-0.0017	0.2090	-0.0017	0.0013	0.0000
	E6	0.2090	-0.0017	0.2090	-0.0017	0.0013	0.0000
	E7	-0.0091	1.3348	-0.0091	1.3348	0.0001	0.0083
	E8	-0.0091	1.3348	-0.0091	1.3348	0.0001	0.0083

Location (ft): (188.000, 90.500)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Low Roof	D	0.0203	0.0020	0.0203	0.0020	0.0001	0.0000
	Sp	0.0274	0.0015	0.0274	0.0015	0.0002	0.0000
	E5	0.2090	-0.0017	0.2090	-0.0017	0.0013	0.0000
	E6	0.2090	-0.0017	0.2090	-0.0017	0.0013	0.0000
	E7	-0.0091	1.3348	-0.0091	1.3348	0.0001	0.0083
	E8	-0.0091	1.3348	-0.0091	1.3348	0.0001	0.0083

Location (ft): (200.000, 51.000)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Low Roof	D	0.0203	0.0020	0.0203	0.0020	0.0001	0.0000
	Sp	0.0274	0.0015	0.0274	0.0015	0.0002	0.0000
	E5	0.2090	-0.0017	0.2090	-0.0017	0.0013	0.0000
	E6	0.2090	-0.0017	0.2090	-0.0017	0.0013	0.0000
	E7	-0.0091	1.3348	-0.0091	1.3348	0.0001	0.0083
	E8	-0.0091	1.3348	-0.0091	1.3348	0.0001	0.0083

Location (ft): (200.000, 80.000)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Low Roof	D	0.0203	0.0020	0.0203	0.0020	0.0001	0.0000
	Sp	0.0274	0.0015	0.0274	0.0015	0.0002	0.0000
	E5	0.2090	-0.0017	0.2090	-0.0017	0.0013	0.0000
	E6	0.2090	-0.0017	0.2090	-0.0017	0.0013	0.0000
	E7	-0.0091	1.3348	-0.0091	1.3348	0.0001	0.0083
	E8	-0.0091	1.3348	-0.0091	1.3348	0.0001	0.0083

Location (ft): (200.000, 28.000)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Low Roof	D	0.0203	0.0020	0.0203	0.0020	0.0001	0.0000
	Sp	0.0274	0.0015	0.0274	0.0015	0.0002	0.0000
	E5	0.2090	-0.0017	0.2090	-0.0017	0.0013	0.0000
	E6	0.2090	-0.0017	0.2090	-0.0017	0.0013	0.0000
	E7	-0.0091	1.3348	-0.0091	1.3348	0.0001	0.0083
	E8	-0.0091	1.3348	-0.0091	1.3348	0.0001	0.0083

TORSIONAL IRREGULARITY DATA:

X-Axis:

Story	LdC	Drift	Coord	Drift	Coord	Max/Min	Max/Ave
		in	ft	in	ft		
High Roof	———	0.0000	(0.00 0.00)	0.0000	(0.00 0.00)	99.999	99.999
Low Roof	———	0.0000	(0.00 0.00)	0.0000	(0.00 0.00)	99.999	99.999

Y-Axis:

Story	LdC	Drift	Coord	Drift	Coord	Max/Min	Max/Ave
		in	ft	in	ft		

High Roof	0.0000	(0.00 0.00)	0.0000	(0.00 0.00)	99.999	99.999
Low Roof	0.0000	(0.00 0.00)	0.0000	(0.00 0.00)	99.999	99.999

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint

P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.00
		Scale Factor (Roof):	1.00	Scale Factor (Snow):	0.70
Ground Level:	Base				

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Sp	PosSnowLoad	RAMUSER
E5	Drift	EQ_ASCE716_X_+E_Drft
E6	Drift	EQ_ASCE716_X_-E_Drft
E7	Drift	EQ_ASCE716_Y_+E_Drft
E8	Drift	EQ_ASCE716_Y_-E_Drft

Displacements for pseudo-flexible and flexible/none diaphragms are reported based on maximum nodal displacement within diaphragm boundary.

RESULTS:

Location (ft): (188.000, 20.500)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Low Roof	D	0.0183	0.0016	0.0183	0.0016	0.0001	0.0000
	Sp	0.0256	0.0012	0.0256	0.0012	0.0002	0.0000
	E5	0.2023	-0.0014	0.2023	-0.0014	0.0013	0.0000
	E6	0.2023	-0.0014	0.2023	-0.0014	0.0013	0.0000
	E7	-0.0066	1.0738	-0.0066	1.0738	0.0000	0.0067
	E8	-0.0066	1.0738	-0.0066	1.0738	0.0000	0.0067

Location (ft): (188.000, 90.500)

Story	LdC	Displacement	Story Drift	Drift Ratio

		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Low Roof	D	0.0183	0.0016	0.0183	0.0016	0.0001	0.0000
	Sp	0.0256	0.0012	0.0256	0.0012	0.0002	0.0000
	E5	0.2023	-0.0014	0.2023	-0.0014	0.0013	0.0000
	E6	0.2023	-0.0014	0.2023	-0.0014	0.0013	0.0000
	E7	-0.0066	1.0738	-0.0066	1.0738	0.0000	0.0067
	E8	-0.0066	1.0738	-0.0066	1.0738	0.0000	0.0067

Location (ft): (200.000, 51.000)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Low Roof	D	0.0183	0.0016	0.0183	0.0016	0.0001	0.0000
	Sp	0.0256	0.0012	0.0256	0.0012	0.0002	0.0000
	E5	0.2023	-0.0014	0.2023	-0.0014	0.0013	0.0000
	E6	0.2023	-0.0014	0.2023	-0.0014	0.0013	0.0000
	E7	-0.0066	1.0738	-0.0066	1.0738	0.0000	0.0067
	E8	-0.0066	1.0738	-0.0066	1.0738	0.0000	0.0067

Location (ft): (200.000, 80.000)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Low Roof	D	0.0183	0.0016	0.0183	0.0016	0.0001	0.0000
	Sp	0.0256	0.0012	0.0256	0.0012	0.0002	0.0000
	E5	0.2023	-0.0014	0.2023	-0.0014	0.0013	0.0000
	E6	0.2023	-0.0014	0.2023	-0.0014	0.0013	0.0000
	E7	-0.0066	1.0738	-0.0066	1.0738	0.0000	0.0067
	E8	-0.0066	1.0738	-0.0066	1.0738	0.0000	0.0067

Location (ft): (200.000, 28.000)

Story	**LdC**	**Displacement**		**Story Drift**		**Drift Ratio**	
		X	**Y**	**X**	**Y**	**X**	**Y**
		in	**in**	**in**	**in**		
High Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Low Roof	D	0.0183	0.0016	0.0183	0.0016	0.0001	0.0000
	Sp	0.0256	0.0012	0.0256	0.0012	0.0002	0.0000
	E5	0.2023	-0.0014	0.2023	-0.0014	0.0013	0.0000
	E6	0.2023	-0.0014	0.2023	-0.0014	0.0013	0.0000
	E7	-0.0066	1.0738	-0.0066	1.0738	0.0000	0.0067
	E8	-0.0066	1.0738	-0.0066	1.0738	0.0000	0.0067

TORSIONAL IRREGULARITY DATA:

X-Axis:

Story	**LdC**	**Drift**	**Coord**	**Drift**	**Coord**	**Max/Min**	**Max/Ave**
		in	ft	in	ft		
High Roof	————	0.0000	(0.00 0.00)	0.0000	(0.00 0.00)	99.999	99.999
Low Roof	————	0.0000	(0.00 0.00)	0.0000	(0.00 0.00)	99.999	99.999

Y-Axis:

Story	**LdC**	**Drift**	**Coord**	**Drift**	**Coord**	**Max/Min**	**Max/Ave**
		in	ft	in	ft		
High Roof	————	0.0000	(0.00 0.00)	0.0000	(0.00 0.00)	99.999	99.999

Drift

Low Roof	0.0000	(0.00 0.00)	0.0000	(0.00 0.00)	99.999	99.999

Drift

RAM Structural System 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/22/24 11:36:54
Steel Code: IBC

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes Scale Factor (DL): 1.20 Scale Factor (LL): 1.00
Scale Factor (Roof): 1.00 Scale Factor (Snow): 0.70
Ground Level: Base
Use Reduced Stiffness for Steel Members (AISC 360): τb = 1.00

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Sp	PosSnowLoad	RAMUSER
E5	Drift	EQ_ASCE716_X_+E_Drft
E6	Drift	EQ_ASCE716_X_-E_Drft
E7	Drift	EQ_ASCE716_Y_+E_Drft
E8	Drift	EQ_ASCE716_Y_-E_Drft

Displacements for pseudo-flexible and flexible/none diaphragms are reported based on maximum nodal displacement within diaphragm boundary.

RESULTS:

Location (ft): (174.029, 12.484)

Story	LdC	Displacement X (in)	Displacement Y (in)	Story Drift X (in)	Story Drift Y (in)	Drift Ratio X	Drift Ratio Y
High Roof	D	0.0407	0.0271	0.0407	0.0271	0.0002	0.0001
	Sp	-0.0472	-0.0670	-0.0472	-0.0670	0.0002	0.0003
	E5	0.2831	0.0178	0.2831	0.0178	0.0014	0.0001
	E6	0.2831	0.0178	0.2831	0.0178	0.0014	0.0001
	E7	0.0063	0.0044	0.0063	0.0044	0.0000	0.0000
	E8	0.0063	0.0044	0.0063	0.0044	0.0000	0.0000
Low Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Drift

RAM Structural System 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/22/24 11:43:50
Steel Code: IBC

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes Scale Factor (DL): 1.20 Scale Factor (LL): 1.00
Scale Factor (Roof): 1.00 Scale Factor (Snow): 0.70
Ground Level: Base

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Sp	PosSnowLoad	RAMUSER
E5	Drift	EQ_ASCE716_X_+E_Drft
E6	Drift	EQ_ASCE716_X_-E_Drft
E7	Drift	EQ_ASCE716_Y_+E_Drft
E8	Drift	EQ_ASCE716_Y_-E_Drft

Displacements for pseudo-flexible and flexible/none diaphragms are reported based on maximum nodal displacement within diaphragm boundary.

RESULTS:

Location (ft): (175.477, 10.772)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0374	0.0271	0.0374	0.0271	0.0002	0.0001
	Sp	-0.0472	-0.0669	-0.0472	-0.0669	0.0002	0.0003
	E5	0.2741	0.0173	0.2741	0.0173	0.0013	0.0001
	E6	0.2741	0.0173	0.2741	0.0173	0.0013	0.0001
	E7	0.0063	0.0044	0.0063	0.0044	0.0000	0.0000
	E8	0.0063	0.0044	0.0063	0.0044	0.0000	0.0000
Low Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Drift

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes   Scale Factor (DL): 1.20   Scale Factor (LL): 1.00
Scale Factor (Roof): 1.00 Scale Factor (Snow): 0.70
Ground Level: Base
Use Reduced Stiffness for Steel Members (AISC 360): $\tau b = 1.00$

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Sp	PosSnowLoad	RAMUSER
E5	Drift	EQ_ASCE716_X_+E_Drft
E6	Drift	EQ_ASCE716_X_-E_Drft
E7	Drift	EQ_ASCE716_Y_+E_Drft
E8	Drift	EQ_ASCE716_Y_-E_Drft

Displacements for pseudo-flexible and flexible/none diaphragms are reported based on maximum nodal displacement within diaphragm boundary.

RESULTS:

Location (ft): (173.897, 58.973)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0407	0.0271	0.0407	0.0271	0.0002	0.0001
	Sp	-0.0472	-0.0670	-0.0472	-0.0670	0.0002	0.0003
	E5	0.2831	0.0178	0.2831	0.0178	0.0014	0.0001
	E6	0.2831	0.0178	0.2831	0.0178	0.0014	0.0001
	E7	0.0063	0.0044	0.0063	0.0044	0.0000	0.0000
	E8	0.0063	0.0044	0.0063	0.0044	0.0000	0.0000
Low Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Drift

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint

P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.00
		Scale Factor (Roof):	1.00	Scale Factor (Snow):	0.70
Ground Level:	Base				

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Sp	PosSnowLoad	RAMUSER
E5	Drift	EQ_ASCE716_X_+E_Drft
E6	Drift	EQ_ASCE716_X_-E_Drft
E7	Drift	EQ_ASCE716_Y_+E_Drft
E8	Drift	EQ_ASCE716_Y_-E_Drft

Displacements for pseudo-flexible and flexible/none diaphragms are reported based on maximum nodal displacement within diaphragm boundary.

RESULTS:

Location (ft): (38.908, 10.772)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0374	0.0271	-0.0741	0.0508	0.0017	0.0011
	Sp	-0.0472	-0.0669	-0.2118	-0.0318	0.0048	0.0007
	E5	0.2741	0.0173	-2.0182	-2.8488	0.0455	0.0642
	E6	0.2741	0.0173	-2.0546	-2.9676	0.0463	0.0668
	E7	0.0063	0.0044	-0.5245	-1.7743	0.0118	0.0400
	E8	0.0063	0.0044	-0.4205	-1.4346	0.0095	0.0323
Low Roof	D	0.1115	-0.0237	0.1115	-0.0237	0.0007	0.0001
	Sp	0.1646	-0.0352	0.1646	-0.0352	0.0010	0.0002
	E5	2.2923	2.8661	2.2923	2.8661	0.0143	0.0179
	E6	2.3287	2.9849	2.3287	2.9849	0.0146	0.0187
	E7	0.5308	1.7787	0.5308	1.7787	0.0033	0.0111
	E8	0.4268	1.4390	0.4268	1.4390	0.0027	0.0090

Drift

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes Scale Factor (DL): 1.20 Scale Factor (LL): 1.00
Scale Factor (Roof): 1.00 Scale Factor (Snow): 0.70
Ground Level: Base
Use Reduced Stiffness for Steel Members (AISC 360): τb = 1.00

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Sp	PosSnowLoad	RAMUSER
E5	Drift	EQ_ASCE716_X_+E_Drft
E6	Drift	EQ_ASCE716_X_-E_Drft
E7	Drift	EQ_ASCE716_Y_+E_Drft
E8	Drift	EQ_ASCE716_Y_-E_Drft

Displacements for pseudo-flexible and flexible/none diaphragms are reported based on maximum nodal displacement within diaphragm boundary.

RESULTS:

Location (ft): (96.591, 106.779)

Story	LdC	Displacement X	Displacement Y	Story Drift X	Story Drift Y	Drift Ratio X	Drift Ratio Y
		in	in	in	in		
High Roof	D	0.0407	0.0271	0.0407	0.0271	0.0002	0.0001
	Sp	-0.0472	-0.0670	-0.0472	-0.0670	0.0002	0.0003
	E5	0.2831	0.0178	0.2831	0.0178	0.0014	0.0001
	E6	0.2831	0.0178	0.2831	0.0178	0.0014	0.0001
	E7	0.0063	0.0044	0.0063	0.0044	0.0000	0.0000
	E8	0.0063	0.0044	0.0063	0.0044	0.0000	0.0000
Low Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Drift

RAM Structural System 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/22/24 11:43:50
Steel Code: IBC

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint

P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.00
		Scale Factor (Roof):	1.00	Scale Factor (Snow):	0.70
Ground Level:	Base				

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Sp	PosSnowLoad	RAMUSER
E5	Drift	EQ_ASCE716_X_+E_Drft
E6	Drift	EQ_ASCE716_X_-E_Drft
E7	Drift	EQ_ASCE716_Y_+E_Drft
E8	Drift	EQ_ASCE716_Y_-E_Drft

Displacements for pseudo-flexible and flexible/none diaphragms are reported based on maximum nodal displacement within diaphragm boundary.

RESULTS:

Location (ft): (175.741, 106.120)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0374	0.0271	0.0374	0.0271	0.0002	0.0001
	Sp	-0.0472	-0.0669	-0.0472	-0.0669	0.0002	0.0003
	E5	0.2741	0.0173	0.2741	0.0173	0.0013	0.0001
	E6	0.2741	0.0173	0.2741	0.0173	0.0013	0.0001
	E7	0.0063	0.0044	0.0063	0.0044	0.0000	0.0000
	E8	0.0063	0.0044	0.0063	0.0044	0.0000	0.0000
Low Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Drift

RAM Structural System 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/22/24 11:36:54
Steel Code: IBC

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes Scale Factor (DL): 1.20 Scale Factor (LL): 1.00
Scale Factor (Roof): 1.00 Scale Factor (Snow): 0.70
Ground Level: Base
Use Reduced Stiffness for Steel Members (AISC 360): τb = 1.00

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Sp	PosSnowLoad	RAMUSER
E5	Drift	EQ_ASCE716_X_+E_Drft
E6	Drift	EQ_ASCE716_X_-E_Drft
E7	Drift	EQ_ASCE716_Y_+E_Drft
E8	Drift	EQ_ASCE716_Y_-E_Drft

Displacements for pseudo-flexible and flexible/none diaphragms are reported based on maximum nodal displacement within diaphragm boundary.

RESULTS:

Location (ft): (16.388, 94.531)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Low Roof	D	0.1352	-0.0279	0.1352	-0.0279	0.0008	0.0002
	Sp	0.1986	-0.0410	0.1986	-0.0410	0.0012	0.0003
	E5	2.6041	3.5102	2.6041	3.5102	0.0163	0.0219
	E6	2.6482	3.6530	2.6482	3.6530	0.0166	0.0228
	E7	0.6442	2.1392	0.6442	2.1392	0.0040	0.0134
	E8	0.5181	1.7311	0.5181	1.7311	0.0032	0.0108

Drift

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint

P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.00
		Scale Factor (Roof):	1.00	Scale Factor (Snow):	0.70
Ground Level:	Base				

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Sp	PosSnowLoad	RAMUSER
E5	Drift	EQ_ASCE716_X_+E_Drft
E6	Drift	EQ_ASCE716_X_-E_Drft
E7	Drift	EQ_ASCE716_Y_+E_Drft
E8	Drift	EQ_ASCE716_Y_-E_Drft

Displacements for pseudo-flexible and flexible/none diaphragms are reported based on maximum nodal displacement within diaphragm boundary.

RESULTS:

Location (ft): (18.364, 94.926)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Low Roof	D	0.1115	-0.0237	0.1115	-0.0237	0.0007	0.0001
	Sp	0.1646	-0.0352	0.1646	-0.0352	0.0010	0.0002
	E5	2.2923	2.8661	2.2923	2.8661	0.0143	0.0179
	E6	2.3287	2.9849	2.3287	2.9849	0.0146	0.0187
	E7	0.5308	1.7787	0.5308	1.7787	0.0033	0.0111
	E8	0.4268	1.4390	0.4268	1.4390	0.0027	0.0090

Drift

RAM Structural System 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/22/24 11:43:50
Steel Code: IBC

CRITERIA:

Rigid End Zones:	Ignore Effects				
Member Force Output:	At Face of Joint				
P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.00
		Scale Factor (Roof):	1.00	Scale Factor (Snow):	0.70
Ground Level:	Base				

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Sp	PosSnowLoad	RAMUSER
E5	Drift	EQ_ASCE716_X_+E_Drft
E6	Drift	EQ_ASCE716_X_-E_Drft
E7	Drift	EQ_ASCE716_Y_+E_Drft
E8	Drift	EQ_ASCE716_Y_-E_Drft

Displacements for pseudo-flexible and flexible/none diaphragms are reported based on maximum nodal displacement within diaphragm boundary.

RESULTS:

Location (ft): (-0.337, 94.926)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Low Roof	D	0.1115	-0.0237	0.1115	-0.0237	0.0007	0.0001
	Sp	0.1646	-0.0352	0.1646	-0.0352	0.0010	0.0002
	E5	2.2923	2.8661	2.2923	2.8661	0.0143	0.0179
	E6	2.3287	2.9849	2.3287	2.9849	0.0146	0.0187
	E7	0.5308	1.7787	0.5308	1.7787	0.0033	0.0111
	E8	0.4268	1.4390	0.4268	1.4390	0.0027	0.0090

Drift

CRITERIA:

Rigid End Zones:	Ignore Effects				
Member Force Output:	At Face of Joint				
P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.00
		Scale Factor (Roof):	1.00	Scale Factor (Snow):	0.70
Ground Level:	Base				

Use Reduced Stiffness for Steel Members (AISC 360): τb = 1.00

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Sp	PosSnowLoad	RAMUSER
E5	Drift	EQ_ASCE716_X_+E_Drft
E6	Drift	EQ_ASCE716_X_-E_Drft
E7	Drift	EQ_ASCE716_Y_+E_Drft
E8	Drift	EQ_ASCE716_Y_-E_Drft

Displacements for pseudo-flexible and flexible/none diaphragms are reported based on maximum nodal displacement within diaphragm boundary.

RESULTS:

Location (ft): (25.475, -0.291)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Low Roof	D	0.1352	-0.0279	0.1352	-0.0279	0.0008	0.0002
	Sp	0.1986	-0.0410	0.1986	-0.0410	0.0012	0.0003
	E5	2.6041	3.5102	2.6041	3.5102	0.0163	0.0219
	E6	2.6482	3.6530	2.6482	3.6530	0.0166	0.0228
	E7	0.6442	2.1392	0.6442	2.1392	0.0040	0.0134
	E8	0.5181	1.7311	0.5181	1.7311	0.0032	0.0108

Drift

RAM Structural System 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/22/24 11:43:50
Steel Code: IBC

CRITERIA:

Rigid End Zones:	Ignore Effects				
Member Force Output:	At Face of Joint				
P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.00
		Scale Factor (Roof):	1.00	Scale Factor (Snow):	0.70
Ground Level:	Base				

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Sp	PosSnowLoad	RAMUSER
E5	Drift	EQ_ASCE716_X_+E_Drft
E6	Drift	EQ_ASCE716_X_-E_Drft
E7	Drift	EQ_ASCE716_Y_+E_Drft
E8	Drift	EQ_ASCE716_Y_-E_Drft

Displacements for pseudo-flexible and flexible/none diaphragms are reported based on maximum nodal displacement within diaphragm boundary.

RESULTS:

Location (ft): (26.265, -0.554)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Low Roof	D	0.1115	-0.0237	0.1115	-0.0237	0.0007	0.0001
	Sp	0.1646	-0.0352	0.1646	-0.0352	0.0010	0.0002
	E5	2.2923	2.8661	2.2923	2.8661	0.0143	0.0179
	E6	2.3287	2.9849	2.3287	2.9849	0.0146	0.0187
	E7	0.5308	1.7787	0.5308	1.7787	0.0033	0.0111
	E8	0.4268	1.4390	0.4268	1.4390	0.0027	0.0090

Drift

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint

P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.00
		Scale Factor (Roof):	1.00	Scale Factor (Snow):	0.70
Ground Level:	Base				

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Sp	PosSnowLoad	RAMUSER
E5	Drift	EQ_ASCE716_X_+E_Drft
E6	Drift	EQ_ASCE716_X_-E_Drft
E7	Drift	EQ_ASCE716_Y_+E_Drft
E8	Drift	EQ_ASCE716_Y_-E_Drft

Displacements for pseudo-flexible and flexible/none diaphragms are reported based on maximum nodal displacement within diaphragm boundary.

RESULTS:

Location (ft): (5.457, 0.105)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Low Roof	D	0.1115	-0.0237	0.1115	-0.0237	0.0007	0.0001
	Sp	0.1646	-0.0352	0.1646	-0.0352	0.0010	0.0002
	E5	2.2923	2.8661	2.2923	2.8661	0.0143	0.0179
	E6	2.3287	2.9849	2.3287	2.9849	0.0146	0.0187
	E7	0.5308	1.7787	0.5308	1.7787	0.0033	0.0111
	E8	0.4268	1.4390	0.4268	1.4390	0.0027	0.0090

RAM Structural System 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/22/24 11:36:54
Steel Code: IBC

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes Scale Factor (DL): 1.20 Scale Factor (LL): 1.00
Scale Factor (Roof): 1.00 Scale Factor (Snow): 0.70
Ground Level: Base
Use Reduced Stiffness for Steel Members (AISC 360): τb = 1.00

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Sp	PosSnowLoad	RAMUSER
E5	Drift	EQ_ASCE716_X_+E_Drft
E6	Drift	EQ_ASCE716_X_-E_Drft
E7	Drift	EQ_ASCE716_Y_+E_Drft
E8	Drift	EQ_ASCE716_Y_-E_Drft

Displacements for pseudo-flexible and flexible/none diaphragms are reported based on maximum nodal displacement within diaphragm boundary.

RESULTS:

Location (ft): (0.585, 47.779)

Story	**LdC**	**Displacement**		**Story Drift**		**Drift Ratio**	
		X	**Y**	**X**	**Y**	**X**	**Y**
		in	**in**	**in**	**in**		
High Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Low Roof	D	0.1352	-0.0279	0.1352	-0.0279	0.0008	0.0002
	Sp	0.1986	-0.0410	0.1986	-0.0410	0.0012	0.0003
	E5	2.6041	3.5102	2.6041	3.5102	0.0163	0.0219
	E6	2.6482	3.6530	2.6482	3.6530	0.0166	0.0228
	E7	0.6442	2.1392	0.6442	2.1392	0.0040	0.0134
	E8	0.5181	1.7311	0.5181	1.7311	0.0032	0.0108

Drift

RAM Structural System 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/22/24 11:43:50
Steel Code: IBC

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes Scale Factor (DL): 1.20 Scale Factor (LL): 1.00
Scale Factor (Roof): 1.00 Scale Factor (Snow): 0.70
Ground Level: Base

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Sp	PosSnowLoad	RAMUSER
E5	Drift	EQ_ASCE716_X_+E_Drft
E6	Drift	EQ_ASCE716_X_-E_Drft
E7	Drift	EQ_ASCE716_Y_+E_Drft
E8	Drift	EQ_ASCE716_Y_-E_Drft

Displacements for pseudo-flexible and flexible/none diaphragms are reported based on maximum nodal displacement within diaphragm boundary.

RESULTS:

Location (ft): (-0.074, 47.779)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Low Roof	D	0.1115	-0.0237	0.1115	-0.0237	0.0007	0.0001
	Sp	0.1646	-0.0352	0.1646	-0.0352	0.0010	0.0002
	E5	2.2923	2.8661	2.2923	2.8661	0.0143	0.0179
	E6	2.3287	2.9849	2.3287	2.9849	0.0146	0.0187
	E7	0.5308	1.7787	0.5308	1.7787	0.0033	0.0111
	E8	0.4268	1.4390	0.4268	1.4390	0.0027	0.0090

Drift

RAM Structural System 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

08/22/24 11:43:50
Steel Code: IBC

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes Scale Factor (DL): 1.20 Scale Factor (LL): 1.00
Scale Factor (Roof): 1.00 Scale Factor (Snow): 0.70
Ground Level: Base

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Sp	PosSnowLoad	RAMUSER
E5	Drift	EQ_ASCE716_X_+E_Drft
E6	Drift	EQ_ASCE716_X_-E_Drft
E7	Drift	EQ_ASCE716_Y_+E_Drft
E8	Drift	EQ_ASCE716_Y_-E_Drft

Displacements for pseudo-flexible and flexible/none diaphragms are reported based on maximum nodal displacement within diaphragm boundary.

RESULTS:

Location (ft): (46.547, 0.500)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Sp	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	E8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Low Roof	D	0.1115	-0.0237	0.1115	-0.0237	0.0007	0.0001
	Sp	0.1646	-0.0352	0.1646	-0.0352	0.0010	0.0002
	E5	2.2923	2.8661	2.2923	2.8661	0.0143	0.0179
	E6	2.3287	2.9849	2.3287	2.9849	0.0146	0.0187
	E7	0.5308	1.7787	0.5308	1.7787	0.0033	0.0111
	E8	0.4268	1.4390	0.4268	1.4390	0.0027	0.0090

Drift

W-49

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes Scale Factor (DL): 1.20 Scale Factor (LL): 1.00
Scale Factor (Roof): 1.00 Scale Factor (Snow): 0.70
Ground Level: Base
Use Reduced Stiffness for Steel Members (AISC 360): τb = 1.00

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Sp	PosSnowLoad	RAMUSER
E5	Drift	EQ_ASCE716_X_+E_Drft
E6	Drift	EQ_ASCE716_X_-E_Drft
E7	Drift	EQ_ASCE716_Y_+E_Drft
E8	Drift	EQ_ASCE716_Y_-E_Drft

Displacements for pseudo-flexible and flexible/none diaphragms are reported based on maximum nodal displacement within diaphragm boundary.

RESULTS:

Location (ft): (27.319, 32.502)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
High Roof	D	0.0709	-0.0184	-0.0644	0.0095	0.0015	0.0002
	Sp	0.1074	-0.0275	-0.0911	0.0135	0.0021	0.0003
	E5	1.6531	3.4397	-0.9510	-0.0705	0.0214	0.0016
	E6	1.6580	3.5796	-0.9902	-0.0734	0.0223	0.0017
	E7	0.0722	2.1026	-0.5720	-0.0366	0.0129	0.0008
	E8	0.0581	1.7028	-0.4600	-0.0283	0.0104	0.0006
Low Roof	D	0.1352	-0.0279	0.1352	-0.0279	0.0008	0.0002
	Sp	0.1986	-0.0410	0.1986	-0.0410	0.0012	0.0003
	E5	2.6041	3.5102	2.6041	3.5102	0.0163	0.0219
	E6	2.6482	3.6530	2.6482	3.6530	0.0166	0.0228
	E7	0.6442	2.1392	0.6442	2.1392	0.0040	0.0134
	E8	0.5181	1.7311	0.5181	1.7311	0.0032	0.0108

ASCE 7 Stability Coefficients

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes Scale Factor (DL): 1.20 Scale Factor (LL): 1.00
Scale Factor (Roof): 1.00 Scale Factor (Snow): 0.70
Ground Level: Base
Mesh Criteria :
Max. Distance Between Nodes on Mesh Line (ft) : 8.00
Merge Node Tolerance (in) : 0.0100
Geometry Tolerance (in) : 0.0010
Walls Out-of-plane Stiffness Included in Analysis.
Use Reduced Stiffness for Steel Members (AISC 360): τb = 1.00
Sign considered for Dynamic Load Case Results.
Rigid Links Included at Fixed Beam-to-Wall Locations
Eigenvalue Analysis : Eigen Vectors (Subspace Iteration)

STABILITY COEFFICIENTS:ASCE 7-10/16 Eq. (12.8-16)

β = 1.00
Cd : X-Dir = 3.00 Y-Dir = 3.00
Note that the reported drifts are unfactored elastic story drift values.
Calculated vertical load includes dead, live and roof loads. Live loads are reduced with live load reduction factors.
Calculated vertical load is the sum of the total vertical load at and above story.

Vertical Load Factors:

Dead Load : 1.00 Live Load : 1.00 Roof Load : 1.00 Snow Load : 1.00

LOAD CASE: ELF

Type : EQ_ASCE716_X_+E_F

Level	Diaph. #	Ht	Shear X	Shear Y	Drift X	Drift Y	Vertical Load
		ft	kips	kips	in	in	kips
High Roof	1	17.03	165.82	-0.00	0.00	0.00	1119.66
High Roof	2	17.03	1.71	0.02	-0.05	-0.22	17.89
Low Roof	1	13.33	71.17	17.54	0.39	0.49	405.06
Low Roof	2	13.33	0.05	0.74	0.00	-0.00	258.83

Level	Diaph. #	θx	θy	θx/(1+θx)	θy/(1+θy)	θxmax	θymax
High Roof	1	0.000	0.000	0.000	0.000	0.167	0.167
High Roof	2	0.000	0.000	0.000	0.000	0.167	0.167
Low Roof	1	0.014	0.071	0.014	0.067	0.167	0.167
Low Roof	2	0.000	0.000	0.000	0.000	0.167	0.167

ASCE 7 Stability Coefficients

Type : EQ_ASCE716_X_-E_F

Level	Diaph. #	Ht	Shear X	Shear Y	Drift X	Drift Y	Vertical Load
		ft	kips	kips	in	in	kips
High Roof	1	17.03	165.82	-0.00	0.00	0.00	1119.66
High Roof	2	17.03	1.71	0.03	-0.07	-0.29	17.89
Low Roof	1	13.33	71.17	17.54	0.43	0.64	405.06
Low Roof	2	13.33	0.05	0.74	0.00	-0.00	258.83

Level	Diaph. #	θx	θy	θx/(1+θx)	θy/(1+θy)	θxmax	θymax
High Roof	1	0.000	0.000	0.000	0.000	0.167	0.167
High Roof	2	0.000	0.000	0.000	0.000	0.167	0.167
Low Roof	1	0.015	0.092	0.015	0.084	0.167	0.167
Low Roof	2	0.000	0.000	0.000	0.000	0.167	0.167

Type : EQ_ASCE716_Y_+E_F

Level	Diaph. #	Ht	Shear X	Shear Y	Drift X	Drift Y	Vertical Load
		ft	kips	kips	in	in	kips
High Roof	1	17.03	-0.00	165.82	-0.00	0.00	1119.66
High Roof	2	17.03	0.03	1.78	-0.30	-0.94	17.89
Low Roof	1	13.33	0.01	81.31	0.64	2.14	405.06
Low Roof	2	13.33	-0.02	63.80	-0.00	0.77	258.83

Level	Diaph. #	θx	θy	θx/(1+θx)	θy/(1+θy)	θxmax	θymax
High Roof	1	0.000	0.001	0.000	0.001	0.167	0.167
High Roof	2	0.000	0.000	0.000	0.000	0.167	0.167
Low Roof	1	0.000	0.067	0.000	0.062	0.167	0.167
Low Roof	2	0.000	0.019	0.000	0.019	0.167	0.167

Type : EQ_ASCE716_Y_-E_F

Level	Diaph. #	Ht	Shear X	Shear Y	Drift X	Drift Y	Vertical Load
		ft	kips	kips	in	in	kips
High Roof	1	17.03	-0.00	165.82	-0.00	0.00	1119.66
High Roof	2	17.03	0.02	1.76	-0.24	-0.76	17.89
Low Roof	1	13.33	0.00	81.29	0.52	1.73	405.06
Low Roof	2	13.33	-0.02	63.80	-0.00	0.77	258.83

Level	Diaph. #	θx	θy	θx/(1+θx)	θy/(1+θy)	θxmax	θymax
High Roof	1	0.000	0.001	0.000	0.001	0.167	0.167
High Roof	2	0.000	0.000	0.000	0.000	0.167	0.167
Low Roof	1	0.000	0.054	0.000	0.051	0.167	0.167
Low Roof	2	0.000	0.019	0.000	0.019	0.167	0.167

ASCE 7 Stability Coefficients

CRITERIA:

Rigid End Zones:		Ignore Effects			
Member Force Output:		At Face of Joint			
P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.00
		Scale Factor (Roof):	1.00	Scale Factor (Snow):	0.70
Ground Level:	Base				

Mesh Criteria :

Max. Distance Between Nodes on Mesh Line (ft) : 8.00

Merge Node Tolerance (in) : 0.0100

Geometry Tolerance (in) : 0.0010

Walls Out-of-plane Stiffness Included in Analysis.

Use Reduced Stiffness for Steel Members (AISC 360): τb = 1.00

Sign considered for Dynamic Load Case Results.

Rigid Links Included at Fixed Beam-to-Wall Locations

Eigenvalue Analysis : Eigen Vectors (Subspace Iteration)

STABILITY COEFFICIENTS:ASCE 7-10/16 Eq. (12.8-16)

β = 1.00

Cd : X-Dir = 3.00 Y-Dir = 3.00

Note that the reported drifts are unfactored elastic story drift values.

Calculated vertical load includes dead, live and roof loads. Live loads are reduced with live load reduction factors.

Calculated vertical load is the sum of the total vertical load at and above story.

Vertical Load Factors:

Dead Load : 1.00 Live Load : 1.00 Roof Load : 1.00 Snow Load : 1.00

LOAD CASE: ELF

Type : EQ_ASCE716_X_+E_F

Level	Diaph. #	Ht	Shear X	Shear Y	Drift X	Drift Y	Vertical Load
		ft	kips	kips	in	in	kips
High Roof	1	17.03	165.58	0.00	0.28	0.02	1539.91
High Roof	2	17.03	1.85	0.15	-0.50	-1.59	17.89
Low Roof	1	13.33	18.09	3.32	0.21	-0.00	276.91
Low Roof	2	13.33	73.54	17.64	2.61	3.51	423.59

Level	Diaph. #	θx	θy	$\theta x/(1+\theta x)$	$\theta y/(1+\theta y)$	$\theta xmax$	$\theta ymax$
High Roof	1	0.059	0.000	0.056	0.000	0.167	0.167
High Roof	2	0.000	0.000	0.000	0.000	0.167	0.167
Low Roof	1	0.020	0.000	0.020	0.000	0.167	0.167
Low Roof	2	0.094	0.527	0.086	0.345	0.167	0.167

ASCE 7 Stability Coefficients

Type : EQ_ASCE716_X_-E_F

Level	Diaph. #	Ht	Shear X	Shear Y	Drift X	Drift Y	Vertical Load
		ft	kips	kips	in	in	kips
High Roof	1	17.03	165.58	0.00	0.28	0.02	1539.91
High Roof	2	17.03	1.85	0.16	-0.52	-1.66	17.89
Low Roof	1	13.33	18.09	3.32	0.21	-0.00	276.91
Low Roof	2	13.33	73.54	17.65	2.65	3.66	423.59

Level	Diaph. #	θx	θy	θx/(1+θx)	θy/(1+θy)	θxmax	θymax
High Roof	1	0.059	0.000	0.056	0.000	0.167	0.167
High Roof	2	0.000	0.000	0.000	0.000	0.167	0.167
Low Roof	1	0.020	0.000	0.020	0.000	0.167	0.167
Low Roof	2	0.095	0.549	0.087	0.354	0.167	0.167

Type : EQ_ASCE716_Y_+E_F

Level	Diaph. #	Ht	Shear X	Shear Y	Drift X	Drift Y	Vertical Load
		ft	kips	kips	in	in	kips
High Roof	1	17.03	-0.00	165.58	0.01	0.00	1539.91
High Roof	2	17.03	0.03	1.78	-0.30	-0.94	17.89
Low Roof	1	13.33	-0.00	69.98	-0.01	1.33	276.91
Low Roof	2	13.33	0.01	81.19	0.64	2.14	423.59

Level	Diaph. #	θx	θy	θx/(1+θx)	θy/(1+θy)	θxmax	θymax
High Roof	1	0.000	0.000	0.000	0.000	0.167	0.167
High Roof	2	0.000	0.000	0.000	0.000	0.167	0.167
Low Roof	1	0.000	0.033	0.000	0.032	0.167	0.167
Low Roof	2	0.000	0.070	0.000	0.065	0.167	0.167

Type : EQ_ASCE716_Y_-E_F

Level	Diaph. #	Ht	Shear X	Shear Y	Drift X	Drift Y	Vertical Load
		ft	kips	kips	in	in	kips
High Roof	1	17.03	-0.00	165.58	0.01	0.00	1539.91
High Roof	2	17.03	0.02	1.76	-0.24	-0.76	17.89
Low Roof	1	13.33	-0.00	69.98	-0.01	1.33	276.91
Low Roof	2	13.33	0.00	81.18	0.52	1.73	423.59

Level	Diaph. #	θx	θy	θx/(1+θx)	θy/(1+θy)	θxmax	θymax
High Roof	1	0.000	0.000	0.000	0.000	0.167	0.167
High Roof	2	0.000	0.000	0.000	0.000	0.167	0.167
Low Roof	1	0.000	0.033	0.000	0.032	0.167	0.167
Low Roof	2	0.000	0.056	0.000	0.053	0.167	0.167

AISC 360 Direct Analysis Validation Report

DESIGN CODE

AISC 360-16 LRFD

SECOND-ORDER ANALYSIS

P-Delta analysis was performed with gravity loads.

Scale factor (DL) : 1.20 Scale factor (LL) : 1.00

Scale factor (Roof) : 1.00 Scale factor (Snow) : 0.70

B1 Factors:

B1 factors were calculated and applied to gravity load case moments.

B2 Factors:

RMX = 1.000

RMY = 1.000

Maximum B2 = 11.058 on Level Low Roof at an angle of 90.00 degrees.

Load Combination : 1.200 D + 0.500 Sp + 1.000 W4.

B2 factors were not applied.

NOTIONAL LOADS

Generated Load Combinations:

Number of Selected Load Combinations = 122

Analysis Invalid. Notional Loads were not included in load combinations.

REDUCED STIFFNESS

Flexural Stiffness:

The flexural stiffnesses were reduced.

Number of members with required τb < 1.0 = 0

τb used in Analysis : 1.000

Axial Stiffness:

The axial stiffnesses were reduced.

Building Story Shears

CRITICAL:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes Scale Factor (DL): 1.20 Scale Factor (LL): 1.00
Scale Factor (Roof): 1.00 Scale Factor (Snow): 0.70
Ground Level: Base
Mesh Criteria :
Max. Distance Between Nodes on Mesh Line (ft) : 8.00
Merge Node Tolerance (in) : 0.0100
Geometry Tolerance (in) : 0.0010
Walls Out-of-plane Stiffness Included in Analysis.
Use Reduced Stiffness for Steel Members (AISC 360): τb = 1.00
Sign considered for Dynamic Load Case Results.
Rigid Links Included at Fixed Beam-to-Wall Locations
Eigenvalue Analysis : Eigen Vectors (Subspace Iteration)

Load Case: D DeadLoad RAMUSER

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	0.00	0.00
High Roof	2	0.01	-0.00
Low Roof	1	-0.01	-1.26
Low Roof	2	0.05	-0.43
Low Roof	None	-0.03	1.69

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.01	0.01	-0.00	-0.00
Low Roof	0.01	0.00	-0.00	-0.00

Load Case: Sp PosSnowLoad RAMUSER

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	0.00	0.00
High Roof	2	0.01	-0.00
Low Roof	1	0.15	-0.61
Low Roof	2	-0.04	-0.88
Low Roof	None	-0.10	1.48

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.01	0.01	-0.00	-0.00
Low Roof	0.01	-0.00	-0.00	-0.00

Load Case: W1 MWFRS Wind_ASCE716_1_X

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	6.20	0.00
High Roof	2	0.51	0.01
Low Roof	1	18.79	-0.30
Low Roof	2	0.00	0.03
Low Roof	None	9.78	0.28

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	6.71	6.71	0.01	0.01
Low Roof	28.56	21.85	0.01	-0.00

Load Case: W2 MWFRS Wind_ASCE716_1_Y

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	-0.00	29.55
High Roof	2	0.02	1.71
Low Roof	1	0.02	19.60
Low Roof	2	-0.00	11.43
Low Roof	None	0.00	16.41

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.02	0.02	31.26	31.26
Low Roof	0.02	-0.00	47.45	16.19

Load Case: W3 MWFRS Wind_ASCE716_2_X+E

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	4.65	0.00
High Roof	2	0.38	0.00
Low Roof	1	14.09	-0.23
Low Roof	2	0.00	0.02

Level	Diaph. #	Shear-X kips	Shear-Y kips
Low Roof	None	7.33	0.21

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	5.03	5.03	0.00	0.00
Low Roof	21.42	16.39	0.00	-0.00

Load Case: W4 MWFRS Wind_ASCE716_2_X-E

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	4.65	0.00
High Roof	2	0.39	0.01
Low Roof	1	14.09	-0.22
Low Roof	2	0.00	0.02
Low Roof	None	7.33	0.21

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	5.03	5.03	0.01	0.01
Low Roof	21.42	16.39	0.01	-0.00

Load Case: W5 MWFRS Wind_ASCE716_2_Y+E

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	-0.00	22.16
High Roof	2	0.02	1.30
Low Roof	1	0.02	14.72
Low Roof	2	-0.00	8.57
Low Roof	None	0.00	12.31

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.02	0.02	23.46	23.46
Low Roof	0.02	-0.00	35.60	12.14

Load Case: W6 MWFRS Wind_ASCE716_2_Y-E

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	-0.00	22.16

High Roof	2	0.01	1.26
Low Roof	1	0.01	14.68
Low Roof	2	-0.00	8.57
Low Roof	None	0.00	12.31

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.01	0.01	23.42	23.42
Low Roof	0.01	-0.00	35.57	12.14

Load Case: W7 MWFRS Wind_ASCE716_3_X+Y

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	4.65	22.16
High Roof	2	0.40	1.29
Low Roof	1	14.11	14.48
Low Roof	2	-0.00	8.60
Low Roof	None	7.33	12.52

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	5.05	5.05	23.45	23.45
Low Roof	21.44	16.39	35.59	12.14

Load Case: W8 MWFRS Wind_ASCE716_3_X-Y

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	4.65	-22.16
High Roof	2	0.37	-1.28
Low Roof	1	14.07	-14.93
Low Roof	2	0.00	-8.55
Low Roof	None	7.33	-12.10

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	5.01	5.01	-23.44	-23.44
Low Roof	21.40	16.39	-35.58	-12.14

Load Case: W9 MWFRS Wind_ASCE716_4_X+Y_CW

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	3.49	16.62
High Roof	2	0.30	0.95
Low Roof	1	10.58	10.84
Low Roof	2	-0.00	6.45
Low Roof	None	5.50	9.39

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	3.78	3.78	17.57	17.57
Low Roof	16.08	12.29	26.68	9.11

Load Case: W10 MWFRS Wind_ASCE716_4_X+Y_CCW

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	3.49	16.62
High Roof	2	0.31	0.98
Low Roof	1	10.59	10.87
Low Roof	2	-0.00	6.45
Low Roof	None	5.50	9.39

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	3.79	3.79	17.60	17.60
Low Roof	16.08	12.29	26.71	9.11

Load Case: W11 MWFRS Wind_ASCE716_4_X-Y_CW

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	3.49	-16.62
High Roof	2	0.27	-0.97
Low Roof	1	10.55	-11.21
Low Roof	2	0.00	-6.42
Low Roof	None	5.50	-9.07

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	3.76	3.76	-17.59	-17.59

Low Roof	16.05	12.29	-26.70	-9.11

Load Case: W12 MWFRS Wind_ASCE716_4_X-Y_CCW

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	3.49	-16.62
High Roof	2	0.28	-0.94
Low Roof	1	10.56	-11.18
Low Roof	2	0.00	-6.42
Low Roof	None	5.50	-9.07

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	3.77	3.77	-17.56	-17.56
Low Roof	16.06	12.29	-26.67	-9.11

Load Case: E1 ELF EQ_ASCE716_X_+E_F

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	165.82	-0.00
High Roof	2	1.71	0.02
Low Roof	1	51.11	-2.53
Low Roof	2	0.04	0.74
Low Roof	None	162.57	1.82

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	167.53	167.53	0.02	0.02
Low Roof	213.72	46.19	0.02	-0.00

Load Case: E2 ELF EQ_ASCE716_X_-E_F

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	165.82	-0.00
High Roof	2	1.71	0.03
Low Roof	1	51.11	-2.52
Low Roof	2	0.04	0.74
Low Roof	None	162.57	1.82

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	167.53	167.53	0.03	0.03
Low Roof	213.72	46.19	0.03	-0.00

Load Case: E3 ELF EQ_ASCE716_Y_+E_F

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	-0.00	165.82
High Roof	2	0.03	1.78
Low Roof	1	0.03	81.33
Low Roof	2	-0.02	63.80
Low Roof	None	0.02	86.51

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.03	0.03	167.60	167.60
Low Roof	0.03	-0.00	231.63	64.03

Load Case: E4 ELF EQ_ASCE716_Y_-E_F

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	-0.00	165.82
High Roof	2	0.02	1.76
Low Roof	1	0.02	81.31
Low Roof	2	-0.02	63.80
Low Roof	None	0.02	86.51

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.02	0.02	167.58	167.58
Low Roof	0.02	-0.00	231.61	64.03

RAM Frame 24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding

CRITERIA:

Rigid End Zones:		Ignore Effects			
Member Force Output:		At Face of Joint			
P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.00
		Scale Factor (Roof):	1.00	Scale Factor (Snow):	0.70
Ground Level:	Base				

Mesh Criteria :

Max. Distance Between Nodes on Mesh Line (ft) : 8.00

Merge Node Tolerance (in) : 0.0100

Geometry Tolerance (in) : 0.0010

Walls Out-of-plane Stiffness Included in Analysis.

Use Reduced Stiffness for Steel Members (AISC 360): τb = 1.00

Sign considered for Dynamic Load Case Results.

Rigid Links Included at Fixed Beam-to-Wall Locations

Eigenvalue Analysis : Eigen Vectors (Subspace Iteration)

Load Case: D DeadLoad RAMUSER

Level	**Diaph. #**	**Shear-X kips**	**Shear-Y kips**
High Roof	1	0.00	0.00
High Roof	2	0.01	-0.00
Low Roof	1	0.96	-0.50
Low Roof	2	-0.01	-1.26
Low Roof	None	-0.94	1.76

Summary - Total Story Shears

Level	**Shear-X kips**	**Change-X kips**	**Shear-Y kips**	**Change-Y kips**
High Roof	0.01	0.01	-0.00	-0.00
Low Roof	0.01	-0.00	-0.00	-0.00

Load Case: Sp PosSnowLoad RAMUSER

Level	**Diaph. #**	**Shear-X kips**	**Shear-Y kips**
High Roof	1	0.00	0.00
High Roof	2	0.01	-0.00
Low Roof	1	0.43	-0.96
Low Roof	2	0.03	-0.84
Low Roof	None	-0.45	1.81

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.01	0.01	-0.00	-0.00
Low Roof	0.01	-0.00	-0.00	-0.00

Load Case: W1 MWFRS Wind_ASCE716_1_X

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	6.20	0.00
High Roof	2	0.58	0.07
Low Roof	1	9.00	-0.29
Low Roof	2	19.95	-0.24
Low Roof	None	14.90	0.60

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	6.78	6.78	0.07	0.07
Low Roof	43.85	37.07	0.07	-0.00

Load Case: W2 MWFRS Wind_ASCE716_1_Y

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	-0.00	29.58
High Roof	2	0.02	1.71
Low Roof	1	-0.00	11.49
Low Roof	2	0.02	19.61
Low Roof	None	0.00	16.45

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.02	0.02	31.28	31.28
Low Roof	0.02	0.00	47.55	16.27

Load Case: W3 MWFRS Wind_ASCE716_2_X+E

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	4.65	0.00
High Roof	2	0.43	0.05
Low Roof	1	6.75	-0.22
Low Roof	2	14.96	-0.18

Low Roof	None	11.17	0.45

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	5.08	5.08	0.05	0.05
Low Roof	32.89	27.81	0.05	-0.00

Load Case: W4 MWFRS Wind_ASCE716_2_X-E

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	4.65	0.00
High Roof	2	0.44	0.05
Low Roof	1	6.75	-0.22
Low Roof	2	14.96	-0.18
Low Roof	None	11.17	0.45

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	5.08	5.08	0.05	0.05
Low Roof	32.89	27.81	0.05	-0.00

Load Case: W5 MWFRS Wind_ASCE716_2_Y+E

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	-0.00	22.18
High Roof	2	0.02	1.30
Low Roof	1	-0.00	8.62
Low Roof	2	0.02	14.73
Low Roof	None	0.00	12.34

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.02	0.02	23.48	23.48
Low Roof	0.02	0.00	35.68	12.20

Load Case: W6 MWFRS Wind_ASCE716_2_Y-E

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	-0.00	22.18

Building Story Shears

High Roof	2	0.01	1.26
Low Roof	1	-0.00	8.62
Low Roof	2	0.01	14.69
Low Roof	None	0.00	12.34

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.01	0.01	23.44	23.44
Low Roof	0.01	0.00	35.64	12.20

Load Case: W7 MWFRS Wind_ASCE716_3_X+Y

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	4.65	22.18
High Roof	2	0.45	1.33
Low Roof	1	6.75	8.40
Low Roof	2	14.98	14.53
Low Roof	None	11.17	12.78

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	5.10	5.10	23.52	23.52
Low Roof	32.90	27.81	35.72	12.20

Load Case: W8 MWFRS Wind_ASCE716_3_X-Y

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	4.65	-22.18
High Roof	2	0.42	-1.23
Low Roof	1	6.75	-8.83
Low Roof	2	14.94	-14.89
Low Roof	None	11.17	-11.89

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	5.06	5.06	-23.41	-23.41
Low Roof	32.87	27.81	-35.61	-12.20

Load Case: W9 MWFRS Wind_ASCE716_4_X+Y_CW

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	3.48	16.64
High Roof	2	0.34	0.98
Low Roof	1	5.06	6.30
Low Roof	2	11.23	10.88
Low Roof	None	8.38	9.59

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	3.82	3.82	17.62	17.62
Low Roof	24.67	20.85	26.77	9.15

Load Case: W10 MWFRS Wind_ASCE716_4_X+Y_CCW

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	3.48	16.64
High Roof	2	0.34	1.02
Low Roof	1	5.06	6.30
Low Roof	2	11.24	10.91
Low Roof	None	8.38	9.59

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	3.83	3.83	17.65	17.65
Low Roof	24.68	20.85	26.80	9.15

Load Case: W11 MWFRS Wind_ASCE716_4_X-Y_CW

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	3.48	-16.64
High Roof	2	0.31	-0.94
Low Roof	1	5.06	-6.63
Low Roof	2	11.20	-11.18
Low Roof	None	8.38	-8.92

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	3.79	3.79	-17.57	-17.57

Low Roof	24.65	20.85	-26.72	-9.15

Load Case: W12 MWFRS Wind_ASCE716_4_X-Y_CCW

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	3.48	-16.64
High Roof	2	0.32	-0.91
Low Roof	1	5.06	-6.63
Low Roof	2	11.21	-11.15
Low Roof	None	8.38	-8.92

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	3.80	3.80	-17.54	-17.54
Low Roof	24.66	20.85	-26.69	-9.15

Load Case: E1 ELF EQ_ASCE716_X_+E_F

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	165.58	0.00
High Roof	2	1.85	0.15
Low Roof	1	14.98	0.21
Low Roof	2	53.50	-2.39
Low Roof	None	170.83	2.34

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	167.43	167.43	0.15	0.15
Low Roof	239.32	71.88	0.15	-0.00

Load Case: E2 ELF EQ_ASCE716_X_-E_F

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	165.58	0.00
High Roof	2	1.85	0.16
Low Roof	1	14.98	0.21
Low Roof	2	53.50	-2.39
Low Roof	None	170.83	2.34

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	167.44	167.44	0.16	0.16
Low Roof	239.32	71.88	0.16	-0.00

Load Case: E3 ELF EQ_ASCE716_Y_+E_F

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	-0.00	165.58
High Roof	2	0.03	1.78
Low Roof	1	0.00	69.98
Low Roof	2	0.03	81.21
Low Roof	None	-0.00	86.17

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.03	0.03	167.36	167.36
Low Roof	0.03	0.00	237.37	70.00

Load Case: E4 ELF EQ_ASCE716_Y_-E_F

Level	Diaph. #	Shear-X kips	Shear-Y kips
High Roof	1	-0.00	165.58
High Roof	2	0.02	1.76
Low Roof	1	0.00	69.98
Low Roof	2	0.02	81.19
Low Roof	None	-0.00	86.17

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.02	0.02	167.34	167.34
Low Roof	0.02	0.00	237.35	70.00

Frame Story Shears

CRITERIA:

Rigid End Zones:		Ignore Effects			
Member Force Output:		At Face of Joint			
P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.00
		Scale Factor (Roof):	1.00	Scale Factor (Snow):	0.70
Ground Level:	Base				

Mesh Criteria :

Max. Distance Between Nodes on Mesh Line (ft) : 8.00

Merge Node Tolerance (in) : 0.0100

Geometry Tolerance (in) : 0.0010

Walls Out-of-plane Stiffness Included in Analysis.

Use Reduced Stiffness for Steel Members (AISC 360): τb = 1.00

Sign considered for Dynamic Load Case Results.

Rigid Links Included at Fixed Beam-to-Wall Locations

Eigenvalue Analysis : Eigen Vectors (Subspace Iteration)

Frame #0

Load Case: D DeadLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.01	0.01	0.00	0.00
Low Roof	0.10	0.10	-0.02	-0.02

Load Case: Sp PosSnowLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.01	0.01	0.00	0.00
Low Roof	0.15	0.14	-0.03	-0.03

Load Case: W1 MWFRS Wind_ASCE716_1_X

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.51	0.51	0.01	0.01
Low Roof	4.62	4.10	0.05	0.05

Load Case: W2 MWFRS Wind_ASCE716_1_Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.02	0.02	1.71	1.71
Low Roof	0.20	0.18	0.62	-1.09

Load Case: W3 MWFRS Wind_ASCE716_2_X+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.38	0.38	0.00	0.00
Low Roof	3.46	3.07	0.03	0.03

Load Case: W4 MWFRS Wind_ASCE716_2_X-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.39	0.39	0.01	0.01
Low Roof	3.47	3.08	0.06	0.05

Load Case: W5 MWFRS Wind_ASCE716_2_Y+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.02	0.02	1.30	1.30
Low Roof	0.20	0.18	0.60	-0.70

Load Case: W6 MWFRS Wind_ASCE716_2_Y-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.01	0.01	1.26	1.26
Low Roof	0.10	0.09	0.32	-0.94

Load Case: W7 MWFRS Wind_ASCE716_3_X+Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.40	0.40	1.29	1.29
Low Roof	3.61	3.21	0.50	-0.78

Load Case: W8 MWFRS Wind_ASCE716_3_X-Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.37	0.37	-1.28	-1.28
Low Roof	3.31	2.94	-0.42	0.85

Load Case: W9 MWFRS Wind_ASCE716_4_X+Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.30	0.30	0.95	0.95
Low Roof	2.67	2.37	0.26	-0.69

Frame Story Shears

Load Case: W10 MWFRS Wind_ASCE716_4_X+Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.31	0.31	0.98	0.98
Low Roof	2.75	2.44	0.50	-0.49

Load Case: W11 MWFRS Wind_ASCE716_4_X-Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.27	0.27	-0.97	-0.97
Low Roof	2.44	2.17	-0.43	0.54

Load Case: W12 MWFRS Wind_ASCE716_4_X-Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.28	0.28	-0.94	-0.94
Low Roof	2.52	2.24	-0.20	0.74

Load Case: E1 ELF EQ_ASCE716_X_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	1.71	1.71	0.02	0.02
Low Roof	9.78	8.07	0.16	0.14

Load Case: E2 ELF EQ_ASCE716_X_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	1.71	1.71	0.03	0.03
Low Roof	9.80	8.08	0.20	0.17

Load Case: E3 ELF EQ_ASCE716_Y_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.03	0.03	1.78	1.78
Low Roof	0.23	0.20	0.71	-1.07

Load Case: E4 ELF EQ_ASCE716_Y_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.02	0.02	1.76	1.76
Low Roof	0.19	0.16	0.58	-1.19

Frame #1

Load Case: D DeadLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	-0.10	-0.10	0.02	0.02

Load Case: Sp PosSnowLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	-0.14	-0.14	0.02	0.02

Load Case: W1 MWFRS Wind_ASCE716_1_X

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.49	0.49	-0.05	-0.05

Load Case: W2 MWFRS Wind_ASCE716_1_Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	-0.18	-0.18	6.90	6.90

Load Case: W3 MWFRS Wind_ASCE716_2_X+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.37	0.37	-0.02	-0.02

Load Case: W4 MWFRS Wind_ASCE716_2_X-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.36	0.36	-0.05	-0.05

Load Case: W5 MWFRS Wind_ASCE716_2_Y+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	-0.18	-0.18	5.05	5.05

Load Case: W6 MWFRS Wind_ASCE716_2_Y-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	-0.09	-0.09	5.29	5.29

Load Case: W7 MWFRS Wind_ASCE716_3_X+Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.23	0.23	5.14	5.14

Load Case: W8 MWFRS Wind_ASCE716_3_X-Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.50	0.50	-5.21	-5.21

Load Case: W9 MWFRS Wind_ASCE716_4_X+Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.21	0.21	3.95	3.95

Load Case: W10 MWFRS Wind_ASCE716_4_X+Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.14	0.14	3.75	3.75

Load Case: W11 MWFRS Wind_ASCE716_4_X-Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.41	0.41	-3.80	-3.80

Load Case: W12 MWFRS Wind_ASCE716_4_X-Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.34	0.34	-4.01	-4.01

Load Case: E1 ELF EQ_ASCE716_X_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	1.63	1.63	-0.14	-0.14

Load Case: E2 ELF EQ_ASCE716_X_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	1.62	1.62	-0.17	-0.17

Load Case: E3 ELF EQ_ASCE716_Y_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	-0.20	-0.20	20.48	20.48

Load Case: E4 ELF EQ_ASCE716_Y_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	-0.16	-0.16	20.59	20.59

Frame #2

Load Case: D DeadLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.26	0.26	-0.11	-0.11
Low Roof	-0.03	-0.30	-0.01	0.10

Load Case: Sp PosSnowLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	1.60	1.60	-0.03	-0.03
Low Roof	0.45	-1.15	-0.06	-0.03

Load Case: W1 MWFRS Wind_ASCE716_1_X

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.01	-0.01	0.02	0.02
Low Roof	0.05	0.07	-0.01	-0.03

Load Case: W2 MWFRS Wind_ASCE716_1_Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.01	-0.01	14.71	14.71
Low Roof	0.00	0.01	20.52	5.81

Load Case: W3 MWFRS Wind_ASCE716_2_X+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.01	-0.01	0.02	0.02
Low Roof	0.04	0.05	0.00	-0.02

Load Case: W4 MWFRS Wind_ASCE716_2_X-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.01	-0.01	0.02	0.02
Low Roof	0.04	0.05	0.00	-0.02

Frame Story Shears

Load Case: W5 MWFRS Wind_ASCE716_2_Y+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.01	-0.01	11.03	11.03
Low Roof	0.00	0.01	15.39	4.35

Load Case: W6 MWFRS Wind_ASCE716_2_Y-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.01	-0.01	11.03	11.03
Low Roof	0.00	0.01	15.39	4.35

Load Case: W7 MWFRS Wind_ASCE716_3_X+Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.02	-0.02	11.05	11.05
Low Roof	0.04	0.06	15.38	4.33

Load Case: W8 MWFRS Wind_ASCE716_3_X-Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.00	0.00	-11.02	-11.02
Low Roof	0.04	0.04	-15.39	-4.37

Load Case: W9 MWFRS Wind_ASCE716_4_X+Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.01	-0.01	8.29	8.29
Low Roof	0.03	0.04	11.54	3.25

Load Case: W10 MWFRS Wind_ASCE716_4_X+Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.01	-0.01	8.29	8.29
Low Roof	0.03	0.04	11.54	3.25

Load Case: W11 MWFRS Wind_ASCE716_4_X-Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.00	0.00	-8.26	-8.26
Low Roof	0.03	0.03	-11.54	-3.28

Load Case: W12 MWFRS Wind_ASCE716_4_X-Y_CCW

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	0.00	0.00	-8.26	-8.26
Low Roof	0.03	0.03	-11.54	-3.28

Load Case: E1 ELF EQ_ASCE716_X_+E_F

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	0.44	0.44	0.03	0.03
Low Roof	0.35	-0.09	-0.02	-0.05

Load Case: E2 ELF EQ_ASCE716_X_-E_F

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	0.44	0.44	0.03	0.03
Low Roof	0.35	-0.09	-0.02	-0.05

Load Case: E3 ELF EQ_ASCE716_Y_+E_F

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	-0.06	-0.06	82.56	82.56
Low Roof	0.00	0.06	102.00	19.44

Load Case: E4 ELF EQ_ASCE716_Y_-E_F

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	-0.06	-0.06	82.56	82.56
Low Roof	0.00	0.06	102.00	19.44

Frame #3

Load Case: D DeadLoad RAMUSER

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	-0.13	-0.13	0.09	0.09
Low Roof	0.05	0.19	0.15	0.06

Load Case: Sp PosSnowLoad RAMUSER

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	-0.32	-0.32	0.25	0.25

Level	Shear-X	Change-X	Shear-Y	Change-Y
Low Roof	0.02	0.34	0.09	-0.17

Load Case: W1 MWFRS Wind_ASCE716_1_X

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.02	0.02	0.00	0.00
Low Roof	0.01	-0.01	0.00	0.00

Load Case: W2 MWFRS Wind_ASCE716_1_Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.00	0.00	14.72	14.72
Low Roof	-0.01	-0.01	16.97	2.25

Load Case: W3 MWFRS Wind_ASCE716_2_X+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.02	0.02	0.00	0.00
Low Roof	0.00	-0.02	0.00	0.00

Load Case: W4 MWFRS Wind_ASCE716_2_X-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.02	0.02	0.00	0.00
Low Roof	0.00	-0.02	0.00	0.00

Load Case: W5 MWFRS Wind_ASCE716_2_Y+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.00	0.00	11.04	11.04
Low Roof	-0.01	-0.01	12.73	1.69

Load Case: W6 MWFRS Wind_ASCE716_2_Y-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.00	0.00	11.04	11.04
Low Roof	-0.01	-0.01	12.73	1.69

Load Case: W7 MWFRS Wind_ASCE716_3_X+Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.02	0.02	11.04	11.04

Low Roof	0.00	-0.02	12.73	1.68

Load Case: W8 MWFRS Wind_ASCE716_3_X-Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.01	0.01	-11.04	-11.04
Low Roof	0.01	-0.00	-12.73	-1.69

Load Case: W9 MWFRS Wind_ASCE716_4_X+Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.01	0.01	8.28	8.28
Low Roof	0.00	-0.01	9.55	1.26

Load Case: W10 MWFRS Wind_ASCE716_4_X+Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.01	0.01	8.28	8.28
Low Roof	0.00	-0.01	9.55	1.26

Load Case: W11 MWFRS Wind_ASCE716_4_X-Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.01	0.01	-8.28	-8.28
Low Roof	0.01	-0.00	-9.55	-1.26

Load Case: W12 MWFRS Wind_ASCE716_4_X-Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.01	0.01	-8.28	-8.28
Low Roof	0.01	-0.00	-9.55	-1.26

Load Case: E1 ELF EQ_ASCE716_X_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.54	0.54	0.02	0.02
Low Roof	0.18	-0.37	-0.01	-0.03

Load Case: E2 ELF EQ_ASCE716_X_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.54	0.54	0.02	0.02

Low Roof	0.18	-0.37	-0.01	-0.03

Load Case: E3 ELF EQ_ASCE716_Y_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.01	0.01	82.63	82.63
Low Roof	-0.04	-0.05	95.00	12.37

Load Case: E4 ELF EQ_ASCE716_Y_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.01	0.01	82.63	82.63
Low Roof	-0.04	-0.05	95.00	12.37

Frame #6

Load Case: D DeadLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.23	-0.23	-0.85	-0.85
Low Roof	-0.08	0.15	-0.33	0.53

Load Case: Sp PosSnowLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-1.06	-1.06	-1.39	-1.39
Low Roof	-0.36	0.71	-0.12	1.26

Load Case: W1 MWFRS Wind_ASCE716_1_X

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	3.11	3.11	-0.02	-0.02
Low Roof	11.13	8.02	0.01	0.03

Load Case: W2 MWFRS Wind_ASCE716_1_Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.01	0.01	0.05	0.05
Low Roof	0.00	-0.01	0.11	0.05

Load Case: W3 MWFRS Wind_ASCE716_2_X+E

Level	Shear-X	Change-X	Shear-Y	Change-Y

	kips	kips	kips	kips
High Roof	2.33	2.33	-0.02	-0.02
Low Roof	8.34	6.01	0.00	0.02

Load Case: W4 MWFRS Wind_ASCE716_2_X-E

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	2.33	2.33	-0.02	-0.02
Low Roof	8.34	6.01	0.00	0.02

Load Case: W5 MWFRS Wind_ASCE716_2_Y+E

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	0.00	0.00	0.04	0.04
Low Roof	0.00	0.00	0.08	0.04

Load Case: W6 MWFRS Wind_ASCE716_2_Y-E

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	0.00	0.00	0.04	0.04
Low Roof	0.00	0.00	0.08	0.04

Load Case: W7 MWFRS Wind_ASCE716_3_X+Y

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	2.34	2.34	0.02	0.02
Low Roof	8.35	6.01	0.08	0.06

Load Case: W8 MWFRS Wind_ASCE716_3_X-Y

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	2.33	2.33	-0.05	-0.05
Low Roof	8.34	6.02	-0.08	-0.02

Load Case: W9 MWFRS Wind_ASCE716_4_X+Y_CW

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	1.75	1.75	0.02	0.02
Low Roof	6.26	4.51	0.06	0.05

Load Case: W10 MWFRS Wind_ASCE716_4_X+Y_CCW

Level	Shear-X	Change-X	Shear-Y	Change-Y

	kips	kips	kips	kips
High Roof	1.75	1.75	0.02	0.02
Low Roof	6.26	4.51	0.06	0.05

Load Case: W11 MWFRS Wind_ASCE716_4_X-Y_CW

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	1.75	1.75	-0.04	-0.04
Low Roof	6.26	4.51	-0.06	-0.02

Load Case: W12 MWFRS Wind_ASCE716_4_X-Y_CCW

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	1.75	1.75	-0.04	-0.04
Low Roof	6.26	4.51	-0.06	-0.02

Load Case: E1 ELF EQ_ASCE716_X_+E_F

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	82.40	82.40	-0.06	-0.06
Low Roof	99.69	17.29	0.03	0.09

Load Case: E2 ELF EQ_ASCE716_X_-E_F

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	82.40	82.40	-0.06	-0.06
Low Roof	99.69	17.29	0.03	0.09

Load Case: E3 ELF EQ_ASCE716_Y_+E_F

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	0.02	0.02	0.29	0.29
Low Roof	0.02	0.00	0.57	0.28

Load Case: E4 ELF EQ_ASCE716_Y_-E_F

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	0.02	0.02	0.29	0.29
Low Roof	0.02	0.00	0.57	0.28

Frame #7

Frame Story Shears

Load Case: D DeadLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	0.00	0.00

Load Case: Sp PosSnowLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	0.00	0.00

Load Case: W1 MWFRS Wind_ASCE716_1_X

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	9.18	9.18	0.00	0.00

Load Case: W2 MWFRS Wind_ASCE716_1_Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	0.00	0.00

Load Case: W3 MWFRS Wind_ASCE716_2_X+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	6.89	6.89	0.00	0.00

Load Case: W4 MWFRS Wind_ASCE716_2_X-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	6.89	6.89	0.00	0.00

Load Case: W5 MWFRS Wind_ASCE716_2_Y+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	0.00	0.00

Load Case: W6 MWFRS Wind_ASCE716_2_Y-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	0.00	0.00

Load Case: W7 MWFRS Wind_ASCE716_3_X+Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips

Low Roof	6.89	6.89	0.00	0.00

Load Case: W8 MWFRS Wind_ASCE716_3_X-Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	6.89	6.89	0.00	0.00

Load Case: W9 MWFRS Wind_ASCE716_4_X+Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	5.17	5.17	0.00	0.00

Load Case: W10 MWFRS Wind_ASCE716_4_X+Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	5.17	5.17	0.00	0.00

Load Case: W11 MWFRS Wind_ASCE716_4_X-Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	5.17	5.17	0.00	0.00

Load Case: W12 MWFRS Wind_ASCE716_4_X-Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	5.17	5.17	0.00	0.00

Load Case: E1 ELF EQ_ASCE716_X_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	19.41	19.41	0.00	0.00

Load Case: E2 ELF EQ_ASCE716_X_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	19.41	19.41	0.00	0.00

Load Case: E3 ELF EQ_ASCE716_Y_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	0.00	0.00

Load Case: E4 ELF EQ_ASCE716_Y_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	0.00	0.00

Frame #8

Load Case: D DeadLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.10	0.10	0.87	0.87
Low Roof	0.06	-0.04	0.19	-0.68

Load Case: Sp PosSnowLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.21	-0.21	1.16	1.16
Low Roof	-0.11	0.09	0.10	-1.06

Load Case: W1 MWFRS Wind_ASCE716_1_X

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	3.08	3.08	0.00	0.00
Low Roof	3.09	0.01	0.00	0.00

Load Case: W2 MWFRS Wind_ASCE716_1_Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.00	0.00	0.06	0.06
Low Roof	0.00	0.00	0.05	-0.01

Load Case: W3 MWFRS Wind_ASCE716_2_X+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	2.31	2.31	0.00	0.00
Low Roof	2.32	0.01	0.00	0.00

Load Case: W4 MWFRS Wind_ASCE716_2_X-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	2.31	2.31	0.00	0.00
Low Roof	2.32	0.01	0.00	0.00

Load Case: W5 MWFRS Wind_ASCE716_2_Y+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.00	0.00	0.05	0.05
Low Roof	0.00	0.00	0.04	-0.01

Load Case: W6 MWFRS Wind_ASCE716_2_Y-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.00	0.00	0.05	0.05
Low Roof	0.00	0.00	0.04	-0.01

Load Case: W7 MWFRS Wind_ASCE716_3_X+Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	2.31	2.31	0.05	0.05
Low Roof	2.32	0.01	0.04	-0.01

Load Case: W8 MWFRS Wind_ASCE716_3_X-Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	2.31	2.31	-0.05	-0.05
Low Roof	2.31	0.01	-0.04	0.01

Load Case: W9 MWFRS Wind_ASCE716_4_X+Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	1.74	1.74	0.04	0.04
Low Roof	1.74	0.00	0.03	-0.01

Load Case: W10 MWFRS Wind_ASCE716_4_X+Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	1.74	1.74	0.04	0.04
Low Roof	1.74	0.00	0.03	-0.01

Load Case: W11 MWFRS Wind_ASCE716_4_X-Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	1.73	1.73	-0.03	-0.03
Low Roof	1.74	0.01	-0.03	0.01

Load Case: W12 MWFRS Wind_ASCE716_4_X-Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	1.73	1.73	-0.03	-0.03
Low Roof	1.74	0.01	-0.03	0.01

Load Case: E1 ELF EQ_ASCE716_X_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	82.43	82.43	0.01	0.01
Low Roof	82.68	0.25	0.00	-0.01

Load Case: E2 ELF EQ_ASCE716_X_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	82.43	82.43	0.01	0.01
Low Roof	82.68	0.25	0.00	-0.01

Load Case: E3 ELF EQ_ASCE716_Y_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.03	0.03	0.35	0.35
Low Roof	0.02	-0.01	0.26	-0.08

Load Case: E4 ELF EQ_ASCE716_Y_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.03	0.03	0.35	0.35
Low Roof	0.02	-0.01	0.26	-0.08

Frame #15

Load Case: D DeadLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	0.00	0.00

Load Case: Sp PosSnowLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	0.00	0.00

Frame Story Shears

Load Case: W1 MWFRS Wind_ASCE716_1_X

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	0.00	0.00

Load Case: W2 MWFRS Wind_ASCE716_1_Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	2.29	2.29

Load Case: W3 MWFRS Wind_ASCE716_2_X+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	0.00	0.00

Load Case: W4 MWFRS Wind_ASCE716_2_X-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	0.00	0.00

Load Case: W5 MWFRS Wind_ASCE716_2_Y+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	1.72	1.72

Load Case: W6 MWFRS Wind_ASCE716_2_Y-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	1.72	1.72

Load Case: W7 MWFRS Wind_ASCE716_3_X+Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	1.72	1.72

Load Case: W8 MWFRS Wind_ASCE716_3_X-Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	-1.72	-1.72

Load Case: W9 MWFRS Wind_ASCE716_4_X+Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips

Low Roof	0.00	0.00	1.29	1.29

Load Case: W10 MWFRS Wind_ASCE716_4_X+Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	1.29	1.29

Load Case: W11 MWFRS Wind_ASCE716_4_X-Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	-1.29	-1.29

Load Case: W12 MWFRS Wind_ASCE716_4_X-Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	-1.29	-1.29

Load Case: E1 ELF EQ_ASCE716_X_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	0.00	0.00

Load Case: E2 ELF EQ_ASCE716_X_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	0.00	0.00

Load Case: E3 ELF EQ_ASCE716_Y_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	12.61	12.61

Load Case: E4 ELF EQ_ASCE716_Y_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	12.61	12.61

Frame Story Shears

CRITERIA:

Rigid End Zones:		Ignore Effects			
Member Force Output:		At Face of Joint			
P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.00
		Scale Factor (Roof):	1.00	Scale Factor (Snow):	0.70
Ground Level:	Base				

Mesh Criteria :

Max. Distance Between Nodes on Mesh Line (ft) : 8.00
Merge Node Tolerance (in) : 0.0100
Geometry Tolerance (in) : 0.0010

Walls Out-of-plane Stiffness Included in Analysis.
Use Reduced Stiffness for Steel Members (AISC 360): τb = 1.00
Sign considered for Dynamic Load Case Results.
Rigid Links Included at Fixed Beam-to-Wall Locations
Eigenvalue Analysis : Eigen Vectors (Subspace Iteration)

Frame #0

Load Case: D DeadLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.01	0.01	0.00	0.00
Low Roof	0.10	0.10	-0.02	-0.02

Load Case: Sp PosSnowLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.01	0.01	0.00	0.00
Low Roof	0.15	0.14	-0.03	-0.03

Load Case: W1 MWFRS Wind_ASCE716_1_X

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.58	0.58	0.07	0.07
Low Roof	0.49	-0.09	0.51	0.44

Load Case: W2 MWFRS Wind_ASCE716_1_Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.02	0.02	1.71	1.71
Low Roof	0.20	0.18	0.62	-1.09

Frame Story Shears

Load Case: W3 MWFRS Wind_ASCE716_2_X+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.43	0.43	0.05	0.05
Low Roof	0.36	-0.07	0.37	0.32

Load Case: W4 MWFRS Wind_ASCE716_2_X-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.44	0.44	0.05	0.05
Low Roof	0.37	-0.06	0.40	0.34

Load Case: W5 MWFRS Wind_ASCE716_2_Y+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.02	0.02	1.30	1.30
Low Roof	0.20	0.18	0.60	-0.70

Load Case: W6 MWFRS Wind_ASCE716_2_Y-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.01	0.01	1.26	1.26
Low Roof	0.10	0.09	0.32	-0.94

Load Case: W7 MWFRS Wind_ASCE716_3_X+Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.45	0.45	1.33	1.33
Low Roof	0.52	0.06	0.85	-0.49

Load Case: W8 MWFRS Wind_ASCE716_3_X-Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.42	0.42	-1.23	-1.23
Low Roof	0.22	-0.20	-0.08	1.15

Load Case: W9 MWFRS Wind_ASCE716_4_X+Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.34	0.34	0.98	0.98
Low Roof	0.35	0.01	0.52	-0.47

Load Case: W10 MWFRS Wind_ASCE716_4_X+Y_CCW

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	0.34	0.34	1.02	1.02
Low Roof	0.43	0.08	0.75	-0.26

Load Case: W11 MWFRS Wind_ASCE716_4_X-Y_CW

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	0.31	0.31	-0.94	-0.94
Low Roof	0.12	-0.19	-0.18	0.76

Load Case: W12 MWFRS Wind_ASCE716_4_X-Y_CCW

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	0.32	0.32	-0.91	-0.91
Low Roof	0.20	-0.12	0.06	0.96

Load Case: E1 ELF EQ_ASCE716_X_+E_F

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	1.85	1.85	0.15	0.15
Low Roof	1.05	-0.80	1.12	0.97

Load Case: E2 ELF EQ_ASCE716_X_-E_F

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	1.85	1.85	0.16	0.16
Low Roof	1.07	-0.78	1.16	1.00

Load Case: E3 ELF EQ_ASCE716_Y_+E_F

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	0.03	0.03	1.78	1.78
Low Roof	0.23	0.20	0.70	-1.07

Load Case: E4 ELF EQ_ASCE716_Y_-E_F

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	0.02	0.02	1.76	1.76
Low Roof	0.19	0.16	0.57	-1.18

Frame #1

Load Case: D DeadLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	-0.10	-0.10	0.02	0.02

Load Case: Sp PosSnowLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	-0.14	-0.14	0.02	0.02

Load Case: W1 MWFRS Wind_ASCE716_1_X

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	4.68	4.68	-0.44	-0.44

Load Case: W2 MWFRS Wind_ASCE716_1_Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	-0.18	-0.18	6.89	6.89

Load Case: W3 MWFRS Wind_ASCE716_2_X+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	3.52	3.52	-0.32	-0.32

Load Case: W4 MWFRS Wind_ASCE716_2_X-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	3.51	3.51	-0.34	-0.34

Load Case: W5 MWFRS Wind_ASCE716_2_Y+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	-0.18	-0.18	5.05	5.05

Load Case: W6 MWFRS Wind_ASCE716_2_Y-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	-0.09	-0.09	5.29	5.29

Load Case: W7 MWFRS Wind_ASCE716_3_X+Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	3.38	3.38	4.84	4.84

Load Case: W8 MWFRS Wind_ASCE716_3_X-Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	3.64	3.64	-5.50	-5.50

Load Case: W9 MWFRS Wind_ASCE716_4_X+Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	2.57	2.57	3.73	3.73

Load Case: W10 MWFRS Wind_ASCE716_4_X+Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	2.50	2.50	3.53	3.53

Load Case: W11 MWFRS Wind_ASCE716_4_X-Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	2.77	2.77	-4.02	-4.02

Load Case: W12 MWFRS Wind_ASCE716_4_X-Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	2.70	2.70	-4.23	-4.23

Load Case: E1 ELF EQ_ASCE716_X_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	10.49	10.49	-0.97	-0.97

Load Case: E2 ELF EQ_ASCE716_X_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	10.47	10.47	-1.00	-1.00

Load Case: E3 ELF EQ_ASCE716_Y_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	-0.20	-0.20	20.45	20.45

Load Case: E4 ELF EQ_ASCE716_Y_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	-0.16	-0.16	20.56	20.56

Frame #2

Load Case: D DeadLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.26	0.26	-0.11	-0.11
Low Roof	-0.03	-0.30	-0.01	0.10

Load Case: Sp PosSnowLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	1.14	1.14	-0.70	-0.70
Low Roof	0.14	-1.00	-0.25	0.45

Load Case: W1 MWFRS Wind_ASCE716_1_X

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.01	-0.01	0.02	0.02
Low Roof	0.05	0.07	-0.01	-0.03

Load Case: W2 MWFRS Wind_ASCE716_1_Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.01	-0.01	14.72	14.72
Low Roof	0.00	0.01	20.53	5.80

Load Case: W3 MWFRS Wind_ASCE716_2_X+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.01	-0.01	0.02	0.02
Low Roof	0.04	0.05	0.00	-0.02

Load Case: W4 MWFRS Wind_ASCE716_2_X-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.01	-0.01	0.02	0.02
Low Roof	0.04	0.05	0.00	-0.02

Load Case: W5 MWFRS Wind_ASCE716_2_Y+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.01	-0.01	11.04	11.04
Low Roof	0.00	0.01	15.40	4.35

Load Case: W6 MWFRS Wind_ASCE716_2_Y-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.01	-0.01	11.04	11.04
Low Roof	0.00	0.01	15.40	4.35

Load Case: W7 MWFRS Wind_ASCE716_3_X+Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.02	-0.02	11.06	11.06
Low Roof	0.04	0.06	15.39	4.33

Load Case: W8 MWFRS Wind_ASCE716_3_X-Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.00	0.00	-11.03	-11.03
Low Roof	0.04	0.04	-15.40	-4.37

Load Case: W9 MWFRS Wind_ASCE716_4_X+Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.01	-0.01	8.29	8.29
Low Roof	0.03	0.04	11.54	3.25

Load Case: W10 MWFRS Wind_ASCE716_4_X+Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.01	-0.01	8.29	8.29
Low Roof	0.03	0.04	11.54	3.25

Load Case: W11 MWFRS Wind_ASCE716_4_X-Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.00	0.00	-8.27	-8.27
Low Roof	0.03	0.03	-11.55	-3.28

Frame Story Shears

Load Case: W12 MWFRS Wind_ASCE716_4_X-Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.00	0.00	-8.27	-8.27
Low Roof	0.03	0.03	-11.55	-3.28

Load Case: E1 ELF EQ_ASCE716_X_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.44	0.44	0.03	0.03
Low Roof	0.35	-0.09	-0.02	-0.05

Load Case: E2 ELF EQ_ASCE716_X_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.44	0.44	0.03	0.03
Low Roof	0.35	-0.09	-0.02	-0.05

Load Case: E3 ELF EQ_ASCE716_Y_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.06	-0.06	82.44	82.44
Low Roof	0.00	0.06	101.85	19.41

Load Case: E4 ELF EQ_ASCE716_Y_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.06	-0.06	82.44	82.44
Low Roof	0.00	0.06	101.85	19.41

Frame #3

Load Case: D DeadLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.82	-0.82	0.18	0.18
Low Roof	-2.09	-1.27	0.33	0.14

Load Case: Sp PosSnowLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.29	-0.29	-0.43	-0.43

Low Roof	-1.03	-0.75	-0.03	0.40

Load Case: W1 MWFRS Wind_ASCE716_1_X

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-2.72	-2.72	0.01	0.01
Low Roof	11.12	13.84	-0.26	-0.26

Load Case: W2 MWFRS Wind_ASCE716_1_Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.01	-0.01	14.74	14.74
Low Roof	-0.02	-0.01	17.13	2.39

Load Case: W3 MWFRS Wind_ASCE716_2_X+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-2.04	-2.04	0.00	0.00
Low Roof	8.34	10.38	-0.19	-0.19

Load Case: W4 MWFRS Wind_ASCE716_2_X-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-2.04	-2.04	0.00	0.00
Low Roof	8.34	10.38	-0.19	-0.19

Load Case: W5 MWFRS Wind_ASCE716_2_Y+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.01	-0.01	11.05	11.05
Low Roof	-0.01	-0.01	12.85	1.79

Load Case: W6 MWFRS Wind_ASCE716_2_Y-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.01	-0.01	11.05	11.05
Low Roof	-0.01	-0.01	12.85	1.79

Load Case: W7 MWFRS Wind_ASCE716_3_X+Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-2.05	-2.05	11.06	11.06

Low Roof	8.33	10.37	12.65	1.59

Load Case: W8 MWFRS Wind_ASCE716_3_X-Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-2.03	-2.03	-11.05	-11.05
Low Roof	8.35	10.38	-13.04	-1.99

Load Case: W9 MWFRS Wind_ASCE716_4_X+Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-1.53	-1.53	8.29	8.29
Low Roof	6.24	7.78	9.49	1.20

Load Case: W10 MWFRS Wind_ASCE716_4_X+Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-1.53	-1.53	8.29	8.29
Low Roof	6.24	7.78	9.49	1.20

Load Case: W11 MWFRS Wind_ASCE716_4_X-Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-1.53	-1.53	-8.29	-8.29
Low Roof	6.26	7.79	-9.78	-1.49

Load Case: W12 MWFRS Wind_ASCE716_4_X-Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-1.53	-1.53	-8.29	-8.29
Low Roof	6.26	7.79	-9.78	-1.49

Load Case: E1 ELF EQ_ASCE716_X_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-4.03	-4.03	0.04	0.04
Low Roof	18.61	22.64	-0.44	-0.48

Load Case: E2 ELF EQ_ASCE716_X_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-4.03	-4.03	0.04	0.04

Low Roof	18.61	22.64	-0.44	-0.48

Load Case: E3 ELF EQ_ASCE716_Y_+E_F

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
High Roof	-0.06	-0.06	82.51	82.51
Low Roof	-0.11	-0.05	94.86	12.35

Load Case: E4 ELF EQ_ASCE716_Y_-E_F

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
High Roof	-0.06	-0.06	82.51	82.51
Low Roof	-0.11	-0.05	94.86	12.35

Frame #5

Load Case: D DeadLoad RAMUSER

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
Low Roof	0.00	0.00	0.00	0.00

Load Case: Sp PosSnowLoad RAMUSER

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
Low Roof	0.00	0.00	0.00	0.00

Load Case: W1 MWFRS Wind_ASCE716_1_X

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
Low Roof	1.10	1.10	0.00	0.00

Load Case: W2 MWFRS Wind_ASCE716_1_Y

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
Low Roof	0.00	0.00	0.00	0.00

Load Case: W3 MWFRS Wind_ASCE716_2_X+E

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
Low Roof	0.83	0.83	0.00	0.00

Load Case: W4 MWFRS Wind_ASCE716_2_X-E

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**

	kips	**kips**	**kips**	**kips**
Low Roof	0.83	0.83	0.00	0.00

Load Case: W5 MWFRS Wind_ASCE716_2_Y+E

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
Low Roof	0.00	0.00	0.00	0.00

Load Case: W6 MWFRS Wind_ASCE716_2_Y-E

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
Low Roof	0.00	0.00	0.00	0.00

Load Case: W7 MWFRS Wind_ASCE716_3_X+Y

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
Low Roof	0.83	0.83	0.00	0.00

Load Case: W8 MWFRS Wind_ASCE716_3_X-Y

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
Low Roof	0.83	0.83	0.00	0.00

Load Case: W9 MWFRS Wind_ASCE716_4_X+Y_CW

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
Low Roof	0.62	0.62	0.00	0.00

Load Case: W10 MWFRS Wind_ASCE716_4_X+Y_CCW

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
Low Roof	0.62	0.62	0.00	0.00

Load Case: W11 MWFRS Wind_ASCE716_4_X-Y_CW

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
Low Roof	0.62	0.62	0.00	0.00

Load Case: W12 MWFRS Wind_ASCE716_4_X-Y_CCW

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
Low Roof	0.62	0.62	0.00	0.00

Load Case: E1 ELF EQ_ASCE716_X_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	2.33	2.33	0.00	0.00

Load Case: E2 ELF EQ_ASCE716_X_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	2.33	2.33	0.00	0.00

Load Case: E3 ELF EQ_ASCE716_Y_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	0.00	0.00

Load Case: E4 ELF EQ_ASCE716_Y_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	0.00	0.00

Frame #6

Load Case: D DeadLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.32	-0.32	-0.88	-0.88
Low Roof	-0.13	0.19	-0.33	0.55

Load Case: Sp PosSnowLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-1.02	-1.02	-2.19	-2.19
Low Roof	-0.39	0.63	-0.44	1.74

Load Case: W1 MWFRS Wind_ASCE716_1_X

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	4.75	4.75	0.01	0.01
Low Roof	12.51	7.76	0.78	0.77

Load Case: W2 MWFRS Wind_ASCE716_1_Y

Level	Shear-X	Change-X	Shear-Y	Change-Y

	kips	**kips**	**kips**	**kips**
High Roof	0.03	0.03	0.05	0.05
Low Roof	0.03	0.01	0.10	0.05

Load Case: W3 MWFRS Wind_ASCE716_2_X+E

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
High Roof	3.56	3.56	0.01	0.01
Low Roof	9.38	5.82	0.59	0.58

Load Case: W4 MWFRS Wind_ASCE716_2_X-E

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
High Roof	3.56	3.56	0.01	0.01
Low Roof	9.38	5.82	0.59	0.58

Load Case: W5 MWFRS Wind_ASCE716_2_Y+E

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
High Roof	0.02	0.02	0.04	0.04
Low Roof	0.02	0.01	0.08	0.04

Load Case: W6 MWFRS Wind_ASCE716_2_Y-E

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
High Roof	0.02	0.02	0.04	0.04
Low Roof	0.02	0.01	0.08	0.04

Load Case: W7 MWFRS Wind_ASCE716_3_X+Y

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
High Roof	3.58	3.58	0.05	0.05
Low Roof	9.41	5.83	0.66	0.62

Load Case: W8 MWFRS Wind_ASCE716_3_X-Y

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
High Roof	3.54	3.54	-0.03	-0.03
Low Roof	9.36	5.82	0.51	0.54

Load Case: W9 MWFRS Wind_ASCE716_4_X+Y_CW

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**

	kips	**kips**	**kips**	**kips**
High Roof	2.69	2.69	0.04	0.04
Low Roof	7.06	4.37	0.50	0.46

Load Case: W10 MWFRS Wind_ASCE716_4_X+Y_CCW

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
High Roof	2.69	2.69	0.04	0.04
Low Roof	7.06	4.37	0.50	0.46

Load Case: W11 MWFRS Wind_ASCE716_4_X-Y_CW

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
High Roof	2.66	2.66	-0.02	-0.02
Low Roof	7.02	4.36	0.38	0.40

Load Case: W12 MWFRS Wind_ASCE716_4_X-Y_CCW

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
High Roof	2.66	2.66	-0.02	-0.02
Low Roof	7.02	4.36	0.38	0.40

Load Case: E1 ELF EQ_ASCE716_X_+E_F

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
High Roof	85.03	85.03	-0.03	-0.03
Low Roof	101.84	16.81	1.31	1.34

Load Case: E2 ELF EQ_ASCE716_X_-E_F

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
High Roof	85.03	85.03	-0.03	-0.03
Low Roof	101.84	16.81	1.31	1.34

Load Case: E3 ELF EQ_ASCE716_Y_+E_F

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**
	kips	**kips**	**kips**	**kips**
High Roof	0.18	0.18	0.28	0.28
Low Roof	0.27	0.09	0.56	0.28

Load Case: E4 ELF EQ_ASCE716_Y_-E_F

Level	**Shear-X**	**Change-X**	**Shear-Y**	**Change-Y**

	kips	kips	kips	kips
High Roof	0.18	0.18	0.28	0.28
Low Roof	0.27	0.09	0.56	0.28

Frame #7

Load Case: D DeadLoad RAMUSER

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
Low Roof	0.00	0.00	0.00	0.00

Load Case: Sp PosSnowLoad RAMUSER

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
Low Roof	0.00	0.00	0.00	0.00

Load Case: W1 MWFRS Wind_ASCE716_1_X

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
Low Roof	9.18	9.18	0.00	0.00

Load Case: W2 MWFRS Wind_ASCE716_1_Y

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
Low Roof	0.00	0.00	0.00	0.00

Load Case: W3 MWFRS Wind_ASCE716_2_X+E

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
Low Roof	6.88	6.88	0.00	0.00

Load Case: W4 MWFRS Wind_ASCE716_2_X-E

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
Low Roof	6.88	6.88	0.00	0.00

Load Case: W5 MWFRS Wind_ASCE716_2_Y+E

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
Low Roof	0.00	0.00	0.00	0.00

Load Case: W6 MWFRS Wind_ASCE716_2_Y-E

Level	Shear-X	Change-X	Shear-Y	Change-Y

	kips	kips	kips	kips
Low Roof	0.00	0.00	0.00	0.00

Load Case: W7 MWFRS Wind_ASCE716_3_X+Y

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
Low Roof	6.88	6.88	0.00	0.00

Load Case: W8 MWFRS Wind_ASCE716_3_X-Y

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
Low Roof	6.88	6.88	0.00	0.00

Load Case: W9 MWFRS Wind_ASCE716_4_X+Y_CW

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
Low Roof	5.16	5.16	0.00	0.00

Load Case: W10 MWFRS Wind_ASCE716_4_X+Y_CCW

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
Low Roof	5.16	5.16	0.00	0.00

Load Case: W11 MWFRS Wind_ASCE716_4_X-Y_CW

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
Low Roof	5.16	5.16	0.00	0.00

Load Case: W12 MWFRS Wind_ASCE716_4_X-Y_CCW

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
Low Roof	5.16	5.16	0.00	0.00

Load Case: E1 ELF EQ_ASCE716_X_+E_F

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
Low Roof	19.38	19.38	0.00	0.00

Load Case: E2 ELF EQ_ASCE716_X_-E_F

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
Low Roof	19.38	19.38	0.00	0.00

Load Case: E3 ELF EQ_ASCE716_Y_+E_F

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
Low Roof	0.00	0.00	0.00	0.00

Load Case: E4 ELF EQ_ASCE716_Y_-E_F

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
Low Roof	0.00	0.00	0.00	0.00

Frame #8

Load Case: D DeadLoad RAMUSER

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	0.87	0.87	0.81	0.81
Low Roof	0.47	-0.40	0.02	-0.79

Load Case: Sp PosSnowLoad RAMUSER

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	0.17	0.17	3.32	3.32
Low Roof	0.03	-0.14	0.72	-2.60

Load Case: W1 MWFRS Wind_ASCE716_1_X

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	4.18	4.18	-0.04	-0.04
Low Roof	3.91	-0.26	-0.50	-0.47

Load Case: W2 MWFRS Wind_ASCE716_1_Y

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	-0.01	-0.01	0.06	0.06
Low Roof	-0.01	-0.01	0.06	-0.01

Load Case: W3 MWFRS Wind_ASCE716_2_X+E

Level	Shear-X	Change-X	Shear-Y	Change-Y
	kips	kips	kips	kips
High Roof	3.13	3.13	-0.03	-0.03
Low Roof	2.94	-0.20	-0.38	-0.35

Load Case: W4 MWFRS Wind_ASCE716_2_X-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	3.13	3.13	-0.03	-0.03
Low Roof	2.94	-0.20	-0.38	-0.35

Load Case: W5 MWFRS Wind_ASCE716_2_Y+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.00	0.00	0.05	0.05
Low Roof	-0.01	-0.01	0.04	-0.01

Load Case: W6 MWFRS Wind_ASCE716_2_Y-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	0.00	0.00	0.05	0.05
Low Roof	-0.01	-0.01	0.04	-0.01

Load Case: W7 MWFRS Wind_ASCE716_3_X+Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	3.13	3.13	0.02	0.02
Low Roof	2.92	-0.20	-0.34	-0.36

Load Case: W8 MWFRS Wind_ASCE716_3_X-Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	3.14	3.14	-0.08	-0.08
Low Roof	2.95	-0.19	-0.42	-0.34

Load Case: W9 MWFRS Wind_ASCE716_4_X+Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	2.35	2.35	0.01	0.01
Low Roof	2.19	-0.15	-0.25	-0.27

Load Case: W10 MWFRS Wind_ASCE716_4_X+Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	2.35	2.35	0.01	0.01
Low Roof	2.19	-0.15	-0.25	-0.27

Load Case: W11 MWFRS Wind_ASCE716_4_X-Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	2.35	2.35	-0.06	-0.06
Low Roof	2.21	-0.14	-0.32	-0.26

Load Case: W12 MWFRS Wind_ASCE716_4_X-Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	2.35	2.35	-0.06	-0.06
Low Roof	2.21	-0.14	-0.32	-0.26

Load Case: E1 ELF EQ_ASCE716_X_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	84.14	84.14	-0.05	-0.05
Low Roof	83.93	-0.20	-0.84	-0.79

Load Case: E2 ELF EQ_ASCE716_X_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	84.14	84.14	-0.05	-0.05
Low Roof	83.93	-0.20	-0.84	-0.79

Load Case: E3 ELF EQ_ASCE716_Y_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.06	-0.06	0.35	0.35
Low Roof	-0.14	-0.08	0.31	-0.04

Load Case: E4 ELF EQ_ASCE716_Y_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
High Roof	-0.06	-0.06	0.35	0.35
Low Roof	-0.14	-0.08	0.31	-0.04

Frame #15

Load Case: D DeadLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	1.78	1.78	0.00	0.00

Load Case: Sp PosSnowLoad RAMUSER

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	1.25	1.25	0.01	0.01

Load Case: W1 MWFRS Wind_ASCE716_1_X

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.80	0.80	-0.01	-0.01

Load Case: W2 MWFRS Wind_ASCE716_1_Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	2.22	2.22

Load Case: W3 MWFRS Wind_ASCE716_2_X+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.60	0.60	-0.01	-0.01

Load Case: W4 MWFRS Wind_ASCE716_2_X-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.60	0.60	-0.01	-0.01

Load Case: W5 MWFRS Wind_ASCE716_2_Y+E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	1.67	1.67

Load Case: W6 MWFRS Wind_ASCE716_2_Y-E

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.00	0.00	1.67	1.67

Load Case: W7 MWFRS Wind_ASCE716_3_X+Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.60	0.60	1.66	1.66

Load Case: W8 MWFRS Wind_ASCE716_3_X-Y

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips

Low Roof	0.60	0.60	-1.67	-1.67

Load Case: W9 MWFRS Wind_ASCE716_4_X+Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.45	0.45	1.24	1.24

Load Case: W10 MWFRS Wind_ASCE716_4_X+Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.45	0.45	1.24	1.24

Load Case: W11 MWFRS Wind_ASCE716_4_X-Y_CW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.45	0.45	-1.26	-1.26

Load Case: W12 MWFRS Wind_ASCE716_4_X-Y_CCW

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	0.45	0.45	-1.26	-1.26

Load Case: E1 ELF EQ_ASCE716_X_+E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	1.33	1.33	-0.02	-0.02

Load Case: E2 ELF EQ_ASCE716_X_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	1.33	1.33	-0.02	-0.02

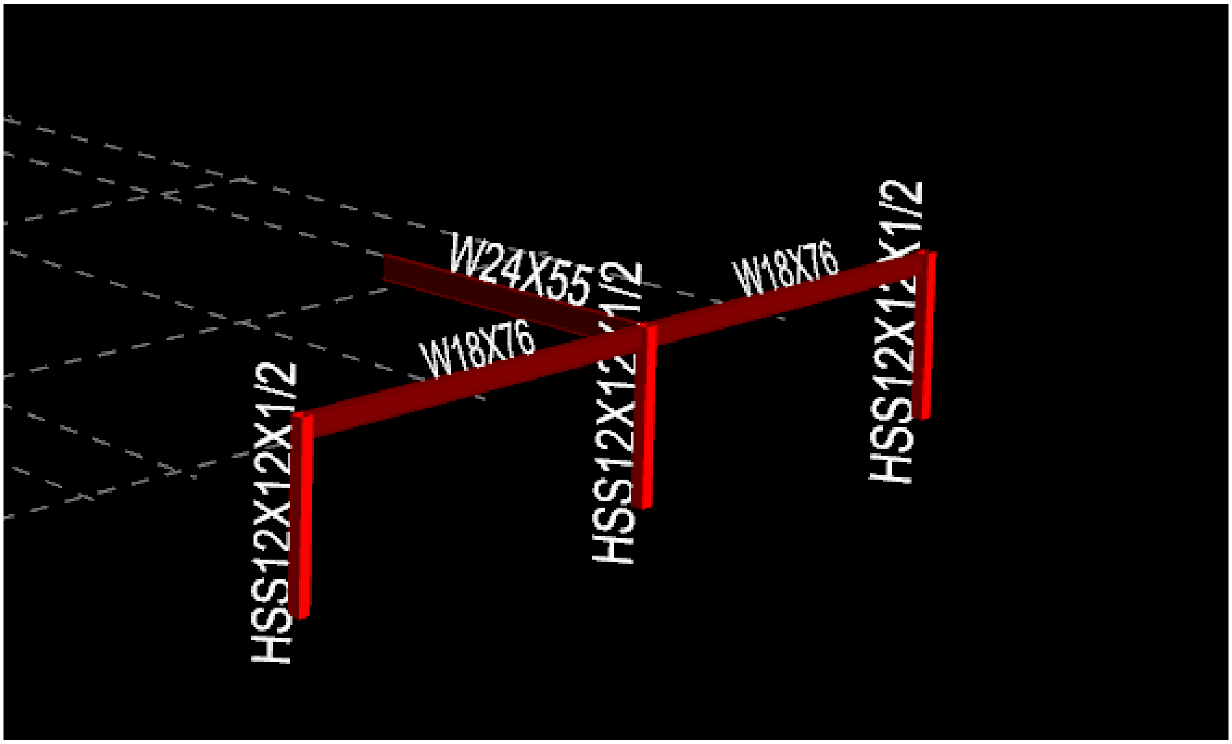
Load Case: E3 ELF EQ_ASCE716_Y_+E_F

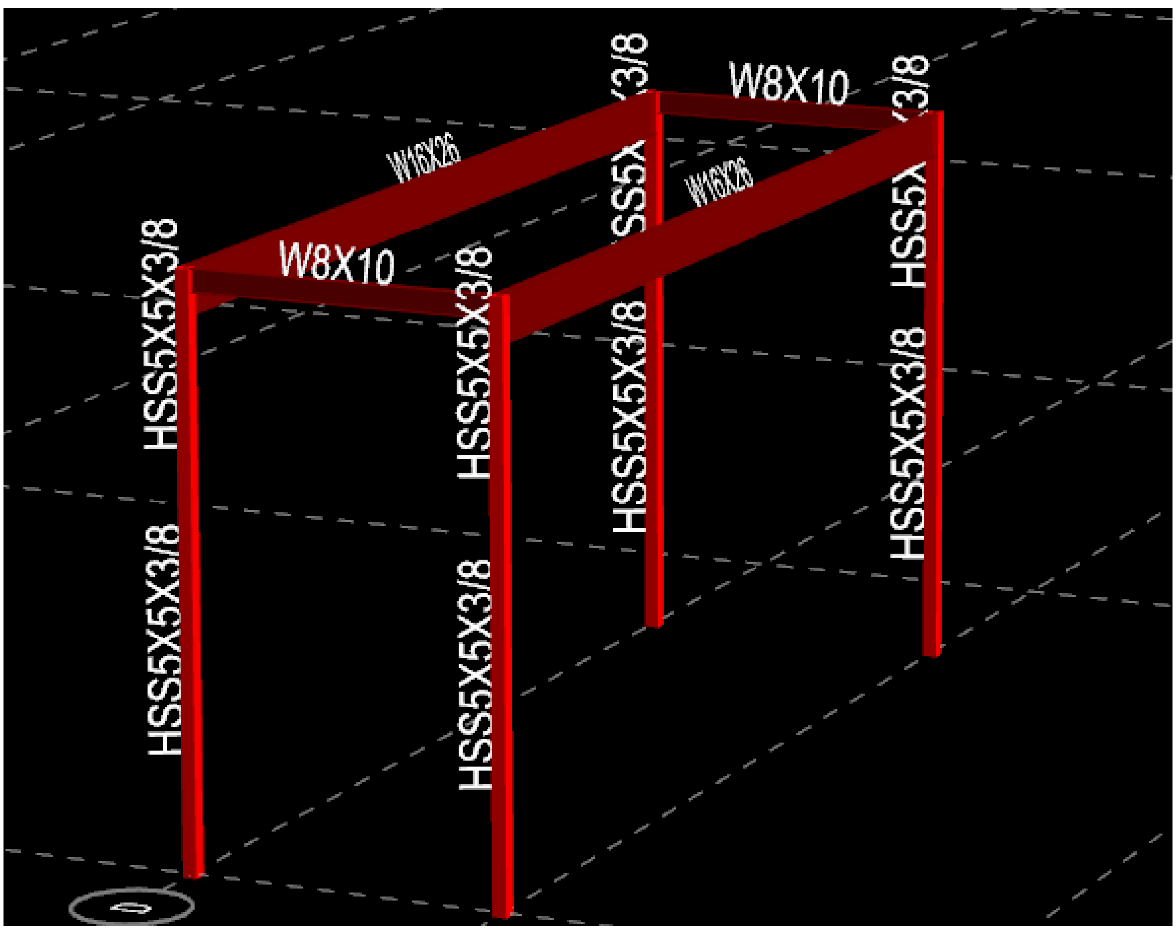
Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	-0.01	-0.01	18.62	18.62

Load Case: E4 ELF EQ_ASCE716_Y_-E_F

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
Low Roof	-0.01	-0.01	18.62	18.62

CANOPY AND POP UP MOMENT FRAME
MEMBER SIZES





Steel Code Check Criteria

MEMBER CODE CHECK CRITERIA - GLOBAL:

B1 and B2 Criteria

Apply B1 Factor
B2 Factor Not Applied

K-Factor:	Columns	Beams	Braces
Kx:	1.000	1.000	1.000
Ky:	1.000	1.000	1.000

Compression Flange Bracing:

Columns:

Deck Does Not Brace Column
Knee Brace Does Not Brace Column
Max Angle for which Beam Braces Column: 45.00 deg

Beams / Horiz Braces:

Top Flange Continuously Braced
Bottom Flange Not Continuously Braced
Do Not Consider Point of Inflection as Brace Point

Column Design Moments:

Percent of Gravity Load Moments to include in design of steel columns:

Dead Load: 100.00 %
Live Load: 100.00 %
Roof Load: 100.00 %

Axial Slenderness Limits

Check KL/r exceeds 200 for Compression Members
Check L/r exceeds 300 for Tension Members (excludes rods)

MEMBER CODE CHECK CRITERIA - ASSIGNED

Frame #0:

Level: High Roof

Steel Column:

#	K-Factor		Flange Bracing		Unbraced Length		
	Kx	Ky	Major	Minor	Lx	Ly	Lby
62	1.00	1.00	Global	Global	Global	Global	Global
63	1.00	1.00	Global	Global	Global	Global	Global
66	1.00	1.00	Global	Global	Global	Global	Global
67	1.00	1.00	Global	Global	Global	Global	Global

Steel Beam:

#	K-Factor		Flange Bracing		Unbraced Length			RBS
	Kx	Ky	Major	Minor	Lx	Ly	Lby	
559	1.00	1.00	Global	Global	Global	Global	Global	N
560	1.00	1.00	Global	Global	Global	Global	Global	N
561	1.00	1.00	Global	Global	Global	Global	Global	N
562	1.00	1.00	Global	Global	Global	Global	Global	N

Level: Low Roof

Steel Column:

#	K-Factor		Flange Bracing		Unbraced Length		
	Kx	Ky	Major	Minor	Lx	Ly	Lby
31	1.00	1.00	Global	Global	Global	Global	Global
56	1.00	1.00	Global	Global	Global	Global	Global
71	1.00	1.00	Global	Global	Global	Global	Global
73	1.00	1.00	Global	Global	Global	Global	Global

Steel Beam:

#	K-Factor		Flange Bracing		Unbraced Length			RBS
	Kx	Ky	Major	Minor	Lx	Ly	Lby	
383	1.00	1.00	Global	Global	Global	Global	Global	N

Frame #15:

Level: Low Roof

Steel Column:

#	K-Factor		Flange Bracing		Unbraced Length		
	Kx	Ky	Major	Minor	Lx	Ly	Lby
68	1.00	1.00	Global	Global	Global	Global	Global
69	1.00	1.00	Global	Global	Global	Global	Global
70	1.00	1.00	Global	Global	Global	Global	Global

Steel Beam:

#	K-Factor		Flange Bracing		Unbraced Length			RBS
	Kx	Ky	Major	Minor	Lx	Ly	Lby	
217	1.00	1.00	Global	Global	Global	Global	Global	N
366	1.00	1.00	Global	Global	Global	Global	Global	N

JOINT CODE CHECK CRITERIA

Material Properties

Web plate Fy (ksi):	50.00
Stiffener plate Fy (ksi):	50.00

Geometry

Maximum angle between a beam and column to assume the beam frames into column flange:	45.0
One diagonal stiffener designed if the difference in beam depths at a joint is less than (in):	4.00

Design Force

Use actual beam forces

Consider axial load in beam

Optimization

Stiffeners

Optimize each stiffener at joint

Minimum Thickness:	Per Code
Minimum Width:	Half Column Width
Thickness Increment (in):	0.125
Width Increment (in):	0.125
Clip (cope) dimension (in):	0.750

Web Plates

Maximum Thickness:	Unlimited
Minimum Thickness (in):	0.375
Thickness Increment (in):	0.125

Fillet weld plate to column flange.

Plug weld plate to web.

Steel Code Check Criteria

MEMBER CODE CHECK CRITERIA - GLOBAL:

B1 and B2 Criteria

Apply B1 Factor

B2 Factor Not Applied

K-Factor:	Columns	Beams	Braces
Kx:	1.000	1.000	1.000
Ky:	1.000	1.000	1.000

Compression Flange Bracing:

Columns:

Deck Does Not Brace Column

Knee Brace Does Not Brace Column

Max Angle for which Beam Braces Column: 45.00 deg

Beams / Horiz Braces:

Top Flange Continuously Braced

Bottom Flange Not Continuously Braced

Do Not Consider Point of Inflection as Brace Point

Column Design Moments:

Percent of Gravity Load Moments to include in design of steel columns:

Dead Load:	100.00 %
Live Load:	100.00 %
Roof Load:	100.00 %

Axial Slenderness Limits

Check KL/r exceeds 200 for Compression Members

Check L/r exceeds 300 for Tension Members (excludes rods)

MEMBER CODE CHECK CRITERIA - ASSIGNED

Frame #0:

Steel Code Check Criteria

Level: High Roof

Steel Column:

#	K-Factor		Flange Bracing		Unbraced Length		
	Kx	Ky	Major	Minor	Lx	Ly	Lby
62	1.00	1.00	Global	Global	Global	Global	Global
63	1.00	1.00	Global	Global	Global	Global	Global
66	1.00	1.00	Global	Global	Global	Global	Global
67	1.00	1.00	Global	Global	Global	Global	Global

Steel Beam:

#	K-Factor		Flange Bracing		Unbraced Length			RBS
	Kx	Ky	Major	Minor	Lx	Ly	Lby	
559	1.00	1.00	Global	Global	Global	Global	Global	N
560	1.00	1.00	Global	Global	Global	Global	Global	N
561	1.00	1.00	Global	Global	Global	Global	Global	N
562	1.00	1.00	Global	Global	Global	Global	Global	N

Level: Low Roof

Steel Column:

#	K-Factor		Flange Bracing		Unbraced Length		
	Kx	Ky	Major	Minor	Lx	Ly	Lby
31	1.00	1.00	Global	Global	Global	Global	Global
56	1.00	1.00	Global	Global	Global	Global	Global
71	1.00	1.00	Global	Global	Global	Global	Global
73	1.00	1.00	Global	Global	Global	Global	Global

Frame #15:

Level: Low Roof

Steel Column:

#	K-Factor		Flange Bracing		Unbraced Length		
	Kx	Ky	Major	Minor	Lx	Ly	Lby

45	1.00	1.00	Global	Global	Global	Global	Global
68	1.00	1.00	Global	Global	Global	Global	Global
69	1.00	1.00	Global	Global	Global	Global	Global
70	1.00	1.00	Global	Global	Global	Global	Global

Steel Beam:

#	K-Factor		Flange Bracing		Unbraced Length			RBS
	Kx	Ky	Major	Minor	Lx	Ly	Lby	
217	1.00	1.00	Global	Global	Global	Global	Global	N
366	1.00	1.00	Global	Global	Global	Global	Global	N
368	1.00	1.00	Global	Global	Global	Global	Global	N

Frame #16:

Level: Low Roof

Steel Beam:

#	K-Factor		Flange Bracing		Unbraced Length			RBS
	Kx	Ky	Major	Minor	Lx	Ly	Lby	
295	1.00	1.00	Global	Global	Global	Global	Global	N
365	1.00	1.00	Global	Global	Global	Global	Global	N
367	1.00	1.00	Global	Global	Global	Global	Global	N
369	1.00	1.00	Global	Global	Global	Global	Global	N

JOINT CODE CHECK CRITERIA

Material Properties

Web plate Fy (ksi):	50.00
Stiffener plate Fy (ksi):	50.00

Geometry

Maximum angle between a beam and column to assume the beam frames into column flange:	45.0

Steel Code Check Criteria

One diagonal stiffener designed if the difference in beam depths at a joint is less than (in):	4.00

Design Force

Use actual beam forces

Consider axial load in beam

Optimization

Stiffeners

Optimize each stiffener at joint

Minimum Thickness:	Per Code
Minimum Width:	Half Column Width
Thickness Increment (in):	0.125
Width Increment (in):	0.125
Clip (cope) dimension (in):	0.750

Web Plates

Maximum Thickness:	Unlimited
Minimum Thickness (in):	0.375
Thickness Increment (in):	0.125

Fillet weld plate to column flange.

Plug weld plate to web.

Seismic Provisions Member Code Check

Column Parameters

Story: High Roof   Frame No: 0   Member No: 62

Fy (ksi): 50.00   Size: HSS5X5X3/8

Frame Type: Ordinary Moment Resisting Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 5.55 --- Combination: 1.375 D + 0.700 Sp + 1.000 E3

Max Pu/φPn = 0.05 OK

Tension: Max Pu (kip) = 1.14 --- Combination: 0.725 D - 2.000 E3

Max Pu/φPn = 0.00 OK

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:
Required tension and compression strength from D1.4a.
Shear in major axis (kip)= 0.27 --- Combination: 1.375 D + 0.700 Sp + 1.000 E1
Shear in minor axis (kip)= 0.70 --- Combination: 1.375 D + 0.200 Sp + 2.000 E3
Moment in major axis (kip-ft)= 4.46 --- Combination: 1.375 D + 0.700 Sp + 1.000 E1
Moment in minor axis (kip-ft)= 11.77 --- Combination: 1.375 D + 0.200 Sp + 2.000 E3
Required shear for column splice is max result from D2.5b and D2.5c
Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	**Minor**
Mpc (kip-ft)	44.17	44.17

Column Splice Shear Force Required Mpc / H
Where Mpc is the lesser nominal plastic flexural strength of the column sections.
See code for more information on the Required Shear Strength

Seismic Provisions Member Code Check

Column Parameters

Story: High Roof   Frame No: 0   Member No: 63

Fy (ksi): 50.00   Size: HSS5X5X3/8

Frame Type: Ordinary Moment Resisting Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 5.55 --- Combination: 1.375 D + 0.700 Sp - 1.000 E3

Max Pu/φPn = 0.05 OK

Tension: Max Pu (kip) = 0.89 --- Combination: 0.725 D + 2.000 E3

Max Pu/φPn = 0.00 OK

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:
Required tension and compression strength from D1.4a.
Shear in major axis (kip)= 0.39 --- Combination: 1.375 D + 0.200 Sp + 2.000 E3
Shear in minor axis (kip)= 0.71 --- Combination: 1.375 D + 0.200 Sp - 2.000 E3
Moment in major axis (kip-ft)= 6.37 --- Combination: 1.375 D + 0.200 Sp + 2.000 E3
Moment in minor axis (kip-ft)= 11.94 --- Combination: 1.375 D + 0.200 Sp - 2.000 E3
Required shear for column splice is max result from D2.5b and D2.5c
Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	Minor
Mpc (kip-ft)	44.17	44.17

Column Splice Shear Force Required Mpc / H

Where Mpc is the lesser nominal plastic flexural strength of the column sections.

See code for more information on the Required Shear Strength

Column Parameters

Story: High Roof   Frame No: 0   Member No: 66
Fy (ksi): 50.00   Size: HSS5X5X3/8
Frame Type: Ordinary Moment Resisting Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 4.64 --- Combination: 1.375 D + 0.700 Sp + 1.000 E4

Max Pu/φPn = 0.02 OK

Tension: No tension on column

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:
Required tension and compression strength from D1.4a.
Shear in major axis (kip)= 3.22 --- Combination: 1.375 D + 0.200 Sp - 2.000 E1
Shear in minor axis (kip)= 2.40 --- Combination: 1.375 D + 0.200 Sp + 2.000 E4
Moment in major axis (kip-ft)= 8.75 --- Combination: 1.375 D + 0.200 Sp - 2.000 E1
Moment in minor axis (kip-ft)= 6.21 --- Combination: 1.375 D + 0.200 Sp - 2.000 E4
Required shear for column splice is max result from D2.5b and D2.5c
Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	Minor
Mpc (kip-ft)	44.17	44.17

Column Splice Shear Force Required Mpc / H
Where Mpc is the lesser nominal plastic flexural strength of the column sections.
See code for more information on the Required Shear Strength

Column Parameters

Story: High Roof   Frame No: 0   Member No: 67

Fy (ksi): 50.00   Size: HSS5X5X3/8

Frame Type: Ordinary Moment Resisting Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 4.62 --- Combination: 1.375 D + 0.700 Sp - 1.000 E3

Max Pu/φPn = 0.02 OK

Tension: No tension on column

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:
Required tension and compression strength from D1.4a.
Shear in major axis (kip)= 0.35 --- Combination: 1.375 D + 0.200 Sp - 2.000 E3
Shear in minor axis (kip)= 0.05 --- Combination: 1.375 D + 0.200 Sp - 2.000 E4
Moment in major axis (kip-ft)= 5.75 --- Combination: 1.375 D + 0.200 Sp - 2.000 E3
Moment in minor axis (kip-ft)= 0.89 --- Combination: 1.375 D + 0.200 Sp - 2.000 E4
Required shear for column splice is max result from D2.5b and D2.5c
Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	**Minor**
Mpc (kip-ft)	44.17	44.17

Column Splice Shear Force Required Mpc / H
Where Mpc is the lesser nominal plastic flexural strength of the column sections.
See code for more information on the Required Shear Strength

Beam Parameters

Story: High Roof   Frame No: 0   Member No: 559

Fy (ksi): 50.00   Size: W16X26

Frame Type: Ordinary Moment Resisting Frame

E1.6b Beam-to-Column - FR Moment Connections

FR Moment Connections shall be designed for required flexure strength of (kip-ft) = 222.84

Beam Parameters

Story: High Roof | Frame No: 0 | Member No: 560

Fy (ksi): 50.00 | Size: W8X10

Frame Type: Ordinary Moment Resisting Frame

E1.6b Beam-to-Column - FR Moment Connections

FR Moment Connections shall be designed for required flexure strength of (kip-ft) = 44.72

Beam Parameters

Story: High Roof   Frame No: 0   Member No: 561

Fy (ksi): 50.00   Size: W16X26

Frame Type: Ordinary Moment Resisting Frame

E1.6b Beam-to-Column - FR Moment Connections

FR Moment Connections shall be designed for required flexure strength of (kip-ft) = 222.84

Seismic Provisions Member Code Check

Beam Parameters

Story: High Roof　Frame No: 0　Member No: 562

Fy (ksi): 50.00　Size: W8X10

Frame Type: Ordinary Moment Resisting Frame

E1.6b Beam-to-Column - FR Moment Connections

FR Moment Connections shall be designed for required flexure strength of (kip-ft) = 44.72

Column Parameters

Story: Low Roof   Frame No: 0   Member No: 31
Fy (ksi): 50.00   Size: HSS5X5X3/8
Frame Type: Ordinary Moment Resisting Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 10.20 --- Combination: 1.375 D + 0.700 Sp - 1.000 E3

Max Pu/φPn = 0.06 OK

Tension: No tension on column

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:
Required tension and compression strength from D1.4a.
Shear in major axis (kip)= 0.35 --- Combination: 1.375 D + 0.200 Sp - 2.000 E3
Shear in minor axis (kip)= 0.05 --- Combination: 1.375 D + 0.200 Sp - 2.000 E4
Moment in major axis (kip-ft)= 4.68 --- Combination: 1.375 D + 0.200 Sp - 2.000 E3
Moment in minor axis (kip-ft)= 0.71 --- Combination: 1.375 D + 0.200 Sp - 2.000 E4
Required shear for column splice is max result from D2.5b and D2.5c
Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	**Minor**
Mpc (kip-ft)	44.17	44.17

Column Splice Shear Force Required Mpc / H
Where Mpc is the lesser nominal plastic flexural strength of the column sections.
See code for more information on the Required Shear Strength

Column Parameters

Story: Low Roof   Frame No: 0   Member No: 56

Fy (ksi): 50.00   Size: HSS5X5X3/8

Frame Type: Ordinary Moment Resisting Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 7.82 --- Combination: 1.375 D + 0.200 Sp - 2.000 E4

Max Pu/φPn = 0.05 OK

Tension: Max Pu (kip) = 6.46 --- Combination: 0.725 D + 2.000 E4

Max Pu/φPn = 0.02 OK

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:
Required tension and compression strength from D1.4a.
Shear in major axis (kip)= 0.25 --- Combination: 1.375 D + 0.200 Sp + 2.000 E1
No shear in minor axis
Moment in major axis (kip-ft)= 1.65 --- Combination: 1.375 D + 0.200 Sp + 2.000 E1
Moment in minor axis (kip-ft)= 0.06 --- Combination: 1.375 D + 0.200 Sp - 2.000 E4
Required shear for column splice is max result from D2.5b and D2.5c
Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	Minor
Mpc (kip-ft)	44.17	44.17

Column Splice Shear Force Required Mpc / H
Where Mpc is the lesser nominal plastic flexural strength of the column sections.
See code for more information on the Required Shear Strength

Column Parameters

Story: Low Roof Frame No: 0 Member No: 71

Fy (ksi): 50.00 Size: HSS5X5X3/8

Frame Type: Ordinary Moment Resisting Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 12.15 --- Combination: 1.375 D + 0.700 Sp + 1.000 E3

Max Pu/φPn = 0.10 OK

Tension: No tension on column

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:

Required tension and compression strength from D1.4a.

Shear in major axis (kip)= 0.27 --- Combination: 1.375 D + 0.700 Sp + 1.000 E1

Shear in minor axis (kip)= 0.70 --- Combination: 1.375 D + 0.200 Sp + 2.000 E3

Moment in major axis (kip-ft)= 3.63 --- Combination: 1.375 D + 0.700 Sp + 1.000 E1

Moment in minor axis (kip-ft)= 9.39 --- Combination: 1.375 D + 0.200 Sp + 2.000 E3

Required shear for column splice is max result from D2.5b and D2.5c

Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	Minor
Mpc (kip-ft)	44.17	44.17

Column Splice Shear Force Required Mpc / H

Where Mpc is the lesser nominal plastic flexural strength of the column sections.

See code for more information on the Required Shear Strength

Seismic Provisions Member Code Check

Column Parameters

Story: Low Roof   Frame No: 0   Member No: 73

Fy (ksi): 50.00   Size: HSS5X5X3/8

Frame Type: Ordinary Moment Resisting Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 11.41 --- Combination: 1.375 D + 0.700 Sp - 1.000 E3

Max Pu/φPn = 0.10 OK

Tension: No tension on column

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:

Required tension and compression strength from D1.4a.

Shear in major axis (kip)= 0.39 --- Combination: 1.375 D + 0.200 Sp + 2.000 E3

Shear in minor axis (kip)= 0.71 --- Combination: 1.375 D + 0.200 Sp - 2.000 E3

Moment in major axis (kip-ft)= 5.18 --- Combination: 1.375 D + 0.200 Sp + 2.000 E3

Moment in minor axis (kip-ft)= 9.53 --- Combination: 1.375 D + 0.200 Sp - 2.000 E3

Required shear for column splice is max result from D2.5b and D2.5c

Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	**Minor**
Mpc (kip-ft)	44.17	44.17

Column Splice Shear Force Required Mpc / H

Where Mpc is the lesser nominal plastic flexural strength of the column sections.

See code for more information on the Required Shear Strength

Beam Parameters

Story: Low Roof　　Frame No: 0　　Member No: 383

Fy (ksi): 50.00　　Size: W24X55

Frame Type: No Frame Type

Warning: This frame type is not a valid designation in the current building code.

Seismic Provisions Member Code Check

Column Parameters

Story: Low Roof   Frame No: 15   Member No: 68

Fy (ksi): 50.00   Size: HSS12X12X1/2

Frame Type: Ordinary Moment Resisting Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 50.44 --- Combination: 1.375 D + 0.700 Sp - 1.000 E4

Max Pu/φPn = 0.06 OK

Tension: No tension on column

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:
Required tension and compression strength from D1.4a.
No shear in major axis
Shear in minor axis (kip)= 12.37 --- Combination: 1.375 D + 0.200 Sp - 2.000 E3
No moment in major axis
Moment in minor axis (kip-ft)= 155.54 --- Combination: 1.375 D + 0.200 Sp - 2.000 E3
Required shear for column splice is max result from D2.5b and D2.5c
Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	**Minor**
Mpc (kip-ft)	373.33	373.33

Column Splice Shear Force Required Mpc / H

Where Mpc is the lesser nominal plastic flexural strength of the column sections.

See code for more information on the Required Shear Strength

Column Parameters

Story: Low Roof   Frame No: 15   Member No: 69

Fy (ksi): 50.00   Size: HSS12X12X1/2

Frame Type: Ordinary Moment Resisting Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 36.21 --- Combination: 1.375 D + 0.700 Sp + 1.000 E4

Max Pu/φPn = 0.04 OK

Tension: No tension on column

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:
Required tension and compression strength from D1.4a.
No shear in major axis
Shear in minor axis (kip)= 11.38 --- Combination: 1.375 D + 0.200 Sp + 2.000 E3
No moment in major axis
Moment in minor axis (kip-ft)= 143.04 --- Combination: 1.375 D + 0.200 Sp + 2.000 E3
Required shear for column splice is max result from D2.5b and D2.5c
Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	**Minor**
Mpc (kip-ft)	373.33	373.33

Column Splice Shear Force Required Mpc / H

Where Mpc is the lesser nominal plastic flexural strength of the column sections.

See code for more information on the Required Shear Strength

Column Parameters

Story: Low Roof   Frame No: 15   Member No: 70

Fy (ksi): 50.00   Size: HSS12X12X1/2

Frame Type: Ordinary Moment Resisting Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 14.47 --- Combination: 1.375 D + 0.200 Sp - 2.000 E4

Max Pu/φPn = 0.02 OK

Tension: No tension on column

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:
Required tension and compression strength from D1.4a.
No shear in major axis
Shear in minor axis (kip)= 9.38 --- Combination: 1.375 D + 0.200 Sp - 2.000 E3
No moment in major axis
Moment in minor axis (kip-ft)= 117.98 --- Combination: 1.375 D + 0.200 Sp - 2.000 E3
Required shear for column splice is max result from D2.5b and D2.5c
Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	Minor
Mpc (kip-ft)	373.33	373.33

Column Splice Shear Force Required Mpc / H

Where Mpc is the lesser nominal plastic flexural strength of the column sections.

See code for more information on the Required Shear Strength

Seismic Provisions Member Code Check

Beam Parameters

Story: Low Roof   Frame No: 15   Member No: 217

Fy (ksi): 50.00   Size: W18X76

Frame Type: Ordinary Moment Resisting Frame

E1.6b Beam-to-Column - FR Moment Connections

FR Moment Connections shall be designed for required flexure strength of (kip-ft) = 821.79

Beam Parameters

Story: Low Roof   Frame No: 15   Member No: 366
Fy (ksi): 50.00   Size: W18X76
Frame Type: Ordinary Moment Resisting Frame

E1.6b Beam-to-Column - FR Moment Connections

FR Moment Connections shall be designed for required flexure strength of (kip-ft) = 821.79

Seismic Provisions Member Code Check Summary

W-138

Criteria

Cd/Ie = 4.0
Apply AISC 358 Provisions to Moment Frame
RBS Strain Hardening Factor Cpr = 1.10
Other Strain Hardening Factor Cpr = 1.10
AISC 358 Live Load Factor = 0.50
AISC 358 Snow Load Factor = 0.20
BRBF and SCBF - Required Column Strength based on Larger of Strength and Capacity Limited Seismic Forces.

Frame #0:

Story:High Roof **Column: 62** **Type: Ordinary Moment Resisting Frame**
Size:HSS5X5X3/8 Fy (ksi): 50.00
D1.4a Required Strength --- OK
D2.5b Column Splices - Required Strength
D2.5c Required Shear Strength

Story:High Roof **Column: 63** **Type: Ordinary Moment Resisting Frame**
Size:HSS5X5X3/8 Fy (ksi): 50.00
D1.4a Required Strength --- OK
D2.5b Column Splices - Required Strength
D2.5c Required Shear Strength

Story:High Roof **Column: 66** **Type: Ordinary Moment Resisting Frame**
Size:HSS5X5X3/8 Fy (ksi): 50.00
D1.4a Required Strength --- OK
D2.5b Column Splices - Required Strength
D2.5c Required Shear Strength

Story:High Roof **Column: 67** **Type: Ordinary Moment Resisting Frame**
Size:HSS5X5X3/8 Fy (ksi): 50.00
D1.4a Required Strength --- OK
D2.5b Column Splices - Required Strength
D2.5c Required Shear Strength

Story:High Roof **Beam:559** **Type: Ordinary Moment Resisting Frame**
Size:W16X26 Fy (ksi): 50.00

Story:High Roof **Beam:560** **Type: Ordinary Moment Resisting Frame**
Size:W8X10 Fy (ksi): 50.00

Story:High Roof **Beam:561** **Type: Ordinary Moment Resisting Frame**
Size:W16X26 Fy (ksi): 50.00

Seismic Provisions Member Code Check Summary

Story:High Roof **Beam:562** **Type: Ordinary Moment Resisting Frame**

Size:W8X10 Fy (ksi): 50.00

Story:Low Roof **Column: 31** **Type: Ordinary Moment Resisting Frame**

Size:HSS5X5X3/8 Fy (ksi): 50.00

D1.4a Required Strength --- OK
D2.5b Column Splices - Required Strength
D2.5c Required Shear Strength

Story:Low Roof **Column: 56** **Type: Ordinary Moment Resisting Frame**

Size:HSS5X5X3/8 Fy (ksi): 50.00

D1.4a Required Strength --- OK
D2.5b Column Splices - Required Strength
D2.5c Required Shear Strength

Story:Low Roof **Column: 71** **Type: Ordinary Moment Resisting Frame**

Size:HSS5X5X3/8 Fy (ksi): 50.00

D1.4a Required Strength --- OK
D2.5b Column Splices - Required Strength
D2.5c Required Shear Strength

Story:Low Roof **Column: 73** **Type: Ordinary Moment Resisting Frame**

Size:HSS5X5X3/8 Fy (ksi): 50.00

D1.4a Required Strength --- OK
D2.5b Column Splices - Required Strength
D2.5c Required Shear Strength

Seismic Provisions Joint Code Check Summary

W-140

Criteria

Cd/Ie = 4.0

Apply AISC 358 Provisions to Moment Frame

RBS Strain Hardening Factor Cpr = 1.10

Other Strain Hardening Factor Cpr = 1.10

AISC 358 Live Load Factor = 0.50

AISC 358 Snow Load Factor = 0.20

BRBF and SCBF - Required Column Strength based on Larger of Strength and Capacity Limited Seismic Forces.

Frame #0:

Story:High Roof **Joint: 4** **Type: Ordinary Moment Resisting Frame**

Size:HSS5X5X3/8 Fy (ksi): 50.00

HSS joint check not implemented except for some Custom/Prequalified connections.

Story:High Roof **Joint: 3** **Type: Ordinary Moment Resisting Frame**

Size:HSS5X5X3/8 Fy (ksi): 50.00

HSS joint check not implemented except for some Custom/Prequalified connections.

Story:High Roof **Joint: 2** **Type: Ordinary Moment Resisting Frame**

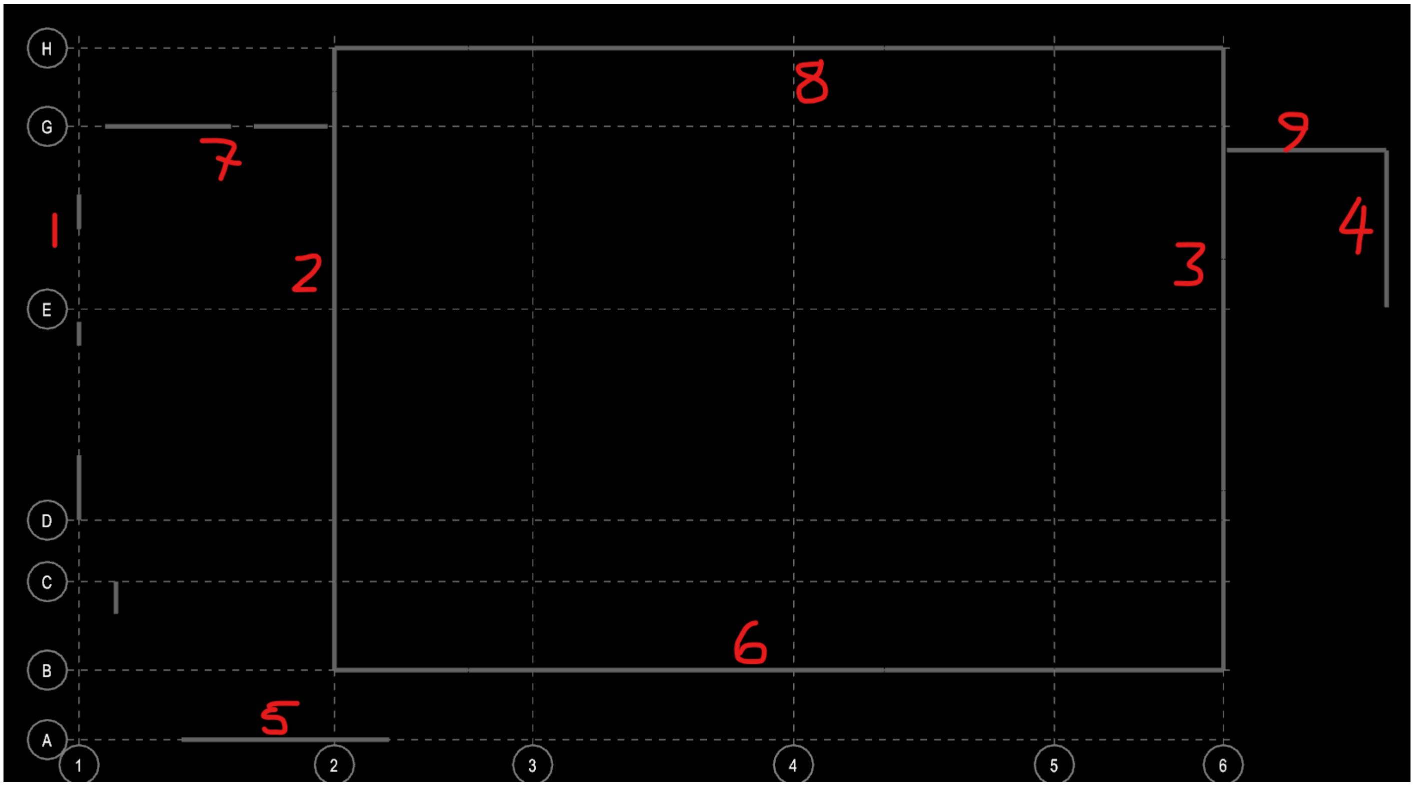
Size:HSS5X5X3/8 Fy (ksi): 50.00

HSS joint check not implemented except for some Custom/Prequalified connections.

Story:High Roof **Joint: 1** **Type: Ordinary Moment Resisting Frame**

Size:HSS5X5X3/8 Fy (ksi): 50.00

HSS joint check not implemented except for some Custom/Prequalified connections.


H
G
E
D
C
B
A
1
2
3
4
5
6
8
7
9
1
2
3
4
6
5

Building Parameters

Building Length =	136.333	ft	Elevation =	4200	ft
Building Width =	94.333	ft	DB =	17	ft
Suggested Joints =	1		Parapet =	3	ft
N/S Nominal Thickness =	8	in	Vertical grout spacing=	32	
E/W Nominal Thickness =	8	in	Masonry unit weight type=	115	
Masonry Strength=	2000	psi	N/S wall psf=	45	
			E/W wall psf=	45	

Loading Inputs

Gravity Loading

DL =	20	psf
LL =	20	psf
SL =	28.5	psf
Mass =	20	psf

Seismic Parameters

S_{DS} =	0.874	g
R =	5	
I_e =	1.25	

Wind Parameters

Exposure =	B		L/B =	1.45	
V =	140	mph	$C_{p, Windward}$ =	0.8	
K_z =	0.60		$C_{p, Leewardd}$ =	-0.411	
K_{zt} =	1.00				
K_d =	0.85		L/B =	0.69	
K_e =	0.86		$C_{p, Windward}$ =	0.8	
			$C_{p, Leewardd}$ =	-0.500	
q_z =	21.8	psf			
G =	0.85			10.91	-11.55
GC_{pi} =	0.18			10.91	-13.20
			W_x =	24.11	psf
			W_y =	22.46	psf

Diaphragm Analysis

Left Side

Building Geometry:

N-Wall	L =	**136.3**	*ft*	t =	8	*in*	h =	17	*ft*	parapet=	3	*ft*	**Masonry**
E-Wall	L =	**96**	*ft*	t =	8	*in*	h =	17	*ft*	parapet=	3	*ft*	**Masonry**
S-Wall	L =	**136.3**	*ft*	t =	8	*in*	h =	17	*ft*	parapet=	3	*ft*	**Masonry**
W-Wall	L =	**96**	*ft*	t =	8	*in*	h =	17	*ft*	parapet=	3	*ft*	**Masonry**

Gravity Loads:

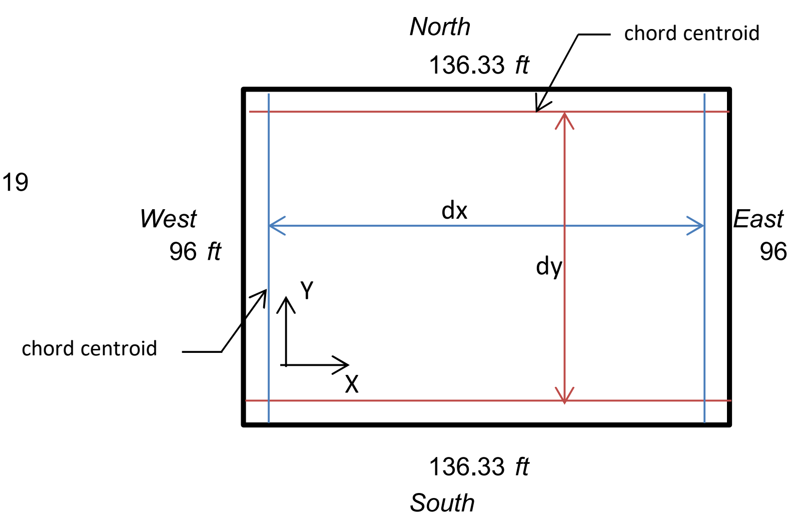
Dead = 20 psf
Mass = 20 *psf*
Live = 20 *psf*
Snow = 28.5 *psf*

Seismic Mass:

X-Dir = 361 *kips*
Y-Dir = 1038 *kips*

Seismic Criteria:

S_{DS} = 0.87
Rx = 5   Ry = 5
Ie = 1.25
Cs_x = 0.2185 Cs_y = 0.219



Lateral Loads:

*Ex = 6.028824177 *psf*
*Ey = 17.32636719 *psf*

W_x = 24 *psf*
W_y = 22 *psf*

Base Shear

Wind		*Seismic*			
X-Dir =	27 *kips*	X-Dir =	79 *kips*	X-Dir =	***Seismic Controls***
Y-Dir =	38 *kips*	Y-Dir =	227 *kips*	Y-Dir =	***Seismic Controls***

Chord Forces:

ωx =	0.8219096 *klf*	Mu_x =	947 *k-ft*	dx =	**116** *ft*	Fx =	8.14 *k*
						Fx =	4.1 k / Joist
ωy =	1.66333125 *klf*	Mu_y =	3864 *k-ft*	dy =	**89** *ft*	Fy =	43.4 *k*

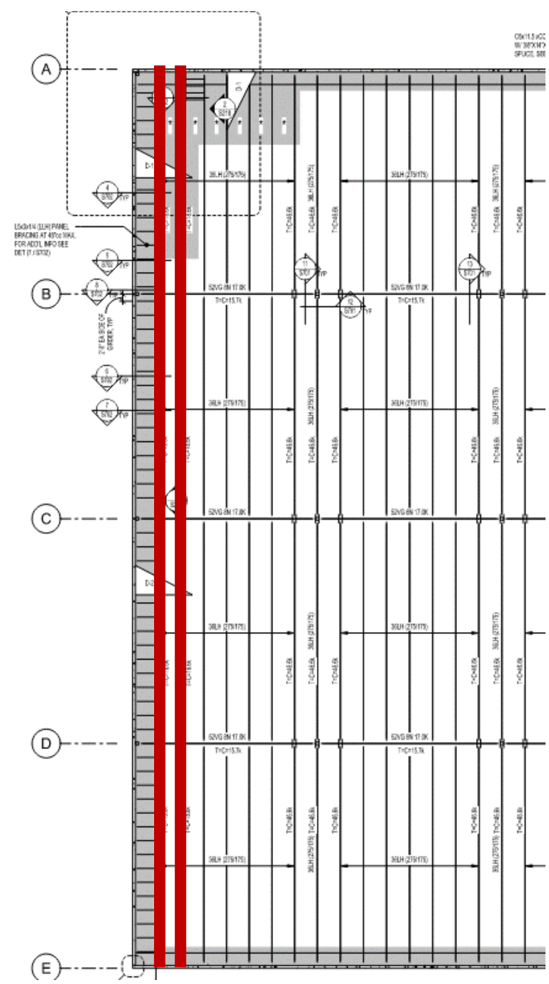
Diaphragm Analysis

Left Side

Diaphragm Chord Forces in Short Direction

Chord Force at either end of the roof diaphragm	8.14	kips
Number of joists used as chords	**2**	
Chord force in each joist	**5**	kips

Joists at either end of the diaphragm will be used as the diaphragm chord in shorter direction.



ft

Splice Capacity:

Splice Plate

Thick (in.)	**5/16**
Width (in.)	**5.0**
Length (in.)	**5**

Weld Size **4/16** in.

Weld Size if OK

Weld Capacity 22.27 kips

Splice weld is acceptable

Splice Plate Yield 50.63 kips

Splice plate size is acceptable

2 Joists

Channel

Diaphragm Analysis

Left Side

Diaphragm Chord Forces in Long Direction

Fy (ksi):	36.00	
Channel:	C6X10.5	
Plate Thickness (in):	3/8	
Plate Width (in):	14.00	**The plate width is acceptable**
Channel Chord Span (ft):	6.67	

Properties:

Channel Area =	3.07	in^2	Total Area =	
I_y =	0.86	in^4	y_{bar} =	
X_bar =	0.5	in	$I_{y,total}$ =	
b_f =	2.03	in	r_{total} =	
t_f =	0.343	in	KL/r =	
t_w =	0.314	in		
T =	4.375			
b_w =	6	in		
Plate Area =	5.25	in^2		
I_y =	0.061523	in^4		

Design:

F_e =	35.67	ksi
b/t =	5.92	Non-Slender
F_{cr} =	23.60	ksi
$\phi P_n = 0.9 F_{cr} A_g$ =	176.69	kips

Channel chord is acceptable

Splice Capacity:

	Thick (in.)	Width (in.)	
Splice Plate	5/8		4.0
Strap Plate	5/8		4.0
Weld Size	1/4	in.	
Weld Capacity	233.86	kips	
Splice Plate Yield	81.00	kips	
Strap Plate Yield	81.00	kips	
Net Yield Capacity	162.00	kips	

8.32	in^2
0.821	in
6.636	in^4
0.893	in
89.578	

> 43.5 kips

Length (in.)
24
24

Splice weld is acceptable

Splice plate size is acceptable

Diaphragm Analysis

Middle Section

Building Geometry:

N-Wall	L =	**0**	*ft*	t =	8	*in*	h =	17	*ft*	parapet=	3	*ft*	**Masonry**
E-Wall	L =	**0**	*ft*	t =	8	*in*	h =	17	*ft*	parapet=	3	*ft*	**Masonry**
S-Wall	L =	**0**	*ft*	t =	8	*in*	h =	17	*ft*	parapet=	3	*ft*	**Masonry**
W-Wall	L =	**0**	*ft*	t =	8	*in*	h =	17	*ft*	parapet=	3	*ft*	**Masonry**

Gravity Loads:

Dead = 20

Mass = 20 *psf*

Live = 20 *psf*

Snow = 28.5 *psf*

Seismic Mass:

X-Dir = 0 *kips*

Y-Dir = 0 *kips*

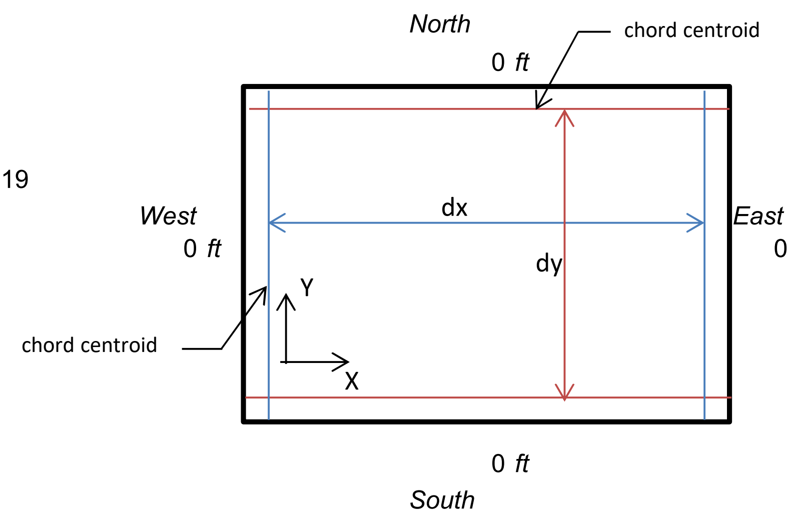
Seismic Criteria:

S_{DS} = 0.87

Rx = 5 Ry = 5

Ie = 1.25

Cs_x = 0.2185 Cs_y = 0.219



Lateral Loads:

*Ex = #DIV/0! *psf*

*Ey = #DIV/0! *psf*

W_x = 24 *psf*

W_y = 22 *psf*

Base Shear

Wind		*Seismic*		
X-Dir =	0 *kips*	X-Dir =	#### *kips*	X-Dir = ***#DIV/0!***
Y-Dir =	0 *kips*	Y-Dir =	#### *kips*	Y-Dir = ***#DIV/0!***

Chord Forces:

ωx =	#DIV/0!	*klf*	Mu_x =	#DIV/0! *k-ft*	dx =	**-20** *ft*	Fx =	#### *k*
							Fx =	#### k / Joist
ωy =	#DIV/0!	*klf*	Mu_y =	#DIV/0! *k-ft*	dy =	**-7** *ft*	Fy =	#### *k*

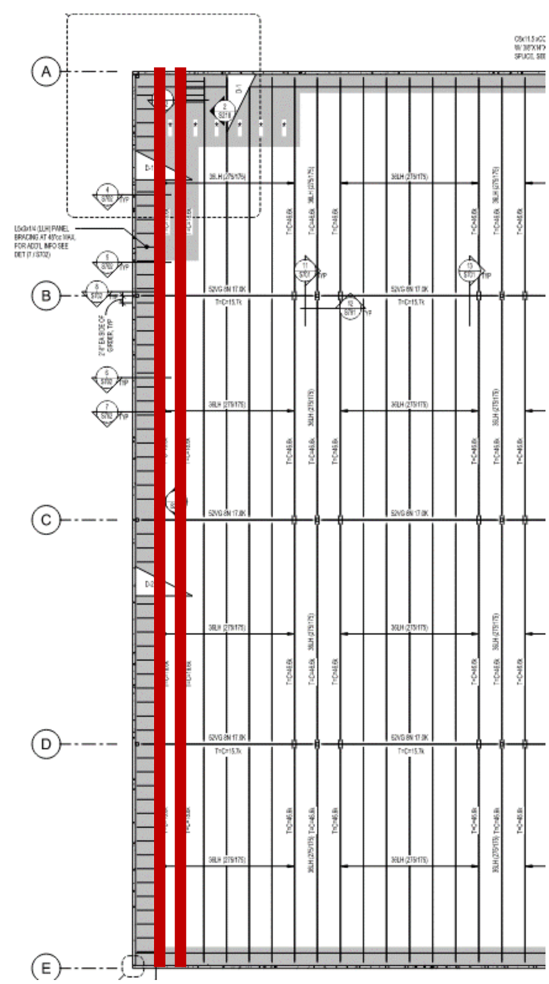
Diaphragm Analysis

Middle Section

Diaphragm Chord Forces in Short Direction

Chord Force at either end of the roof diaphragm	#DIV/0!	kips
Number of joists used as chords	**1**	
Chord force in each joist	**#DIV/0!**	kips

Joists at either end of the diaphragm will be used as the diaphragm chord in shorter direction.



ft

Splice Capacity:

Splice Plate

Thick (in.)	**5/16**
Width (in.)	**6.0**
Length (in.)	**5**

Weld Size **1/4** in.

Weld Size if OK

Weld Capacity 22.27 kips

Splice weld is acceptable

Splice Plate Yield 60.75 kips

Splice plate size is acceptable

2 Joists

Channel

Diaphragm Analysis

Middle Section

Diaphragm Chord Forces in Long Direction

Fy (ksi):	36.00	
Channel:	**C6X10.5**	
Plate Thickness (in):	**6/16**	
Plate Width (in):	14.00	**The plate width is acceptable**
Channel Chord Span (ft):	**6.6666667**	

Properties:

Channel Area =	3.07	in^2	Total Area =
I_y =	0.86	in^4	y_{bar} =
X_bar =	0.5	in	$I_{y,total}$ =
b_f =	2.03	in	r_{total} =
t_f =	0.343	in	KL/r =
t_w =	0.314	in	
T =	4.375		
b_w =	6	in	
Plate Area =	5.25	in^2	
I_y =	0.061523	in^4	

Design:

F_e =	35.67	ksi
b/t =	5.92	Non-Slender
F_{cr} =	23.60	ksi
$\phi P_n = 0.9F_{cr}A_g =$	176.69	kips
	#DIV/0!	

Splice Capacity:

	Thick (in.)	Width (in.)	
Splice Plate	**5/8**		**4.0**
Strap Plate	**5/8**		**4.0**
Weld Size	**1/4**	in.	
Weld Capacity	233.86	kips	
Splice Plate Yield	81.00	kips	
Strap Plate Yield	81.00	kips	
Net Yield Capacity	162.00	kips	

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8.32	in^2
0.821	in
6.636	in^4
0.893	in
89.578	

#DIV/0!

Length (in.)

24
24

#DIV/0!

#DIV/0!

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Diaphragm Analysis
Right Section

Building Geometry:

N-Wall	L =	**0**	*ft*	t =	8	*in*	h =	17	*ft*	parapet=	3	*ft*	**Masonry**
E-Wall	L =	**0**	*ft*	t =	8	*in*	h =	17	*ft*	parapet=	3	*ft*	**Masonry**
S-Wall	L =	**0**	*ft*	t =	8	*in*	h =	17	*ft*	parapet=	3	*ft*	**Masonry**
W-Wall	L =	**0**	*ft*	t =	8	*in*	h =	17	*ft*	parapet=	3	*ft*	**Masonry**

Gravity Loads:

Dead = 20
Mass = 20 *psf*
Live = 20 *psf*
Snow = 28.5 *psf*

Seismic Mass:

X-Dir = 0 *kips*
Y-Dir = 0 *kips*

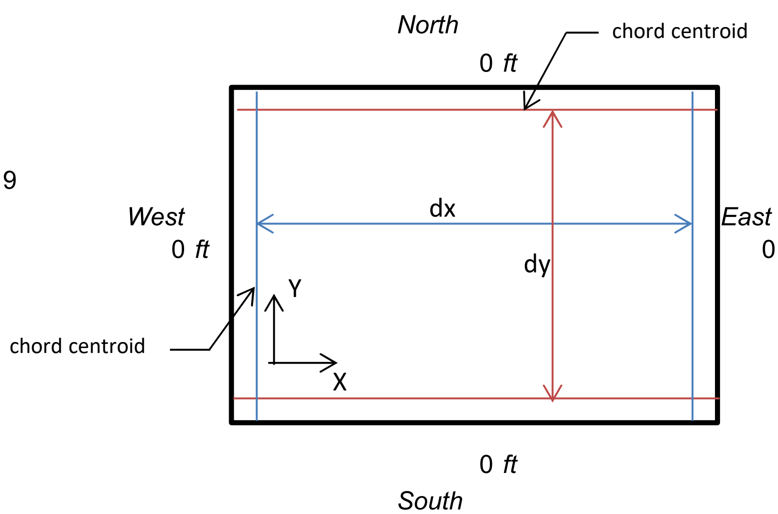
Seismic Criteria:

S_{DS} = 0.87
Rx = 5 Ry = 5
Ie = 1.25
Cs_x = 0.2185 Cs_y = 0.219

Lateral Loads:

*Ex = #DIV/0! *psf*
*Ey = #DIV/0! *psf*

W_x = 24 *psf*
W_y = 22 *psf*



Base Shear

Wind		*Seismic*			
X-Dir =	0 *kips*	X-Dir =	#### *kips*	X-Dir =	***#DIV/0!***
Y-Dir =	0 *kips*	Y-Dir =	#### *kips*	Y-Dir =	***#DIV/0!***

Chord Forces:

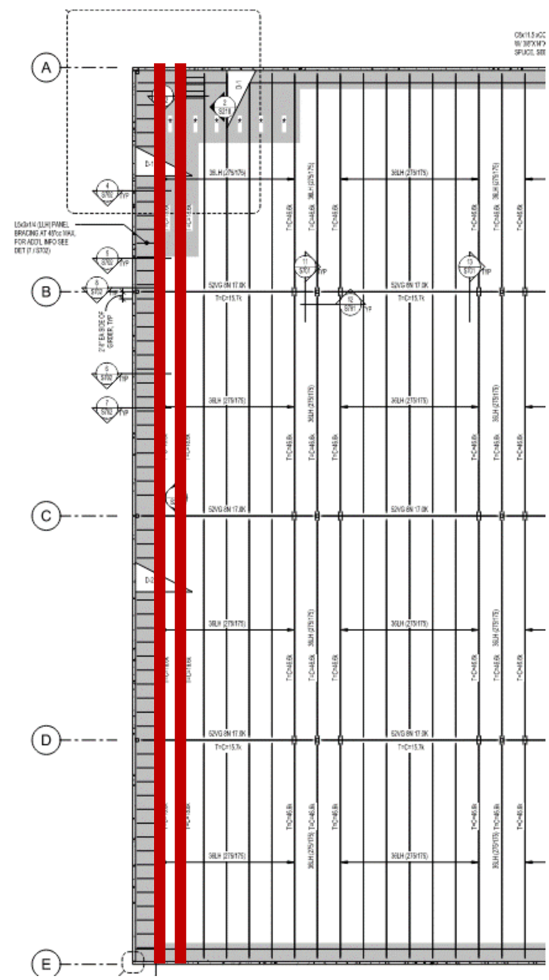
ωx =	#DIV/0! *klf*	Mu_x =	#DIV/0! *k-ft*	dx =	**-20** *ft*	Fx =	#### *k*
						Fx =	#### k / Joist
ωy =	#DIV/0! *klf*	Mu_y =	#DIV/0! *k-ft*	dy =	**-7** *ft*	Fy =	#### *k*

Diaphragm Analysis
Right Section

Diaphragm Chord Forces in Short Direction

Chord Force at either end of the roof diaphragm	#DIV/0!	kips
Number of joists used as chords	**2**	
Chord force in each joist	**#DIV/0!**	kips

Joists at either end of the diaphragm will be used as the diaphragm chord in shorter direction.



ft

Splice Capacity:

Splice Plate

Thick (in.)	**5/16**
Width (in.)	**6.0**
Length (in.)	**5**

Weld Size **1/4** in.
Weld Size if OK

Weld Capacity 22.27 kips
Splice weld is acceptable

Splice Plate Yield 60.75 kips
Splice plate size is acceptable

2 Joists

Channel

Diaphragm Analysis

Right Section

Diaphragm Chord Forces in Long Direction

Fy (ksi):	36.00	
Channel:	**C6X10.5**	
Plate Thickness (in):	**3/8**	
Plate Width (in):	14.00	**The plate width is acceptable**
Channel Chord Span (ft):	**6.6666667**	

Properties:

Channel Area =	3.07	in^2	Total Area =
I_y =	0.86	in^4	y_{bar} =
X_bar =	0.5	in	$I_{y,total}$ =
b_f =	2.03	in	r_{total} =
t_f =	0.343	in	KL/r =
t_w =	0.314	in	
T =	4.375		
b_w =	6	in	
Plate Area =	5.25	in^2	
I_y =	0.061523	in^4	

Design:

F_e =	35.67	ksi
b/t =	5.92	Non-Slender
F_{cr} =	23.60	ksi
$\phi P_n = 0.9 F_{cr} A_g$ =	176.69	kips
	#DIV/0!	

Splice Capacity:

	Thick (in.)	Width (in.)	
Splice Plate	**5/8**		**4.0**
Strap Plate	**5/8**		**4.0**
Weld Size	**1/4**	in.	
Weld Capacity	233.86	kips	
Splice Plate Yield	81.00	kips	
Strap Plate Yield	81.00	kips	
Net Yield Capacity	162.00	kips	

8.32	in^2
0.821	in
6.636	in^4
0.893	in
89.578	

#DIV/0!

Length (in.)

24
24

#DIV/0!

#DIV/0!

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Tilt Up Roof Analysis
3. Joist Anchorage Forces

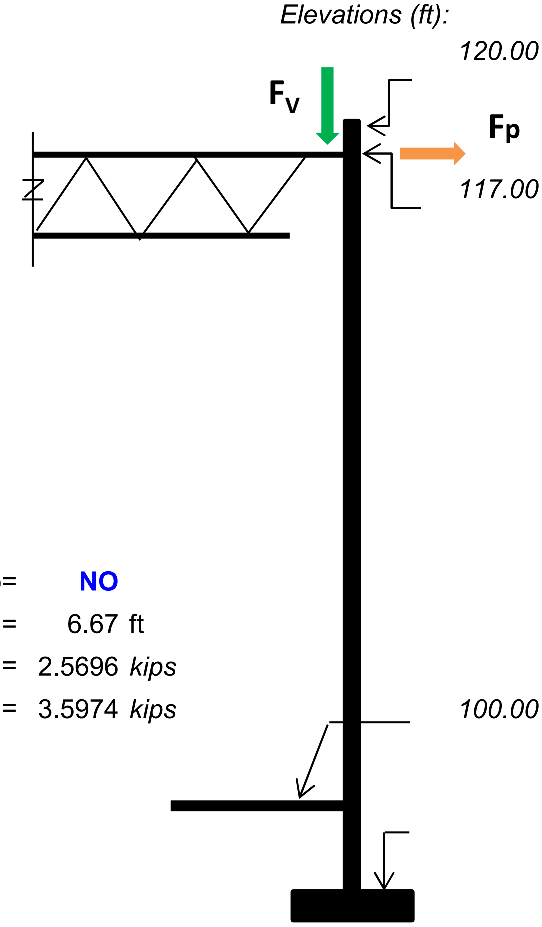
Sheet No: ________
Job No: ________
Date: 8/22/2024
By: ________

Anchorage Forces

Typical Joist Anchorage to Tilt-Up Panel

Wall Data:

Thickness = 8 *in*
Parapet = 120.0 *ft*
Deck Bearing = 117.0 *ft*
Top of Slab = 100 *ft*
Top of Footing = 98.5 *ft*



Wall Anchorage Force:

S_{DS} = 0.874
Ie = 1
L_f = 136.3 *ft*
k_a = 2
W_p = 45 *psf*
F_p = 31.46 *psf*

Force per anchor:

Braced at SOG? (Y/N)= NO
Anchor Spacing = 6.67 ft
F_p = 2.5696 *kips*
1.4*F_p = 3.5974 *kips*

Angle Brace Load	
Spacing (in)	Load
8	0.36
12	0.54
16	0.72
24	1.08
32	**1.44**
48	2.16
60	2.70
72	3.2376456
84	3.78

See the joist to embed calculation separate spreadsheet:

"K:\2024\240104\Joist to wall masonry embed.xlsm"

Anchorage Forces

High Parapet

Wall Data:

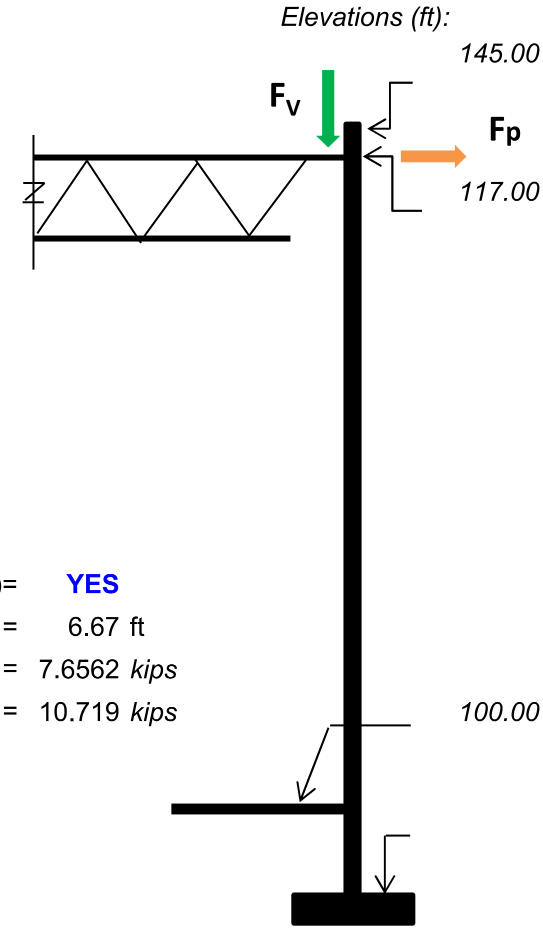
Thickness = 8 *in*
Parapet = 145.0 *ft*
Deck Bearing = 117.0 *ft*
Top of Slab = 100 *ft*
Top of Footing = 98 *ft*

Wall Anchorage Force:

S_{DS} = 0.87
Ie = 1
L_f = 136 *ft*
k_a = 2
W_p = 45 *psf*
F_p = 31 *psf*

Force per anchor:

Braced at SOG? (Y/N)= **YES**
Anchor Spacing = 6.67 ft
F_p = 7.6562 *kips*
1.4*F_p = 10.719 *kips*



Angle Brace Load	
Spacing (in)	Load
8	1.07
12	1.61
16	2.14
24	3.22
32	4.29
48	**6.43**
60	8.04
72	9.6468624
84	11.25

Tilt Up Roof Analysis

Sheet No: ________
Job No: ________
Date: 8/22/2024
By: ________

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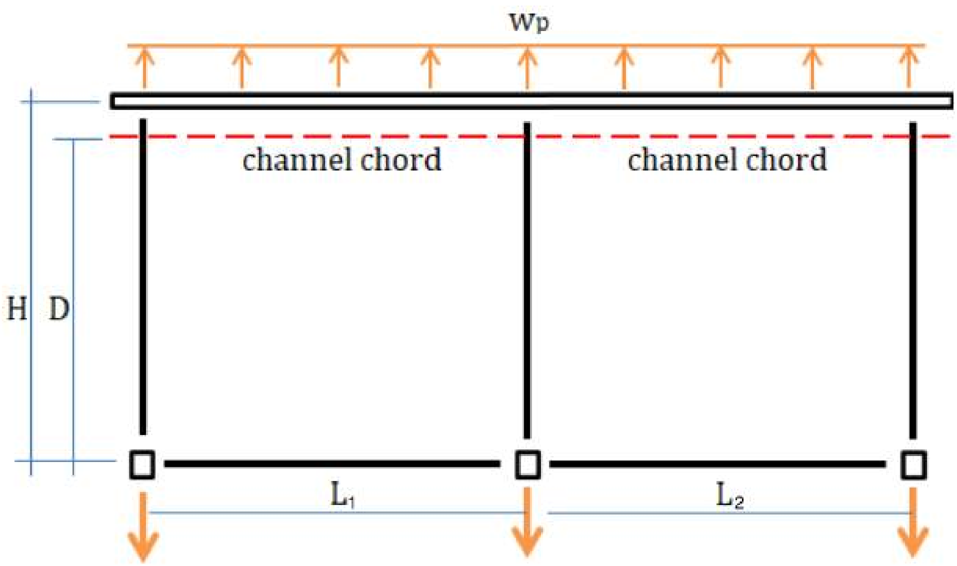
Subdiaphragm Forces

Middle Bays, Long

1.4*Wp = 0.54 klf



Case 1:

H=	**55.3**	ft	$M = \frac{wL^2}{8}$	=	108	k-ft
D=	**55.3**	ft				
L_1=	**40**	ft	$T = C = \frac{M}{D}$	=	1.95	k => T/C on Joist Girder
L_2=	**40**	ft				

$$Tie\ Force = \frac{w(L_1 + L_2)}{2}$$ = 22 k

Joists = 3 Joists => T/C on Joists
Force/Joist = 7.19 k

Tie Plate:

Fy=	36	ksi
Width=	**5**	in
Length=	**12**	in
hickness=	0.04	in
Design, t=	**3/8**	in
φTn=	60.8	k

Thickness	Capacity
0.125	20.25
0.25	40.5
0.375	**60.75**
0.5	81
0.625	101.25
0.75	121.5

Tie Plate Weld:

Fxx =	70	ksi
t =	**4/16**	in.
length =	9	in.
Weld Capacity =	50.1	kips
	OK	

T

Summary:

Tie Plate	***3/8 x5x12***
Weld Size	***4/16***

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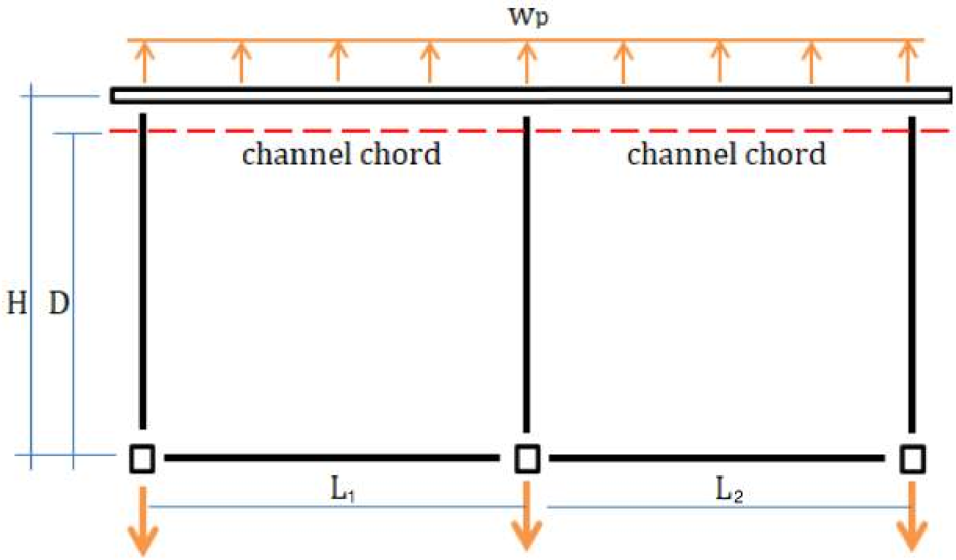
Tilt Up Roof Analysis

Sheet No: ________
Job No: ________
Date: 8/22/2024
By: ________

Subdiaphragm Forces

End bay

1.4*Wp = 0.54 klf



Case 1:

H= **55.3** ft

D= **55.3** ft

L_1= **30.4** ft

L_2= **40** ft

$M = \frac{wL^2}{8}$ = 108 k-ft

$T = C = \frac{M}{D}$ = 1.95 k => T/C on Joist Girder

$Tie\ Force = \frac{w(L_1 + L_2)}{2}$ = 19 k

Joists = 3 Joists => T/C on Joists

Force/Joist = 6.33 k

Tie Plate:

Fy= 36 ksi

Width= **5** in

Length= **12** in

hickness= 0.04 in

Design, t= 3/8 in

φTn= 60.8 k

Thickness	**Capacity**
0.125	20.25
0.25	40.5
0.375	**60.75**
0.5	81
0.625	101.25
0.75	121.5

Tie Plate Weld:

Fxx = 70 ksi

t = **4/16** in.

length = 9 in.

Weld Capacity = 50.112 kips

OK

Summary:

Tie Plate ***3/8 x5x12***

Weld Size ***4/16***

Tilt Up Roof Analysis
5. Diaphragm Shears

Diaphragm Shears (LRFD)
Y-Dir

Grid 1 Panel Length = 106 ft
Grid 6 Panel Length = 180.41667 ft
wu = 1.663

Grid 5 Panel Length = 0 ft
Grid 11 Panel Length = 0 ft
wu = #DIV/0!

Grid 11 Panel Length = 0 ft
Grid 20 Panel Length = 0 ft
wu = #DIV/0!

	2	3	4	5	6	6	7	8	9	10	11	12	12	13	14	15	16	17	18	19	20	21
Distance	0	30.4167	80.41667	130.41667	180.4167	200	250	300	350	400	450	500	500	550	600	650	700	750	800	850	900	950
0	1416	938	154	631	832	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	1416	938	154	631	832	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
40	1416	938	154	631	832	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
72.354	1416	938	154	631	832	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
81.771	1416	938	154	631	832	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
95.333	1416	938	154	631	832	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
106	1416	938	154	631	832	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
						#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

X-Dir
wu= 0.82 klf
wu= #DIV/0! klf
wu= #DIV/0! klf

		2	3	4	5	6	6	7	8	9	10	11	12	12	13	14	15	16	17	18	19	20	21
	Distance	0	30.4167	80.41667	130.41667	180.4167	200	250	300	350	400	450	500	500	550	600	650	700	750	800	850	900	950
H	0	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
G	12	55	55	55	55	55	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
F	40	182	182	182	182	182	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
E	72.354	330	330	330	330	330	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
D	81.771	373	373	373	373	373	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
C	95.333	434	434	434	434	434	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
B	106	483	483	483	483	483	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
A							#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

DO NOT DELETE
CHECK
0

Diaphragm Attachment Lengths

Horiz Location	Left	Mid	Right
Grid J Length	180.417	300	450
Grid A Length	180.417	300	450

DIAPHRAGM SHEAR ENVELOPE - LRFD

	2	3	4	5	6	6	7	8	9	10	11	12	12	13	14	15	16	17	18	19	20	21
H	1416	938	154	631	832	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
G	1416	938	154	631	832	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
F	1416	938	182	631	832	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
E	1416	938	330	631	832	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
D	1416	938	373	631	832	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
C	1416	938	434	631	832	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
B	1416	938	483	631	832	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
A	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

DIAPHRAGM SHEAR ENVELOPE - ASD

	2	3	4	5	6	6	7	8	9	10	11	12	12	13	14	15	16	17	18	19	20	21
H	991	657	108	442	582	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
G	991	657	108	442	582	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
F	991	657	128	442	582	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
E	991	657	231	442	582	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
D	991	657	261	442	582	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
C	991	657	304	442	582	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
B	991	657	338	442	582	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
A	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

	SHEAR	Pattern	Allowable Shear	FASTENER	SIDELAP	G' (k/in)
20 GA	991	36/7	**1438**	**Hilti Pin**	**8"oc**	199
22 GA	657	36/7	**1138**	**Hilti Pin**	**8"oc**	158
22 GA	0	36/7	**656**	**Hilti Pin**	**12"oc**	138

North/South Direction

Left Side

Section	L (ft)	L (in)	G'	v_{left}	v_{right}	v_{ave}	Type	δ_{si}
1	18	216	95	120	120	120	Simple	0.02
						#DIV/0!	Cant	
Total	18	216					Total =	0.02

Middle Section

Section	L (ft)	L (in)	G'	v_{left}	v_{right}	v_{ave}	Type	δ_{si}
1	50	600	199	#DIV/0!	#DIV/0!	#DIV/0!	Cant	#DIV/0!
2	50	600	158	#DIV/0!	#DIV/0!	#DIV/0!	Cant	#DIV/0!
3	150	1800	138	#DIV/0!	#DIV/0!	#DIV/0!	Simple	#DIV/0!
4	50	600	158	#DIV/0!	#DIV/0!	#DIV/0!	Cant	#DIV/0!
5	50	600	199	#DIV/0!	#DIV/0!	#DIV/0!	Cant	#DIV/0!
Total	350	4200					Total =	#DIV/0!

Right Section

Section	L (ft)	L (in)	G'	v_{left}	v_{right}	v_{ave}	Type	δ_{si}
1	100	1200	199	#DIV/0!	#DIV/0!	#DIV/0!	Cant	#DIV/0!
2	50	600	158	#DIV/0!	#DIV/0!	#DIV/0!	Cant	#DIV/0!
3	150	1800	138	#DIV/0!	#DIV/0!	#DIV/0!	Simple	#DIV/0!
4	50	600	158	#DIV/0!	#DIV/0!	#DIV/0!	Cant	#DIV/0!
5	100	1200	199	#DIV/0!	#DIV/0!	#DIV/0!	Cant	#DIV/0!
Total	450	5400					Total =	#DIV/0!

East/West Direction

Left Side

Section	L (ft)	L (in)	G'	v_{left}	v_{right}	v_{ave}	Type	δ_{si}
1	50	600	199	0	55	27	Cant	0.00
2	250	3000	158	55	55	55	Simple	0.09
3	50	600	199	55	0	27	Cant	0.00
Total	350	4200					Total =	0.09

Middle Section

Section	L (ft)	L (in)	G'	v_{left}	v_{right}	v_{ave}	Type	δ_{si}
1	50	600	199	#DIV/0!	#DIV/0!	#DIV/0!	Cant	#DIV/0!
2	50	600	158	#DIV/0!	#DIV/0!	#DIV/0!	Cant	#DIV/0!
3	150	1800	199	#DIV/0!	#DIV/0!	#DIV/0!	Simple	#DIV/0!
4	50	600	158	#DIV/0!	#DIV/0!	#DIV/0!	Cant	#DIV/0!
5	50	600	199	#DIV/0!	#DIV/0!	#DIV/0!	Cant	#DIV/0!
Total	350	4200					Total =	#DIV/0!

Right Section

Section	L (ft)	L (in)	G'	v_{left}	v_{right}	v_{ave}	Type	δ_{si}
1	50	600	199	#DIV/0!	#DIV/0!	#DIV/0!	Cant	#DIV/0!
2	50	600	158	#DIV/0!	#DIV/0!	#DIV/0!	Cant	#DIV/0!
3	150	1800	199	#DIV/0!	#DIV/0!	#DIV/0!	Simple	#DIV/0!
4	50	600	158	#DIV/0!	#DIV/0!	#DIV/0!	Cant	#DIV/0!
5	50	600	199	#DIV/0!	#DIV/0!	#DIV/0!	Cant	#DIV/0!
Total	350	4200					Total =	#DIV/0!

$$\theta = P_x \Delta I_e / (V_x h_{sx} C_d) \leq 0.10$$

2% Drift =	4.08	in
Max Drift =	0.09	in
$\delta_{inelastic}$ =	**0.47**	**in**
	OK	

C_d = 5 (Special Masonry Walls)
$\delta_{elastic,max}$ = 0.82 in
$\delta_{e,x}$ = 0.47 in
$\delta_{e,y}$ = 0.11 in
Maximum Elastic Brace Deflection = 0.79 in
*See RAM Output

$P_{x,N/S}$ = 1037.8121 kip
$P_{x,E/W}$ = 361.1136 kip
$V_{x,N/S}$ = 227 kip
$V_{x,E/W}$ = 79 kip

θ_x = 0.001
θ_y = 0.000
θ_{max} = 0.001
OK

RAM Elements

Current Date: 8/28/2024 10:51 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Grid 2\G and D Wall with openings with new openings.msw

Design Results
Masonry wall

General Information

Global status : Warnings in design

Design code	:	TMS 402-16 SD

Materials:

Material	:	CMU 1.5-60
Mortar type	:	Port/Mort - M/S
Grouting type	:	Full grouting
Masonry compression strength (F`m)	:	1.5 [Kip/in2]
Steel tension strength (fy)	:	60 [Kip/in2]
Steel allowable tension strength (Fs)	:	24 [Kip/in2]
Steel elasticity modulus (Es)	:	29000 [Kip/in2]
Masonry elasticity modulus (Em)	:	1350 [Kip/in2]
Masonry unit weight	:	0.135 [Kip/ft3]

Seismic data:

Seismic design category	:	SDC D
Response modification factor	:	5.00
Shear wall type	:	Special

Geometry

Total height	:	20.00 [ft]
Total length	:	88.76 [ft]
Foundation type	:	Continuous
Wall bottom restraint	:	Pinned
Column bottom restraint	:	Fixed
Rigidity elements	:	Columns

Number of stories: 1

Story	Story height [ft]	Wall thickness [in]	Effective unit weight [Kip/ft3]
1	17.00	7.63	0.14

Openings:

Reference	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
Lower left	1.33	0.00	3.33	8.00
Lower left	18.79	0.00	14.00	8.00
Lower left	36.76	0.00	16.00	8.00
Lower left	8.27	4.00	8.50	4.00
Lower left	66.26	0.00	20.50	8.00

Columns:

Distance [ft]	Width X [in]	Width Z [in]	Position Z
0.67	16.00	8.00	Centered
5.33	16.00	8.00	Centered
17.80	24.00	8.00	Centered
34.77	48.00	8.00	Centered
53.43	16.00	8.00	Centered
7.66	16.00	8.00	Centered
65.33	24.00	8.00	Centered
87.75	24.00	8.00	Centered

Load Conditions

ID	Comb.	Category	Description
DL	No	DL	Dead Load
LL	No	LL	Live Load
SL	No	SNOW	Snow Load
EQoop	No	EQ	EQoop Load
Woop	No	WIND	Wind Load
EQ	No	EQ	EQ Load
SM1	Yes		DL
DM1	Yes		DL
D1	Yes		1.4DL
D2	Yes		1.2DL+1.6LL
D3	Yes		1.2DL+0.5SL
D4	Yes		1.2DL+1.6LL+0.5SL
D5	Yes		1.2DL+1.6SL
D6	Yes		1.2DL+0.5Woop
D7	Yes		1.2DL+LL+1.6SL
D8	Yes		1.2DL+1.6SL+0.5Woop
D9	Yes		1.2DL+Woop
D10	Yes		1.2DL+0.5SL+Woop
D11	Yes		1.2DL+LL+Woop
D12	Yes		1.2DL+LL+0.5SL+Woop
D13	Yes		0.9DL+Woop
D14	Yes		1.2DL+0.2SL
D15	Yes		1.2DL+EQoop
D16	Yes		1.2DL+LL+0.2SL
D17	Yes		1.2DL+0.2SL+EQoop
D18	Yes		1.2DL+LL+EQoop
D19	Yes		1.2DL+LL+0.2SL+EQoop
D20	Yes		0.9DL+EQoop
S1	Yes		DL
S2	Yes		DL+LL
S3	Yes		DL+SL
S4	Yes		DL+0.75LL
S5	Yes		DL+0.75SL
S6	Yes		DL+0.75LL+0.75SL
S7	Yes		DL+0.6Woop
S8	Yes		DL+0.7EQoop
S9	Yes		DL+0.75LL+0.75SL+0.45Woop
S10	Yes		DL+0.75LL+0.45Woop
S11	Yes		DL+0.75SL+0.45Woop
S12	Yes		0.6DL+0.6Woop
S13	Yes		DL+0.7EQoop
S14	Yes		DL+0.75LL+0.525EQoop
S15	Yes		DL+0.75LL+0.75SL
S16	Yes		DL+0.75LL+0.75SL+0.525EQoop
S17	Yes		DL+0.525EQoop

S18	Yes	DL+0.75SL
S19	Yes	DL+0.75SL+0.525EQoop
S20	Yes	0.6DL+0.7EQoop

Loads

Concentrated loads:

Story	Condition	Direction	Magnitude [Kip]	Eccentricity [in]	Distance [ft]
1	DL	Vertical	11.50	0.00	33.78
1	SL	Vertical	35.00	0.00	33.78
1	EQ	Horizontal	102.00	0.00	0.00

Distributed loads:

Consider self weight : DL

Out-of-plane loads:

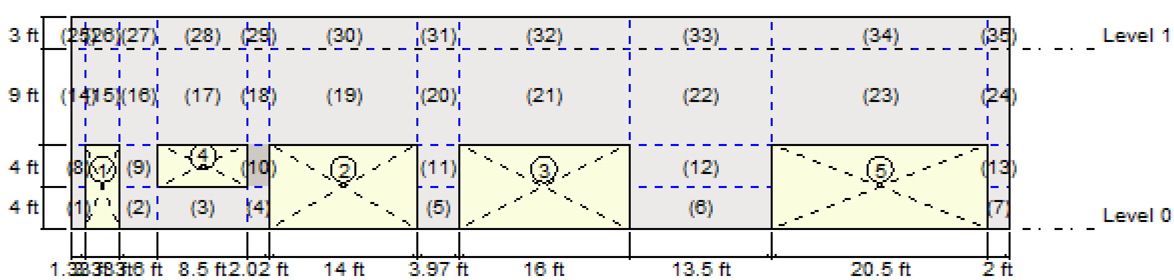
Story	Condition	Magnitude [Kip/ft2]
1	EQoop	0.02
Parapet	EQoop	0.02

Out-of-plane seismic weight:

Load condition	Coefficient
EQoop	0.44

Bearing Wall Design

Status : OK



Geometry

Level	Segment	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
0	1	0.00	0.00	1.33	4.00
	2	4.67	0.00	3.60	4.00
	3	8.27	0.00	8.50	4.00
	4	16.77	0.00	2.02	4.00
	5	32.79	0.00	3.97	4.00
	6	52.76	0.00	13.50	4.00

	7	86.76	0.00	2.00	4.00
	8	0.00	4.00	1.33	4.00
	9	4.67	4.00	3.60	4.00
	10	16.77	4.00	2.02	4.00
	11	32.79	4.00	3.97	4.00
	12	52.76	4.00	13.50	4.00
	13	86.76	4.00	2.00	4.00
	14	0.00	8.00	1.33	9.00
	15	1.33	8.00	3.33	9.00
	16	4.67	8.00	3.60	9.00
	17	8.27	8.00	8.50	9.00
	18	16.77	8.00	2.02	9.00
	19	18.79	8.00	14.00	9.00
	20	32.79	8.00	3.97	9.00
	21	36.76	8.00	16.00	9.00
	22	52.76	8.00	13.50	9.00
	23	66.26	8.00	20.50	9.00
	24	86.76	8.00	2.00	9.00
1	25	0.00	17.00	1.33	3.00
	26	1.33	17.00	3.33	3.00
	27	4.67	17.00	3.60	3.00
	28	8.27	17.00	8.50	3.00
	29	16.77	17.00	2.02	3.00
	30	18.79	17.00	14.00	3.00
	31	32.79	17.00	3.97	3.00
	32	36.76	17.00	16.00	3.00
	33	52.76	17.00	13.50	3.00
	34	66.26	17.00	20.50	3.00
	35	86.76	17.00	2.00	3.00

Vertical reinforcement

Segment	Bars	Spacing [in]	Ld [in]
1	1-#5	32.00	39.33
2	2-#5	32.00	39.33
3	4-#5	32.00	39.33
4	1-#5	24.00	39.33
5	2-#5	32.00	39.33
6	5-#5	32.00	39.33
7	1-#5	24.00	39.33
8	1-#5	32.00	39.33
9	2-#5	32.00	39.33
10	1-#5	24.00	39.33
11	2-#5	32.00	39.33
12	5-#5	32.00	39.33
13	1-#5	24.00	39.33
14	1-#5	32.00	39.33
15	2-#5	32.00	39.33
16	2-#5	32.00	39.33
17	4-#5	32.00	39.33
18	1-#5	24.00	39.33
19	6-#5	32.00	39.33
20	2-#5	32.00	39.33
21	6-#5	32.00	39.33
22	5-#5	32.00	39.33
23	8-#5	32.00	39.33
24	1-#5	24.00	39.33
25	1-#5	32.00	39.33
26	2-#5	32.00	39.33
27	2-#5	32.00	39.33
28	4-#5	32.00	39.33

29	1-#5	32.00	39.33
30	6-#5	32.00	39.33
31	2-#5	32.00	39.33
32	6-#5	32.00	39.33
33	5-#5	32.00	39.33
34	8-#5	32.00	39.33
35	1-#5	32.00	39.33

Combined axial flexure

Segment	Condition	Pu [Kip]	Mua [Kip*ft]	Mu [Kip*ft]	ϕMn [Kip*ft]	Ratio
1	D20(Max)	2.33	1.64	1.66	3.12	0.53
2	D20(Bottom)	7.26	5.34	5.42	8.70	0.62
3	D20(Max)	7.95	4.78	4.81	18.08	0.27
4	D20(Max)	5.99	4.67	5.02	6.44	0.78
5	D20(Max)	16.09	3.90	4.02	11.67	0.34
6	D20(Bottom)	34.12	13.17	13.41	34.42	0.39
7	D20(Max)	6.84	3.27	3.35	6.60	0.51
8	D20(Top)	1.89	1.70	1.72	3.01	0.57
9	D20(Top)	7.49	5.51	5.60	8.76	0.64
10	D20(Max)	8.24	5.72	6.53	6.98	0.93
11	D20(Max)	12.58	7.83	8.15	10.78	0.76
12	D20(Max)	28.51	24.81	25.37	32.95	0.77
13	D20(Max)	6.34	5.25	5.79	6.48	0.89
14	D20(Bottom)	1.88	1.69	1.70	3.00	0.57
15	D20(Max)	1.73	2.97	2.98	6.70	0.45
16	D20(Max)	7.47	5.49	5.57	8.76	0.64
17	D20(Max)	3.14	6.40	6.42	16.76	0.38
18	D20(Bottom)	8.21	5.69	6.49	6.98	0.93
19	D20(Max)	5.78	9.08	9.10	27.76	0.33
20	D20(Bottom)	12.54	7.81	8.11	10.77	0.75
21	D20(Max)	6.03	11.92	11.95	31.57	0.38
22	D20(Bottom)	28.48	24.81	25.38	32.94	0.77
23	D20(Max)	2.57	14.08	14.09	39.02	0.36
24	D20(Max)	6.32	5.24	5.78	6.48	0.89
25	D20(Bottom)	0.22	0.30	0.30	2.55	0.12
26	D20(Max)	0.61	0.71	0.71	6.40	0.11
27	D20(Max)	0.54	0.83	0.83	6.88	0.12
28	D20(Max)	1.31	1.90	1.90	16.26	0.12
29	D20(Max)	0.65	0.61	0.61	3.95	0.16
30	D20(Bottom)	2.08	3.83	3.83	26.74	0.14
31	D19(Bottom)	-2.41	0.94	0.94	6.74	0.14
32	D20(Bottom)	2.74	4.39	4.39	30.66	0.14
33	D20(Bottom)	2.89	2.91	2.91	26.03	0.11
34	D20(Max)	2.70	6.93	6.93	39.06	0.18
35	D20(Bottom)	0.32	0.12	0.12	3.83	0.03

Flexural reinforcement area

Segment	Condition	Pu [Kip]	As [in2]	Asmax [in2]	Ratio
1	D20(Bottom)	0.00	0.15	0.43	0.36
2	D20(Bottom)	0.00	0.42	1.17	0.36
3	D20(Bottom)	0.00	0.99	2.75	0.36
4	D15(Top)	0.00	0.31	0.65	0.48
5	D20(Bottom)	0.00	0.46	1.28	0.36

6	D20(Bottom)	0.00	1.57	4.37	0.36
7	D15(Top)	0.00	0.31	0.65	0.48
8	D20(Bottom)	0.00	0.15	0.43	0.36
9	D20(Max)	0.00	0.42	1.17	0.36
10	D15(Top)	0.00	0.31	0.65	0.48
11	D20(Bottom)	0.00	0.46	1.28	0.36
12	D20(Bottom)	0.00	1.57	4.37	0.36
13	D15(Top)	0.00	0.31	0.65	0.48
14	D20(Bottom)	0.00	0.15	0.43	0.36
15	D20(Max)	0.00	0.39	1.08	0.36
16	D20(Bottom)	0.00	0.42	1.17	0.36
17	D20(Max)	0.00	0.99	2.75	0.36
18	D15(Top)	0.00	0.31	0.65	0.48
19	D20(Bottom)	0.00	1.63	4.53	0.36
20	D20(Bottom)	0.00	0.46	1.28	0.36
21	D20(Max)	0.00	1.86	5.18	0.36
22	D20(Bottom)	0.00	1.57	4.37	0.36
23	D20(Max)	0.00	2.38	6.63	0.36
24	D15(Max)	0.00	0.31	0.65	0.48
25	D20(Bottom)	0.00	0.15	0.43	0.36
26	D20(Bottom)	0.00	0.39	1.08	0.36
27	D20(Bottom)	0.00	0.42	1.17	0.36
28	D20(Bottom)	0.00	0.99	2.75	0.36
29	D20(Bottom)	0.00	0.23	0.65	0.36
30	D20(Bottom)	0.00	1.63	4.53	0.36
31	D20(Bottom)	0.00	0.46	1.28	0.36
32	D20(Bottom)	0.00	1.86	5.18	0.36
33	D20(Bottom)	0.00	1.57	4.37	0.36
34	D20(Bottom)	0.00	2.38	6.63	0.36
35	D20(Bottom)	0.00	0.23	0.65	0.36

Intermediate results for axial-bending

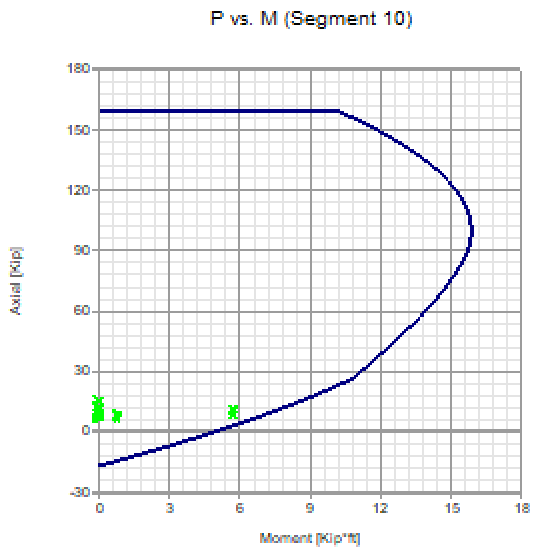
Segment	Condition	c [in]	d [in]	Mcr [Kip*ft]
1	D20(Max)	0.77	3.81	1.77
2	D20(Bottom)	0.80	3.81	1.80
3	D20(Max)	0.70	3.81	1.68
4	D20(Max)	1.09	3.81	1.90
5	D20(Max)	1.00	3.81	2.01
6	D20(Bottom)	0.85	3.81	1.85
7	D20(Max)	1.14	3.81	1.94
8	D20(Top)	0.74	3.81	1.76
9	D20(Top)	0.81	3.81	1.81
10	D20(Max)	1.20	3.81	1.92
11	D20(Max)	0.91	3.81	2.02
12	D20(Max)	0.81	3.81	1.85
13	D20(Max)	1.11	3.81	1.93
14	D20(Bottom)	0.74	3.81	1.73
15	D20(Max)	0.66	3.81	1.61
16	D20(Max)	0.81	3.81	1.80
17	D20(Max)	0.64	3.81	1.62
18	D20(Bottom)	1.20	3.81	2.01
19	D20(Max)	0.65	3.81	1.62
20	D20(Bottom)	0.91	3.81	1.92
21	D20(Max)	0.64	3.81	1.63
22	D20(Bottom)	0.81	3.81	1.81
23	D20(Max)	0.62	3.81	1.58
24	D20(Max)	1.11	3.81	1.92
25	D20(Bottom)	0.62	3.81	1.60
26	D20(Max)	0.62	3.81	1.60

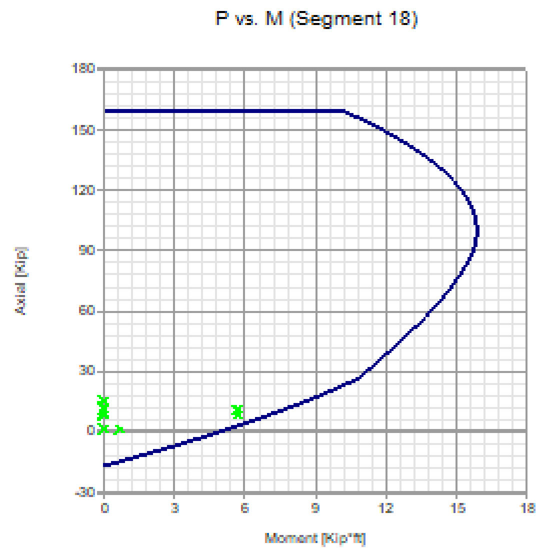
27	D20(Max)	0.62	3.81	1.60
28	D20(Max)	0.62	3.81	1.60
29	D20(Max)	0.64	3.81	1.62
30	D20(Bottom)	0.62	3.81	1.60
31	D19(Bottom)	0.55	3.81	1.58
32	D20(Bottom)	0.62	3.81	1.60
33	D20(Bottom)	0.63	3.81	1.60
34	D20(Max)	0.62	3.81	1.60
35	D20(Bottom)	0.62	3.81	1.60

Inertias

Segment	**Condition**	**Ig** [in4]	**Icr** [in4]
1	D20(Max)	444.19	33.82
2	D20(Bottom)	444.19	34.72
3	D20(Max)	444.19	31.15
4	D20(Max)	444.19	42.98
5	D20(Max)	444.19	41.93
6	D20(Bottom)	444.19	36.46
7	D20(Max)	444.19	44.43
8	D20(Top)	444.19	32.73
9	D20(Top)	444.19	34.93
10	D20(Max)	444.19	46.59
11	D20(Max)	444.19	38.70
12	D20(Max)	444.19	35.04
13	D20(Max)	444.19	43.62
14	D20(Bottom)	444.19	32.70
15	D20(Max)	444.19	29.78
16	D20(Max)	444.19	34.91
17	D20(Max)	444.19	29.30
18	D20(Bottom)	444.19	46.54
19	D20(Max)	444.19	29.44
20	D20(Bottom)	444.19	38.66
21	D20(Max)	444.19	29.32
22	D20(Bottom)	444.19	35.04
23	D20(Max)	444.19	28.50
24	D20(Max)	444.19	43.59
25	D20(Bottom)	444.19	28.63
26	D20(Max)	444.19	28.69
27	D20(Max)	444.19	28.58
28	D20(Max)	444.19	28.60
29	D20(Max)	444.19	29.15
30	D20(Bottom)	444.19	28.58
31	D19(Bottom)	444.19	26.10
32	D20(Bottom)	444.19	28.65
33	D20(Bottom)	444.19	28.79
34	D20(Max)	444.19	28.52
35	D20(Bottom)	444.19	28.61

Interaction diagrams, P vs. M





Axial compression

Segment	Condition	Pu [Kip]	ϕPn [Kip]	Ratio
1	D1(Bottom)	3.62	59.22	0.06
2	D1(Top)	11.97	160.08	0.07
3	D5(Bottom)	14.45	377.82	0.04
4	D5(Top)	11.08	89.66	0.12
5	D8(Top)	44.11	176.29	0.25
6	D1(Bottom)	53.07	599.79	0.09
7	D1(Bottom)	10.65	88.82	0.12
8	D1(Bottom)	3.48	59.22	0.06
9	D1(Bottom)	11.96	160.08	0.07
10	D5(Top)	15.73	89.66	0.18
11	D8(Bottom)	44.21	176.29	0.25
12	D1(Bottom)	52.84	599.79	0.09
13	D1(Bottom)	10.33	88.82	0.12
14	D1(Bottom)	2.92	59.22	0.05
15	D18(Max)	2.30	148.08	0.02
16	D1(Bottom)	11.62	160.08	0.07
17	D1(Top)	5.64	377.82	0.01
18	D5(Bottom)	15.68	89.66	0.17
19	D8(Top)	19.83	622.01	0.03
20	D5(Bottom)	35.70	176.29	0.20
21	D5(Bottom)	16.41	710.86	0.02
22	D1(Bottom)	44.31	599.79	0.07
23	D1(Top)	5.08	910.80	0.01
24	D1(Bottom)	9.82	88.82	0.11
25	D1(Bottom)	0.34	103.88	0.00
26	D1(Bottom)	0.95	259.74	0.00
27	D1(Bottom)	0.84	280.78	0.00
28	D1(Bottom)	2.04	662.72	0.00
29	D8(Bottom)	1.48	157.34	0.01
30	D5(Top)	4.71	1091.03	0.00
31	DM1(Top)	-0.08	309.23	0.00
32	D8(Bottom)	4.38	1246.89	0.00
33	D1(Bottom)	4.50	1052.06	0.00
34	D1(Bottom)	4.20	1597.58	0.00
35	D1(Bottom)	0.49	155.86	0.00

Axial stress

Segment	Condition	Pu [Kip]	Pu/Ag [Kip/in2]	Fn [Kip/in2]	Ratio
1	D1(Bottom)	3.62	0.03	0.30	0.10
2	D1(Top)	11.97	0.04	0.30	0.12
3	D5(Bottom)	14.45	0.02	0.30	0.06
4	D8(Top)	11.08	0.06	0.30	0.20
5	D5(Top)	44.11	0.12	0.30	0.40
6	D1(Bottom)	53.07	0.04	0.30	0.14
7	D1(Bottom)	10.65	0.06	0.30	0.19
8	D1(Bottom)	3.48	0.03	0.30	0.10
9	D1(Bottom)	11.96	0.04	0.30	0.12
10	D5(Top)	15.73	0.09	0.30	0.28
11	D8(Bottom)	44.21	0.12	0.30	0.41
12	D1(Bottom)	52.84	0.04	0.30	0.14
13	D1(Bottom)	10.33	0.06	0.30	0.19
14	D1(Bottom)	2.92	0.02	0.30	0.08
15	D18(Max)	2.30	0.01	0.30	0.03
16	D1(Bottom)	11.62	0.04	0.30	0.12
17	D1(Top)	5.64	0.01	0.30	0.02
18	D5(Bottom)	15.68	0.08	0.30	0.28
19	D8(Top)	19.83	0.02	0.30	0.05
20	D8(Bottom)	35.70	0.10	0.30	0.33
21	D5(Bottom)	16.41	0.01	0.30	0.04
22	D1(Bottom)	44.31	0.04	0.30	0.12
23	D1(Top)	5.08	0.00	0.30	0.01
24	D1(Bottom)	9.82	0.05	0.30	0.18
25	D1(Bottom)	0.34	0.00	0.30	0.01
26	D1(Bottom)	0.95	0.00	0.30	0.01
27	D1(Bottom)	0.84	0.00	0.30	0.01
28	D1(Bottom)	2.04	0.00	0.30	0.01
29	D5(Bottom)	1.48	0.01	0.30	0.03
30	D5(Top)	4.71	0.00	0.30	0.01
31	D5(Max)	-9.79	0.03	0.30	0.09
32	D8(Bottom)	4.38	0.00	0.30	0.01
33	D1(Bottom)	4.50	0.00	0.30	0.01
34	D1(Bottom)	4.20	0.00	0.30	0.01
35	D1(Bottom)	0.49	0.00	0.30	0.01

Shear

Segment	Condition	Vu [Kip]	ϕVn [Kip]	Ratio
1	D20(Bottom)	0.29	3.54	0.08
2	D20(Bottom)	0.36	3.59	0.10
3	D20(Max)	0.17	3.38	0.05
4	D20(Top)	0.55	3.83	0.14
5	D20(Bottom)	0.36	4.01	0.09
6	D20(Max)	0.38	3.70	0.10
7	D20(Bottom)	0.31	3.88	0.08
8	D20(Top)	0.31	3.47	0.09
9	D20(Max)	0.34	3.61	0.09
10	D20(Top)	0.97	4.01	0.24
11	D20(Max)	0.43	3.83	0.11
12	D20(Max)	0.41	3.61	0.11

13	D20(Top)	0.82	3.83	0.22
14	D20(Max)	0.31	3.47	0.09
15	D20(Bottom)	0.70	5.38	0.13
16	D20(Bottom)	0.34	3.61	0.09
17	D20(Bottom)	0.32	4.51	0.07
18	D20(Max)	0.96	4.00	0.24
19	D20(Top)	0.24	3.28	0.07
20	D20(Max)	0.43	3.82	0.11
21	D20(Bottom)	0.26	3.71	0.07
22	D20(Max)	0.41	3.61	0.11
23	D20(Top)	0.30	3.22	0.09
24	D20(Bottom)	0.81	3.82	0.21
25	D20(Max)	0.13	3.22	0.04
26	D20(Max)	0.12	3.23	0.04
27	D20(Bottom)	0.13	3.22	0.04
28	D20(Max)	0.12	3.22	0.04
29	D20(Max)	0.16	3.26	0.05
30	D20(Max)	0.14	3.22	0.04
31	D20(Bottom)	0.12	3.19	0.04
32	D20(Max)	0.14	3.23	0.04
33	D20(Max)	0.12	3.23	0.04
34	D20(Bottom)	0.16	3.22	0.05
35	D20(Bottom)	0.06	3.22	0.02

Deflection

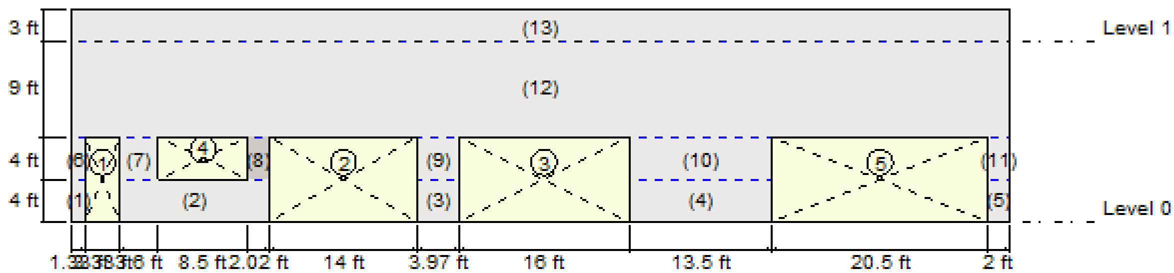
Segment	Condition	δs [in]	δmax [in]	δs/δmax
1	S8(Max)	0.07	1.43	0.05
2	S20(Bottom)	0.09	1.43	0.06
3	S8(Max)	0.03	1.43	0.02
4	S8(Max)	0.14	1.43	0.10
5	S8(Max)	0.06	1.43	0.04
6	S20(Bottom)	0.06	1.43	0.04
7	S8(Max)	0.10	1.43	0.07
8	S8(Top)	0.08	1.43	0.05
9	S8(Top)	0.09	1.43	0.07
10	S20(Max)	0.26	1.43	0.19
11	S8(Top)	0.12	1.43	0.08
12	S8(Top)	0.11	1.43	0.08
13	S20(Top)	0.19	1.43	0.13
14	S20(Bottom)	0.08	1.43	0.05
15	S20(Max)	0.05	1.43	0.04
16	S20(Bottom)	0.09	1.43	0.06
17	S8(Max)	0.05	1.43	0.03
18	S20(Max)	0.26	1.43	0.18
19	S20(Max)	0.04	1.43	0.03
20	S8(Max)	0.12	1.43	0.08
21	S8(Max)	0.05	1.43	0.03
22	S20(Bottom)	0.11	1.43	0.08
23	S20(Max)	0.04	1.43	0.03
24	S20(Bottom)	0.18	1.43	0.13
25	S8(Max)	0.00	0.25	0.00
26	S20(Bottom)	0.00	0.25	0.00
27	S20(Bottom)	0.00	0.25	0.00
28	S20(Bottom)	0.00	0.25	0.00
29	S20(Bottom)	0.00	0.25	0.00
30	S20(Bottom)	0.00	0.25	0.00
31	S8(Max)	0.00	0.25	0.00

32	S20(Bottom)	0.00	0.25	0.00
33	S8(Max)	0.00	0.25	0.00
34	S20(Bottom)	0.00	0.25	0.00
35	S20(Bottom)	0.00	0.25	0.00

All segments where excessive flexural reinforcement area is noted are tied column elements, and therefore does not apply.

Shear Wall Design

Status : Warnings in design
- Excessive flexural reinforcement area, TMS 402-16 SD, 9.3.3.2 (Segment 1)



Geometry

Level	Segment	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
0	1	0.00	0.00	1.33	4.00
	2	4.67	0.00	14.13	4.00
	3	32.79	0.00	3.97	4.00
	4	52.76	0.00	13.50	4.00
	5	86.76	0.00	2.00	4.00
	6	0.00	4.00	1.33	4.00
	7	4.67	4.00	3.60	4.00
	8	16.77	4.00	2.02	4.00
	9	32.79	4.00	3.97	4.00
	10	52.76	4.00	13.50	4.00
	11	86.76	4.00	2.00	4.00
	12	0.00	8.00	88.76	9.00
1	13	0.00	17.00	88.76	3.00

Reinforcement

Segment	Vertical reinforcement Bars	Vertical Spacing [in]	Vertical Ld [in]	Horizontal reinforcement Bars	Horizontal Spacing [in]	Horizontal Ld [in]
1	1-#5	32.00	39.33	6-#5	8.00	39.33
2	2-#5	32.00	39.33	2-#5	32.00	39.33
	4-#5	32.00	39.33	2-#5	32.00	39.33
	1-#5	24.00	39.33	2-#5	32.00	39.33
3	2-#5	32.00	39.33	3-#5	16.00	39.33
4	5-#5	32.00	39.33	2-#5	32.00	39.33
5	1-#5	24.00	39.33	6-#5	8.00	39.33
6	1-#5	32.00	39.33	6-#5	8.00	39.33
7	2-#5	32.00	39.33	3-#5	16.00	39.33
8	1-#5	24.00	39.33	6-#5	8.00	39.33
9	2-#5	32.00	39.33	3-#5	16.00	39.33
10	5-#5	32.00	39.33	2-#5	32.00	39.33
11	1-#5	24.00	39.33	6-#5	8.00	39.33
12	1-#5	32.00	39.33	4-#5	32.00	39.33
	2-#5	32.00	39.33	4-#5	32.00	39.33

	2-#5	32.00	39.33	4-#5	32.00	39.33
	4-#5	32.00	39.33	4-#5	32.00	39.33
	1-#5	24.00	39.33	4-#5	32.00	39.33
	6-#5	32.00	39.33	4-#5	32.00	39.33
	2-#5	32.00	39.33	4-#5	32.00	39.33
	6-#5	32.00	39.33	4-#5	32.00	39.33
	5-#5	32.00	39.33	4-#5	32.00	39.33
	8-#5	32.00	39.33	4-#5	32.00	39.33
	1-#5	24.00	39.33	4-#5	32.00	39.33
13	1-#5	32.00	39.33	2-#5	32.00	39.33
	2-#5	32.00	39.33	2-#5	32.00	39.33
	2-#5	32.00	39.33	2-#5	32.00	39.33
	4-#5	32.00	39.33	2-#5	32.00	39.33
	1-#5	32.00	39.33	2-#5	32.00	39.33
	6-#5	32.00	39.33	2-#5	32.00	39.33
	2-#5	32.00	39.33	2-#5	32.00	39.33
	6-#5	32.00	39.33	2-#5	32.00	39.33
	5-#5	32.00	39.33	2-#5	32.00	39.33
	8-#5	32.00	39.33	2-#5	32.00	39.33
	1-#5	32.00	39.33	2-#5	32.00	39.33

Combined axial flexure

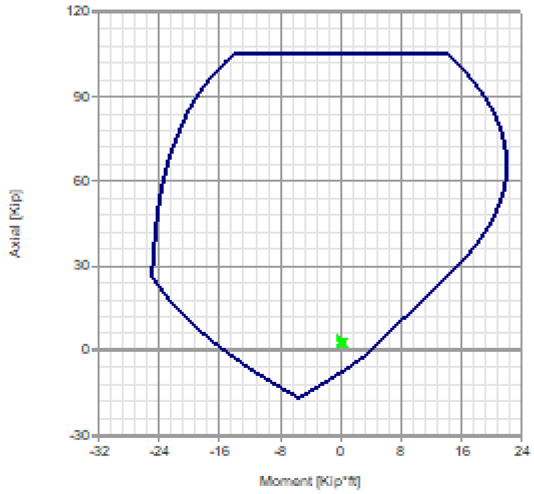
Segment	Condition	Pu [Kip]	Mu [Kip*ft]	ϕMn [Kip*ft]	Ratio
1	D5(Top)	2.56	0.19	4.88	0.04
2	D5(Bottom)	34.89	-49.25	977.42	0.05
3	D5(Top)	44.11	2.09	119.00	0.02
4	D8(Top)	49.30	10.22	732.86	0.01
5	D1(Top)	10.22	-1.28	34.44	0.04
6	D5(Bottom)	2.59	0.17	4.89	0.03
7	D8(Top)	10.24	-2.61	71.72	0.04
8	D8(Bottom)	11.39	1.18	12.22	0.10
9	D5(Top)	35.84	-8.11	120.45	0.07
10	D5(Bottom)	49.36	9.88	733.22	0.01
11	D1(Max)	10.07	2.08	11.16	0.19
12	D5(Max)	86.36	748.96	27468.70	0.03
13	D5(Max)	-7.88	-148.37	28047.21	0.01

Flexural reinforcement area

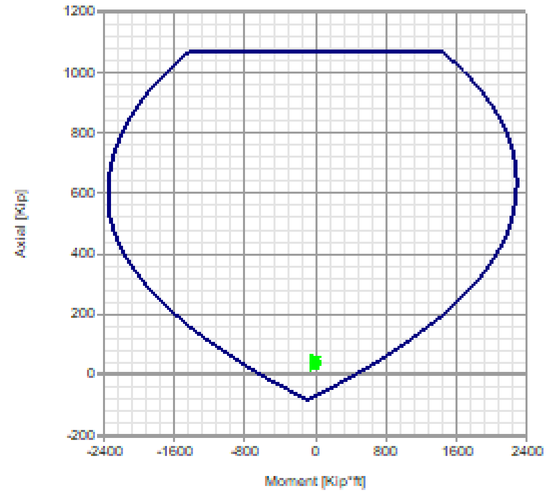
Segment	Condition	Pu [Kip]	As [in2]	Asmax [in2]	Ratio
1	DM1(Top)	0.00	0.31	0.11	2.84
2	D20(Bottom)	0.00	2.17	55.99	0.04
3	D20(Bottom)	0.00	0.62	9.26	0.07
4	D20(Bottom)	0.00	1.55	28.31	0.05
5	D20(Bottom)	0.00	0.31	0.56	0.55
6	DM1(Bottom)	0.00	0.31	0.11	2.84
7	DM1(Top)	0.00	0.62	2.92	0.21
8	DM1(Bottom)	0.00	0.31	0.21	1.45
9	D20(Top)	0.00	0.62	2.07	0.30
10	D20(Bottom)	0.00	1.55	6.11	0.25
11	DM1(Top)	0.00	0.31	0.11	2.84
12	DM1(Top)	0.00	11.78	65.81	0.18
13	D20(Bottom)	0.00	11.78	294.82	0.04

Interaction diagrams, P vs. M

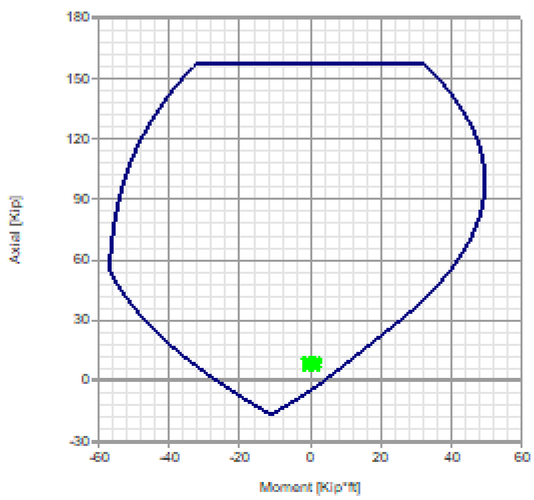
P vs. M (Segment 1)



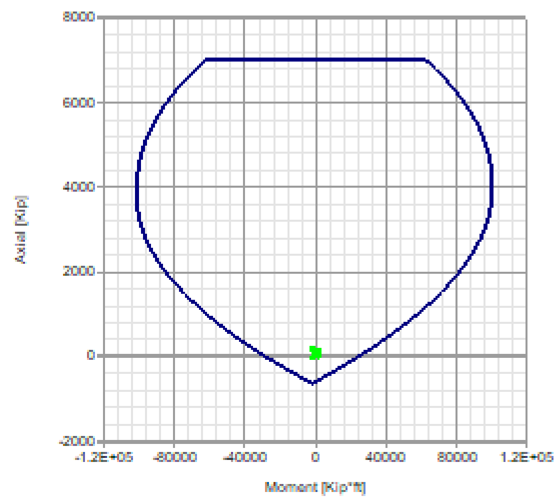
P vs. M (Segment 10)



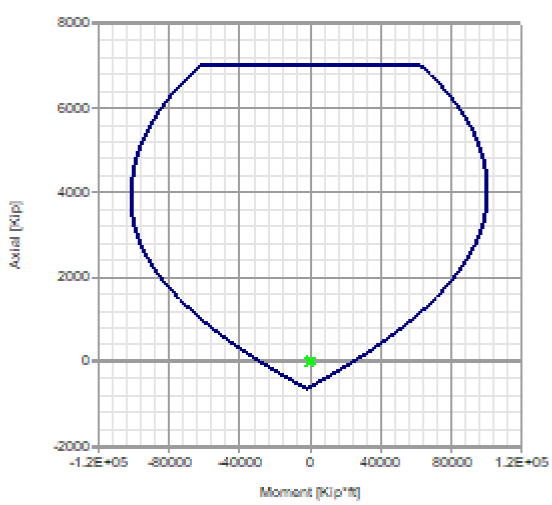
P vs. M (Segment 11)



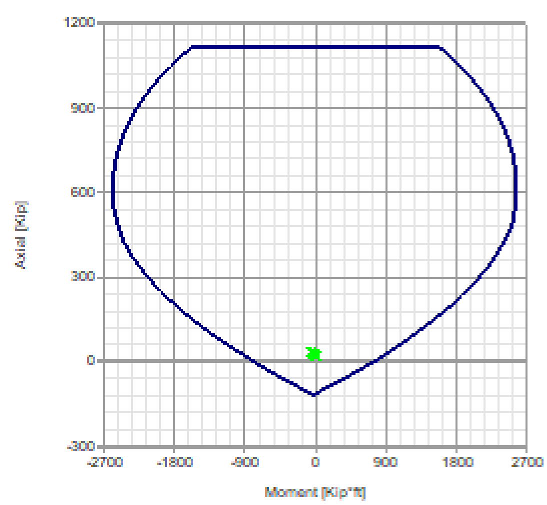
P vs. M (Segment 12)

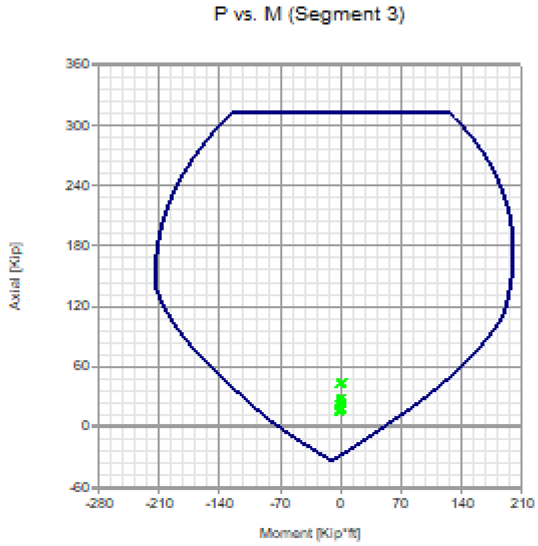


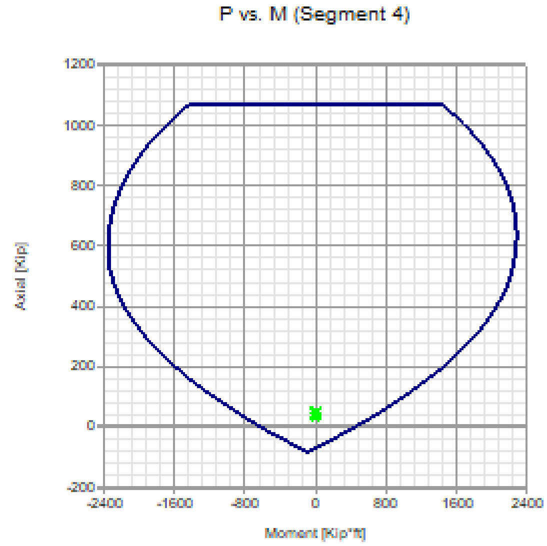
P vs. M (Segment 13)

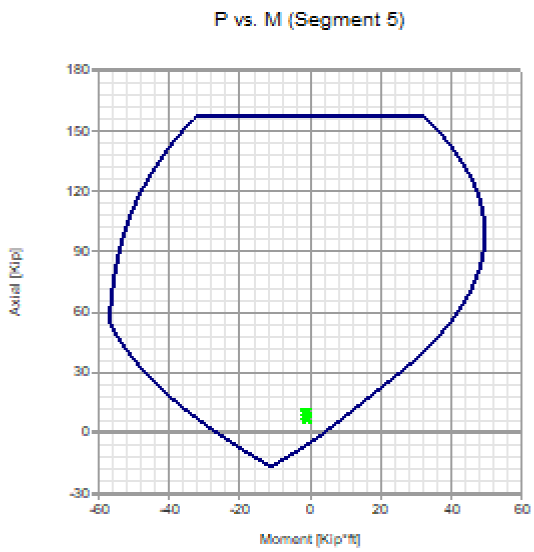


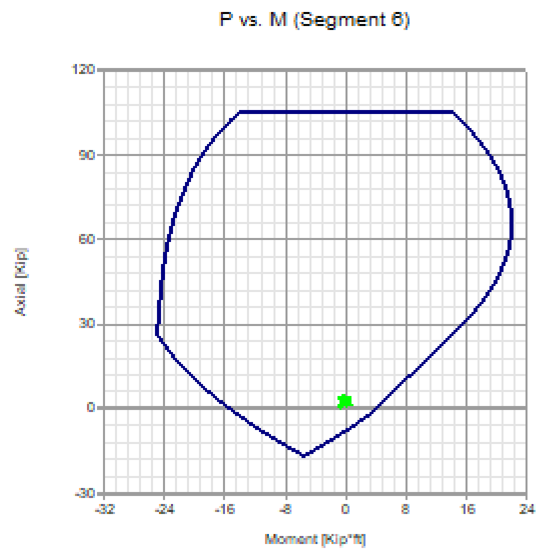
P vs. M (Segment 2)

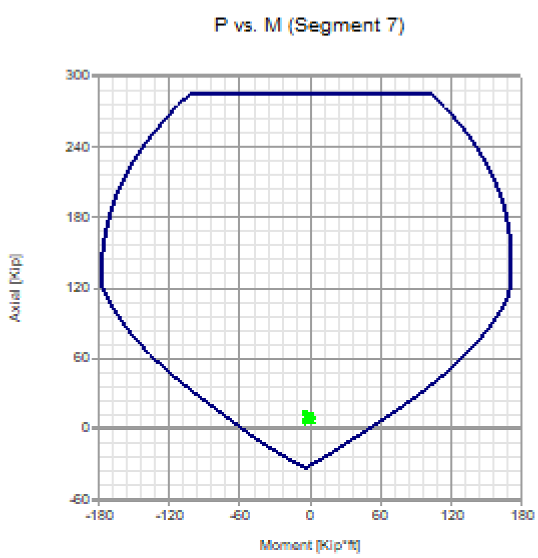


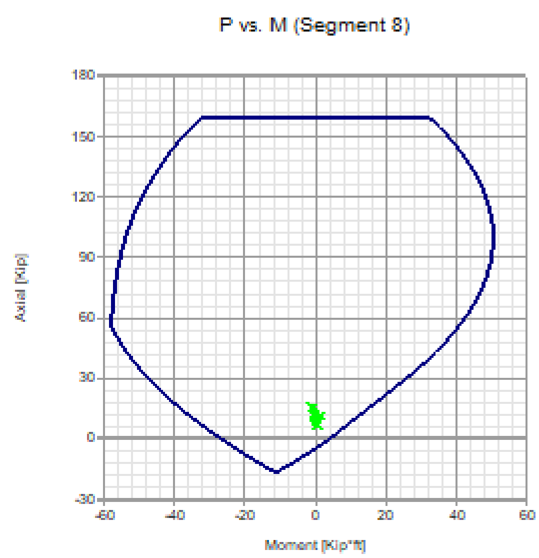

P vs. M (Segment 3)
Axial [Kip]
Moment [Kip*ft]
360
300
240
180
120
60
0
-60
-280
-210
-140
-70
0
70
140
210

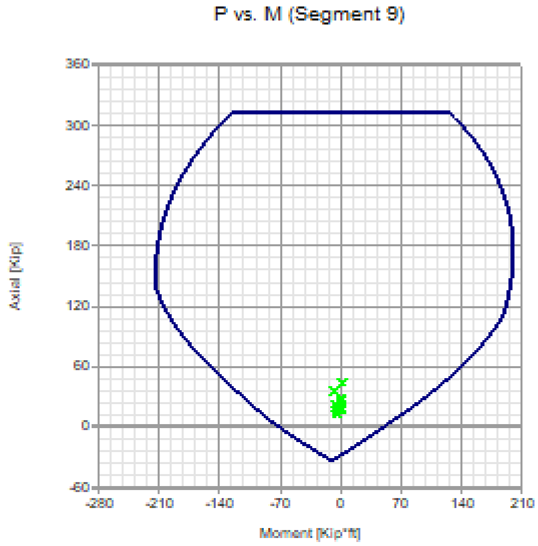

P vs. M (Segment 4)
Axial [Kip]
Moment [Kip*ft]
1200
1000
800
600
400
200
0
-200
-2400
-1600
-800
0
800
1600
2400


P vs. M (Segment 5)
Axial [Kip]
Moment [Kip*ft]
180
150
120
90
60
30
0
-30
-60
-40
-20
0
20
40
60


P vs. M (Segment 6)
Axial [Kip]
Moment [Kip*ft]
120
90
60
30
0
-30
-32
-24
-16
-8
0
8
16
24


P vs. M (Segment 7)
Axial [Kip]
Moment [Kip*ft]
300
240
180
120
60
0
-60
-180
-120
-60
0
60
120
180


P vs. M (Segment 8)
Axial [Kip]
Moment [Kip*ft]
180
150
120
90
60
30
0
-30
-60
-40
-20
0
20
40
60



Axial compression

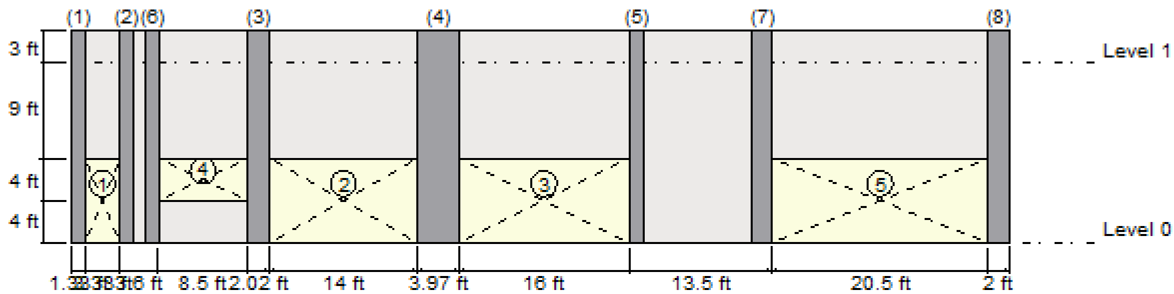
Segment	Condition	Pu [Kip]	ϕPn [Kip]	Ratio
1	D1(Bottom)	3.62	59.15	0.06
2	D5(Bottom)	34.89	627.35	0.06
3	D8(Top)	44.11	176.22	0.25
4	D1(Bottom)	53.07	599.80	0.09
5	D1(Bottom)	10.65	88.82	0.12
6	D1(Bottom)	3.49	59.15	0.06
7	D1(Bottom)	11.95	159.98	0.07
8	D8(Top)	15.73	89.67	0.18
9	D5(Bottom)	44.23	176.22	0.25
10	D1(Bottom)	52.85	599.80	0.09
11	D1(Bottom)	10.36	88.82	0.12
12	D5(Bottom)	146.66	3942.81	0.04
13	D1(Bottom)	20.29	6915.87	0.00

Shear

Segment	Condition	Vu [Kip]	ϕVn [Kip]	Ratio
1	D8(Max)	0.50	14.59	0.03
2	D5(Max)	16.40	164.53	0.10
3	D5(Max)	3.61	57.61	0.06
4	D5(Max)	12.72	184.70	0.07
5	D1(Max)	2.19	21.56	0.10
6	D8(Max)	0.33	12.10	0.03
7	D8(Max)	3.04	44.90	0.07
8	D5(Max)	9.68	27.49	0.35
9	D5(Max)	2.80	49.99	0.06
10	D8(Max)	6.53	179.73	0.04
11	D1(Max)	2.30	18.16	0.13
12	D5(Max)	14.38	827.74	0.02
13	D5(Max)	2.91	996.61	0.00

Column Design

Status : OK



Geometry

Column	Distance [ft]	Position Z	Width X [in]	Width Z [in]	Height [ft]
1	0.67	Centered	16.00	8.00	20.00
2	5.33	Centered	16.00	8.00	20.00
3	17.80	Centered	24.00	8.00	20.00
4	34.77	Centered	48.00	8.00	20.00
5	53.43	Centered	16.00	8.00	20.00
6	7.66	Centered	16.00	8.00	20.00
7	65.33	Centered	24.00	8.00	20.00
8	87.75	Centered	24.00	8.00	20.00

Reinforcement

Column	Longitudinal reinforcement Bars	As [in2]	Ld [in]	Transverse reinforcement Bars	Spacing [in]
1	4-#4	0.80	25.17	#4	8.00
2	4-#4	0.80	25.17	#4	8.00
3	4-#4	0.80	25.17	#4	8.00
4	8-#4	1.60	40.28	#4	8.00
5	4-#4	0.80	25.17	#4	8.00
6	4-#4	0.80	25.17	#4	8.00
7	4-#4	0.80	25.17	#4	8.00
8	4-#4	0.80	25.17	#4	8.00

Combined axial - flexure along X direction

Column	Condition	Pu [Kip]	Mu [Kip*ft]	ϕMn [Kip*ft]	Ratio
1	D5(Bottom)	3.06	0.26	9.59	0.03
2	D5(Bottom)	4.72	0.29	9.83	0.03
3	D8(Max)	6.31	0.86	11.70	0.07
4	D5(Max)	21.76	5.14	25.17	0.20
5	D8(Bottom)	5.80	0.21	9.98	0.02
6	D8(Max)	4.71	0.27	9.82	0.03
7	D1(Max)	2.90	0.41	11.17	0.04
8	D1(Bottom)	11.68	1.87	12.54	0.15

Flexural reinforcement area

Column	Condition	Pu [Kip]	As [in2]	Asmax [in2]	Ratio
1	DM1(Top)	0.00	0.80	0.97	0.82
2	DM1(Top)	0.00	0.80	0.97	0.82
3	DM1(Top)	0.00	0.80	1.46	0.55
4	D20(Bottom)	0.00	1.60	2.65	0.00
5	DM1(Top)	0.00	0.80	0.97	0.82
6	DM1(Top)	0.00	0.80	0.97	0.82
7	DM1(Top)	0.00	0.80	1.46	0.55
8	DM1(Top)	0.00	0.80	1.46	0.55

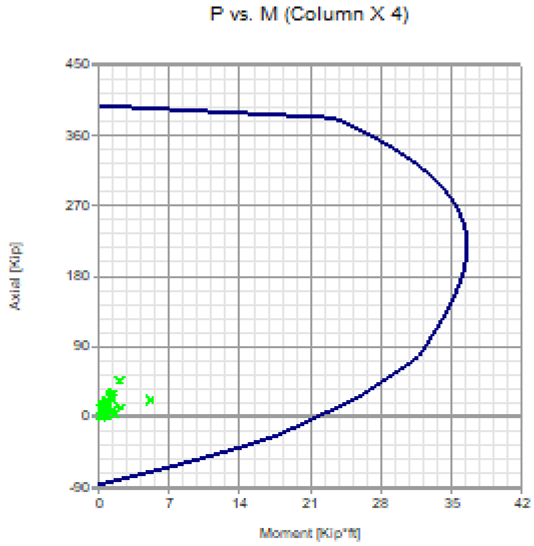
Combined axial - flexure along Z direction

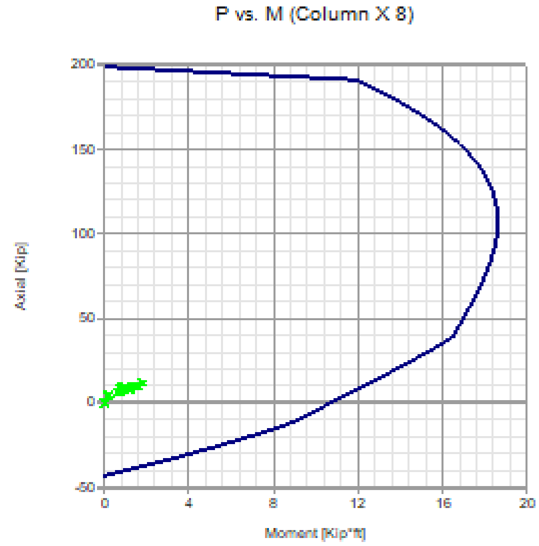
Column	Condition	Pu [Kip]	Mu [Kip*ft]	ϕMn [Kip*ft]	Ratio
1	D20(Bottom)	2.63	3.69	22.73	0.16
2	D20(Bottom)	3.37	3.90	23.06	0.17
3	D20(Bottom)	6.91	7.75	41.33	0.19
4	D20(Bottom)	17.78	17.16	184.19	0.09
5	D20(Bottom)	3.68	7.26	23.20	0.31
6	D20(Bottom)	2.85	4.18	22.83	0.18
7	D20(Bottom)	6.14	10.62	40.73	0.26
8	D20(Bottom)	7.51	9.46	41.79	0.23

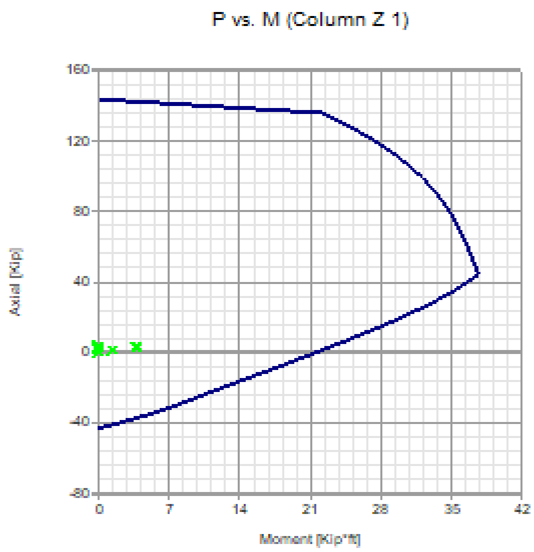
Flexural reinforcement area

Column	Condition	Pu [Kip]	As [in2]	Asmax [in2]	Ratio
1	DM1(Top)	0.00	0.80	4.05	0.00
2	DM1(Top)	0.00	0.80	4.05	0.00
3	D20(Top)	0.00	0.80	15.35	0.05
4	DM1(Top)	0.00	1.60	40.96	0.00
5	DM1(Top)	0.00	0.80	4.05	0.00
6	D20(Top)	0.00	0.80	4.05	0.20
7	D20(Top)	0.00	0.80	15.35	0.05
8	D19(Top)	0.00	0.80	15.35	0.05

Interaction diagrams, P vs. M







Axial compression

Column	Condition	Pu [Kip]	ϕPn [Kip]	Ratio
1	D1(Bottom)	4.10	86.53	0.05
2	D1(Bottom)	5.24	86.53	0.06
3	D5(Bottom)	12.18	119.82	0.10
4	D5(Bottom)	46.37	239.63	0.19
5	D8(Bottom)	5.80	86.53	0.07
6	D1(Max)	5.14	86.53	0.06
7	D1(Bottom)	9.55	119.82	0.08
8	D1(Bottom)	11.68	119.82	0.10

Shear along X direction

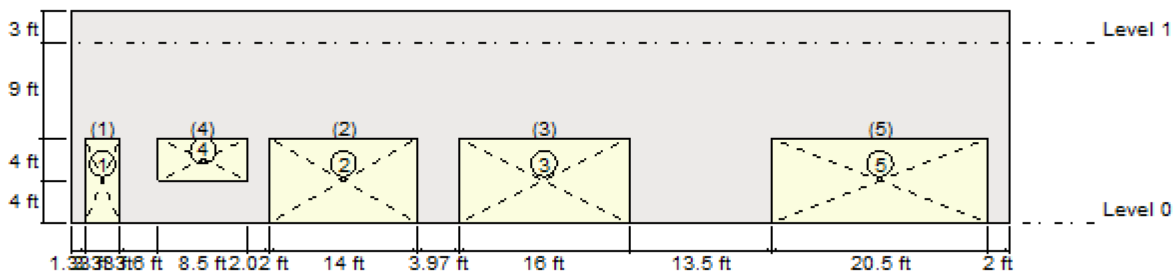
Column	Condition	Vu [Kip]	ϕVn [Kip]	Ratio
1	D19(Bottom)	0.06	26.27	0.00
2	D19(Bottom)	0.08	26.27	0.00
3	D8(Max)	0.40	93.27	0.00
4	D5(Max)	0.79	331.14	0.00
5	D5(Max)	0.16	39.41	0.00
6	D5(Max)	0.13	39.41	0.00
7	D19(Max)	0.20	63.21	0.00
8	D15(Max)	0.49	63.21	0.01

Shear along Z direction

Column	Condition	Vu [Kip]	ϕVn [Kip]	Ratio
1	D19(Bottom)	1.15	15.54	0.07
2	D17(Bottom)	1.22	15.57	0.08
3	D15(Bottom)	2.27	23.42	0.10
4	D20(Bottom)	5.31	41.10	0.13
5	D20(Bottom)	2.31	15.62	0.15
6	D15(Bottom)	1.29	15.62	0.08
7	D15(Bottom)	3.27	23.42	0.14
8	D18(Bottom)	2.86	17.26	0.17

Lintel Design

Status : OK



Geometry

Lintel	X Coordinate [ft]	Y Coordinate [ft]	Length [ft]	Depth [in]
1	1.33	0.00	3.33	16.00
2	18.79	0.00	14.00	40.00
3	36.76	0.00	16.00	40.00
4	8.27	4.00	8.50	40.00
5	66.26	0.00	20.50	40.00

Reinforcement

Lintel	Top long. reinforcement Bars	Top long. reinforcement Extent [in]	Bottom long. reinforcement Bars	Bottom long. reinforcement Extent [in]	Transverse reinforcement Bars	Transverse reinforcement Spacing [in]	Ld [in]
1	1-#7	0.00	1-#7	0.00	--	0.00	0.00
2	1-#7	20.50	1-#7	0.00	--	0.00	0.00
3	1-#7	26.00	1-#7	0.00	--	0.00	0.00
4	1-#7	4.50	1-#7	0.00	--	0.00	0.00
5	1-#7	0.00	1-#7	0.00	--	0.00	0.00

Bending

Lintel	Condition	Mu [Kip*ft]	ϕMn [Kip*ft]	Ratio
1	D8(Top)	0.19	31.31	0.01
2	D8(Top)	32.46	96.10	0.34
3	D12(Bottom)	-42.98	96.10	0.45
4	D14(Bottom)	-3.77	96.10	0.04
5	D1(Top)	31.90	96.10	0.33

Flexural reinforcement area

Segment	Condition	Pu [Kip]	As [in2]	Asmax [in2]	Ratio
1		0.00	0.00	0.00	0.00
2	D20(Bottom)	0.00	1.20	4.08	0.29
3	D20(Bottom)	0.00	1.20	4.08	0.29
4	D20(Bottom)	0.00	1.20	4.08	0.29
5	D20(Bottom)	0.00	1.20	4.08	0.29

Cracking moment

Lintel	Condition	1.3 Mcr [Kip*ft]	Mn [Kip*ft]	Ratio
1	DM1(Top)	2.96	34.79	0.09
2	D20(Bottom)	18.52	106.77	0.17
3	D20(Bottom)	18.52	106.77	0.17
4	D20(Bottom)	18.52	106.77	0.17
5	D20(Bottom)	18.52	106.77	0.17

Shear

Lintel	Condition	Vu [Kip]	ϕVn [Kip]	Ratio
1	D1(Bottom)	0.72	7.21	0.10
2	D5(Top)	10.98	19.98	0.55
3	D8(Bottom)	10.83	19.98	0.54
4	D5(Top)	3.16	19.98	0.16
5	D1(Top)	14.49	19.98	0.73

Deflection

Lintel	Condition	δs [in]	δmax [in]	Ratio
1	S3(Top)	0.00	0.07	0.00
2	S3(Top)	0.05	0.28	0.17
3	S19(Bottom)	-0.05	0.32	0.16
4	S3(Bottom)	0.00	0.17	0.01
5	S17(Top)	0.10	0.41	0.25

Notes

* Pu = Factored axial load
* Pn = Nominal compression strength
* δ = Moment magnification factor
* Mu = Factored total flexural moment
* Mua = Factored flexural moment from analysis
* Mn = Nominal moment strength
* Mcr = Nominal cracking moment
* ft = Stress due to flexural tension
* fc = Stress due to flexural compression
* Fn = Nominal stress
* Vu = Factored shear force
* Vn = Nominal shear strength
* Vf = Nominal shear friction strength
* δs = Calculated deflection
* δmax = Maximum allowable deflection
* ld = Embedment length
* Ag = Gross cross sectional area of a member
* As = Effective cross sectional area of reinforcement
* c = Distance from the fiber of maximum compressive strain to the neutral axis
* d = Distance from the extreme compression fiber to centroid of tension reinforcement

RAM Elements

Current Date: 8/28/2024 11:01 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Grid 6\B and E Wall with openings.msw

Design Results
Masonry wall

General Information

Global status : N. G.

Design code	:	TMS 402-16 SD

Materials:

Material	:	CMU 2.0-60
Mortar type	:	Port/Mort - M/S
Grouting type	:	Full grouting
Masonry compression strength (F`m)	:	2 [Kip/in2]
Steel tension strength (fy)	:	60 [Kip/in2]
Steel allowable tension strength (Fs)	:	24 [Kip/in2]
Steel elasticity modulus (Es)	:	29000 [Kip/in2]
Masonry elasticity modulus (Em)	:	1800 [Kip/in2]
Masonry unit weight	:	0.135 [Kip/ft3]

Seismic data:

Seismic design category	:	SDC D
Response modification factor	:	5.00
Shear wall type	:	Nonparticipating

Geometry

Total height	:	20.00 [ft]
Total length	:	60.00 [ft]
Foundation type	:	Continuous
Wall bottom restraint	:	Pinned
Column bottom restraint	:	Fixed
Rigidity elements	:	Columns

Number of stories: 1

Story	Story height [ft]	Wall thickness [in]	Effective unit weight [Kip/ft3]
1	17.00	7.63	0.14

Openings:

Reference	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
Lower left	4.66	0.00	3.33	7.33
Lower left	1.33	13.00	2.00	2.00
Lower left	10.66	0.00	10.00	10.00
Lower left	24.66	0.00	3.33	7.33
Lower left	30.66	0.00	14.00	10.00
Lower left	48.00	0.00	8.00	10.00

Columns:

Distance [ft]	Width X [in]	Width Z [in]	Position Z
0.66	16.00	8.00	Centered
4.00	16.00	8.00	Centered
9.33	32.00	8.00	Centered
22.66	48.00	8.00	Centered
29.33	32.00	8.00	Centered
46.33	40.00	8.00	Centered
57.00	24.00	8.00	Centered

Load Conditions

ID	Comb.	Category	Description
DL	No	DL	Dead Load
SL	No	SNOW	Snow Load
EQ	No	EQ	EQ Load
WL	No	WIND	Wind Load
EQoop	No	EQ	EQ Load out of plane
WLoop	No	WIND	Wind Load out of plane
SM1	Yes		DL
DM1	Yes		DL
D1	Yes		1.4DL
D2	Yes		1.2DL+0.5SL
D3	Yes		1.2DL+1.6SL
D4	Yes		1.2DL+0.5WL
D5	Yes		1.2DL+0.5WLoop
D6	Yes		1.2DL+1.6SL+0.5WL
D7	Yes		1.2DL+1.6SL+0.5WLoop
D8	Yes		1.2DL+WL
D9	Yes		1.2DL+WLoop
D10	Yes		1.2DL+0.5SL+WL
D11	Yes		1.2DL+0.5SL+WLoop
D12	Yes		0.9DL+WL
D13	Yes		0.9DL+WLoop
D14	Yes		1.2DL+0.2SL
D15	Yes		1.2DL+EQ
D16	Yes		1.2DL+EQoop
D17	Yes		1.2DL+0.2SL+EQ
D18	Yes		1.2DL+0.2SL+EQoop
D19	Yes		0.9DL+EQ
D20	Yes		0.9DL+EQoop
S1	Yes		DL
S2	Yes		DL+SL
S3	Yes		DL+0.75SL
S4	Yes		DL+0.6WL
S5	Yes		DL+0.6WLoop
S6	Yes		DL+0.7EQ
S7	Yes		DL+0.7EQoop
S8	Yes		DL+0.75SL+0.45WL
S9	Yes		DL+0.75SL+0.45WLoop
S10	Yes		0.6DL+0.6WL
S11	Yes		0.6DL+0.6WLoop
S12	Yes		DL+0.7EQ
S13	Yes		DL+0.7EQoop
S14	Yes		DL+0.525EQ
S15	Yes		DL+0.525EQoop
S16	Yes		DL+0.75SL
S17	Yes		DL+0.75SL+0.525EQ

S18	Yes	DL+0.75SL+0.525EQoop
S19	Yes	0.6DL+0.7EQ
S20	Yes	0.6DL+0.7EQoop

Loads

In-plane seismic weight:

Load condition	Coefficient
EQoop	0.44

Distributed loads:

Consider self weight : DL

Out-of-plane loads:

Story	Condition	Magnitude [Kip/ft2]
1	WLoop	0.02
Parapet	WLoop	0.02

Out-of-plane seismic weight:

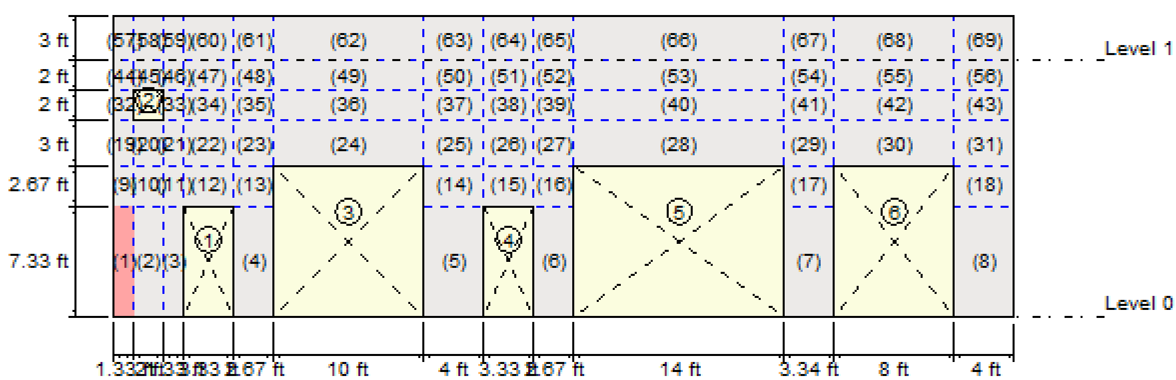
Load condition	Coefficient
EQoop	0.44

This is resolved in the column design by having ties in all of the sections of the wall

Bearing Wall Design

Status : N. G.

- Insufficient combined axial-flexural strength, TMS 402-16 SD, 9.2.4.1(a) (Segment 1)



Geometry

Level	Segment	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
0	1	0.00	0.00	1.33	7.33
	2	1.33	0.00	2.00	7.33
	3	3.33	0.00	1.33	7.33
	4	7.99	0.00	2.67	7.33
	5	20.66	0.00	4.00	7.33

	6	27.99	0.00	2.67	7.33
	7	44.66	0.00	3.34	7.33
	8	56.00	0.00	4.00	7.33
	9	0.00	7.33	1.33	2.67
	10	1.33	7.33	2.00	2.67
	11	3.33	7.33	1.33	2.67
	12	4.66	7.33	3.33	2.67
	13	7.99	7.33	2.67	2.67
	14	20.66	7.33	4.00	2.67
	15	24.66	7.33	3.33	2.67
	16	27.99	7.33	2.67	2.67
	17	44.66	7.33	3.34	2.67
	18	56.00	7.33	4.00	2.67
	19	0.00	10.00	1.33	3.00
	20	1.33	10.00	2.00	3.00
	21	3.33	10.00	1.33	3.00
	22	4.66	10.00	3.33	3.00
	23	7.99	10.00	2.67	3.00
	24	10.66	10.00	10.00	3.00
	25	20.66	10.00	4.00	3.00
	26	24.66	10.00	3.33	3.00
	27	27.99	10.00	2.67	3.00
	28	30.66	10.00	14.00	3.00
	29	44.66	10.00	3.34	3.00
	30	48.00	10.00	8.00	3.00
	31	56.00	10.00	4.00	3.00
	32	0.00	13.00	1.33	2.00
	33	3.33	13.00	1.33	2.00
	34	4.66	13.00	3.33	2.00
	35	7.99	13.00	2.67	2.00
	36	10.66	13.00	10.00	2.00
	37	20.66	13.00	4.00	2.00
	38	24.66	13.00	3.33	2.00
	39	27.99	13.00	2.67	2.00
	40	30.66	13.00	14.00	2.00
	41	44.66	13.00	3.34	2.00
	42	48.00	13.00	8.00	2.00
	43	56.00	13.00	4.00	2.00
	44	0.00	15.00	1.33	2.00
	45	1.33	15.00	2.00	2.00
	46	3.33	15.00	1.33	2.00
	47	4.66	15.00	3.33	2.00
	48	7.99	15.00	2.67	2.00
	49	10.66	15.00	10.00	2.00
	50	20.66	15.00	4.00	2.00
	51	24.66	15.00	3.33	2.00
	52	27.99	15.00	2.67	2.00
	53	30.66	15.00	14.00	2.00
	54	44.66	15.00	3.34	2.00
	55	48.00	15.00	8.00	2.00
	56	56.00	15.00	4.00	2.00

1	57	0.00	17.00	1.33	3.00
	58	1.33	17.00	2.00	3.00
	59	3.33	17.00	1.33	3.00
	60	4.66	17.00	3.33	3.00
	61	7.99	17.00	2.67	3.00
	62	10.66	17.00	10.00	3.00
	63	20.66	17.00	4.00	3.00
	64	24.66	17.00	3.33	3.00
	65	27.99	17.00	2.67	3.00
	66	30.66	17.00	14.00	3.00
	67	44.66	17.00	3.34	3.00
	68	48.00	17.00	8.00	3.00
	69	56.00	17.00	4.00	3.00

Vertical reinforcement

Segment	Bars	Spacing [in]	Ld [in]
1	1-#5	32.00	34.07
2	1-#5	32.00	34.07
3	1-#5	32.00	34.07
4	1-#5	32.00	34.07
5	2-#5	32.00	34.07
6	1-#5	32.00	34.07
7	2-#5	32.00	34.07
8	2-#5	32.00	34.07
9	1-#5	32.00	34.07
10	1-#5	32.00	34.07
11	1-#5	32.00	34.07
12	2-#5	32.00	34.07
13	1-#5	32.00	34.07
14	2-#5	32.00	34.07
15	2-#5	32.00	34.07
16	1-#5	32.00	34.07
17	2-#5	32.00	34.07
18	2-#5	32.00	34.07
19	1-#5	32.00	34.07
20	1-#5	32.00	34.07
21	1-#5	32.00	34.07
22	2-#5	32.00	34.07
23	1-#5	32.00	34.07
24	4-#5	32.00	34.07
25	2-#5	32.00	34.07
26	2-#5	32.00	34.07
27	1-#5	32.00	34.07
28	6-#5	32.00	34.07
29	2-#5	32.00	34.07
30	3-#5	32.00	34.07
31	2-#5	32.00	34.07
32	1-#5	32.00	34.07
33	1-#5	32.00	34.07
34	2-#5	32.00	34.07
35	1-#5	32.00	34.07
36	4-#5	32.00	34.07
37	2-#5	32.00	34.07
38	2-#5	32.00	34.07
39	1-#5	32.00	34.07
40	6-#5	32.00	34.07
41	2-#5	32.00	34.07
42	3-#5	32.00	34.07
43	2-#5	32.00	34.07
44	1-#5	32.00	34.07
45	1-#5	32.00	34.07
46	1-#5	32.00	34.07
47	2-#5	32.00	34.07
48	1-#5	32.00	34.07
49	4-#5	32.00	34.07
50	2-#5	32.00	34.07
51	2-#5	32.00	34.07
52	1-#5	32.00	34.07
53	6-#5	32.00	34.07
54	2-#5	32.00	34.07
55	3-#5	32.00	34.07
56	2-#5	32.00	34.07
57	1-#5	32.00	34.07
58	1-#5	32.00	34.07
59	1-#5	32.00	34.07

60	2-#5	32.00	34.07
61	1-#5	32.00	34.07
62	4-#5	32.00	34.07
63	2-#5	32.00	34.07
64	2-#5	32.00	34.07
65	1-#5	32.00	34.07
66	6-#5	32.00	34.07
67	2-#5	32.00	34.07
68	3-#5	32.00	34.07
69	2-#5	32.00	34.07

Combined axial flexure

Segment	Condition	Pu [Kip]	Mua [Kip*ft]	Mu [Kip*ft]	ϕMn [Kip*ft]	Ratio
1	D20(Max)	-7.38	2.48	2.19	0.31	7.19
2	D20(Top)	0.45	1.57	1.58	3.93	0.40
3	D20(Max)	6.73	2.88	3.03	4.38	0.69
4	D20(Top)	6.32	2.80	2.83	6.86	0.41
5	D20(Max)	7.42	4.49	4.53	9.70	0.47
6	D20(Top)	8.01	3.37	3.42	7.32	0.47
7	D20(Top)	8.27	4.21	4.27	8.68	0.49
8	D20(Top)	8.39	3.98	4.03	9.97	0.40
9	D20(Max)	3.18	1.11	1.13	3.42	0.33
10	D20(Max)	0.57	1.69	1.69	3.96	0.43
11	D20(Max)	-2.33	1.21	1.20	1.85	0.65
12	D20(Top)	0.56	2.63	2.63	6.49	0.41
13	D20(Max)	0.69	2.88	2.88	5.27	0.55
14	D20(Bottom)	7.43	4.48	4.53	9.70	0.47
15	D20(Top)	1.64	3.07	3.08	6.80	0.45
16	D20(Top)	1.65	3.37	3.39	5.55	0.61
17	D20(Top)	7.09	5.45	5.51	8.35	0.66
18	D20(Max)	7.70	4.81	4.86	9.78	0.50
19	D20(Top)	2.82	1.01	1.02	3.32	0.31
20	D20(Bottom)	1.05	1.50	1.51	4.10	0.37
21	D20(Bottom)	-0.97	0.94	0.93	2.25	0.42
22	D20(Bottom)	0.57	2.63	2.63	6.49	0.41
23	D20(Max)	0.69	2.87	2.87	5.27	0.54
24	D20(Max)	2.19	3.11	3.12	19.63	0.16
25	D20(Max)	10.51	4.46	4.52	10.56	0.43
26	D20(Max)	1.63	3.07	3.08	6.80	0.45
27	D20(Max)	1.64	3.36	3.37	5.54	0.61
28	D20(Max)	3.01	3.56	3.56	27.47	0.13
29	D20(Bottom)	7.04	5.41	5.47	8.34	0.66
30	D20(Max)	2.40	2.98	2.99	15.89	0.19
31	D20(Max)	7.01	4.67	4.71	9.59	0.49
32	D20(Bottom)	2.83	1.01	1.02	3.33	0.31
33	D20(Max)	0.66	0.97	0.97	2.72	0.36
34	D20(Bottom)	0.73	1.84	1.84	6.54	0.28
35	D20(Max)	-0.80	1.23	1.23	4.84	0.25
36	D20(Max)	3.73	2.98	2.98	20.07	0.15
37	D20(Max)	4.26	2.03	2.04	8.81	0.23
38	D20(Bottom)	0.92	1.80	1.81	6.59	0.27
39	D20(Max)	0.46	1.29	1.29	5.21	0.25
40	D20(Max)	4.56	3.45	3.46	27.91	0.12
41	D20(Max)	2.32	1.51	1.52	7.01	0.22
42	D20(Bottom)	2.83	2.68	2.69	16.02	0.17
43	D20(Bottom)	1.99	2.19	2.20	8.17	0.27
44	D13(Max)	0.45	0.45	0.45	2.66	0.17
45	D20(Max)	0.67	0.39	0.39	3.99	0.10

46	D13(Top)	0.39	0.42	0.42	2.64	0.16
47	D20(Top)	-0.28	0.74	0.74	6.25	0.12
48	D13(Top)	0.28	1.03	1.03	5.15	0.20
49	D20(Top)	0.38	2.30	2.30	19.11	0.12
50	D13(Max)	0.24	1.81	1.81	7.67	0.24
51	D20(Top)	0.87	0.82	0.82	6.58	0.12
52	D20(Top)	-1.59	1.09	1.08	4.62	0.23
53	D20(Top)	1.60	3.54	3.54	27.06	0.13
54	D9(Top)	-0.28	1.59	1.59	6.27	0.25
55	D20(Max)	2.58	1.65	1.65	15.94	0.10
56	D20(Top)	0.02	1.21	1.21	7.61	0.16
57	D20(Bottom)	0.79	0.20	0.20	2.75	0.07
58	D20(Bottom)	0.69	0.38	0.38	4.00	0.10
59	D20(Max)	0.15	0.14	0.14	2.57	0.06
60	D20(Bottom)	1.17	0.74	0.74	6.66	0.11
61	D20(Bottom)	0.20	0.26	0.26	5.13	0.05
62	D20(Max)	0.37	2.32	2.32	19.11	0.12
63	D20(Bottom)	1.21	0.40	0.40	7.95	0.05
64	D20(Bottom)	0.27	0.98	0.98	6.40	0.15
65	D20(Max)	1.51	0.17	0.17	5.51	0.03
66	D20(Max)	0.59	3.66	3.66	26.77	0.14
67	D20(Max)	1.15	0.22	0.22	6.68	0.03
68	D20(Bottom)	1.28	1.75	1.75	15.57	0.11
69	D20(Bottom)	0.57	0.66	0.66	7.76	0.09

Flexural reinforcement area

Segment	Condition	Pu [Kip]	As [in2]	Asmax [in2]	Ratio
1	D5(Top)	0.00	0.15	0.57	0.27
2	D5(Top)	0.00	0.23	0.86	0.27
3	D5(Top)	0.00	0.15	0.57	0.27
4	D5(Top)	0.00	0.31	1.15	0.27
5	D5(Top)	0.00	0.46	1.72	0.27
6	D5(Top)	0.00	0.31	1.15	0.27
7	D5(Top)	0.00	0.39	1.44	0.27
8	D5(Top)	0.00	0.46	1.72	0.27
9	D5(Top)	0.00	0.15	0.57	0.27
10	D5(Top)	0.00	0.23	0.86	0.27
11	D5(Top)	0.00	0.15	0.57	0.27
12	D5(Top)	0.00	0.39	1.44	0.27
13	D5(Top)	0.00	0.31	1.15	0.27
14	D5(Top)	0.00	0.46	1.72	0.27
15	D5(Top)	0.00	0.39	1.44	0.27
16	D5(Top)	0.00	0.31	1.15	0.27
17	D5(Top)	0.00	0.39	1.44	0.27
18	D5(Top)	0.00	0.46	1.72	0.27
19	D5(Top)	0.00	0.15	0.57	0.27
20	D5(Top)	0.00	0.23	0.86	0.27
21	D5(Top)	0.00	0.15	0.57	0.27
22	D5(Top)	0.00	0.39	1.44	0.27
23	D5(Top)	0.00	0.31	1.15	0.27
24	D5(Top)	0.00	1.16	4.31	0.27
25	D5(Top)	0.00	0.46	1.72	0.27
26	D5(Top)	0.00	0.39	1.44	0.27
27	D5(Top)	0.00	0.31	1.15	0.27
28	D5(Top)	0.00	1.63	6.03	0.27
29	D5(Top)	0.00	0.39	1.44	0.27
30	D5(Top)	0.00	0.93	3.45	0.27

31	D5(Top)	0.00	0.46	1.72	0.27
32	D5(Max)	0.00	0.15	0.57	0.27
33	D5(Max)	0.00	0.15	0.57	0.27
34	D5(Max)	0.00	0.39	1.44	0.27
35	D5(Max)	0.00	0.31	1.15	0.27
36	D5(Max)	0.00	1.16	4.31	0.27
37	D5(Max)	0.00	0.46	1.72	0.27
38	D5(Max)	0.00	0.39	1.44	0.27
39	D5(Max)	0.00	0.31	1.15	0.27
40	D5(Max)	0.00	1.63	6.03	0.27
41	D5(Max)	0.00	0.39	1.44	0.27
42	D5(Max)	0.00	0.93	3.45	0.27
43	D5(Max)	0.00	0.46	1.72	0.27
44	D5(Top)	0.00	0.15	0.57	0.27
45	D5(Top)	0.00	0.23	0.86	0.27
46	D5(Top)	0.00	0.15	0.57	0.27
47	D5(Top)	0.00	0.39	1.44	0.27
48	D5(Top)	0.00	0.31	1.15	0.27
49	D5(Top)	0.00	1.16	4.31	0.27
50	D5(Top)	0.00	0.46	1.72	0.27
51	D5(Top)	0.00	0.39	1.44	0.27
52	D5(Top)	0.00	0.31	1.15	0.27
53	D5(Top)	0.00	1.63	6.03	0.27
54	D5(Top)	0.00	0.39	1.44	0.27
55	D5(Top)	0.00	0.93	3.45	0.27
56	D5(Top)	0.00	0.46	1.72	0.27
57	D5(Top)	0.00	0.15	0.57	0.27
58	D5(Max)	0.00	0.23	0.86	0.27
59	D5(Max)	0.00	0.15	0.57	0.27
60	D5(Max)	0.00	0.39	1.44	0.27
61	D5(Top)	0.00	0.31	1.15	0.27
62	D5(Max)	0.00	1.16	4.31	0.27
63	D5(Top)	0.00	0.46	1.72	0.27
64	D5(Max)	0.00	0.39	1.44	0.27
65	D5(Top)	0.00	0.31	1.15	0.27
66	D5(Max)	0.00	1.63	6.03	0.27
67	D5(Top)	0.00	0.39	1.44	0.27
68	D5(Max)	0.00	0.93	3.45	0.27
69	D5(Max)	0.00	0.46	1.72	0.27

Intermediate results for axial-bending

Segment	Condition	c [in]	d [in]	Mcr [Kip*ft]
1	D20(Max)	0.05	3.81	1.58
2	D20(Top)	0.47	3.81	1.58
3	D20(Max)	0.82	3.81	2.12
4	D20(Top)	0.63	3.81	2.00
5	D20(Max)	0.59	3.81	1.76
6	D20(Top)	0.67	3.81	2.10
7	D20(Top)	0.63	3.81	1.89
8	D20(Top)	0.61	3.81	1.88
9	D20(Max)	0.63	3.81	1.75
10	D20(Max)	0.47	3.81	1.61
11	D20(Max)	0.33	3.81	1.58
12	D20(Top)	0.47	3.81	1.60
13	D20(Max)	0.47	3.81	1.83
14	D20(Bottom)	0.59	3.81	1.78
15	D20(Top)	0.49	3.81	1.60
16	D20(Top)	0.50	3.81	1.90

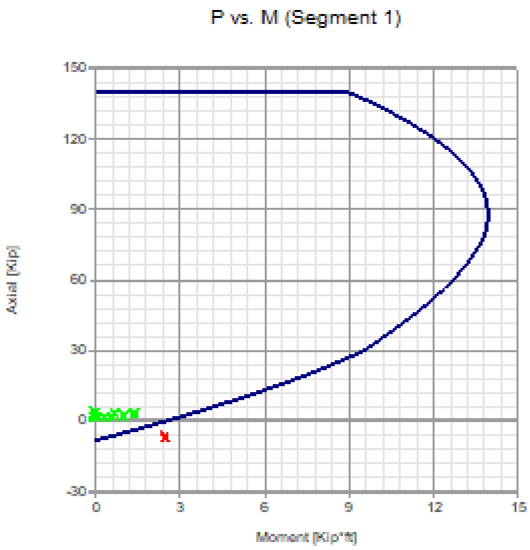
17	D20(Top)	0.61	3.81	1.84
18	D20(Max)	0.59	3.81	1.80
19	D20(Top)	0.61	3.81	1.84
20	D20(Bottom)	0.49	3.81	1.64
21	D20(Bottom)	0.40	3.81	1.58
22	D20(Bottom)	0.47	3.81	1.60
23	D20(Max)	0.47	3.81	1.61
24	D20(Max)	0.47	3.81	1.58
25	D20(Max)	0.64	3.81	1.86
26	D20(Max)	0.49	3.81	1.63
27	D20(Max)	0.50	3.81	1.65
28	D20(Max)	0.47	3.81	1.58
29	D20(Bottom)	0.61	3.81	1.80
30	D20(Max)	0.48	3.81	1.60
31	D20(Max)	0.58	3.81	1.77
32	D20(Bottom)	0.61	3.81	1.81
33	D20(Max)	0.49	3.81	1.63
34	D20(Bottom)	0.47	3.81	1.60
35	D20(Max)	0.43	3.81	1.58
36	D20(Max)	0.48	3.81	1.62
37	D20(Max)	0.53	3.81	1.69
38	D20(Bottom)	0.47	3.81	1.61
39	D20(Max)	0.47	3.81	1.60
40	D20(Max)	0.48	3.81	1.62
41	D20(Max)	0.50	3.81	1.66
42	D20(Bottom)	0.48	3.81	1.62
43	D20(Bottom)	0.49	3.81	1.63
44	D13(Max)	0.48	3.81	1.76
45	D20(Max)	0.48	3.81	1.62
46	D13(Top)	0.48	3.81	1.62
47	D20(Top)	0.45	3.81	1.58
48	D13(Top)	0.46	3.81	1.58
49	D20(Top)	0.46	3.81	1.60
50	D13(Max)	0.46	3.81	1.65
51	D20(Top)	0.47	3.81	1.61
52	D20(Top)	0.41	3.81	1.58
53	D20(Top)	0.46	3.81	1.59
54	D9(Top)	0.45	3.81	1.60
55	D20(Max)	0.48	3.81	1.61
56	D20(Top)	0.45	3.81	1.58
57	D20(Bottom)	0.50	3.81	1.64
58	D20(Bottom)	0.48	3.81	1.62
59	D20(Max)	0.46	3.81	1.59
60	D20(Bottom)	0.48	3.81	1.62
61	D20(Bottom)	0.46	3.81	1.59
62	D20(Max)	0.46	3.81	1.59
63	D20(Bottom)	0.48	3.81	1.61
64	D20(Bottom)	0.46	3.81	1.59
65	D20(Max)	0.50	3.81	1.64
66	D20(Max)	0.46	3.81	1.59
67	D20(Max)	0.48	3.81	1.62
68	D20(Bottom)	0.47	3.81	1.60
69	D20(Bottom)	0.46	3.81	1.60

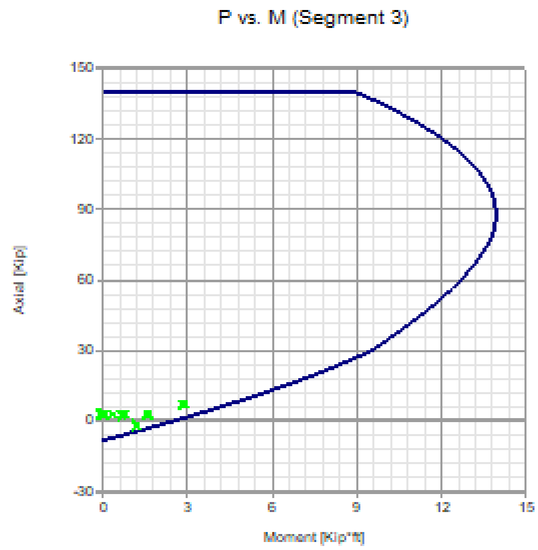
Inertias

Segment	**Condition**	**Ig** [in4]	**Icr** [in4]
1	D20(Max)	444.19	5.42
2	D20(Top)	444.19	22.74
3	D20(Max)	444.19	34.86
4	D20(Top)	444.19	28.13
5	D20(Max)	444.19	26.86

6	D20(Top)	444.19	29.70
7	D20(Top)	444.19	28.40
8	D20(Top)	444.19	27.46
9	D20(Max)	444.19	28.19
10	D20(Max)	444.19	22.89
11	D20(Max)	444.19	17.42
12	D20(Top)	444.19	22.59
13	D20(Max)	444.19	22.83
14	D20(Bottom)	444.19	26.86
15	D20(Top)	444.19	23.42
16	D20(Top)	444.19	23.74
17	D20(Top)	444.19	27.52
18	D20(Max)	444.19	27.03
19	D20(Top)	444.19	27.52
20	D20(Bottom)	444.19	23.51
21	D20(Bottom)	444.19	20.23
22	D20(Bottom)	444.19	22.60
23	D20(Max)	444.19	22.82
24	D20(Max)	444.19	22.72
25	D20(Max)	444.19	28.77
26	D20(Max)	444.19	23.42
27	D20(Max)	444.19	23.74
28	D20(Max)	444.19	22.71
29	D20(Bottom)	444.19	27.49
30	D20(Max)	444.19	22.93
31	D20(Max)	444.19	26.60
32	D20(Bottom)	444.19	27.53
33	D20(Max)	444.19	23.43
34	D20(Bottom)	444.19	22.73
35	D20(Max)	444.19	21.37
36	D20(Max)	444.19	23.12
37	D20(Max)	444.19	24.88
38	D20(Bottom)	444.19	22.87
39	D20(Max)	444.19	22.60
40	D20(Max)	444.19	23.00
41	D20(Max)	444.19	23.94
42	D20(Bottom)	444.19	23.07
43	D20(Bottom)	444.19	23.44
44	D13(Max)	444.19	23.03
45	D20(Max)	444.19	23.03
46	D13(Top)	444.19	22.91
47	D20(Top)	444.19	21.94
48	D13(Top)	444.19	22.43
49	D20(Top)	444.19	22.25
50	D13(Max)	444.19	22.31
51	D20(Top)	444.19	22.83
52	D20(Top)	444.19	20.59
53	D20(Top)	444.19	22.45
54	D9(Top)	444.19	21.93
55	D20(Max)	444.19	22.99
56	D20(Top)	444.19	22.17
57	D20(Bottom)	444.19	23.69
58	D20(Bottom)	444.19	23.05
59	D20(Max)	444.19	22.46
60	D20(Bottom)	444.19	23.06
61	D20(Bottom)	444.19	22.35
62	D20(Max)	444.19	22.25
63	D20(Bottom)	444.19	22.94
64	D20(Bottom)	444.19	22.36
65	D20(Max)	444.19	23.62
66	D20(Max)	444.19	22.26
67	D20(Max)	444.19	23.04
68	D20(Bottom)	444.19	22.57
69	D20(Bottom)	444.19	22.52

Interaction diagrams, P vs. M





Axial compression

Segment	Condition	Pu [Kip]	ϕPn [Kip]	Ratio
1	D1(Bottom)	4.05	78.79	0.05
2	D1(Bottom)	5.50	118.48	0.05
3	D18(Bottom)	7.48	78.79	0.09
4	D18(Bottom)	12.62	158.17	0.08
5	D1(Bottom)	16.45	236.95	0.07
6	D18(Bottom)	15.69	158.17	0.10
7	D1(Bottom)	15.73	197.86	0.08
8	D18(Bottom)	13.90	236.95	0.06
9	D16(Top)	3.53	78.79	0.04
10	D1(Bottom)	3.75	118.48	0.03
11	D1(Bottom)	3.15	78.79	0.04
12	D1(Top)	3.29	197.27	0.02
13	D16(Bottom)	7.88	158.17	0.05
14	D18(Top)	12.42	236.95	0.05
15	D1(Top)	3.76	197.27	0.02
16	D18(Bottom)	10.00	158.17	0.06
17	D1(Bottom)	13.43	197.86	0.07
18	D16(Bottom)	10.40	236.95	0.04
19	D18(Bottom)	3.53	78.79	0.04
20	D1(Bottom)	2.46	118.48	0.02
21	D1(Bottom)	1.63	78.79	0.02
22	D1(Bottom)	3.29	197.27	0.02
23	D1(Bottom)	5.41	158.17	0.03
24	D18(Top)	4.32	592.39	0.01
25	D16(Max)	12.35	236.95	0.05
26	D1(Bottom)	3.76	197.27	0.02
27	D1(Bottom)	7.04	158.17	0.04
28	D16(Top)	5.32	829.34	0.01
29	D1(Bottom)	11.21	197.86	0.06
30	D16(Top)	3.26	473.91	0.01
31	D16(Max)	8.67	236.95	0.04
32	D18(Bottom)	3.13	78.79	0.04
33	D1(Bottom)	1.39	78.79	0.02

34	D1(Bottom)	2.73	197.27	0.01
35	D1(Bottom)	2.26	158.17	0.01
36	D18(Bottom)	4.35	592.39	0.01
37	D18(Bottom)	5.14	236.95	0.02
38	D1(Bottom)	2.86	197.27	0.01
39	D1(Bottom)	2.93	158.17	0.02
40	D16(Max)	5.39	829.34	0.01
41	D1(Bottom)	4.38	197.86	0.02
42	D16(Max)	3.30	473.91	0.01
43	D1(Bottom)	4.17	236.95	0.02
44	D18(Bottom)	2.47	78.79	0.03
45	D16(Top)	0.79	118.48	0.01
46	D16(Top)	0.90	78.79	0.01
47	D1(Bottom)	1.75	197.27	0.01
48	D1(Bottom)	0.48	158.17	0.00
49	D1(Top)	2.21	592.39	0.00
50	D16(Bottom)	2.73	236.95	0.01
51	D1(Bottom)	1.80	197.27	0.01
52	D1(Bottom)	0.34	158.17	0.00
53	D1(Top)	3.23	829.34	0.00
54	D16(Bottom)	0.59	197.86	0.00
55	D18(Max)	3.08	473.91	0.01
56	D1(Bottom)	1.73	236.95	0.01
57	D16(Max)	0.88	138.20	0.01
58	D18(Bottom)	0.78	207.81	0.00
59	D1(Bottom)	0.45	138.20	0.00
60	D18(Bottom)	1.34	346.01	0.00
61	D1(Bottom)	1.13	277.43	0.00
62	D1(Bottom)	1.42	1039.07	0.00
63	D1(Bottom)	1.71	415.63	0.00
64	D16(Top)	0.58	346.01	0.00
65	D16(Max)	1.83	277.43	0.01
66	D1(Bottom)	1.63	1454.70	0.00
67	D1(Bottom)	2.05	347.05	0.01
68	D18(Bottom)	1.50	831.26	0.00
69	D1(Bottom)	1.39	415.63	0.00

Axial stress

Segment	Condition	Pu [Kip]	Pu/Ag [Kip/in2]	Fn [Kip/in2]	Ratio
1	D20(Bottom)	-7.38	0.06	0.40	0.15
2	D1(Bottom)	5.50	0.03	0.40	0.08
3	D18(Bottom)	7.48	0.06	0.40	0.15
4	D18(Bottom)	12.62	0.05	0.40	0.13
5	D1(Bottom)	16.45	0.04	0.40	0.11
6	D18(Bottom)	15.69	0.06	0.40	0.16
7	D1(Bottom)	15.73	0.05	0.40	0.13
8	D18(Bottom)	13.90	0.04	0.40	0.09
9	D18(Top)	3.53	0.03	0.40	0.07
10	D1(Bottom)	3.75	0.02	0.40	0.05
11	D1(Bottom)	3.15	0.03	0.40	0.06
12	D1(Top)	3.29	0.01	0.40	0.03
13	D16(Bottom)	7.88	0.03	0.40	0.08
14	D18(Top)	12.42	0.03	0.40	0.08
15	D1(Top)	3.76	0.01	0.40	0.03
16	D16(Bottom)	10.00	0.04	0.40	0.10
17	D1(Bottom)	13.43	0.04	0.40	0.11
18	D16(Bottom)	10.40	0.03	0.40	0.07

19	D18(Bottom)	3.53	0.03	0.40	0.07
20	D1(Bottom)	2.46	0.01	0.40	0.03
21	D1(Bottom)	1.63	0.01	0.40	0.03
22	D1(Bottom)	3.29	0.01	0.40	0.03
23	D1(Bottom)	5.41	0.02	0.40	0.06
24	D18(Top)	4.32	0.00	0.40	0.01
25	D16(Max)	12.35	0.03	0.40	0.08
26	D1(Bottom)	3.76	0.01	0.40	0.03
27	D1(Bottom)	7.04	0.03	0.40	0.07
28	D16(Top)	5.32	0.00	0.40	0.01
29	D1(Bottom)	11.21	0.04	0.40	0.09
30	D18(Top)	3.26	0.00	0.40	0.01
31	D18(Bottom)	8.67	0.02	0.40	0.06
32	D18(Bottom)	3.13	0.03	0.40	0.06
33	D1(Bottom)	1.39	0.01	0.40	0.03
34	D1(Bottom)	2.73	0.01	0.40	0.02
35	D1(Bottom)	2.26	0.01	0.40	0.02
36	D16(Max)	4.35	0.00	0.40	0.01
37	D16(Max)	5.14	0.01	0.40	0.04
38	D1(Bottom)	2.86	0.01	0.40	0.02
39	D1(Bottom)	2.93	0.01	0.40	0.03
40	D18(Bottom)	5.39	0.00	0.40	0.01
41	D1(Bottom)	4.38	0.01	0.40	0.04
42	D18(Bottom)	3.30	0.00	0.40	0.01
43	D1(Bottom)	4.17	0.01	0.40	0.03
44	D18(Bottom)	2.47	0.02	0.40	0.05
45	D18(Max)	0.79	0.00	0.40	0.01
46	D18(Max)	0.90	0.01	0.40	0.02
47	D1(Bottom)	1.75	0.01	0.40	0.01
48	D20(Bottom)	-0.98	0.00	0.40	0.01
49	D1(Top)	2.21	0.00	0.40	0.01
50	D16(Bottom)	2.73	0.01	0.40	0.02
51	D1(Bottom)	1.80	0.01	0.40	0.01
52	D20(Max)	-1.59	0.01	0.40	0.02
53	D1(Top)	3.23	0.00	0.40	0.01
54	D16(Bottom)	0.59	0.00	0.40	0.00
55	D18(Max)	3.08	0.00	0.40	0.01
56	D1(Bottom)	1.73	0.00	0.40	0.01
57	D18(Bottom)	0.88	0.01	0.40	0.02
58	D18(Bottom)	0.78	0.00	0.40	0.01
59	D1(Bottom)	0.45	0.00	0.40	0.01
60	D16(Max)	1.34	0.00	0.40	0.01
61	D1(Bottom)	1.13	0.00	0.40	0.01
62	D1(Bottom)	1.42	0.00	0.40	0.00
63	D1(Bottom)	1.71	0.00	0.40	0.01
64	D18(Top)	0.58	0.00	0.40	0.00
65	D18(Bottom)	1.83	0.01	0.40	0.02
66	D1(Bottom)	1.63	0.00	0.40	0.00
67	D1(Bottom)	2.05	0.01	0.40	0.02
68	D16(Max)	1.50	0.00	0.40	0.01
69	D1(Bottom)	1.39	0.00	0.40	0.01

Shear

Segment	Condition	Vu [Kip]	ϕVn [Kip]	Ratio
1	D16(Max)	0.73	3.69	0.20
2	D20(Bottom)	0.14	3.89	0.04
3	D20(Bottom)	0.61	4.70	0.13
4	D20(Bottom)	0.35	4.47	0.08
5	D20(Bottom)	0.37	4.03	0.09
6	D20(Bottom)	0.41	4.66	0.09
7	D20(Bottom)	0.44	4.27	0.10
8	D20(Bottom)	0.37	4.25	0.09
9	D20(Bottom)	0.08	4.00	0.02
10	D20(Bottom)	0.06	3.73	0.02
11	D16(Max)	0.37	3.69	0.10
12	D20(Bottom)	0.24	3.72	0.06
13	D20(Max)	0.23	3.74	0.06
14	D20(Top)	0.13	4.21	0.03
15	D20(Bottom)	0.31	3.71	0.08
16	D20(Top)	0.26	3.81	0.07
17	D20(Top)	0.44	4.11	0.11
18	D20(Top)	0.16	4.04	0.04
19	D20(Top)	0.54	4.11	0.13
20	D20(Top)	0.22	3.75	0.06
21	D20(Top)	0.59	3.78	0.16
22	D20(Top)	0.12	3.73	0.03
23	D20(Max)	0.23	3.74	0.06
24	D20(Max)	0.11	3.73	0.03
25	D20(Top)	0.16	3.90	0.04
26	D20(Top)	0.16	3.74	0.04
27	D20(Bottom)	0.26	3.81	0.07
28	D20(Max)	0.08	3.73	0.02
29	D20(Max)	0.43	4.11	0.10
30	D20(Max)	0.19	3.75	0.05
31	D20(Max)	0.16	4.04	0.04
32	D20(Max)	0.55	4.11	0.13
33	D20(Bottom)	0.59	3.78	0.16
34	D20(Top)	0.21	3.69	0.06
35	D16(Top)	0.23	3.80	0.06
36	D20(Top)	0.15	3.71	0.04
37	D20(Top)	0.25	4.68	0.05
38	D20(Top)	0.20	3.74	0.05
39	D20(Top)	0.25	4.55	0.06
40	D20(Top)	0.14	5.40	0.03
41	D20(Top)	0.25	5.53	0.05
42	D20(Top)	0.15	3.75	0.04
43	D20(Top)	0.23	3.69	0.06
44	D20(Top)	0.21	3.89	0.05
45	D20(Top)	0.13	3.75	0.03
46	D20(Max)	0.19	3.80	0.05
47	D20(Top)	0.21	3.69	0.06
48	D16(Top)	0.24	3.69	0.06
49	D20(Top)	0.18	3.69	0.05
50	D20(Top)	0.27	3.78	0.07
51	D20(Bottom)	0.20	3.74	0.05
52	D16(Top)	0.26	3.69	0.07
53	D20(Top)	0.16	3.71	0.04
54	D16(Top)	0.28	3.69	0.08
55	D20(Top)	0.17	3.75	0.05
56	D20(Top)	0.23	3.69	0.06
57	D20(Bottom)	0.08	3.80	0.02
58	D13(Max)	0.11	3.71	0.03
59	D13(Max)	0.05	3.69	0.01

60	D13(Bottom)	0.12	3.72	0.03
61	D20(Top)	0.04	3.93	0.01
62	D20(Bottom)	0.11	3.69	0.03
63	D20(Top)	0.05	3.69	0.01
64	D13(Bottom)	0.17	3.69	0.05
65	D20(Top)	0.06	3.69	0.02
66	D20(Bottom)	0.12	3.69	0.03
67	D16(Top)	0.06	3.69	0.02
68	D20(Max)	0.12	3.72	0.03
69	D20(Bottom)	0.08	3.71	0.02

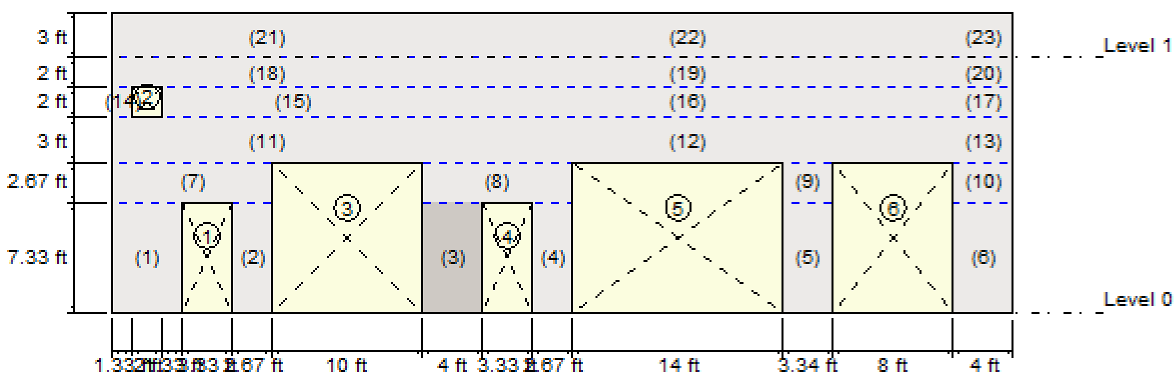
Deflection

Segment	Condition	δs [in]	δmax [in]	δs/δmax
1	S20(Bottom)	0.08	1.43	0.06
2	S7(Top)	0.04	1.43	0.03
3	S7(Max)	0.10	1.43	0.07
4	S20(Bottom)	0.05	1.43	0.04
5	S20(Max)	0.05	1.43	0.04
6	S20(Bottom)	0.06	1.43	0.04
7	S20(Top)	0.06	1.43	0.04
8	S7(Top)	0.05	1.43	0.03
9	S20(Max)	0.04	1.43	0.03
10	S20(Max)	0.04	1.43	0.03
11	S20(Bottom)	0.04	1.43	0.03
12	S20(Max)	0.04	1.43	0.03
13	S20(Max)	0.05	1.43	0.03
14	S20(Max)	0.05	1.43	0.04
15	S7(Top)	0.04	1.43	0.03
16	S7(Max)	0.06	1.43	0.04
17	S20(Max)	0.07	1.43	0.05
18	S20(Max)	0.05	1.43	0.04
19	S20(Bottom)	0.04	1.43	0.02
20	S7(Max)	0.03	1.43	0.02
21	S7(Top)	0.03	1.43	0.02
22	S7(Max)	0.04	1.43	0.03
23	S7(Max)	0.05	1.43	0.03
24	S20(Max)	0.01	1.43	0.01
25	S20(Bottom)	0.05	1.43	0.04
26	S20(Bottom)	0.04	1.43	0.03
27	S20(Bottom)	0.06	1.43	0.04
28	S7(Max)	0.01	1.43	0.01
29	S20(Bottom)	0.07	1.43	0.05
30	S20(Max)	0.02	1.43	0.01
31	S7(Max)	0.05	1.43	0.04
32	S7(Max)	0.03	1.43	0.02
33	S20(Bottom)	0.03	1.43	0.02
34	S20(Bottom)	0.03	1.43	0.02
35	S7(Max)	0.02	1.43	0.01
36	S7(Max)	0.01	1.43	0.01
37	S7(Max)	0.02	1.43	0.02
38	S7(Max)	0.02	1.43	0.02
39	S20(Bottom)	0.02	1.43	0.02
40	S7(Max)	0.01	1.43	0.01
41	S20(Bottom)	0.02	1.43	0.01
42	S7(Max)	0.02	1.43	0.01
43	S7(Max)	0.02	1.43	0.02
44	S20(Max)	0.01	1.43	0.01

45	S7(Top)	0.01	1.43	0.01
46	S5(Top)	0.01	1.43	0.01
47	S7(Top)	0.01	1.43	0.01
48	S5(Top)	0.02	1.43	0.01
49	S7(Top)	0.01	1.43	0.01
50	S20(Max)	0.02	1.43	0.01
51	S7(Top)	0.01	1.43	0.01
52	S20(Max)	0.02	1.43	0.01
53	S20(Max)	0.01	1.43	0.01
54	S7(Top)	0.02	1.43	0.02
55	S20(Max)	0.01	1.43	0.01
56	S7(Top)	0.01	1.43	0.01
57	S20(Bottom)	0.00	0.25	0.00
58	S7(Max)	0.00	0.25	0.00
59	S7(Max)	0.00	0.25	0.00
60	S20(Bottom)	0.00	0.25	0.00
61	S20(Bottom)	0.00	0.25	0.00
62	S7(Max)	0.00	0.25	0.00
63	S7(Max)	0.00	0.25	0.00
64	S20(Bottom)	0.00	0.25	0.00
65	S7(Max)	0.00	0.25	0.00
66	S20(Bottom)	0.00	0.25	0.00
67	S7(Max)	0.00	0.25	0.00
68	S7(Max)	0.00	0.25	0.00
69	S7(Max)	0.00	0.25	0.00

Shear Wall Design

Status : Warnings in design
- Excessive flexural reinforcement area, TMS 402-16 SD, 9.3.3.2 (Segment 2)



Geometry

Level	Segment	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
0	1	0.00	0.00	4.66	7.33
	2	7.99	0.00	2.67	7.33
	3	20.66	0.00	4.00	7.33
	4	27.99	0.00	2.67	7.33
	5	44.66	0.00	3.34	7.33
	6	56.00	0.00	4.00	7.33
	7	0.00	7.33	10.66	2.67
	8	20.66	7.33	10.00	2.67
	9	44.66	7.33	3.34	2.67
	10	56.00	7.33	4.00	2.67
	11	0.00	10.00	20.66	3.00
	12	20.66	10.00	35.34	3.00

	13	56.00	10.00	4.00	3.00
	14	0.00	13.00	1.33	2.00
	15	3.33	13.00	17.33	2.00
	16	20.66	13.00	35.34	2.00
	17	56.00	13.00	4.00	2.00
	18	0.00	15.00	20.66	2.00
	19	20.66	15.00	35.34	2.00
	20	56.00	15.00	4.00	2.00
1	21	0.00	17.00	20.66	3.00
	22	20.66	17.00	35.34	3.00
	23	56.00	17.00	4.00	3.00

Reinforcement

	Vertical reinforcement			Horizontal reinforcement		
Segment	Bars	Spacing [in]	Ld [in]	Bars	Spacing [in]	Ld [in]
1	1-#5	32.00	34.07	3-#5	32.00	34.07
	1-#5	32.00	34.07	3-#5	32.00	34.07
	1-#5	32.00	34.07	3-#5	32.00	34.07
2	1-#5	32.00	34.07	3-#5	32.00	34.07
3	2-#5	32.00	34.07	3-#5	32.00	34.07
4	1-#5	32.00	34.07	3-#5	32.00	34.07
5	2-#5	32.00	34.07	3-#5	32.00	34.07
6	2-#5	32.00	34.07	3-#5	32.00	34.07
7	1-#5	32.00	34.07	1-#5	32.00	34.07
	1-#5	32.00	34.07	1-#5	32.00	34.07
	1-#5	32.00	34.07	1-#5	32.00	34.07
	2-#5	32.00	34.07	1-#5	32.00	34.07
	1-#5	32.00	34.07	1-#5	32.00	34.07
8	2-#5	32.00	34.07	1-#5	32.00	34.07
	2-#5	32.00	34.07	1-#5	32.00	34.07
	1-#5	32.00	34.07	1-#5	32.00	34.07
9	2-#5	32.00	34.07	1-#5	32.00	34.07
10	2-#5	32.00	34.07	1-#5	32.00	34.07
11	1-#5	32.00	34.07	2-#5	32.00	34.07
	1-#5	32.00	34.07	2-#5	32.00	34.07
	1-#5	32.00	34.07	2-#5	32.00	34.07
	2-#5	32.00	34.07	2-#5	32.00	34.07
	1-#5	32.00	34.07	2-#5	32.00	34.07
	4-#5	32.00	34.07	2-#5	32.00	34.07
12	2-#5	32.00	34.07	2-#5	32.00	34.07
	2-#5	32.00	34.07	2-#5	32.00	34.07
	1-#5	32.00	34.07	2-#5	32.00	34.07
	6-#5	32.00	34.07	2-#5	32.00	34.07
	2-#5	32.00	34.07	2-#5	32.00	34.07
	3-#5	32.00	34.07	2-#5	32.00	34.07
13	2-#5	32.00	34.07	2-#5	32.00	34.07
14	1-#5	32.00	34.07	1-#7	32.00	86.80
15	1-#5	32.00	34.07	1-#5	32.00	34.07
	2-#5	32.00	34.07	1-#5	32.00	34.07
	1-#5	32.00	34.07	1-#5	32.00	34.07
	4-#5	32.00	34.07	1-#5	32.00	34.07
16	2-#5	32.00	34.07	1-#5	32.00	34.07
	2-#5	32.00	34.07	1-#5	32.00	34.07
	1-#5	32.00	34.07	1-#5	32.00	34.07
	6-#5	32.00	34.07	1-#5	32.00	34.07
	2-#5	32.00	34.07	1-#5	32.00	34.07
	3-#5	32.00	34.07	1-#5	32.00	34.07
17	2-#5	32.00	34.07	1-#5	32.00	34.07
18	1-#5	32.00	34.07	1-#5	32.00	34.07
	1-#5	32.00	34.07	1-#5	32.00	34.07

	1-#5	32.00	34.07	1-#5	32.00	34.07
	2-#5	32.00	34.07	1-#5	32.00	34.07
	1-#5	32.00	34.07	1-#5	32.00	34.07
	4-#5	32.00	34.07	1-#5	32.00	34.07
19	2-#5	32.00	34.07	1-#5	32.00	34.07
	2-#5	32.00	34.07	1-#5	32.00	34.07
	1-#5	32.00	34.07	1-#5	32.00	34.07
	6-#5	32.00	34.07	1-#5	32.00	34.07
	2-#5	32.00	34.07	1-#5	32.00	34.07
	3-#5	32.00	34.07	1-#5	32.00	34.07
20	2-#5	32.00	34.07	1-#5	32.00	34.07
21	1-#5	32.00	34.07	2-#5	32.00	34.07
	1-#5	32.00	34.07	2-#5	32.00	34.07
	1-#5	32.00	34.07	2-#5	32.00	34.07
	2-#5	32.00	34.07	2-#5	32.00	34.07
	1-#5	32.00	34.07	2-#5	32.00	34.07
	4-#5	32.00	34.07	2-#5	32.00	34.07
22	2-#5	32.00	34.07	2-#5	32.00	34.07
	2-#5	32.00	34.07	2-#5	32.00	34.07
	1-#5	32.00	34.07	2-#5	32.00	34.07
	6-#5	32.00	34.07	2-#5	32.00	34.07
	2-#5	32.00	34.07	2-#5	32.00	34.07
	3-#5	32.00	34.07	2-#5	32.00	34.07
23	2-#5	32.00	34.07	2-#5	32.00	34.07

Combined axial flexure

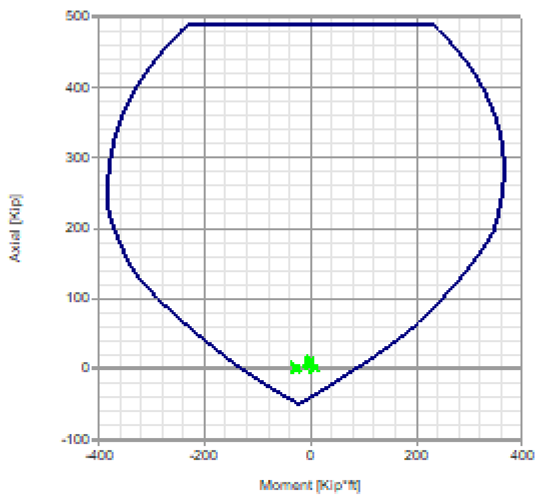
Segment	Condition	Pu [Kip]	Mu [Kip*ft]	ϕMn [Kip*ft]	Ratio
1	D20(Max)	-0.34	-28.29	129.05	0.22
2	D20(Top)	6.33	2.68	11.60	0.23
3	D20(Bottom)	6.89	-24.62	85.68	0.29
4	D20(Top)	8.02	3.49	13.41	0.26
5	D20(Bottom)	9.74	-16.71	64.40	0.26
6	D20(Bottom)	11.24	-22.33	92.97	0.24
7	D16(Bottom)	10.94	-24.48	635.70	0.04
8	D20(Top)	13.86	36.46	412.56	0.09
9	D20(Max)	8.06	13.26	61.90	0.21
10	D18(Max)	9.43	15.64	66.91	0.23
11	D1(Bottom)	15.49	55.26	1492.79	0.04
12	D1(Bottom)	34.21	133.17	4734.70	0.03
13	D18(Bottom)	8.67	14.80	65.60	0.23
14	D20(Bottom)	2.83	0.05	5.97	0.01
15	D1(Max)	8.47	26.17	972.99	0.03
16	D1(Max)	19.70	57.01	4513.50	0.01
17	D20(Bottom)	1.99	6.15	54.04	0.11
18	D18(Top)	3.56	19.14	1384.04	0.01
19	D16(Top)	7.13	-18.45	4833.26	0.00
20	D20(Bottom)	0.06	0.94	50.69	0.02
21	D16(Bottom)	4.38	16.66	1391.53	0.01
22	D16(Top)	0.37	-18.89	4726.17	0.00
23	D18(Bottom)	0.87	1.31	52.10	0.03

Flexural reinforcement area

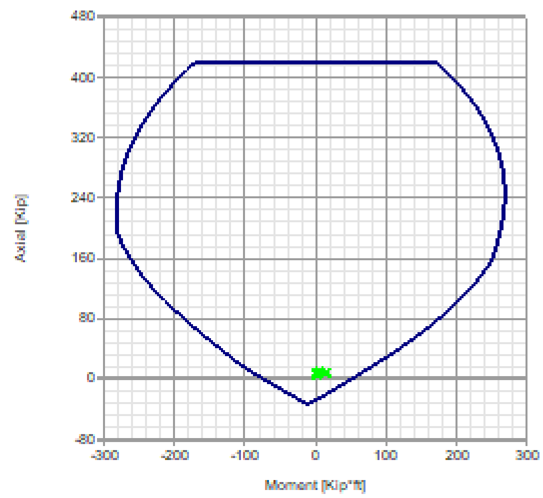
Segment	Condition	Pu [Kip]	As [in2]	Asmax [in2]	Ratio
1	DM1(Top)	0.00	0.93	10.45	0.09
2	D20(Top)	0.00	0.31	0.29	1.09
3	D20(Bottom)	0.00	0.62	12.04	0.05
4	D20(Top)	0.00	0.31	0.29	1.09
5	D20(Bottom)	0.00	0.62	53.48	0.01
6	D20(Bottom)	0.00	0.62	12.04	0.05
7	D20(Bottom)	0.00	1.86	28.59	0.07
8	DM1(Max)	0.00	1.55	28.32	0.05
9	DM1(Top)	0.00	0.62	56.44	0.01
10	DM1(Top)	0.00	0.62	56.44	0.01
11	DM1(Top)	0.00	3.10	0.00	NPC
12	D20(Top)	0.00	4.96	172.55	0.03
13	DM1(Top)	0.00	0.62	56.44	0.01
14	D20(Bottom)	0.00	0.31	0.29	1.09
15	DM1(Top)	0.00	2.48	0.00	NPC
16	D16(Top)	0.00	4.96	172.55	0.03
17	D19(Max)	0.00	0.62	12.04	0.05
18	DM1(Top)	0.00	3.10	0.00	NPC
19	DM1(Top)	0.00	4.96	172.55	0.03
20	D19(Bottom)	0.00	0.62	12.04	0.05
21	DM1(Max)	0.00	3.10	0.00	NPC
22	DM1(Top)	0.00	4.96	172.55	0.03
23	D20(Top)	0.00	0.62	12.04	0.05

Interaction diagrams, P vs. M

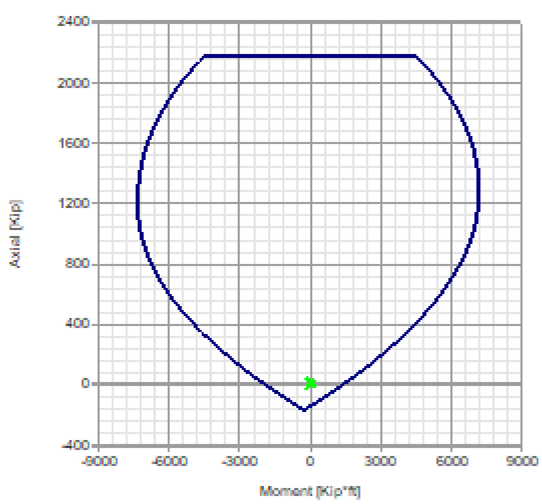
P vs. M (Segment 1)



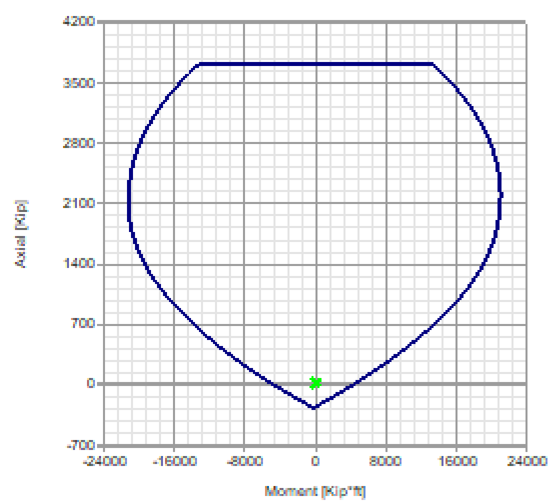
P vs. M (Segment 10)



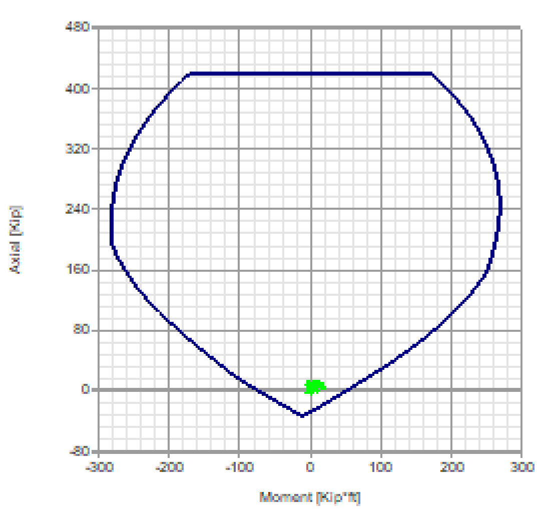
P vs. M (Segment 11)



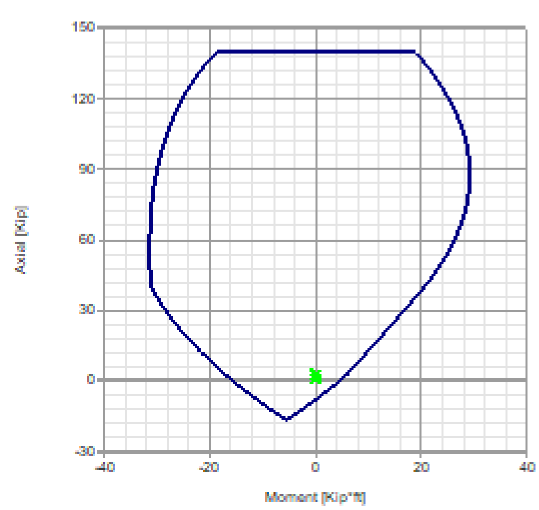
P vs. M (Segment 12)

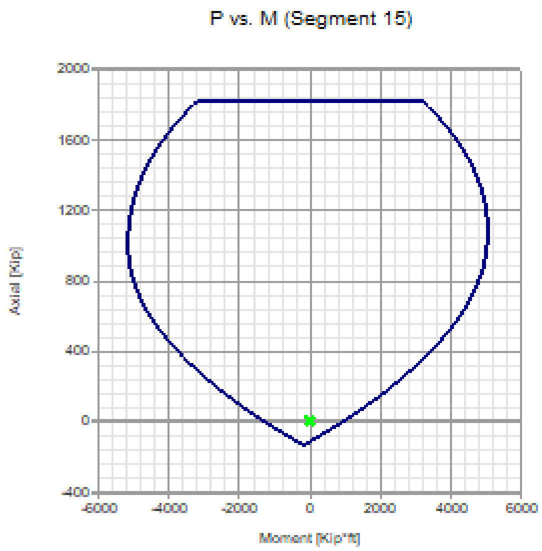


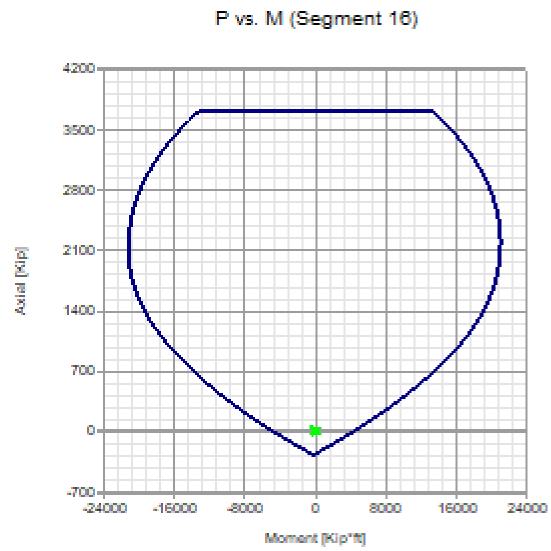
P vs. M (Segment 13)

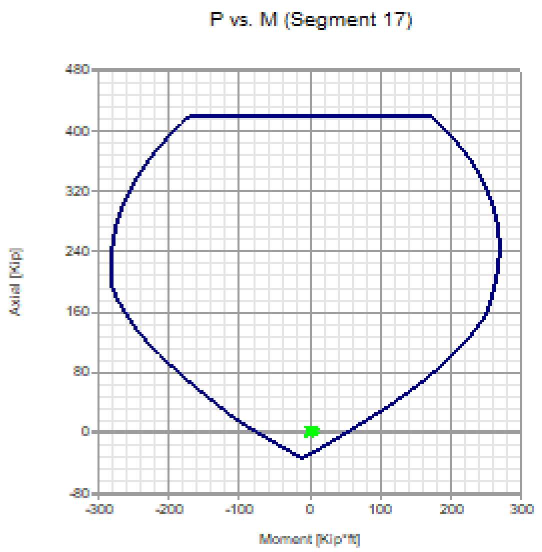


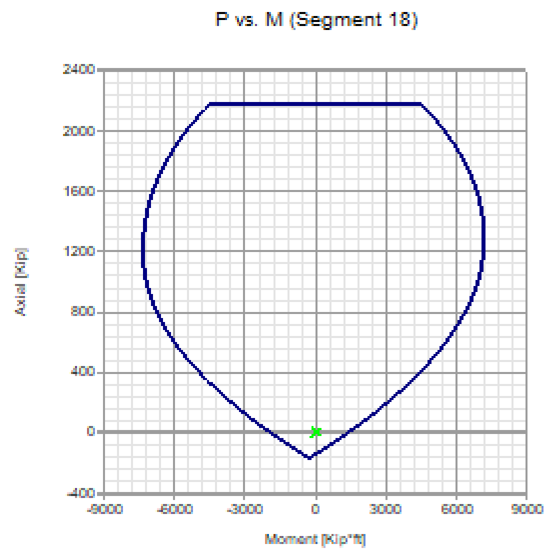
P vs. M (Segment 14)

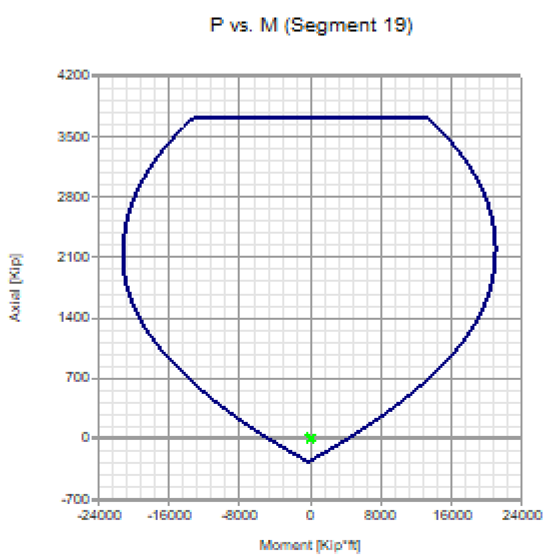


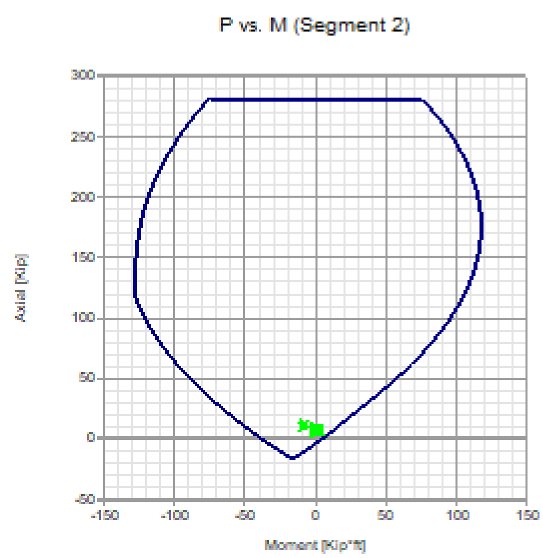

P vs. M (Segment 15)
Axial [Kip]
Moment [Kip*ft]
2000
1600
1200
800
400
0
-400
-6000
-4000
-2000
0
2000
4000
6000


P vs. M (Segment 16)
Axial [Kip]
Moment [Kip*ft]
4200
3500
2800
2100
1400
700
0
-700
-24000
-16000
-8000
0
8000
16000
24000

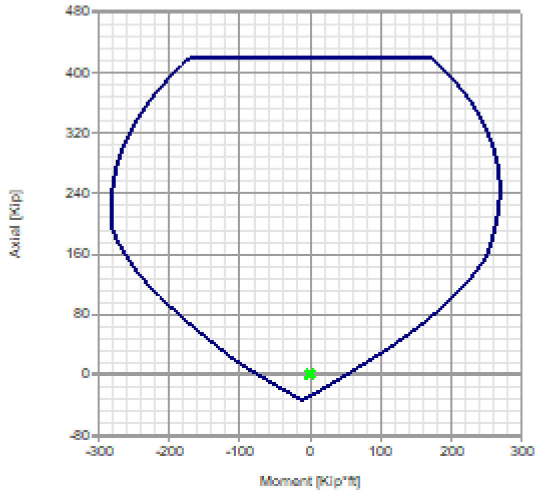

P vs. M (Segment 17)
Axial [Kip]
Moment [Kip*ft]
480
400
320
240
160
80
0
-80
-300
-200
-100
0
100
200
300


P vs. M (Segment 18)
Axial [Kip]
Moment [Kip*ft]
2400
2000
1600
1200
800
400
0
-400
-9000
-6000
-3000
0
3000
6000
9000

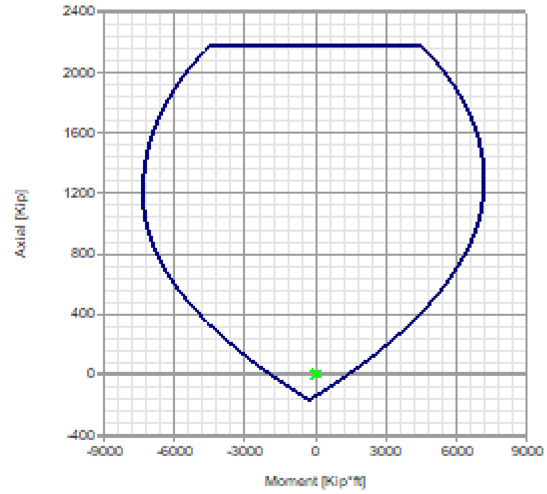

P vs. M (Segment 19)
Axial [Kip]
Moment [Kip*ft]
4200
3500
2800
2100
1400
700
0
-700
-24000
-16000
-8000
0
8000
16000
24000


P vs. M (Segment 2)
Axial [Kip]
Moment [Kip*ft]
300
250
200
150
100
50
0
-50
-150
-100
-50
0
50
100
150

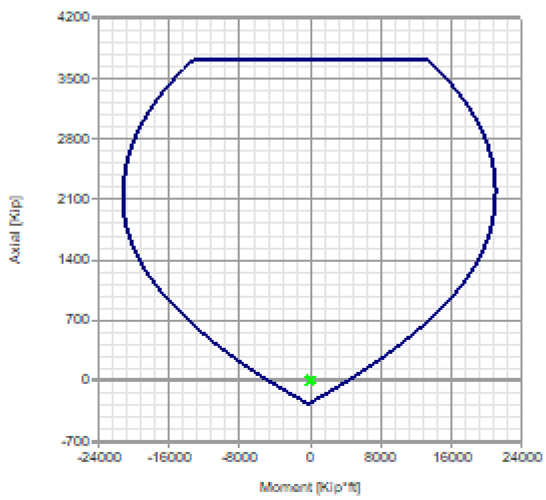
P vs. M (Segment 20)



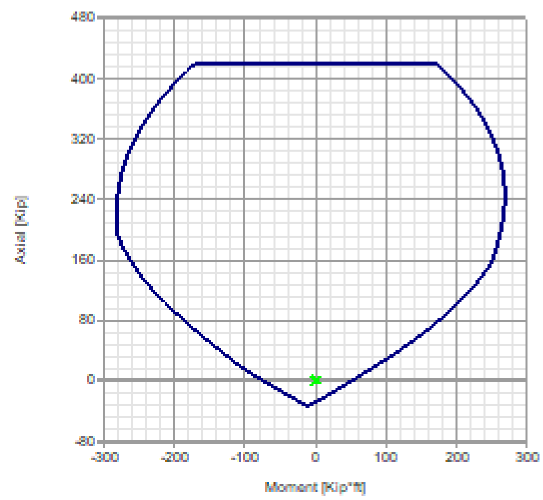
P vs. M (Segment 21)



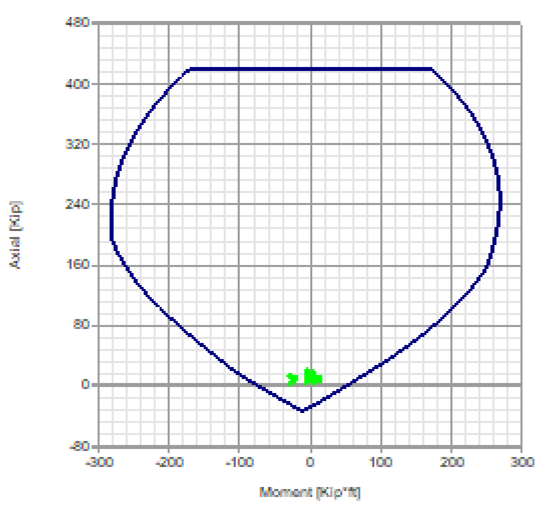
P vs. M (Segment 22)



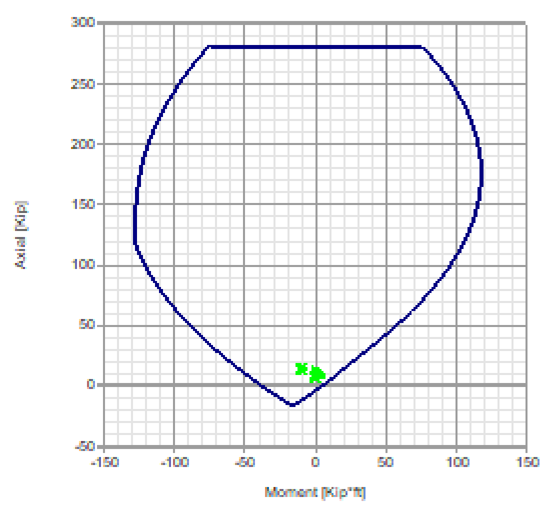
P vs. M (Segment 23)



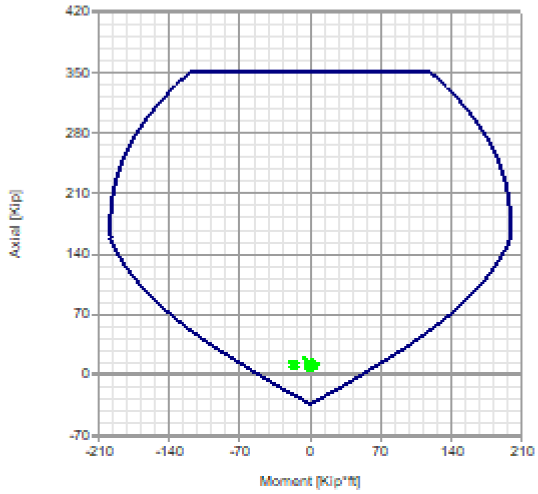
P vs. M (Segment 3)



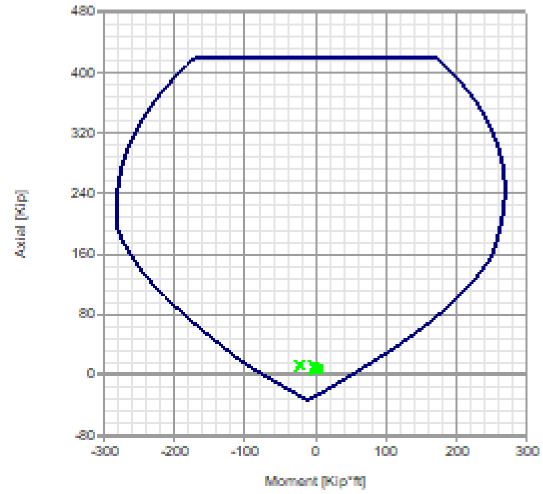
P vs. M (Segment 4)



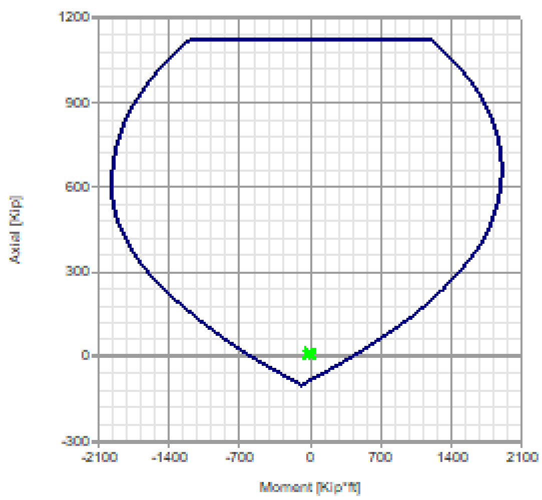
P vs. M (Segment 5)



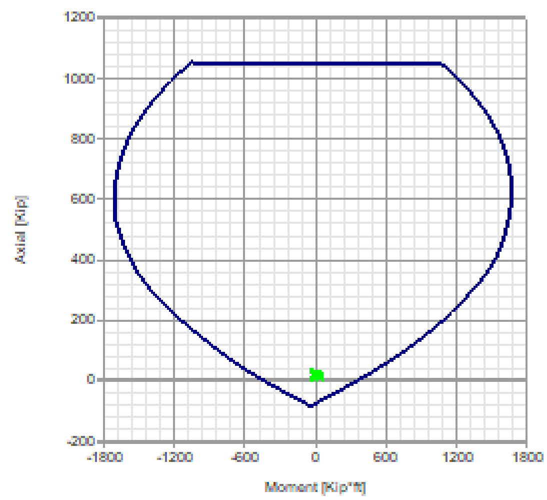
P vs. M (Segment 6)



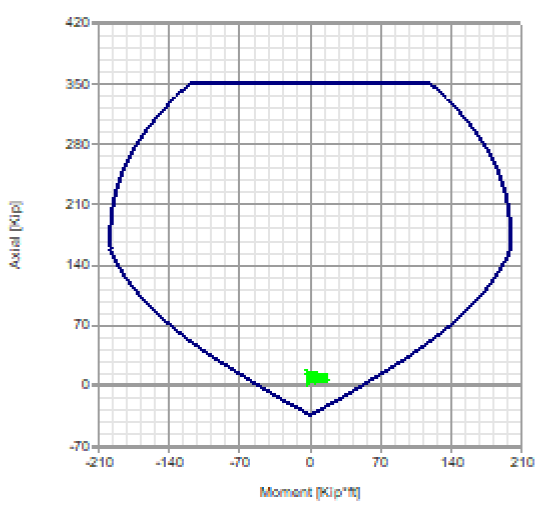
P vs. M (Segment 7)



P vs. M (Segment 8)



P vs. M (Segment 9)



Axial compression

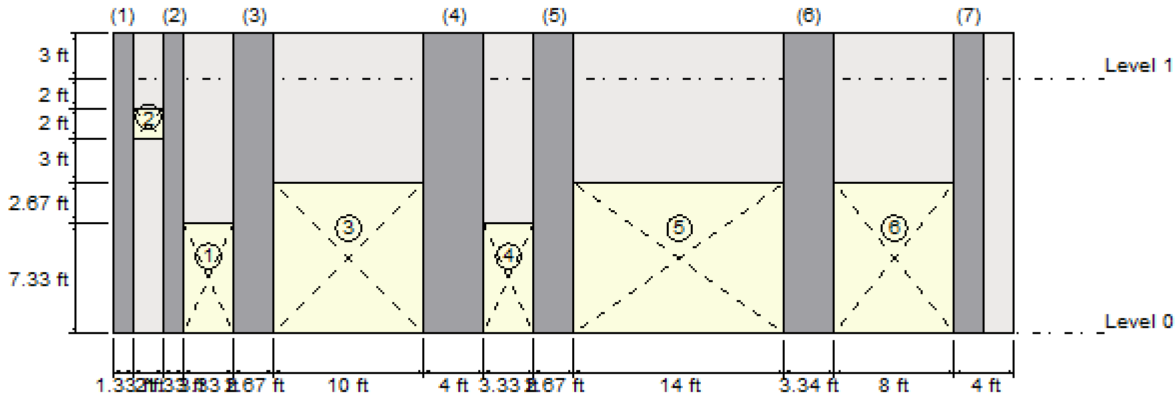
Segment	Condition	Pu [Kip]	ϕPn [Kip]	Ratio
1	D1(Bottom)	13.05	275.80	0.05
2	D16(Bottom)	12.62	158.17	0.08
3	D1(Bottom)	16.45	236.85	0.07
4	D18(Bottom)	15.69	158.17	0.10
5	D1(Bottom)	15.73	197.71	0.08
6	D18(Bottom)	13.90	236.85	0.06
7	D1(Bottom)	18.28	631.08	0.03
8	D1(Max)	25.32	592.14	0.04
9	D1(Bottom)	13.43	197.71	0.07
10	D18(Bottom)	10.40	236.85	0.04
11	D1(Bottom)	15.49	1223.42	0.01
12	D1(Bottom)	34.21	2092.95	0.02
13	D18(Bottom)	8.67	236.85	0.04
14	D16(Bottom)	3.13	78.69	0.04
15	D1(Bottom)	9.28	1026.31	0.01
16	D1(Bottom)	20.37	2092.95	0.01
17	D1(Bottom)	4.17	236.85	0.02
18	D1(Bottom)	6.40	1223.42	0.01
19	D18(Bottom)	7.67	2092.95	0.00
20	D1(Bottom)	1.73	236.85	0.01
21	D1(Max)	4.75	2145.93	0.00
22	D1(Bottom)	8.02	3671.12	0.00
23	D1(Bottom)	1.39	415.45	0.00

Shear

Segment	Condition	Vu [Kip]	ϕVn [Kip]	Ratio
1	D20(Max)	9.20	51.00	0.18
2	D20(Max)	4.03	27.81	0.14
3	D20(Bottom)	7.98	42.19	0.19
4	D20(Max)	4.88	28.77	0.17
5	D18(Max)	4.55	32.23	0.14
6	D16(Max)	5.72	39.21	0.15
7	D20(Max)	15.81	157.39	0.10
8	D20(Max)	15.78	144.91	0.11
9	D16(Max)	4.12	31.88	0.13
10	D16(Max)	5.30	43.37	0.12
11	D18(Bottom)	11.30	304.08	0.04
12	D16(Bottom)	15.18	513.62	0.03
13	D18(Max)	1.66	37.82	0.04
14	D1(Max)	0.06	14.73	0.00
15	D20(Max)	11.09	257.33	0.04
16	D20(Max)	8.51	539.81	0.02
17	D20(Max)	1.58	37.79	0.04
18	D18(Top)	9.01	309.59	0.03
19	D20(Bottom)	7.08	542.03	0.01
20	D20(Max)	0.76	50.17	0.02
21	D16(Max)	4.90	303.42	0.02
22	D20(Max)	5.90	539.27	0.01
23	D20(Max)	0.53	45.98	0.01

Column Design

Status : OK



Geometry

Column	Distance [ft]	Position Z	Width X [in]	Width Z [in]	Height [ft]
1	0.66	Centered	16.00	8.00	20.00
2	4.00	Centered	16.00	8.00	20.00
3	9.33	Centered	32.00	8.00	20.00
4	22.66	Centered	48.00	8.00	20.00
5	29.33	Centered	32.00	8.00	20.00
6	46.33	Centered	40.00	8.00	20.00
7	57.00	Centered	24.00	8.00	20.00

Reinforcement

Column	Longitudinal reinforcement Bars	As [in2]	Ld [in]	Transverse reinforcement Bars	Spacing [in]
1	4-#4	0.80	21.80	#4	8.00
2	4-#4	0.80	21.80	#4	8.00
3	4-#4	0.80	21.80	#4	8.00
4	8-#4	1.60	34.88	#4	8.00
5	4-#4	0.80	21.80	#4	8.00
6	8-#4	1.60	34.88	#4	8.00
7	4-#4	0.80	21.80	#4	8.00

Combined axial - flexure along X direction

Column	Condition	Pu [Kip]	Mu [Kip*ft]	ϕMn [Kip*ft]	Ratio
1	D20(Bottom)	1.10	1.87	10.39	0.18
2	D20(Bottom)	2.01	1.85	10.53	0.18
3	D20(Bottom)	6.36	6.69	14.30	0.47
4	D20(Bottom)	9.04	16.24	25.69	0.63
5	D20(Bottom)	7.75	6.82	14.63	0.47
6	D20(Bottom)	8.22	11.49	23.88	0.48
7	D20(Bottom)	4.70	3.98	12.82	0.31

Flexural reinforcement area

Column	Condition	Pu [Kip]	As [in2]	Asmax [in2]	Ratio
1	D20(Bottom)	0.00	0.80	1.30	0.62
2	D20(Bottom)	0.00	0.80	1.30	0.62
3	D20(Bottom)	0.00	0.80	2.61	0.31
4	D20(Bottom)	0.00	1.60	3.55	0.45
5	D20(Bottom)	0.00	0.80	2.61	0.31
6	D20(Bottom)	0.00	1.60	2.95	0.54
7	D20(Bottom)	0.00	0.80	1.96	0.41

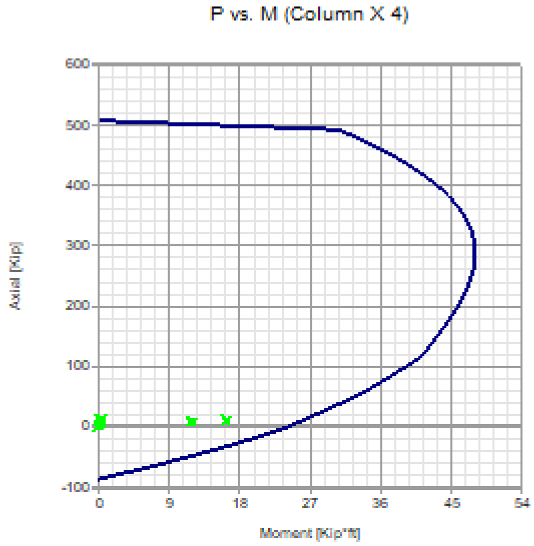
Combined axial - flexure along Z direction

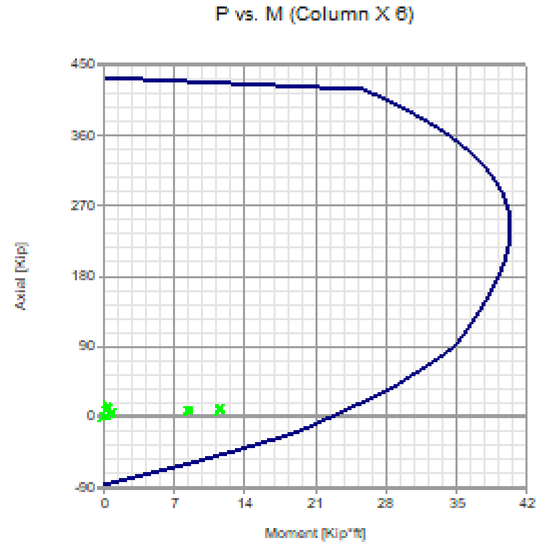
Column	Condition	Pu [Kip]	Mu [Kip*ft]	ϕMn [Kip*ft]	Ratio
1	D20(Bottom)	1.10	1.95	22.80	0.09
2	D20(Bottom)	2.01	1.95	23.23	0.08
3	D20(Bottom)	6.36	3.93	58.24	0.07
4	D20(Bottom)	9.04	6.02	171.84	0.04
5	D20(Bottom)	7.75	4.12	59.80	0.07
6	D20(Bottom)	8.22	5.19	138.89	0.04
7	D20(Bottom)	4.70	3.06	40.42	0.08

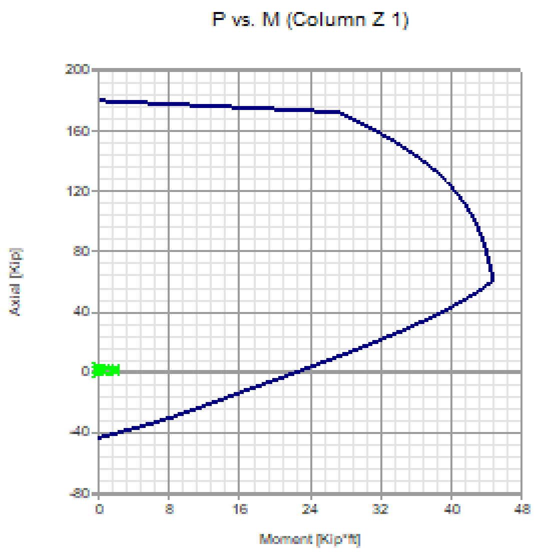
Flexural reinforcement area

Column	Condition	Pu [Kip]	As [in2]	Asmax [in2]	Ratio
1	D5(Max)	0.00	0.80	5.31	0.15
2	D5(Top)	0.00	0.80	5.31	0.15
3	D20(Bottom)	0.00	0.80	65.79	0.01
4	D20(Bottom)	0.00	1.60	53.02	0.03
5	D20(Bottom)	0.00	0.80	65.79	0.01
6	D20(Bottom)	0.00	1.60	40.80	0.04
7	D5(Max)	0.00	0.80	19.78	0.04

Interaction diagrams, P vs. M







Axial compression

Column	Condition	Pu [Kip]	ϕPn [Kip]	Ratio
1	D1(Bottom)	3.56	108.44	0.03
2	D1(Bottom)	3.89	108.44	0.04
3	D1(Bottom)	8.79	197.20	0.04
4	D1(Bottom)	13.80	305.64	0.05
5	D1(Bottom)	10.31	197.20	0.05
6	D1(Bottom)	13.33	261.26	0.05
7	D1(Bottom)	6.34	152.82	0.04

Shear along X direction

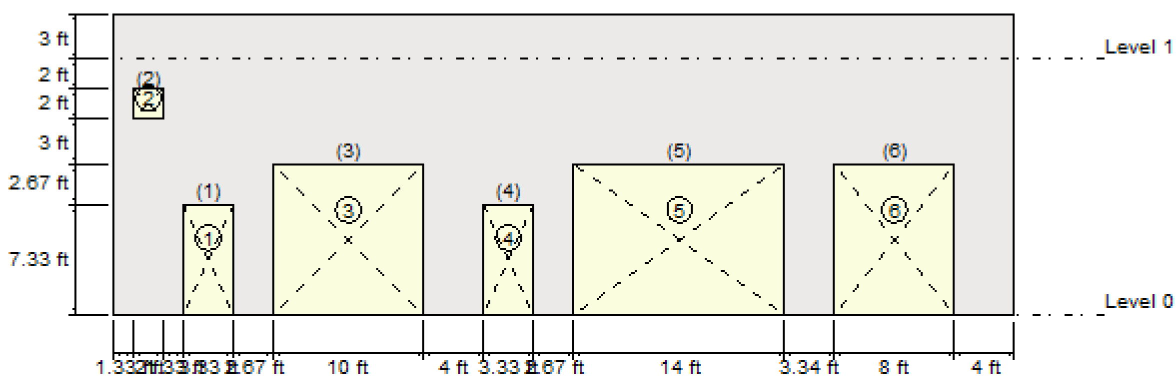
Column	Condition	Vu [Kip]	ϕVn [Kip]	Ratio
1	D20(Bottom)	0.52	30.34	0.02
2	D20(Bottom)	0.51	30.34	0.02
3	D20(Bottom)	1.35	115.02	0.01
4	D16(Bottom)	2.66	293.76	0.01
5	D20(Bottom)	1.37	115.30	0.01
6	D16(Bottom)	2.06	193.04	0.01
7	D16(Bottom)	0.91	71.07	0.01

Shear along Z direction

Column	Condition	Vu [Kip]	ϕVn [Kip]	Ratio
1	D20(Bottom)	0.57	12.02	0.05
2	D16(Bottom)	0.57	12.02	0.05
3	D16(Bottom)	1.14	24.04	0.05
4	D20(Bottom)	1.73	31.69	0.05
5	D20(Bottom)	1.17	24.04	0.05
6	D20(Bottom)	1.47	28.15	0.05
7	D16(Bottom)	0.87	18.03	0.05

Lintel Design

Status : Warnings in design
- Insufficient development length, TMS 402-16 SD, 6.1.5.1 (Lintel 1)



Geometry

Lintel	X Coordinate [ft]	Y Coordinate [ft]	Length [ft]	Depth [in]
1	4.66	0.00	3.33	16.00
2	1.33	13.00	2.00	16.00
3	10.66	0.00	10.00	48.00
4	24.66	0.00	3.33	32.00
5	30.66	0.00	14.00	48.00
6	48.00	0.00	8.00	48.00

Reinforcement

Lintel	Top long. reinforcement Bars	Extent [in]	Bottom long. reinforcement Bars	Extent [in]	Transverse reinforcement Bars	Spacing [in]	Ld [in]
1	1-#7	0.50	1-#7	2.00	--	0.00	0.00
2	1-#7	0.50	1-#7	0.50	--	0.00	0.00
3	1-#7	0.00	1-#7	0.00	--	0.00	0.00
4	1-#7	54.00	1-#7	5.50	--	0.00	0.00
5	1-#7	1.50	1-#7	0.00	--	0.00	0.00
6	1-#7	1.00	1-#7	0.00	--	0.00	0.00

Bending

Lintel	Condition	Mu [Kip*ft]	ϕMn [Kip*ft]	Ratio
1	D20(Top)	3.95	32.64	0.12
2	D18(Top)	0.06	32.64	0.00
3	D18(Top)	7.25	118.99	0.06
4	D20(Bottom)	-0.78	75.83	0.01
5	D16(Bottom)	-10.65	118.99	0.09
6	D18(Bottom)	-6.30	118.99	0.05

Flexural reinforcement area

Segment	Condition	Pu [Kip]	As [in2]	Asmax [in2]	Ratio
1	D16(Top)	0.00	1.20	1.95	0.62
2		0.00	0.00	0.00	0.00
3	D20(Bottom)	0.00	1.20	6.63	0.18
4		0.00	0.00	0.00	0.00
5	D20(Bottom)	0.00	1.20	6.63	0.18
6	D20(Bottom)	0.00	1.20	6.63	0.18

Cracking moment

Lintel	Condition	1.3 Mcr [Kip*ft]	Mn [Kip*ft]	Ratio
1	D20(Bottom)	2.96	36.26	0.08
2	D20(Bottom)	2.96	36.26	0.08
3	D20(Bottom)	26.66	132.21	0.20
4	DM1(Top)	11.85	84.25	0.14
5	D20(Bottom)	26.66	132.21	0.20
6	D20(Bottom)	26.66	132.21	0.20

Shear

Lintel	Condition	Vu [Kip]	ϕVn [Kip]	Ratio
1	D20(Top)	4.64	8.33	0.56
2	D18(Bottom)	0.28	8.33	0.03
3	D18(Bottom)	8.29	27.98	0.30
4	D18(Bottom)	5.12	18.16	0.28
5	D16(Top)	9.81	27.98	0.35
6	D16(Top)	6.24	27.98	0.22

Deflection

Lintel	Condition	δs [in]	δmax [in]	Ratio
1	S20(Top)	0.00	0.07	0.04
2	S13(Top)	0.00	0.04	0.00
3	S13(Top)	0.00	0.20	0.02
4	S20(Bottom)	0.00	0.07	0.00
5	S13(Top)	0.01	0.28	0.04
6	S7(Bottom)	0.00	0.16	0.01

Notes

* Pu = Factored axial load
* Pn = Nominal compression strength
* δ = Moment magnification factor
* Mu = Factored total flexural moment
* Mua = Factored flexural moment from analysis
* Mn = Nominal moment strength
* Mcr = Nominal cracking moment
* ft = Stress due to flexural tension
* fc = Stress due to flexural compression
* Fn = Nominal stress
* Vu = Factored shear force
* Vn = Nominal shear strength
* Vf = Nominal shear friction strength
* δs = Calculated deflection
* δmax = Maximum allowable deflection
* ld = Embedment length
* Ag = Gross cross sectional area of a member
* As = Effective cross sectional area of reinforcement
* c = Distance from the fiber of maximum compressive strain to the neutral axis
* d = Distance from the extreme compression fiber to centroid of tension reinforcement

RAM Elements

Current Date: 8/28/2024 11:02 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Grid 6\G to H Wall for Mech Unit openings.msw

Design Results
Masonry wall

General Information

Global status : OK

Design code	:	TMS 402-22 ASD

Materials:

Material	:	CMU 1.5-60
Mortar type	:	Port/Mort - M/S
Grouting type	:	Full grouting
Masonry compression strength (F`m)	:	1.5 [Kip/in2]
Steel tension strength (fy)	:	60 [Kip/in2]
Steel allowable tension strength (Fs)	:	32 [Kip/in2]
Steel elasticity modulus (Es)	:	29000 [Kip/in2]
Masonry elasticity modulus (Em)	:	1350 [Kip/in2]
Masonry unit weight	:	0.135 [Kip/ft3]

Seismic data:

Seismic design category	:	SDC D
Response modification factor	:	1.00
Shear wall type	:	Nonparticipating

Geometry

Total height	:	20.00 [ft]
Total length	:	12.00 [ft]
Foundation type	:	Continuous
Wall bottom restraint	:	Pinned
Column bottom restraint	:	Fixed
Rigidity elements	:	Columns

Number of stories: 1

Story	Story height [ft]	Wall thickness [in]	Effective unit weight [Kip/ft3]
1	17.00	3.63	0.14

Openings:

Reference	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
Lower left	1.33	11.33	8.00	2.00

Columns:

Distance [ft]	Width X [in]	Width Z [in]	Position Z
0.66	16.00	8.00	Centered
10.00	16.00	8.00	Centered

Load Conditions

ID	Comb.	Category	Description
DL	No	DL	Dead Load
SL	No	SNOW	Snow Load
EQ	No	EQ	EQ Load
EQoop	No	EQ	EQoop Load
SM1	Yes		DL
DM1	Yes		DL

Loads

Distributed loads:

Consider self weight : DL

Out-of-plane loads:

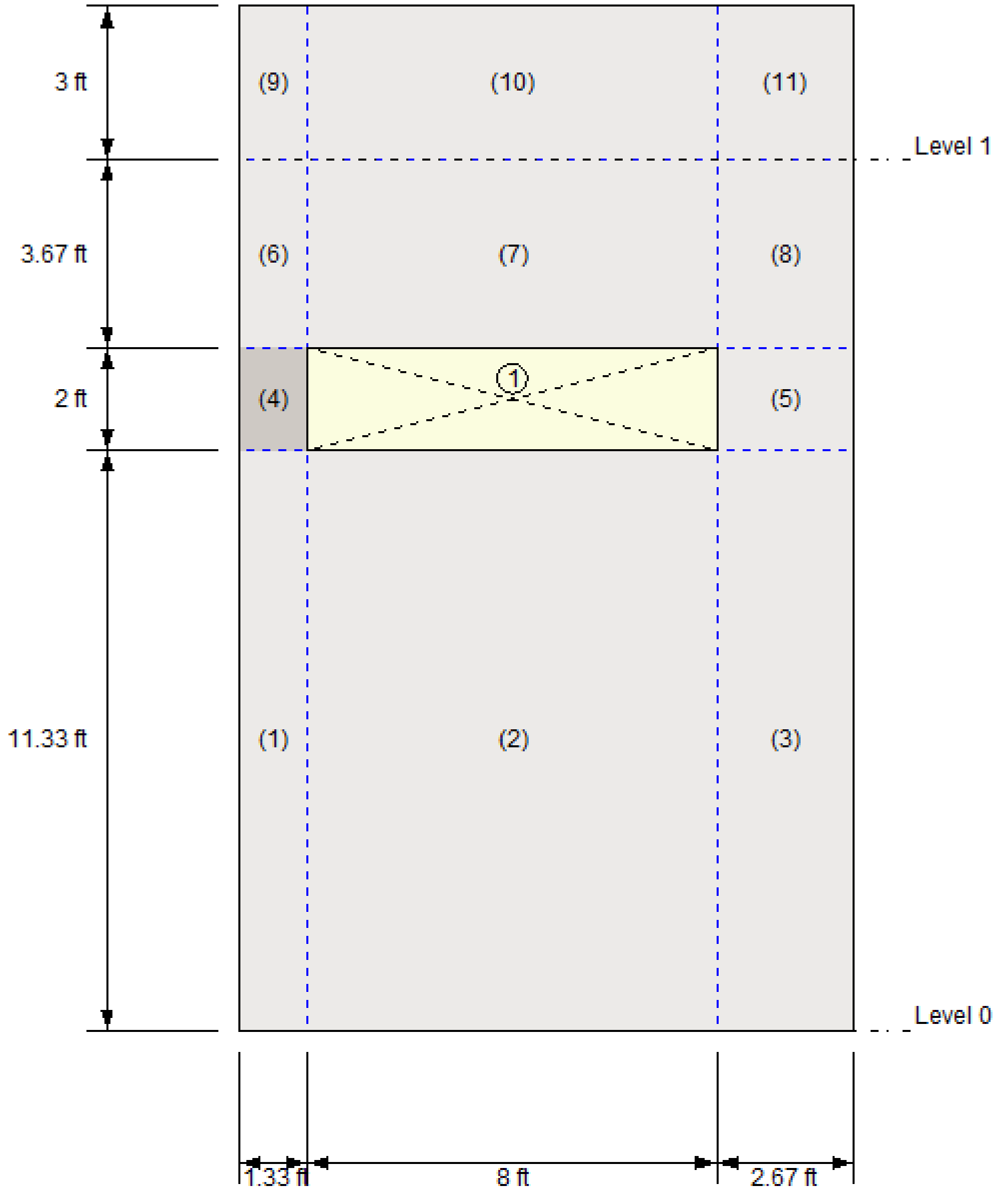
Story	Condition	Magnitude [Kip/ft2]
1	EQoop	0.02
Parapet	EQoop	0.02

Out-of-plane seismic weight:

Load condition	Coefficient
EQoop	0.44

Bearing Wall Design

Status : OK



Geometry

Level	Segment	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
0	1	0.00	0.00	1.33	11.33
	2	1.33	0.00	8.00	11.33
	3	9.33	0.00	2.67	11.33
	4	0.00	11.33	1.33	2.00
	5	9.33	11.33	2.67	2.00
	6	0.00	13.33	1.33	3.67
	7	1.33	13.33	8.00	3.67
	8	9.33	13.33	2.67	3.67
1	9	0.00	17.00	1.33	3.00
	10	1.33	17.00	8.00	3.00
	11	9.33	17.00	2.67	3.00

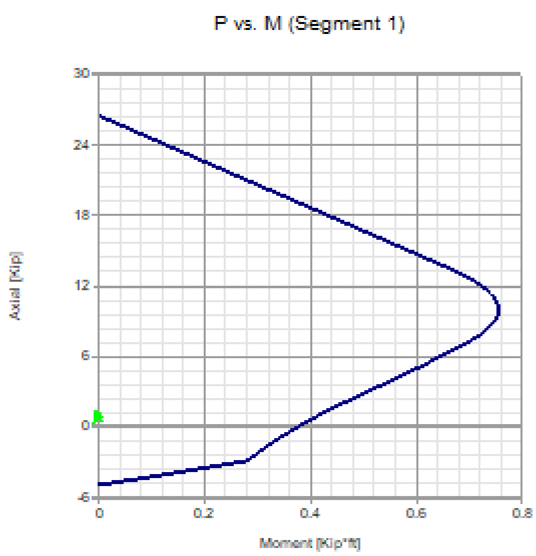
Vertical reinforcement

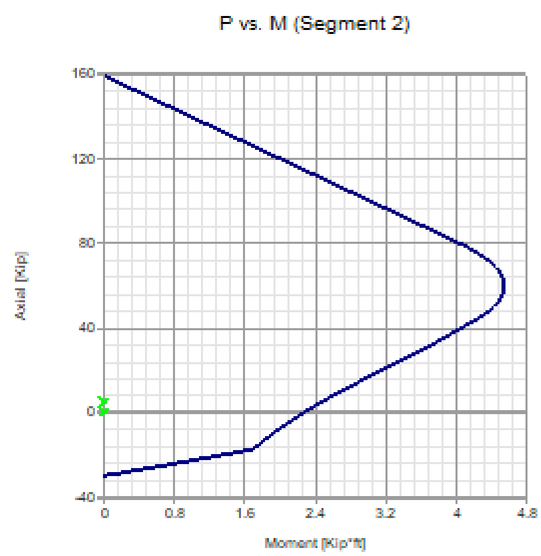
Segment	Bars	Spacing [in]	Ld [in]
1	1-#5	32.00	39.33
2	3-#5	32.00	39.33
3	1-#5	32.00	39.33
4	1-#5	32.00	39.33
5	1-#5	32.00	39.33
6	1-#5	32.00	39.33
7	3-#5	32.00	39.33
8	1-#5	32.00	39.33
9	1-#5	32.00	39.33
10	3-#5	32.00	39.33
11	1-#5	32.00	39.33

Combined axial flexure

Segment	Condition	P [Kip]	M [Kip*ft]	Ma [Kip*ft]	Ratio
1	DM1(Top)	1.07	0.00	0.42	0.00
2	DM1(Top)	0.54	0.00	2.28	0.00
3	DM1(Top)	1.60	0.00	0.82	0.00
4	DM1(Top)	1.09	0.00	0.42	0.00
5	DM1(Top)	1.50	0.00	0.81	0.00
6	DM1(Top)	0.19	0.00	0.38	0.00
7	DM1(Top)	0.45	0.00	2.28	0.00
8	DM1(Top)	0.44	0.00	0.77	0.00
9	DM1(Top)	-0.10	0.00	0.37	0.00
10	DM1(Top)	0.16	0.00	2.26	0.00
11	DM1(Top)	-0.02	0.00	0.75	0.00

Interaction diagrams, P vs. M





Axial compression

Segment	Condition	P [Kip]	Pa [Kip]	Ratio
1	DM1(Top)	1.07	3.36	0.32
2	DM1(Bottom)	5.36	20.20	0.27
3	DM1(Bottom)	2.01	6.74	0.30
4	DM1(Top)	1.09	3.36	0.32
5	DM1(Bottom)	1.60	6.74	0.24
6	DM1(Bottom)	1.07	3.36	0.32
7	DM1(Top)	0.45	20.20	0.02
8	DM1(Bottom)	1.49	6.74	0.22
9	DM1(Bottom)	0.36	24.40	0.01
10	DM1(Bottom)	0.25	146.80	0.00
11	DM1(Bottom)	0.50	48.99	0.01

Axial tension

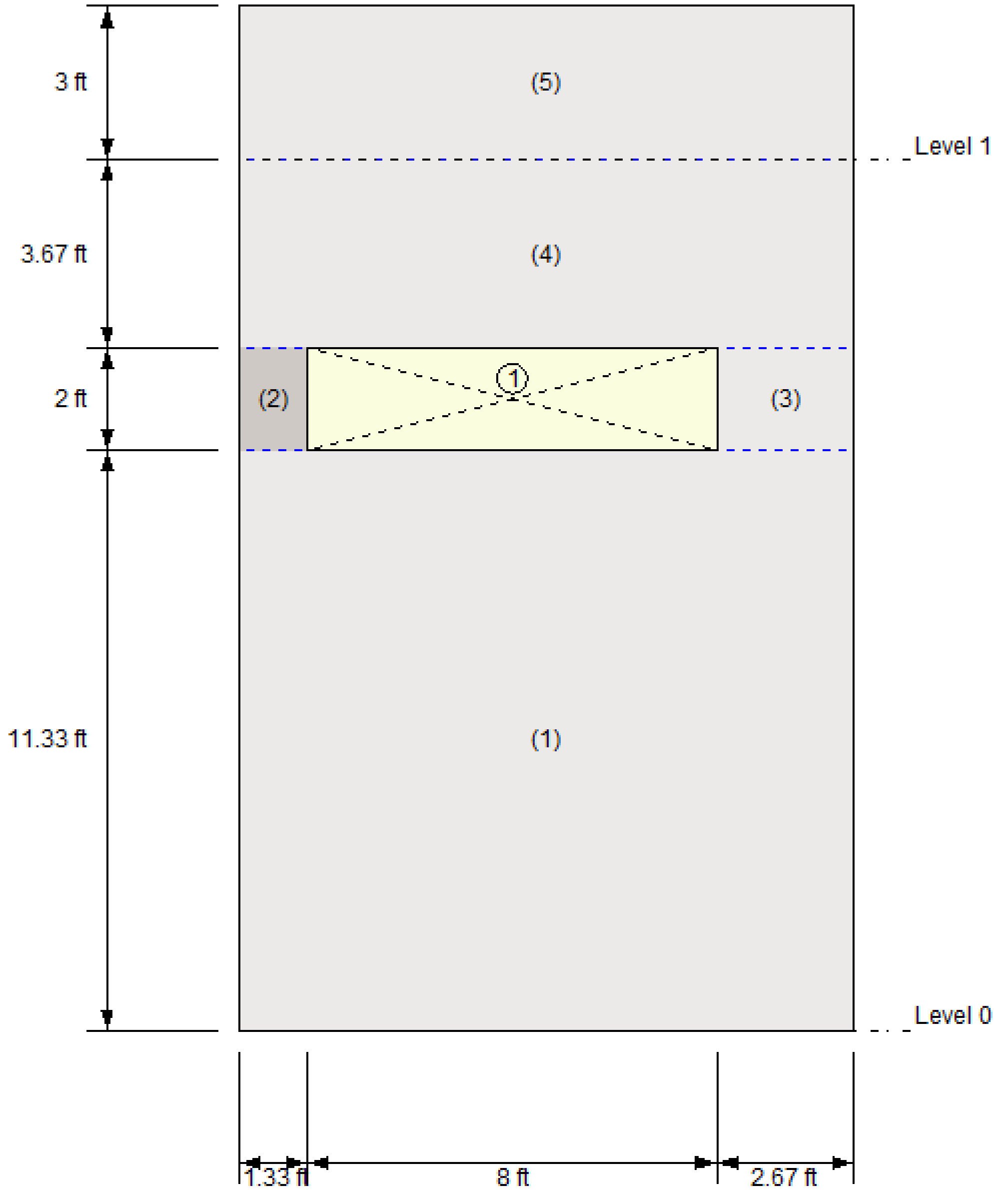
Segment	Condition	ft [Kip/in2]	Fs [Kip/in2]	Ratio
1	DM1(Top)	0.00	32.00	0.00
2	DM1(Top)	0.00	32.00	0.00
3	DM1(Top)	0.00	32.00	0.00
4	DM1(Top)	0.00	32.00	0.00
5	DM1(Top)	0.00	32.00	0.00
6	DM1(Top)	0.00	32.00	0.00
7	DM1(Top)	0.00	32.00	0.00
8	DM1(Top)	0.00	32.00	0.00
9	DM1(Top)	0.63	32.00	0.02
10	DM1(Top)	0.00	32.00	0.00
11	DM1(Max)	0.07	32.00	0.00

Shear

Segment	Condition	fv [Kip/in2]	Fv [Kip/in2]	Ratio
1	DM1(Top)	0.000	0.085	0.00
2	DM1(Top)	0.000	0.078	0.00
3	DM1(Top)	0.000	0.083	0.00
4	DM1(Top)	0.000	0.085	0.00
5	DM1(Top)	0.000	0.083	0.00
6	DM1(Top)	0.000	0.079	0.00
7	DM1(Top)	0.000	0.078	0.00
8	DM1(Top)	0.000	0.079	0.00
9	DM1(Top)	0.000	0.077	0.00
10	DM1(Top)	0.000	0.078	0.00
11	DM1(Top)	0.000	0.077	0.00

Shear Wall Design

Status : OK



Geometry

Level	Segment	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
0	1	0.00	0.00	12.00	11.33
	2	0.00	11.33	1.33	2.00
	3	9.33	11.33	2.67	2.00
	4	0.00	13.33	12.00	3.67
1	5	0.00	17.00	12.00	3.00

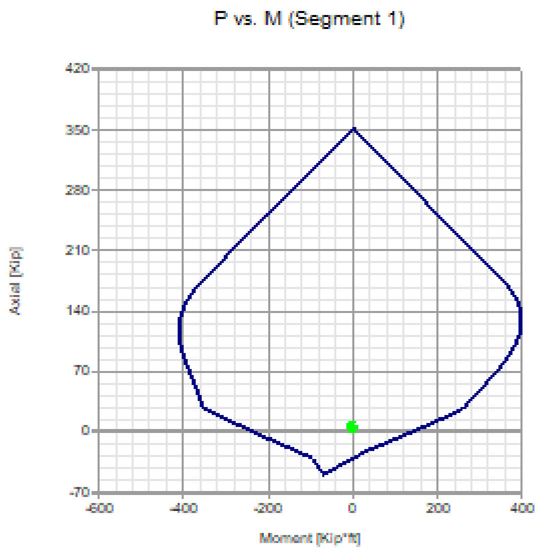
Reinforcement

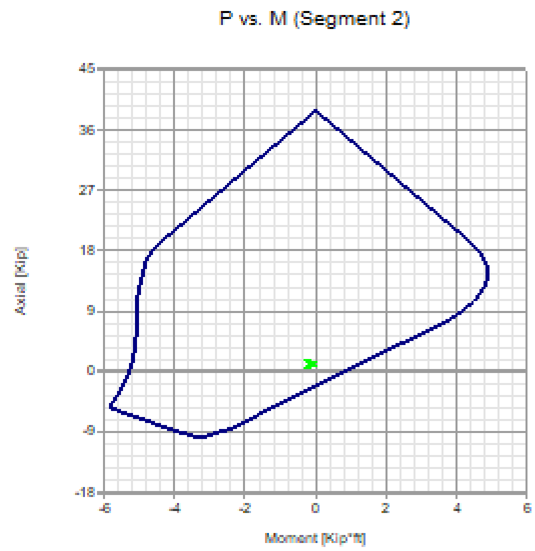
Segment	Vertical reinforcement Bars	Spacing [in]	Ld [in]	Horizontal reinforcement Bars	Spacing [in]	Ld [in]
1	1-#5	32.00	39.33	5-#3	32.00	15.10
	3-#5	32.00	39.33	5-#3	32.00	15.10
	1-#5	32.00	39.33	5-#3	32.00	15.10
2	1-#5	32.00	39.33	1-#11	24.00	300.30
3	1-#5	32.00	39.33	1-#11	24.00	300.30
4	1-#5	32.00	39.33	2-#3	32.00	15.10
	3-#5	32.00	39.33	2-#3	32.00	15.10
	1-#5	32.00	39.33	2-#3	32.00	15.10
5	1-#5	32.00	39.33	2-#3	32.00	15.10
	3-#5	32.00	39.33	2-#3	32.00	15.10
	1-#5	32.00	39.33	2-#3	32.00	15.10

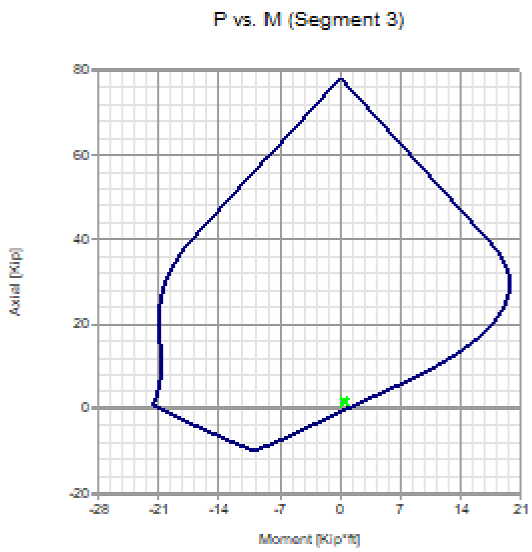
Combined axial flexure

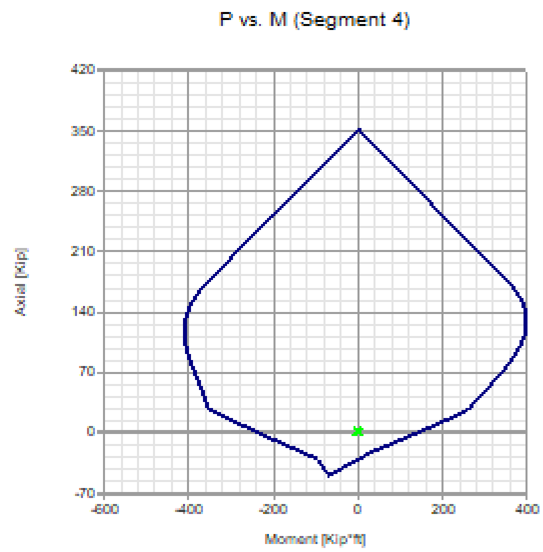
Segment	Condition	P [Kip]	M [Kip*ft]	Ma [Kip*ft]	Ratio
1	DM1(Max)	4.67	-1.48	254.52	0.01
2	DM1(Max)	1.16	-0.17	5.22	0.03
3	DM1(Max)	1.65	0.60	2.54	0.24
4	DM1(Max)	1.88	-0.89	242.41	0.00
5	DM1(Top)	0.04	-0.31	234.34	0.00

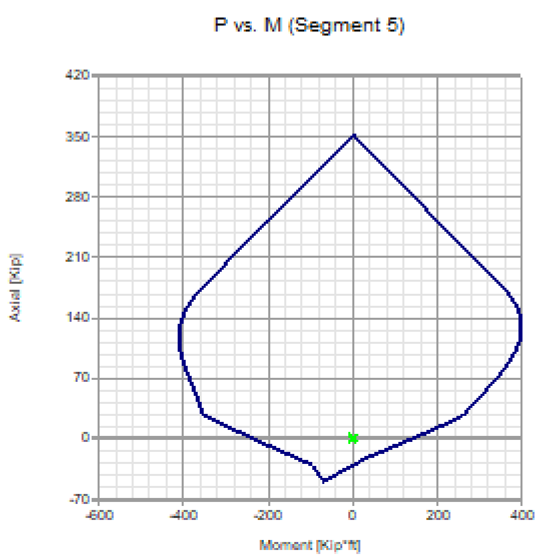
Interaction diagrams, P vs. M


P vs. M (Segment 1)
Axial [Kip]
420
350
280
210
140
70
0
-70
-600
-400
-200
0
200
400
Moment [Kip*ft]


P vs. M (Segment 2)
Axial [Kip]
45
36
27
18
9
0
-9
-18
-6
-4
-2
0
2
4
6
Moment [Kip*ft]


P vs. M (Segment 3)
Axial [Kip]
80
60
40
20
0
-20
-28
-21
-14
-7
0
7
14
21
Moment [Kip*ft]


P vs. M (Segment 4)
Axial [Kip]
420
350
280
210
140
70
0
-70
-600
-400
-200
0
200
400
Moment [Kip*ft]


P vs. M (Segment 5)
Axial [Kip]
420
350
280
210
140
70
0
-70
-600
-400
-200
0
200
400
Moment [Kip*ft]

Axial compression

Segment	Condition	P [Kip]	Pa [Kip]	Ratio
1	DM1(Bottom)	8.30	30.32	0.27
2	DM1(Max)	1.16	3.35	0.35
3	DM1(Max)	1.65	6.75	0.24
4	DM1(Bottom)	2.60	30.32	0.09
5	DM1(Bottom)	1.11	220.40	0.01

Axial tension

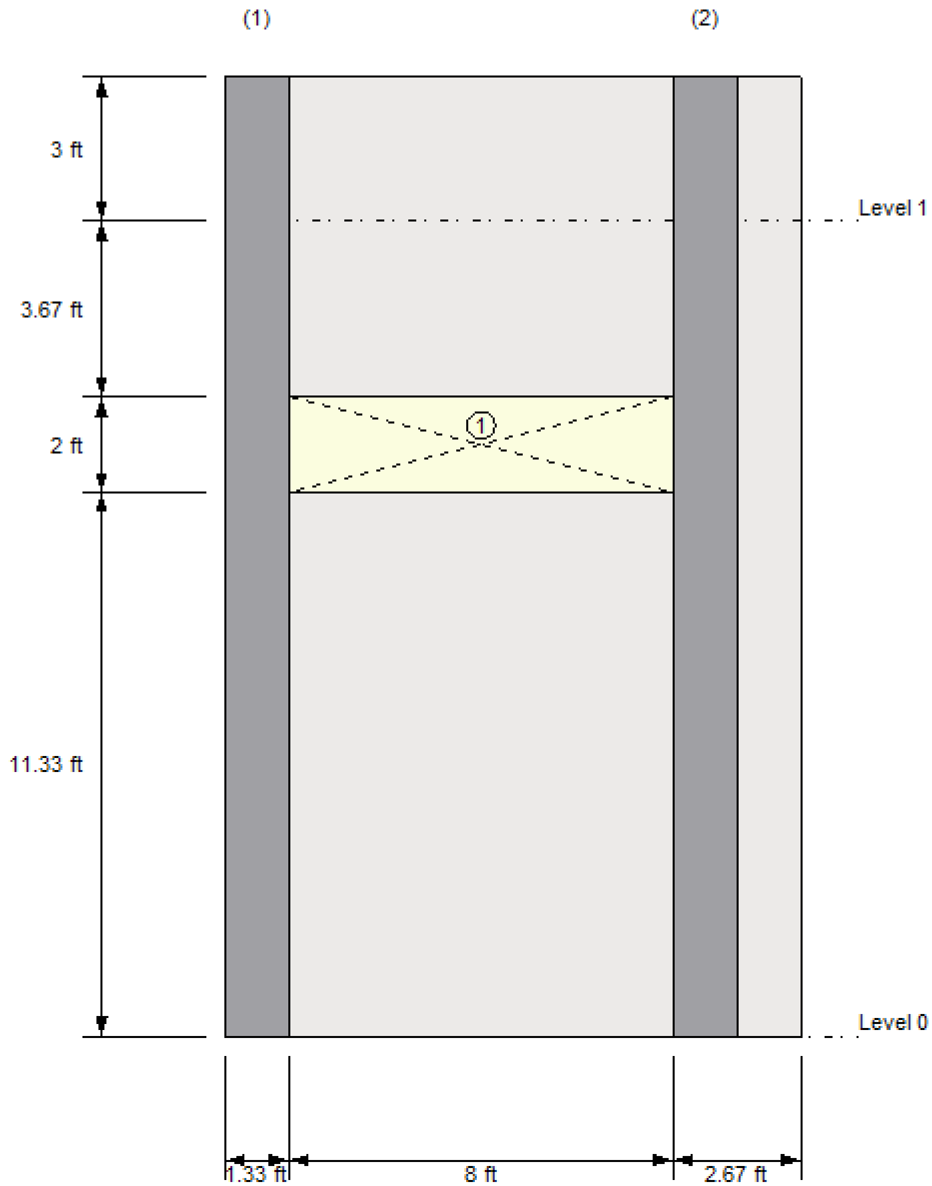
Segment	Condition	ft [Kip/in2]	Fs [Kip/in2]	Ratio
1	DM1(Top)	0.00	32.00	0.00
2	DM1(Top)	0.00	32.00	0.00
3	DM1(Top)	0.00	32.00	0.00
4	DM1(Top)	0.00	32.00	0.00
5	DM1(Top)	0.00	32.00	0.00

Shear

Segment	Condition	fv [Kip/in2]	Fv [Kip/in2]	Ratio
1	DM1(Top)	0.000	0.061	0.00
2	DM1(Bottom)	0.001	0.077	0.01
3	DM1(Max)	0.000	0.077	0.00
4	DM1(Max)	0.000	0.060	0.00
5	DM1(Max)	0.000	0.060	0.00

Column Design

Status : OK



Geometry

Column	Distance [ft]	Position Z	Width X [in]	Width Z [in]	Height [ft]
1	0.66	Centered	16.00	8.00	20.00
2	10.00	Centered	16.00	8.00	20.00

Reinforcement

	Longitudinal reinforcement			Transverse reinforcement	
Column	Bars	As [in2]	Ld [in]	Bars	Spacing [in]
1	4-#4	0.80	25.17	#4	8.00
2	4-#4	0.80	25.17	#4	8.00

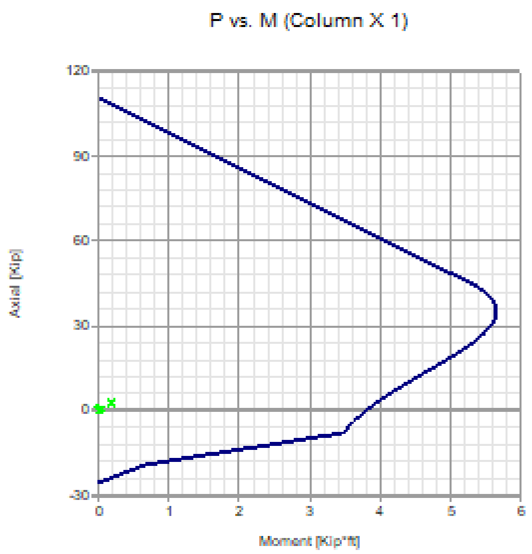
Combined axial - flexure along X direction

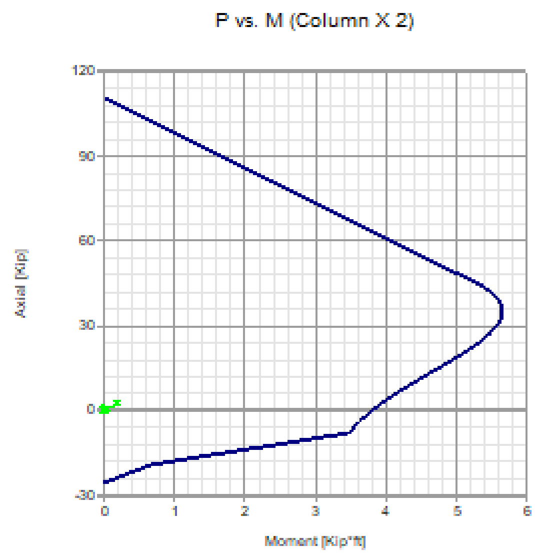
Column	Condition	P [Kip]	M [Kip*ft]	Ma [Kip*ft]	Ratio
1	DM1(Bottom)	2.75	0.18	3.94	0.05
2	DM1(Bottom)	2.67	0.18	3.94	0.05

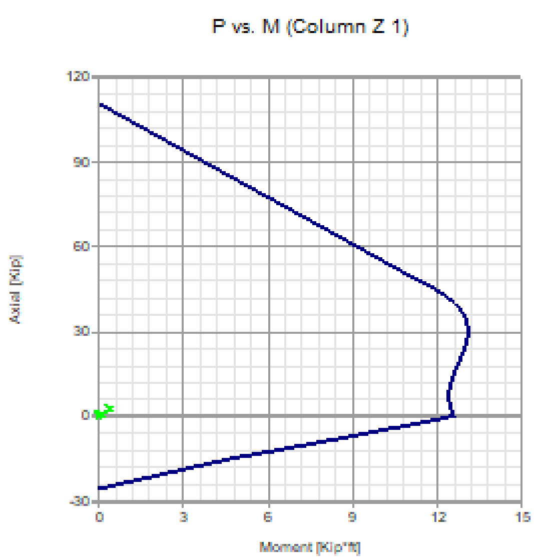
Combined axial - flexure along Z direction

Column	Condition	P [Kip]	M [Kip*ft]	Ma [Kip*ft]	Ratio
1	DM1(Bottom)	2.75	0.37	12.47	0.03
2	DM1(Bottom)	2.67	0.36	12.47	0.03

Interaction diagrams, P vs. M







Axial compression

Column	Condition	P [Kip]	Pa [Kip]	Ratio
1	DM1(Bottom)	2.75	44.25	0.06
2	DM1(Bottom)	2.67	44.25	0.06

Axial tension

Column	Condition	ft [Kip/in2]	Fs [Kip/in2]	Ratio
1	DM1(Top)	0.00	32.00	0.00
2	DM1(Top)	0.00	32.00	0.00

Shear along X direction

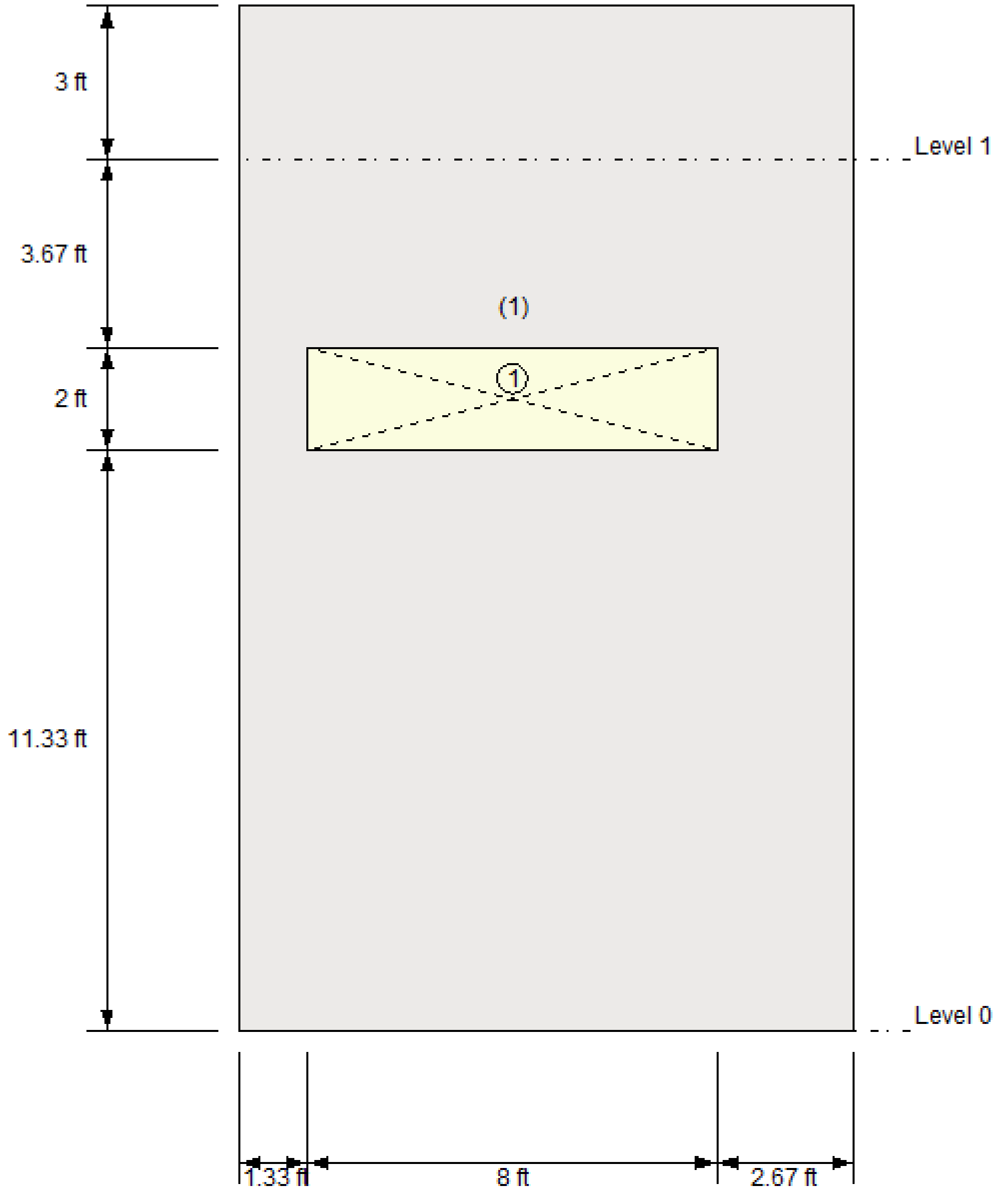
Column	Condition	fv [Kip/in2]	Fv [Kip/in2]	Ratio
1	DM1(Top)	0.000	0.116	0.00
2	DM1(Top)	0.000	0.116	0.00

Shear along Z direction

Column	Condition	fv [Kip/in2]	Fv [Kip/in2]	Ratio
1	DM1(Top)	0.000	0.077	0.00
2	DM1(Top)	0.000	0.077	0.00

Lintel Design

Status : OK



Geometry

Lintel	X Coordinate [ft]	Y Coordinate [ft]	Length [ft]	Depth [in]
1	1.33	11.33	8.00	32.00

Reinforcement

Lintel	Top long. reinforcement Bars	Top long. reinforcement Extent [in]	Bottom long. reinforcement Bars	Bottom long. reinforcement Extent [in]	Transverse reinforcement Bars	Transverse reinforcement Spacing [in]	Ld [in]
1	--	0.00	1-#7	0.00	--	0.00	0.00

Bending

Lintel	Condition	M [Kip*ft]	Ma [Kip*ft]	Ratio
1	DM1(Top)	0.73	29.92	0.02

Shear

Lintel	Condition	fv [Kip/in2]	Fv [Kip/in2]	Ratio
1	DM1(Bottom)	0.007	0.044	0.15

Deflection

Lintel	Condition	δs [in]	δmax [in]	Ratio
1		0.00	0.00	0.00

Notes

* P = Axial load
* Pa = Allowable compressive force due to axial load.
* M = Moment at the section under consideration.
* Ma = Wall allowable moment due to axial force or lintel pure flexure allowable moment
* fa = Calculated compressive stress due to axial load only
* fb = Calculated compressive stress due to axial flexure only
* ft = Calculated axial tension
* Fa = Allowable compressive stress due to axial load only
* Fb = Allowable compressive stress due to axial flexure only
* fv = Calculated shear stress
* Fs = Allowable tensile or compressive stress
* Fv = Allowable shear stress
* ld = Embedment length
* As = Effective cross sectional area of reinforcement
* δs = Calculated deflection
* δmax = Maximum allowable deflection

RAM Elements

Current Date: 8/28/2024 10:58 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Grid B\2024.08.27 Wall with openings works.msw

Design Results
Masonry wall

General Information

Global status : N. G.

Design code	:	TMS 402-16 SD

Materials:

Material	:	CMU 2.0-60
Mortar type	:	Port/Mort - M/S
Grouting type	:	Partial grouting
Mortar bed type	:	Full bed
Masonry compression strength (F`m)	:	2 [Kip/in2]
Steel tension strength (fy)	:	60 [Kip/in2]
Steel allowable tension strength (Fs)	:	24 [Kip/in2]
Steel elasticity modulus (Es)	:	29000 [Kip/in2]
Masonry elasticity modulus (Em)	:	1800 [Kip/in2]
Masonry unit weight	:	0.135 [Kip/ft3]

Seismic data:

Seismic design category	:	SDC D
Response modification factor	:	5.00
Shear wall type	:	Special

Geometry

Total height	:	20.00 [ft]
Total length	:	64.00 [ft]
Foundation type	:	Continuous
Wall bottom restraint	:	Pinned
Column bottom restraint	:	Fixed
Rigidity elements	:	Columns

Number of stories: 1

Story	Story height [ft]	Wall thickness [in]	Effective unit weight [Kip/ft3]
1	17.00	7.63	0.10

Openings:

Reference	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
Lower left	4.00	10.67	8.00	2.67
Lower left	14.00	10.67	8.00	2.67
Lower left	24.00	10.67	8.00	2.67
Lower left	34.00	10.67	8.00	2.67
Lower left	44.00	10.67	8.00	2.67

Lower left	54.00	10.67	8.00	2.67

Columns:

Distance [ft]	**Width X** [in]	**Width Z** [in]	**Position Z**
3.00	24.00	7.63	Back
13.00	24.00	7.63	Back
23.00	24.00	7.63	Back
33.00	24.00	7.63	Back
43.00	24.00	7.63	Back
53.00	24.00	7.63	Back
63.00	24.00	7.63	Back

Load Conditions

ID	**Comb.**	**Category**	**Description**
DL	No	DL	Dead Load
SL	No	SNOW	Snow Load
EQ	No	EQ	EQ Load
WL	No	WIND	Wind Load
EQoop	No	EQ	EQ Load Out of Plane
WLoop	No	WIND	Wind Load Out of Plane
SM1	Yes		DL
DM1	Yes		DL
D1	Yes		1.4DL
D2	Yes		1.2DL+0.5SL
D3	Yes		1.2DL+1.6SL
D4	Yes		1.2DL+0.5WL
D5	Yes		1.2DL+0.5WLoop
D6	Yes		1.2DL+1.6SL+0.5WL
D7	Yes		1.2DL+1.6SL+0.5WLoop
D8	Yes		1.2DL+WL
D9	Yes		1.2DL+WLoop
D10	Yes		1.2DL+WL+0.5SL
D11	Yes		1.2DL+WLoop+0.5SL
D12	Yes		0.9DL+WL
D13	Yes		0.9DL+WLoop
D14	Yes		1.2DL+0.2SL
D15	Yes		1.2DL+EQ
D16	Yes		1.2DL+EQoop
D17	Yes		1.2DL+EQ+0.2SL
D18	Yes		1.2DL+EQoop+0.2SL
D19	Yes		0.9DL+EQ
D20	Yes		0.9DL+EQoop
S1	Yes		DL
S2	Yes		DL+SL
S3	Yes		DL+0.75SL
S4	Yes		DL+0.6WL
S5	Yes		DL+0.6WLoop
S6	Yes		DL+0.7EQ
S7	Yes		DL+0.7EQoop
S8	Yes		DL+0.45WL+0.75SL
S9	Yes		DL+0.45WLoop+0.75SL
S10	Yes		0.6DL+0.6WL
S11	Yes		0.6DL+0.6WLoop
S12	Yes		DL+0.7EQ
S13	Yes		DL+0.7EQoop
S14	Yes		DL+0.525EQ
S15	Yes		DL+0.525EQoop
S16	Yes		DL+0.75SL

S17	Yes	DL+0.525EQ+0.75SL
S18	Yes	DL+0.525EQoop+0.75SL
S19	Yes	0.6DL+0.7EQ
S20	Yes	0.6DL+0.7EQoop

Loads

Concentrated loads:

Story	Condition	Direction	Magnitude [Kip]	Eccentricity [in]	Distance [ft]
1	DL	Vertical	3.69	0.00	6.67
1	DL	Vertical	3.69	0.00	13.33
1	DL	Vertical	3.69	0.00	20.00
1	DL	Vertical	3.69	0.00	26.67
1	DL	Vertical	3.69	0.00	34.33
1	DL	Vertical	3.69	0.00	40.00
1	DL	Vertical	3.69	0.00	46.67
1	DL	Vertical	3.69	0.00	53.33
1	DL	Vertical	3.69	0.00	60.00
1	SL	Vertical	5.26	0.00	6.67
1	SL	Vertical	5.26	0.00	13.33
1	SL	Vertical	5.26	0.00	20.00
1	SL	Vertical	5.26	0.00	26.67
1	SL	Vertical	5.26	0.00	34.33
1	SL	Vertical	5.26	0.00	40.00
1	SL	Vertical	5.26	0.00	46.67
1	SL	Vertical	5.26	0.00	53.33
1	SL	Vertical	5.26	0.00	60.00

Distributed loads:

Consider self weight : DL

Out-of-plane loads:

Story	Condition	Magnitude [Kip/ft2]
1	WLoop	0.02
Parapet	WLoop	0.02

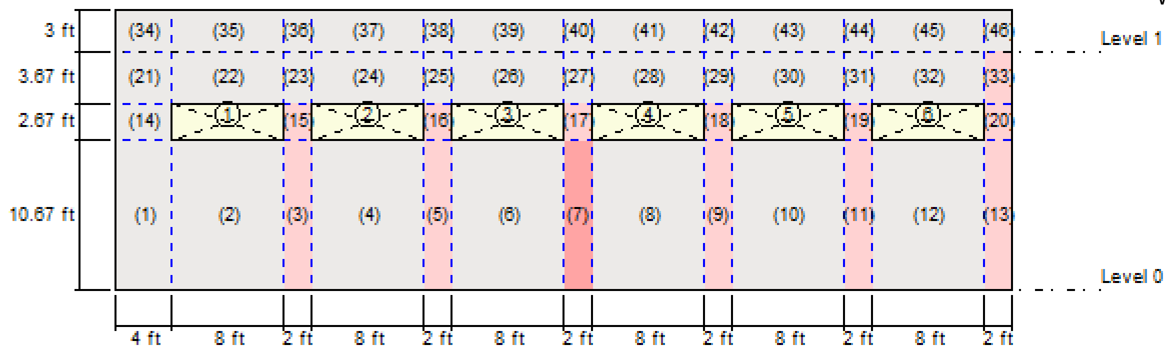
Out-of-plane seismic weight:

Load condition	Coefficient
EQoop	0.44

Bearing Wall Design

This is resolved in the column design by having ties in all of the sections of the wall

Status : N. G.
- Insufficient combined axial-flexural strength, TMS 402-16 SD, 9.2.4.1(a) (Segment 3)
- Excessive deflection, TMS 402-16 SD, 5.2.1.4.1 (Segment 3)



Geometry

Level	Segment	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
0	1	0.00	0.00	4.00	10.67
	2	4.00	0.00	8.00	10.67
	3	12.00	0.00	2.00	10.67
	4	14.00	0.00	8.00	10.67
	5	22.00	0.00	2.00	10.67
	6	24.00	0.00	8.00	10.67
	7	32.00	0.00	2.00	10.67
	8	34.00	0.00	8.00	10.67
	9	42.00	0.00	2.00	10.67
	10	44.00	0.00	8.00	10.67
	11	52.00	0.00	2.00	10.67
	12	54.00	0.00	8.00	10.67
	13	62.00	0.00	2.00	10.67
	14	0.00	10.67	4.00	2.67
	15	12.00	10.67	2.00	2.67
	16	22.00	10.67	2.00	2.67
	17	32.00	10.67	2.00	2.67
	18	42.00	10.67	2.00	2.67
	19	52.00	10.67	2.00	2.67
	20	62.00	10.67	2.00	2.67
	21	0.00	13.33	4.00	3.67
	22	4.00	13.33	8.00	3.67
	23	12.00	13.33	2.00	3.67
	24	14.00	13.33	8.00	3.67
	25	22.00	13.33	2.00	3.67
	26	24.00	13.33	8.00	3.67
	27	32.00	13.33	2.00	3.67
	28	34.00	13.33	8.00	3.67
	29	42.00	13.33	2.00	3.67
	30	44.00	13.33	8.00	3.67
	31	52.00	13.33	2.00	3.67
	32	54.00	13.33	8.00	3.67
	33	62.00	13.33	2.00	3.67
1	34	0.00	17.00	4.00	3.00
	35	4.00	17.00	8.00	3.00
	36	12.00	17.00	2.00	3.00
	37	14.00	17.00	8.00	3.00
	38	22.00	17.00	2.00	3.00
	39	24.00	17.00	8.00	3.00
	40	32.00	17.00	2.00	3.00
	41	34.00	17.00	8.00	3.00
	42	42.00	17.00	2.00	3.00
	43	44.00	17.00	8.00	3.00
	44	52.00	17.00	2.00	3.00
	45	54.00	17.00	8.00	3.00
	46	62.00	17.00	2.00	3.00

Vertical reinforcement

Segment	Bars	Spacing [in]	Ld [in]
1	2-#5	32.00	34.07
2	3-#5	32.00	34.07
3	1-#2	32.00	12.00
4	3-#5	32.00	34.07
5	1-#2	32.00	12.00
6	3-#5	32.00	34.07
7	1-#2	32.00	12.00
8	3-#5	32.00	34.07
9	1-#2	32.00	12.00
10	3-#5	32.00	34.07
11	1-#2	32.00	12.00
12	3-#5	32.00	34.07
13	1-#2	32.00	12.00
14	2-#5	32.00	34.07
15	1-#2	32.00	12.00
16	1-#2	32.00	12.00
17	1-#2	32.00	12.00
18	1-#2	32.00	12.00
19	1-#2	32.00	12.00
20	1-#2	32.00	12.00
21	2-#5	32.00	34.07
22	3-#5	32.00	34.07
23	1-#2	32.00	12.00
24	3-#5	32.00	34.07
25	1-#2	32.00	12.00
26	3-#5	32.00	34.07
27	1-#2	32.00	12.00
28	3-#5	32.00	34.07
29	1-#2	32.00	12.00
30	3-#5	32.00	34.07
31	1-#2	32.00	12.00
32	3-#5	32.00	34.07
33	1-#2	32.00	12.00
34	2-#5	32.00	34.07
35	3-#5	32.00	34.07
36	1-#5	32.00	34.07
37	3-#5	32.00	34.07
38	1-#5	32.00	34.07
39	3-#5	32.00	34.07
40	1-#5	32.00	34.07
41	3-#5	32.00	34.07
42	1-#5	32.00	34.07
43	3-#5	32.00	34.07
44	1-#5	32.00	34.07
45	3-#5	32.00	34.07
46	1-#5	32.00	34.07

Combined axial flexure

Segment	Condition	Pu [Kip]	Mua [Kip*ft]	Mu [Kip*ft]	ϕMn [Kip*ft]	Ratio
1	D20(Max)	4.13	3.85	3.88	8.78	0.44
2	D20(Max)	6.11	3.04	3.06	16.95	0.18
3	D20(Max)	2.85	3.85	4.97	1.52	3.27
4	D20(Max)	7.24	3.00	3.02	17.27	0.17
5	D20(Bottom)	2.93	3.91	5.09	1.54	3.30
6	D20(Max)	7.25	3.02	3.04	17.27	0.18
7	D20(Max)	2.95	3.94	5.14	1.55	3.31
8	D20(Max)	7.29	3.02	3.03	17.28	0.18
9	D20(Max)	2.96	3.92	5.12	1.56	3.29
10	D20(Max)	7.33	3.02	3.04	17.29	0.18
11	D20(Bottom)	2.90	3.88	5.03	1.54	3.27
12	D20(Max)	6.50	3.01	3.03	17.06	0.18
13	D20(Max)	3.29	2.40	2.63	1.65	1.59
14	D20(Max)	4.14	3.85	3.88	8.78	0.44
15	D20(Max)	4.66	2.71	3.13	2.07	1.51
16	D20(Max)	4.50	2.81	3.31	2.02	1.64
17	D20(Max)	4.57	2.83	3.35	2.04	1.64
18	D20(Bottom)	4.62	2.82	3.32	2.06	1.61
19	D20(Bottom)	4.76	2.77	3.22	2.10	1.53
20	D20(Bottom)	2.87	2.08	2.12	1.53	1.39
21	D20(Bottom)	3.55	2.78	2.80	8.61	0.33
22	D20(Top)	3.16	0.93	0.93	16.11	0.06
23	D20(Max)	4.68	1.74	1.77	2.08	0.85
24	D20(Top)	3.91	1.03	1.03	16.33	0.06
25	D20(Max)	4.82	1.78	1.81	2.12	0.85
26	D20(Max)	2.09	0.97	0.97	15.80	0.06
27	D20(Bottom)	4.71	1.89	1.92	2.09	0.92
28	D20(Top)	4.29	0.96	0.97	16.43	0.06
29	D20(Max)	4.97	1.78	1.81	2.16	0.84
30	D20(Max)	2.30	0.95	0.95	15.86	0.06
31	D20(Max)	4.80	1.79	1.82	2.11	0.86
32	D20(Top)	3.96	0.95	0.96	16.34	0.06
33	D20(Bottom)	2.38	1.37	1.38	1.38	1.00
34	D20(Max)	0.98	0.45	0.45	7.88	0.06
35	D18(Max)	-0.20	0.92	0.92	15.14	0.06
36	D20(Max)	0.34	0.37	0.37	3.90	0.10
37	D18(Max)	-0.64	0.95	0.95	15.02	0.06
38	D20(Max)	1.11	0.37	0.37	4.12	0.09
39	D18(Max)	-0.13	0.92	0.92	15.16	0.06
40	D20(Bottom)	0.86	0.36	0.36	4.05	0.09
41	D18(Bottom)	-1.37	0.92	0.92	14.81	0.06
42	D20(Max)	1.15	0.37	0.37	4.13	0.09
43	D18(Max)	0.07	0.94	0.94	15.22	0.06
44	D20(Bottom)	0.31	0.36	0.36	3.89	0.09
45	D18(Bottom)	-1.13	0.87	0.87	14.88	0.06
46	D20(Bottom)	0.82	0.27	0.27	4.04	0.07

Flexural reinforcement area

Segment	Condition	Pu [Kip]	As [in2]	Asmax [in2]	Ratio
1	DM1(Top)	0.00	0.46	1.42	0.33
2	DM1(Max)	0.00	0.93	2.85	0.33
3	D20(Bottom)	0.00	0.04	0.66	0.06
4	DM1(Top)	0.00	0.93	2.85	0.33
5	D20(Bottom)	0.00	0.04	0.66	0.06

6	DM1(Top)	0.00	0.93	2.85	0.33
7	D20(Bottom)	0.00	0.04	0.66	0.06
8	DM1(Top)	0.00	0.93	2.85	0.33
9	D20(Bottom)	0.00	0.04	0.66	0.06
10	DM1(Top)	0.00	0.93	2.85	0.33
11	D20(Bottom)	0.00	0.04	0.66	0.06
12	DM1(Top)	0.00	0.93	2.85	0.33
13	D20(Bottom)	0.00	0.04	0.66	0.06
14	DM1(Top)	0.00	0.46	1.42	0.33
15	D20(Bottom)	0.00	0.04	0.66	0.06
16	D20(Bottom)	0.00	0.04	0.66	0.06
17	D20(Bottom)	0.00	0.04	0.66	0.06
18	D20(Bottom)	0.00	0.04	0.66	0.06
19	D20(Bottom)	0.00	0.04	0.66	0.06
20	D20(Bottom)	0.00	0.04	0.66	0.06
21	DM1(Top)	0.00	0.46	1.42	0.33
22	DM1(Max)	0.00	0.93	2.85	0.33
23	D20(Bottom)	0.00	0.04	0.66	0.06
24	DM1(Max)	0.00	0.93	2.85	0.33
25	D20(Bottom)	0.00	0.04	0.66	0.06
26	DM1(Top)	0.00	0.93	2.85	0.33
27	D20(Bottom)	0.00	0.04	0.66	0.06
28	DM1(Top)	0.00	0.93	2.85	0.33
29	D20(Bottom)	0.00	0.04	0.66	0.06
30	DM1(Top)	0.00	0.93	2.85	0.33
31	D20(Bottom)	0.00	0.04	0.66	0.06
32	DM1(Top)	0.00	0.93	2.85	0.33
33	D20(Bottom)	0.00	0.04	0.66	0.06
34	DM1(Top)	0.00	0.46	1.42	0.33
35	DM1(Max)	0.00	0.93	2.85	0.33
36	DM1(Top)	0.00	0.23	0.66	0.35
37	DM1(Max)	0.00	0.93	2.85	0.33
38	DM1(Top)	0.00	0.23	0.66	0.35
39	DM1(Bottom)	0.00	0.93	2.85	0.33
40	DM1(Max)	0.00	0.23	0.66	0.35
41	DM1(Max)	0.00	0.93	2.85	0.33
42	DM1(Top)	0.00	0.23	0.66	0.35
43	DM1(Max)	0.00	0.93	2.85	0.33
44	DM1(Top)	0.00	0.23	0.66	0.35
45	DM1(Max)	0.00	0.93	2.85	0.33
46	DM1(Top)	0.00	0.23	0.66	0.35

Intermediate results for axial-bending

Segment	Condition	c [in]	d [in]	Mcr [Kip*ft]
1	D20(Max)	0.53	3.81	1.04
2	D20(Max)	0.51	3.81	1.00
3	D20(Max)	0.18	3.81	1.02
4	D20(Max)	0.52	3.81	1.02
5	D20(Bottom)	0.18	3.81	1.03
6	D20(Max)	0.52	3.81	1.02
7	D20(Max)	0.18	3.81	1.03
8	D20(Max)	0.52	3.81	1.02
9	D20(Max)	0.18	3.81	1.03
10	D20(Max)	0.52	3.81	1.02
11	D20(Bottom)	0.18	3.81	1.03
12	D20(Max)	0.51	3.81	1.01
13	D20(Max)	0.19	3.81	1.06
14	D20(Max)	0.53	3.81	0.96

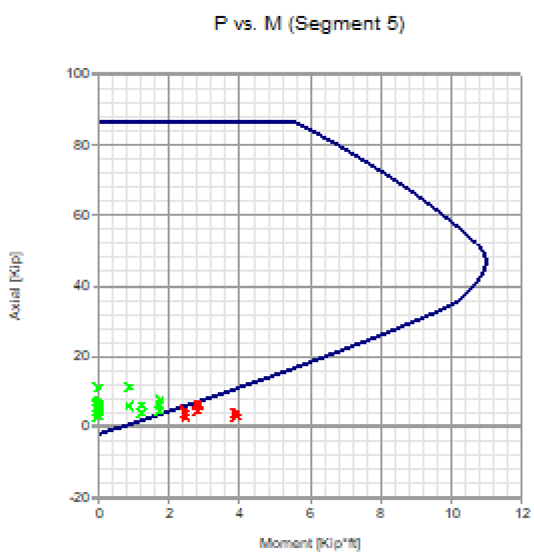
15	D20(Max)	0.24	3.81	1.16
16	D20(Max)	0.24	3.81	1.15
17	D20(Max)	0.24	3.81	1.15
18	D20(Bottom)	0.24	3.81	1.16
19	D20(Bottom)	0.25	3.81	1.17
20	D20(Bottom)	0.18	3.81	1.02
21	D20(Bottom)	0.52	3.81	0.94
22	D20(Top)	0.48	3.81	0.84
23	D20(Max)	0.24	3.81	1.16
24	D20(Top)	0.49	3.81	0.84
25	D20(Max)	0.25	3.81	1.17
26	D20(Max)	0.47	3.81	0.84
27	D20(Bottom)	0.24	3.81	1.16
28	D20(Top)	0.49	3.81	0.85
29	D20(Max)	0.25	3.81	1.18
30	D20(Max)	0.47	3.81	0.85
31	D20(Max)	0.25	3.81	1.17
32	D20(Top)	0.49	3.81	0.83
33	D20(Bottom)	0.16	3.81	0.99
34	D20(Max)	0.47	3.81	0.84
35	D18(Max)	0.45	3.81	0.81
36	D20(Max)	0.47	3.81	0.83
37	D18(Max)	0.45	3.81	0.81
38	D20(Max)	0.49	3.81	0.89
39	D18(Max)	0.45	3.81	0.81
40	D20(Bottom)	0.49	3.81	0.87
41	D18(Bottom)	0.44	3.81	0.81
42	D20(Max)	0.50	3.81	0.89
43	D18(Max)	0.45	3.81	0.81
44	D20(Bottom)	0.47	3.81	0.83
45	D18(Bottom)	0.44	3.81	0.81
46	D20(Bottom)	0.48	3.81	0.87

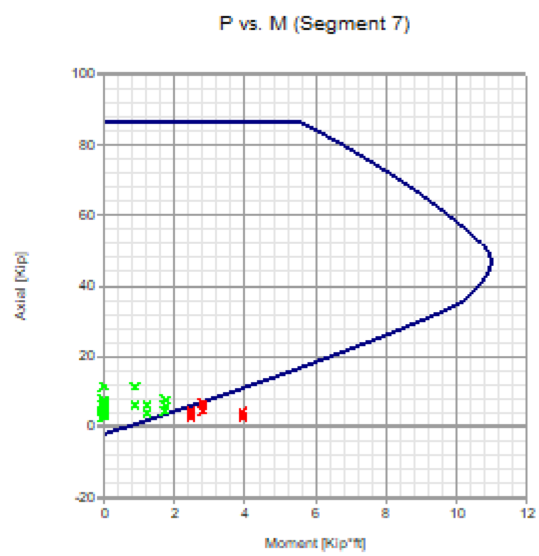
Inertias

Segment	**Condition**	**Ig** [in4]	**Icr** [in4]
1	D20(Max)	355.60	24.80
2	D20(Max)	355.60	24.12
3	D20(Max)	355.60	9.12
4	D20(Max)	355.60	24.48
5	D20(Bottom)	355.60	9.26
6	D20(Max)	355.60	24.48
7	D20(Max)	355.60	9.28
8	D20(Max)	355.60	24.49
9	D20(Max)	355.60	9.31
10	D20(Max)	355.60	24.50
11	D20(Bottom)	355.60	9.21
12	D20(Max)	355.60	24.24
13	D20(Max)	355.60	9.83
14	D20(Max)	355.60	24.80
15	D20(Max)	355.60	11.99
16	D20(Max)	355.60	11.75
17	D20(Max)	355.60	11.86
18	D20(Bottom)	355.60	11.93
19	D20(Bottom)	355.60	12.14
20	D20(Bottom)	355.60	9.16
21	D20(Bottom)	355.60	24.43
22	D20(Top)	355.60	23.18
23	D20(Max)	355.60	12.03
24	D20(Top)	355.60	23.42
25	D20(Max)	355.60	12.25
26	D20(Max)	355.60	22.83

27	D20(Bottom)	355.60	12.08
28	D20(Top)	355.60	23.54
29	D20(Max)	355.60	12.47
30	D20(Max)	355.60	22.90
31	D20(Max)	355.60	12.21
32	D20(Top)	355.60	23.43
33	D20(Bottom)	355.60	8.36
34	D20(Max)	355.60	22.79
35	D18(Max)	355.60	22.09
36	D20(Max)	355.60	22.59
37	D18(Max)	355.60	21.95
38	D20(Max)	355.60	23.58
39	D18(Max)	355.60	22.11
40	D20(Bottom)	355.60	23.27
41	D18(Bottom)	355.60	21.71
42	D20(Max)	355.60	23.64
43	D18(Max)	355.60	22.18
44	D20(Bottom)	355.60	22.56
45	D18(Bottom)	355.60	21.79
46	D20(Bottom)	355.60	23.22

Interaction diagrams, P vs. M





Axial compression

Segment	Condition	Pu [Kip]	ϕPn [Kip]	Ratio
1	D6(Bottom)	11.35	163.36	0.07
2	D6(Bottom)	19.40	326.72	0.06
3	D7(Top)	11.68	60.29	0.19
4	D3(Bottom)	22.61	326.72	0.07
5	D6(Max)	11.26	60.29	0.19
6	D6(Bottom)	23.14	326.72	0.07
7	D7(Top)	11.51	60.29	0.19
8	D3(Bottom)	23.32	326.72	0.07
9	D3(Top)	11.73	60.29	0.19
10	D6(Bottom)	23.12	326.72	0.07
11	D7(Top)	12.01	60.29	0.20
12	D7(Bottom)	21.70	326.72	0.07

13	D6(Top)	6.60	60.29	0.11
14	D7(Max)	8.42	163.36	0.05
15	D7(Top)	12.29	60.29	0.20
16	D6(Top)	12.61	60.29	0.21
17	D6(Max)	12.82	60.29	0.21
18	D3(Max)	14.78	60.29	0.25
19	D3(Max)	14.59	60.29	0.24
20	D7(Max)	7.10	60.29	0.12
21	D7(Bottom)	7.53	163.36	0.05
22	D3(Top)	10.16	326.72	0.03
23	D7(Bottom)	12.22	60.29	0.20
24	D3(Top)	12.45	326.72	0.04
25	D6(Bottom)	12.52	60.29	0.21
26	D7(Top)	9.88	326.72	0.03
27	D7(Bottom)	12.38	60.29	0.21
28	D3(Max)	15.92	326.72	0.05
29	D6(Bottom)	13.08	60.29	0.22
30	D7(Top)	10.36	326.72	0.03
31	D7(Max)	12.63	60.29	0.21
32	D7(Top)	12.68	326.72	0.04
33	D6(Bottom)	5.71	60.29	0.09
34	D6(Bottom)	2.17	232.98	0.01
35	D1(Top)	0.39	465.96	0.00
36	D1(Bottom)	0.52	85.76	0.01
37	D1(Top)	0.35	465.96	0.00
38	D7(Max)	3.27	85.76	0.04
39	D1(Top)	0.24	465.96	0.00
40	D3(Max)	2.27	85.76	0.03
41	D1(Top)	0.18	465.96	0.00
42	D7(Max)	3.46	85.76	0.04
43	D1(Max)	0.39	465.96	0.00
44	D1(Bottom)	0.48	85.76	0.01
45	D7(Top)	0.66	465.96	0.00
46	D7(Bottom)	2.16	85.76	0.03

Axial stress

Segment	Condition	Pu [Kip]	Pu/Ag [Kip/in2]	Fn [Kip/in2]	Ratio
1	D3(Max)	11.35	0.06	0.40	0.14
2	D3(Bottom)	19.40	0.05	0.40	0.12
3	D7(Top)	11.68	0.11	0.40	0.29
4	D6(Bottom)	22.61	0.06	0.40	0.14
5	D3(Top)	11.26	0.11	0.40	0.28
6	D6(Bottom)	23.14	0.06	0.40	0.14
7	D7(Top)	11.51	0.11	0.40	0.28
8	D7(Bottom)	23.32	0.06	0.40	0.14
9	D6(Top)	11.73	0.11	0.40	0.29
10	D3(Bottom)	23.12	0.06	0.40	0.14
11	D7(Top)	12.01	0.12	0.40	0.29
12	D7(Bottom)	21.70	0.05	0.40	0.13
13	D3(Top)	6.60	0.06	0.40	0.16
14	D7(Bottom)	8.42	0.04	0.40	0.10
15	D7(Top)	12.29	0.12	0.40	0.30
16	D3(Top)	12.61	0.12	0.40	0.31
17	D3(Max)	12.82	0.13	0.40	0.31
18	D3(Max)	14.78	0.14	0.40	0.36
19	D6(Max)	14.59	0.14	0.40	0.36
20	D7(Max)	7.10	0.07	0.40	0.17

21	D7(Max)	7.53	0.04	0.40	0.09
22	D3(Top)	10.16	0.02	0.40	0.06
23	D7(Bottom)	12.22	0.12	0.40	0.30
24	D6(Top)	12.45	0.03	0.40	0.08
25	D6(Bottom)	12.52	0.12	0.40	0.31
26	D7(Top)	9.88	0.02	0.40	0.06
27	D7(Max)	12.38	0.12	0.40	0.30
28	D6(Max)	15.92	0.04	0.40	0.10
29	D6(Bottom)	13.08	0.13	0.40	0.32
30	D7(Top)	10.36	0.03	0.40	0.06
31	D7(Bottom)	12.63	0.12	0.40	0.31
32	D7(Top)	12.68	0.03	0.40	0.08
33	D3(Max)	5.71	0.06	0.40	0.14
34	D3(Bottom)	2.17	0.01	0.40	0.03
35	D7(Max)	-1.47	0.00	0.40	0.01
36	D1(Bottom)	0.52	0.01	0.40	0.01
37	D6(Bottom)	-2.53	0.01	0.40	0.02
38	D7(Bottom)	3.27	0.03	0.40	0.08
39	D7(Max)	-1.50	0.00	0.40	0.01
40	D6(Bottom)	2.27	0.02	0.40	0.06
41	D7(Bottom)	-4.39	0.01	0.40	0.03
42	D7(Bottom)	3.46	0.03	0.40	0.08
43	D7(Max)	-1.03	0.00	0.40	0.01
44	D1(Bottom)	0.48	0.00	0.40	0.01
45	D6(Bottom)	-3.33	0.01	0.40	0.02
46	D7(Bottom)	2.16	0.02	0.40	0.05

Shear

Segment	Condition	Vu [Kip]	ϕVn [Kip]	Ratio
1	D20(Top)	0.24	3.89	0.06
2	D20(Max)	0.14	3.84	0.04
3	D20(Top)	1.18	4.15	0.28
4	D20(Max)	0.14	3.87	0.04
5	D20(Top)	1.24	4.13	0.30
6	D20(Max)	0.14	3.87	0.04
7	D20(Top)	1.25	4.14	0.30
8	D20(Max)	0.15	3.87	0.04
9	D20(Top)	1.24	4.15	0.30
10	D20(Max)	0.14	3.87	0.04
11	D20(Top)	1.21	4.16	0.29
12	D20(Max)	0.14	3.85	0.04
13	D20(Top)	0.54	3.97	0.13
14	D20(Bottom)	0.24	3.89	0.06
15	D20(Max)	1.18	4.15	0.28
16	D20(Max)	1.24	4.14	0.30
17	D20(Max)	1.25	4.14	0.30
18	D20(Max)	1.24	4.15	0.30
19	D20(Max)	1.21	4.16	0.29
20	D20(Bottom)	0.53	3.97	0.13
21	D20(Top)	0.21	4.18	0.05
22	D20(Top)	0.11	3.76	0.03
23	D20(Bottom)	0.46	4.15	0.11
24	D20(Max)	0.13	3.75	0.04
25	D20(Bottom)	0.33	4.17	0.08
26	D20(Top)	0.11	3.76	0.03
27	D20(Bottom)	0.40	4.16	0.10
28	D20(Top)	0.13	3.79	0.03

29	D20(Max)	0.33	4.18	0.08
30	D20(Top)	0.11	3.77	0.03
31	D20(Max)	0.48	4.17	0.12
32	D20(Max)	0.13	3.76	0.04
33	D20(Top)	0.19	4.37	0.04
34	D20(Max)	0.07	3.73	0.02
35	D18(Max)	0.07	3.69	0.02
36	D20(Bottom)	0.08	3.72	0.02
37	D18(Bottom)	0.07	3.69	0.02
38	D20(Bottom)	0.10	3.80	0.03
39	D18(Bottom)	0.06	3.69	0.02
40	D20(Bottom)	0.10	3.77	0.03
41	D18(Bottom)	0.07	3.69	0.02
42	D20(Bottom)	0.10	3.80	0.03
43	D18(Bottom)	0.06	3.69	0.02
44	D20(Bottom)	0.08	3.72	0.02
45	D20(Bottom)	0.07	3.69	0.02
46	D20(Bottom)	0.08	3.77	0.02

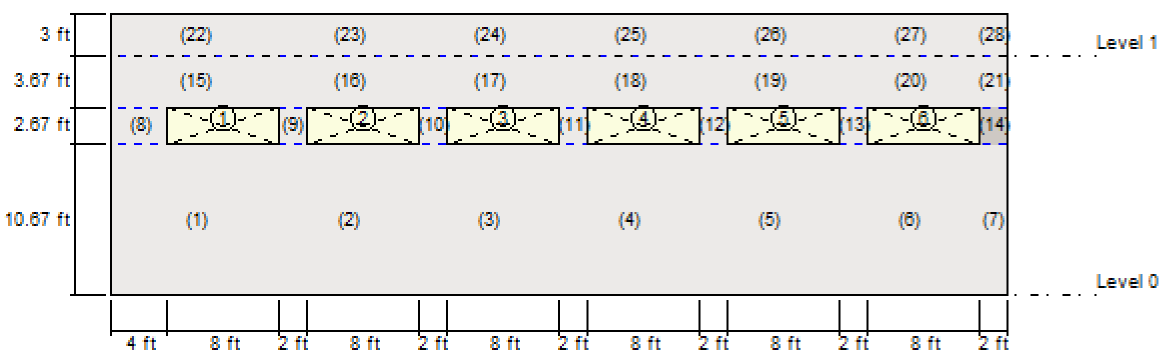
Deflection

Segment	Condition	δs [in]	δmax [in]	δs/δmax
1	S20(Top)	0.05	1.43	0.04
2	S7(Max)	0.02	1.43	0.02
3	S20(Max)	1.60	1.43	1.12
4	S20(Max)	0.02	1.43	0.01
5	S20(Bottom)	1.65	1.43	1.16
6	S20(Max)	0.02	1.43	0.02
7	S20(Max)	1.68	1.43	1.18
8	S13(Max)	0.02	1.43	0.02
9	S20(Max)	1.65	1.43	1.16
10	S7(Max)	0.02	1.43	0.02
11	S20(Bottom)	1.62	1.43	1.13
12	S20(Max)	0.02	1.43	0.01
13	S13(Bottom)	0.07	1.43	0.05
14	S20(Max)	0.05	1.43	0.04
15	S20(Max)	0.08	1.43	0.05
16	S20(Bottom)	0.08	1.43	0.06
17	S13(Bottom)	0.08	1.43	0.06
18	S13(Bottom)	0.08	1.43	0.06
19	S7(Max)	0.08	1.43	0.06
20	S13(Max)	0.06	1.43	0.04
21	S20(Bottom)	0.04	1.43	0.03
22	S7(Top)	0.01	1.43	0.00
23	S20(Bottom)	0.05	1.43	0.03
24	S7(Top)	0.01	1.43	0.01
25	S7(Max)	0.05	1.43	0.04
26	S20(Max)	0.01	1.43	0.00
27	S20(Max)	0.05	1.43	0.04
28	S20(Top)	0.01	1.43	0.00
29	S13(Bottom)	0.05	1.43	0.04
30	S20(Top)	0.01	1.43	0.00
31	S7(Max)	0.05	1.43	0.04
32	S20(Top)	0.01	1.43	0.00
33	S13(Bottom)	0.04	1.43	0.03
34	S20(Bottom)	0.00	0.25	0.00
35	S13(Bottom)	0.00	0.25	0.00
36	S7(Max)	0.00	0.25	0.00

37	S7(Max)	0.00	0.25	0.00
38	S20(Bottom)	0.00	0.25	0.00
39	S7(Max)	0.00	0.25	0.00
40	S7(Max)	0.00	0.25	0.00
41	S20(Bottom)	0.00	0.25	0.00
42	S20(Max)	0.00	0.25	0.00
43	S20(Bottom)	0.00	0.25	0.00
44	S13(Bottom)	0.00	0.25	0.00
45	S20(Max)	0.00	0.25	0.00
46	S13(Bottom)	0.00	0.25	0.00

Shear Wall Design

Status : Warnings in design
- Insufficient vertical reinforcement area, TMS 402-16 SD, 9.3.6.2, 7.3.2, 7.4 (Segment 7)
- Excessive spacing between vertical reinforcement bars, TMS 402-16 SD, 7.3.2, 7.4 (Segment 22)
- Excessive flexural reinforcement area, TMS 402-16 SD, 9.3.3.2 (Segment 28)



Geometry

Level	Segment	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
0	1	0.00	0.00	12.00	10.67
	2	12.00	0.00	10.00	10.67
	3	22.00	0.00	10.00	10.67
	4	32.00	0.00	10.00	10.67
	5	42.00	0.00	10.00	10.67
	6	52.00	0.00	10.00	10.67
	7	62.00	0.00	2.00	10.67
	8	0.00	10.67	4.00	2.67
	9	12.00	10.67	2.00	2.67
	10	22.00	10.67	2.00	2.67
	11	32.00	10.67	2.00	2.67
	12	42.00	10.67	2.00	2.67
	13	52.00	10.67	2.00	2.67
	14	62.00	10.67	2.00	2.67
	15	0.00	13.33	12.00	3.67
	16	12.00	13.33	10.00	3.67
	17	22.00	13.33	10.00	3.67
	18	32.00	13.33	10.00	3.67
	19	42.00	13.33	10.00	3.67
	20	52.00	13.33	10.00	3.67
	21	62.00	13.33	2.00	3.67
1	22	0.00	17.00	12.00	3.00
	23	12.00	17.00	10.00	3.00
	24	22.00	17.00	10.00	3.00
	25	32.00	17.00	10.00	3.00
	26	42.00	17.00	10.00	3.00

27	52.00	17.00	10.00	3.00
28	62.00	17.00	2.00	3.00

Reinforcement

	Vertical reinforcement			Horizontal reinforcement		
Segment	Bars	Spacing [in]	Ld [in]	Bars	Spacing [in]	Ld [in]
1	2-#5	32.00	34.07	4-#5	32.00	34.07
	3-#5	32.00	34.07	4-#5	32.00	34.07
2	1-#2	32.00	34.07	4-#5	32.00	34.07
	3-#5	32.00	34.07	4-#5	32.00	34.07
3	1-#2	32.00	34.07	4-#5	32.00	34.07
	3-#5	32.00	34.07	4-#5	32.00	34.07
4	1-#2	32.00	34.07	4-#5	32.00	34.07
	3-#5	32.00	34.07	4-#5	32.00	34.07
5	1-#2	32.00	34.07	4-#5	32.00	34.07
	3-#5	32.00	34.07	4-#5	32.00	34.07
6	1-#2	32.00	34.07	4-#5	32.00	34.07
	3-#5	32.00	34.07	4-#5	32.00	34.07
7	1-#2	32.00	12.00	16-#5	8.00	34.07
8	2-#5	32.00	34.07	2-#5	16.00	34.07
9	1-#2	32.00	12.00	4-#3	8.00	13.08
10	1-#2	32.00	12.00	4-#3	8.00	13.08
11	1-#2	32.00	12.00	4-#3	8.00	13.08
12	1-#2	32.00	12.00	4-#3	8.00	13.08
13	1-#2	32.00	12.00	4-#3	8.00	13.08
14	1-#2	32.00	12.00	4-#3	8.00	13.08
15	2-#5	32.00	34.07	2-#5	32.00	34.07
	3-#5	32.00	34.07	2-#5	32.00	34.07
16	1-#2	32.00	34.07	2-#5	32.00	34.07
	3-#5	32.00	34.07	2-#5	32.00	34.07
17	1-#2	32.00	34.07	2-#5	32.00	34.07
	3-#5	32.00	34.07	2-#5	32.00	34.07
18	1-#2	32.00	34.07	2-#5	32.00	34.07
	3-#5	32.00	34.07	2-#5	32.00	34.07
19	1-#2	32.00	34.07	2-#5	32.00	34.07
	3-#5	32.00	34.07	2-#5	32.00	34.07
20	1-#2	32.00	34.07	2-#5	32.00	34.07
	3-#5	32.00	34.07	2-#5	32.00	34.07
21	1-#2	32.00	12.00	6-#3	8.00	13.08
22	2-#5	32.00	34.07	5-#5	8.00	34.07
	3-#5	32.00	34.07	5-#5	8.00	34.07
23	1-#5	32.00	34.07	5-#3	8.00	13.08
	3-#5	32.00	34.07	5-#3	8.00	13.08
24	1-#5	32.00	34.07	5-#3	8.00	13.08
	3-#5	32.00	34.07	5-#3	8.00	13.08
25	1-#5	32.00	34.07	5-#3	8.00	13.08
	3-#5	32.00	34.07	5-#3	8.00	13.08
26	1-#5	32.00	34.07	5-#3	8.00	13.08
	3-#5	32.00	34.07	5-#3	8.00	13.08
27	1-#5	32.00	34.07	5-#3	8.00	13.08
	3-#5	32.00	34.07	5-#3	8.00	13.08
28	1-#5	32.00	34.07	5-#3	8.00	13.08

Combined axial flexure

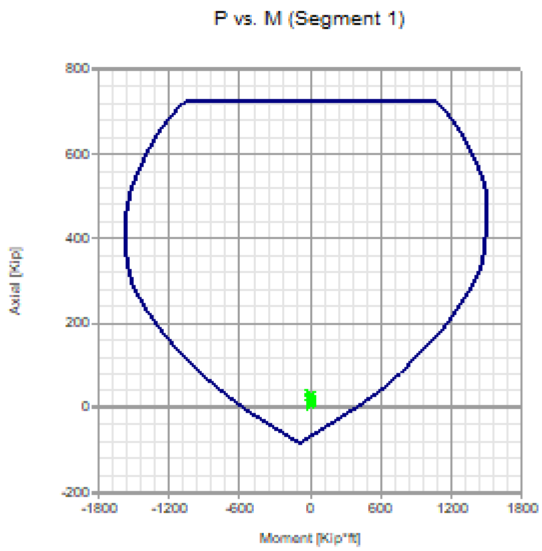
Segment	Condition	Pu [Kip]	Mu [Kip*ft]	ϕMn [Kip*ft]	Ratio
1	D1(Top)	11.77	9.41	447.36	0.02
2	D6(Top)	21.53	37.86	338.02	0.11
3	D3(Top)	21.05	35.50	335.91	0.11
4	D3(Top)	21.51	35.51	337.94	0.11
5	D6(Top)	21.76	36.91	339.05	0.11
6	D6(Top)	20.12	46.82	331.80	0.14
7	D7(Top)	6.60	0.51	7.17	0.07
8	D3(Max)	8.10	-7.94	87.74	0.09
9	D1(Top)	7.33	0.74	7.85	0.09
10	D7(Top)	12.62	-0.74	16.23	0.05
11	D1(Top)	7.37	0.52	7.89	0.07
12	D7(Top)	13.19	-0.86	16.73	0.05
13	D3(Top)	12.70	1.27	12.70	0.10
14	D7(Max)	6.80	2.00	7.36	0.27
15	D1(Bottom)	8.50	10.63	429.81	0.02
16	D7(Bottom)	17.31	40.75	319.42	0.13
17	D6(Bottom)	18.12	44.52	322.97	0.14
18	D7(Bottom)	19.65	47.67	329.74	0.14
19	D3(Bottom)	19.40	45.17	328.64	0.14
20	D7(Bottom)	17.13	45.56	318.62	0.14
21	D7(Bottom)	5.71	1.11	6.34	0.18
22	D7(Max)	0.69	3.65	387.41	0.01
23	D7(Bottom)	-2.24	15.35	231.00	0.07
24	D7(Bottom)	1.77	9.48	249.51	0.04
25	D7(Bottom)	-2.13	11.72	231.54	0.05
26	D7(Bottom)	2.44	9.69	252.57	0.04
27	D7(Bottom)	-3.10	16.56	227.06	0.07
28	D3(Bottom)	2.16	0.42	6.38	0.07

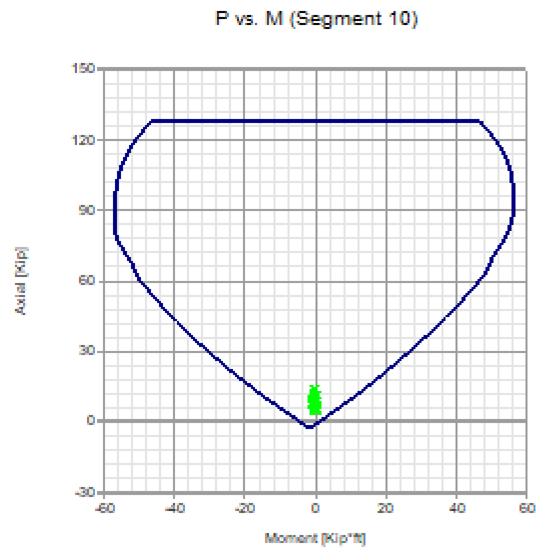
Flexural reinforcement area

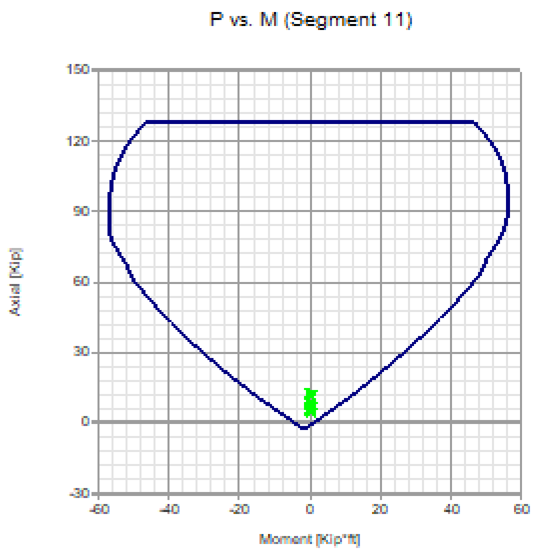
Segment	Condition	Pu [Kip]	As [in2]	Asmax [in2]	Ratio
1	D20(Bottom)	0.00	1.55	68.51	0.02
2	DM1(Top)	0.00	0.98	6.19	0.16
3	DM1(Top)	0.00	0.98	6.19	0.16
4	DM1(Top)	0.00	0.98	6.19	0.16
5	DM1(Top)	0.00	0.98	6.19	0.16
6	DM1(Top)	0.00	0.98	6.19	0.16
7	D20(Top)	0.00	0.05	0.15	0.34
8	D20(Max)	0.00	0.62	2.41	0.26
9	D20(Top)	0.00	0.05	0.15	0.34
10	D20(Bottom)	0.00	0.05	0.29	0.18
11	D20(Top)	0.00	0.05	0.15	0.34
12	D20(Bottom)	0.00	0.05	0.29	0.18
13	D20(Top)	0.00	0.05	0.15	0.34
14	D20(Bottom)	0.00	0.05	0.15	0.34
15	DM1(Top)	0.00	1.55	3.86	0.40
16	DM1(Max)	0.00	0.98	6.19	0.16
17	DM1(Top)	0.00	0.98	6.19	0.16
18	DM1(Top)	0.00	0.98	6.19	0.16
19	DM1(Top)	0.00	0.98	6.19	0.16
20	DM1(Max)	0.00	0.98	6.19	0.16
21	D20(Bottom)	0.00	0.05	0.29	0.18
22	DM1(Max)	0.00	1.55	5.31	0.29
23	DM1(Bottom)	0.00	1.24	6.19	0.20

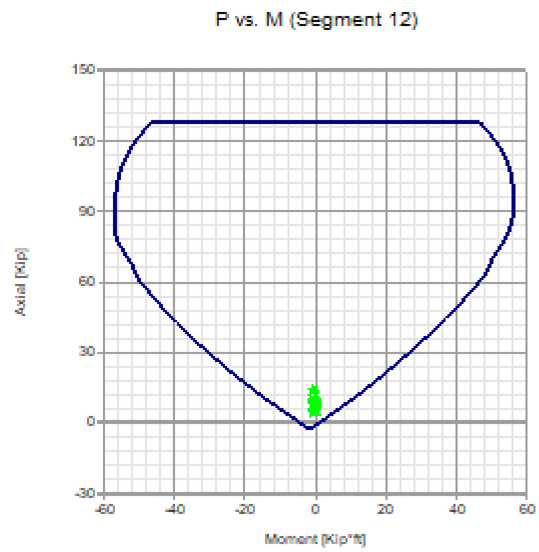
24	D7(Top)	0.00	1.24	3.70	0.34
25	DM1(Bottom)	0.00	1.24	6.19	0.20
26	DM1(Bottom)	0.00	1.24	6.19	0.20
27	DM1(Bottom)	0.00	1.24	6.19	0.20
28	D20(Bottom)	0.00	0.31	0.29	1.09

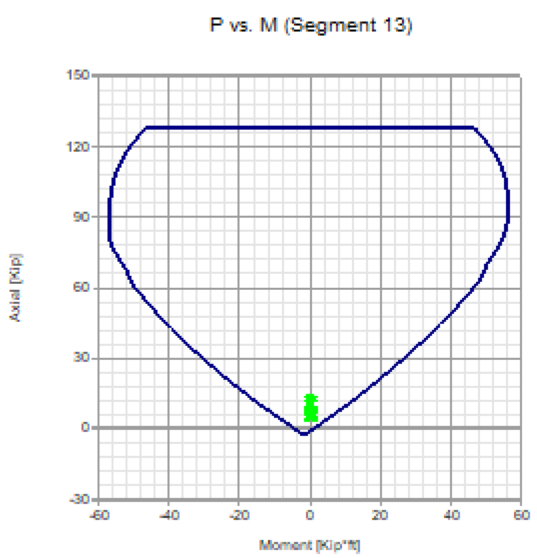
Interaction diagrams, P vs. M

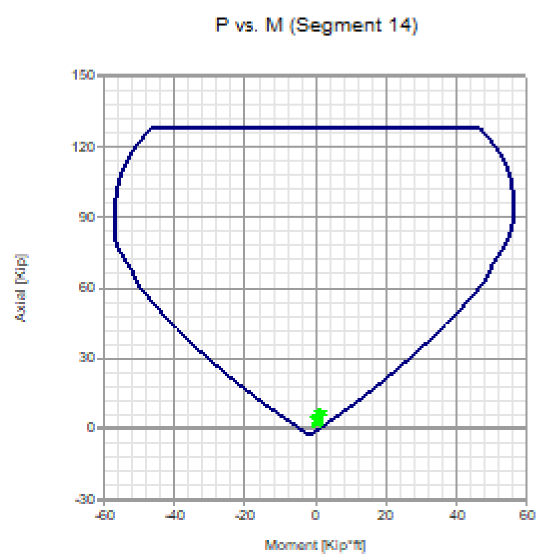

P vs. M (Segment 1)
Axial [Kip]
Moment [Kip*ft]


P vs. M (Segment 10)
Axial [Kip]
Moment [Kip*ft]

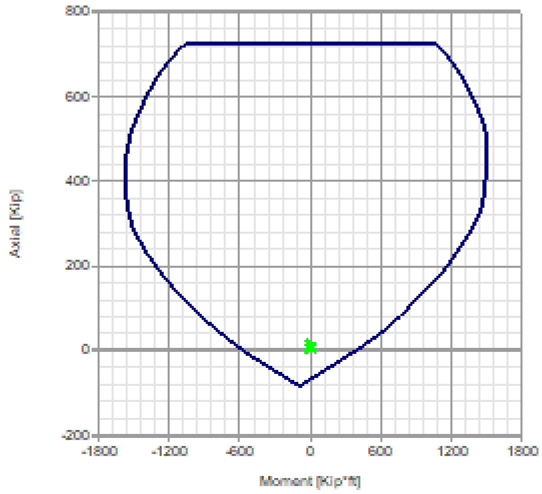

P vs. M (Segment 11)
Axial [Kip]
Moment [Kip*ft]


P vs. M (Segment 12)
Axial [Kip]
Moment [Kip*ft]

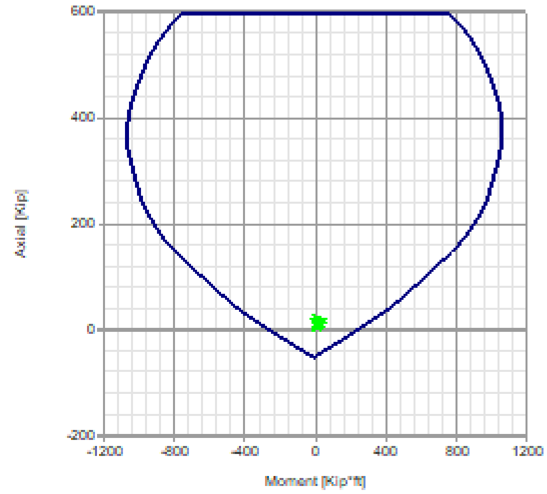

P vs. M (Segment 13)
Axial [Kip]
Moment [Kip*ft]


P vs. M (Segment 14)
Axial [Kip]
Moment [Kip*ft]

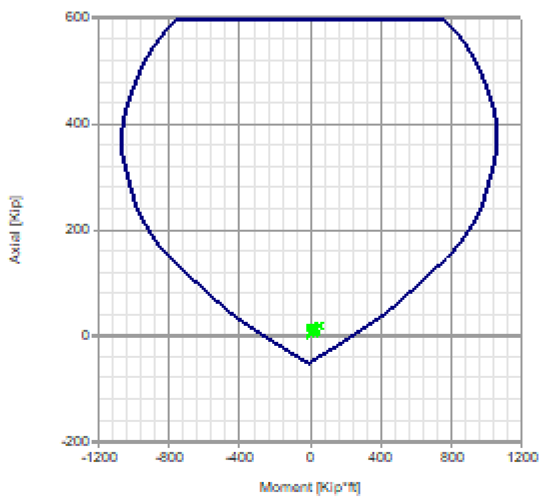
P vs. M (Segment 15)



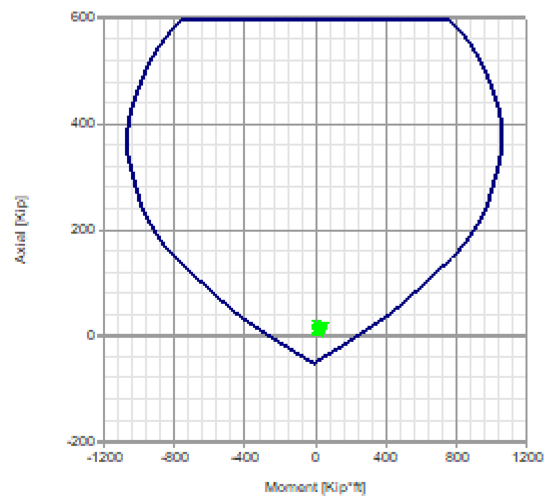
P vs. M (Segment 16)



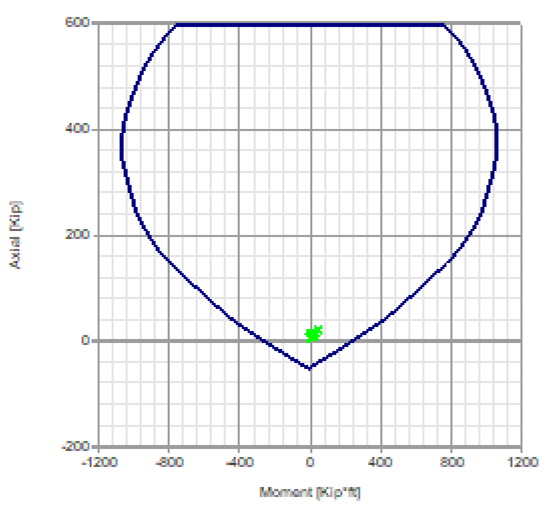
P vs. M (Segment 17)



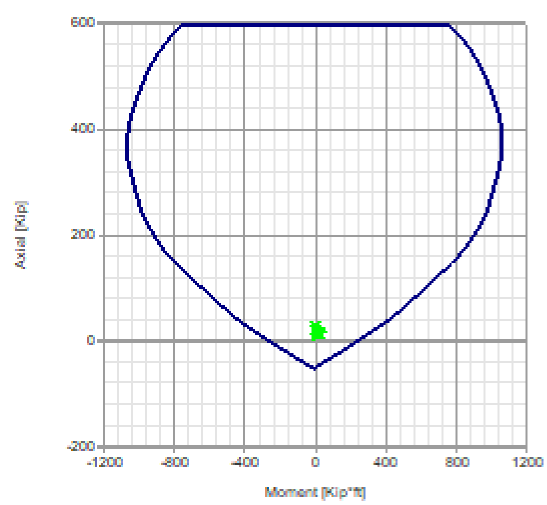
P vs. M (Segment 18)



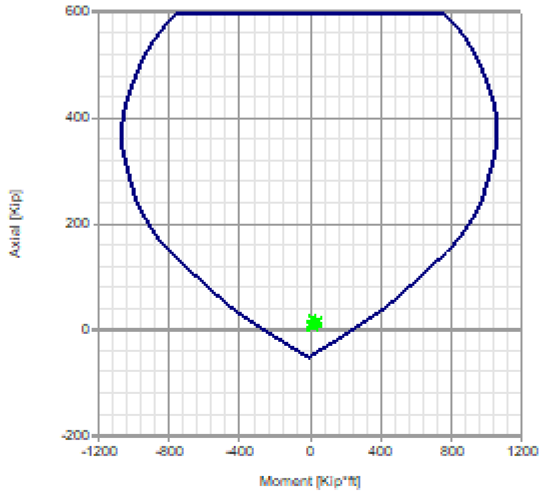
P vs. M (Segment 19)



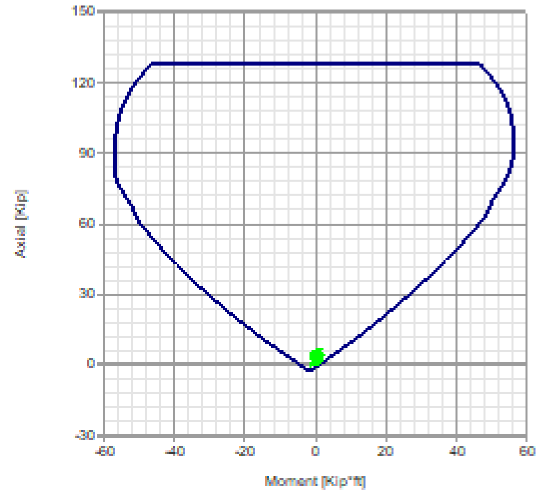
P vs. M (Segment 2)



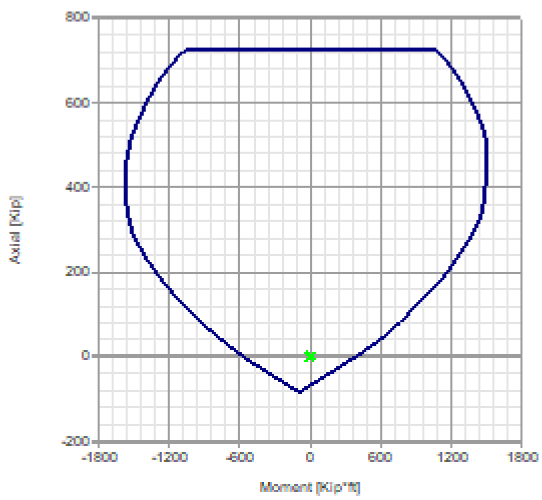
P vs. M (Segment 20)



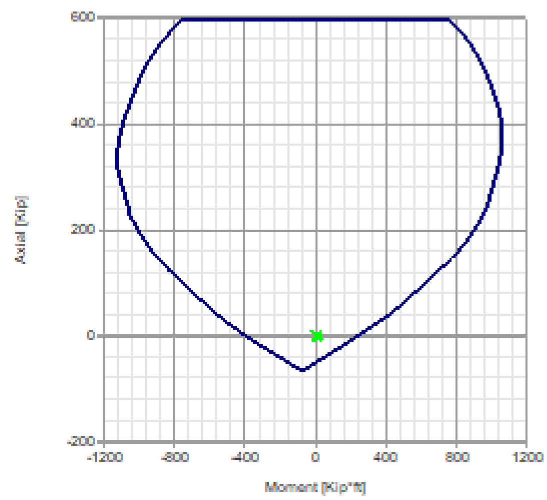
P vs. M (Segment 21)



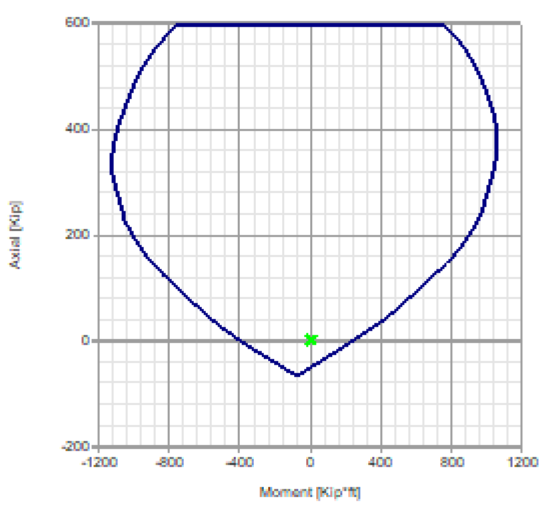
P vs. M (Segment 22)



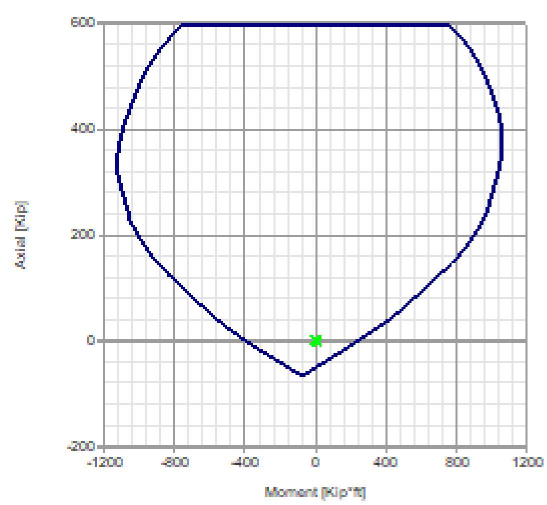
P vs. M (Segment 23)



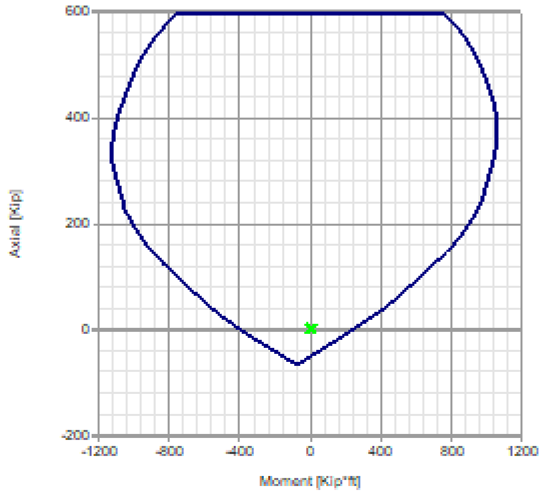
P vs. M (Segment 24)



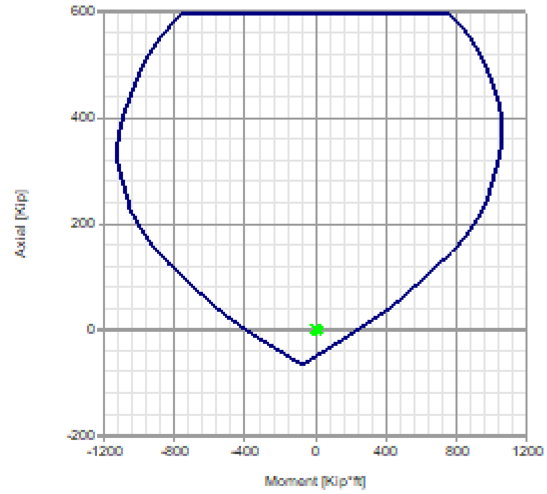
P vs. M (Segment 25)



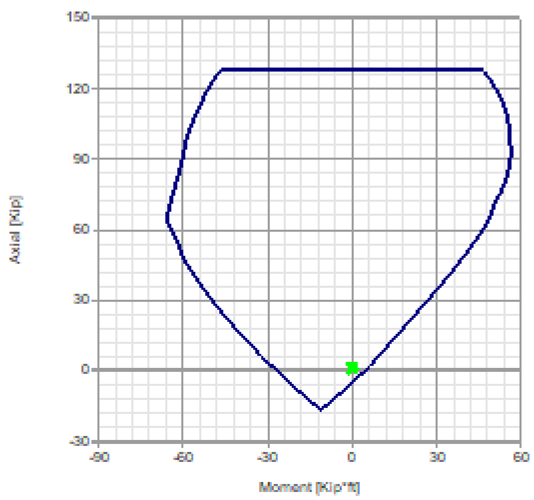
P vs. M (Segment 26)



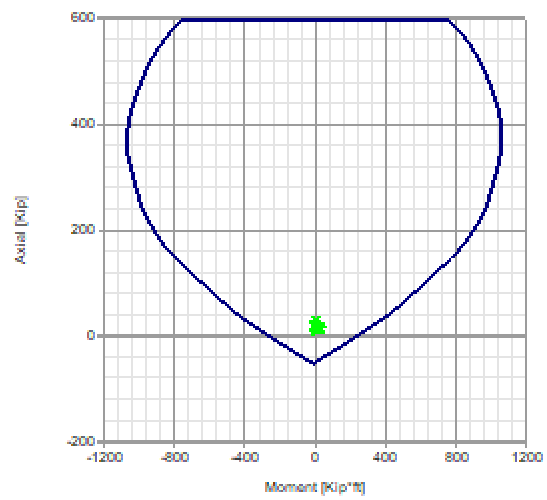
P vs. M (Segment 27)



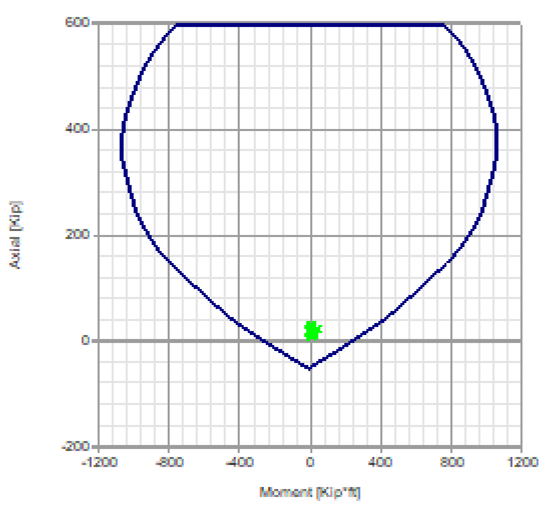
P vs. M (Segment 28)



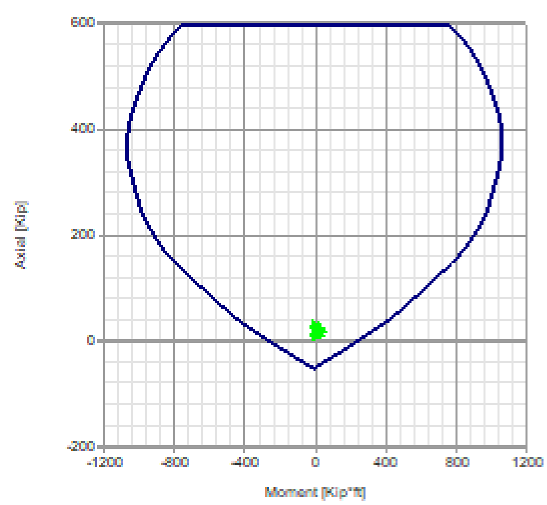
P vs. M (Segment 3)

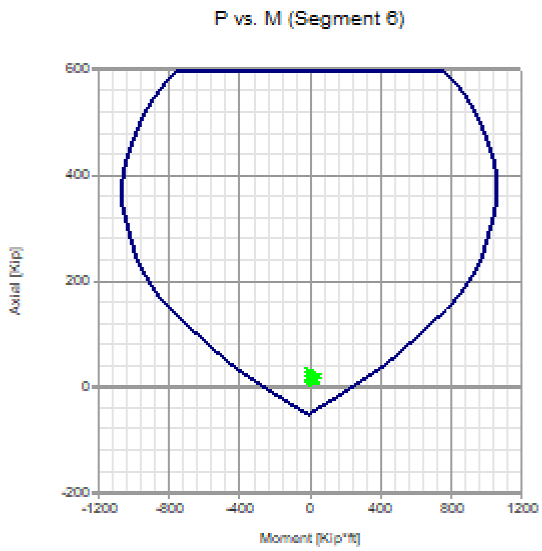


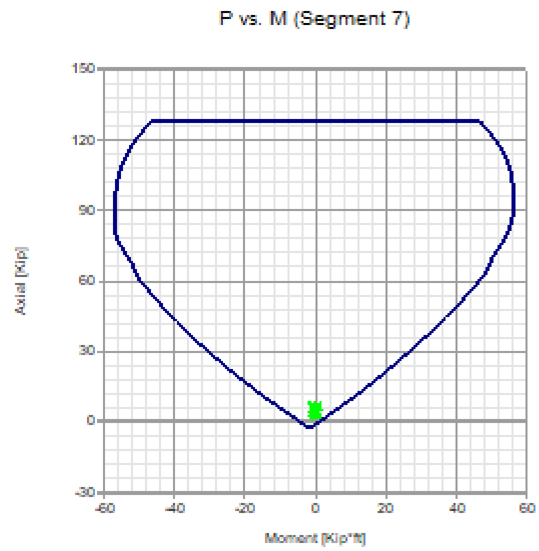
P vs. M (Segment 4)

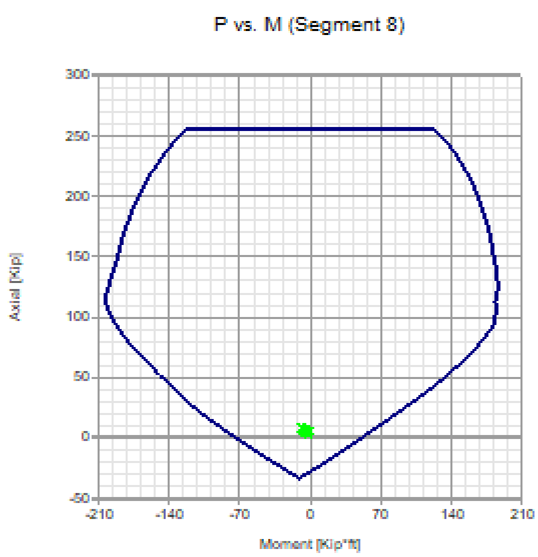


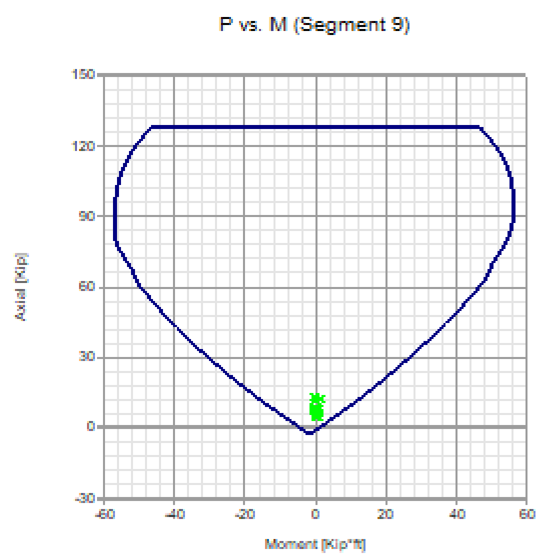
P vs. M (Segment 5)











Axial compression

Segment	Condition	Pu [Kip]	ϕPn [Kip]	Ratio
1	D6(Bottom)	30.75	499.92	0.06
2	D6(Bottom)	28.40	413.55	0.07
3	D3(Bottom)	29.20	413.55	0.07
4	D3(Bottom)	29.44	413.55	0.07
5	D3(Bottom)	29.31	413.55	0.07
6	D7(Bottom)	27.69	413.55	0.07
7	D6(Top)	6.60	86.72	0.08
8	D7(Bottom)	8.42	173.04	0.05
9	D7(Max)	13.01	86.72	0.15
10	D7(Max)	14.05	86.72	0.16
11	D7(Max)	12.82	86.72	0.15
12	D7(Max)	14.72	86.72	0.17
13	D7(Max)	13.36	86.72	0.15
14	D3(Max)	6.80	86.72	0.08
15	D3(Max)	13.12	499.92	0.03
16	D6(Top)	19.58	413.55	0.05

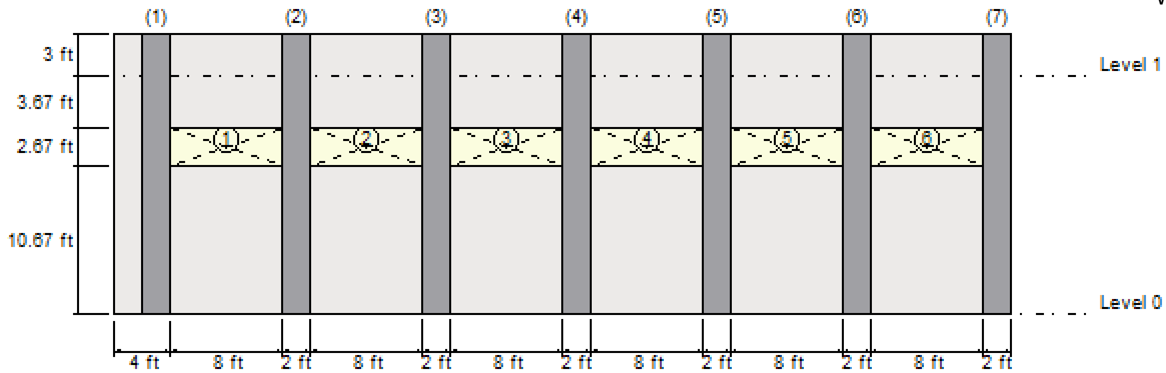
17	D7(Bottom)	18.12	413.55	0.04	
18	D3(Top)	20.15	413.55	0.05	
19	D3(Bottom)	19.40	413.55	0.05	
20	D7(Top)	20.04	413.55	0.05	
21	D3(Bottom)	5.71	86.72	0.07	
22	D1(Max)	1.52	719.11	0.00	
23	D1(Top)	0.30	592.53	0.00	
24	D1(Bottom)	1.79	592.53	0.00	
25	D1(Bottom)	0.25	592.53	0.00	
26	D6(Bottom)	2.44	592.53	0.00	
27	D1(Top)	0.46	592.53	0.00	
28	D7(Bottom)	2.16	126.57	0.02	

Shear

Segment	Condition	Vu [Kip]	ϕVn [Kip]	Ratio	
1	D6(Top)	10.18	88.54	0.11	
2	D3(Max)	3.73	60.16	0.06	
3	D3(Max)	0.64	54.61	0.01	
4	D7(Max)	0.86	54.63	0.02	
5	D7(Max)	3.72	60.10	0.06	
6	D7(Top)	8.25	54.16	0.15	
7	D7(Max)	1.46	18.93	0.08	
8	D7(Max)	3.90	28.98	0.13	
9	D7(Max)	1.01	17.02	0.06	
10	D6(Max)	1.18	17.35	0.07	
11	D7(Max)	1.21	17.08	0.07	
12	D7(Max)	1.48	17.42	0.09	
13	D3(Max)	1.01	17.29	0.06	
14	D6(Max)	1.46	12.80	0.11	
15	D7(Max)	5.15	84.36	0.06	
16	D6(Max)	7.06	53.76	0.13	
17	D3(Max)	1.59	53.18	0.03	
18	D7(Max)	2.92	53.87	0.05	
19	D7(Max)	3.16	53.33	0.06	
20	D7(Max)	4.98	53.48	0.09	
21	D6(Max)	3.09	15.95	0.19	
22	D6(Max)	1.37	113.48	0.01	
23	D7(Top)	5.30	75.80	0.07	
24	D6(Max)	1.96	60.14	0.03	
25	D7(Max)	3.95	70.24	0.06	
26	D7(Max)	2.64	65.18	0.04	
27	D7(Max)	6.58	71.78	0.09	
28	D7(Top)	1.28	16.38	0.08	

Column Design

Status : OK



Geometry

Column	Distance [ft]	Position Z	Width X [in]	Width Z [in]	Height [ft]
1	3.00	Back	24.00	7.63	20.00
2	13.00	Back	24.00	7.63	20.00
3	23.00	Back	24.00	7.63	20.00
4	33.00	Back	24.00	7.63	20.00
5	43.00	Back	24.00	7.63	20.00
6	53.00	Back	24.00	7.63	20.00
7	63.00	Back	24.00	7.63	20.00

Reinforcement

	Longitudinal reinforcement			Transverse reinforcement	
Column	Bars	As [in2]	Ld [in]	Bars	Spacing [in]
1	4-#4	0.80	21.80	#4	7.00
2	4-#4	0.80	21.80	#4	7.00
3	4-#4	0.80	21.80	#4	7.00
4	4-#4	0.80	21.80	#4	7.00
5	4-#4	0.80	21.80	#4	7.00
6	4-#4	0.80	21.80	#4	7.00
7	4-#4	0.80	21.80	#4	7.00

Combined axial - flexure along X direction

Column	Condition	Pu [Kip]	Mu [Kip*ft]	ϕMn [Kip*ft]	Ratio
1	D7(Max)	5.05	0.95	12.12	0.08
2	D7(Bottom)	6.01	0.28	12.27	0.02
3	D3(Max)	10.62	0.12	12.95	0.01
4	D3(Max)	10.89	0.08	12.99	0.01
5	D3(Bottom)	6.34	0.11	12.31	0.01
6	D6(Bottom)	6.17	0.31	12.29	0.03
7	D6(Max)	5.92	1.12	12.25	0.09

Flexural reinforcement area

Column	Condition	Pu [Kip]	As [in2]	Asmax [in2]	Ratio
1	D20(Bottom)	0.00	0.80	1.67	0.00
2	D20(Bottom)	0.00	0.80	1.67	0.00
3	D20(Bottom)	0.00	0.80	1.67	0.00
4	D20(Bottom)	0.00	0.80	1.67	0.00
5	D20(Bottom)	0.00	0.80	1.67	0.00
6	D20(Bottom)	0.00	0.80	1.67	0.00
7	D20(Bottom)	0.00	0.80	1.67	0.00

Combined axial - flexure along Z direction

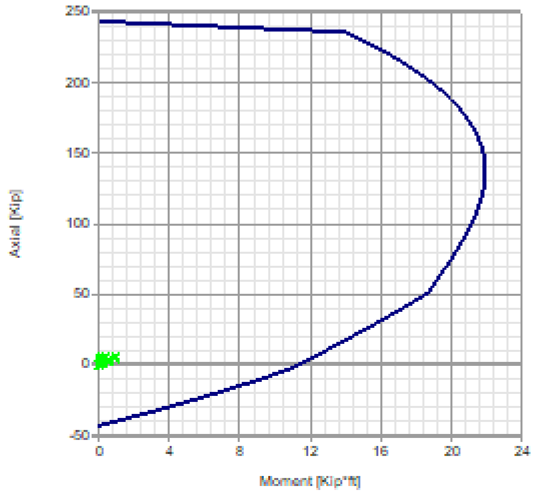
Column	Condition	Pu [Kip]	Mu [Kip*ft]	ϕMn [Kip*ft]	Ratio
1	D20(Bottom)	2.97	4.49	38.91	0.12
2	D20(Bottom)	3.01	4.60	38.95	0.12
3	D20(Bottom)	3.07	4.68	38.99	0.12
4	D20(Bottom)	3.09	4.71	39.00	0.12
5	D20(Bottom)	3.11	4.70	39.02	0.12
6	D20(Bottom)	3.06	4.64	38.99	0.12
7	D20(Bottom)	3.39	4.12	39.24	0.11

Flexural reinforcement area

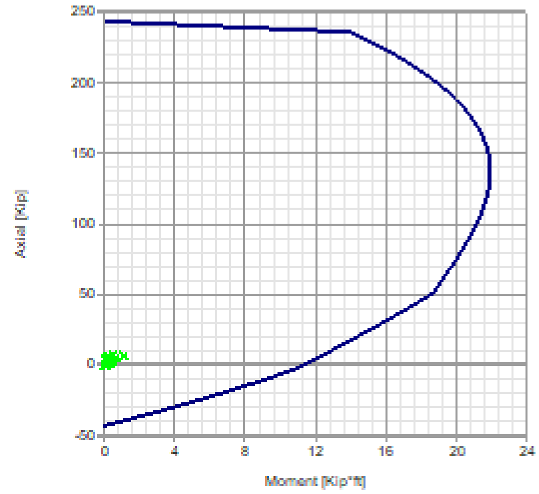
Column	Condition	Pu [Kip]	As [in2]	Asmax [in2]	Ratio
1	D5(Top)	0.00	0.80	18.86	0.04
2	D16(Top)	0.00	0.80	18.86	0.04
3	D16(Top)	0.00	0.80	18.86	0.04
4	D18(Top)	0.00	0.80	18.86	0.04
5	D16(Top)	0.00	0.80	18.86	0.04
6	D16(Top)	0.00	0.80	18.86	0.04
7	D5(Max)	0.00	0.80	18.86	0.04

Interaction diagrams, P vs. M

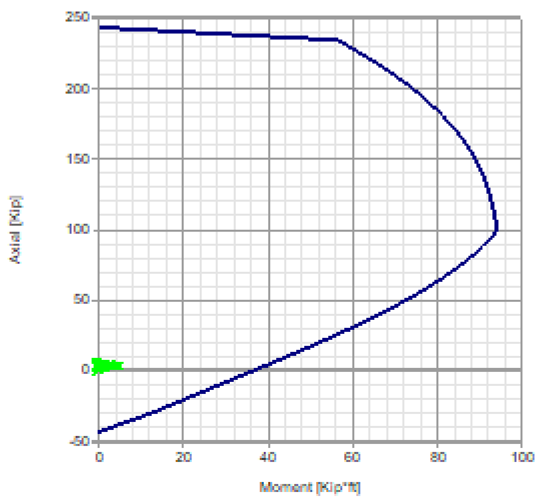
P vs. M (Column X 1)



P vs. M (Column X 7)



P vs. M (Column Z 1)



Axial compression

Column	Condition	Pu [Kip]	ϕPn [Kip]	Ratio
1	D6(Bottom)	5.32	136.81	0.04
2	D7(Max)	9.77	136.81	0.07
3	D6(Max)	10.62	136.81	0.08
4	D6(Max)	10.89	136.81	0.08
5	D7(Max)	9.95	136.81	0.07
6	D3(Max)	11.62	136.81	0.08
7	D7(Bottom)	6.61	136.81	0.05

Shear along X direction

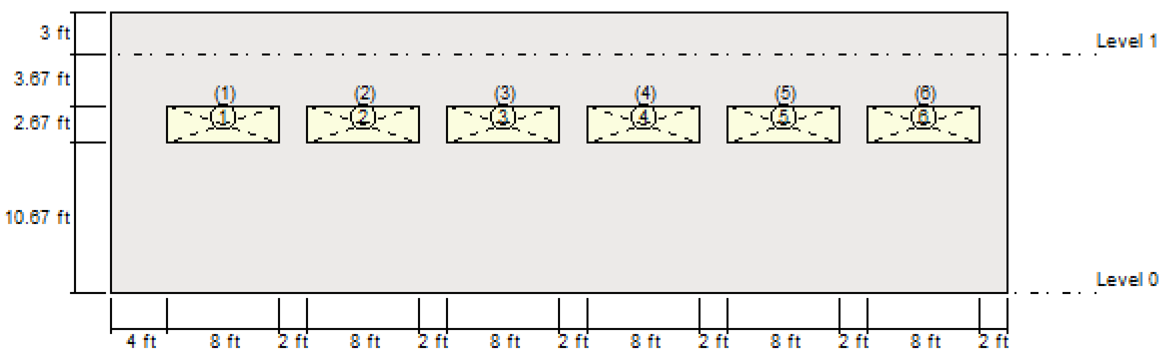
Column	Condition	Vu [Kip]	ϕVn [Kip]	Ratio
1	D7(Max)	0.31	86.84	0.00
2	D7(Max)	0.20	72.99	0.00
3	D7(Max)	0.08	72.99	0.00
4	D7(Max)	0.13	72.99	0.00
5	D7(Max)	0.06	72.99	0.00
6	D7(Bottom)	0.14	72.99	0.00
7	D7(Max)	0.43	91.88	0.00

Shear along Z direction

Column	Condition	Vu [Kip]	ϕVn [Kip]	Ratio
1	D20(Bottom)	1.78	25.12	0.07
2	D20(Bottom)	1.77	25.12	0.07
3	D20(Bottom)	1.80	25.12	0.07
4	D18(Bottom)	1.81	25.12	0.07
5	D18(Bottom)	1.80	25.12	0.07
6	D18(Bottom)	1.78	25.12	0.07
7	D18(Bottom)	1.57	24.37	0.06

Lintel Design

Status : Warnings in design
- Insufficient development length, TMS 402-16 SD, 6.1.5.1 (Lintel 2)



Geometry

Lintel	X Coordinate [ft]	Y Coordinate [ft]	Length [ft]	Depth [in]
1	4.00	10.67	8.00	24.00
2	14.00	10.67	8.00	24.00
3	24.00	10.67	8.00	24.00
4	34.00	10.67	8.00	24.00
5	44.00	10.67	8.00	24.00
6	54.00	10.67	8.00	24.00

Reinforcement

Lintel	Top long. reinforcement Bars	Extent [in]	Bottom long. reinforcement Bars	Extent [in]	Transverse reinforcement Bars	Spacing [in]	Ld [in]
1	1-#7	0.00	1-#7	0.00	--	0.00	0.00
2	1-#7	3.50	1-#7	8.00	--	0.00	0.00
3	1-#7	0.00	1-#7	0.00	--	0.00	0.00
4	1-#7	15.50	1-#7	0.00	--	0.00	0.00
5	1-#7	0.00	1-#7	0.00	--	0.00	0.00
6	1-#7	0.00	1-#7	0.00	--	0.00	0.00

Bending

Lintel	Condition	Mu [Kip*ft]	ϕMn [Kip*ft]	Ratio
1	D6(Top)	5.32	54.23	0.10
2	D7(Top)	5.30	54.23	0.10
3	D6(Top)	3.06	54.23	0.06
4	D6(Bottom)	-5.97	54.23	0.11
5	D3(Top)	3.49	54.23	0.06
6	D7(Top)	5.70	54.23	0.11

Flexural reinforcement area

Segment	Condition	Pu [Kip]	As [in2]	Asmax [in2]	Ratio
1	D20(Top)	0.00	1.20	3.10	0.39
2		0.00	0.00	0.00	0.00
3		0.00	0.00	0.00	0.00
4		0.00	0.00	0.00	0.00
5		0.00	0.00	0.00	0.00
6	D20(Top)	0.00	1.20	3.10	0.39

Cracking moment

Lintel	Condition	1.3 Mcr [Kip*ft]	Mn [Kip*ft]	Ratio
1	D20(Bottom)	6.67	60.25	0.11
2	D20(Bottom)	6.67	60.25	0.11
3	D20(Bottom)	6.67	60.25	0.11
4	D20(Bottom)	6.67	60.25	0.11
5	D20(Bottom)	6.67	60.25	0.11
6	D20(Bottom)	6.67	60.25	0.11

Shear

Lintel	Condition	Vu [Kip]	ϕVn [Kip]	Ratio
1	D7(Bottom)	7.17	13.24	0.54
2	D3(Top)	9.89	13.24	0.75
3	D7(Top)	7.16	13.24	0.54
4	D6(Bottom)	10.05	13.24	0.76
5	D7(Top)	7.93	13.24	0.60
6	D6(Bottom)	8.52	13.24	0.64

Deflection

Lintel	Condition	δs [in]	δmax [in]	Ratio
1	S2(Top)	0.01	0.16	0.05
2	S2(Top)	0.01	0.16	0.05
3	S2(Top)	0.00	0.16	0.03
4	S2(Bottom)	-0.01	0.16	0.06
5	S2(Top)	0.01	0.16	0.03
6	S2(Top)	0.01	0.16	0.06

Notes

* Pu = Factored axial load
* Pn = Nominal compression strength
* δ = Moment magnification factor
* Mu = Factored total flexural moment
* Mua = Factored flexural moment from analysis
* Mn = Nominal moment strength
* Mcr = Nominal cracking moment
* ft = Stress due to flexural tension
* fc = Stress due to flexural compression
* Fn = Nominal stress
* Vu = Factored shear force
* Vn = Nominal shear strength
* Vf = Nominal shear friction strength
* δs = Calculated deflection
* δmax = Maximum allowable deflection
* ld = Embedment length
* Ag = Gross cross sectional area of a member
* As = Effective cross sectional area of reinforcement
* c = Distance from the fiber of maximum compressive strain to the neutral axis
* d = Distance from the extreme compression fiber to centroid of tension reinforcement

RAM Elements

Current Date: 8/28/2024 11:03 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Grid 6\E and H Wall typical wall.msw

Design Results
Masonry wall

General Information

Global status : OK

Design code	:	TMS 402-16 SD

Materials:

Material	:	CMU 2.0-60
Mortar type	:	Port/Mort - M/S
Grouting type	:	Full grouting
Masonry compression strength (F`m)	:	2 [Kip/in2]
Steel tension strength (fy)	:	60 [Kip/in2]
Steel allowable tension strength (Fs)	:	24 [Kip/in2]
Steel elasticity modulus (Es)	:	29000 [Kip/in2]
Masonry elasticity modulus (Em)	:	1800 [Kip/in2]
Masonry unit weight	:	0.135 [Kip/ft3]

Seismic data:

Seismic design category	:	SDC D
Response modification factor	:	5.00
Shear wall type	:	Special

Geometry

Total height	:	20.00 [ft]
Total length	:	20.33 [ft]
Foundation type	:	Continuous
Wall bottom restraint	:	Pinned
Column bottom restraint	:	Fixed
Rigidity elements	:	None

Number of stories: 1

Story	Story height [ft]	Wall thickness [in]	Effective unit weight [Kip/ft3]
1	17.00	7.63	0.14

Load Conditions

ID	Comb.	Category	Description
DL	No	DL	Dead Load
SL	No	SNOW	Snow Load
EQ	No	EQ	EQ Load
WL	No	WIND	Wind Load
EQoop	No	EQ	EQ load OOP
WLoop	No	WIND	Wind load OOP
SM1	Yes		DL
DM1	Yes		DL
D1	Yes		1.4DL
D2	Yes		1.2DL+0.5SL
D3	Yes		1.2DL+1.6SL
D4	Yes		1.2DL+0.5WL
D5	Yes		1.2DL+0.5WLoop
D6	Yes		1.2DL+1.6SL+0.5WL
D7	Yes		1.2DL+1.6SL+0.5WLoop
D8	Yes		1.2DL+WL
D9	Yes		1.2DL+WLoop
D10	Yes		1.2DL+WL+0.5SL
D11	Yes		1.2DL+WLoop+0.5SL
D12	Yes		0.9DL+WL
D13	Yes		0.9DL+WLoop
D14	Yes		1.2DL+0.2SL
D15	Yes		1.2DL+EQ
D16	Yes		1.2DL+EQoop
D17	Yes		1.2DL+EQ+0.2SL
D18	Yes		1.2DL+EQoop+0.2SL
D19	Yes		0.9DL+EQ
D20	Yes		0.9DL+EQoop
S1	Yes		DL
S2	Yes		DL+SL
S3	Yes		DL+0.75SL
S4	Yes		DL+0.6WL
S5	Yes		DL+0.6WLoop
S6	Yes		DL+0.7EQ
S7	Yes		DL+0.7EQoop
S8	Yes		DL+0.45WL+0.75SL
S9	Yes		DL+0.45WLoop+0.75SL
S10	Yes		0.6DL+0.6WL
S11	Yes		0.6DL+0.6WLoop
S12	Yes		DL+0.7EQ
S13	Yes		DL+0.7EQoop
S14	Yes		DL+0.525EQ
S15	Yes		DL+0.525EQoop
S16	Yes		DL+0.75SL
S17	Yes		DL+0.525EQ+0.75SL
S18	Yes		DL+0.525EQoop+0.75SL
S19	Yes		0.6DL+0.7EQ
S20	Yes		0.6DL+0.7EQoop

Loads

Concentrated loads:

Story	Condition	Direction	Magnitude [Kip]	Eccentricity [in]	Distance [ft]
1	EQ	Horizontal	90.10	0.00	0.00

Distributed loads:

Consider self weight : DL

Out-of-plane loads:

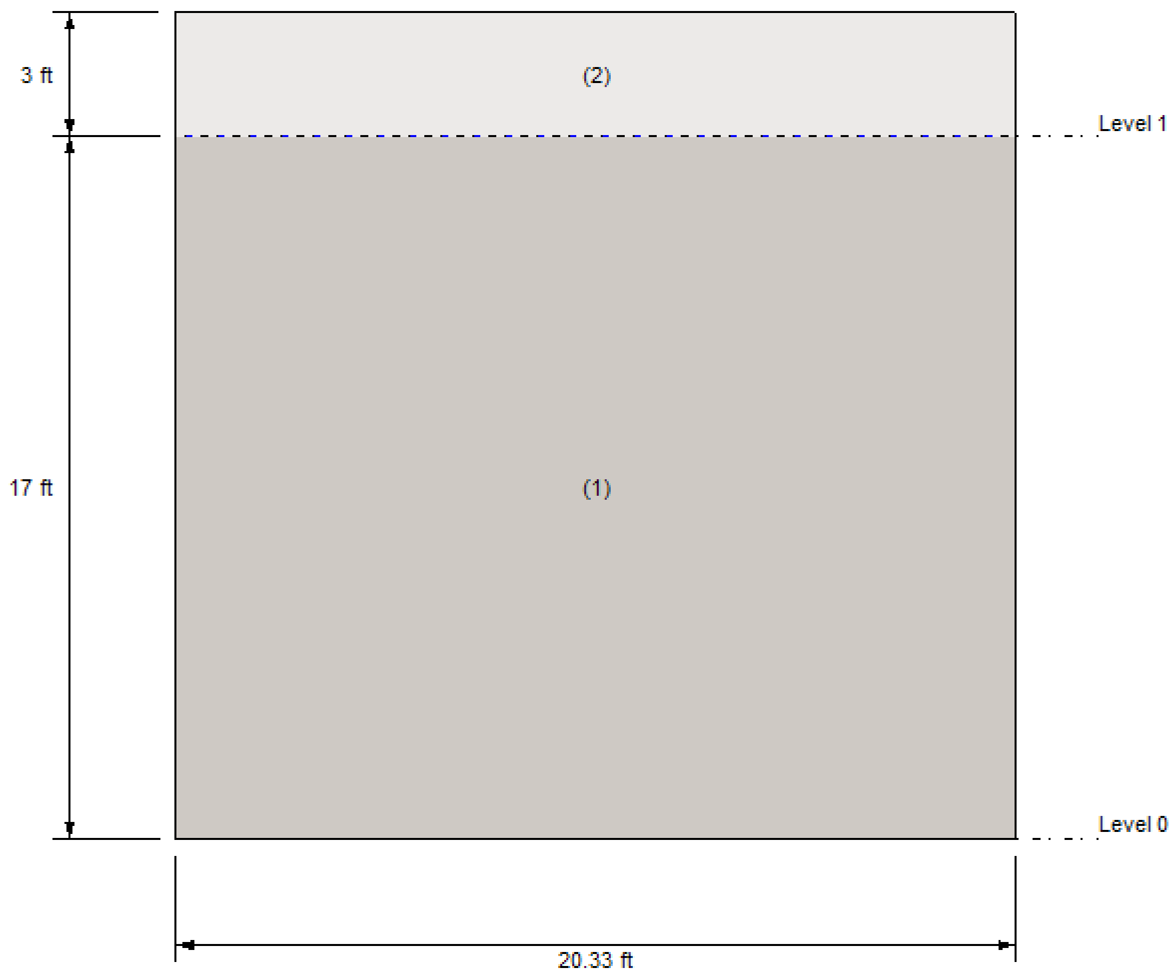
Story	Condition	Magnitude [Kip/ft2]
1	WLoop	0.02
Parapet	WLoop	0.02

Out-of-plane seismic weight:

Load condition	Coefficient
EQoop	0.44

Bearing Wall Design

Status : OK



Geometry

Level	Segment	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
0	1	0.00	0.00	20.33	17.00
1	2	0.00	17.00	20.33	3.00

Vertical reinforcement

Segment	Bars	Spacing [in]	Ld [in]
1	8-#5	32.00	34.07
2	8-#5	32.00	34.07

Combined axial flexure

Segment	Condition	Pu [Kip]	Mua [Kip*ft]	Mu [Kip*ft]	ϕMn [Kip*ft]	Ratio
1	D20(Max)	17.32	25.84	25.96	43.58	0.60
2	D20(Bottom)	4.12	3.42	3.42	39.82	0.09

Flexural reinforcement area

Segment	Condition	Pu [Kip]	As [in2]	Asmax [in2]	Ratio
1	D5(Max)	0.00	2.36	8.76	0.27
2	D5(Max)	0.00	2.36	8.76	0.27

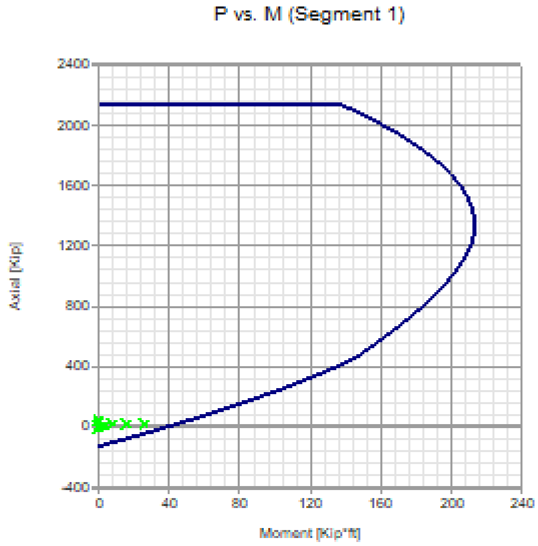
Intermediate results for axial-bending

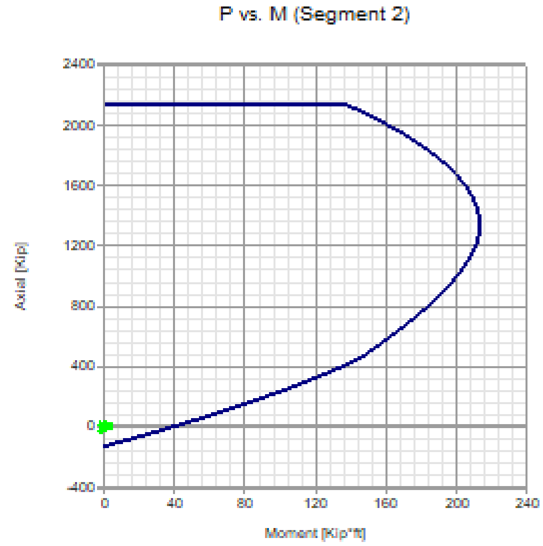
Segment	Condition	c [in]	d [in]	Mcr [Kip*ft]
1	D20(Max)	0.52	3.81	1.74
2	D20(Bottom)	0.47	3.81	1.60

Inertias

Segment	Condition	Ig [in4]	Icr [in4]
1	D20(Max)	444.19	24.34
2	D20(Bottom)	444.19	22.68

Interaction diagrams, P vs. M





Axial compression

Segment	Condition	Pu [Kip]	ϕPn [Kip]	Ratio
1	D1(Bottom)	47.62	1204.32	0.04
2	D15(Top)	7.60	2112.44	0.00

Axial stress

Segment	Condition	Pu [Kip]	Pu/Ag [Kip/in2]	Fn [Kip/in2]	Ratio
1	D1(Bottom)	47.62	0.03	0.40	0.06
2	D19(Bottom)	-19.66	0.01	0.40	0.03

Shear

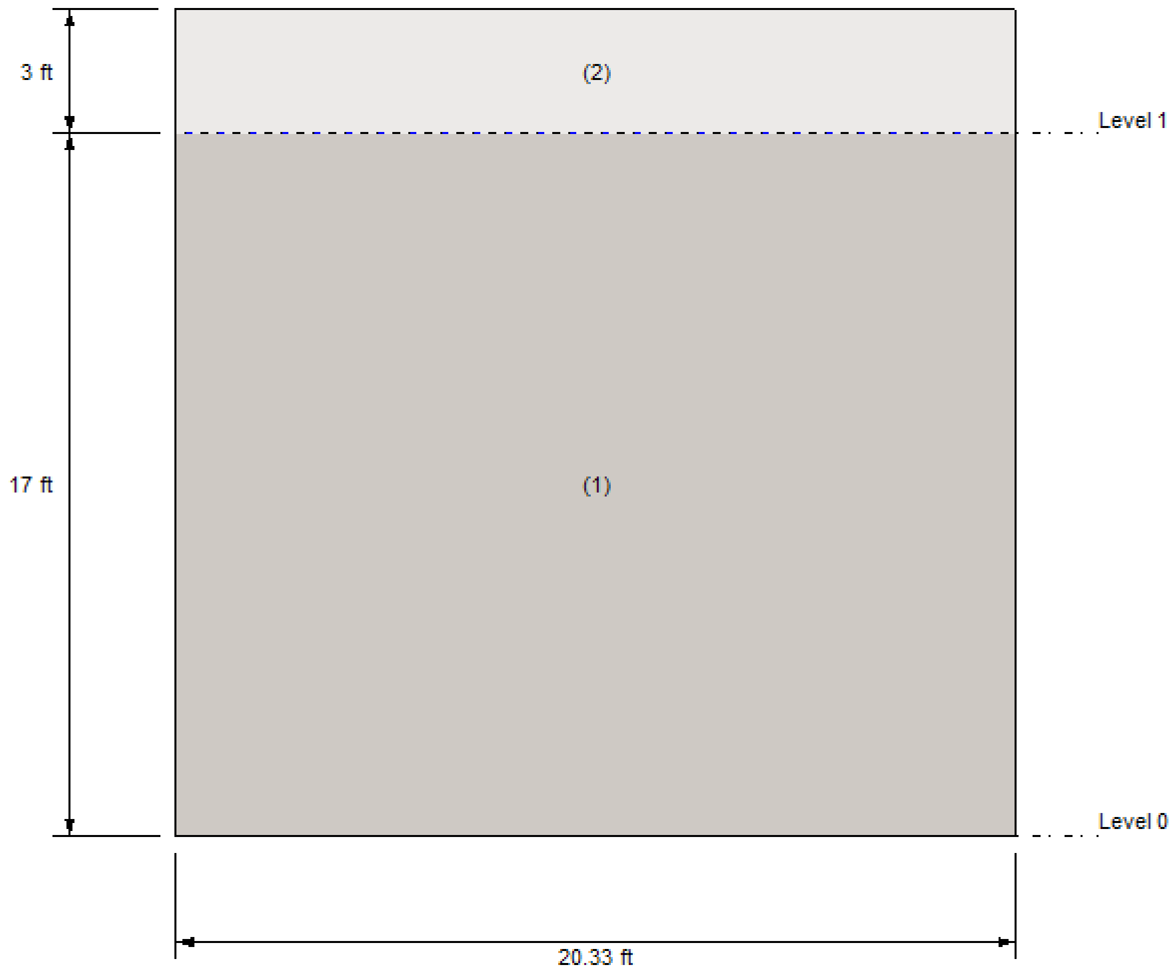
Segment	Condition	Vu [Kip]	ϕVn [Kip]	Ratio
1	D20(Top)	0.30	4.14	0.07
2	D20(Max)	0.10	3.73	0.03

Deflection

Segment	Condition	δs [in]	δmax [in]	δs/δmax
1	S7(Max)	0.06	1.43	0.04
2	S20(Bottom)	0.00	0.25	0.00

Shear Wall Design

Status : OK



Geometry

Level	Segment	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
0	1	0.00	0.00	20.33	17.00
1	2	0.00	17.00	20.33	3.00

Reinforcement

	Vertical reinforcement			Horizontal reinforcement		
Segment	Bars	Spacing [in]	Ld [in]	Bars	Spacing [in]	Ld [in]
1	8-#5	32.00	34.07	7-#5	32.00	34.07
2	8-#5	32.00	34.07	2-#5	32.00	34.07

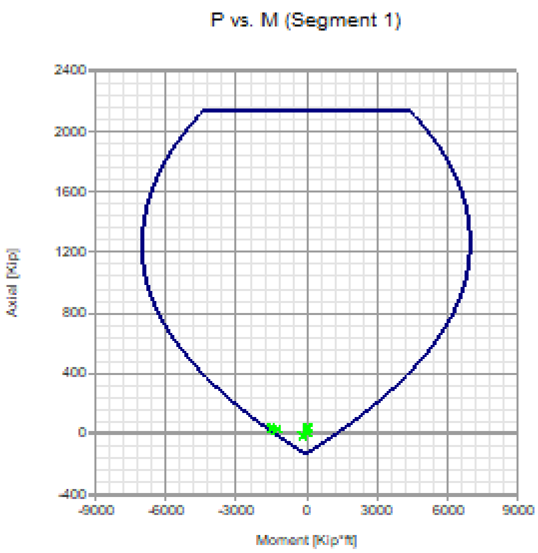
Combined axial flexure

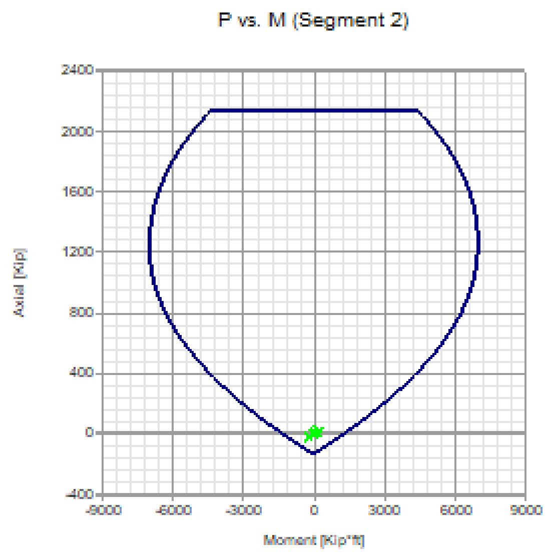
Segment	Condition	Pu [Kip]	Mu [Kip*ft]	ϕMn [Kip*ft]	Ratio
1	D19(Bottom)	30.58	-1484.40	1633.28	0.91
2	D19(Bottom)	-19.62	-229.70	1173.39	0.20

Flexural reinforcement area

Segment	Condition	Pu [Kip]	As [in2]	Asmax [in2]	Ratio
1	D19(Bottom)	0.00	2.48	109.10	0.02
2	D19(Bottom)	0.00	2.48	109.10	0.02

Interaction diagrams, P vs. M





Axial compression

Segment	Condition	Pu [Kip]	ϕPn [Kip]	Ratio
1	D1(Bottom)	47.62	1204.25	0.04
2	D17(Max)	22.97	2112.31	0.01

Shear

Segment	Condition	Vu [Kip]	ϕVn [Kip]	Ratio
1	D15(Top)	220.19	303.59	0.73
2	D19(Max)	2.22	206.66	0.01

Notes

* Pu = Factored axial load
* Pn = Nominal compression strength
* δ = Moment magnification factor
* Mu = Factored total flexural moment
* Mua = Factored flexural moment from analysis
* Mn = Nominal moment strength
* Mcr = Nominal cracking moment
* ft = Stress due to flexural tension
* fc = Stress due to flexural compression
* Fn = Nominal stress
* Vu = Factored shear force
* Vn = Nominal shear strength
* Vf = Nominal shear friction strength
* δs = Calculated deflection
* δmax = Maximum allowable deflection
* ld = Embedment length
* Ag = Gross cross sectional area of a member
* As = Effective cross sectional area of reinforcement
* c = Distance from the fiber of maximum compressive strain to the neutral axis
* d = Distance from the extreme compression fiber to centroid of tension reinforcement

RAM Elements

Current Date: 8/28/2024 11:00 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Grid B\Typical wall.msw

Design Results
Masonry wall

General Information

Global status : Warnings in design

Design code	:	TMS 402-16 SD

Materials:

Material	:	CMU 2.0-60
Mortar type	:	Port/Mort - M/S
Grouting type	:	Full grouting
Masonry compression strength (F`m)	:	2 [Kip/in2]
Steel tension strength (fy)	:	60 [Kip/in2]
Steel allowable tension strength (Fs)	:	24 [Kip/in2]
Steel elasticity modulus (Es)	:	29000 [Kip/in2]
Masonry elasticity modulus (Em)	:	1800 [Kip/in2]
Masonry unit weight	:	0.135 [Kip/ft3]

Seismic data:

Seismic design category	:	SDC D
Response modification factor	:	5.00
Shear wall type	:	Special

Geometry

Total height	:	20.00 [ft]
Total length	:	26.00 [ft]
Foundation type	:	Continuous
Wall bottom restraint	:	Pinned
Column bottom restraint	:	Fixed
Rigidity elements	:	None

Number of stories: 1

Story	Story height [ft]	Wall thickness [in]	Effective unit weight [Kip/ft3]
1	17.00	7.63	0.14

Load Conditions

ID	Comb.	Category	Description
DL	No	DL	Dead Load
SL	No	SNOW	Snow Load
EQ	No	EQ	EQ
WL	No	WIND	Wind Load
EQoop	No	EQ	EQ Load Out of Plane
WLoop	No	WIND	Wind Load Out of Plane
SM1	Yes		DL
DM1	Yes		DL
D1	Yes		1.4DL
D2	Yes		1.2DL+0.5SL
D3	Yes		1.2DL+1.6SL
D4	Yes		1.2DL+0.5WL
D5	Yes		1.2DL+0.5WLoop
D6	Yes		1.2DL+1.6SL+0.5WL
D7	Yes		1.2DL+1.6SL+0.5WLoop
D8	Yes		1.2DL+WL
D9	Yes		1.2DL+WLoop
D10	Yes		1.2DL+WL+0.5SL
D11	Yes		1.2DL+WLoop+0.5SL
D12	Yes		0.9DL+WL
D13	Yes		0.9DL+WLoop
D14	Yes		1.2DL+0.2SL
D15	Yes		1.2DL+EQ
D16	Yes		1.2DL+EQoop
D17	Yes		1.2DL+EQ+0.2SL
D18	Yes		1.2DL+EQoop+0.2SL
D19	Yes		0.9DL+EQ
D20	Yes		0.9DL+EQoop
S1	Yes		DL
S2	Yes		DL+SL
S3	Yes		DL+0.75SL
S4	Yes		DL+0.6WL
S5	Yes		DL+0.6WLoop
S6	Yes		DL+0.7EQ
S7	Yes		DL+0.7EQoop
S8	Yes		DL+0.45WL+0.75SL
S9	Yes		DL+0.45WLoop+0.75SL
S10	Yes		0.6DL+0.6WL
S11	Yes		0.6DL+0.6WLoop
S12	Yes		DL+0.7EQ
S13	Yes		DL+0.7EQoop
S14	Yes		DL+0.525EQ
S15	Yes		DL+0.525EQoop
S16	Yes		DL+0.75SL
S17	Yes		DL+0.525EQ+0.75SL
S18	Yes		DL+0.525EQoop+0.75SL
S19	Yes		0.6DL+0.7EQ
S20	Yes		0.6DL+0.7EQoop

Loads

Concentrated loads:

Story	Condition	Direction	Magnitude [Kip]	Eccentricity [in]	Distance [ft]
1	DL	Vertical	3.69	0.00	6.67
1	DL	Vertical	3.69	0.00	13.33
1	DL	Vertical	3.69	0.00	20.00
1	SL	Vertical	9.84	0.00	6.67
1	SL	Vertical	9.84	0.00	13.33
1	SL	Vertical	9.84	0.00	20.00

1	EQ	Horizontal	43.93	0.00	0.00

In-plane seismic weight:

Load condition	Coefficient
EQoop	0.44

Distributed loads:

Consider self weight : DL

Out-of-plane loads:

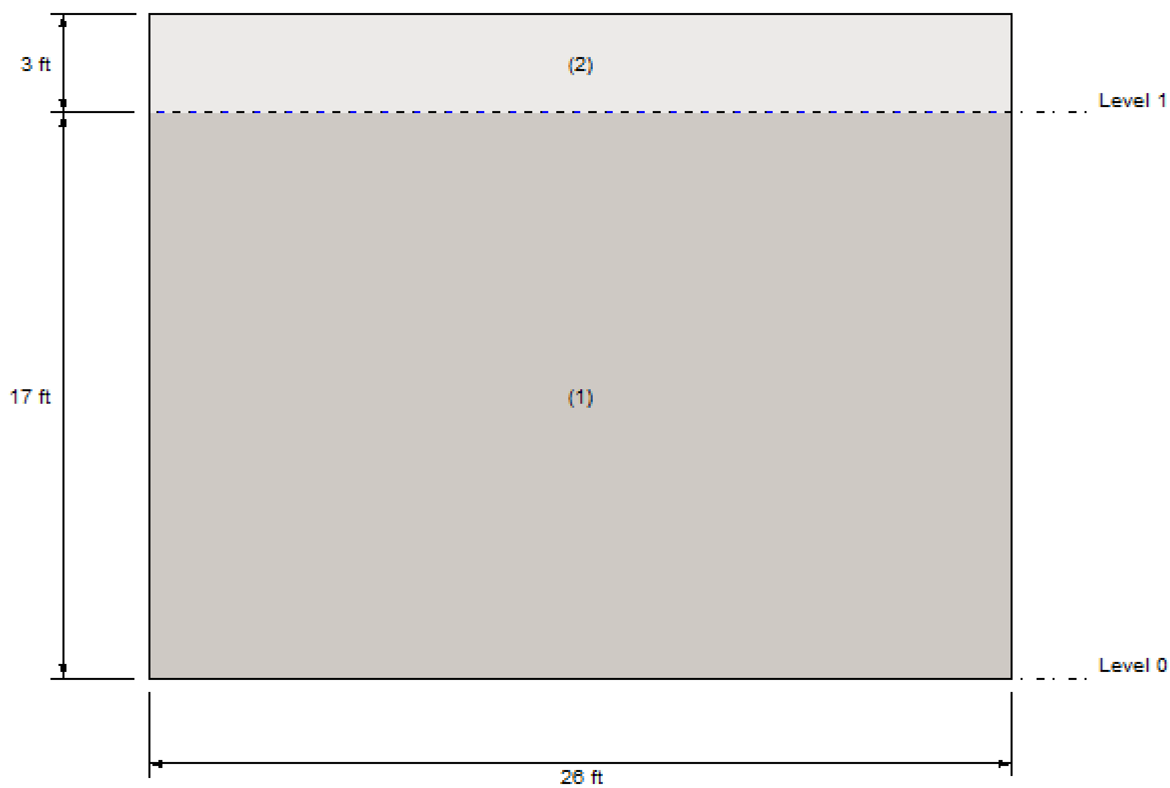
Story	Condition	Magnitude [Kip/ft2]
1	WLoop	0.05
Parapet	WLoop	0.05

Out-of-plane seismic weight:

Load condition	Coefficient
EQoop	0.22

Bearing Wall Design

Status : OK



Geometry

Level	Segment	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
0	1	0.00	0.00	26.00	17.00
1	2	0.00	17.00	26.00	3.00

Vertical reinforcement

Segment	Bars	Spacing [in]	Ld [in]
1	10-#5	32.00	34.07
2	10-#5	32.00	34.07

Combined axial flexure

Segment	Condition	Pu [Kip]	Mua [Kip*ft]	Mu [Kip*ft]	ϕMn [Kip*ft]	Ratio
1	D13(Max)	33.94	40.40	40.69	59.07	0.69
2	D13(Max)	4.67	5.37	5.37	50.75	0.11

Flexural reinforcement area

Segment	Condition	Pu [Kip]	As [in2]	Asmax [in2]	Ratio
1	D5(Max)	0.00	3.02	11.20	0.27
2	D5(Max)	0.00	3.02	11.20	0.27

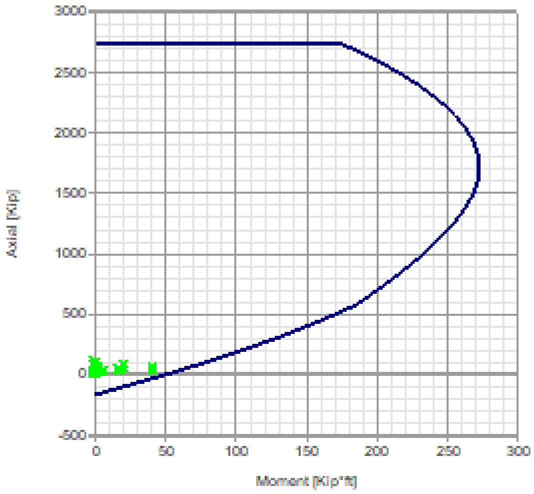
Intermediate results for axial-bending

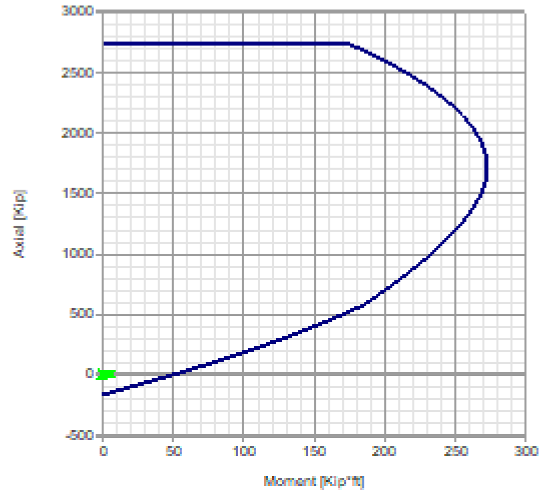
Segment	Condition	c [in]	d [in]	Mcr [Kip*ft]
1	D13(Max)	0.55	3.81	1.78
2	D13(Max)	0.47	3.81	1.60

Inertias

Segment	Condition	Ig [in4]	Icr [in4]
1	D13(Max)	444.19	25.48
2	D13(Max)	444.19	22.62

Interaction diagrams, P vs. M





Axial compression

Segment	Condition	Pu [Kip]	ϕPn [Kip]	Ratio
1	D7(Bottom)	112.15	1540.21	0.07
2	D1(Bottom)	7.26	2701.59	0.00

Axial stress

Segment	Condition	Pu [Kip]	Pu/Ag [Kip/in2]	Fn [Kip/in2]	Ratio
1	D3(Bottom)	112.15	0.05	0.40	0.12
2	D1(Bottom)	7.26	0.00	0.40	0.01

Shear

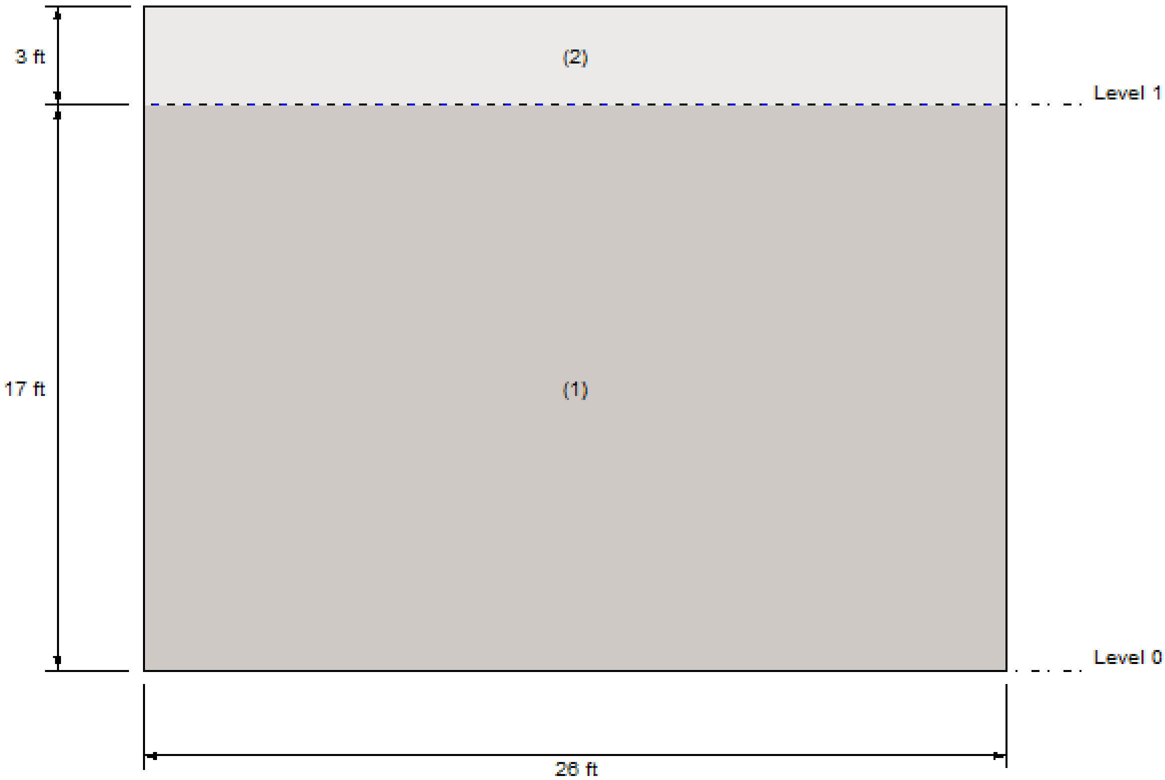
Segment	Condition	Vu [Kip]	ϕVn [Kip]	Ratio
1	D13(Top)	0.37	4.20	0.09
2	D13(Bottom)	0.10	3.72	0.03

Deflection

Segment	Condition	δs [in]	δmax [in]	δs/δmax
1	S5(Max)	0.06	1.43	0.04
2	S11(Bottom)	0.00	0.25	0.00

Shear Wall Design

Status : Warnings in design
- Insufficient combined horizontal and vertical reinforcement area, TMS 402-16 SD, 7.3.2, 7.4.1 (Segment 1)



Geometry

Level	Segment	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
0	1	0.00	0.00	26.00	17.00
1	2	0.00	17.00	26.00	3.00

Reinforcement

	Vertical reinforcement			Horizontal reinforcement		
Segment	Bars	Spacing [in]	Ld [in]	Bars	Spacing [in]	Ld [in]
1	10-#5	32.00	34.07	--	0.00	0.00
2	10-#5	32.00	34.07	--	0.00	0.00

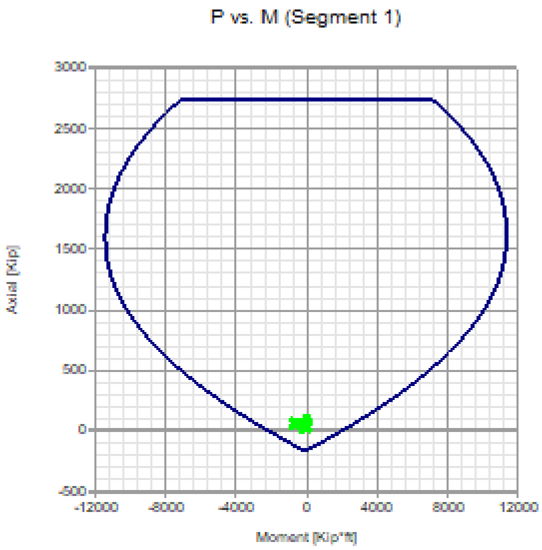
Combined axial flexure

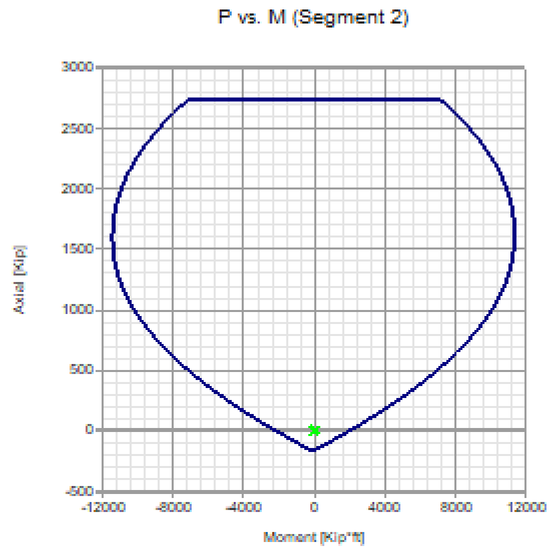
Segment	Condition	Pu [Kip]	Mu [Kip*ft]	ϕMn [Kip*ft]	Ratio
1	D19(Bottom)	48.77	-721.34	2742.68	0.26
2	D19(Max)	5.12	45.67	2030.25	0.02

Flexural reinforcement area

Segment	Condition	Pu [Kip]	As [in2]	Asmax [in2]	Ratio
1	D14(Bottom)	0.00	3.10	20.15	0.15
2	DM1(Max)	0.00	3.10	135.24	0.02

Interaction diagrams, P vs. M





Axial compression

Segment	Condition	Pu [Kip]	ϕPn [Kip]	Ratio
1	D3(Bottom)	112.15	1540.16	0.07
2	D1(Bottom)	7.26	2701.50	0.00

Shear

Segment	Condition	Vu [Kip]	ϕVn [Kip]	Ratio
1	D19(Bottom)	110.22	251.10	0.44
2	D7(Max)	5.35	332.60	0.02

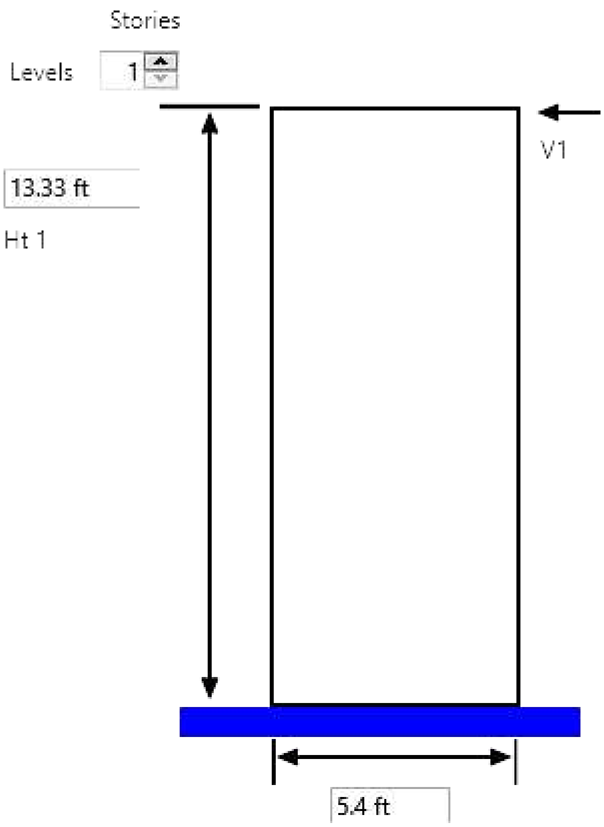
Notes

* P_u = Factored axial load
* P_n = Nominal compression strength
* δ = Moment magnification factor
* M_u = Factored total flexural moment
* M_{ua} = Factored flexural moment from analysis
* M_n = Nominal moment strength
* M_{cr} = Nominal cracking moment
* f_t = Stress due to flexural tension
* f_c = Stress due to flexural compression
* F_n = Nominal stress
* V_u = Factored shear force
* V_n = Nominal shear strength
* V_f = Nominal shear friction strength
* δ_s = Calculated deflection
* δ_{max} = Maximum allowable deflection
* l_d = Embedment length
* A_g = Gross cross sectional area of a member
* A_s = Effective cross sectional area of reinforcement
* c = Distance from the fiber of maximum compressive strain to the neutral axis
* d = Distance from the extreme compression fiber to centroid of tension reinforcement

Project Name: Steel stud shear wall
Model: 5.4 ft wall 89
Code: 2012 NASPEC [AISI S100-2012]
AISI S400-15/S1-16 AISI S240-15

Date: 08/22/2024
Simpson Strong-Tie® CFS Designer™ 5.2.4.0

LFRS Shearwall Summary Report



Load Inputs (All Loads are Unfactored LRFD Forces)

Top of Level Shear (lb)

Level	Wind	Seismic	Aspect Ratio
1	690	2670	2.47

Seismic Design Parameters:

Seismic Design Category = D S_{DS} = 0.874 Ie = 1.25

Level	Overstrength Factor, Ω_0	Defl Amplification Factor, Cd
1	2.5	3.5

Additional Applied Chord Axial Loads (lb) - Unfactored

Level	D	L	Lr	S	W
1	8320	9090	0	0	0

Additional Applied Chord Moments (ft-lb) - Unfactored

Level	D	L	Lr	S	W	E
1	0	0	0	0	0	0

Total and Unit Shear Forces

	Wind Shear Forces		Seismic Shear Forces	
Level	Vu, Total (lb)	vu, per ft (lb/ft)	Vu, Total (lb)	vu, per ft (lb/ft)
1	690	127.	2670	494.

Shear Wall Sheathing and Fastener Selection

Level	Sheathing	Fastener Size	Edge/Field Fastener Spac (in)	Framing Thickness (mils)	Max Framing Spac (in)	One or Two Sides
1	0.027" Steel Sheet	No. 8	2/12	68	24	2

Shear Strength Modification Factors

Level	Wind Modifiers	Seismic Modifiers

Project Name: Steel stud shear wall
Model: 5.4 ft wall 89
Code: 2012 NASPEC [AISI S100-2012]
AISI S400-15/S1-16 AISI S240-15

Date: 08/22/2024
Simpson Strong-Tie® CFS Designer™ 5.2.4.0

LFRS Shearwall Summary Report

1 Sheet overlap in lieu of blocking: Reduction factor = 0.7 Sheet overlap in lieu of blocking: Reduction factor = 0.7

Available Shear Strength and Shear Ratios

Level	Wind: Aspect Ratio Factor	Wind: Available Shear Strength, ϕvn (lb/ft)	Wind: Shear Ratio $vu/\phi vn$	Seismic: Aspect Ratio Factor	Seismic: Available Shear Strength, ϕvn (lb/ft)	Seismic: Shear Ratio $vu/\phi vn$
1	0.81	863	0.148	0.81	796	0.621

Chords

Level	Section	Fy (ksi)	Configuration	Bracing (in): Flexural	Bracing (in): Axial KyLy	Bracing (in): Axial KtLt	Flex Kϕ (lb-in/in)	Axial Kϕ (lb-in/in)	Bracing, Lm (in)
1	600S200-68	50	(3) Boxed	60	60	60	0	0	None

Interconnection Spacing = 6 in

Load Combinations IBC 2018 LRFD

LC1 = 1.4D
LC2 = 1.2D + 1.6L + 0.5(Lr or S)
LC3 = 1.2D + 1.6(Lr or S) + (L or 0.5W)
LC4 = 1.2D + 1.0W + L + 0.5(Lr or S)
LC6 = 1.2D + 1.0E + L + 0.2S
LCO6 = (1.2+0.2Sds)D + Ω_oQe + L + 0.2S Note: LCO6 based on the lower of Overstrength or Expected Strength

Factored Chord Compression, Pu (lb)

Level	LC1	LC2	LC3	LC4	LC6	LCO6
1	11648	24528	19074	20777	25665	37006

Factored Chord Strong-Axis Bending, Mux (ft-lb)

Level	LC1	LC2	LC3	LC4	LC6	LCO6
1	0	0	0	0	0	0

Level	Minimum ϕMnx (ft-lb)	Minimum ϕPn (lb)	Interactions: LC1	LC2	LC3	LC4	LC6	LCO6
1	16422	47043	0.248	0.521	0.405	0.442	0.546	0.787

Ties and Holdowns

Level	Holdown	Quantity	Config	Exposed Rod Length (in)	Holdown Capacity Φ Tn (lb/Each)	Holdown Disp at Φ Tn (in)	Holdown height (in)	Rod Dia. (in)
1	S/HDU11 - 54	1	Base	4	12265	0.109	16.625	0.875

LFRS Shearwall Summary Report

Level	Holdown Offset from End of Shear Wall (in)
1	0.0

Load Combinations (IBC 2018 LRFD)

LC5 = 0.9D + 1.0W
LC7 = (0.9-0.2Sds)D + 1.0E
LCO7 = (0.9-0.2Sds)D + Ω_oQe Note: LCO7 based on the lower of Overstrength or Expected Strength

	Factored Net Uplift (lb) (Negative values represent uplift, Positive values indicate no net uplift)			Shear Forces (lb)		
Level	LC5	LC7	LCO7	Wind	Seismic	Seismic w/Overstrength
1	5785	897	-10444	690	2670	6675

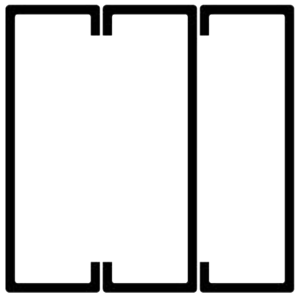
Ratio (Factored Net Uplift)/(Holdown Capacity)

Level	LC5	LC7	LCO7
1	0	0	0.852

Displacement

	Floor-Floor Relative Displacement (in)			Drift %		
Level	Wind	Seismic	Seismic, Cd	Wind	Seismic	Seismic, Cd
1	0.01	0.09	0.26	0.01	0.06	0.16

(3) and (4) Chord Configuration Schematics

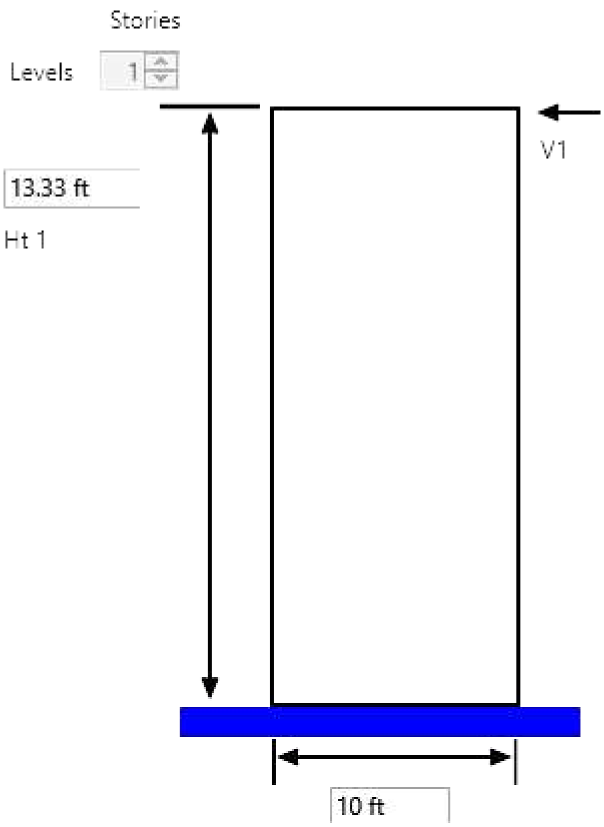


(3) Boxed

Project Name: Steel stud shear wall
Model: 10 ft wall 84
Code: 2012 NASPEC [AISI S100-2012]
AISI S400-15/S1-16 AISI S240-15

Date: 08/22/2024
Simpson Strong-Tie® CFS Designer™ 5.2.4.0

LFRS Shearwall Summary Report



Load Inputs (All Loads are Unfactored LRFD Forces)

Top of Level Shear (lb)

Level	Wind	Seismic	Aspect Ratio
1	3490	13520	1.33

Seismic Design Parameters:

Seismic Design Category = D S_{DS} = 0.874 Ie = 1.25

Level	Overstrength Factor, Ω_0	Defl Amplification Factor, Cd
1	2.5	3.5

Additional Applied Chord Axial Loads (lb) - Unfactored

Level	D	L	Lr	S	W
1	12140	0	0	12640	0

Additional Applied Chord Moments (ft-lb) - Unfactored

Level	D	L	Lr	S	W	E
1	0	0	0	0	0	0

Total and Unit Shear Forces

	Wind Shear Forces		Seismic Shear Forces	
Level	Vu, Total (lb)	vu, per ft (lb/ft)	Vu, Total (lb)	vu, per ft (lb/ft)
1	3490	349	13520	1352

Shear Wall Sheathing and Fastener Selection

Level	Sheathing	Fastener Size	Edge/Field Fastener Spac (in)	Framing Thickness (mils)	Max Framing Spac (in)	One or Two Sides
1	0.027" Steel Sheet	No. 8	2/12	68	24	2

Shear Strength Modification Factors

Level	Wind Modifiers	Seismic Modifiers

LFRS Shearwall Summary Report

1	None	None

Available Shear Strength and Shear Ratios

	Wind			Seismic		
Level	Aspect Ratio Factor	Available Shear Strength, ϕvn (lb/ft)	Shear Ratio vu/ϕvn	Aspect Ratio Factor	Available Shear Strength, ϕvn (lb/ft)	Shear Ratio vu/ϕvn
1	1	1521	0.229	1	1404	0.963

Chords

				Bracing (in)					
Level	Section	Fy (ksi)	Configuration	Flexural	Axial KyLy	Axial KtLt	Flex Kϕ (lb-in/in)	Axial Kϕ (lb-in/in)	Bracing, Lm (in)
1	600S250-97	50	(4) Configuration 3	60	60	60	0	0	None

Interconnection Spacing = 6 in

Load Combinations IBC 2018 LRFD

LC1 = 1.4D
LC2 = 1.2D + 1.6L + 0.5(Lr or S)
LC3 = 1.2D + 1.6(Lr or S) + (L or 0.5W)
LC4 = 1.2D + 1.0W + L + 0.5(Lr or S)
LC6 = 1.2D + 1.0E + L + 0.2S
LCO6 = (1.2+0.2Sds)D + Ω_oQe + L + 0.2S   Note: LCO6 based on the lower of Overstrength or Expected Strength

Factored Chord Compression, Pu (lb)

Level	LC1	LC2	LC3	LC4	LC6	LCO6
1	16996	20888	37118	25540	35118	64273

Factored Chord Strong-Axis Bending, Mux (ft-lb)

Level	LC1	LC2	LC3	LC4	LC6	LCO6
1	0	0	0	0	0	0

			Interactions					
Level	Minimum ϕMnx (ft-lb)	Minimum ϕPn (lb)	LC1	LC2	LC3	LC4	LC6	LCO6
1	33475	110625	0.154	0.189	0.336	0.231	0.317	0.581

Ties and Holdowns

Level	Holdown	Quantity	Config	Exposed Rod Length (in)	Holdown Capacity Φ Tn (lb/Each)	Holdown Disp at Φ Tn (in)	Holdown height (in)	Rod Dia. (in)
1	S/HDU11 - 97	2	Base	4	23880	0.235	16.625	0.875

LFRS Shearwall Summary Report

Level	Holdown Offset from End of Shear Wall (in)
1	0.0

Load Combinations (IBC 2018 LRFD)

LC5 = 0.9D + 1.0W
LC7 = (0.9-0.2Sds)D + 1.0E
LCO7 = (0.9-0.2Sds)D + Ω_oQe   Note: LCO7 based on the lower of Overstrength or Expected Strength

Factored Net Uplift (lb) (Negative values represent uplift, Positive values indicate no net uplift) / **Shear Forces (lb)**

Level	LC5	LC7	LCO7	Wind	Seismic	Seismic w/Overstrength
1	6274	-7096	-36251	3490	13520	33800

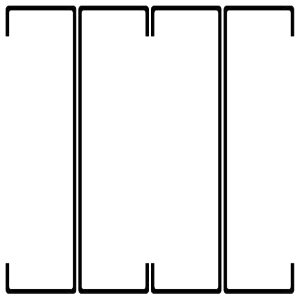
Ratio (Factored Net Uplift)/(Holdown Capacity)

Level	LC5	LC7	LCO7
1	0	0	0.759

<u>Displacement</u>

	Floor-Floor Relative Displacement (in)			Drift %		
Level	Wind	Seismic	Seismic, Cd	Wind	Seismic	Seismic, Cd
1	0.03	0.39	1.09	0.02	0.24	0.68

(3) and (4) Chord Configuration Schematics

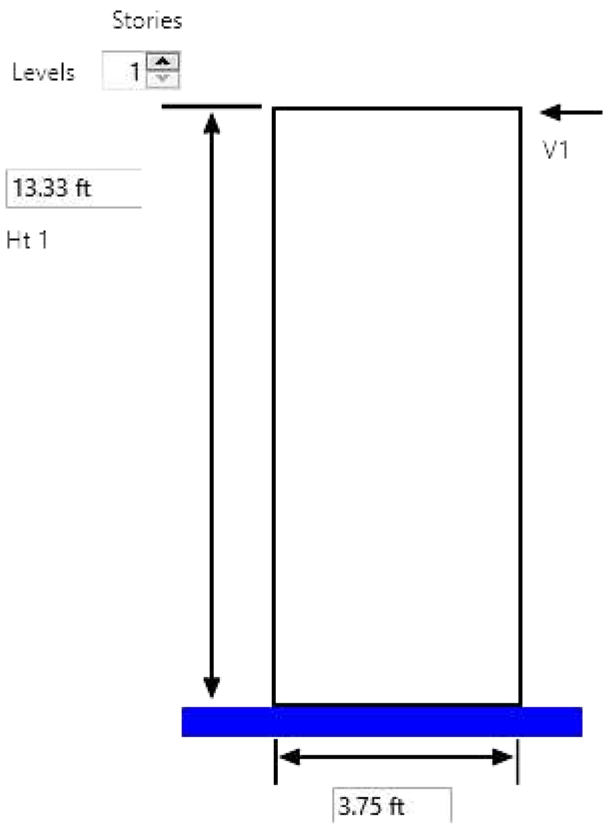


(4) Configuration 3

Project Name: Steel stud shear wall
Model: 3.75 ft wall 90
Code: 2012 NASPEC [AISI S100-2012]
AISI S400-15/S1-16 AISI S240-15

Date: 08/22/2024
Simpson Strong-Tie® CFS Designer™ 5.2.4.0

LFRS Shearwall Summary Report



Load Inputs (All Loads are Unfactored LRFD Forces)

Top of Level Shear (lb)

Level	Wind	Seismic	Aspect Ratio
1	180	950	3.55

Seismic Design Parameters:

Seismic Design Category = D S_{DS} = 0.874 Ie = 1.25

Level	Overstrength Factor, Ω_0	Defl Amplification Factor, Cd
1	2.5	3.5

Additional Applied Chord Axial Loads (lb) - Unfactored

Level	D	L	Lr	S	W
1	991	0	0	11840	0

Additional Applied Chord Moments (ft-lb) - Unfactored

Level	D	L	Lr	S	W	E
1	0	0	0	0	0	0

Total and Unit Shear Forces

	Wind Shear Forces		Seismic Shear Forces	
Level	Vu, Total (lb)	vu, per ft (lb/ft)	Vu, Total (lb)	vu, per ft (lb/ft)
1	180	48	950	253.

Shear Wall Sheathing and Fastener Selection

Level	Sheathing	Fastener Size	Edge/Field Fastener Spac (in)	Framing Thickness (mils)	Max Framing Spac (in)	One or Two Sides
1	0.027" Steel Sheet	No. 8	2/12	68	24	2

Shear Strength Modification Factors

Level	Wind Modifiers	Seismic Modifiers

Project Name: Steel stud shear wall
Model: 3.75 ft wall 90
Code: 2012 NASPEC [AISI S100-2012]
AISI S400-15/S1-16 AISI S240-15

LFRS Shearwall Summary Report

1 Sheet overlap in lieu of blocking: Reduction factor = 0.7 Sheet overlap in lieu of blocking: Reduction factor = 0.7

Available Shear Strength and Shear Ratios

Level	Wind: Aspect Ratio Factor	Wind: Available Shear Strength, ϕvn (lb/ft)	Wind: Shear Ratio vu/ϕvn	Seismic: Aspect Ratio Factor	Seismic: Available Shear Strength, ϕvn (lb/ft)	Seismic: Shear Ratio vu/ϕvn
1	0.563	599	0.08	0.563	553	0.458

Chords

Level	Section	Fy (ksi)	Configuration	Bracing (in): Flexural	Bracing (in): Axial KyLy	Bracing (in): Axial KtLt	Flex Kϕ (lb-in/in)	Axial Kϕ (lb-in/in)	Bracing, Lm (in)
1	600S200-68	50	(3) Boxed	60	60	60	0	0	None

Interconnection Spacing = 6 in

Load Combinations IBC 2018 LRFD

LC1 = 1.4D
LC2 = 1.2D + 1.6L + 0.5(Lr or S)
LC3 = 1.2D + 1.6(Lr or S) + (L or 0.5W)
LC4 = 1.2D + 1.0W + L + 0.5(Lr or S)
LC6 = 1.2D + 1.0E + L + 0.2S
LCO6 = (1.2+0.2Sds)D + Ω_oQe + L + 0.2S Note: LCO6 based on the lower of Overstrength or Expected Strength

Factored Chord Compression, Pu (lb)

Level	LC1	LC2	LC3	LC4	LC6	LCO6
1	1387	7109	20453	7749	6934	12173

Factored Chord Strong-Axis Bending, Mux (ft-lb)

Level	LC1	LC2	LC3	LC4	LC6	LCO6
1	0	0	0	0	0	0

Level	Minimum ϕMnx (ft-lb)	Minimum ϕPn (lb)	Interactions: LC1	LC2	LC3	LC4	LC6	LCO6
1	16422	47043	0.029	0.151	0.435	0.165	0.147	0.259

Ties and Holdowns

Level	Holdown	Quantity	Config	Exposed Rod Length (in)	Holdown Capacity Φ Tn (lb/Each)	Holdown Disp at Φ Tn (in)	Holdown height (in)	Rod Dia. (in)
1	S/HDU6 - 68	1	Base	4	8915	0.095	10.375	0.625

LFRS Shearwall Summary Report

Level	Holdown Offset from End of Shear Wall (in)
1	0.0

Load Combinations (IBC 2018 LRFD)

LC5 = 0.9D + 1.0W
LC7 = (0.9-0.2Sds)D + 1.0E
LCO7 = (0.9-0.2Sds)D + Ω_oQe   Note: LCO7 based on the lower of Overstrength or Expected Strength

	Factored Net Uplift (lb) (Negative values represent uplift, Positive values indicate no net uplift)			Shear Forces (lb)		
Level	LC5	LC7	LCO7	Wind	Seismic	Seismic w/Overstrength
1	252	-2485	-7724	180	950	2375

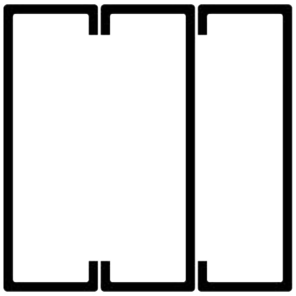
Ratio (Factored Net Uplift)/(Holdown Capacity)

Level	LC5	LC7	LCO7
1	0	0	0.866

Displacement

	Floor-Floor Relative Displacement (in)			Drift %		
Level	Wind	Seismic	Seismic, Cd	Wind	Seismic	Seismic, Cd
1	0.01	0.14	0.38	0	0.09	0.24

(3) and (4) Chord Configuration Schematics

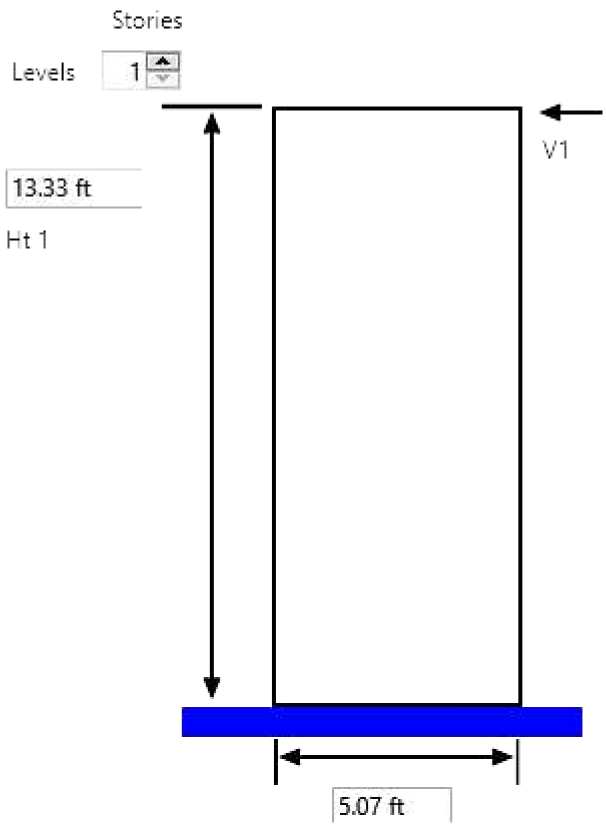


(3) Boxed

Project Name: Steel stud shear wall
Model: 5.07 ft wall 91
Code: 2012 NASPEC [AISI S100-2012]
AISI S400-15/S1-16 AISI S240-15

Date: 08/22/2024
Simpson Strong-Tie® CFS Designer™ 5.2.4.0

LFRS Shearwall Summary Report



Load Inputs (All Loads are Unfactored LRFD Forces)

Top of Level Shear (lb)

Level	Wind	Seismic	Aspect Ratio
1	580	2250	2.63

Seismic Design Parameters:

Seismic Design Category = D S_{DS} = 0.874 Ie = 1.25

Level	Overstrength Factor, Ω_0	Defl Amplification Factor, Cd
1	2.5	3.5

Additional Applied Chord Axial Loads (lb) - Unfactored

Level	D	L	Lr	S	W
1	8260	0	0	9010	0

Additional Applied Chord Moments (ft-lb) - Unfactored

Level	D	L	Lr	S	W	E
1	0	0	0	0	0	0

Total and Unit Shear Forces

	Wind Shear Forces		Seismic Shear Forces	
Level	Vu, Total (lb)	vu, per ft (lb/ft)	Vu, Total (lb)	vu, per ft (lb/ft)
1	580	114.	2250	443.

Shear Wall Sheathing and Fastener Selection

Level	Sheathing	Fastener Size	Edge/Field Fastener Spac (in)	Framing Thickness (mils)	Max Framing Spac (in)	One or Two Sides
1	0.027" Steel Sheet	No. 8	6/12	68	24	2

Shear Strength Modification Factors

Level	Wind Modifiers	Seismic Modifiers

LFRS Shearwall Summary Report

1	None	None

Available Shear Strength and Shear Ratios

	Wind			Seismic		
Level	Aspect Ratio Factor	Available Shear Strength, ϕvn (lb/ft)	Shear Ratio vu/ϕvn	Aspect Ratio Factor	Available Shear Strength, ϕvn (lb/ft)	Shear Ratio vu/ϕvn
1	0.761	638	0.179	0.761	591	0.751

Chords

Level	Section	Fy (ksi)	Configuration	Bracing (in) Flexural	Axial KyLy	Axial KtLt	Flex Kϕ (lb-in/in)	Axial Kϕ (lb-in/in)	Bracing, Lm (in)
1	600S200-68	50	(2) Back-To-Back	60	60	60	0	0	None

Interconnection Spacing = 6 in

Load Combinations IBC 2018 LRFD

LC1 = 1.4D
LC2 = 1.2D + 1.6L + 0.5(Lr or S)
LC3 = 1.2D + 1.6(Lr or S) + (L or 0.5W)
LC4 = 1.2D + 1.0W + L + 0.5(Lr or S)
LC6 = 1.2D + 1.0E + L + 0.2S
LCO6 = (1.2+0.2Sds)D + Ω_oQe + L + 0.2S Note: LCO6 based on the lower of Overstrength or Expected Strength

Factored Chord Compression, Pu (lb)

Level	LC1	LC2	LC3	LC4	LC6	LCO6
1	11564	14417	25090	15942	17630	27947

Factored Chord Strong-Axis Bending, Mux (ft-lb)

Level	LC1	LC2	LC3	LC4	LC6	LCO6
1	0	0	0	0	0	0

Level	Minimum ϕMnx (ft-lb)	Minimum ϕPn (lb)	Interactions LC1	LC2	LC3	LC4	LC6	LCO6
1	9942	31360	0.369	0.46	0.8	0.508	0.562	0.891

Ties and Holdowns

Level	Holdown	Quantity	Config	Exposed Rod Length (in)	Holdown Capacity Φ Tn (lb/Each)	Holdown Disp at Φ Tn (in)	Holdown height (in)	Rod Dia. (in)
1	S/HDU6 - 68	1	Base	4	8915	0.095	10.375	0.625

Project Name: Steel stud shear wall
Model: 5.07 ft wall 91
Code: 2012 NASPEC [AISI S100-2012]
AISI S400-15/S1-16 AISI S240-15

Date: 08/22/2024
Simpson Strong-Tie® CFS Designer™ 5.2.4.0

LFRS Shearwall Summary Report

Level	Holdown Offset from End of Shear Wall (in)
1	0.0

Load Combinations (IBC 2018 LRFD)

LC5 = 0.9D + 1.0W
LC7 = (0.9-0.2Sds)D + 1.0E
LCO7 = (0.9-0.2Sds)D + Ω_oQe Note: LCO7 based on the lower of Overstrength or Expected Strength

	Factored Net Uplift (lb) (Negative values represent uplift, Positive values indicate no net uplift)			Shear Forces (lb)		
Level	**LC5**	**LC7**	**LCO7**	**Wind**	**Seismic**	**Seismic w/Overstrength**
1	5909	1518	-8799	580	2250	5625

Ratio (Factored Net Uplift)/(Holdown Capacity)

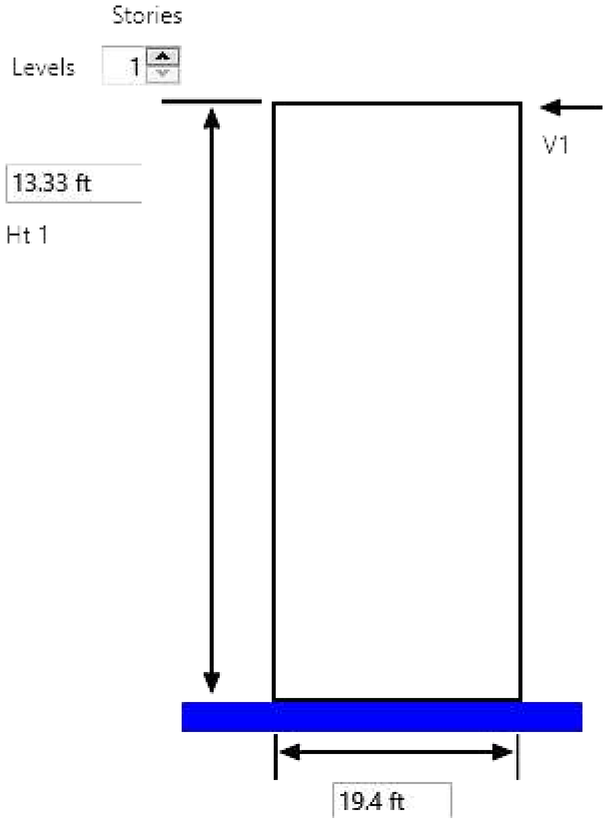
Level	LC5	LC7	LCO7
1	0	0	0.987

Displacement

	Floor-Floor Relative Displacement (in)			Drift %		
Level	**Wind**	**Seismic**	**Seismic, Cd**	**Wind**	**Seismic**	**Seismic, Cd**
1	0.03	0.25	0.69	0.02	0.15	0.43

Project Name: Steel stud shear wall
Model: 19.40 ft wall 94
Code: 2012 NASPEC [AISI S100-2012]
AISI S400-15/S1-16 AISI S240-15

LFRS Shearwall Summary Report



Load Inputs (All Loads are Unfactored LRFD Forces)

Top of Level Shear (lb)

Level	Wind	Seismic	Aspect Ratio
1	6890	14490	0.69

Seismic Design Parameters:

Seismic Design Category = D S_{DS} = 0.874 Ie = 1.25

Level	Overstrength Factor, Ω_0	Defl Amplification Factor, Cd
1	2.5	3.5

Additional Applied Chord Axial Loads (lb) - Unfactored

Level	D	L	Lr	S	W
1	10930	0	0	3440	0

Additional Applied Chord Moments (ft-lb) - Unfactored

Level	D	L	Lr	S	W	E
1	0	0	0	0	0	0

Total and Unit Shear Forces

	Wind Shear Forces		Seismic Shear Forces	
Level	Vu, Total (lb)	vu, per ft (lb/ft)	Vu, Total (lb)	vu, per ft (lb/ft)
1	6890	355.	14490	746.

Shear Wall Sheathing and Fastener Selection

Level	Sheathing	Fastener Size	Edge/Field Fastener Spac (in)	Framing Thickness (mils)	Max Framing Spac (in)	One or Two Sides
1	0.027" Steel Sheet	No. 8	6/12	68	24	2

Shear Strength Modification Factors

Level	Wind Modifiers	Seismic Modifiers

LFRS Shearwall Summary Report

1	None	None

Available Shear Strength and Shear Ratios

	Wind			Seismic		
Level	Aspect Ratio Factor	Available Shear Strength, ϕvn (lb/ft)	Shear Ratio vu/ϕvn	Aspect Ratio Factor	Available Shear Strength, ϕvn (lb/ft)	Shear Ratio vu/ϕvn
1	1	838	0.424	1	776	0.962

Chords

Level	Section	Fy (ksi)	Configuration	Bracing (in) Flexural	Axial KyLy	Axial KtLt	Flex Kϕ (lb-in/in)	Axial Kϕ (lb-in/in)	Bracing, Lm (in)
1	600S200-68	50	(4) Configuration 3	60	60	60	0	0	None

Interconnection Spacing = 6 in

Load Combinations IBC 2018 LRFD

LC1 = 1.4D
LC2 = 1.2D + 1.6L + 0.5(Lr or S)
LC3 = 1.2D + 1.6(Lr or S) + (L or 0.5W)
LC4 = 1.2D + 1.0W + L + 0.5(Lr or S)
LC6 = 1.2D + 1.0E + L + 0.2S
LCO6 = (1.2+0.2Sds)D + Ω_oQe + L + 0.2S Note: LCO6 based on the lower of Overstrength or Expected Strength

Factored Chord Compression, Pu (lb)

Level	LC1	LC2	LC3	LC4	LC6	LCO6
1	15302	14836	20987	19570	23760	40605

Factored Chord Strong-Axis Bending, Mux (ft-lb)

Level	LC1	LC2	LC3	LC4	LC6	LCO6
1	0	0	0	0	0	0

Level	Minimum ϕMnx (ft-lb)	Minimum ϕPn (lb)	Interactions LC1	LC2	LC3	LC4	LC6	LCO6
1	19888	62721	0.244	0.237	0.335	0.312	0.379	0.647

Ties and Holdowns

Level	Holdown	Quantity	Config	Exposed Rod Length (in)	Holdown Capacity Φ Tn (lb/Each)	Holdown Disp at Φ Tn (in)	Holdown height (in)	Rod Dia. (in)
1	S/HDU6 - 68	2	Base	4	8915	0.095	10.375	0.625

LFRS Shearwall Summary Report

Level	Holdown Offset from End of Shear Wall (in)
1	0.0

Load Combinations (IBC 2018 LRFD)

LC5 = 0.9D + 1.0W
LC7 = (0.9-0.2Sds)D + 1.0E
LCO7 = (0.9-0.2Sds)D + Ω_oQe   Note: LCO7 based on the lower of Overstrength or Expected Strength

Factored Net Uplift (lb) (Negative values represent uplift, Positive values indicate no net uplift) / **Shear Forces (lb)**

Level	LC5	LC7	LCO7	Wind	Seismic	Seismic w/Overstrength
1	5103	-119	-16964	6890	14490	36225

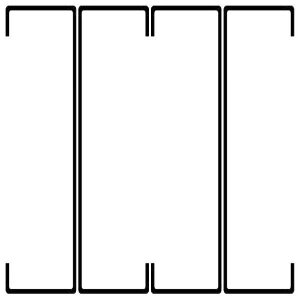
Ratio (Factored Net Uplift)/(Holdown Capacity)

Level	LC5	LC7	LCO7
1	0	0	0.951

Displacement

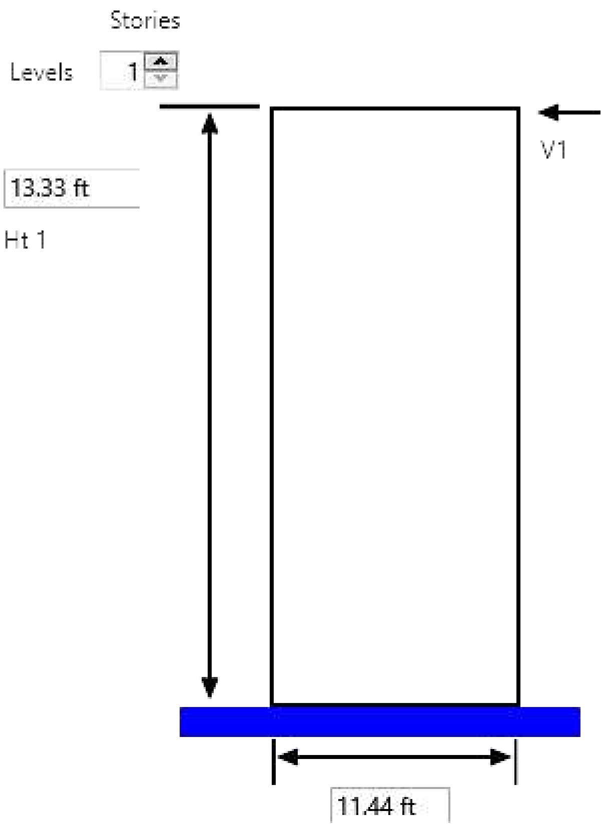
	Floor-Floor Relative Displacement (in)			Drift %		
Level	Wind	Seismic	Seismic, Cd	Wind	Seismic	Seismic, Cd
1	0.09	0.32	0.89	0.06	0.2	0.56

(3) and (4) Chord Configuration Schematics



(4) Configuration 3

LFRS Shearwall Summary Report



Load Inputs (All Loads are Unfactored LRFD Forces)

Top of Level Shear (lb)

Level	Wind	Seismic	Aspect Ratio
1	2330	4900	1.17

Seismic Design Parameters:

Seismic Design Category = D S_{DS} = 0.874 Ie = 1.25

Level	Overstrength Factor, Ω_0	Defl Amplification Factor, Cd
1	2.5	3.5

Additional Applied Chord Axial Loads (lb) - Unfactored

Level	D	L	Lr	S	W
1	6120	0	0	4030	0

Additional Applied Chord Moments (ft-lb) - Unfactored

Level	D	L	Lr	S	W	E
1	0	0	0	0	0	0

Total and Unit Shear Forces

	Wind Shear Forces		Seismic Shear Forces	
Level	Vu, Total (lb)	vu, per ft (lb/ft)	Vu, Total (lb)	vu, per ft (lb/ft)
1	2330	203.	4900	428.

Shear Wall Sheathing and Fastener Selection

Level	Sheathing	Fastener Size	Edge/Field Fastener Spac (in)	Framing Thickness (mils)	Max Framing Spac (in)	One or Two Sides
1	0.027" Steel Sheet	No. 8	6/12	68	24	2

Shear Strength Modification Factors

Level	Wind Modifiers	Seismic Modifiers

LFRS Shearwall Summary Report

1	None	None

Available Shear Strength and Shear Ratios

	Wind			Seismic		
Level	Aspect Ratio Factor	Available Shear Strength, ϕvn (lb/ft)	Shear Ratio vu/ϕvn	Aspect Ratio Factor	Available Shear Strength, ϕvn (lb/ft)	Shear Ratio vu/ϕvn
1	1	838	0.243	1	776	0.552

Chords

				Bracing (in)					
Level	Section	Fy (ksi)	Configuration	Flexural	Axial KyLy	Axial KtLt	Flex Kϕ (lb-in/in)	Axial Kϕ (lb-in/in)	Bracing, Lm (in)
1	600S200-68	50	(4) Configuration 3	60	60	60	0	0	None

Interconnection Spacing = 6 in

Load Combinations IBC 2018 LRFD

LC1 = 1.4D
LC2 = 1.2D + 1.6L + 0.5(Lr or S)
LC3 = 1.2D + 1.6(Lr or S) + (L or 0.5W)
LC4 = 1.2D + 1.0W + L + 0.5(Lr or S)
LC6 = 1.2D + 1.0E + L + 0.2S
LCO6 = (1.2+0.2Sds)D + Ω_oQe + L + 0.2S Note: LCO6 based on the lower of Overstrength or Expected Strength

Factored Chord Compression, Pu (lb)

Level	LC1	LC2	LC3	LC4	LC6	LCO6
1	8568	9359	15149	12074	13860	23494

Factored Chord Strong-Axis Bending, Mux (ft-lb)

Level	LC1	LC2	LC3	LC4	LC6	LCO6
1	0	0	0	0	0	0

			Interactions					
Level	Minimum ϕMnx (ft-lb)	Minimum ϕPn (lb)	LC1	LC2	LC3	LC4	LC6	LCO6
1	19888	62721	0.137	0.149	0.242	0.193	0.221	0.375

Ties and Holdowns

Level	Holdown	Quantity	Config	Exposed Rod Length (in)	Holdown Capacity Φ Tn (lb/Each)	Holdown Disp at Φ Tn (in)	Holdown height (in)	Rod Dia. (in)
1	S/HDU9 - 68	1	Base	4	13370	0.159	12.875	0.875

LFRS Shearwall Summary Report

Level	Holdown Offset from End of Shear Wall (in)
1	0.0

Load Combinations (IBC 2018 LRFD)

LC5 = 0.9D + 1.0W
LC7 = (0.9-0.2Sds)D + 1.0E
LCO7 = (0.9-0.2Sds)D + Ω_oQe   Note: LCO7 based on the lower of Overstrength or Expected Strength

	Factored Net Uplift (lb) (Negative values represent uplift, Positive values indicate no net uplift)			Shear Forces (lb)		
Level	LC5	LC7	LCO7	Wind	Seismic	Seismic w/Overstrength
1	2793	-202	-9836	2330	4900	12250

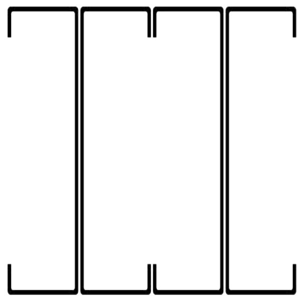
Ratio (Factored Net Uplift)/(Holdown Capacity)

Level	LC5	LC7	LCO7
1	0	0	0.736

Displacement

	Floor-Floor Relative Displacement (in)			Drift %		
Level	Wind	Seismic	Seismic, Cd	Wind	Seismic	Seismic, Cd
1	0.05	0.16	0.43	0.03	0.1	0.27

(3) and (4) Chord Configuration Schematics

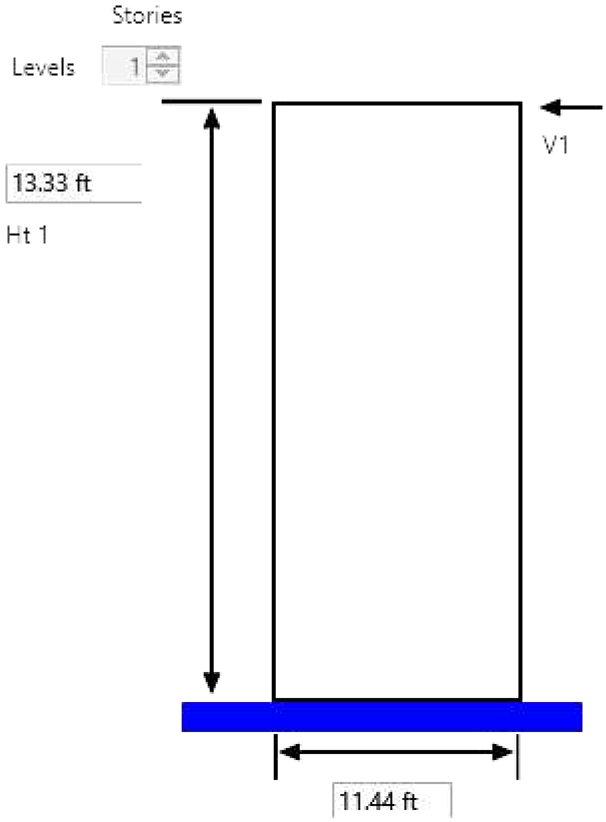


(4) Configuration 3

Project Name: Steel stud shear wall
Model: 19.39 ft wall 92
Code: 2012 NASPEC [AISI S100-2012]
AISI S400-15/S1-16 AISI S240-15

Date: 08/22/2024
Simpson Strong-Tie® CFS Designer™ 5.2.4.0

LFRS Shearwall Summary Report



Load Inputs (All Loads are Unfactored LRFD Forces)

Top of Level Shear (lb)

Level	Wind	Seismic	Aspect Ratio
1	1110	19390	1.17

Seismic Design Parameters:

Seismic Design Category = D S_{DS} = 0.874 Ie = 1.25

Level	Overstrength Factor, Ω_0	Defl Amplification Factor, Cd
1	2.5	3.5

Additional Applied Chord Axial Loads (lb) - Unfactored

Level	D	L	Lr	S	W
1	16860	0	0	7470	0

Additional Applied Chord Moments (ft-lb) - Unfactored

Level	D	L	Lr	S	W	E
1	0	0	0	0	0	0

Total and Unit Shear Forces

	Wind Shear Forces		Seismic Shear Forces	
Level	Vu, Total (lb)	vu, per ft (lb/ft)	Vu, Total (lb)	vu, per ft (lb/ft)
1	1110	97.	19390	1694.

Shear Wall Sheathing and Fastener Selection

Level	Sheathing	Fastener Size	Edge/Field Fastener Spac (in)	Framing Thickness (mils)	Max Framing Spac (in)	One or Two Sides
1	0.033" Steel Sheet	No. 8	2/12	68	24	2

Shear Strength Modification Factors

Level	Wind Modifiers	Seismic Modifiers

Project Name: Steel stud shear wall
Model: 19.39 ft wall 92
Code: 2012 NASPEC [AISI S100-2012]
AISI S400-15/S1-16 AISI S240-15

Date: 08/22/2024
Simpson Strong-Tie® CFS Designer™ 5.2.4.0

LFRS Shearwall Summary Report

1	None	None

Available Shear Strength and Shear Ratios

	Wind			Seismic		
Level	Aspect Ratio Factor	Available Shear Strength, ϕvn (lb/ft)	Shear Ratio vu/ϕvn	Aspect Ratio Factor	Available Shear Strength, ϕvn (lb/ft)	Shear Ratio vu/ϕvn
1	1	2431	0.04	1	2244	0.755

Chords

Level	Section	Fy (ksi)	Configuration	Bracing (in) Flexural	Axial KyLy	Axial KtLt	Flex Kϕ (lb-in/in)	Axial Kϕ (lb-in/in)	Bracing, Lm (in)
1	600S200-97	50	(4) Configuration 3	60	60	60	0	0	None

Interconnection Spacing = 6 in

Load Combinations IBC 2018 LRFD

LC1 = 1.4D
LC2 = 1.2D + 1.6L + 0.5(Lr or S)
LC3 = 1.2D + 1.6(Lr or S) + (L or 0.5W)
LC4 = 1.2D + 1.0W + L + 0.5(Lr or S)
LC6 = 1.2D + 1.0E + L + 0.2S
LCO6 = (1.2+0.2Sds)D + Ω_oQe + L + 0.2S Note: LCO6 based on the lower of Overstrength or Expected Strength

Factored Chord Compression, Pu (lb)

Level	LC1	LC2	LC3	LC4	LC6	LCO6
1	23604	23967	32831	25260	44319	81157

Factored Chord Strong-Axis Bending, Mux (ft-lb)

Level	LC1	LC2	LC3	LC4	LC6	LCO6
1	0	0	0	0	0	0

Level	Minimum ϕMnx (ft-lb)	Minimum ϕPn (lb)	Interactions LC1	LC2	LC3	LC4	LC6	LCO6
1	31900	96625	0.244	0.248	0.34	0.261	0.459	0.84

Ties and Holdowns

Level	Holdown	Quantity	Config	Exposed Rod Length (in)	Holdown Capacity Φ Tn (lb/Each)	Holdown Disp at Φ Tn (in)	Holdown height (in)	Rod Dia. (in)
1	S/HDU11 - 97	2	Base	4	23880	0.235	16.625	0.875

LFRS Shearwall Summary Report

Level	Holdown Offset from End of Shear Wall (in)
1	0.0

Load Combinations (IBC 2018 LRFD)

LC5 = $0.9D + 1.0W$

LC7 = $(0.9\text{-}0.2Sds)D + 1.0E$

LCO7 = $(0.9\text{-}0.2Sds)D + \Omega_o Qe$ Note: LCO7 based on the lower of Overstrength or Expected Strength

	Factored Net Uplift (lb) (Negative values represent uplift, Positive values indicate no net uplift)			Shear Forces (lb)		
Level	LC5	LC7	LCO7	Wind	Seismic	Seismic w/Overstrength
1	13881	-7419	-44257	1110	19390	48475

Ratio (Factored Net Uplift)/(Holdown Capacity)

Level	LC5	LC7	LCO7
1	0	0	0.927

Displacement

	Floor-Floor Relative Displacement (in)			Drift %		
Level	Wind	Seismic	Seismic, Cd	Wind	Seismic	Seismic, Cd
1	0	0.38	1.05	0	0.24	0.66

Project Name: Steel stud shear wall

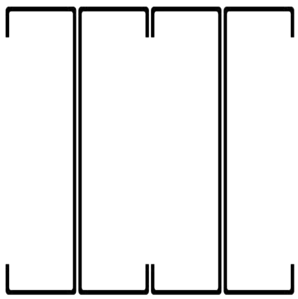
Model: 19.39 ft wall 92

Code: 2012 NASPEC [AISI S100-2012]
AISI S400-15/S1-16 AISI S240-15

Date: 08/22/2024

Simpson Strong-Tie® CFS Designer™ 5.2.4.0

(3) and (4) Chord Configuration Schematics



(4) Configuration 3

RAM Elements

Current Date: 8/22/2024 10:14 AM
Units system: English
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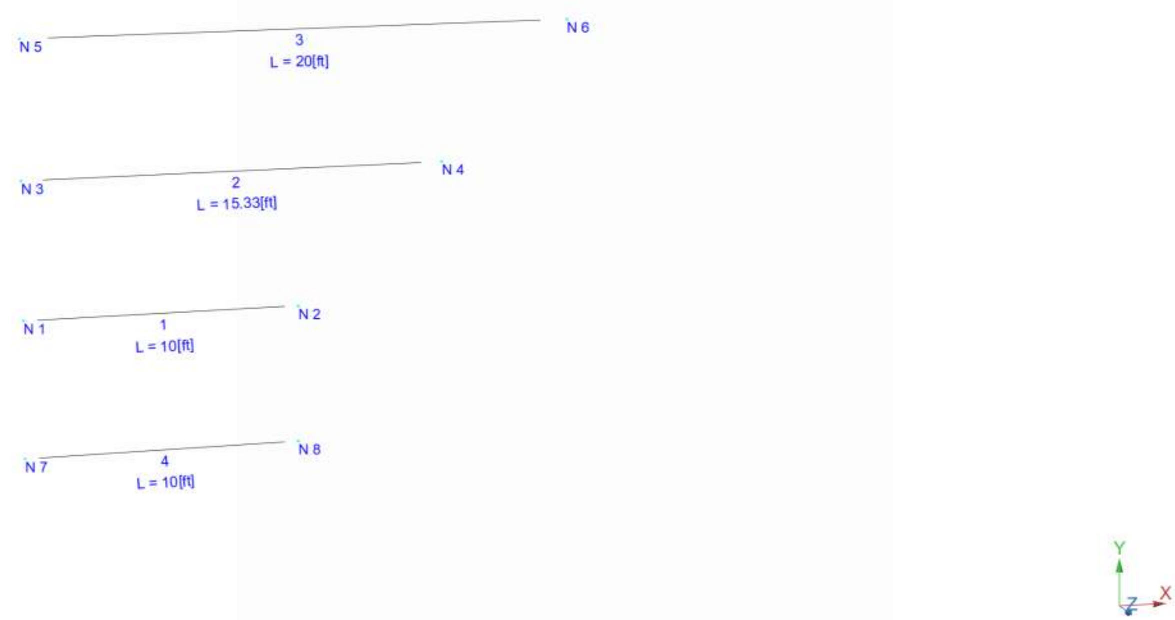

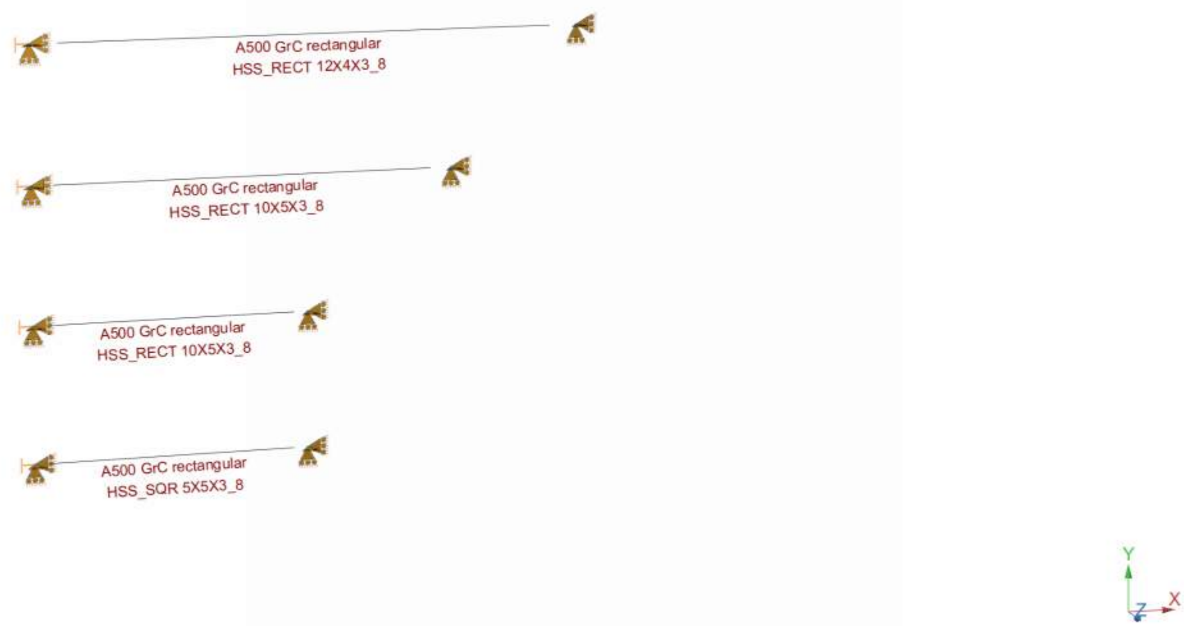
A500 GrC rectangular
HSS_RECT 12X4X3_8
A500 GrC rectangular
HSS_RECT 10X5X3_8
A500 GrC rectangular
HSS_RECT 10X5X3_8
A500 GrC rectangular
HSS_SQR 5X5X3_8
Y
Z
X

RAM Elements

Current Date: 8/22/2024 10:17 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Wind Girts\Wind Girts.retx

Load data

Load Conditions

Condition	Description	Comb.	Category
D1	1.4DL	Yes	
D2	1.2DL+1.6LL	Yes	
D3	1.2DL+0.5SL	Yes	
D4	1.2DL+1.6LL+0.5SL	Yes	
D5	1.2DL+1.6SL	Yes	
D6	1.2DL+0.5WL	Yes	
D7	1.2DL+1.6SL+LL	Yes	
D8	1.2DL+1.6SL+0.5WL	Yes	
D9	1.2DL+WL	Yes	
D10	1.2DL+WL+0.5SL	Yes	
D11	1.2DL+WL+LL	Yes	
D12	1.2DL+WL+LL+0.5SL	Yes	
D13	0.9DL+WL	Yes	
D14	1.2DL+0.2SL	Yes	
D15	1.2DL+EQ	Yes	
D16	1.2DL+LL+0.2SL	Yes	
D17	1.2DL+EQ+0.2SL	Yes	
D18	1.2DL+EQ+LL	Yes	
D19	1.2DL+EQ+LL+0.2SL	Yes	
D20	0.9DL+EQ	Yes	
S1	DL	Yes	
S2	DL+LL	Yes	
S3	DL+SL	Yes	
S4	DL+0.75LL	Yes	
S5	DL+0.75SL	Yes	
S6	DL+0.75LL+0.75SL	Yes	
S7	DL+0.6WL	Yes	
S8	DL+0.7EQ	Yes	
S9	DL+0.75LL+0.45WL+0.75SL	Yes	
S10	DL+0.75LL+0.45WL	Yes	
S11	DL+0.45WL+0.75SL	Yes	
S12	0.6DL+0.6WL	Yes	
S13	DL+0.7EQ	Yes	
S14	DL+0.75LL+0.525EQ	Yes	
S15	DL+0.75LL+0.75SL	Yes	
S16	DL+0.75LL+0.525EQ+0.75SL	Yes	
S17	DL+0.525EQ	Yes	
S18	DL+0.75SL	Yes	
S19	DL+0.525EQ+0.75SL	Yes	
S20	0.6DL+0.7EQ	Yes	

Glossary

Comb : Indicates if load condition is a load combination

RAM Elements

W-300

Current Date: 8/22/2024 10:25 AM
Units system: English
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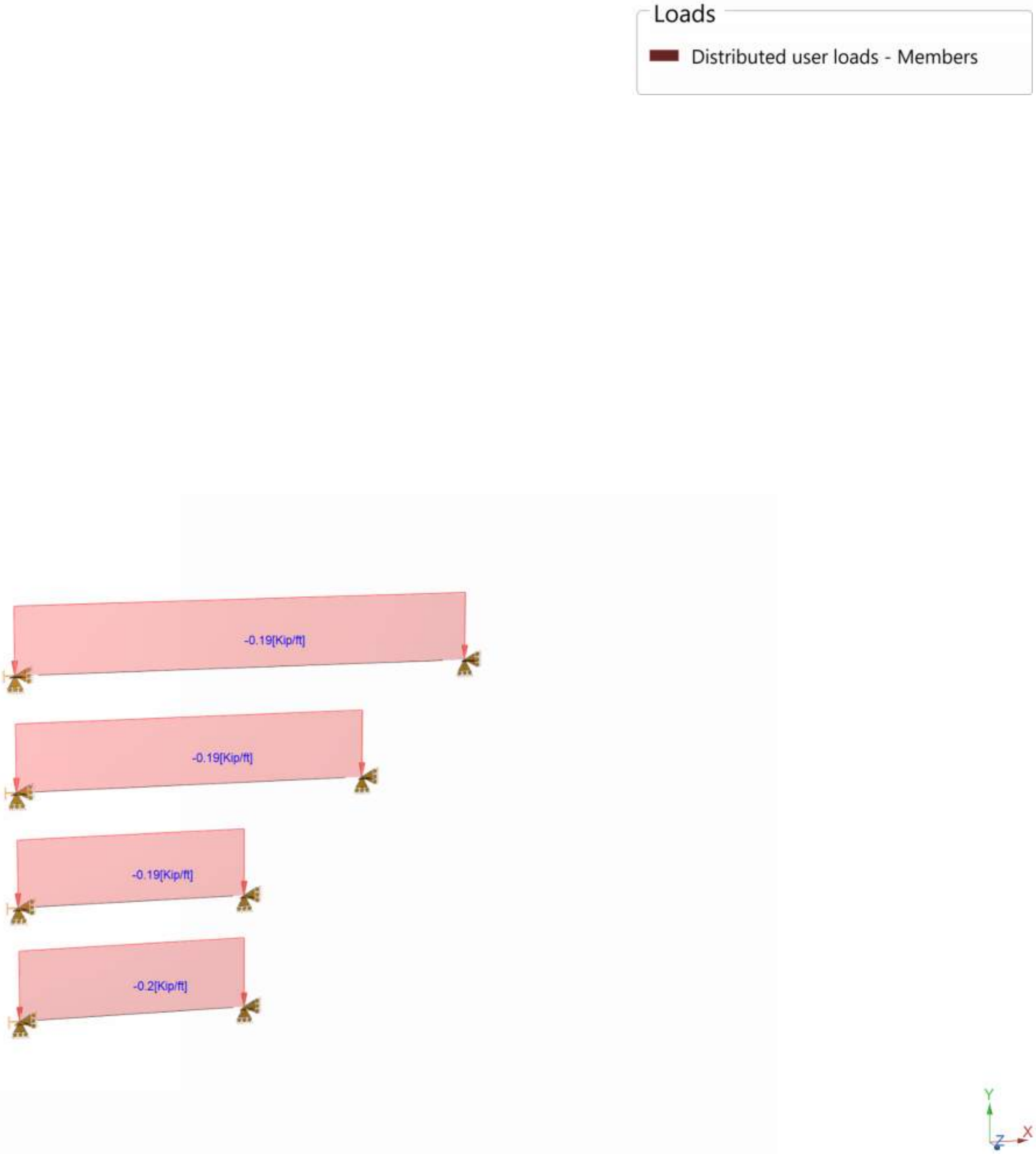
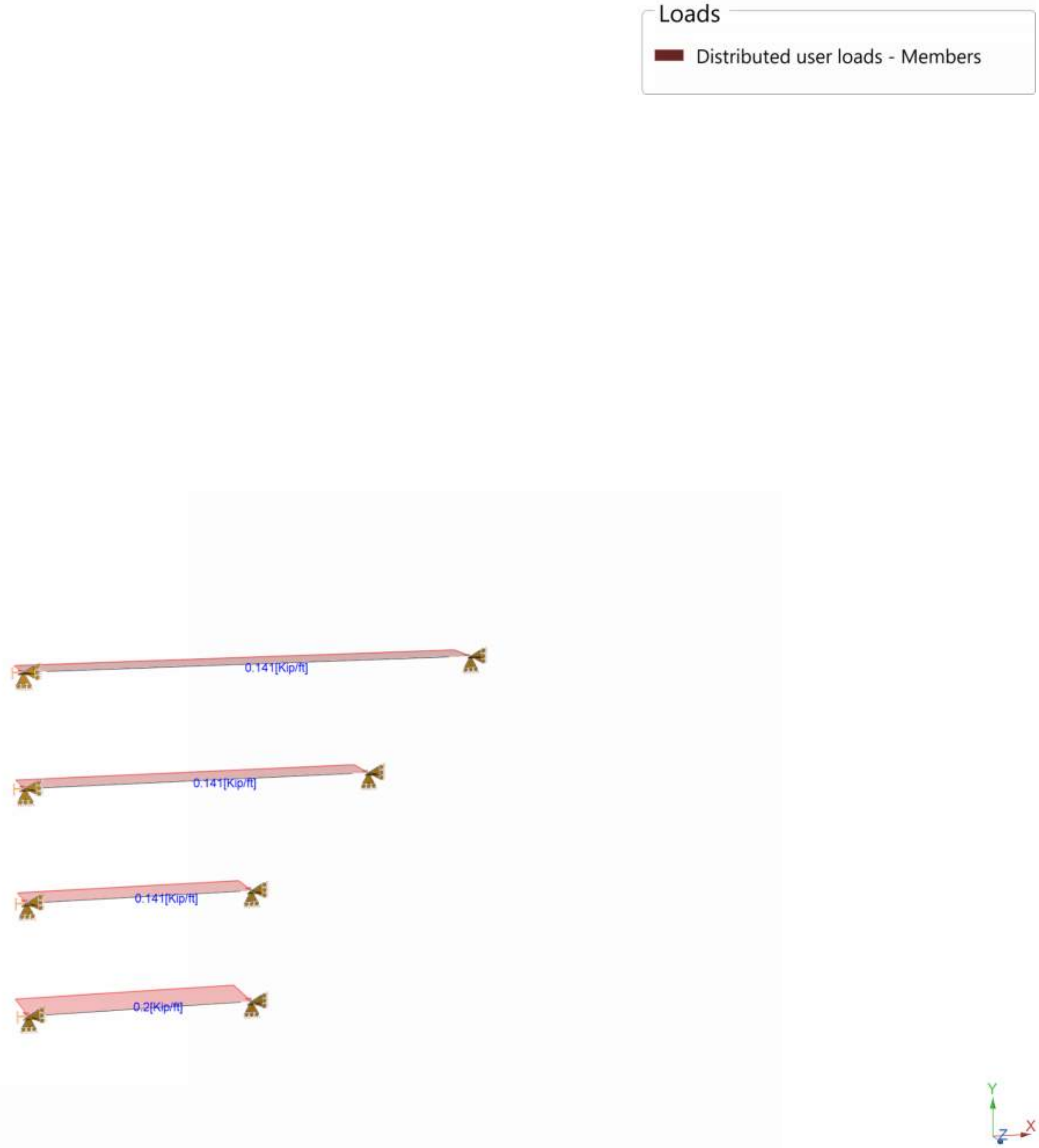
Load condition: DL=Dead Load



Current Date: 8/22/2024 10:25 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Wind Girts\Wind Girts.retx
Load condition: WL=Wind Load



RAM Elements

Current Date: 8/22/2024 10:26 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Wind Girts\Wind Girts.retx

Steel Code Check
Concise Report

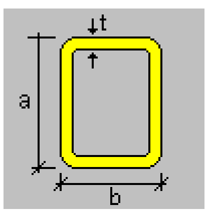
AISC 360-2016 LRFD (Hot-rolled)

Member : 1 - OK

Section information

Section name: HSS_RECT 10X5X3_8 **(US)**

Dimensions



a	=	10.000	[in]	Height
b	=	5.000	[in]	Width
T	=	0.349	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	9.670	
Moment of Inertia (local axes) (I)	[in4]	120.000	40.600
Moment of Inertia (principal axes) (I')	[in4]	120.000	40.600
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	3.523	2.049
Radius of gyration (principal axes) (r')	[in]	3.523	2.049
Saint-Venant torsion constant. (J)	[in4]	100.000	
Section warping constant. (Cw)	[in6]	51.273	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	24.100	16.200
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	24.100	16.200
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	24.100	16.200
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	24.100	16.200
Plastic section modulus (local axis) (Z)	[in3]	30.400	18.700
Plastic section modulus (principal axis) (Z')	[in3]	30.400	18.700
Polar radius of gyration. (ro)	[in]	4.081	
Area for shear (Aw)	[in2]	2.759	6.249
Torsional constant. (C)	[in3]	31.163	

Material : A500 GrC rectangular

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	62.00
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11153.85

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[ft]	10.00

Distance between member lateral bracing points

Length (Lb) [ft] Top	Bottom
10.00	10.00

Laterally unbraced length

Length [ft] Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Effective length factor Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
10.00	10.00	10.00	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	:	0.00			
Capacity	:	435.15 [Kip]	Reference	:	Cl.D2
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕP_n):	[Kip]	435.15	Cl.D2

Axial Compression Design ✔

Compression in the major axis 33

Ratio	:	0.00			
Capacity	:	399.75 [Kip]	Reference	:	Cl.E3
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n33}):	[Kip]	399.75	Cl.E3

Compression in the minor axis 22

Ratio	:	0.00			
Capacity	:	338.63 [Kip]	Reference	:	Cl.E3
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n22}):	[Kip]	338.63	Cl.E3

Flexural Design ✔

Bending about major axis, M33

Ratio	:	0.03			
Capacity	:	114.00 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	3.90 [Kip*ft]	Ctrl Eq.	:	D1 at 50.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength(ϕM_n):	[Kip*ft]	114.00	Cl.F7.1

Bending about minor axis, M22

Ratio	:	0.03			
Capacity	:	70.13 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	-1.76 [Kip*ft]	Ctrl Eq.	:	D9 at 50.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength about a geometric axis(ϕM_n):	[Kip*ft]	70.13	Cl.F7.1

Shear Design ✔

Shear in major axis 33

Ratio	:	0.01			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	0.71 [Kip]	Ctrl Eq.	:	D9 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	74.50	Cl.G1

Shear in minor axis 22

Ratio	:	0.01			
Capacity	:	168.73 [Kip]	Reference	:	Cl.G1
Demand	:	1.56 [Kip]	Ctrl Eq.	:	D1 at 100.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕVn):	[Kip]	168.73	Cl.G1

Torsion Design ✔

Torsion

Ratio	:	0.00			
Capacity	:	70.12 [Kip*ft]	Reference	:	Cl.H3.1
Demand	:	0.00 [Kip*ft]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored torsion capacity(ϕTn):	[Kip*ft]	70.12	Cl.H3.1

Combined Actions Design ✔

Combined flexure and axial

Ratio	:	0.05			
Ctrl Eq.	:	D9 at 50.00%	Reference	:	Eq.H1-1b

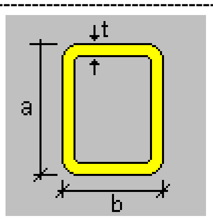
Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.05	Eq.H1-1b

Member : 2 - OK

Section information

Section name: HSS_RECT 10X5X3_8 **(US)**

Dimensions



a	=	10.000	[in]	Height
b	=	5.000	[in]	Width
T	=	0.349	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	9.670	
Moment of Inertia (local axes) (I)	[in4]	120.000	40.600
Moment of Inertia (principal axes) (I')	[in4]	120.000	40.600
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	3.523	2.049
Radius of gyration (principal axes) (r')	[in]	3.523	2.049
Saint-Venant torsion constant. (J)	[in4]	100.000	
Section warping constant. (Cw)	[in6]	51.273	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	24.100	16.200
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	24.100	16.200
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	24.100	16.200
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	24.100	16.200
Plastic section modulus (local axis) (Z)	[in3]	30.400	18.700
Plastic section modulus (principal axis) (Z')	[in3]	30.400	18.700
Polar radius of gyration. (ro)	[in]	4.081	
Area for shear (Aw)	[in2]	2.759	6.249
Torsional constant. (C)	[in3]	31.163	

Material : A500 GrC rectangular

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	62.00
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11153.85

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[ft]	15.33

Distance between member lateral bracing points

Length (Lb) [ft]	
Top	Bottom
15.33	15.33

Laterally unbraced length

Length [ft]			Effective length factor		
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
15.33	15.33	15.33	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	: 0.00		
Capacity	: 435.15 [Kip]	Reference	: Cl.D2
Demand	: 0.00 [Kip]	Ctrl Eq.	: D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕPn):	[Kip]	435.15	Cl.D2

Axial Compression Design ✔

Compression in the major axis 33

Ratio	: 0.00		
Capacity	: 356.46 [Kip]	Reference	: Cl.E3
Demand	: 0.00 [Kip]	Ctrl Eq.	: D1 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕPn33):	[Kip]	356.46	Cl.E3

Compression in the minor axis 22

Ratio	: 0.00		
Capacity	: 241.32 [Kip]	Reference	: Cl.E3
Demand	: 0.00 [Kip]	Ctrl Eq.	: D1 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕPn22):	[Kip]	241.32	Cl.E3

Flexural Design ✔

Bending about major axis, M33

Ratio	: 0.08		
Capacity	: 114.00 [Kip*ft]	Reference	: Cl.F7.1
Demand	: 9.16 [Kip*ft]	Ctrl Eq.	: D1 at 50.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength(ϕMn):	[Kip*ft]	114.00	Cl.F7.1
Factored lateral-torsional buckling strength(ϕMn):	[Kip*ft]	114.00	Cl.F7.4

Bending about minor axis, M22

Ratio	: 0.06		
Capacity	: 70.13 [Kip*ft]	Reference	: Cl.F7.1
Demand	: -4.15 [Kip*ft]	Ctrl Eq.	: D9 at 50.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength about a geometric axis(ϕM_n):	[Kip*ft]	70.13	Cl.F7.1

Shear Design ✔

Shear in major axis 33

Ratio	:	0.01			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	1.08 [Kip]	Ctrl Eq.	:	D9 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	74.50	Cl.G1

Shear in minor axis 22

Ratio	:	0.01			
Capacity	:	168.73 [Kip]	Reference	:	Cl.G1
Demand	:	2.39 [Kip]	Ctrl Eq.	:	D1 at 100.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	168.73	Cl.G1

Torsion Design ✔

Torsion

Ratio	:	0.00			
Capacity	:	70.12 [Kip*ft]	Reference	:	Cl.H3.1
Demand	:	0.00 [Kip*ft]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored torsion capacity(ϕT_n):	[Kip*ft]	70.12	Cl.H3.1

Combined Actions Design ✔

Combined flexure and axial

Ratio	:	0.13			
Ctrl Eq.	:	D9 at 50.00%	Reference	:	Eq.H1-1b

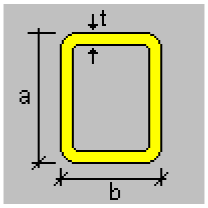
Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.13	Eq.H1-1b

Member : 3 - OK

Section information

Section name: HSS_RECT 12X4X3_8 **(US)**

Dimensions



a	=	12.000	[in]	Height
b	=	4.000	[in]	Width
T	=	0.349	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	10.400	
Moment of Inertia (local axes) (I)	[in4]	168.000	28.900
Moment of Inertia (principal axes) (I')	[in4]	168.000	28.900
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	4.019	1.667
Radius of gyration (principal axes) (r')	[in]	4.019	1.667
Saint-Venant torsion constant. (J)	[in4]	84.100	
Section warping constant. (Cw)	[in6]	109.500	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	28.000	14.500
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	28.000	14.500
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	28.000	14.500
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	28.000	14.500
Plastic section modulus (local axis) (Z)	[in3]	36.700	16.600
Plastic section modulus (principal axis) (Z')	[in3]	36.700	16.600
Polar radius of gyration. (ro)	[in]	4.355	
Area for shear (Aw)	[in2]	2.061	7.645
Torsional constant. (C)	[in3]	29.523	

Material : A500 GrC rectangular

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	62.00
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11153.85

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[ft]	20.00

Distance between member lateral bracing points

Length (Lb) [ft]	
Top	Bottom
20.00	20.00

Laterally unbraced length

	Length [ft]			Effective length factor	
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
20.00	20.00	20.00	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design

Axial tension

Ratio	:	0.00			
Capacity	:	468.00 [Kip]	Reference	:	Cl.D2
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕP_n):	[Kip]	468.00	Cl.D2

Axial Compression Design

Compression in the major axis 33

Ratio	:	0.00			
Capacity	:	360.59 [Kip]	Reference	:	Cl.E3
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n33}):	[Kip]	360.59	Cl.E3

Compression in the minor axis 22

Ratio	:	0.00			
Capacity	:	113.35 [Kip]	Reference	:	Cl.E3
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n22}):	[Kip]	113.35	Cl.E3

Flexural Design ✔

Bending about major axis, M33

Ratio	: 0.11		
Capacity	: 137.63 [Kip*ft]	Reference	: Cl.F7.1
Demand	: 15.76 [Kip*ft]	Ctrl Eq.	: D1 at 50.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength(ϕM_n):	[Kip*ft]	137.63	Cl.F7.1
Factored lateral-torsional buckling strength(ϕM_n):	[Kip*ft]	137.63	Cl.F7.4

Bending about minor axis, M22

Ratio	: 0.12		
Capacity	: 57.11 [Kip*ft]	Reference	: Cl.F7.2
Demand	: -7.06 [Kip*ft]	Ctrl Eq.	: D9 at 50.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength about a geometric axis(ϕM_n):	[Kip*ft]	62.25	Cl.F7.1
Factored web local buckling strength about a geometric axis(ϕM_n):	[Kip*ft]	57.11	Cl.F7.2

Shear Design ✔

Shear in major axis 33

Ratio	: 0.03		
Capacity	: 55.65 [Kip]	Reference	: Cl.G1
Demand	: 1.41 [Kip]	Ctrl Eq.	: D9 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	55.65	Cl.G1

Shear in minor axis 22

Ratio	: 0.02		
Capacity	: 206.42 [Kip]	Reference	: Cl.G1
Demand	: 3.15 [Kip]	Ctrl Eq.	: D1 at 100.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	206.42	Cl.G1

Torsion Design

Torsion

Ratio	:	0.00			
Capacity	:	66.43 [Kip*ft]	Reference	:	Cl.H3.1
Demand	:	0.00 [Kip*ft]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored torsion capacity(ϕTn):	[Kip*ft]	66.43	Cl.H3.1

Combined Actions Design

Combined flexure and axial

Ratio	:	0.22			
Ctrl Eq.	:	D9 at 50.00%	Reference	:	Eq.H1-1b

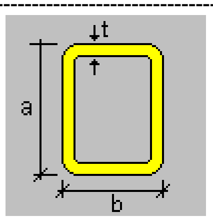
Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.22	Eq.H1-1b

Member : 4 - OK

Section information

Section name: HSS_SQR 5X5X3_8 **(US)**

Dimensions



a	=	5.000	[in]	Height
b	=	5.000	[in]	Width
T	=	0.349	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	6.180	
Moment of Inertia (local axes) (I)	[in4]	21.700	21.700
Moment of Inertia (principal axes) (I')	[in4]	21.700	21.700
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	1.874	1.874
Radius of gyration (principal axes) (r')	[in]	1.874	1.874
Saint-Venant torsion constant. (J)	[in4]	36.100	
Section warping constant. (Cw)	[in6]	0.000	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	8.680	8.680
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	8.680	8.680

Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	8.680	8.680
Plastic section modulus (local axis) (Z)	[in3]	10.600	10.600
Plastic section modulus (principal axis) (Z')	[in3]	10.600	10.600
Polar radius of gyration. (ro)	[in]	2.646	
Area for shear (Aw)	[in2]	2.759	2.759
Torsional constant. (C)	[in3]	14.931	

Material : A500 GrC rectangular

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	62.00
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11153.85

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[ft]	10.00

Distance between member lateral bracing points

Length (Lb) [ft]	
Top	Bottom
10.00	10.00

Laterally unbraced length

	Length [ft]			Effective length factor	
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
10.00	10.00	10.00	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	:	0.00			
Capacity	:	278.10 [Kip]	Reference	:	Cl.D2
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕP_n):	[Kip]	278.10	Cl.D2

Axial Compression Design

Compression in the major axis 33

Ratio	:	0.00			
Capacity	:	206.05 [Kip]	Reference	:	Cl.E3
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n33}):	[Kip]	206.05	Cl.E3

Compression in the minor axis 22

Ratio	:	0.00			
Capacity	:	206.05 [Kip]	Reference	:	Cl.E3
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n22}):	[Kip]	206.05	Cl.E3

Flexural Design

Bending about major axis, M33

Ratio	:	0.10			
Capacity	:	39.75 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	3.87 [Kip*ft]	Ctrl Eq.	:	D1 at 50.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength(ϕM_n):	[Kip*ft]	39.75	Cl.F7.1

Bending about minor axis, M22

Ratio	:	0.06			
Capacity	:	39.75 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	-2.50 [Kip*ft]	Ctrl Eq.	:	D9 at 50.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength about a geometric axis(ϕM_n):	[Kip*ft]	39.75	Cl.F7.1

Shear Design

Shear in major axis 33

Ratio	:	0.01			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	1.00 [Kip]	Ctrl Eq.	:	D9 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	74.50	Cl.G1

Shear in minor axis 22

Ratio	:	0.02			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	1.55 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	74.50	Cl.G1

Torsion Design ✔

Torsion

Ratio	:	0.00			
Capacity	:	33.59 [Kip*ft]	Reference	:	Cl.H3.1
Demand	:	0.00 [Kip*ft]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored torsion capacity(ϕT_n):	[Kip*ft]	33.59	Cl.H3.1

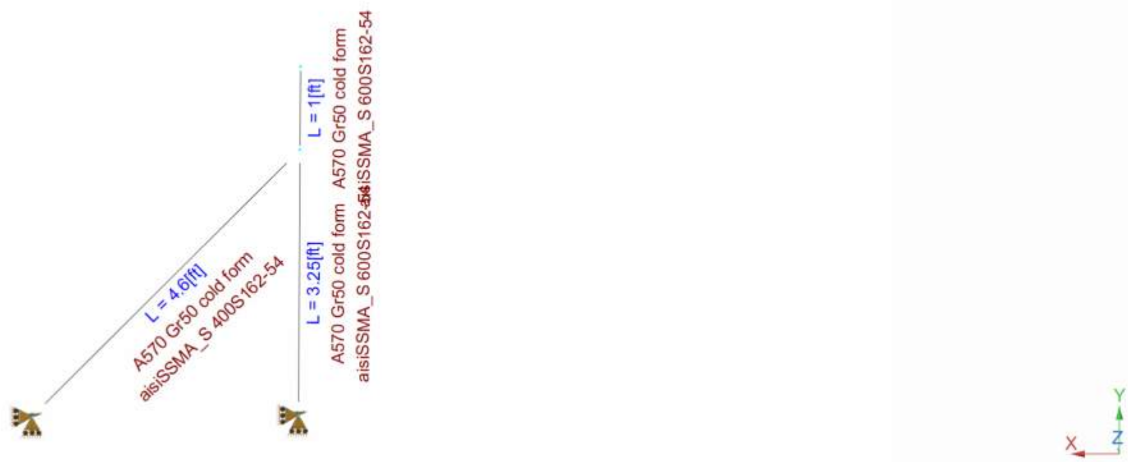
Combined Actions Design ✔

Combined flexure and axial

Ratio	:	0.15			
Ctrl Eq.	:	D9 at 50.00%	Reference	:	Eq.H1-1b

Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.15	Eq.H1-1b

Current Date: 8/22/2024 9:41 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Parapet\Parapet elements model.retx
Load condition: DL=Dead Load



Current Date: 8/22/2024 9:42 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Parapet\Parapet elements model.retx
Load condition: DL=Dead Load

RAM Elements

Current Date: 8/22/2024 9:42 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Parapet\Parapet elements model.retx

Load data

Load Conditions

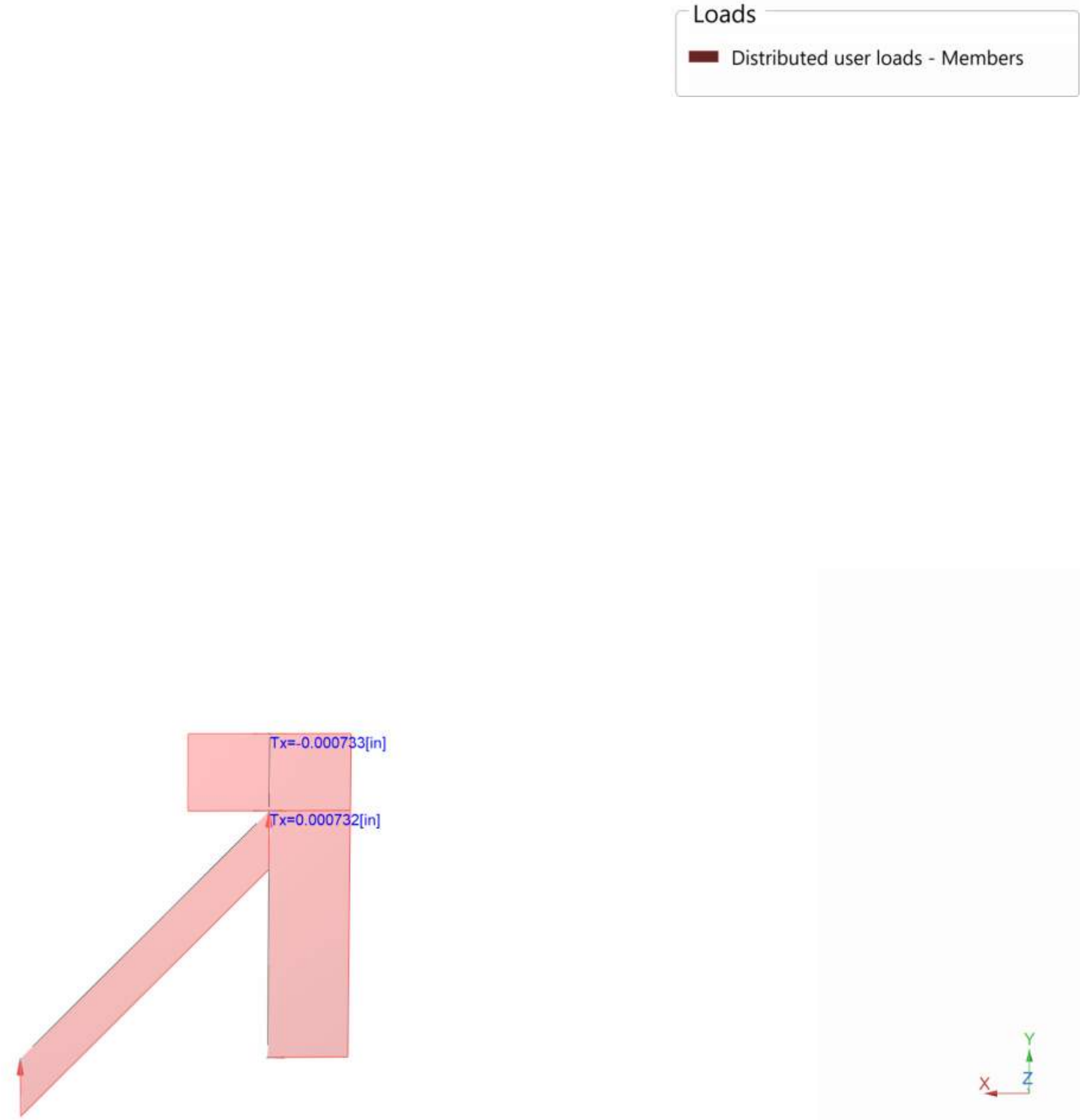
Condition	Description	Comb.	Category
D1	1.4DL	Yes	
D2	1.2DL+1.6LL	Yes	
D3	1.2DL+0.5WposA	Yes	
D4	1.2DL+0.5WnegA	Yes	
D5	1.2DL+0.5WposB	Yes	
D6	1.2DL+0.5WnegB	Yes	
D7	1.2DL+WposA	Yes	
D8	1.2DL+WnegA	Yes	
D9	1.2DL+WposB	Yes	
D10	1.2DL+WnegB	Yes	
D11	1.2DL+WposA+LL	Yes	
D12	1.2DL+WnegA+LL	Yes	
D13	1.2DL+WposB+LL	Yes	
D14	1.2DL+WnegB+LL	Yes	
D15	0.9DL+WposA	Yes	
D16	0.9DL+WnegA	Yes	
D17	0.9DL+WposB	Yes	
D18	0.9DL+WnegB	Yes	

Glossary

Comb : Indicates if load condition is a load combination

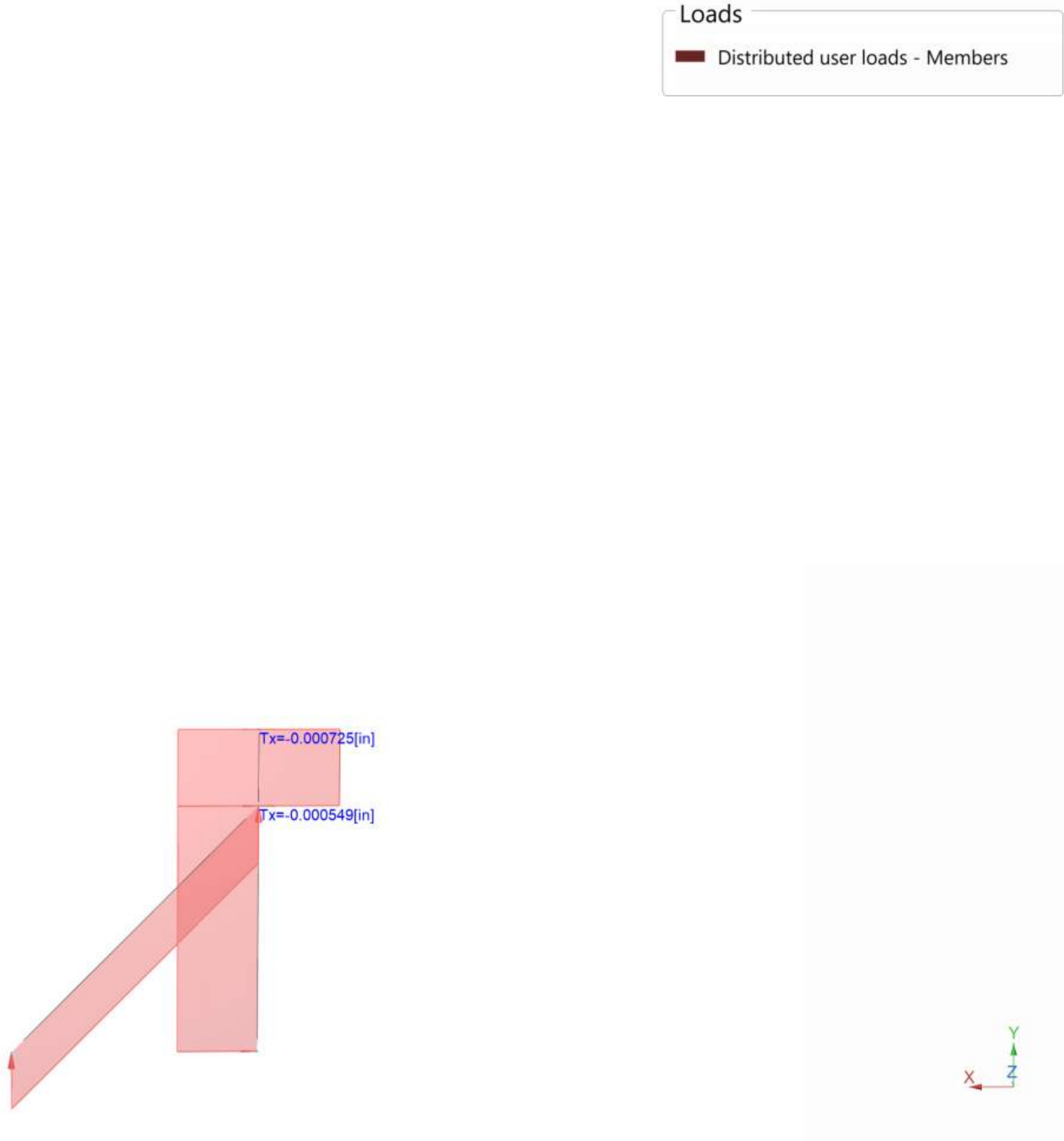
Current Date: 8/22/2024 9:44 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Parapet\Parapet elements model.retx
Load condition: WnegA=WindnA

Current Date: 8/22/2024 9:44 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Parapet\Parapet elements model.retx
Load condition: WposB=WindpB



Current Date: 8/22/2024 9:45 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Parapet\Parapet elements model.retx
Load condition: WnegB=WindnB

Current Date: 8/22/2024 9:43 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Parapet\Parapet elements model.retx
Load condition: WposA=WindpA



RAM Elements

Current Date: 8/22/2024 9:45 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Parapet\Parapet elements model.retx

Steel Code Check
Concise Report

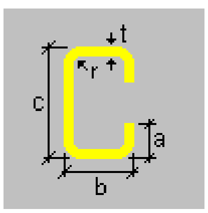
AISI 2016 LRFD (Cold-formed)

Member : 1 - OK

Section information

Section name: aisiSSMA_S 600S162-54 **(US)**

Dimensions



a	=	0.500	[in]	Lip
b	=	1.625	[in]	Flange width
c	=	6.000	[in]	Depth
r	=	0.085	[in]	Inside bend radius
t	=	0.057	[in]	Thickness

Properties	**Unit**	**Major axis**	**Minor axis**
Gross area of the section. (Ag)	[in2]	0.556	
Moment of Inertia (local axes) (I)	[in4]	2.860	0.181
Moment of Inertia (principal axes) (I')	[in4]	2.860	0.181
Bending constant for moments (principal axis) (J')	[in]	0.000	3.380
Radius of gyration (local axes) (r)	[in]	2.268	0.571
Radius of gyration (principal axes) (r')	[in]	2.268	0.571
Saint-Venant torsion constant. (J)	[in4]	5.94E-04	
Section warping constant. (Cw)	[in6]	1.340	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	-1.049	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	0.950	0.148
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	0.950	0.435
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	0.950	0.148
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	0.950	0.435
Plastic section modulus (local axis) (Z)	[in3]	1.137	0.215
Plastic section modulus (principal axis) (Z')	[in3]	1.137	0.215
Polar radius of gyration. (ro)	[in]	2.560	
Area for shear (Aw)	[in2]	0.178	0.390
Torsional constant. (C)	[in3]	0.011	

Material : A570 Gr50 cold form

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	65.30
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11507.94

Design Criteria

Description	Unit	Major axis	Minor axis
Additional hypotheses			
Full lateral restraints		No	
Continuous flexural torsional restraint		No	
Local axis design		No	
Region between inflection points adjacent to support		No	
Span type		Simple	
Fastened to support		Unfastened	
Local shear		No	
Braced for sidesway in major axis		No	
Braced for sidesway in minor axis		No	
Loading condition		EOF	
Flange support condition		Fastened	

Member lateral unbraced lengths

Length (Lb) [ft]		Restraint arrangement		Rotation restraint	
Top	Bottom	Top	Bottom	Top	Bottom
1.00	1.00	FF	FF	None	None

Compression member unbraced lengths

Length (L) [ft]			Effective length factor (ke)		
Major axis	Minor axis		Major axis	Minor axis	
1.00	1.00	1.00	0.00	0.00	1.0

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	:	0.00			
Capacity	:	25.02 [Kip]	Reference	:	Sec. D2
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕP_n):	[Kip]	25.02	Sec. D2
Factored axial tensile fracture capacity(ϕP_n):	[Kip]	27.23	Sec. D3

Shear Design ✔

Shear in major axis 33

Ratio	:	0.00			
Capacity	:	4.33 [Kip]	Reference	:	Sec. G2
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	4.33	Sec. G2

Shear in minor axis 22

Ratio	:	0.03			
Capacity	:	4.22 [Kip]	Reference	:	Sec. G2
Demand	:	-0.11 [Kip]	Ctrl Eq.	:	D8 at 100.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	4.22	Sec. G2

Axial Compression Design ✔

Axial compression

Ratio	:	0.00			
Capacity	:	13.55 [Kip]	Reference	:	Sec. E4
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial compression capacity(ϕP_n):	[Kip]	22.88	Sec. E2
Factored axial compression distortional buckling capacity(ϕP_n):	[Kip]	13.55	Sec. E4
Factored local buckling strength(ϕP_n):	[Kip]	14.49	Sec. E3

Flexural Design ✔

Bending about major axis, M33

Ratio	:	0.02			
Capacity	:	3.30 [Kip*ft]	Reference	:	Sec. F4
Demand	:	-0.06 [Kip*ft]	Ctrl Eq.	:	D8 at 100.00%

Intermediate results	Unit	Value	Reference
Factored section moment capacity(ϕM_n):	[Kip*ft]	3.56	Sec. F2
Factored moment distortional buckling capacity(ϕM_n):	[Kip*ft]	3.30	Sec. F4
Factored local buckling strength(ϕM_n):	[Kip*ft]	3.48	Sec. F3

Bending about the minor axis 22

Ratio	:	0.00			
Capacity	:	0.53 [Kip*ft]	Reference	:	Sec. F3
Demand	:	0.00 [Kip*ft]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored section moment capacity(ϕM_n):	[Kip*ft]	0.56	Sec. F2
Factored local buckling strength(ϕM_n):	[Kip*ft]	0.53	Sec. F3

Web Crippling Design ✔

Web crippling

Ratio	:	0.00			
Capacity	:	0.36 [Kip]	Reference	:	Sec. G5
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored web crippling capacity(ϕP_n):	[Kip]	0.36	Sec. G5

Combined Actions Design ✔

Combined bending and web crippling interaction

Ratio	:	0.01			
Ctrl Eq.	:	D8 at 100.00%	Reference	:	Sec. H3

Intermediate results	Unit	Value	Reference

Combined bending and shear interaction

Ratio	:	0.03			
Ctrl Eq.	:	D8 at 100.00%	Reference	:	Sec. H2

Intermediate results	Unit	Value	Reference
Combined bending and shear interaction (x-x):	--	0.03	Sec. H2
Combined bending and shear interaction(y-y):	--	0.00	

Combined bending and tension interaction

Ratio	:	0.02			
Ctrl Eq.	:	D8 at 100.00%	Reference	:	Eq. H1.1-2

Intermediate results	Unit	Value	Reference
Combined tensile axial and bending (flexure with tension yielding):	--	0.02	Eq. H1.1-1
Combined tensile axial and bending (flexure with buckling):	--	0.02	Eq. H1.1-2

Combined bending and compression interaction

Ratio	:	0.02			
Ctrl Eq.	:	D8 at 100.00%	Reference	:	Eq. H1.2-1

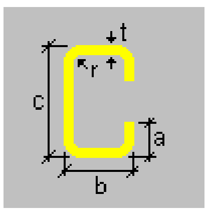
Intermediate results	Unit	Value	Reference
Combined bending and compression interaction:	--	0.02	Eq. H1.2-1

Member : 2 - OK

Section information

Section name: aisiSSMA_S 600S162-54 **(US)**

Dimensions



a	=	0.500	[in]	Lip
b	=	1.625	[in]	Flange width
c	=	6.000	[in]	Depth
r	=	0.085	[in]	Inside bend radius
t	=	0.057	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	0.556	
Moment of Inertia (local axes) (I)	[in4]	2.860	0.181
Moment of Inertia (principal axes) (I')	[in4]	2.860	0.181
Bending constant for moments (principal axis) (J')	[in]	0.000	3.380
Radius of gyration (local axes) (r)	[in]	2.268	0.571
Radius of gyration (principal axes) (r')	[in]	2.268	0.571
Saint-Venant torsion constant. (J)	[in4]	5.94E-04	
Section warping constant. (Cw)	[in6]	1.340	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	-1.049	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	0.950	0.148
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	0.950	0.435
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	0.950	0.148
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	0.950	0.435
Plastic section modulus (local axis) (Z)	[in3]	1.137	0.215
Plastic section modulus (principal axis) (Z')	[in3]	1.137	0.215
Polar radius of gyration. (ro)	[in]	2.560	
Area for shear (Aw)	[in2]	0.178	0.390
Torsional constant. (C)	[in3]	0.011	

Material : A570 Gr50 cold form

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	65.30
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11507.94

Design Criteria

Description	Unit	Major axis	Minor axis
Additional hypotheses			
Full lateral restraints		No	
Continuous flexural torsional restraint		No	
Local axis design		No	
Region between inflection points adjacent to support		No	
Span type		Simple	
Fastened to support		Unfastened	
Local shear		No	
Braced for sidesway in major axis		No	
Braced for sidesway in minor axis		No	
Loading condition		EOF	
Flange support condition		Fastened	

Member lateral unbraced lengths

Length (Lb) [ft]		Restraint arrangement		Rotation restraint	
Top	Bottom	Top	Bottom	Top	Bottom
3.25	3.25	FF	FF	None	None

Compression member unbraced lengths

Length (L) [ft]			Effective length factor (ke)		
Major axis	Minor axis		Major axis	Minor axis	
3.25	3.25	3.25	0.00	0.00	1.0

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	:	0.00			
Capacity	:	25.02 [Kip]	Reference	:	Sec. D2
Demand	:	0.12 [Kip]	Ctrl Eq.	:	D9 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕP_n):	[Kip]	25.02	Sec. D2
Factored axial tensile fracture capacity(ϕP_n):	[Kip]	27.23	Sec. D3

Shear Design ✔

Shear in major axis 33

Ratio	:	0.00			
Capacity	:	4.33 [Kip]	Reference	:	Sec. G2
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	4.33	Sec. G2

Shear in minor axis 22

Ratio	:	0.02			
Capacity	:	4.22 [Kip]	Reference	:	Sec. G2
Demand	:	-0.09 [Kip]	Ctrl Eq.	:	D10 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	4.22	Sec. G2

Axial Compression Design ✔

Axial compression

Ratio	:	0.03			
Capacity	:	11.62 [Kip]	Reference	:	Sec. E3
Demand	:	0.33 [Kip]	Ctrl Eq.	:	D8 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial compression capacity(ϕP_n):	[Kip]	16.79	Sec. E2
Factored axial compression distortional buckling capacity(ϕP_n):	[Kip]	12.98	Sec. E4
Factored local buckling strength(ϕP_n):	[Kip]	11.62	Sec. E3

Flexural Design ✔

Bending about major axis, M33

Ratio	:	0.03			
Capacity	:	3.18 [Kip*ft]	Reference	:	Sec. F4
Demand	:	-0.08 [Kip*ft]	Ctrl Eq.	:	D10 at 62.50%

Intermediate results	Unit	Value	Reference
Factored section moment capacity(ϕM_n):	[Kip*ft]	3.56	Sec. F2
Factored lateral-torsional buckling strength(ϕM_n):	[Kip*ft]	3.46	Sec. F2
Factored moment distortional buckling capacity(ϕM_n):	[Kip*ft]	3.18	Sec. F4
Factored local buckling strength(ϕM_n):	[Kip*ft]	3.39	Sec. F3

Bending about the minor axis 22

Ratio	:	0.00			
Capacity	:	0.53 [Kip*ft]	Reference	:	Sec. F3
Demand	:	0.00 [Kip*ft]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored section moment capacity(ϕM_n):	[Kip*ft]	0.56	Sec. F2
Factored local buckling strength(ϕM_n):	[Kip*ft]	0.53	Sec. F3

Web Crippling Design ✔

Web crippling

Ratio	:	0.24			
Capacity	:	0.36 [Kip]	Reference	:	Sec. G5
Demand	:	-0.09 [Kip]	Ctrl Eq.	:	D10 at 0.00%

Intermediate results	Unit	Value	Reference
Factored web crippling capacity(ϕP_n):	[Kip]	0.36	Sec. G5

Combined Actions Design ✔

Combined bending and web crippling interaction

Ratio	:	0.12			
Ctrl Eq.	:	D10 at 0.00%	Reference	:	Sec. H3

Intermediate results	Unit	Value	Reference

Combined bending and shear interaction

Ratio	:	0.02			
Ctrl Eq.	:	D10 at 62.50%	Reference	:	Sec. H2

Intermediate results	Unit	Value	Reference
Combined bending and shear interaction (x-x):	--	0.02	Sec. H2
Combined bending and shear interaction(y-y):	--	0.00	

Combined bending and tension interaction

Ratio	:	0.03			
Ctrl Eq.	:	D10 at 62.50%	Reference	:	Eq. H1.1-2

Intermediate results	Unit	Value	Reference
Combined tensile axial and bending (flexure with tension yielding):	--	0.02	Eq. H1.1-1
Combined tensile axial and bending (flexure with buckling):	--	0.03	Eq. H1.1-2

Combined bending and compression interaction

Ratio	:	0.05			
Ctrl Eq.	:	D8 at 56.25%	Reference	:	Eq. H1.2-1

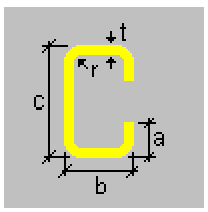
Intermediate results	Unit	Value	Reference
Combined bending and compression interaction:	--	0.05	Eq. H1.2-1

Member : 3 - OK

Section information

Section name: aisiSSMA_S 400S162-54 **(US)**

Dimensions



a	=	0.500	[in]	Lip
b	=	1.625	[in]	Flange width
c	=	4.000	[in]	Depth
r	=	0.085	[in]	Inside bend radius
t	=	0.057	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	0.443	
Moment of Inertia (local axes) (I)	[in4]	1.100	0.159
Moment of Inertia (principal axes) (I')	[in4]	1.100	0.159
Bending constant for moments (principal axis) (J')	[in]	0.000	2.250
Radius of gyration (local axes) (r)	[in]	1.576	0.599
Radius of gyration (principal axes) (r')	[in]	1.576	0.599
Saint-Venant torsion constant. (J)	[in4]	4.73E-04	
Section warping constant. (Cw)	[in6]	0.560	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	-1.238	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	0.547	0.142
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	0.547	0.310
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	0.547	0.142
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	0.547	0.310
Plastic section modulus (local axis) (Z)	[in3]	0.639	0.213
Plastic section modulus (principal axis) (Z')	[in3]	0.639	0.213
Polar radius of gyration. (ro)	[in]	2.090	
Area for shear (Aw)	[in2]	0.178	0.277
Torsional constant. (C)	[in3]	0.009	

Material : A570 Gr50 cold form

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	65.30
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11507.94

Design Criteria

Description	Unit	Major axis	Minor axis
Additional hypotheses			
Full lateral restraints		No	
Continuous flexural torsional restraint		No	
Local axis design		No	
Region between inflection points adjacent to support		No	
Span type		Simple	
Fastened to support		Unfastened	
Local shear		No	
Braced for sidesway in major axis		No	
Braced for sidesway in minor axis		No	
Loading condition		EOF	
Flange support condition		Fastened	

Member lateral unbraced lengths

Length (Lb) [ft]		Restraint arrangement		Rotation restraint	
Top	Bottom	Top	Bottom	Top	Bottom
4.60	4.60	FF	FF	None	None

Compression member unbraced lengths

Length (L) [ft]			Effective length factor (ke)		
Major axis	Minor axis		Major axis	Minor axis	
4.60	4.60	4.60	0.00	0.00	1.0

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	:	0.02			
Capacity	:	19.94 [Kip]	Reference	:	Sec. D2
Demand	:	0.36 [Kip]	Ctrl Eq.	:	D8 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕP_n):	[Kip]	19.94	Sec. D2
Factored axial tensile fracture capacity(ϕP_n):	[Kip]	21.70	Sec. D3

Shear Design ✔

Shear in major axis 33

Ratio	:	0.00			
Capacity	:	4.33 [Kip]	Reference	:	Sec. G2
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	4.33	Sec. G2

Shear in minor axis 22

Ratio	:	0.02			
Capacity	:	5.08 [Kip]	Reference	:	Sec. G2
Demand	:	0.11 [Kip]	Ctrl Eq.	:	D8 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	5.08	Sec. G2

Axial Compression Design ✔

Axial compression

Ratio	:	0.01			
Capacity	:	8.11 [Kip]	Reference	:	Sec. E3
Demand	:	0.12 [Kip]	Ctrl Eq.	:	D9 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial compression capacity(ϕP_n):	[Kip]	9.07	Sec. E2
Factored axial compression distortional buckling capacity(ϕP_n):	[Kip]	14.11	Sec. E4
Factored local buckling strength(ϕP_n):	[Kip]	8.11	Sec. E3

Flexural Design ✔

Bending about major axis, M33

Ratio	:	0.05			
Capacity	:	1.88 [Kip*ft]	Reference	:	Sec. F3
Demand	:	-0.09 [Kip*ft]	Ctrl Eq.	:	D8 at 0.00%

Intermediate results	Unit	Value	Reference
Factored section moment capacity(ϕM_n):	[Kip*ft]	2.05	Sec. F2
Factored lateral-torsional buckling strength(ϕM_n):	[Kip*ft]	1.90	Sec. F2
Factored moment distortional buckling capacity(ϕM_n):	[Kip*ft]	1.96	Sec. F4
Factored local buckling strength(ϕM_n):	[Kip*ft]	1.88	Sec. F3

Bending about the minor axis 22

Ratio	:	0.00			
Capacity	:	0.52 [Kip*ft]	Reference	:	Sec. F3
Demand	:	0.00 [Kip*ft]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored section moment capacity(ϕM_n):	[Kip*ft]	0.53	Sec. F2
Factored local buckling strength(ϕM_n):	[Kip*ft]	0.52	Sec. F3

Web Crippling Design ✔

Web crippling

Ratio	:	0.20			
Capacity	:	0.38 [Kip]	Reference	:	Sec. G5
Demand	:	0.08 [Kip]	Ctrl Eq.	:	D10 at 100.00%

Intermediate results	Unit	Value	Reference
Factored web crippling capacity(ϕP_n):	[Kip]	0.38	Sec. G5

Combined Actions Design ✔

Combined bending and web crippling interaction

Ratio	:	0.11			
Ctrl Eq.	:	D10 at 100.00%	Reference	:	Sec. H3

Intermediate results	Unit	Value	Reference

Combined bending and shear interaction

Ratio	:	0.05			
Ctrl Eq.	:	D8 at 0.00%	Reference	:	Sec. H2

Intermediate results	Unit	Value	Reference
Combined bending and shear interaction (x-x):	--	0.05	Sec. H2
Combined bending and shear interaction(y-y):	--	0.00	

Combined bending and tension interaction

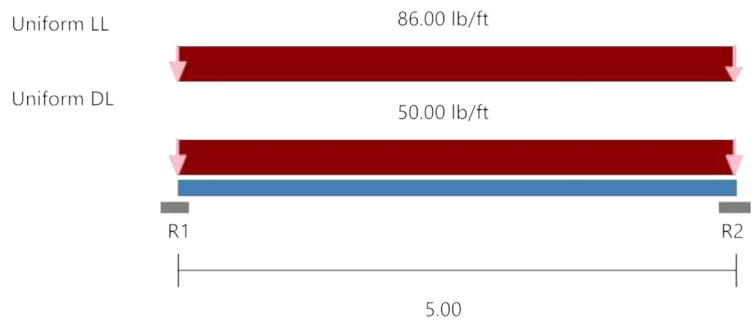
Ratio	:	0.06			
Ctrl Eq.	:	D8 at 0.00%	Reference	:	Eq. H1.1-1

Intermediate results	Unit	Value	Reference
Combined tensile axial and bending (flexure with tension yielding):	--	0.06	Eq. H1.1-1
Combined tensile axial and bending (flexure with buckling):	--	0.03	

Combined bending and compression interaction

Ratio	:	0.05			
Ctrl Eq.	:	D8 at 0.00%	Reference	:	Eq. H1.2-1

Intermediate results	Unit	Value	Reference
Combined bending and compression interaction:	--	0.05	Eq. H1.2-1



Section :	800S200-54 (50 ksi) @ 12 in" o.c. Single C Stud (punched)		
Maxo =	3738.9 ft-lb	**Va =** 2091.3 lb	**I =** 6.573 in^4

Deflection Limits: Total Load - 240 Live Load - 360

Load Comb:
1. DL + LL All spans
2. DL + LL Even spans
3. DL + LL Odd spans
4. LL All spans
5. LL Even spans
6. LL Odd spans

Joist Flexural and Deflection

	Mmax (ft-lb)	K-phi (lb-in/in)	Lm (in)	Ma-dist (ft-lb)	Mmax/ Ma min	Load Comb.	TL Defl	Load Comb.	LL Defl	Load Comb.
Span	425	0.0	60.0	3114.2	0.136	1	L/6083	1	L/9619	4

Joist Bending and Web Crippling

Support	Load (lb)	Load Comb.	Bearing (in)	Pa (lb)	Pn (lb)	Max Intr.	Load Comb.	Stiffeners Required
R1	340.0		--Shear Connection w / clip--					NO
R2	340.0		--Shear Connection w/ clip--					NO

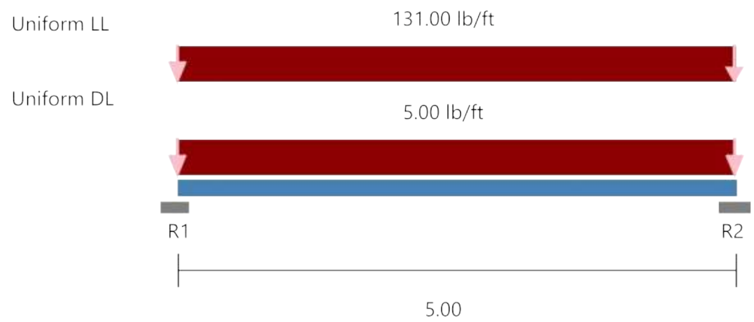
Joist Bending and Shear

Support	Vmax (lb)	Load Comb.	Va Factor	V/Va	M/Ma	Intr. Unstiffened	Load Comb.	Intr. Stiffened	Load Comb.
R1	340.0	1	1.000	0.16	0.00	0.16	1	N/A	N/A
R2	340.0	1	1.000	0.16	0.00	0.16	1	N/A	N/A

Joist Reaction and Connections

Support	Rx(lb)	Ry(lb)	Simpson Strong-Tie Connector	Connector Interaction	Anchor Interaction
R1	0.0	340.0	SSC2.25 Min (3#10) & (2) #10 to Carrying (16/50) (Side Attached)	98.55 %	98.55 %
R2	0.0	340.0	SSC2.25 Min (3#10) & (2) #10 to Carrying (16/50) (Side Attached)	98.55 %	98.55 %

* Reference catalog for connector and anchor requirement notes as well as screw placement requirements



Section : 800S200-54 (50 ksi) @ 12 in" o.c. Single C Stud (punched)	
Maxo = 3738.9 ft-lb	**Va =** 2091.3 lb **I =** 6.573 in^4

Deflection Limits: Total Load - 240 Live Load - 360

Load Comb:
1. DL + LL All spans
2. DL + LL Even spans
3. DL + LL Odd spans
4. LL All spans
5. LL Even spans
6. LL Odd spans

Joist Flexural and Deflection

	Mmax (ft-lb)	K-phi (lb-in/in)	Lm (in)	Ma-dist (ft-lb)	Mmax/ Ma min	Load Comb.	TL Defl	Load Comb.	LL Defl	Load Comb.
Span	425	0.0	60.0	3114.2	0.136	1	L/6083	1	L/6315	4

Joist Bending and Web Crippling

Support	Load (lb)	Load Comb.	Bearing (in)	Pa (lb)	Pn (lb)	Max Intr.	Load Comb.	Stiffeners Required
R1	340.0		--Shear Connection w / clip--					NO
R2	340.0		--Shear Connection w/ clip--					NO

Joist Bending and Shear

Support	Vmax (lb)	Load Comb.	Va Factor	V/Va	M/Ma	Intr. Unstiffened	Load Comb.	Intr. Stiffened	Load Comb.
R1	340.0	1	1.000	0.16	0.00	0.16	1	N/A	N/A
R2	340.0	1	1.000	0.16	0.00	0.16	1	N/A	N/A

Joist Reaction and Connections

Support	Rx(lb)	Ry(lb)	Simpson Strong-Tie Connector	Connector Interaction	Anchor Interaction
R1	0.0	340.0	SSC2.25 Min (3#10) & (2) #10 to Carrying (16/50) (Side Attached)	98.55 %	98.55 %
R2	0.0	340.0	SSC2.25 Min (3#10) & (2) #10 to Carrying (16/50) (Side Attached)	98.55 %	98.55 %

* Reference catalog for connector and anchor requirement notes as well as screw placement requirements

Foundation Design Criteria

REINFORCEMENT PROPERTIES TABLE: ramastm

CODE

ACI318-19
Check ACI 318-19 Sec 13.3.3.3.b (Center Strip Reinforcement)

FORCES

Forces in Gravity Members are Material Specific.
Forces on Gravity Steel members and Gravity 'Other' columns are from RAM Steel.
Forces on Gravity Concrete members and Gravity 'Other' walls are from RAM Concrete.

DESIGN METHOD

Footings designed based on soil capacity.
Design Pile Caps Based on Pile Load.

DESIGN OPTIONS

Include Moment Due to Shear in Column for Spread Footings............................. False
Include Moment Due to Shear in Column for Continuous Footings.......................False
Include Moment Due to Shear in Column for Pile Caps..False
Include Spread Footing Self-Weight When Checking Soil Stress..........................True
Keep Spread Footing Square During Optimization..True
Increase Spread Footing Size to Prevent Uplift in Concrete Load Combinations.. False
Max Width to Depth Ratio for Design of Continuous Footing as Beam................Not Defined

REINFORCEMENT

Clear Bar Spacing-Shear (in)	Max:	CODE	Min:	CODE		
Clear Bar Spacing-Flexure (in)	Max:	CODE	Min:	CODE		
Reinforcement Ratio	Max:	CODE	Min:	CODE		
Clear Bar Cover (in)	Top:	CODE	Bottom:	CODE	Side:	CODE

Bar Sizes Considered - Shear: #3: #4: #5: #6: #7: #8: #9: #10: #11: #14: #18
Bar Sizes Considered - Flexure: #3: #4: #5: #6: #7: #8: #9: #10: #11: #14: #18

REINFORCEMENT SELECTION

Min. number of bars in footing.. 3
Keep all bars in spread footing layer the same... True
Adjacent bars in continuous footing may differ in size by............................ 0
Segment Spacing Increment (in)...12.00
Shear Bar Spacing Increment (in)..2.00
Selection Method.. Min reinf area
For Square Spread Footings Keep Same Quantity and Size Bars for Layer... True

OPTIMIZATION CRITERIA - SPREAD/CONTINUOUS

Foundation Design Criteria

Min. Dimensions Edge of Base Plate to Edge of Footing (in)........................	12.00
Min. Plan Dimensions (in)..	18.00
Pan Dimension Increment (in)..	3.00
Min. Thickness (in)...	12.00
Thickness Increment (in)..	1.00
Uplift Safety Factor Minimum Ratio..	1.00

OPTIMIZATION CRITERIA - PILE/PILE CAP

Edge to Center of Pile Spacing is Maximum of:	
Multiple of Pile Dimension..	0.00
Edge to Center Distance (in)..	21.00
Clear from Face of Pile (in)..	9.00
Center to Center Spacing of Piles is Maximum of:	
Multiple of Pile Dimension..	3.00
Center to Center Distance (in)..	36.00
Clear from Face of Pile (in)..	24.00
Min. Thickness (in)..	24.00
Thickness Increment (in)..	6.00

PILE DEFINITIONS

			Capacity	
Label	**Diameter (in)**	**Compression (kip)**	**Tension (kip)**	**Shear (kip)**

PILE CONFIGURATION

	Rows Parallel to	
Label	**Major**	**Minor**
3 Pile Group	3	0
5 Pile Group	5	0
7 Pile Group	7	0
8 Pile Group	8	0
2 Pile Group	2	1
5 Pile Group Sqr. Cap	5	0

SOIL DEFINITIONS

Fixed Capacities (ksf) : 2.00 ; 2.25 ; 2.50

REINFORCEMENT PROPERTIES TABLE: ramastm

CODE

ACI318-19

Check ACI 318-19 Sec 13.3.3.3.b (Center Strip Reinforcement)

FORCES

Forces in Gravity Members are Material Specific.

Forces on Gravity Steel members and Gravity 'Other' columns are from RAM Steel.

Forces on Gravity Concrete members and Gravity 'Other' walls are from RAM Concrete.

DESIGN METHOD

Footings designed based on soil capacity.

Design Pile Caps Based on Pile Load.

DESIGN OPTIONS

Include Moment Due to Shear in Column for Spread Footings............................. False
Include Moment Due to Shear in Column for Continuous Footings.......................False
Include Moment Due to Shear in Column for Pile Caps.......................................False
Include Spread Footing Self-Weight When Checking Soil Stress..........................True
Keep Spread Footing Square During Optimization...True
Increase Spread Footing Size to Prevent Uplift in Concrete Load Combinations.. False
Max Width to Depth Ratio for Design of Continuous Footing as Beam................Not Defined

REINFORCEMENT

Clear Bar Spacing-Shear (in)	Max:	CODE	Min:	CODE		
Clear Bar Spacing-Flexure (in)	Max:	CODE	Min:	CODE		
Reinforcement Ratio	Max:	CODE	Min:	CODE		
Clear Bar Cover (in)	Top:	CODE	Bottom:	CODE	Side:	CODE

Bar Sizes Considered - Shear: #3: #4: #5: #6: #7: #8: #9: #10: #11: #14: #18

Bar Sizes Considered - Flexure: #3: #4: #5: #6: #7: #8: #9: #10: #11: #14: #18

REINFORCEMENT SELECTION

Min. number of bars in footing.. 3
Keep all bars in spread footing layer the same.. True
Adjacent bars in continuous footing may differ in size by............................ 0
Segment Spacing Increment (in)...12.00
Shear Bar Spacing Increment (in)..2.00
Selection Method.. Min reinf area
For Square Spread Footings Keep Same Quantity and Size Bars for Layer...True

OPTIMIZATION CRITERIA - SPREAD/CONTINUOUS

Min. Dimensions Edge of Base Plate to Edge of Footing (in)	12.00
Min. Plan Dimensions (in)	18.00
Pan Dimension Increment (in)	3.00
Min. Thickness (in)	12.00
Thickness Increment (in)	1.00
Uplift Safety Factor Minimum Ratio	1.00

OPTIMIZATION CRITERIA - PILE/PILE CAP

Edge to Center of Pile Spacing is Maximum of:	
Multiple of Pile Dimension	0.00
Edge to Center Distance (in)	21.00
Clear from Face of Pile (in)	9.00
Center to Center Spacing of Piles is Maximum of:	
Multiple of Pile Dimension	3.00
Center to Center Distance (in)	36.00
Clear from Face of Pile (in)	24.00
Min. Thickness (in)	24.00
Thickness Increment (in)	6.00

PILE DEFINITIONS

Label	Diameter (in)	Compression (kip)	Capacity Tension (kip)	Shear (kip)

PILE CONFIGURATION

Label	Rows Parallel to Major	Minor
3 Pile Group	3	0
5 Pile Group	5	0
7 Pile Group	7	0
8 Pile Group	8	0
2 Pile Group	2	1
5 Pile Group Sqr. Cap	5	0

SOIL DEFINITIONS

Fixed Capacities (ksf) : 2.00 ; 2.25 ; 2.50

Load Combinations

LOAD CASE DEFINITIONS:

D	Dead Load	RAMUSER
Lp	Live Load	RAMUSER
Sp	Live Load Roof	RAMUSER
W1	MWFRS	Wind_ASCE716_1_X
W2	MWFRS	Wind_ASCE716_1_Y
W3	MWFRS	Wind_ASCE716_2_X+E
W4	MWFRS	Wind_ASCE716_2_X-E
W5	MWFRS	Wind_ASCE716_2_Y+E
W6	MWFRS	Wind_ASCE716_2_Y-E
W7	MWFRS	Wind_ASCE716_3_X+Y
W8	MWFRS	Wind_ASCE716_3_X-Y
W9	MWFRS	Wind_ASCE716_4_X+Y_CW
W10	MWFRS	Wind_ASCE716_4_X+Y_CCW
W11	MWFRS	Wind_ASCE716_4_X-Y_CW
W12	MWFRS	Wind_ASCE716_4_X-Y_CCW
E1	ELF	EQ_ASCE716_X_+E_F
E2	ELF	EQ_ASCE716_X_-E_F
E3	ELF	EQ_ASCE716_Y_+E_F
E4	ELF	EQ_ASCE716_Y_-E_F

CONCRETE COMBINATION CRITERIA:

Combination Code:	ACI 318-19 / ASCE 7-16
Roof Live Load:	Snow
Live Load factor f1 (0.5 or 1.0)	0.500
Sds (for Ev)	1.000
RhoX	1.000
RhoY	1.000

GENERATED CONCRETE LOAD COMBINATIONS:

1	*	1.400 D
2	*	1.200 D + 1.600 Lp + 0.500 Sp
3	*	1.200 D + 1.600 Lp
4	*	1.200 D + 0.500 Lp + 1.600 Sp
5	*	1.200 D + 1.600 Sp
6	*	1.200 D + 1.600 Sp + 0.500 W1
7	*	1.200 D + 1.600 Sp + 0.500 W2
8	*	1.200 D + 1.600 Sp + 0.500 W3
9	*	1.200 D + 1.600 Sp + 0.500 W4
10	*	1.200 D + 1.600 Sp + 0.500 W5

Load Combinations

11	*	1.200 D + 1.600 Sp + 0.500 W6
12	*	1.200 D + 1.600 Sp + 0.500 W7
13	*	1.200 D + 1.600 Sp + 0.500 W8
14	*	1.200 D + 1.600 Sp + 0.500 W9
15	*	1.200 D + 1.600 Sp + 0.500 W10
16	*	1.200 D + 1.600 Sp + 0.500 W11
17	*	1.200 D + 1.600 Sp + 0.500 W12
18	*	1.200 D + 1.600 Sp - 0.500 W1
19	*	1.200 D + 1.600 Sp - 0.500 W2
20	*	1.200 D + 1.600 Sp - 0.500 W3
21	*	1.200 D + 1.600 Sp - 0.500 W4
22	*	1.200 D + 1.600 Sp - 0.500 W5
23	*	1.200 D + 1.600 Sp - 0.500 W6
24	*	1.200 D + 1.600 Sp - 0.500 W7
25	*	1.200 D + 1.600 Sp - 0.500 W8
26	*	1.200 D + 1.600 Sp - 0.500 W9
27	*	1.200 D + 1.600 Sp - 0.500 W10
28	*	1.200 D + 1.600 Sp - 0.500 W11
29	*	1.200 D + 1.600 Sp - 0.500 W12
30	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W1
31	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W2
32	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W3
33	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W4
34	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W5
35	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W6
36	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W7
37	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W8
38	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W9
39	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W10
40	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W11
41	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W12
42	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W1
43	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W2
44	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W3
45	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W4
46	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W5
47	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W6
48	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W7
49	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W8

Load Combinations

50	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W9
51	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W10
52	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W11
53	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W12
54	*	1.200 D + 0.500 Lp + 1.000 W1
55	*	1.200 D + 0.500 Lp + 1.000 W2
56	*	1.200 D + 0.500 Lp + 1.000 W3
57	*	1.200 D + 0.500 Lp + 1.000 W4
58	*	1.200 D + 0.500 Lp + 1.000 W5
59	*	1.200 D + 0.500 Lp + 1.000 W6
60	*	1.200 D + 0.500 Lp + 1.000 W7
61	*	1.200 D + 0.500 Lp + 1.000 W8
62	*	1.200 D + 0.500 Lp + 1.000 W9
63	*	1.200 D + 0.500 Lp + 1.000 W10
64	*	1.200 D + 0.500 Lp + 1.000 W11
65	*	1.200 D + 0.500 Lp + 1.000 W12
66	*	1.200 D + 0.500 Lp - 1.000 W1
67	*	1.200 D + 0.500 Lp - 1.000 W2
68	*	1.200 D + 0.500 Lp - 1.000 W3
69	*	1.200 D + 0.500 Lp - 1.000 W4
70	*	1.200 D + 0.500 Lp - 1.000 W5
71	*	1.200 D + 0.500 Lp - 1.000 W6
72	*	1.200 D + 0.500 Lp - 1.000 W7
73	*	1.200 D + 0.500 Lp - 1.000 W8
74	*	1.200 D + 0.500 Lp - 1.000 W9
75	*	1.200 D + 0.500 Lp - 1.000 W10
76	*	1.200 D + 0.500 Lp - 1.000 W11
77	*	1.200 D + 0.500 Lp - 1.000 W12
78	*	1.200 D + 0.500 Sp + 1.000 W1
79	*	1.200 D + 0.500 Sp + 1.000 W2
80	*	1.200 D + 0.500 Sp + 1.000 W3
81	*	1.200 D + 0.500 Sp + 1.000 W4
82	*	1.200 D + 0.500 Sp + 1.000 W5
83	*	1.200 D + 0.500 Sp + 1.000 W6
84	*	1.200 D + 0.500 Sp + 1.000 W7
85	*	1.200 D + 0.500 Sp + 1.000 W8
86	*	1.200 D + 0.500 Sp + 1.000 W9
87	*	1.200 D + 0.500 Sp + 1.000 W10
88	*	1.200 D + 0.500 Sp + 1.000 W11

89	*	1.200 D + 0.500 Sp + 1.000 W12
90	*	1.200 D + 0.500 Sp - 1.000 W1
91	*	1.200 D + 0.500 Sp - 1.000 W2
92	*	1.200 D + 0.500 Sp - 1.000 W3
93	*	1.200 D + 0.500 Sp - 1.000 W4
94	*	1.200 D + 0.500 Sp - 1.000 W5
95	*	1.200 D + 0.500 Sp - 1.000 W6
96	*	1.200 D + 0.500 Sp - 1.000 W7
97	*	1.200 D + 0.500 Sp - 1.000 W8
98	*	1.200 D + 0.500 Sp - 1.000 W9
99	*	1.200 D + 0.500 Sp - 1.000 W10
100	*	1.200 D + 0.500 Sp - 1.000 W11
101	*	1.200 D + 0.500 Sp - 1.000 W12
102	*	1.200 D + 1.000 W1
103	*	1.200 D + 1.000 W2
104	*	1.200 D + 1.000 W3
105	*	1.200 D + 1.000 W4
106	*	1.200 D + 1.000 W5
107	*	1.200 D + 1.000 W6
108	*	1.200 D + 1.000 W7
109	*	1.200 D + 1.000 W8
110	*	1.200 D + 1.000 W9
111	*	1.200 D + 1.000 W10
112	*	1.200 D + 1.000 W11
113	*	1.200 D + 1.000 W12
114	*	1.200 D - 1.000 W1
115	*	1.200 D - 1.000 W2
116	*	1.200 D - 1.000 W3
117	*	1.200 D - 1.000 W4
118	*	1.200 D - 1.000 W5
119	*	1.200 D - 1.000 W6
120	*	1.200 D - 1.000 W7
121	*	1.200 D - 1.000 W8
122	*	1.200 D - 1.000 W9
123	*	1.200 D - 1.000 W10
124	*	1.200 D - 1.000 W11
125	*	1.200 D - 1.000 W12
126	*	1.400 D + 0.500 Lp + 0.200 Sp + 1.000 E1
127	*	1.400 D + 0.500 Lp + 0.200 Sp + 1.000 E2

128	*	1.400 D + 0.500 Lp + 0.200 Sp + 1.000 E3
129	*	1.400 D + 0.500 Lp + 0.200 Sp + 1.000 E4
130	*	1.400 D + 0.500 Lp + 0.200 Sp - 1.000 E1
131	*	1.400 D + 0.500 Lp + 0.200 Sp - 1.000 E2
132	*	1.400 D + 0.500 Lp + 0.200 Sp - 1.000 E3
133	*	1.400 D + 0.500 Lp + 0.200 Sp - 1.000 E4
134	*	1.400 D + 0.200 Sp + 1.000 E1
135	*	1.400 D + 0.200 Sp + 1.000 E2
136	*	1.400 D + 0.200 Sp + 1.000 E3
137	*	1.400 D + 0.200 Sp + 1.000 E4
138	*	1.400 D + 0.200 Sp - 1.000 E1
139	*	1.400 D + 0.200 Sp - 1.000 E2
140	*	1.400 D + 0.200 Sp - 1.000 E3
141	*	1.400 D + 0.200 Sp - 1.000 E4
142	*	1.400 D + 0.500 Lp + 1.000 E1
143	*	1.400 D + 0.500 Lp + 1.000 E2
144	*	1.400 D + 0.500 Lp + 1.000 E3
145	*	1.400 D + 0.500 Lp + 1.000 E4
146	*	1.400 D + 0.500 Lp - 1.000 E1
147	*	1.400 D + 0.500 Lp - 1.000 E2
148	*	1.400 D + 0.500 Lp - 1.000 E3
149	*	1.400 D + 0.500 Lp - 1.000 E4
150	*	1.400 D + 1.000 E1
151	*	1.400 D + 1.000 E2
152	*	1.400 D + 1.000 E3
153	*	1.400 D + 1.000 E4
154	*	1.400 D - 1.000 E1
155	*	1.400 D - 1.000 E2
156	*	1.400 D - 1.000 E3
157	*	1.400 D - 1.000 E4
158	*	0.900 D + 1.000 W1
159	*	0.900 D + 1.000 W2
160	*	0.900 D + 1.000 W3
161	*	0.900 D + 1.000 W4
162	*	0.900 D + 1.000 W5
163	*	0.900 D + 1.000 W6
164	*	0.900 D + 1.000 W7
165	*	0.900 D + 1.000 W8
166	*	0.900 D + 1.000 W9

167	*	0.900 D + 1.000 W10
168	*	0.900 D + 1.000 W11
169	*	0.900 D + 1.000 W12
170	*	0.900 D - 1.000 W1
171	*	0.900 D - 1.000 W2
172	*	0.900 D - 1.000 W3
173	*	0.900 D - 1.000 W4
174	*	0.900 D - 1.000 W5
175	*	0.900 D - 1.000 W6
176	*	0.900 D - 1.000 W7
177	*	0.900 D - 1.000 W8
178	*	0.900 D - 1.000 W9
179	*	0.900 D - 1.000 W10
180	*	0.900 D - 1.000 W11
181	*	0.900 D - 1.000 W12
182	*	0.700 D + 1.000 E1
183	*	0.700 D + 1.000 E2
184	*	0.700 D + 1.000 E3
185	*	0.700 D + 1.000 E4
186	*	0.700 D - 1.000 E1
187	*	0.700 D - 1.000 E2
188	*	0.700 D - 1.000 E3
189	*	0.700 D - 1.000 E4

SOIL COMBINATION CRITERIA:

Combination Code:	IBC 2021 / ASCE 7-16
Roof Live Load:	Snow
Snow Factor	Use Full Factor (0.75) on Snow in Combinations with Seismic
Sds (for Ev)	1.000
RhoX	1.000
RhoY	1.000

GENERATED SOIL LOAD COMBINATIONS:

190	*	1.000 D
191	*	1.000 D + 1.000 Lp
192	*	1.000 D + 1.000 Sp
193	*	1.000 D + 0.750 Lp + 0.750 Sp
194	*	1.000 D + 0.600 W1
195	*	1.000 D + 0.600 W2
196	*	1.000 D + 0.600 W3

197	*	1.000 D + 0.600 W4
198	*	1.000 D + 0.600 W5
199	*	1.000 D + 0.600 W6
200	*	1.000 D + 0.600 W7
201	*	1.000 D + 0.600 W8
202	*	1.000 D + 0.600 W9
203	*	1.000 D + 0.600 W10
204	*	1.000 D + 0.600 W11
205	*	1.000 D + 0.600 W12
206	*	1.000 D - 0.600 W1
207	*	1.000 D - 0.600 W2
208	*	1.000 D - 0.600 W3
209	*	1.000 D - 0.600 W4
210	*	1.000 D - 0.600 W5
211	*	1.000 D - 0.600 W6
212	*	1.000 D - 0.600 W7
213	*	1.000 D - 0.600 W8
214	*	1.000 D - 0.600 W9
215	*	1.000 D - 0.600 W10
216	*	1.000 D - 0.600 W11
217	*	1.000 D - 0.600 W12
218	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W1
219	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W2
220	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W3
221	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W4
222	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W5
223	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W6
224	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W7
225	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W8
226	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W9
227	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W10
228	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W11
229	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W12
230	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W1
231	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W2
232	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W3
233	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W4
234	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W5
235	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W6

Load Combinations

236	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W7
237	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W8
238	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W9
239	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W10
240	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W11
241	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W12
242	*	1.000 D + 0.750 Lp + 0.450 W1
243	*	1.000 D + 0.750 Lp + 0.450 W2
244	*	1.000 D + 0.750 Lp + 0.450 W3
245	*	1.000 D + 0.750 Lp + 0.450 W4
246	*	1.000 D + 0.750 Lp + 0.450 W5
247	*	1.000 D + 0.750 Lp + 0.450 W6
248	*	1.000 D + 0.750 Lp + 0.450 W7
249	*	1.000 D + 0.750 Lp + 0.450 W8
250	*	1.000 D + 0.750 Lp + 0.450 W9
251	*	1.000 D + 0.750 Lp + 0.450 W10
252	*	1.000 D + 0.750 Lp + 0.450 W11
253	*	1.000 D + 0.750 Lp + 0.450 W12
254	*	1.000 D + 0.750 Lp - 0.450 W1
255	*	1.000 D + 0.750 Lp - 0.450 W2
256	*	1.000 D + 0.750 Lp - 0.450 W3
257	*	1.000 D + 0.750 Lp - 0.450 W4
258	*	1.000 D + 0.750 Lp - 0.450 W5
259	*	1.000 D + 0.750 Lp - 0.450 W6
260	*	1.000 D + 0.750 Lp - 0.450 W7
261	*	1.000 D + 0.750 Lp - 0.450 W8
262	*	1.000 D + 0.750 Lp - 0.450 W9
263	*	1.000 D + 0.750 Lp - 0.450 W10
264	*	1.000 D + 0.750 Lp - 0.450 W11
265	*	1.000 D + 0.750 Lp - 0.450 W12
266	*	1.000 D + 0.750 Sp + 0.450 W1
267	*	1.000 D + 0.750 Sp + 0.450 W2
268	*	1.000 D + 0.750 Sp + 0.450 W3
269	*	1.000 D + 0.750 Sp + 0.450 W4
270	*	1.000 D + 0.750 Sp + 0.450 W5
271	*	1.000 D + 0.750 Sp + 0.450 W6
272	*	1.000 D + 0.750 Sp + 0.450 W7
273	*	1.000 D + 0.750 Sp + 0.450 W8
274	*	1.000 D + 0.750 Sp + 0.450 W9

275	*	1.000 D + 0.750 Sp + 0.450 W10
276	*	1.000 D + 0.750 Sp + 0.450 W11
277	*	1.000 D + 0.750 Sp + 0.450 W12
278	*	1.000 D + 0.750 Sp - 0.450 W1
279	*	1.000 D + 0.750 Sp - 0.450 W2
280	*	1.000 D + 0.750 Sp - 0.450 W3
281	*	1.000 D + 0.750 Sp - 0.450 W4
282	*	1.000 D + 0.750 Sp - 0.450 W5
283	*	1.000 D + 0.750 Sp - 0.450 W6
284	*	1.000 D + 0.750 Sp - 0.450 W7
285	*	1.000 D + 0.750 Sp - 0.450 W8
286	*	1.000 D + 0.750 Sp - 0.450 W9
287	*	1.000 D + 0.750 Sp - 0.450 W10
288	*	1.000 D + 0.750 Sp - 0.450 W11
289	*	1.000 D + 0.750 Sp - 0.450 W12
290	*	0.600 D + 0.600 W1
291	*	0.600 D + 0.600 W2
292	*	0.600 D + 0.600 W3
293	*	0.600 D + 0.600 W4
294	*	0.600 D + 0.600 W5
295	*	0.600 D + 0.600 W6
296	*	0.600 D + 0.600 W7
297	*	0.600 D + 0.600 W8
298	*	0.600 D + 0.600 W9
299	*	0.600 D + 0.600 W10
300	*	0.600 D + 0.600 W11
301	*	0.600 D + 0.600 W12
302	*	0.600 D - 0.600 W1
303	*	0.600 D - 0.600 W2
304	*	0.600 D - 0.600 W3
305	*	0.600 D - 0.600 W4
306	*	0.600 D - 0.600 W5
307	*	0.600 D - 0.600 W6
308	*	0.600 D - 0.600 W7
309	*	0.600 D - 0.600 W8
310	*	0.600 D - 0.600 W9
311	*	0.600 D - 0.600 W10
312	*	0.600 D - 0.600 W11
313	*	0.600 D - 0.600 W12

314	*	1.140 D + 0.700 E1
315	*	1.140 D + 0.700 E2
316	*	1.140 D + 0.700 E3
317	*	1.140 D + 0.700 E4
318	*	1.140 D - 0.700 E1
319	*	1.140 D - 0.700 E2
320	*	1.140 D - 0.700 E3
321	*	1.140 D - 0.700 E4
322	*	1.105 D + 0.750 Lp + 0.750 Sp + 0.525 E1
323	*	1.105 D + 0.750 Lp + 0.750 Sp + 0.525 E2
324	*	1.105 D + 0.750 Lp + 0.750 Sp + 0.525 E3
325	*	1.105 D + 0.750 Lp + 0.750 Sp + 0.525 E4
326	*	1.105 D + 0.750 Lp + 0.750 Sp - 0.525 E1
327	*	1.105 D + 0.750 Lp + 0.750 Sp - 0.525 E2
328	*	1.105 D + 0.750 Lp + 0.750 Sp - 0.525 E3
329	*	1.105 D + 0.750 Lp + 0.750 Sp - 0.525 E4
330	*	1.105 D + 0.750 Lp + 0.525 E1
331	*	1.105 D + 0.750 Lp + 0.525 E2
332	*	1.105 D + 0.750 Lp + 0.525 E3
333	*	1.105 D + 0.750 Lp + 0.525 E4
334	*	1.105 D + 0.750 Lp - 0.525 E1
335	*	1.105 D + 0.750 Lp - 0.525 E2
336	*	1.105 D + 0.750 Lp - 0.525 E3
337	*	1.105 D + 0.750 Lp - 0.525 E4
338	*	1.105 D + 0.750 Sp + 0.525 E1
339	*	1.105 D + 0.750 Sp + 0.525 E2
340	*	1.105 D + 0.750 Sp + 0.525 E3
341	*	1.105 D + 0.750 Sp + 0.525 E4
342	*	1.105 D + 0.750 Sp - 0.525 E1
343	*	1.105 D + 0.750 Sp - 0.525 E2
344	*	1.105 D + 0.750 Sp - 0.525 E3
345	*	1.105 D + 0.750 Sp - 0.525 E4
346	*	0.600 D + 0.700 E1
347	*	0.600 D + 0.700 E2
348	*	0.600 D + 0.700 E3
349	*	0.600 D + 0.700 E4
350	*	0.600 D - 0.700 E1
351	*	0.600 D - 0.700 E2
352	*	0.600 D - 0.700 E3

Load Combinations

353	*	0.600 D - 0.700 E4

* = Load combination currently selected to use

Load Combinations

LOAD CASE DEFINITIONS:

D	Dead Load	RAMUSER
Lp	Live Load	RAMUSER
Sp	Live Load Roof	RAMUSER
W1	MWFRS	Wind_ASCE716_1_X
W2	MWFRS	Wind_ASCE716_1_Y
W3	MWFRS	Wind_ASCE716_2_X+E
W4	MWFRS	Wind_ASCE716_2_X-E
W5	MWFRS	Wind_ASCE716_2_Y+E
W6	MWFRS	Wind_ASCE716_2_Y-E
W7	MWFRS	Wind_ASCE716_3_X+Y
W8	MWFRS	Wind_ASCE716_3_X-Y
W9	MWFRS	Wind_ASCE716_4_X+Y_CW
W10	MWFRS	Wind_ASCE716_4_X+Y_CCW
W11	MWFRS	Wind_ASCE716_4_X-Y_CW
W12	MWFRS	Wind_ASCE716_4_X-Y_CCW
E1	ELF	EQ_ASCE716_X_+E_F
E2	ELF	EQ_ASCE716_X_-E_F
E3	ELF	EQ_ASCE716_Y_+E_F
E4	ELF	EQ_ASCE716_Y_-E_F

CONCRETE COMBINATION CRITERIA:

Combination Code:	ACI 318-19 / ASCE 7-16
Roof Live Load:	Snow
Live Load factor f1 (0.5 or 1.0)	0.500
Sds (for Ev)	1.000
RhoX	1.000
RhoY	1.000

GENERATED CONCRETE LOAD COMBINATIONS:

1	*	1.400 D
2	*	1.200 D + 1.600 Lp + 0.500 Sp
3	*	1.200 D + 1.600 Lp
4	*	1.200 D + 0.500 Lp + 1.600 Sp
5	*	1.200 D + 1.600 Sp
6	*	1.200 D + 1.600 Sp + 0.500 W1
7	*	1.200 D + 1.600 Sp + 0.500 W2
8	*	1.200 D + 1.600 Sp + 0.500 W3
9	*	1.200 D + 1.600 Sp + 0.500 W4
10	*	1.200 D + 1.600 Sp + 0.500 W5

Load Combinations

11	*	1.200 D + 1.600 Sp + 0.500 W6
12	*	1.200 D + 1.600 Sp + 0.500 W7
13	*	1.200 D + 1.600 Sp + 0.500 W8
14	*	1.200 D + 1.600 Sp + 0.500 W9
15	*	1.200 D + 1.600 Sp + 0.500 W10
16	*	1.200 D + 1.600 Sp + 0.500 W11
17	*	1.200 D + 1.600 Sp + 0.500 W12
18	*	1.200 D + 1.600 Sp - 0.500 W1
19	*	1.200 D + 1.600 Sp - 0.500 W2
20	*	1.200 D + 1.600 Sp - 0.500 W3
21	*	1.200 D + 1.600 Sp - 0.500 W4
22	*	1.200 D + 1.600 Sp - 0.500 W5
23	*	1.200 D + 1.600 Sp - 0.500 W6
24	*	1.200 D + 1.600 Sp - 0.500 W7
25	*	1.200 D + 1.600 Sp - 0.500 W8
26	*	1.200 D + 1.600 Sp - 0.500 W9
27	*	1.200 D + 1.600 Sp - 0.500 W10
28	*	1.200 D + 1.600 Sp - 0.500 W11
29	*	1.200 D + 1.600 Sp - 0.500 W12
30	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W1
31	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W2
32	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W3
33	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W4
34	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W5
35	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W6
36	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W7
37	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W8
38	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W9
39	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W10
40	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W11
41	*	1.200 D + 0.500 Lp + 0.500 Sp + 1.000 W12
42	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W1
43	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W2
44	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W3
45	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W4
46	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W5
47	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W6
48	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W7
49	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W8

50	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W9
51	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W10
52	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W11
53	*	1.200 D + 0.500 Lp + 0.500 Sp - 1.000 W12
54	*	1.200 D + 0.500 Lp + 1.000 W1
55	*	1.200 D + 0.500 Lp + 1.000 W2
56	*	1.200 D + 0.500 Lp + 1.000 W3
57	*	1.200 D + 0.500 Lp + 1.000 W4
58	*	1.200 D + 0.500 Lp + 1.000 W5
59	*	1.200 D + 0.500 Lp + 1.000 W6
60	*	1.200 D + 0.500 Lp + 1.000 W7
61	*	1.200 D + 0.500 Lp + 1.000 W8
62	*	1.200 D + 0.500 Lp + 1.000 W9
63	*	1.200 D + 0.500 Lp + 1.000 W10
64	*	1.200 D + 0.500 Lp + 1.000 W11
65	*	1.200 D + 0.500 Lp + 1.000 W12
66	*	1.200 D + 0.500 Lp - 1.000 W1
67	*	1.200 D + 0.500 Lp - 1.000 W2
68	*	1.200 D + 0.500 Lp - 1.000 W3
69	*	1.200 D + 0.500 Lp - 1.000 W4
70	*	1.200 D + 0.500 Lp - 1.000 W5
71	*	1.200 D + 0.500 Lp - 1.000 W6
72	*	1.200 D + 0.500 Lp - 1.000 W7
73	*	1.200 D + 0.500 Lp - 1.000 W8
74	*	1.200 D + 0.500 Lp - 1.000 W9
75	*	1.200 D + 0.500 Lp - 1.000 W10
76	*	1.200 D + 0.500 Lp - 1.000 W11
77	*	1.200 D + 0.500 Lp - 1.000 W12
78	*	1.200 D + 0.500 Sp + 1.000 W1
79	*	1.200 D + 0.500 Sp + 1.000 W2
80	*	1.200 D + 0.500 Sp + 1.000 W3
81	*	1.200 D + 0.500 Sp + 1.000 W4
82	*	1.200 D + 0.500 Sp + 1.000 W5
83	*	1.200 D + 0.500 Sp + 1.000 W6
84	*	1.200 D + 0.500 Sp + 1.000 W7
85	*	1.200 D + 0.500 Sp + 1.000 W8
86	*	1.200 D + 0.500 Sp + 1.000 W9
87	*	1.200 D + 0.500 Sp + 1.000 W10
88	*	1.200 D + 0.500 Sp + 1.000 W11

89	*	1.200 D + 0.500 Sp + 1.000 W12
90	*	1.200 D + 0.500 Sp - 1.000 W1
91	*	1.200 D + 0.500 Sp - 1.000 W2
92	*	1.200 D + 0.500 Sp - 1.000 W3
93	*	1.200 D + 0.500 Sp - 1.000 W4
94	*	1.200 D + 0.500 Sp - 1.000 W5
95	*	1.200 D + 0.500 Sp - 1.000 W6
96	*	1.200 D + 0.500 Sp - 1.000 W7
97	*	1.200 D + 0.500 Sp - 1.000 W8
98	*	1.200 D + 0.500 Sp - 1.000 W9
99	*	1.200 D + 0.500 Sp - 1.000 W10
100	*	1.200 D + 0.500 Sp - 1.000 W11
101	*	1.200 D + 0.500 Sp - 1.000 W12
102	*	1.200 D + 1.000 W1
103	*	1.200 D + 1.000 W2
104	*	1.200 D + 1.000 W3
105	*	1.200 D + 1.000 W4
106	*	1.200 D + 1.000 W5
107	*	1.200 D + 1.000 W6
108	*	1.200 D + 1.000 W7
109	*	1.200 D + 1.000 W8
110	*	1.200 D + 1.000 W9
111	*	1.200 D + 1.000 W10
112	*	1.200 D + 1.000 W11
113	*	1.200 D + 1.000 W12
114	*	1.200 D - 1.000 W1
115	*	1.200 D - 1.000 W2
116	*	1.200 D - 1.000 W3
117	*	1.200 D - 1.000 W4
118	*	1.200 D - 1.000 W5
119	*	1.200 D - 1.000 W6
120	*	1.200 D - 1.000 W7
121	*	1.200 D - 1.000 W8
122	*	1.200 D - 1.000 W9
123	*	1.200 D - 1.000 W10
124	*	1.200 D - 1.000 W11
125	*	1.200 D - 1.000 W12
126	*	1.400 D + 0.500 Lp + 0.200 Sp + 1.000 E1
127	*	1.400 D + 0.500 Lp + 0.200 Sp + 1.000 E2

128	*	1.400 D + 0.500 Lp + 0.200 Sp + 1.000 E3
129	*	1.400 D + 0.500 Lp + 0.200 Sp + 1.000 E4
130	*	1.400 D + 0.500 Lp + 0.200 Sp - 1.000 E1
131	*	1.400 D + 0.500 Lp + 0.200 Sp - 1.000 E2
132	*	1.400 D + 0.500 Lp + 0.200 Sp - 1.000 E3
133	*	1.400 D + 0.500 Lp + 0.200 Sp - 1.000 E4
134	*	1.400 D + 0.200 Sp + 1.000 E1
135	*	1.400 D + 0.200 Sp + 1.000 E2
136	*	1.400 D + 0.200 Sp + 1.000 E3
137	*	1.400 D + 0.200 Sp + 1.000 E4
138	*	1.400 D + 0.200 Sp - 1.000 E1
139	*	1.400 D + 0.200 Sp - 1.000 E2
140	*	1.400 D + 0.200 Sp - 1.000 E3
141	*	1.400 D + 0.200 Sp - 1.000 E4
142	*	1.400 D + 0.500 Lp + 1.000 E1
143	*	1.400 D + 0.500 Lp + 1.000 E2
144	*	1.400 D + 0.500 Lp + 1.000 E3
145	*	1.400 D + 0.500 Lp + 1.000 E4
146	*	1.400 D + 0.500 Lp - 1.000 E1
147	*	1.400 D + 0.500 Lp - 1.000 E2
148	*	1.400 D + 0.500 Lp - 1.000 E3
149	*	1.400 D + 0.500 Lp - 1.000 E4
150	*	1.400 D + 1.000 E1
151	*	1.400 D + 1.000 E2
152	*	1.400 D + 1.000 E3
153	*	1.400 D + 1.000 E4
154	*	1.400 D - 1.000 E1
155	*	1.400 D - 1.000 E2
156	*	1.400 D - 1.000 E3
157	*	1.400 D - 1.000 E4
158	*	0.900 D + 1.000 W1
159	*	0.900 D + 1.000 W2
160	*	0.900 D + 1.000 W3
161	*	0.900 D + 1.000 W4
162	*	0.900 D + 1.000 W5
163	*	0.900 D + 1.000 W6
164	*	0.900 D + 1.000 W7
165	*	0.900 D + 1.000 W8
166	*	0.900 D + 1.000 W9

167	*	0.900 D + 1.000 W10
168	*	0.900 D + 1.000 W11
169	*	0.900 D + 1.000 W12
170	*	0.900 D - 1.000 W1
171	*	0.900 D - 1.000 W2
172	*	0.900 D - 1.000 W3
173	*	0.900 D - 1.000 W4
174	*	0.900 D - 1.000 W5
175	*	0.900 D - 1.000 W6
176	*	0.900 D - 1.000 W7
177	*	0.900 D - 1.000 W8
178	*	0.900 D - 1.000 W9
179	*	0.900 D - 1.000 W10
180	*	0.900 D - 1.000 W11
181	*	0.900 D - 1.000 W12
182	*	0.700 D + 1.000 E1
183	*	0.700 D + 1.000 E2
184	*	0.700 D + 1.000 E3
185	*	0.700 D + 1.000 E4
186	*	0.700 D - 1.000 E1
187	*	0.700 D - 1.000 E2
188	*	0.700 D - 1.000 E3
189	*	0.700 D - 1.000 E4

SOIL COMBINATION CRITERIA:

Combination Code:	IBC 2021 / ASCE 7-16
Roof Live Load:	Snow
Snow Factor	Use Full Factor (0.75) on Snow in Combinations with Seismic
Sds (for Ev)	1.000
RhoX	1.000
RhoY	1.000

GENERATED SOIL LOAD COMBINATIONS:

190	*	1.000 D
191	*	1.000 D + 1.000 Lp
192	*	1.000 D + 1.000 Sp
193	*	1.000 D + 0.750 Lp + 0.750 Sp
194	*	1.000 D + 0.600 W1
195	*	1.000 D + 0.600 W2
196	*	1.000 D + 0.600 W3

197	*	1.000 D + 0.600 W4
198	*	1.000 D + 0.600 W5
199	*	1.000 D + 0.600 W6
200	*	1.000 D + 0.600 W7
201	*	1.000 D + 0.600 W8
202	*	1.000 D + 0.600 W9
203	*	1.000 D + 0.600 W10
204	*	1.000 D + 0.600 W11
205	*	1.000 D + 0.600 W12
206	*	1.000 D - 0.600 W1
207	*	1.000 D - 0.600 W2
208	*	1.000 D - 0.600 W3
209	*	1.000 D - 0.600 W4
210	*	1.000 D - 0.600 W5
211	*	1.000 D - 0.600 W6
212	*	1.000 D - 0.600 W7
213	*	1.000 D - 0.600 W8
214	*	1.000 D - 0.600 W9
215	*	1.000 D - 0.600 W10
216	*	1.000 D - 0.600 W11
217	*	1.000 D - 0.600 W12
218	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W1
219	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W2
220	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W3
221	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W4
222	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W5
223	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W6
224	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W7
225	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W8
226	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W9
227	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W10
228	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W11
229	*	1.000 D + 0.750 Lp + 0.750 Sp + 0.450 W12
230	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W1
231	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W2
232	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W3
233	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W4
234	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W5
235	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W6

236	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W7
237	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W8
238	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W9
239	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W10
240	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W11
241	*	1.000 D + 0.750 Lp + 0.750 Sp - 0.450 W12
242	*	1.000 D + 0.750 Lp + 0.450 W1
243	*	1.000 D + 0.750 Lp + 0.450 W2
244	*	1.000 D + 0.750 Lp + 0.450 W3
245	*	1.000 D + 0.750 Lp + 0.450 W4
246	*	1.000 D + 0.750 Lp + 0.450 W5
247	*	1.000 D + 0.750 Lp + 0.450 W6
248	*	1.000 D + 0.750 Lp + 0.450 W7
249	*	1.000 D + 0.750 Lp + 0.450 W8
250	*	1.000 D + 0.750 Lp + 0.450 W9
251	*	1.000 D + 0.750 Lp + 0.450 W10
252	*	1.000 D + 0.750 Lp + 0.450 W11
253	*	1.000 D + 0.750 Lp + 0.450 W12
254	*	1.000 D + 0.750 Lp - 0.450 W1
255	*	1.000 D + 0.750 Lp - 0.450 W2
256	*	1.000 D + 0.750 Lp - 0.450 W3
257	*	1.000 D + 0.750 Lp - 0.450 W4
258	*	1.000 D + 0.750 Lp - 0.450 W5
259	*	1.000 D + 0.750 Lp - 0.450 W6
260	*	1.000 D + 0.750 Lp - 0.450 W7
261	*	1.000 D + 0.750 Lp - 0.450 W8
262	*	1.000 D + 0.750 Lp - 0.450 W9
263	*	1.000 D + 0.750 Lp - 0.450 W10
264	*	1.000 D + 0.750 Lp - 0.450 W11
265	*	1.000 D + 0.750 Lp - 0.450 W12
266	*	1.000 D + 0.750 Sp + 0.450 W1
267	*	1.000 D + 0.750 Sp + 0.450 W2
268	*	1.000 D + 0.750 Sp + 0.450 W3
269	*	1.000 D + 0.750 Sp + 0.450 W4
270	*	1.000 D + 0.750 Sp + 0.450 W5
271	*	1.000 D + 0.750 Sp + 0.450 W6
272	*	1.000 D + 0.750 Sp + 0.450 W7
273	*	1.000 D + 0.750 Sp + 0.450 W8
274	*	1.000 D + 0.750 Sp + 0.450 W9

275	*	1.000 D + 0.750 Sp + 0.450 W10
276	*	1.000 D + 0.750 Sp + 0.450 W11
277	*	1.000 D + 0.750 Sp + 0.450 W12
278	*	1.000 D + 0.750 Sp - 0.450 W1
279	*	1.000 D + 0.750 Sp - 0.450 W2
280	*	1.000 D + 0.750 Sp - 0.450 W3
281	*	1.000 D + 0.750 Sp - 0.450 W4
282	*	1.000 D + 0.750 Sp - 0.450 W5
283	*	1.000 D + 0.750 Sp - 0.450 W6
284	*	1.000 D + 0.750 Sp - 0.450 W7
285	*	1.000 D + 0.750 Sp - 0.450 W8
286	*	1.000 D + 0.750 Sp - 0.450 W9
287	*	1.000 D + 0.750 Sp - 0.450 W10
288	*	1.000 D + 0.750 Sp - 0.450 W11
289	*	1.000 D + 0.750 Sp - 0.450 W12
290	*	0.600 D + 0.600 W1
291	*	0.600 D + 0.600 W2
292	*	0.600 D + 0.600 W3
293	*	0.600 D + 0.600 W4
294	*	0.600 D + 0.600 W5
295	*	0.600 D + 0.600 W6
296	*	0.600 D + 0.600 W7
297	*	0.600 D + 0.600 W8
298	*	0.600 D + 0.600 W9
299	*	0.600 D + 0.600 W10
300	*	0.600 D + 0.600 W11
301	*	0.600 D + 0.600 W12
302	*	0.600 D - 0.600 W1
303	*	0.600 D - 0.600 W2
304	*	0.600 D - 0.600 W3
305	*	0.600 D - 0.600 W4
306	*	0.600 D - 0.600 W5
307	*	0.600 D - 0.600 W6
308	*	0.600 D - 0.600 W7
309	*	0.600 D - 0.600 W8
310	*	0.600 D - 0.600 W9
311	*	0.600 D - 0.600 W10
312	*	0.600 D - 0.600 W11
313	*	0.600 D - 0.600 W12

Load Combinations

314	*	1.140 D + 0.700 E1
315	*	1.140 D + 0.700 E2
316	*	1.140 D + 0.700 E3
317	*	1.140 D + 0.700 E4
318	*	1.140 D - 0.700 E1
319	*	1.140 D - 0.700 E2
320	*	1.140 D - 0.700 E3
321	*	1.140 D - 0.700 E4
322	*	1.105 D + 0.750 Lp + 0.750 Sp + 0.525 E1
323	*	1.105 D + 0.750 Lp + 0.750 Sp + 0.525 E2
324	*	1.105 D + 0.750 Lp + 0.750 Sp + 0.525 E3
325	*	1.105 D + 0.750 Lp + 0.750 Sp + 0.525 E4
326	*	1.105 D + 0.750 Lp + 0.750 Sp - 0.525 E1
327	*	1.105 D + 0.750 Lp + 0.750 Sp - 0.525 E2
328	*	1.105 D + 0.750 Lp + 0.750 Sp - 0.525 E3
329	*	1.105 D + 0.750 Lp + 0.750 Sp - 0.525 E4
330	*	1.105 D + 0.750 Lp + 0.525 E1
331	*	1.105 D + 0.750 Lp + 0.525 E2
332	*	1.105 D + 0.750 Lp + 0.525 E3
333	*	1.105 D + 0.750 Lp + 0.525 E4
334	*	1.105 D + 0.750 Lp - 0.525 E1
335	*	1.105 D + 0.750 Lp - 0.525 E2
336	*	1.105 D + 0.750 Lp - 0.525 E3
337	*	1.105 D + 0.750 Lp - 0.525 E4
338	*	1.105 D + 0.750 Sp + 0.525 E1
339	*	1.105 D + 0.750 Sp + 0.525 E2
340	*	1.105 D + 0.750 Sp + 0.525 E3
341	*	1.105 D + 0.750 Sp + 0.525 E4
342	*	1.105 D + 0.750 Sp - 0.525 E1
343	*	1.105 D + 0.750 Sp - 0.525 E2
344	*	1.105 D + 0.750 Sp - 0.525 E3
345	*	1.105 D + 0.750 Sp - 0.525 E4
346	*	0.600 D + 0.700 E1
347	*	0.600 D + 0.700 E2
348	*	0.600 D + 0.700 E3
349	*	0.600 D + 0.700 E4
350	*	0.600 D - 0.700 E1
351	*	0.600 D - 0.700 E2
352	*	0.600 D - 0.700 E3

353	*	0.600 D - 0.700 E4

* = Load combination currently selected to use

Foundation Model Data

RAM Foundation v24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding

Date: 08/30/24 15:17:52

SPREAD FOOTINGS GEOMETRY

			Length (ft)		Width (ft)		
Footing #	Location (ft)	Angle	L1	L2	W1	W2	Thickness (ft)
11	(0.00 - 94.11)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
13	(-4.47 - 64.08)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
14	(-4.47 - 74.00)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
20	(1 - C)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
21	(1 - D)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
22	(5.67 - 0.00)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
24	(47.61 - 0.00)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
25	(3 - E)	90.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
26	(4 - E)	90.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
27	(5 - E)	90.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
44	(200.55 - 20.23)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
47	(200.55 - 90.36)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
48	(200.55 - 55.36)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
49	(30.67 - 33.65)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
50	(30.67 - 24.23)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
51	(15.67 - -0.00)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)

SPREAD FOOTINGS MATERIAL PROPERTIES

	Concrete					Reinf.	Soil Cap. (ksf)
Footing #	f'c (ksi)	fct (ksi)	Density (pcf)	Type	E (ksi)	fy (ksi)	or Table
11	3.00	CODE	145.00	NW	CODE	60.00	2.50
13	3.00	CODE	145.00	NW	CODE	60.00	2.50
14	3.00	CODE	145.00	NW	CODE	60.00	2.50
20	3.00	CODE	145.00	NW	CODE	60.00	2.50
21	3.00	CODE	145.00	NW	CODE	60.00	2.50
22	3.00	CODE	145.00	NW	CODE	60.00	2.50
24	3.00	CODE	145.00	NW	CODE	60.00	2.50
25	3.00	CODE	145.00	NW	CODE	60.00	2.50
26	3.00	CODE	145.00	NW	CODE	60.00	2.50
27	3.00	CODE	145.00	NW	CODE	60.00	2.50
44	3.00	CODE	145.00	NW	CODE	60.00	2.50
47	3.00	CODE	145.00	NW	CODE	60.00	2.50
48	3.00	CODE	145.00	NW	CODE	60.00	2.50
49	3.00	CODE	145.00	NW	CODE	60.00	2.50

50	3.00	CODE	145.00	NW	CODE	60.00	2.50
51	3.00	CODE	145.00	NW	CODE	60.00	2.50

SPREAD FOOTINGS SUPPORTED MEMBERS

	Column		Base Plate (in)		
Footing #	Location (ft)	Size	Angle	Length	Width
11	(0.00 - 94.11)	HSS5X5X3/8	0.00	18.00	10.00
13	(-4.47 - 64.08)	HSS5X5X1/4	0.00	18.00	10.00
14	(-4.47 - 74.00)	HSS5X5X3/8	0.00	18.00	10.00
20	(1 - C)	HSS5X5X3/8	0.00	18.00	10.00
21	(1 - D)	HSS5X5X3/8	0.00	18.00	10.00
22	(5.67 - 0.00)	HSS5X5X3/8	0.00	18.00	10.00
24	(47.61 - 0.00)	HSS5X5X3/8	0.00	18.00	10.00
25	(3 - E)	HSS8X8X1/4	90.00	20.00	12.00
26	(4 - E)	HSS10X10X3/16	90.00	20.00	12.00
27	(5 - E)	HSS8X8X1/4	90.00	20.00	12.00
44	(200.55 - 20.23)	HSS12X12X1/2	0.00	20.00	20.00
47	(200.55 - 90.36)	HSS12X12X1/2	0.00	20.00	20.00
48	(200.55 - 55.36)	HSS12X12X1/2	0.00	20.00	20.00
49	(30.67 - 33.65)	HSS5X5X3/8	0.00	12.00	12.00
50	(30.67 - 24.23)	HSS5X5X3/8	0.00	12.00	12.00
51	(15.67 - -0.00)	HSS5X5X3/8	0.00	11.00	6.00

CONTINUOUS FOOTINGS GEOMETRY

		Length (ft)		Width (Abs) (ft)		
Footing #	Location (ft)	L1	L2	W1	W2	Thickness (ft)
31	(26.73,94.00) to (38.17,94.00)	10.00(Max)	10.00(Max)	1.50	1.50	5.00(Max)
32	(3.96,94.00) to (23.35,94.00)	10.00(Max)	10.00(Max)	1.50	1.50	5.00(Max)
33	(0.00,78.21) to (0.00,83.61)	10.00(Max)	10.00(Max)	1.50	1.50	5.00(Max)
34	(0.00,60.33) to (0.00,64.08)	10.00(Max)	10.00(Max)	1.50	1.50	5.00(Max)
35	(0.00,33.65) to (0.00,43.65)	10.00(Max)	10.00(Max)	1.50	1.50	5.00(Max)
36	(5.67,19.23) to (5.67,24.30)	10.00(Max)	10.00(Max)	1.50	1.50	5.00(Max)
40	(39.17,106.00) to (175.50,106.00)	10.00(Max)	10.00(Max)	2.00	2.00	5.00(Max)
41	(175.50,10.67) to (175.50,106.00)	10.00(Max)	10.00(Max)	2.50	2.50	5.00(Max)
42	(39.17,10.67) to (175.50,10.67)	10.00(Max)	10.00(Max)	2.00	2.00	5.00(Max)
43	(39.17,10.67) to (39.17,106.00)	10.00(Max)	10.00(Max)	2.50	2.50	5.00(Max)
52	(15.67,-0.00) to (47.61,0.00)	10.00(Max)	10.00(Max)	1.50	1.50	5.00(Max)

CONTINUOUS FOOTINGS MATERIAL PROPERTIES

Footing #	Concrete f'c (ksi)	fct (ksi)	Density (pcf)	Type	E (ksi)	Reinf. fy (ksi)	Soil Cap. (ksf) or Table
31	3.00	CODE	145.00	NW	CODE	60.00	2.50
32	3.00	CODE	145.00	NW	CODE	60.00	2.50
33	3.00	CODE	145.00	NW	CODE	60.00	2.50
34	3.00	CODE	145.00	NW	CODE	60.00	2.50
35	3.00	CODE	145.00	NW	CODE	60.00	2.50
36	3.00	CODE	145.00	NW	CODE	60.00	2.50
40	3.00	CODE	145.00	NW	CODE	60.00	2.50
41	3.00	CODE	145.00	NW	CODE	60.00	2.50
42	3.00	CODE	145.00	NW	CODE	60.00	2.50
43	3.00	CODE	145.00	NW	CODE	60.00	2.50
52	3.00	CODE	145.00	NW	CODE	60.00	2.50

CONTINUOUS FOOTINGS SUPPORTED MEMBERS

Footing #	Column Location (ft)	Size	Angle	Base Plate (in) Length	Width	Wall Location (ft) i End	j End
31	(26.73,94.00)	137.26x 8.00	0.00	N/A	N/A		
32	(3.96,94.00)	232.75x 8.00	0.00	N/A	N/A		
33	(0.00,78.21)	64.75x 8.00	90.00	N/A	N/A		
34	(0.00,60.33)	45.00x 8.00	90.00	N/A	N/A		
35	(0.00,33.65)	120.00x 8.00	90.00	N/A	N/A		
36	(5.67,19.23)	60.87x 8.00	90.00	N/A	N/A		
	(5.67 - 24.30)	HSS5X5X3/8	90.00	18.00	10.00		
40	(39.17,106.00)	247.00x10.00	0.00	N/A	N/A		
	(59.75,106.00)	765.00x10.00	0.00	N/A	N/A		
	(123.50,106.00)	312.00x10.00	0.00	N/A	N/A		
	(149.50,106.00)	312.00x10.00	0.00	N/A	N/A		
41	(175.50,10.67)	275.76x10.00	90.00	N/A	N/A		
	(175.50,33.65)	53.87x10.00	90.00	N/A	N/A		
	(175.50,38.13)	426.01x10.00	90.00	N/A	N/A		
	(175.50,73.64)	244.37x10.00	90.00	N/A	N/A		
	(175.50,94.00)	144.00x10.00	90.00	N/A	N/A		
42	(39.17,10.67)	247.00x10.00	0.00	N/A	N/A		
	(59.75,10.67)	765.00x10.00	0.00	N/A	N/A		
	(123.50,10.67)	313.00x10.00	-0.00	N/A	N/A		

Foundation Model Data

	(149.58,10.67)	311.00x10.00	0.00	N/A	N/A
43	(39.17,10.67)	162.76x10.00	90.00	N/A	N/A
	(39.17,24.23)	901.26x10.00	90.00	N/A	N/A
	(39.17,99.33)	79.99x10.00	90.00	N/A	N/A
52	(15.67,-0.00)	383.28x10.00	0.00	N/A	N/A

RAM Foundation v24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding

SPREAD FOOTINGS GEOMETRY

			Length (ft)		Width (ft)		
Footing #	Location (ft)	Angle	L1	L2	W1	W2	Thickness (ft)
11	(0.00 - 94.11)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
13	(-4.47 - 64.08)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
14	(-4.47 - 74.00)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
17	(200.55 - 34.70)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
20	(1 - C)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
21	(1 - D)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
22	(5.67 - 0.00)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
24	(47.61 - 0.00)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
25	(3 - E)	90.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
26	(4 - E)	90.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
27	(5 - E)	90.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
44	(200.55 - 20.23)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
47	(200.55 - 90.36)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
48	(200.55 - 66.24)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
49	(30.67 - 33.65)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)
50	(30.67 - 24.23)	0.00	10.00(Max)	10.00(Max)	10.00(Max)	10.00(Max)	5.00(Max)

SPREAD FOOTINGS MATERIAL PROPERTIES

	Concrete					Reinf.	Soil Cap. (ksf)
Footing #	f'c (ksi)	fct (ksi)	Density (pcf)	Type	E (ksi)	fy (ksi)	or Table
11	3.00	CODE	145.00	NW	CODE	60.00	2.50
13	3.00	CODE	145.00	NW	CODE	60.00	2.50
14	3.00	CODE	145.00	NW	CODE	60.00	2.50
17	3.00	CODE	145.00	NW	CODE	60.00	2.50
20	3.00	CODE	145.00	NW	CODE	60.00	2.50
21	3.00	CODE	145.00	NW	CODE	60.00	2.50
22	3.00	CODE	145.00	NW	CODE	60.00	2.50
24	3.00	CODE	145.00	NW	CODE	60.00	2.50
25	3.00	CODE	145.00	NW	CODE	60.00	2.50
26	3.00	CODE	145.00	NW	CODE	60.00	2.50
27	3.00	CODE	145.00	NW	CODE	60.00	2.50
44	3.00	CODE	145.00	NW	CODE	60.00	2.50
47	3.00	CODE	145.00	NW	CODE	60.00	2.50

48	3.00	CODE	145.00	NW	CODE	60.00	2.50
49	3.00	CODE	145.00	NW	CODE	60.00	2.50
50	3.00	CODE	145.00	NW	CODE	60.00	2.50

SPREAD FOOTINGS SUPPORTED MEMBERS

	Column		Base Plate (in)		
Footing #	**Location (ft)**	**Size**	**Angle**	**Length**	**Width**
11	(0.00 - 94.11)	HSS5X5X3/8	0.00	18.00	10.00
13	(-4.47 - 64.08)	HSS5X5X1/4	0.00	18.00	10.00
14	(-4.47 - 74.00)	HSS5X5X3/8	0.00	18.00	10.00
17	(200.55 - 34.70)	HSS10X10X5/8	0.00	12.00	12.00
20	(1 - C)	HSS5X5X3/8	0.00	18.00	10.00
21	(1 - D)	HSS5X5X3/8	0.00	18.00	10.00
22	(5.67 - 0.00)	HSS5X5X3/8	0.00	18.00	10.00
24	(47.61 - 0.00)	HSS5X5X3/8	0.00	18.00	10.00
25	(3 - E)	HSS8X8X3/8	90.00	20.00	12.00
26	(4 - E)	HSS8X8X3/8	90.00	20.00	12.00
27	(5 - E)	HSS8X8X3/8	90.00	20.00	12.00
44	(200.55 - 20.23)	HSS10X10X5/8	0.00	12.00	12.00
47	(200.55 - 90.36)	HSS10X10X5/8	0.00	12.00	12.00
48	(200.55 - 66.24)	HSS10X10X5/8	0.00	12.00	12.00
49	(30.67 - 33.65)	HSS5X5X3/8	0.00	12.00	12.00
50	(30.67 - 24.23)	HSS5X5X3/8	0.00	12.00	12.00

CONTINUOUS FOOTINGS GEOMETRY

		Length (ft)		Width (Abs) (ft)		
Footing #	**Location (ft)**	**L1**	**L2**	**W1**	**W2**	**Thickness (ft)**
31	(26.73,94.00) to (38.17,94.00)	10.00(Max)	10.00(Max)	1.50	1.50	5.00(Max)
32	(3.96,94.00) to (23.35,94.00)	10.00(Max)	10.00(Max)	1.50	1.50	5.00(Max)
33	(0.00,78.21) to (0.00,83.61)	10.00(Max)	10.00(Max)	1.50	1.50	5.00(Max)
34	(0.00,60.33) to (0.00,64.08)	10.00(Max)	10.00(Max)	1.50	1.50	5.00(Max)
35	(0.00,33.65) to (0.00,43.65)	10.00(Max)	10.00(Max)	1.50	1.50	5.00(Max)
36	(5.67,19.23) to (5.67,24.30)	10.00(Max)	10.00(Max)	1.50	1.50	5.00(Max)
37	(15.67,-0.00) to (47.61,0.00)	10.00(Max)	10.00(Max)	1.50	1.50	5.00(Max)
40	(39.17,106.00) to (175.50,106.00)	10.00(Max)	10.00(Max)	2.00	2.00	5.00(Max)
41	(175.50,10.67) to (175.50,106.00)	10.00(Max)	10.00(Max)	2.50	2.50	5.00(Max)

42	(39.17,10.67) to (175.50,10.67)	10.00(Max)	10.00(Max)	2.00	2.00	5.00(Max)
43	(39.17,10.67) to (39.17,106.00)	10.00(Max)	10.00(Max)	2.50	2.50	5.00(Max)

CONTINUOUS FOOTINGS MATERIAL PROPERTIES

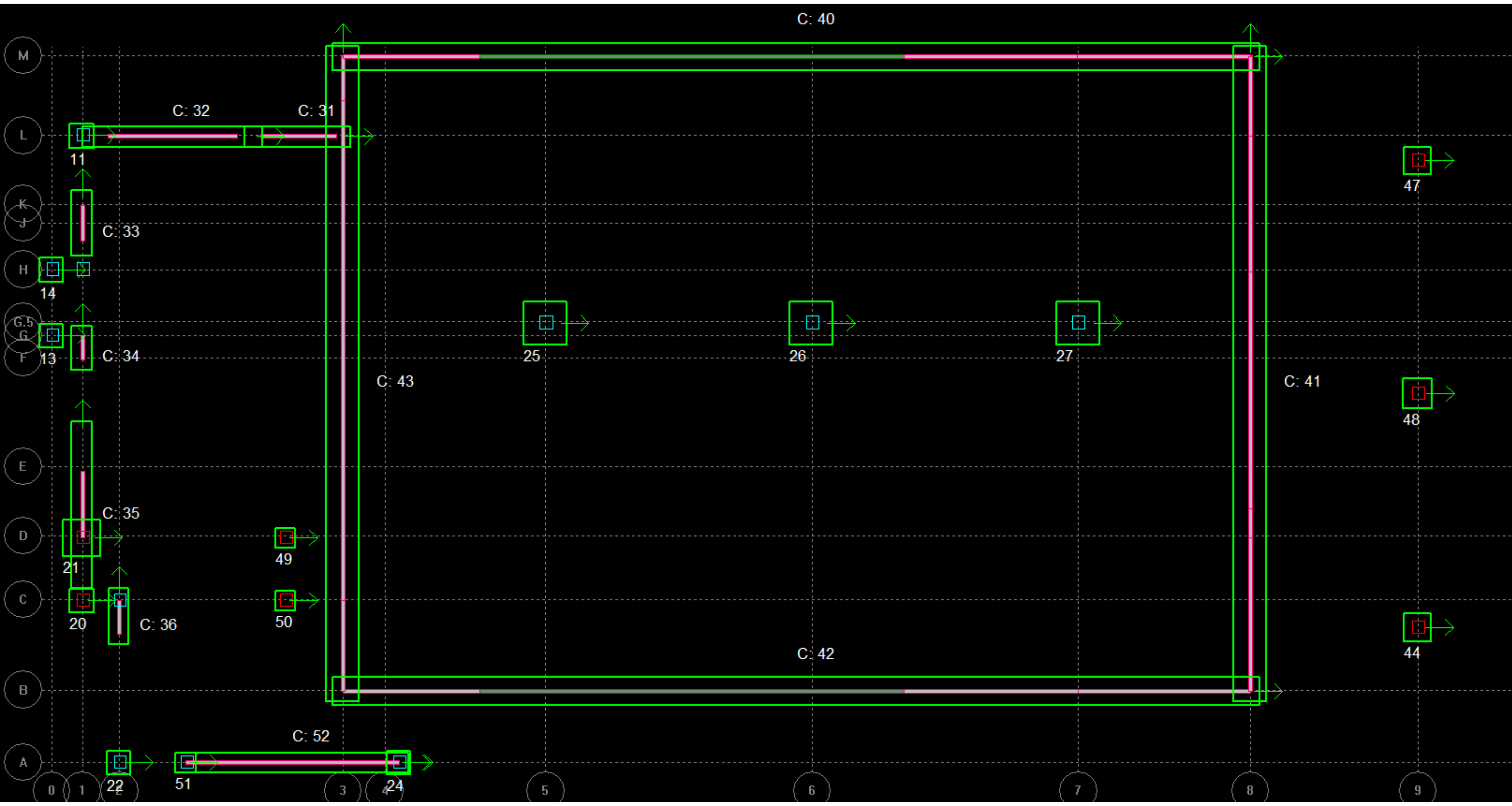
	Concrete					Reinf.	Soil Cap. (ksf)
Footing #	**f'c (ksi)**	**fct (ksi)**	**Density (pcf)**	**Type**	**E (ksi)**	**fy (ksi)**	**or Table**
31	3.00	CODE	145.00	NW	CODE	60.00	2.50
32	3.00	CODE	145.00	NW	CODE	60.00	2.50
33	3.00	CODE	145.00	NW	CODE	60.00	2.50
34	3.00	CODE	145.00	NW	CODE	60.00	2.50
35	3.00	CODE	145.00	NW	CODE	60.00	2.50
36	3.00	CODE	145.00	NW	CODE	60.00	2.50
37	3.00	CODE	145.00	NW	CODE	60.00	2.50
40	3.00	CODE	145.00	NW	CODE	60.00	2.50
41	3.00	CODE	145.00	NW	CODE	60.00	2.50
42	3.00	CODE	145.00	NW	CODE	60.00	2.50
43	3.00	CODE	145.00	NW	CODE	60.00	2.50

CONTINUOUS FOOTINGS SUPPORTED MEMBERS

	Column			Base Plate (in)		Wall Location (ft)	
Footing #	**Location (ft)**	**Size**	**Angle**	**Length**	**Width**	**i End**	**j End**
31	(26.73,94.00)	137.26x 8.00	0.00	N/A	N/A		
32	(3.96,94.00)	232.75x 8.00	0.00	N/A	N/A		
33	(0.00,78.21)	64.75x 8.00	90.00	N/A	N/A		
34	(0.00,60.33)	45.00x 8.00	90.00	N/A	N/A		
35	(0.00,33.65)	120.00x 8.00	90.00	N/A	N/A		
36	(5.67,19.23)	60.87x 8.00	90.00	N/A	N/A		
	(5.67 - 24.30)	HSS5X5X3/8	90.00	18.00	10.00		
37	(15.67,-0.00)	383.28x 8.00	0.00	N/A	N/A		
40	(39.17,106.00)	247.00x10.00	0.00	N/A	N/A		
	(59.75,106.00)	765.00x10.00	0.00	N/A	N/A		
	(123.50,106.00)	312.00x10.00	0.00	N/A	N/A		
	(149.50,106.00)	312.00x10.00	0.00	N/A	N/A		
41	(175.50,10.67)	275.76x10.00	90.00	N/A	N/A		
	(175.50,33.65)	53.87x10.00	90.00	N/A	N/A		
	(175.50,38.13)	426.01x10.00	90.00	N/A	N/A		
	(175.50,73.64)	244.37x10.00	90.00	N/A	N/A		
	(175.50,94.00)	144.00x10.00	90.00	N/A	N/A		

Foundation Model Data

42	(39.17,10.67)	247.00x10.00	0.00	N/A	N/A
	(59.75,10.67)	765.00x10.00	0.00	N/A	N/A
	(123.50,10.67)	313.00x10.00	-0.00	N/A	N/A
	(149.58,10.67)	311.00x10.00	0.00	N/A	N/A
43	(39.17,10.67)	162.76x10.00	90.00	N/A	N/A
	(39.17,24.23)	901.26x10.00	90.00	N/A	N/A
	(39.17,99.33)	79.99x10.00	90.00	N/A	N/A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Spread Footing Design Summary

RAM Foundation v24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

Date: 08/30/24 15:17:52
Design Code: ACI318-19

Grid	Orientation Col/Foot	Dimensions (ft) Length	Width	Thick	f'c/fy ksi	Bottom Reinforcement Parallel to Length	Parallel to Width	Top Reinforcement Parallel to Length	Parallel to Width
(0.00 - 94.11)	0.00/ 0.00	3.50	3.50	1.00	3.00/60.00	12-#3	12-#3	None	None
(-4.47 - 64.08)	0.00/ 0.00	3.50	3.50	1.00	3.00/60.00	12-#3	12-#3	None	None
(-4.47 - 74.00)	0.00/ 0.00	3.50	3.50	1.00	3.00/60.00	12-#3	12-#3	None	None
(1 - C)	0.00/ 0.00	3.50	3.50	1.00	3.00/60.00	12-#3	12-#3	None	None
(1 - D)	0.00/ 0.00	5.50	5.50	1.42	3.00/60.00	19-#3	19-#3	None	None
(5.67 - 0.00)	0.00/ 0.00	3.50	3.50	1.00	3.00/60.00	12-#3	12-#3	None	None
(47.61 - 0.00)	0.00/ 0.00	3.50	3.50	1.00	3.00/60.00	12-#3	12-#3	None	None
(3 - E)	90.00/ 0.00	6.50	6.50	1.33	3.00/60.00	8-#5	8-#5	None	None
(4 - E)	90.00/ 0.00	6.50	6.50	1.25	3.00/60.00	7-#5	7-#5	None	None
(5 - E)	90.00/ 0.00	6.50	6.50	1.33	3.00/60.00	8-#5	8-#5	None	None
(200.55 - 20.23)	0.00/ 0.00	4.00	4.00	1.00	3.00/60.00	12-#3	12-#3	None	None
(200.55 - 90.36)	0.00/ 0.00	4.00	4.00	1.00	3.00/60.00	12-#3	12-#3	None	None
(200.55 - 55.36)	0.00/ 0.00	4.50	4.50	1.00	3.00/60.00	11-#3	11-#3	None	None
(30.67 - 33.65)	0.00/ 0.00	3.00	3.00	1.00	3.00/60.00	11-#3	11-#3	None	None
(30.67 - 24.23)	0.00/ 0.00	3.00	3.00	1.00	3.00/60.00	11-#3	11-#3	None	None
(15.67 - -0.00)	0.00/ 0.00	3.00	3.00	1.00	3.00/60.00	11-#3	11-#3	None	None

Note: Number between () in reinforcement is quantity of bars in center strip of rectangular footing

Spread Footing Design Summary

RAM Foundation v24.00.00.160
Dunn Associates, Inc.
DataBase: 2024.08.19 DTC Welding
Building Code: IBC

Date: 08/22/24 11:48:50
Design Code: ACI318-19

Grid	Orientation Col/Foot	Dimensions (ft) Length	Width	Thick	f'c/fy ksi	Bottom Reinforcement Parallel to Length	Parallel to Width	Top Reinforcement Parallel to Length	Parallel to Width
(0.00 - 94.11)	0.00/ 0.00	3.50	3.50	1.00	3.00/60.00	12-#3	12-#3	None	None
(-4.47 - 64.08)	0.00/ 0.00	3.50	3.50	1.00	3.00/60.00	12-#3	12-#3	None	None
(-4.47 - 74.00)	0.00/ 0.00	3.50	3.50	1.00	3.00/60.00	12-#3	12-#3	None	None
(200.55 - 34.70)	0.00/ 0.00	3.50	3.50	1.00	3.00/60.00	11-#3	11-#3	11-#3	11-#3
(1 - C)	0.00/ 0.00	3.50	3.50	1.00	3.00/60.00	12-#3	12-#3	None	None
(1 - D)	0.00/ 0.00	5.00	5.00	1.33	3.00/60.00	9-#4	9-#4	None	None
(5.67 - 0.00)	0.00/ 0.00	3.50	3.50	1.00	3.00/60.00	12-#3	12-#3	None	None
(47.61 - 0.00)	0.00/ 0.00	3.50	3.50	1.00	3.00/60.00	12-#3	12-#3	None	None
(3 - E)	90.00/ 0.00	8.00	8.00	1.58	3.00/60.00	8-#6	8-#6	None	None
(4 - E)	90.00/ 0.00	8.50	8.50	1.67	3.00/60.00	12-#5	12-#5	None	None
(5 - E)	90.00/ 0.00	7.50	7.50	1.50	3.00/60.00	7-#6	7-#6	None	None
(200.55 - 20.23)	0.00/ 0.00	8.50	8.50	1.83	3.00/60.00	10-#6	10-#6	None	None
(200.55 - 90.36)	0.00/ 0.00	3.50	3.50	1.00	3.00/60.00	11-#3	11-#3	None	None
(200.55 - 66.24)	0.00/ 0.00	4.00	4.00	1.00	3.00/60.00	10-#3	10-#3	None	None
(30.67 - 33.65)	0.00/ 0.00	3.00	3.00	1.00	3.00/60.00	11-#3	11-#3	None	None
(30.67 - 24.23)	0.00/ 0.00	3.00	3.00	1.00	3.00/60.00	11-#3	11-#3	None	None

Note: Number between () in reinforcement is quantity of bars in center strip of rectangular footing

Continuous Foundation Design

FOOTING DESIGN

Footing #.................................... 31
Length (ft):................................ 15.94
Width (ft):.................................. 3.00
Thickness (ft):........................... 1.00
Footing Orientation (deg):......... 0.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.00 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.25

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/ 6.00	H/S	4-#4
2	6.00/10.00	S/S	4-#4
3	10.00/15.94	S/H	4-#4

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.75

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/ 6.00	H/S	4-#4
2	6.00/10.00	S/S	4-#4
3	10.00/15.94	S/H	4-#4

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.81 Bottom Bar Depth (in) 8.31

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 2.00	6-#3	6-#3
2	2.00/14.00	43-#3	43-#3
3	14.00/15.94	5-#3	5-#3

Longitudinal Shear Reinforcement:

Number of Shear bar legs:.......................... 2

Seg.	Segment	Spacing

Continuous Foundation Design

Num.	Start/End (ft)	(in)	Quantity
1	0.00/ 1.52	Not Applic.	None
2	14.42/15.94	Not Applic.	None

Cover (in) Top...........1.50 Bottom.....3.00 Side..........3.00

SUPPORTED MEMBERS

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(26.73,94.00) to (38.17,94.00)	7.97	137.26x 8.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	8.68	42	1.52			
Provided Shear (kip)	25.88		1.52			
Req. Max Pos. Moment (kip-ft)	18.43	42	2.25	3.52	4	2.00
Provided Pos. Moment (kip-ft)	30.56		2.25	112.94		2.00
Req. Max Neg. Moment (kip-ft)	-1.54	26	13.69	-1.66	26	2.00
Provided Neg. Moment (kip-ft)	-35.96		13.69	-134.31		2.00
Req. Max Punching Shear (kip)	28.07	10	7.97			
Provided Punching Shear (kip)	279.15		7.97			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf)......................... 2.5
Soil Subgrade Modulus (ksf / ft)................................. 60.0
Max Unfactored Soil Bearing (ksf)............................. 0.7 Ld Co # 86
Max Average Unfactored Soil Bearing (ksf)................ 0.5

Continuous Foundation Design

FOOTING DESIGN

Footing #.................................... 32
Length (ft):................................ 26.90
Width (ft):.................................. 3.00
Thickness (ft):............................ 1.00
Footing Orientation (deg):......... 0.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.00 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.25

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/10.00	H/S	4-#4
2	10.00/17.00	S/S	4-#4
3	17.00/26.90	S/H	4-#4

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.75

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/10.00	H/S	8-#4
2	10.00/17.00	S/S	4-#4
3	17.00/26.90	S/H	7-#4

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.81 Bottom Bar Depth (in) 8.31

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 3.00	8-#3	8-#3
2	3.00/24.00	74-#3	74-#3
3	24.00/26.90	8-#3	8-#3

Longitudinal Shear Reinforcement:

Number of Shear bar legs:.........................2

Seg.	Segment	Spacing

Continuous Foundation Design

Num.	Start/End (ft)	(in)	Quantity
1	0.00/ 3.02	Not Applic.	None
2	23.88/26.90	Not Applic.	None

Cover (in) Top...........1.50 Bottom.....3.00 Side..........3.00

SUPPORTED MEMBERS

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(3.96,94.00) to (23.35,94.00)	13.45	232.75x 8.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	14.92	42	3.02			
Provided Shear (kip)	25.88		3.02			
Req. Max Pos. Moment (kip-ft)	53.90	42	3.75	5.89	42	0.00
Provided Pos. Moment (kip-ft)	59.24		3.75	29.01		0.00
Req. Max Neg. Moment (kip-ft)	-4.28	26	23.15	-2.90	6	3.00
Provided Neg. Moment (kip-ft)	-35.96		23.15	-231.30		3.00
Req. Max Punching Shear (kip)	53.51	10	13.45			
Provided Punching Shear (kip)	410.93		13.45			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf)......................... 2.5
Soil Subgrade Modulus (ksf / ft)................................. 60.0
Max Unfactored Soil Bearing (ksf)............................. 0.6 Ld Co # 86
Max Average Unfactored Soil Bearing (ksf)................ 0.5

FOOTING DESIGN

Footing #.................................... 33
Length (ft):................................ 9.90
Width (ft):.................................. 3.00
Thickness (ft):............................ 1.00
Footing Orientation (deg):......... 90.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.00 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.25

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/ 4.00	H/S	4-#4
2	4.00/ 6.00	S/S	4-#4
3	6.00/ 9.90	S/H	4-#4

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.75

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/ 4.00	H/S	4-#4
2	4.00/ 6.00	S/S	4-#4
3	6.00/ 9.90	S/H	4-#4

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.81 Bottom Bar Depth (in) 8.31

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 2.00	6-#3	6-#3
2	2.00/ 8.00	22-#3	22-#3
3	8.00/ 9.90	5-#3	5-#3

Longitudinal Shear Reinforcement:

Number of Shear bar legs:.......................... 2

Seg.	Segment	Spacing

Continuous Foundation Design

Num.	Start/End (ft)	(in)	Quantity
1	0.00/ 1.52	Not Applic.	None
2	8.38/ 9.90	Not Applic.	None

Cover (in) Top...........1.50 Bottom.....3.00 Side..........3.00

SUPPORTED MEMBERS

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(0.00,78.21) to (0.00,83.61)	4.95	64.75x 8.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	8.37	40	8.38			
Provided Shear (kip)	25.88		8.38			
Req. Max Pos. Moment (kip-ft)	17.91	40	7.65	3.60	4	2.00
Provided Pos. Moment (kip-ft)	30.56		7.65	57.72		2.00
Req. Max Neg. Moment (kip-ft)	-1.46	24	2.25	-0.46	8	0.00
Provided Neg. Moment (kip-ft)	-35.96		2.25	-25.73		0.00
Req. Max Punching Shear (kip)	32.96	4	4.95			
Provided Punching Shear (kip)	182.71		4.95			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf)......................... 2.5
Soil Subgrade Modulus (ksf / ft)................................. 60.0
Max Unfactored Soil Bearing (ksf).............................. 1.0 Ld Co # 60
Max Average Unfactored Soil Bearing (ksf)................ 0.8

FOOTING DESIGN

Footing #.................................... 34
Length (ft):................................ 6.75
Width (ft):.................................. 3.00
Thickness (ft):........................... 1.00
Footing Orientation (deg):......... 90.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.00 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.25

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/ 2.00	H/S	4-#4
2	2.00/ 4.00	S/S	4-#4
3	4.00/ 6.75	S/H	4-#4

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.75

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/ 2.00	H/S	4-#4
2	2.00/ 4.00	S/S	4-#4
3	4.00/ 6.75	S/H	4-#4

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.81 Bottom Bar Depth (in) 8.31

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 1.00	None	3-#3
2	1.00/ 6.00	18-#3	18-#3
3	6.00/ 6.75	2-#3	2-#3

Longitudinal Shear Reinforcement:

No Shear Reinforcement Required.

SUPPORTED MEMBERS

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(0.00,60.33) to (0.00,64.08)	3.38	45.00x 8.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	7.05	4	0.77			
Provided Shear (kip)	0.00		0.77			
Req. Max Pos. Moment (kip-ft)	9.42	4	1.50	5.14	4	1.00
Provided Pos. Moment (kip-ft)	30.56		1.50	47.27		1.00
Req. Max Neg. Moment (kip-ft)	-0.34	44	5.25	-0.35	44	1.00
Provided Neg. Moment (kip-ft)	-35.96		5.25	-56.21		1.00
Req. Max Punching Shear (kip)	38.62	4	3.38			
Provided Punching Shear (kip)	158.88		3.38			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf)........................ 2.5
Soil Subgrade Modulus (ksf / ft)................................ 60.0
Max Unfactored Soil Bearing (ksf)............................ 1.5 Ld Co # 64
Max Average Unfactored Soil Bearing (ksf)............... 1.2

Continuous Foundation Design

FOOTING DESIGN

Footing #................................... 35
Length (ft):................................ 25.00
Width (ft):.................................. 3.00
Thickness (ft):............................ 1.00
Footing Orientation (deg):......... 90.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.00 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.25

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/ 9.00	H/S	4-#4
2	9.00/16.00	S/S	4-#4
3	16.00/25.00	S/H	4-#4

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.56

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/ 9.00	H/S	7-#6
2	9.00/16.00	S/S	4-#6
3	16.00/25.00	S/H	5-#6

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.81 Bottom Bar Depth (in) 7.94

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 7.00	19-#3	19-#3
2	7.00/18.00	39-#3	39-#3
3	18.00/25.00	19-#3	19-#3

Longitudinal Shear Reinforcement:

Number of Shear bar legs:.......................... 2

Seg.	Segment	Spacing

Num.	Start/End (ft)	(in)	Quantity
1	0.00/ 6.79	Not Applic.	None
2	18.21/25.00	Not Applic.	None

Cover (in) Top...........1.50 Bottom.....3.00 Side..........3.00

SUPPORTED MEMBERS

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(0.00,33.65) to (0.00,43.65)	12.50	120.00x 8.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	16.61	41	18.21			
Provided Shear (kip)	25.33		18.21			
Req. Max Pos. Moment (kip-ft)	102.72	45	7.50	8.20	4	7.00
Provided Pos. Moment (kip-ft)	104.73		7.50	97.64		7.00
Req. Max Neg. Moment (kip-ft)	-17.06	29	17.50	-1.60	12	18.00
Provided Neg. Moment (kip-ft)	-35.96		17.50	-81.73		18.00
Req. Max Punching Shear (kip)	87.98	9	12.50			
Provided Punching Shear (kip)	245.53		12.50			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf)......................... 2.5
Soil Subgrade Modulus (ksf / ft)................................. 60.0
Max Unfactored Soil Bearing (ksf)............................. 1.0 Ld Co # 61
Max Average Unfactored Soil Bearing (ksf)................ 0.8

FOOTING DESIGN

Footing #.................................. 36
Length (ft):............................... 8.32(l1 = 1.50 l2 = 1.75)
Width (ft):................................. 3.00
Thickness (ft):........................... 1.00
Footing Orientation (deg):......... 90.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.00 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.25

Seg. Num.	**Spacing Start/End (ft)**	**Bar End Condition Start/End**	**Top Bars**
1	0.00/ 3.00	H/S	4-#4
2	3.00/ 5.00	S/S	4-#4
3	5.00/ 8.32	S/H	4-#4

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.75

Seg. Num.	**Spacing Start/End (ft)**	**Bar End Condition Start/End**	**Bot. Bars**
1	0.00/ 3.00	H/S	4-#4
2	3.00/ 5.00	S/S	4-#4
3	5.00/ 8.32	S/H	4-#4

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.81 Bottom Bar Depth (in) 8.31

Seg. Num.	**Segment Start/End (ft)**	**Top Bars**	**Bot. Bars**
1	0.00/ 1.00	3-#3	3-#3
2	1.00/ 6.50	20-#3	20-#3
3	6.50/ 8.00	5-#3	5-#3
4	8.00/ 8.32	1-#3	1-#3

Longitudinal Shear Reinforcement:

No Shear Reinforcement Required.

SUPPORTED MEMBERS

Columns:

Location	Loc. Along Footing (ft):	Size	Column Orientation	Base Plate (LxW) (in):	% Rigid
(5.67 - 24.30)	6.57	HSS5X5X3/8	0.00	18.00x10.00	50

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(5.67,19.23) to (5.67,24.30)	4.04	60.87x 8.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	9.58	44	0.77			
Provided Shear (kip)	0.00		0.77			
Req. Max Pos. Moment (kip-ft)	13.58	44	1.50	5.24	4	1.00
Provided Pos. Moment (kip-ft)	30.56		1.50	52.49		1.00
Req. Max Neg. Moment (kip-ft)	-0.49	28	7.05	-0.76	28	1.00
Provided Neg. Moment (kip-ft)	-35.96		7.05	-62.43		1.00
Req. Max Punching Shear (kip)	47.37	4	4.04			
Provided Punching Shear (kip)	177.85		4.04			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf)......................... 2.5
Soil Subgrade Modulus (ksf / ft)................................. 60.0
Max Unfactored Soil Bearing (ksf)............................. 1.8 Ld Co # 64
Max Average Unfactored Soil Bearing (ksf)................ 1.1

FOOTING DESIGN

Footing #.................................... 40
Length (ft):................................ 139.33
Width (ft):.................................. 4.00
Thickness (ft):............................ 1.00
Footing Orientation (deg):......... 0.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.00 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.31

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/44.00	H/S	10-#3
2	44.00/99.00	S/S	10-#3
3	99.00/125.00	S/S	10-#3
4	125.00/139.33	S/H	10-#3

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.81

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/72.00	H/S	10-#3
2	72.00/112.00	S/S	10-#3
3	112.00/139.33	S/H	10-#3

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.88 Bottom Bar Depth (in) 8.38

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 1.00	3-#3	3-#3
2	1.00/22.50	52-#3	52-#3
3	22.50/85.50	153-#3	153-#3
4	85.50/111.50	63-#3	63-#3
5	111.50/138.00	65-#3	65-#3
6	138.00/139.33	2-#4	2-#4

Longitudinal Shear Reinforcement:

No Shear Reinforcement Required.

SUPPORTED MEMBERS

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(39.17,106.00) to (59.75,106.00)	11.79	247.00x10.00	Wall	0.00
(59.75,106.00) to (123.50,106.00)	53.96	765.00x10.00	Wall	0.00
(123.50,106.00) to (149.50,106.00)	98.83	312.00x10.00	Wall	0.00
(149.50,106.00) to (175.50,106.00)	124.83	312.00x10.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	3.98	10	0.77			
Provided Shear (kip)	0.00		0.77			
Req. Max Pos. Moment (kip-ft)	5.27	10	1.50	81.83	4	22.50
Provided Pos. Moment (kip-ft)	42.29		1.50	598.30		22.50
Req. Max Neg. Moment (kip-ft)	-69.26	4	85.83	-8.02	38	22.50
Provided Neg. Moment (kip-ft)	-49.71		85.83	-708.92		22.50
Req. Max Punching Shear (kip)	192.21	4	53.96			
Provided Punching Shear (kip)	1172.41		53.96			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf).........................	2.5	
Soil Subgrade Modulus (ksf / ft).................................	60.0	
Max Unfactored Soil Bearing (ksf).............................	1.7	Ld Co # 58
Max Average Unfactored Soil Bearing (ksf)................	0.7	

FOOTING DESIGN

Footing #.................................... 41
Length (ft):................................ 98.33
Width (ft):.................................. 5.00
Thickness (ft):........................... 1.00
Footing Orientation (deg):......... 90.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.00 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.31

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/49.00	H/S	12-#3
2	49.00/98.33	S/H	12-#3

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.81

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/36.00	H/S	12-#3
2	36.00/62.00	S/S	12-#3
3	62.00/98.33	S/H	12-#3

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.88 Bottom Bar Depth (in) 8.31

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 1.00	None	1-#5
2	1.00/24.50	None	31-#4
3	24.50/28.50	None	10-#3
4	28.50/64.50	None	47-#4
5	64.50/84.50	None	26-#4
6	84.50/97.00	17-#4	17-#4
7	97.00/98.33	2-#4	2-#4

Longitudinal Shear Reinforcement:

No Shear Reinforcement Required.

SUPPORTED MEMBERS

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(175.50,10.67) to (175.50,33.65)	12.99	275.76x10.00	Wall	0.00
(175.50,33.65) to (175.50,38.13)	26.72	53.87x10.00	Wall	0.00
(175.50,38.13) to (175.50,73.64)	46.72	426.01x10.00	Wall	0.00
(175.50,73.64) to (175.50,94.00)	74.65	244.37x10.00	Wall	0.00
(175.50,94.00) to (175.50,106.00)	90.83	144.00x10.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	4.46	24	97.57			
Provided Shear (kip)	0.00		97.57			
Req. Max Pos. Moment (kip-ft)	5.51	24	96.83	79.89	4	28.50
Provided Pos. Moment (kip-ft)	50.81		96.83	340.79		28.50
Req. Max Neg. Moment (kip-ft)	-0.57	12	96.83	-2.75	44	84.50
Provided Neg. Moment (kip-ft)	-59.72		96.83	-147.01		84.50
Req. Max Punching Shear (kip)	178.15	4	46.72			
Provided Punching Shear (kip)	692.01		46.72			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf)......................... 2.5

Soil Subgrade Modulus (ksf / ft)................................. 60.0

Max Unfactored Soil Bearing (ksf)............................. 1.0 Ld Co # 64

Max Average Unfactored Soil Bearing (ksf)................ 0.7

FOOTING DESIGN

Footing #.................................... 42
Length (ft):................................ 139.33
Width (ft):.................................. 4.00
Thickness (ft):............................ 1.00
Footing Orientation (deg):......... 0.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.00 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.31

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/44.00	H/S	10-#3
2	44.00/99.00	S/S	10-#3
3	99.00/125.00	S/S	10-#3
4	125.00/139.33	S/H	10-#3

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.81

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/72.00	H/S	10-#3
2	72.00/111.00	S/S	10-#3
3	111.00/139.33	S/H	10-#3

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.88 Bottom Bar Depth (in) 8.38

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 1.00	3-#3	3-#3
2	1.00/22.50	52-#3	52-#3
3	22.50/85.50	153-#3	153-#3
4	85.50/111.50	63-#3	63-#3
5	111.50/138.00	65-#3	65-#3
6	138.00/139.33	2-#4	2-#4

Longitudinal Shear Reinforcement:

No Shear Reinforcement Required.

SUPPORTED MEMBERS

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(39.17,10.67) to (59.75,10.67)	11.79	247.00x10.00	Wall	-0.00
(59.75,10.67) to (123.50,10.67)	53.96	765.00x10.00	Wall	0.00
(123.50,10.67) to (149.58,10.67)	98.87	313.00x10.00	Wall	0.00
(149.58,10.67) to (175.50,10.67)	124.87	311.00x10.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	5.98	10	0.77			
Provided Shear (kip)	0.00		0.77			
Req. Max Pos. Moment (kip-ft)	7.96	10	1.50	93.84	4	22.50
Provided Pos. Moment (kip-ft)	42.29		1.50	598.30		22.50
Req. Max Neg. Moment (kip-ft)	-81.92	4	85.83	-8.02	38	22.50
Provided Neg. Moment (kip-ft)	-49.71		85.83	-708.92		22.50
Req. Max Punching Shear (kip)	227.28	4	53.96			
Provided Punching Shear (kip)	1172.41		53.96			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf)......................... 2.5
Soil Subgrade Modulus (ksf / ft)................................. 60.0
Max Unfactored Soil Bearing (ksf)............................. 2.0 Ld Co # 62
Max Average Unfactored Soil Bearing (ksf)................ 0.8

FOOTING DESIGN

Footing #.................................... 43
Length (ft):................................ 98.33
Width (ft):.................................. 5.00
Thickness (ft):............................ 1.00
Footing Orientation (deg):......... 90.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.00 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.31

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/49.00	H/S	12-#3
2	49.00/98.33	S/H	12-#3

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.81

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/36.00	H/S	12-#3
2	36.00/62.00	S/S	12-#3
3	62.00/98.33	S/H	12-#3

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.81 Bottom Bar Depth (in) 8.31

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 1.00	1-#5	1-#5
2	1.00/15.50	19-#4	19-#4
3	15.50/90.50	98-#4	98-#4
4	90.50/97.00	9-#4	9-#4
5	97.00/98.33	2-#4	2-#4

Longitudinal Shear Reinforcement:

No Shear Reinforcement Required.

Continuous Foundation Design

SUPPORTED MEMBERS

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(39.17,10.67) to (39.17,24.23)	8.28	162.76x10.00	Wall	0.00
(39.17,24.23) to (39.17,99.33)	52.62	901.26x10.00	Wall	0.00
(39.17,99.33) to (39.17,106.00)	93.50	79.99x10.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	4.14	12	0.00			
Provided Shear (kip)	0.00		0.00			
Req. Max Pos. Moment (kip-ft)	5.21	12	1.14	175.75	4	15.50
Provided Pos. Moment (kip-ft)	50.81		1.14	710.56		15.50
Req. Max Neg. Moment (kip-ft)	-1.14	12	96.83	-16.52	38	15.50
Provided Neg. Moment (kip-ft)	-59.72		96.83	-842.86		15.50
Req. Max Punching Shear (kip)	327.02	4	52.62			
Provided Punching Shear (kip)	1359.50		52.62			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf).........................	2.5	
Soil Subgrade Modulus (ksf / ft).................................	60.0	
Max Unfactored Soil Bearing (ksf).............................	2.1	Ld Co # 48
Max Average Unfactored Soil Bearing (ksf)................	0.7	

FOOTING DESIGN

Footing #.................................. 52
Length (ft):................................ 34.94
Width (ft):.................................. 3.00
Thickness (ft):............................ 1.00
Footing Orientation (deg):......... 0.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.00 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.25

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/13.00	H/S	4-#4
2	13.00/22.00	S/S	4-#4
3	22.00/34.94	S/H	4-#4

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.75

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/13.00	H/S	4-#4
2	13.00/22.00	S/S	4-#4
3	22.00/34.94	S/H	4-#4

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.81 Bottom Bar Depth (in) 8.31

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 1.00	3-#3	3-#3
2	1.00/34.00	128-#3	128-#3
3	34.00/34.94	3-#3	3-#3

Longitudinal Shear Reinforcement:

No Shear Reinforcement Required.

SUPPORTED MEMBERS

Continuous Foundation Design

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(15.67,-0.00) to (47.61,0.00)	17.47	383.28x10.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	1.02	10	0.77			
Provided Shear (kip)	0.00		0.77			
Req. Max Pos. Moment (kip-ft)	1.31	6	33.44	8.85	4	1.00
Provided Pos. Moment (kip-ft)	30.56		33.44	304.40		1.00
Req. Max Neg. Moment (kip-ft)	-0.37	22	1.50	-1.97	38	1.00
Provided Neg. Moment (kip-ft)	-35.96		1.50	-362.24		1.00
Req. Max Punching Shear (kip)	39.12	10	17.47			
Provided Punching Shear (kip)	629.64		17.47			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf)......................... 2.5
Soil Subgrade Modulus (ksf / ft)................................. 60.0
Max Unfactored Soil Bearing (ksf)............................. 0.5 Ld Co # 62
Max Average Unfactored Soil Bearing (ksf)................ 0.4

Continuous Foundation Design

FN-60

FOOTING DESIGN

Footing #.................................... 31
Length (ft):................................ 15.94
Width (ft):.................................. 3.00
Thickness (ft):............................ 1.00
Footing Orientation (deg):......... 0.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf)	Dead Load:	0.00	Live Load:	0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.25

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/ 6.00	H/S	4-#4
2	6.00/10.00	S/S	4-#4
3	10.00/15.94	S/H	4-#4

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.75

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/ 6.00	H/S	4-#4
2	6.00/10.00	S/S	4-#4
3	10.00/15.94	S/H	4-#4

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.81   Bottom Bar Depth (in) 8.31

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 2.00	6-#3	6-#3
2	2.00/14.00	43-#3	43-#3
3	14.00/15.94	5-#3	5-#3

Longitudinal Shear Reinforcement:

Number of Shear bar legs:.......................... 2

Seg.	Segment	Spacing

Continuous Foundation Design

Num.	Start/End (ft)	(in)	Quantity
1	0.00/ 1.52	Not Applic.	None
2	14.42/15.94	Not Applic.	None

Cover (in) Top...........1.50 Bottom.....3.00 Side..........3.00

SUPPORTED MEMBERS

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(26.73,94.00) to (38.17,94.00)	7.97	137.26x 8.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	8.68	186	1.52			
Provided Shear (kip)	25.88		1.52			
Req. Max Pos. Moment (kip-ft)	18.77	186	2.25	3.52	6	2.00
Provided Pos. Moment (kip-ft)	30.56		2.25	112.94		2.00
Req. Max Neg. Moment (kip-ft)	-1.54	146	13.69	-1.66	146	2.00
Provided Neg. Moment (kip-ft)	-35.96		13.69	-134.31		2.00
Req. Max Punching Shear (kip)	28.16	130	7.97			
Provided Punching Shear (kip)	279.15		7.97			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf)......................... 2.5
Soil Subgrade Modulus (ksf / ft)................................. 60.0
Max Unfactored Soil Bearing (ksf)............................. 0.7 Ld Co # 350
Max Average Unfactored Soil Bearing (ksf)................ 0.5

FOOTING DESIGN

Footing #.................................. 32
Length (ft):............................... 26.90
Width (ft):................................. 3.00
Thickness (ft):........................... 1.00
Footing Orientation (deg):......... 0.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.00 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.25

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/10.00	H/S	4-#4
2	10.00/17.00	S/S	4-#4
3	17.00/26.90	S/H	4-#4

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.75

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/10.00	H/S	8-#4
2	10.00/17.00	S/S	4-#4
3	17.00/26.90	S/H	7-#4

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.81 Bottom Bar Depth (in) 8.31

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 3.00	8-#3	8-#3
2	3.00/24.00	74-#3	74-#3
3	24.00/26.90	8-#3	8-#3

Longitudinal Shear Reinforcement:

Number of Shear bar legs:..........................2

Seg.	Segment	Spacing

Continuous Foundation Design

Num.	Start/End (ft)	(in)	Quantity
1	0.00/ 3.02	Not Applic.	None
2	23.88/26.90	Not Applic.	None

Cover (in) Top...........1.50 Bottom.....3.00 Side..........3.00

SUPPORTED MEMBERS

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(3.96,94.00) to (23.35,94.00)	13.45	232.75x 8.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	15.05	186	0.00			
Provided Shear (kip)	25.88		0.00			
Req. Max Pos. Moment (kip-ft)	54.90	186	3.75	5.91	186	0.00
Provided Pos. Moment (kip-ft)	59.24		3.75	29.01		0.00
Req. Max Neg. Moment (kip-ft)	-4.28	146	23.15	-2.90	126	3.00
Provided Neg. Moment (kip-ft)	-35.96		23.15	-231.30		3.00
Req. Max Punching Shear (kip)	53.69	130	13.45			
Provided Punching Shear (kip)	410.93		13.45			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf).........................	2.5	
Soil Subgrade Modulus (ksf / ft).................................	60.0	
Max Unfactored Soil Bearing (ksf).............................	0.6	Ld Co # 350
Max Average Unfactored Soil Bearing (ksf)................	0.5	

Continuous Foundation Design

FOOTING DESIGN

Footing #................................... 33
Length (ft):................................ 9.90
Width (ft):.................................. 3.00
Thickness (ft):............................ 1.00
Footing Orientation (deg):......... 90.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.00 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.25

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/ 4.00	H/S	4-#4
2	4.00/ 6.00	S/S	4-#4
3	6.00/ 9.90	S/H	4-#4

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.75

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/ 4.00	H/S	4-#4
2	4.00/ 6.00	S/S	4-#4
3	6.00/ 9.90	S/H	4-#4

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.81 Bottom Bar Depth (in) 8.31

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 2.00	6-#3	6-#3
2	2.00/ 8.00	22-#3	22-#3
3	8.00/ 9.90	5-#3	5-#3

Longitudinal Shear Reinforcement:

Number of Shear bar legs:..........................2

Seg.	Segment	Spacing

Continuous Foundation Design

Num.	Start/End (ft)	(in)	Quantity
1	0.00/ 1.52	Not Applic.	None
2	8.38/ 9.90	Not Applic.	None

Cover (in) Top...........1.50 Bottom.....3.00 Side..........3.00

SUPPORTED MEMBERS

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(0.00,78.21) to (0.00,83.61)	4.95	64.75x 8.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	8.37	184	8.38			
Provided Shear (kip)	25.88		8.38			
Req. Max Pos. Moment (kip-ft)	17.82	184	7.65	3.60	7	2.00
Provided Pos. Moment (kip-ft)	30.56		7.65	57.72		2.00
Req. Max Neg. Moment (kip-ft)	-1.45	144	2.25	-0.46	128	0.00
Provided Neg. Moment (kip-ft)	-35.96		2.25	-25.73		0.00
Req. Max Punching Shear (kip)	35.18	7	4.95			
Provided Punching Shear (kip)	182.71		4.95			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf)......................... 2.5
Soil Subgrade Modulus (ksf / ft)................................. 60.0
Max Unfactored Soil Bearing (ksf)............................. 1.0 Ld Co # 324
Max Average Unfactored Soil Bearing (ksf)................ 0.8

FOOTING DESIGN

Footing #.................................. 34
Length (ft):................................ 6.75
Width (ft):.................................. 3.00
Thickness (ft):........................... 1.00
Footing Orientation (deg):......... 90.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.00 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.25

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/ 2.00	H/S	4-#4
2	2.00/ 4.00	S/S	4-#4
3	4.00/ 6.75	S/H	4-#4

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.75

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/ 2.00	H/S	4-#4
2	2.00/ 4.00	S/S	4-#4
3	4.00/ 6.75	S/H	4-#4

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.81 Bottom Bar Depth (in) 8.31

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 1.00	None	3-#3
2	1.00/ 6.00	18-#3	18-#3
3	6.00/ 6.75	2-#3	2-#3

Longitudinal Shear Reinforcement:

No Shear Reinforcement Required.

SUPPORTED MEMBERS

Continuous Foundation Design

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(0.00,60.33) to (0.00,64.08)	3.38	45.00x 8.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	7.27	19	0.77			
Provided Shear (kip)	0.00		0.77			
Req. Max Pos. Moment (kip-ft)	9.71	19	1.50	5.15	7	1.00
Provided Pos. Moment (kip-ft)	30.56		1.50	47.27		1.00
Req. Max Neg. Moment (kip-ft)	-0.34	188	5.25	-0.35	188	1.00
Provided Neg. Moment (kip-ft)	-35.96		5.25	-56.21		1.00
Req. Max Punching Shear (kip)	39.55	19	3.38			
Provided Punching Shear (kip)	158.88		3.38			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf)......................... 2.5
Soil Subgrade Modulus (ksf / ft)................................. 60.0
Max Unfactored Soil Bearing (ksf)............................. 1.5 Ld Co # 328
Max Average Unfactored Soil Bearing (ksf)................ 1.2

FOOTING DESIGN

Footing #.................................... 35
Length (ft):................................ 24.50
Width (ft):.................................. 3.00
Thickness (ft):............................ 1.00
Footing Orientation (deg):......... 90.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.00 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.25

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/ 9.00	H/S	4-#4
2	9.00/15.00	S/S	4-#4
3	15.00/24.50	S/H	4-#4

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.63

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/ 9.00	H/S	7-#6
2	9.00/15.00	S/S	4-#6
3	15.00/24.50	S/H	5-#6

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.81 Bottom Bar Depth (in) 8.06

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 7.00	19-#3	19-#3
2	7.00/18.00	39-#3	39-#3
3	18.00/24.50	17-#3	17-#3

Longitudinal Shear Reinforcement:

Number of Shear bar legs:.........................2

Seg.	Segment	Spacing

Num.	Start/End (ft)	(in)	Quantity
1	0.00/ 6.53	Not Applic.	None
2	17.97/24.50	Not Applic.	None

Cover (in) Top...........1.50 Bottom.....3.00 Side..........3.00

SUPPORTED MEMBERS

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(0.00,33.65) to (0.00,43.65)	12.25	120.00x 8.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	17.61	185	17.97			
Provided Shear (kip)	25.51		17.97			
Req. Max Pos. Moment (kip-ft)	104.24	189	7.25	8.35	7	7.00
Provided Pos. Moment (kip-ft)	105.59		7.25	99.25		7.00
Req. Max Neg. Moment (kip-ft)	-15.99	149	17.25	-1.60	128	0.00
Provided Neg. Moment (kip-ft)	-35.96		17.25	-81.73		0.00
Req. Max Punching Shear (kip)	88.11	129	12.25			
Provided Punching Shear (kip)	248.89		12.25			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf).........................	2.5	
Soil Subgrade Modulus (ksf / ft)..................................	60.0	
Max Unfactored Soil Bearing (ksf)..............................	1.0	Ld Co # 325
Max Average Unfactored Soil Bearing (ksf)................	0.8	

Continuous Foundation Design

FOOTING DESIGN

Footing #.................................. 36
Length (ft):............................... 8.32(l1 = 1.50 l2 = 1.75)
Width (ft):................................. 3.00
Thickness (ft):........................... 1.00
Footing Orientation (deg):......... 90.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.00 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.25

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/ 3.00	H/S	4-#4
2	3.00/ 5.00	S/S	4-#4
3	5.00/ 8.32	S/H	4-#4

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.75

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/ 3.00	H/S	4-#4
2	3.00/ 5.00	S/S	4-#4
3	5.00/ 8.32	S/H	4-#4

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.81 Bottom Bar Depth (in) 8.31

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 1.00	3-#3	3-#3
2	1.00/ 6.50	20-#3	20-#3
3	6.50/ 8.00	5-#3	5-#3
4	8.00/ 8.32	1-#3	1-#3

Longitudinal Shear Reinforcement:

No Shear Reinforcement Required.

Continuous Foundation Design

SUPPORTED MEMBERS

Columns:

Location	Loc. Along Footing (ft):	Size	Column Orientation	Base Plate (LxW) (in):	% Rigid
(5.67 - 24.30)	6.57	HSS5X5X3/8	0.00	18.00x10.00	50

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(5.67,19.23) to (5.67,24.30)	4.04	60.87x 8.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	9.58	188	0.77			
Provided Shear (kip)	0.00		0.77			
Req. Max Pos. Moment (kip-ft)	13.51	188	1.50	5.27	19	1.00
Provided Pos. Moment (kip-ft)	30.56		1.50	52.49		1.00
Req. Max Neg. Moment (kip-ft)	-0.49	132	7.05	-0.76	148	1.00
Provided Neg. Moment (kip-ft)	-35.96		7.05	-62.43		1.00
Req. Max Punching Shear (kip)	49.29	19	4.04			
Provided Punching Shear (kip)	177.85		4.04			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf)......................... 2.5
Soil Subgrade Modulus (ksf / ft)................................. 60.0
Max Unfactored Soil Bearing (ksf)............................. 1.8 Ld Co # 328
Max Average Unfactored Soil Bearing (ksf)................ 1.1

FOOTING DESIGN

Footing #.................................... 37
Length (ft):................................ 34.94
Width (ft):.................................. 3.00
Thickness (ft):............................ 1.00
Footing Orientation (deg):......... 0.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.00 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.25

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/17.00	H/S	4-#4
2	17.00/34.94	S/H	4-#4

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.75

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/13.00	H/S	4-#4
2	13.00/22.00	S/S	4-#4
3	22.00/34.94	S/H	4-#4

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 10.00 Bottom Bar Depth (in) 8.31

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 1.00	None	3-#3
2	1.00/34.00	None	117-#3
3	34.00/34.94	None	3-#3

Longitudinal Shear Reinforcement:

No Shear Reinforcement Required.

SUPPORTED MEMBERS

Walls:

Continuous Foundation Design

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(15.67,-0.00) to (47.61,0.00)	17.47	383.28x 8.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	0.73	130	0.77			
Provided Shear (kip)	0.00		0.77			
Req. Max Pos. Moment (kip-ft)	0.92	130	1.50	11.03	6	1.00
Provided Pos. Moment (kip-ft)	30.56		1.50	307.46		1.00
Req. Max Neg. Moment (kip-ft)	-0.06	186	33.44	-0.00	-1	0.00
Provided Neg. Moment (kip-ft)	-35.96		33.44	-0.00		0.00
Req. Max Punching Shear (kip)	40.26	18	17.47			
Provided Punching Shear (kip)	620.73		17.47			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf)........................ 2.5
Soil Subgrade Modulus (ksf / ft)................................ 60.0
Max Unfactored Soil Bearing (ksf)............................. 0.5 Ld Co # 326
Max Average Unfactored Soil Bearing (ksf)............... 0.3

FOOTING DESIGN

Footing #.................................... 40
Length (ft):................................. 139.33
Width (ft):.................................. 4.00
Thickness (ft):............................ 1.00
Footing Orientation (deg):......... 0.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.00 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.31

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/44.00	H/S	10-#3
2	44.00/99.00	S/S	10-#3
3	99.00/125.00	S/S	10-#3
4	125.00/139.33	S/H	10-#3

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.81

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/72.00	H/S	10-#3
2	72.00/111.00	S/S	10-#3
3	111.00/139.33	S/H	10-#3

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.88 Bottom Bar Depth (in) 8.38

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 1.00	3-#3	3-#3
2	1.00/22.50	52-#3	52-#3
3	22.50/85.50	153-#3	153-#3
4	85.50/111.50	63-#3	63-#3
5	111.50/138.00	65-#3	65-#3
6	138.00/139.33	2-#4	2-#4

Longitudinal Shear Reinforcement:

No Shear Reinforcement Required.

SUPPORTED MEMBERS

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(39.17,106.00) to (59.75,106.00)	11.79	247.00x10.00	Wall	0.00
(59.75,106.00) to (123.50,106.00)	53.96	765.00x10.00	Wall	0.00
(123.50,106.00) to (149.50,106.00)	98.83	312.00x10.00	Wall	0.00
(149.50,106.00) to (175.50,106.00)	124.83	312.00x10.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	4.04	130	0.77			
Provided Shear (kip)	0.00		0.77			
Req. Max Pos. Moment (kip-ft)	5.34	130	1.50	120.99	13	22.50
Provided Pos. Moment (kip-ft)	42.29		1.50	598.30		22.50
Req. Max Neg. Moment (kip-ft)	-109.64	13	85.83	-8.02	182	22.50
Provided Neg. Moment (kip-ft)	-49.71		85.83	-708.92		22.50
Req. Max Punching Shear (kip)	302.40	4	53.96			
Provided Punching Shear (kip)	1172.41		53.96			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf)......................... 2.5

Soil Subgrade Modulus (ksf / ft)................................. 60.0

Max Unfactored Soil Bearing (ksf)............................. 2.4 Ld Co # 192

Max Average Unfactored Soil Bearing (ksf)................ 0.9

Continuous Foundation Design

FOOTING DESIGN

Footing #.................................... 41
Length (ft):................................ 98.33
Width (ft):.................................. 5.00
Thickness (ft):........................... 1.00
Footing Orientation (deg):......... 90.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.00 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.31

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/49.00	H/S	12-#3
2	49.00/98.33	S/H	12-#3

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.81

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/36.00	H/S	12-#3
2	36.00/62.00	S/S	12-#3
3	62.00/98.33	S/H	12-#3

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.88 Bottom Bar Depth (in) 8.31

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 1.00	None	1-#5
2	1.00/24.50	None	31-#4
3	24.50/28.50	None	10-#3
4	28.50/64.50	None	47-#4
5	64.50/84.50	None	26-#4
6	84.50/97.00	17-#4	17-#4
7	97.00/98.33	2-#4	2-#4

Longitudinal Shear Reinforcement:

No Shear Reinforcement Required.

SUPPORTED MEMBERS

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(175.50,10.67) to (175.50,33.65)	12.99	275.76x10.00	Wall	0.00
(175.50,33.65) to (175.50,38.13)	26.72	53.87x10.00	Wall	0.00
(175.50,38.13) to (175.50,73.64)	46.72	426.01x10.00	Wall	0.00
(175.50,73.64) to (175.50,94.00)	74.65	244.37x10.00	Wall	0.00
(175.50,94.00) to (175.50,106.00)	90.83	144.00x10.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	4.52	144	97.57			
Provided Shear (kip)	0.00		97.57			
Req. Max Pos. Moment (kip-ft)	5.59	144	96.83	91.89	24	28.50
Provided Pos. Moment (kip-ft)	50.81		96.83	340.79		28.50
Req. Max Neg. Moment (kip-ft)	-0.57	188	96.83	-2.75	188	84.50
Provided Neg. Moment (kip-ft)	-59.72		96.83	-147.01		84.50
Req. Max Punching Shear (kip)	226.24	19	46.72			
Provided Punching Shear (kip)	692.01		46.72			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf)......................... 2.5
Soil Subgrade Modulus (ksf / ft)................................. 60.0
Max Unfactored Soil Bearing (ksf)............................. 1.1 Ld Co # 192
Max Average Unfactored Soil Bearing (ksf)................ 0.7

FOOTING DESIGN

Footing #.................................... 42
Length (ft):................................ 139.33
Width (ft):.................................. 4.00
Thickness (ft):............................ 1.00
Footing Orientation (deg):......... 0.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.00 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.31

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/44.00	H/S	10-#3
2	44.00/99.00	S/S	10-#3
3	99.00/125.00	S/S	10-#3
4	125.00/139.33	S/H	10-#3

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.81

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/72.00	H/S	10-#3
2	72.00/111.00	S/S	10-#3
3	111.00/139.33	S/H	10-#3

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.88 Bottom Bar Depth (in) 8.38

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 1.00	3-#3	3-#3
2	1.00/22.50	52-#3	52-#3
3	22.50/85.50	153-#3	153-#3
4	85.50/111.50	63-#3	63-#3
5	111.50/138.00	65-#3	65-#3
6	138.00/139.33	2-#4	2-#4

Longitudinal Shear Reinforcement:
No Shear Reinforcement Required.

SUPPORTED MEMBERS

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(39.17,10.67) to (59.75,10.67)	11.79	247.00x10.00	Wall	-0.00
(59.75,10.67) to (123.50,10.67)	53.96	765.00x10.00	Wall	0.00
(123.50,10.67) to (149.58,10.67)	98.87	313.00x10.00	Wall	0.00
(149.58,10.67) to (175.50,10.67)	124.87	311.00x10.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	6.00	130	0.77			
Provided Shear (kip)	0.00		0.77			
Req. Max Pos. Moment (kip-ft)	7.99	130	1.50	108.49	6	22.50
Provided Pos. Moment (kip-ft)	42.29		1.50	598.30		22.50
Req. Max Neg. Moment (kip-ft)	-96.64	7	85.83	-8.02	182	22.50
Provided Neg. Moment (kip-ft)	-49.71		85.83	-708.92		22.50
Req. Max Punching Shear (kip)	267.25	4	53.96			
Provided Punching Shear (kip)	1172.41		53.96			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf)........................ 2.5
Soil Subgrade Modulus (ksf / ft)................................ 60.0
Max Unfactored Soil Bearing (ksf)............................. 2.2 Ld Co # 192
Max Average Unfactored Soil Bearing (ksf)................ 0.9

Continuous Foundation Design

FOOTING DESIGN

Footing #.................................... 43
Length (ft):................................ 98.33
Width (ft):.................................. 5.00
Thickness (ft):............................ 1.00
Footing Orientation (deg):......... 90.00[a]
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 145.00 Ec (ksi): 3155.92
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf)	Dead Load:	0.00	Live Load:	0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 10.31

Seg.	**Spacing**	**Bar End Condition**	**Top Bars**
Num.	**Start/End (ft)**	**Start/End**	
1	0.00/49.00	H/S	12-#3
2	49.00/98.33	S/H	12-#3

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 8.81

Seg.	**Spacing**	**Bar End Condition**	**Bot. Bars**
Num.	**Start/End (ft)**	**Start/End**	
1	0.00/36.00	H/S	12-#3
2	36.00/62.00	S/S	12-#3
3	62.00/98.33	S/H	12-#3

Transverse Flexure Reinforcement:

Top Bar Depth (in) .... 9.81 Bottom Bar Depth (in) 8.31

Seg.	**Segment**	**Top Bars**	**Bot. Bars**
Num.	**Start/End (ft)**		
1	0.00/ 1.00	1-#5	1-#5
2	1.00/15.50	19-#4	19-#4
3	15.50/90.50	98-#4	98-#4
4	90.50/97.00	9-#4	9-#4
5	97.00/98.33	2-#4	2-#4

Longitudinal Shear Reinforcement:

No Shear Reinforcement Required.

SUPPORTED MEMBERS

Walls:

Wall Location (ft):	Loc. Along Footing (ft):	Size (LxW) (in):	Type	Orientation
(39.17,10.67) to (39.17,24.23)	8.28	162.76x10.00	Wall	0.00
(39.17,24.23) to (39.17,99.33)	52.62	901.26x10.00	Wall	0.00
(39.17,99.33) to (39.17,106.00)	93.50	79.99x10.00	Wall	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	4.15	132	0.00			
Provided Shear (kip)	0.00		0.00			
Req. Max Pos. Moment (kip-ft)	5.22	132	1.14	198.41	7	15.50
Provided Pos. Moment (kip-ft)	50.81		1.14	710.56		15.50
Req. Max Neg. Moment (kip-ft)	-1.14	132	96.83	-16.52	182	15.50
Provided Neg. Moment (kip-ft)	-59.72		96.83	-842.86		15.50
Req. Max Punching Shear (kip)	398.72	19	52.62			
Provided Punching Shear (kip)	1359.50		52.62			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf)......................... 2.5
Soil Subgrade Modulus (ksf / ft)................................. 60.0
Max Unfactored Soil Bearing (ksf)............................. 2.4 Ld Co # 192
Max Average Unfactored Soil Bearing (ksf)................ 0.7

Concrete Beam

Project File: Enercalc.ec6

DESCRIPTION: --None--

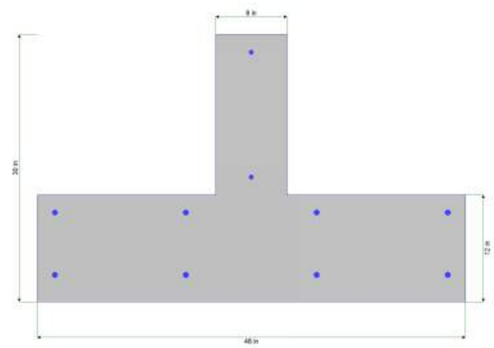
CODE REFERENCES

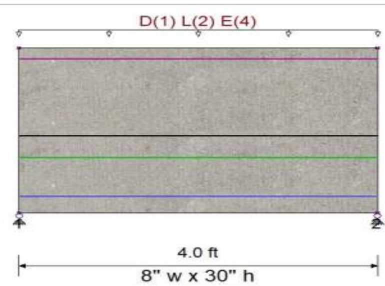
Calculations per ACI 318-19, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

General Information

f'c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
fr = $f'c^{1/2}$ * 7.50	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups		40.0 ksi
fy - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #		3
			Number of Resisting Legs Per Stirrup =		2

Seismic Design Category = A





Cross Section & Reinforcing Details

Inverted Tee Section, Stem Width = 8.0 in, Total Height = 30.0 in, Top Flange Width = 48.0 in, Flange Thickness = 12.0 in
Span #1 Reinforcing....
4-#5 at 3.0 in from Bottom, from 0.0 to 4.0 ft in this span
1-#4 at 2.0 in from Top, from 0.0 to 4.0 ft in this span
4-#5 at 10.0 in from Bottom, from 0.0 to 4.0 ft in this spa
1-#4 at 14.0 in from Bottom, from 0.0 to 4.0 ft in this spa

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 1.0, L = 2.0, E = 4.0 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.060** : 1	
Section used for this span	**Typical Section**	
Mu : Applied	14.140	k-ft
Mn * Phi : Allowable	233.956	k-ft
Location of maximum on span	2.004	ft
Span # where maximum occurs	Span # 1	

Maximum Deflection

Max Downward Transient Deflection	0.000 in	Ratio =	0 <360.0	L Only
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360.0	E Only
Max Downward Total Deflection	0.000 in	Ratio =	0 <180.0	Span: 1 : +D+0.750L+0.5250E
Max Upward Total Deflection	0.000 in	Ratio =	0 <180.0	Span: 1 : +D+0.750L+0.5250E

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	10.650	10.650
Max Upward from Load Combinations	10.650	10.650
Max Upward from Load Cases	8.000	8.000
D Only	3.450	3.450
+D+L	7.450	7.450
+D+0.750L	6.450	6.450

Concrete Beam

Project File: Enercalc.ec6

DESCRIPTION: --None--

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
+D+0.70E	9.050	9.050
+D+0.750L+0.5250E	10.650	10.650
+0.60D	2.070	2.070
+0.60D+0.70E	7.670	7.670
L Only	4.000	4.000
E Only	8.000	8.000

Shear Stirrup Requirements

Between 0.00 to 0.94 ft, Phi*lambda*sqrt(f'c)*bw*d < Vu <= Phi*Vc, Req'd Vs = Min per 9.6.3.1, use #3 stirrups spaced at 11.000 in
Between 0.95 to 3.05 ft, Vu <= Phi*lambda*sqrt(f'c)*bw*d, Req'd Vs = Not Reqd per 9.3.6.1, Stirrups are not required.
Between 3.06 to 3.99 ft, Phi*lambda*sqrt(f'c)*bw*d < Vu <= Phi*Vc, Req'd Vs = Min per 9.6.3.1, use #3 stirrups spaced at 11.000 in

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu Actual	(k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd
+1.20D+0.50L+E	1	0.00	22.67	14.14	14.14	0.00	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.04	22.67	13.83	13.83	0.61	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.09	22.67	13.52	13.52	1.21	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.13	22.67	13.21	13.21	1.79	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.17	22.67	12.90	12.90	2.36	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.22	22.67	12.59	12.59	2.92	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.26	22.67	12.29	12.29	3.47	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.31	22.67	11.98	11.98	4.00	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.35	22.67	11.67	11.67	4.51	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.39	22.67	11.36	11.36	5.02	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.44	22.67	11.05	11.05	5.51	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.48	22.67	10.74	10.74	5.98	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.52	22.67	10.43	10.43	6.44	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.57	22.67	10.12	10.12	6.89	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.61	22.67	9.81	9.81	7.33	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.66	22.67	9.50	9.50	7.75	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.70	22.67	9.19	9.19	8.16	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.74	22.67	8.89	8.89	8.56	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.79	22.67	8.58	8.58	8.94	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.83	22.67	8.27	8.27	9.31	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.87	22.67	7.96	7.96	9.66	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.92	22.67	7.65	7.65	10.00	1.00	14.90	Phi*lambda*sqrt	in per 9.6.:	28.5	11.3
+1.20D+0.50L+E	1	0.96	22.67	7.34	7.34	10.33	1.00	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.01	22.67	7.03	7.03	10.64	1.00	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.05	22.67	6.72	6.72	10.94	1.00	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.09	22.67	6.41	6.41	11.23	1.00	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.14	22.67	6.10	6.10	11.50	1.00	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.18	22.67	5.80	5.80	11.76	0.93	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.22	22.67	5.49	5.49	12.01	0.86	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.27	22.67	5.18	5.18	12.24	0.80	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.31	22.67	4.87	4.87	12.46	0.74	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.36	22.67	4.56	4.56	12.67	0.68	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.40	22.67	4.25	4.25	12.86	0.62	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.44	22.67	3.94	3.94	13.04	0.57	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.49	22.67	3.63	3.63	13.21	0.52	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.53	22.67	3.32	3.32	13.36	0.47	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.57	22.67	3.01	3.01	13.50	0.42	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.62	22.67	2.70	2.70	13.62	0.37	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.66	22.67	2.40	2.40	13.73	0.33	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.70	22.67	2.09	2.09	13.83	0.28	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.75	22.67	1.78	1.78	13.92	0.24	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.79	22.67	1.47	1.47	13.99	0.20	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.84	22.67	1.16	1.16	14.04	0.16	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.88	22.67	0.85	0.85	14.09	0.11	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	1.92	22.67	0.54	0.54	14.12	0.07	11.44	Vu <= Phi*lambd	ot Reqd pe	11.4	0.0

Concrete Beam

Project File: Enercalc.ec6

LIC# : KW-06015170, Build:20.24.06.04 DUNN ASSOCIATES INC.

DESCRIPTION: --None--

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu Actual	(k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd
+1.20D+0.50L+E	1	1.97	22.67	0.23	0.23	14.14	0.03	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.01	22.67	-0.08	0.08	14.14	0.01	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.05	22.67	-0.39	0.39	14.13	0.05	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.10	22.67	-0.70	0.70	14.11	0.09	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.14	22.67	-1.00	1.00	14.07	0.13	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.19	22.67	-1.31	1.31	14.02	0.18	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.23	22.67	-1.62	1.62	13.95	0.22	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.27	22.67	-1.93	1.93	13.88	0.26	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.32	22.67	-2.24	2.24	13.78	0.31	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.36	22.67	-2.55	2.55	13.68	0.35	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.40	22.67	-2.86	2.86	13.56	0.40	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.45	22.67	-3.17	3.17	13.43	0.45	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.49	22.67	-3.48	3.48	13.28	0.49	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.54	22.67	-3.79	3.79	13.13	0.54	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.58	22.67	-4.10	4.10	12.95	0.60	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.62	22.67	-4.40	4.40	12.77	0.65	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.67	22.67	-4.71	4.71	12.57	0.71	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.71	22.67	-5.02	5.02	12.36	0.77	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.75	22.67	-5.33	5.33	12.13	0.83	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.80	22.67	-5.64	5.64	11.89	0.90	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.84	22.67	-5.95	5.95	11.64	0.97	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.89	22.67	-6.26	6.26	11.37	1.00	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.93	22.67	-6.57	6.57	11.09	1.00	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	2.97	22.67	-6.88	6.88	10.80	1.00	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	3.02	22.67	-7.19	7.19	10.49	1.00	11.44	Vu <= Phi*lambd	t Reqd pe	11.4	0.0
+1.20D+0.50L+E	1	3.06	22.67	-7.49	7.49	10.17	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.10	22.67	-7.80	7.80	9.83	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.15	22.67	-8.11	8.11	9.48	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.19	22.67	-8.42	8.42	9.12	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.23	22.67	-8.73	8.73	8.75	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.28	22.67	-9.04	9.04	8.36	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.32	22.67	-9.35	9.35	7.96	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.37	22.67	-9.66	9.66	7.54	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.41	22.67	-9.97	9.97	7.11	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.45	22.67	-10.28	10.28	6.67	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.50	22.67	-10.59	10.59	6.22	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.54	22.67	-10.89	10.89	5.75	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.58	22.67	-11.20	11.20	5.26	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.63	22.67	-11.51	11.51	4.77	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.67	22.67	-11.82	11.82	4.26	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.72	22.67	-12.13	12.13	3.73	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.76	22.67	-12.44	12.44	3.20	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.80	22.67	-12.75	12.75	2.64	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.85	22.67	-13.06	13.06	2.08	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.89	22.67	-13.37	13.37	1.50	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.93	22.67	-13.68	13.68	0.91	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3
+1.20D+0.50L+E	1	3.98	22.67	-13.99	13.99	0.31	1.00	14.90	Phi*lambda*sqrt	in per 9.6.	28.5	11.3

Maximum Forces & Stresses for Load Combinations

Load Combination Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	4.000	14.14	233.96	0.06
+1.40D					
Span # 1	1	4.000	4.83	233.96	0.02
+1.20D+1.60L					
Span # 1	1	4.000	10.54	233.96	0.05
+1.20D+0.50L					
Span # 1	1	4.000	6.14	233.96	0.03

Concrete Beam

Project File: Enercalc.ec6

LIC# : KW-06015170, Build:20.24.06.04 DUNN ASSOCIATES INC.

DESCRIPTION: --None--

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
+1.20D					
Span # 1	1	4.000	4.14	233.96	0.02
+1.20D+0.50L+E					
Span # 1	1	4.000	14.14	233.96	0.06
+0.90D					
Span # 1	1	4.000	3.10	233.96	0.01
+0.90D+E					
Span # 1	1	4.000	11.10	233.96	0.05

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
+D+0.750L+0.5250E	1	0.0003	2.000		0.0000	0.000

Concrete Beam

Project File: Enercalc.ec6

LIC# : KW-06015170, Build:20.24.06.04 DUNN ASSOCIATES INC. (c) ENERCALC INC 1983-2023

DESCRIPTION: Copy of --None--

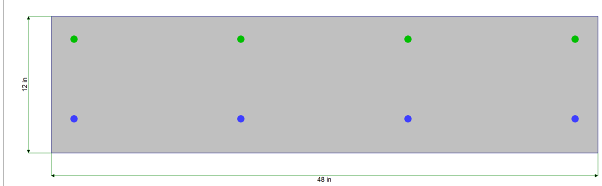
CODE REFERENCES

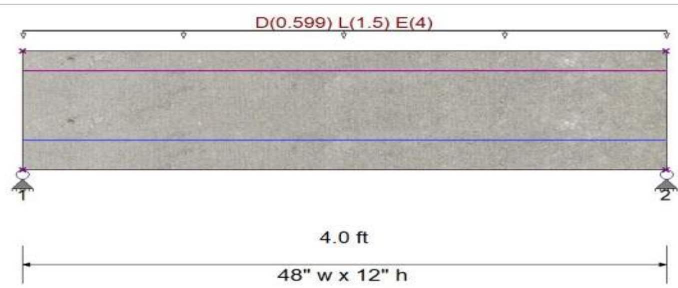
Calculations per ACI 318-19, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

General Information

f'c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
fr = $f'c^{1/2}$ * 7.50	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups		40.0 ksi
fy - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #		3
			Number of Resisting Legs Per Stirrup =		2

Seismic Design Category = A





Cross Section & Reinforcing Details

Rectangular Section, Width = 48.0 in, Height = 12.0 in
Span #1 Reinforcing....

4-#5 at 3.0 in from Bottom, from 0.0 to 4.0 ft in this span
1-#4 at 2.0 in from Top, from 0.0 to 4.0 ft in this span
4-#5 at 10.0 in from Bottom, from 0.0 to 4.0 ft in this spa
1-#4 at 14.0 in from Bottom, from 0.0 to 4.0 ft in this spa

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.5990, L = 1.50, E = 4.0 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.216** : 1
Section used for this span	**Typical Section**
Mu : Applied	12.330 k-ft
Mn * Phi : Allowable	57.055 k-ft
Location of maximum on span	1.996 ft
Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.001 in	Ratio =	44971	>=360.0	L Only
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360.0	E Only
Max Downward Total Deflection	0.001 in	Ratio =	40845	>=180.0	Span: 1 : +D+0.750L+0.5250E
Max Upward Total Deflection	0.000 in	Ratio =	0	<180.0	Span: 1 : +D+0.750L+0.5250E

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	8.808	8.808
Max Upward from Load Combinations	8.808	8.808
Max Upward from Load Cases	8.000	8.000
D Only	2.358	2.358
+D+L	5.358	5.358
+D+0.750L	4.608	4.608

Concrete Beam

Project File: Enercalc.ec6

LIC# : KW-06015170, Build:20.24.06.04 DUNN ASSOCIATES INC.

DESCRIPTION: Copy of --None--

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
+D+0.70E	7.958	7.958
+D+0.750L+0.5250E	8.808	8.808
+0.60D	1.415	1.415
+0.60D+0.70E	7.015	7.015
L Only	3.000	3.000
E Only	8.000	8.000

Shear Stirrup Requirements

Entire Beam Span Length : Vu <= Phi*lambda*sqrt(f'c)*bw*d, Req'd Vs = Not Reqd per 9.3.6.1, Stirrups are not required.

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu Actual	(k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd
+1.20D+0.50L+E	1	0.00	9.00	12.33	12.33	0.00	1.00	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.04	9.00	12.06	12.06	0.53	1.00	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.09	9.00	11.79	11.79	1.05	1.00	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.13	9.00	11.52	11.52	1.56	1.00	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.17	9.00	11.25	11.25	2.06	1.00	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.22	9.00	10.98	10.98	2.55	1.00	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.26	9.00	10.71	10.71	3.02	1.00	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.31	9.00	10.44	10.44	3.48	1.00	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.35	9.00	10.17	10.17	3.93	1.00	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.39	9.00	9.90	9.90	4.37	1.00	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.44	9.00	9.63	9.63	4.80	1.00	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.48	9.00	9.37	9.37	5.22	1.00	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.52	9.00	9.10	9.10	5.62	1.00	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.57	9.00	8.83	8.83	6.01	1.00	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.61	9.00	8.56	8.56	6.39	1.00	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.66	9.00	8.29	8.29	6.76	0.92	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.70	9.00	8.02	8.02	7.12	0.85	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.74	9.00	7.75	7.75	7.46	0.78	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.79	9.00	7.48	7.48	7.79	0.72	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.83	9.00	7.21	7.21	8.11	0.67	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.87	9.00	6.94	6.94	8.42	0.62	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.92	9.00	6.67	6.67	8.72	0.57	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	0.96	9.00	6.40	6.40	9.01	0.53	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.01	9.00	6.13	6.13	9.28	0.50	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.05	9.00	5.86	5.86	9.54	0.46	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.09	9.00	5.59	5.59	9.79	0.43	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.14	9.00	5.32	5.32	10.03	0.40	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.18	9.00	5.05	5.05	10.26	0.37	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.22	9.00	4.78	4.78	10.47	0.34	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.27	9.00	4.51	4.51	10.68	0.32	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.31	9.00	4.24	4.24	10.87	0.29	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.36	9.00	3.98	3.98	11.05	0.27	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.40	9.00	3.71	3.71	11.22	0.25	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.44	9.00	3.44	3.44	11.37	0.23	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.49	9.00	3.17	3.17	11.52	0.21	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.53	9.00	2.90	2.90	11.65	0.19	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.57	9.00	2.63	2.63	11.77	0.17	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.62	9.00	2.36	2.36	11.88	0.15	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.66	9.00	2.09	2.09	11.98	0.13	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.70	9.00	1.82	1.82	12.06	0.11	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.75	9.00	1.55	1.55	12.13	0.10	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.79	9.00	1.28	1.28	12.20	0.08	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.84	9.00	1.01	1.01	12.25	0.06	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.88	9.00	0.74	0.74	12.29	0.05	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.92	9.00	0.47	0.47	12.31	0.03	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	1.97	9.00	0.20	0.20	12.33	0.01	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0
+1.20D+0.50L+E	1	2.01	9.00	-0.07	0.07	12.33	0.00	20.18	Vu <= Phi*lambd	ot Reqd pe	20.2	0.0

Concrete Beam

Project File: Enercalc.ec6

LIC# : KW-06015170, Build:20.24.06.04 DUNN ASSOCIATES INC.

DESCRIPTION: Copy of --None--

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu Actual	(k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd
+1.20D+0.50L+E	1	2.05	9.00	-0.34	0.34	12.32	0.02	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.10	9.00	-0.61	0.61	12.30	0.04	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.14	9.00	-0.88	0.88	12.27	0.05	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.19	9.00	-1.15	1.15	12.22	0.07	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.23	9.00	-1.41	1.41	12.17	0.09	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.27	9.00	-1.68	1.68	12.10	0.10	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.32	9.00	-1.95	1.95	12.02	0.12	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.36	9.00	-2.22	2.22	11.93	0.14	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.40	9.00	-2.49	2.49	11.83	0.16	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.45	9.00	-2.76	2.76	11.71	0.18	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.49	9.00	-3.03	3.03	11.58	0.20	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.54	9.00	-3.30	3.30	11.45	0.22	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.58	9.00	-3.57	3.57	11.30	0.24	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.62	9.00	-3.84	3.84	11.13	0.26	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.67	9.00	-4.11	4.11	10.96	0.28	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.71	9.00	-4.38	4.38	10.77	0.30	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.75	9.00	-4.65	4.65	10.58	0.33	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.80	9.00	-4.92	4.92	10.37	0.36	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.84	9.00	-5.19	5.19	10.15	0.38	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.89	9.00	-5.46	5.46	9.91	0.41	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.93	9.00	-5.73	5.73	9.67	0.44	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	2.97	9.00	-6.00	6.00	9.41	0.48	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.02	9.00	-6.27	6.27	9.15	0.51	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.06	9.00	-6.54	6.54	8.87	0.55	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.10	9.00	-6.80	6.80	8.57	0.60	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.15	9.00	-7.07	7.07	8.27	0.64	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.19	9.00	-7.34	7.34	7.96	0.69	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.23	9.00	-7.61	7.61	7.63	0.75	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.28	9.00	-7.88	7.88	7.29	0.81	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.32	9.00	-8.15	8.15	6.94	0.88	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.37	9.00	-8.42	8.42	6.58	0.96	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.41	9.00	-8.69	8.69	6.20	1.00	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.45	9.00	-8.96	8.96	5.82	1.00	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.50	9.00	-9.23	9.23	5.42	1.00	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.54	9.00	-9.50	9.50	5.01	1.00	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.58	9.00	-9.77	9.77	4.59	1.00	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.63	9.00	-10.04	10.04	4.16	1.00	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.67	9.00	-10.31	10.31	3.71	1.00	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.72	9.00	-10.58	10.58	3.25	1.00	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.76	9.00	-10.85	10.85	2.79	1.00	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.80	9.00	-11.12	11.12	2.31	1.00	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.85	9.00	-11.39	11.39	1.81	1.00	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.89	9.00	-11.66	11.66	1.31	1.00	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.93	9.00	-11.93	11.93	0.80	1.00	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0
+1.20D+0.50L+E	1	3.98	9.00	-12.19	12.19	0.27	1.00	20.18	Vu <= Phi*lambd)t Reqd pe		20.2	0.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	4.000	12.33	57.06	0.22
+1.40D					
Span # 1	1	4.000	3.30	57.06	0.06
+1.20D+1.60L					
Span # 1	1	4.000	7.63	57.06	0.13
+1.20D+0.50L					
Span # 1	1	4.000	4.33	57.06	0.08
+1.20D					
Span # 1	1	4.000	2.83	57.06	0.05
+1.20D+0.50L+E					

Concrete Beam

Project File: Enercalc.ec6

DESCRIPTION: Copy of --None--

Load Combination Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 1	1	4.000	12.33	57.06	0.22
+0.90D					
Span # 1	1	4.000	2.12	57.06	0.04
+0.90D+E					
Span # 1	1	4.000	10.12	57.06	0.18

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
+D+0.750L+0.5250E	1	0.0012	2.000		0.0000	0.000

DUNN ASSOCIATES, INC
Consulting Structural Engineers

DUNN ASSOCIATES

Sheet #: FS-
Job Num: 240104
Date: 8/22/2024
By: GN

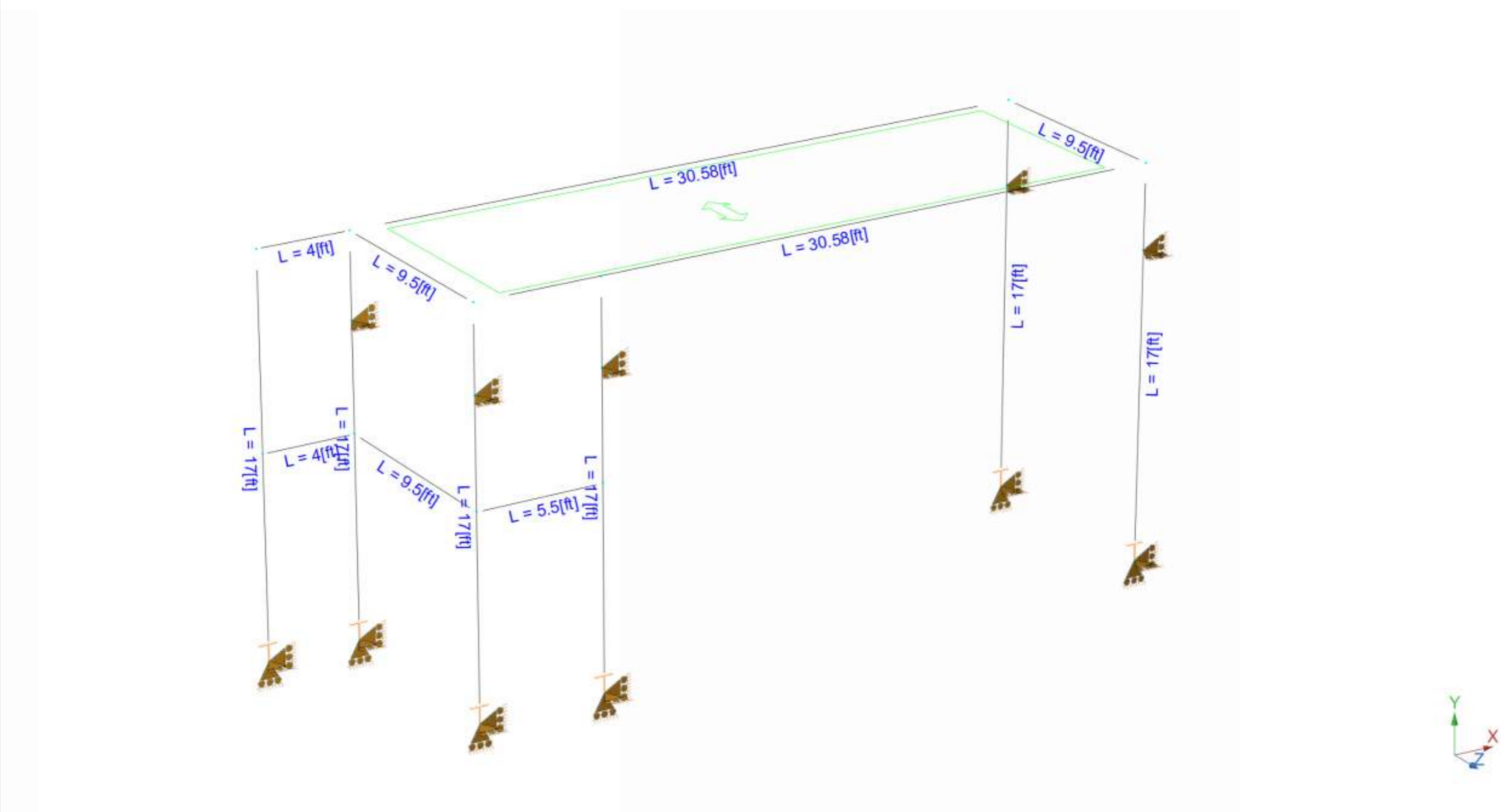
Continuous Footing (FC) Schedule

Continuous footing schedule based on RAM Structural System design

Before using this sheet: size the footing in RSS, lock all the dimensions (with rebar optimized). Then feed the info from RSS to this sheet.

			Long Top			Long Bottom			Trans Top			Trans Bott		
Footing #	Width (ft.)	Depth (in.)	As (in^2)	No	Size	As (in^2)	No	Size	As/ft	Size	Spacing	As/ft	Size	Spacing
FC4.0N	**4**	**12**	**1.04**	**4**	**#5**	**1.04**	**4**	**#5**	**0.2707**	**#5**	**13 in.**	**0.2707**	**#5**	**13 in.**
FC4.0S	**4**	**12**	**1.04**	**4**	**#5**	**1.04**	**4**	**#5**	**0.2707**	**#5**	**13 in.**	**0.2707**	**#5**	**13 in.**
FC4.5E	**4.5**	**12**	**1.3**	**5**	**#5**	**1.3**	**5**	**#5**	**0.2632**	**#5**	**14 in.**	**0.2632**	**#5**	**14 in.**
FC4.5W	**4.5**	**12**	**1.3**	**5**	**#5**	**1.3**	**5**	**#5**	**0.2632**	**#5**	**14 in.**	**0.2632**	**#5**	**14 in.**
FC3.0	**3**	**12**	**0.78**	**3**	**#5**	**0.78**	**3**	**#5**	**0.2857**	**#5**	**13 in.**	**0.3880**	**#5**	**9 in.**

Current Date: 8/22/2024 9:51 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Vestibule\vestibule.retx



RAM Elements

Current Date: 8/22/2024 9:52 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Vestibule\vestibule.retx

Geometry data

Nodes

Node	X [ft]	Y [ft]	Z [ft]	Rigid Floor
1	0.00	17.00	0.00	0
2	30.5833	17.00	0.00	0
3	30.5833	17.00	9.50	0
4	0.00	17.00	9.50	0
5	30.5833	0.00	9.50	0
6	0.00	0.00	9.50	0
7	5.50	0.00	9.50	0
8	5.50	17.00	9.50	0
9	0.00	8.666	9.50	0
10	5.50	8.666	9.50	0
11	0.00	0.00	0.00	0
12	0.00	8.666	0.00	0
13	30.5833	0.00	0.00	0
14	-4.00	17.00	0.00	0
15	-4.00	0.00	0.00	0
16	30.5833	13.33	9.50	0
17	0.00	13.33	9.50	0
18	5.50	13.33	9.50	0
19	0.00	13.33	0.00	0
20	30.5833	13.33	0.00	0
21	-4.00	8.666	0.00	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
5	1	1	1	0	1	0
6	1	1	1	0	1	0
7	1	1	1	0	1	0
11	1	1	1	0	1	0
13	1	1	1	0	1	0
15	1	1	1	0	1	0
16	1	0	1	0	0	0
17	1	0	1	0	0	0
18	1	0	1	0	0	0
19	1	0	1	0	0	0
20	1	0	1	0	0	0

Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	Ig factor
1	1	2		W 14X43	A992 Gr50	0.00	0.00	0.00
2	2	3		W 14X43	A500 GrC rectangular	0.00	0.00	0.00
3	3	4		W 14X43	A992 Gr50	0.00	0.00	0.00
4	1	4		W 14X43	A992 Gr50	0.00	0.00	0.00
5	4	6		W 14X43	A500 GrC rectangular	0.00	0.00	0.00
6	7	8		W 14X43	A500 GrC rectangular	0.00	0.00	0.00
8	9	10		W 14X43	A500 GrC rectangular	0.00	0.00	0.00
9	1	11		W 14X43	A500 GrC rectangular	0.00	0.00	0.00
10	9	12		W 14X43	A500 GrC rectangular	0.00	0.00	0.00
12	3	5		W 14X43	A500 GrC rectangular	0.00	0.00	0.00
13	2	13		W 14X43	A500 GrC rectangular	0.00	0.00	0.00
14	14	15		W 14X43	A500 GrC rectangular	0.00	0.00	0.00
15	1	14		W 14X43	A500 GrC rectangular	0.00	0.00	0.00
16	12	21		W 14X43	A500 GrC rectangular	0.00	0.00	0.00

Glossary

Cb22, Cb33	: Moment gradient coefficients
Cm22, Cm33	: Coefficients applied to bending term in interaction formula
d0	: Tapered member section depth at J end of member
DJX	: Rigid end offset distance measured from J node in axis X
DJY	: Rigid end offset distance measured from J node in axis Y
DJZ	: Rigid end offset distance measured from J node in axis Z
DKX	: Rigid end offset distance measured from K node in axis X
DKY	: Rigid end offset distance measured from K node in axis Y
DKZ	: Rigid end offset distance measured from K node in axis Z
dL	: Tapered member section depth at K end of member
Ig factor	: Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members
K22	: Effective length factor about axis 2
K33	: Effective length factor about axis 3
L22	: Member length for calculation of axial capacity
L33	: Member length for calculation of axial capacity
LB pos	: Lateral unbraced length of the compression flange in the positive side of local axis 2
LB neg	: Lateral unbraced length of the compression flange in the negative side of local axis 2
RX	: Rotation about X
RY	: Rotation about Y
RZ	: Rotation about Z
TO	: 1 = Tension only member 0 = Normal member
TX	: Translation in X
TY	: Translation in Y
TZ	: Translation in Z

RAM Elements

Current Date: 8/22/2024 9:52 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Vestibule\vestibule.retx

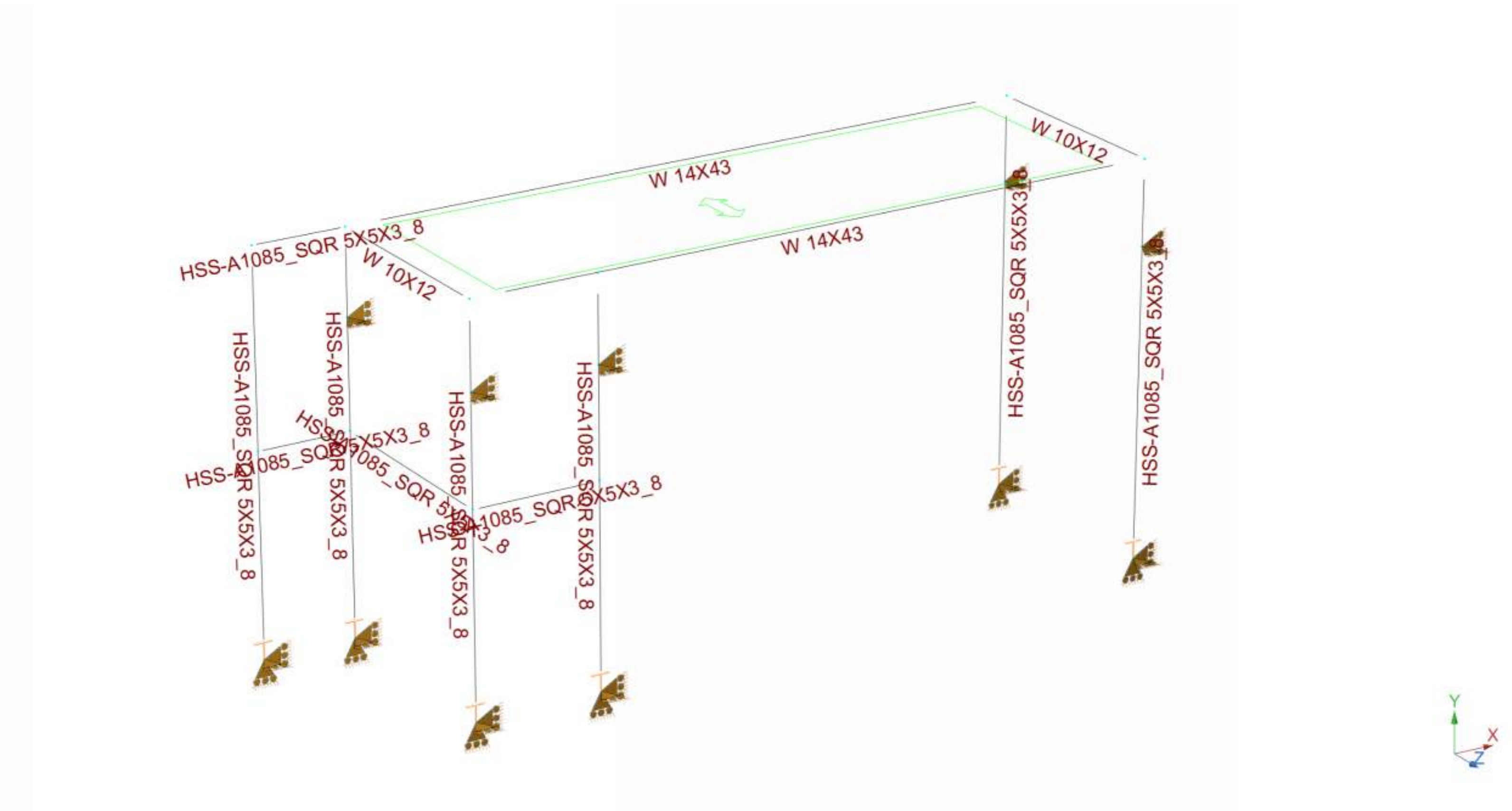
Load data

Load Conditions

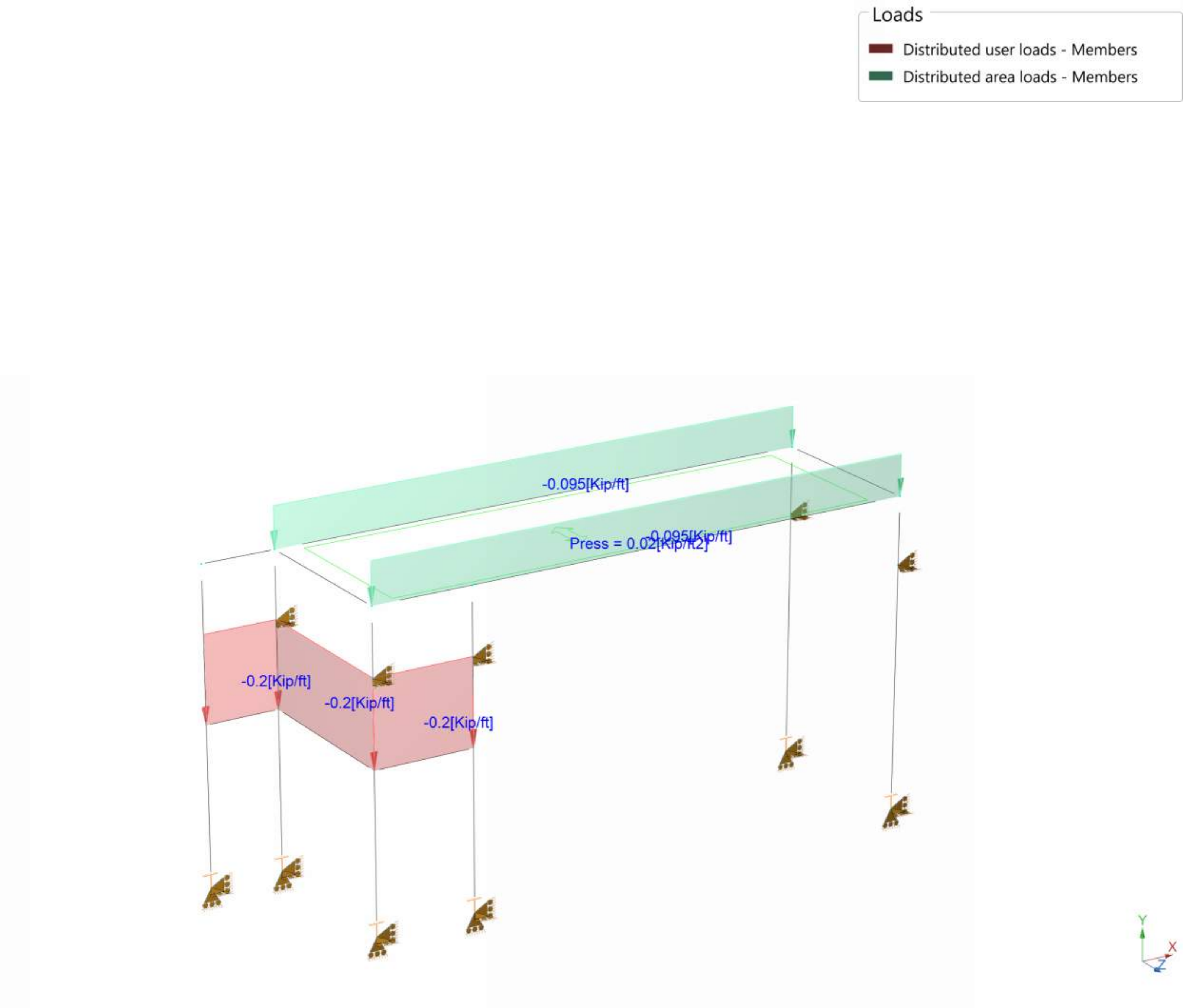
Condition	Description	Comb.	Category
D1	1.4DL	Yes	
D2	1.2DL+1.6LL	Yes	
D3	1.2DL+0.5SL	Yes	
D4	1.2DL+1.6LL+0.5SL	Yes	
D5	1.2DL+1.6SL	Yes	
D6	1.2DL+0.5WLx	Yes	
D7	1.2DL+0.5WLz	Yes	
D8	1.2DL+1.6SL+LL	Yes	
D9	1.2DL+1.6SL+0.5WLx	Yes	
D10	1.2DL+1.6SL+0.5WLz	Yes	
D11	1.2DL+WLx	Yes	
D12	1.2DL+WLz	Yes	
D13	1.2DL+WLx+0.5SL	Yes	
D14	1.2DL+WLz+0.5SL	Yes	
D15	1.2DL+WLx+LL	Yes	
D16	1.2DL+WLz+LL	Yes	
D17	1.2DL+WLx+LL+0.5SL	Yes	
D18	1.2DL+WLz+LL+0.5SL	Yes	
D19	0.9DL+WLx	Yes	
D20	0.9DL+WLz	Yes	
D21	1.2DL+0.2SL	Yes	
D22	1.2DL+EQx	Yes	
D23	1.2DL+EQz	Yes	
D24	1.2DL+LL+0.2SL	Yes	
D25	1.2DL+EQx+0.2SL	Yes	
D26	1.2DL+EQz+0.2SL	Yes	
D27	1.2DL+EQx+LL	Yes	
D28	1.2DL+EQz+LL	Yes	
D29	1.2DL+EQx+LL+0.2SL	Yes	
D30	1.2DL+EQz+LL+0.2SL	Yes	
D31	0.9DL+EQx	Yes	
D32	0.9DL+EQz	Yes	

Glossary

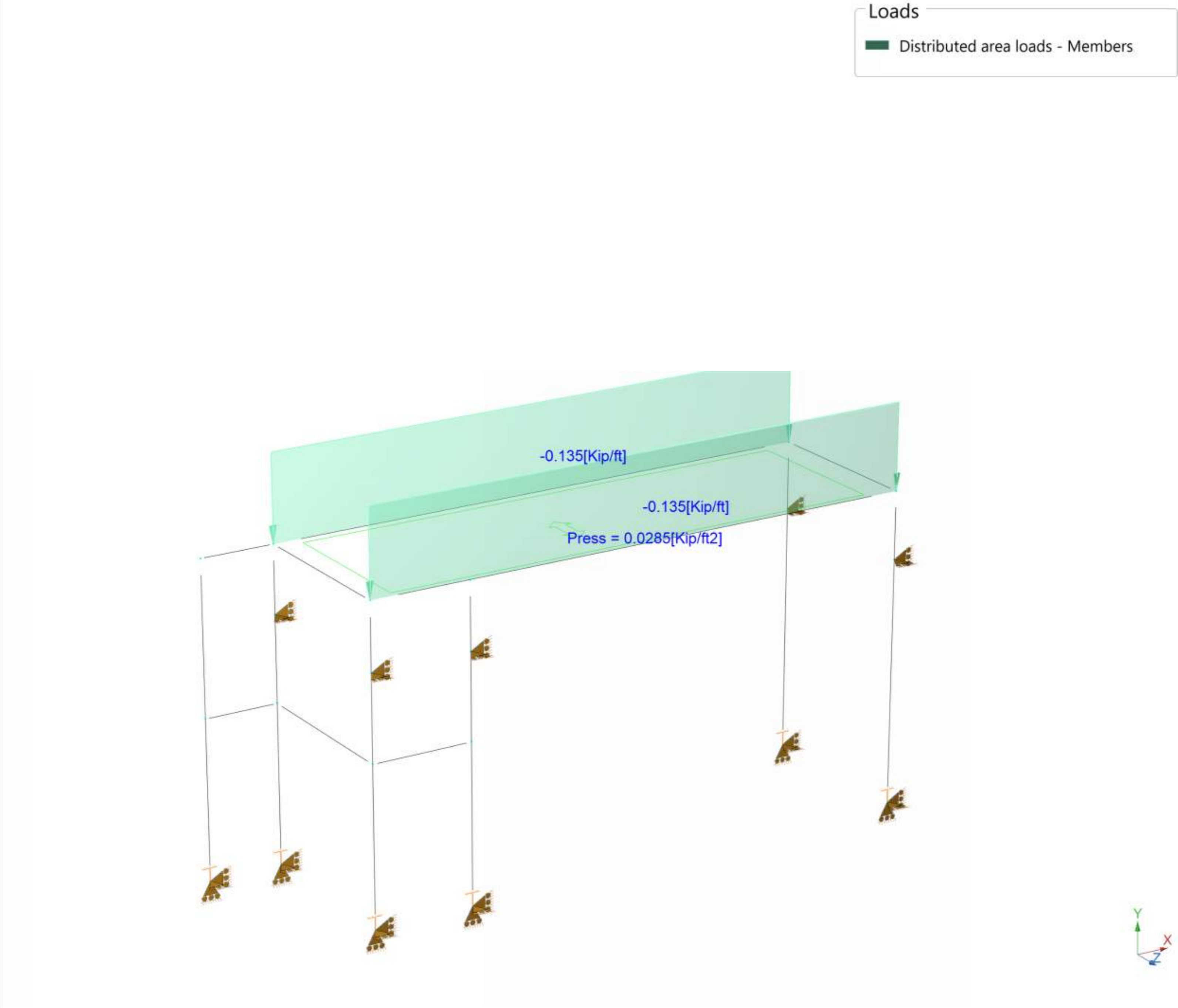
Comb : Indicates if load condition is a load combination


W 14X43
W 14X43
W 10X12
W 10X12
HSS-A1085_SQR 5X5X3_8
HSS-A1085_SQR 5X5X3_8
HSS-A1085_SQR 5X5X3_8
HSS-A1085_SQR 5X5X3_8
HSS-A1085_SQR 5X5X3_8
HSS-A1085_SQR 5X5X3_8
Y
X
Z

Current Date: 8/22/2024 10:02 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Vestibule\vestibule.retx
Load condition: DL=Dead Load

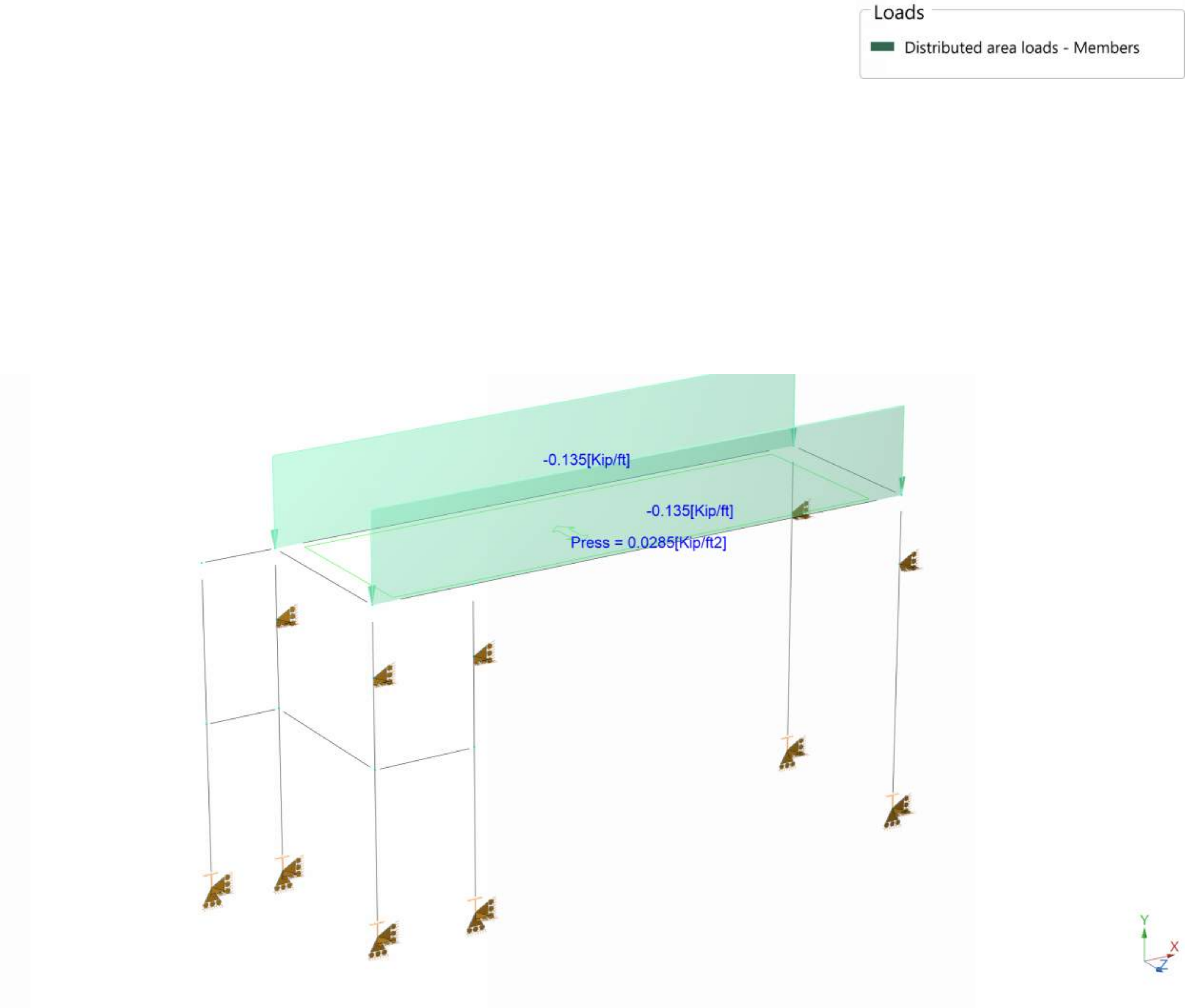


Current Date: 8/22/2024 10:03 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Vestibule\vestibule.retx
Load condition: SL=Snow Load

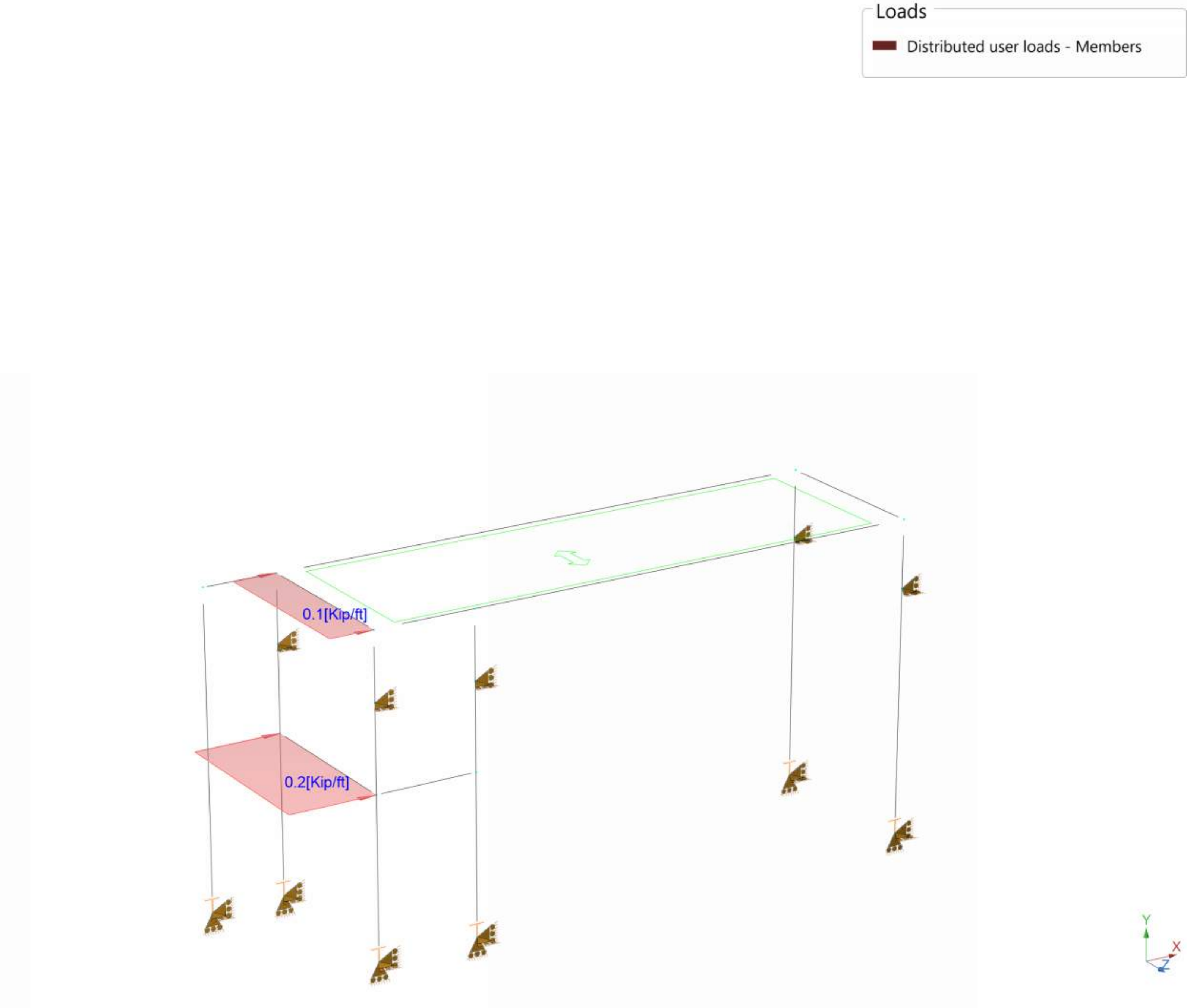


RAM Elements

Current Date: 8/22/2024 10:04 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Vestibule\vestibule.retx
Load condition: LL=Live Load

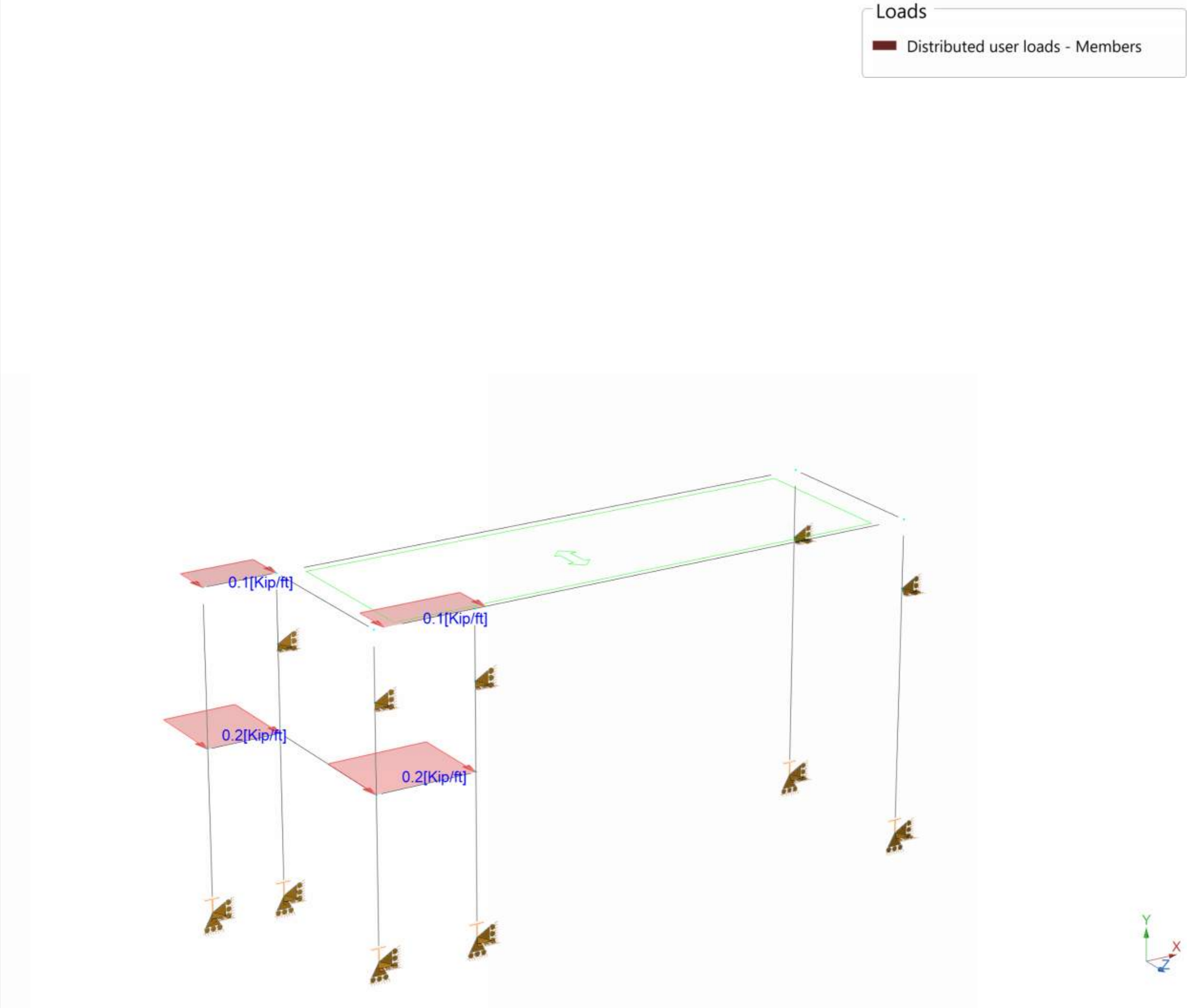


Current Date: 8/22/2024 10:07 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Vestibule\vestibule.retx
Load condition: WLx=Wind x



RAM Elements

Current Date: 8/22/2024 10:07 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Vestibule\vestibule.retx
Load condition: WLz=Wind z



RAM Elements

Current Date: 8/22/2024 10:08 AM
Units system: English
File name: K:\2024\240104\Ram Elements\Vestibule\vestibule.retx

Steel Code Check
Concise Report

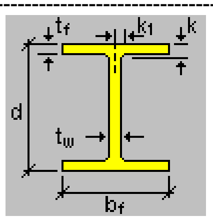
AISC 360-2016 LRFD (Hot-rolled)

Member : 1 - OK

Section information

Section name: W 14X43 **(US)**

Dimensions



bf	=	8.000	[in]	Width
d	=	13.700	[in]	Depth
k	=	1.120	[in]	Distance k
k1	=	1.000	[in]	Distance k1
tf	=	0.530	[in]	Flange thickness
tw	=	0.305	[in]	Web thickness

Properties	**Unit**	**Major axis**	**Minor axis**
Gross area of the section. (Ag)	[in2]	12.600	
Moment of Inertia (local axes) (I)	[in4]	428.000	45.200
Moment of Inertia (principal axes) (I')	[in4]	428.000	45.200
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	5.828	1.894
Radius of gyration (principal axes) (r')	[in]	5.828	1.894
Saint-Venant torsion constant. (J)	[in4]	1.050	
Section warping constant. (Cw)	[in6]	1950.000	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	62.600	11.300
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	62.600	11.300
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	62.600	11.300
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	62.600	11.300
Plastic section modulus (local axis) (Z)	[in3]	69.600	17.300
Plastic section modulus (principal axis) (Z')	[in3]	69.600	17.300
Polar radius of gyration. (ro)	[in]	6.128	
Area for shear (Aw)	[in2]	8.480	4.180
Torsional constant. (C)	[in3]	1.733	

Material : A992 Gr50

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	65.00
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11153.85

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[ft]	30.58

Distance between member lateral bracing points

Length (Lb) [ft] Top	Bottom
30.58	30.58

Laterally unbraced length

Length [ft] Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Effective length factor Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
30.58	30.58	30.58	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	:	0.00			
Capacity	:	567.00 [Kip]	Reference	:	Cl.D2
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕP_n):	[Kip]	567.00	Cl.D2

Axial Compression Design ✔

Compression in the major axis 33

Ratio	:	0.01			
Capacity	:	424.30 [Kip]	Reference	:	Cl.E3
Demand	:	4.16 [Kip]	Ctrl Eq.	:	D8 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n33}):	[Kip]	424.30	Cl.E3

Compression in the minor axis 22

Ratio	:	0.05			
Capacity	:	75.81 [Kip]	Reference	:	Cl.E3
Demand	:	4.16 [Kip]	Ctrl Eq.	:	D8 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n22}):	[Kip]	75.81	Cl.E3
Factored torsional or flexural-torsional buckling strength(ϕP_{n11}):	[Kip]	303.62	Cl.E4

Flexural Design ✔

Bending about major axis, M33

Ratio	:	0.37			
Capacity	:	112.08 [Kip*ft]	Reference	:	Cl.F2.2
Demand	:	41.53 [Kip*ft]	Ctrl Eq.	:	D8 at 50.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength(ϕM_n):	[Kip*ft]	261.00	Cl.F2.1
Factored lateral-torsional buckling strength(ϕM_n):	[Kip*ft]	112.08	Cl.F2.2

Bending about minor axis, M22

Ratio	:	0.01			
Capacity	:	64.88 [Kip*ft]	Reference	:	Cl.F6.1
Demand	:	0.78 [Kip*ft]	Ctrl Eq.	:	D12 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength about a geometric axis(ϕM_n):	[Kip*ft]	64.88	Cl.F6.1

Shear Design ✔

Shear in major axis 33

Ratio	:	0.00			
Capacity	:	228.96 [Kip]	Reference	:	Cl.G1
Demand	:	0.12 [Kip]	Ctrl Eq.	:	D23 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	228.96	Cl.G1

Shear in minor axis 22

Ratio	:	0.07			
Capacity	:	125.40 [Kip]	Reference	:	Cl.G1
Demand	:	8.23 [Kip]	Ctrl Eq.	:	D8 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	125.40	Cl.G1

Combined Actions Design ✔

Combined flexure and axial

Ratio	:	0.22			
Ctrl Eq.	:	D8 at 50.00%	Reference	:	Eq.H1-3b

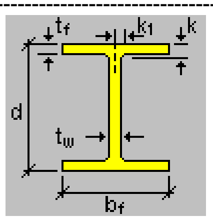
Intermediate results	Unit	Value	Reference
Interaction for doubly symmetric members for in-plane bending:	--	0.16	Eq.H1-3a(H1-1b)
Interaction for doubly symmetric members for out-of-plane bending:	--	0.22	Eq.H1-3b

Member : 2 - OK

Section information

Section name: W 10X12 **(US)**

Dimensions



bf	=	3.960	[in]	Width
d	=	9.870	[in]	Depth
k	=	0.510	[in]	Distance k
k1	=	0.563	[in]	Distance k1
tf	=	0.210	[in]	Flange thickness
tw	=	0.190	[in]	Web thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	3.540	
Moment of Inertia (local axes) (I)	[in4]	53.800	2.180
Moment of Inertia (principal axes) (I')	[in4]	53.800	2.180
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	3.898	0.785
Radius of gyration (principal axes) (r')	[in]	3.898	0.785
Saint-Venant torsion constant. (J)	[in4]	0.055	
Section warping constant. (Cw)	[in6]	50.900	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	10.900	1.100

Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	10.900	1.100
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	10.900	1.100
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	10.900	1.100
Plastic section modulus (local axis) (Z)	[in3]	12.600	1.740
Plastic section modulus (principal axis) (Z')	[in3]	12.600	1.740
Polar radius of gyration. (ro)	[in]	3.977	
Area for shear (Aw)	[in2]	1.660	1.880
Torsional constant. (C)	[in3]	0.222	

Material : A500 GrC rectangular

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	62.00
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11153.85

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[ft]	9.50

Distance between member lateral bracing points

Length (Lb) [ft]	
Top	Bottom
9.50	9.50

Laterally unbraced length

Length [ft]			Effective length factor		
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
9.50	9.50	9.50	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design ✔

Axial tension

Ratio : 0.00
Capacity : 159.30 [Kip] Reference : Cl.D2
Demand : 0.00 [Kip] Ctrl Eq. : D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕP_n):	[Kip]	159.30	Cl.D2

Axial Compression Design ✔

Compression in the major axis 33

Ratio	: 0.00			
Capacity	: 138.63 [Kip]	Reference	:	Cl.E3
Demand	: 0.04 [Kip]	Ctrl Eq.	:	D30 at 100.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n33}):	[Kip]	138.63	Cl.E3

Compression in the minor axis 22

Ratio	: 0.00			
Capacity	: 37.90 [Kip]	Reference	:	Cl.E3
Demand	: 0.04 [Kip]	Ctrl Eq.	:	D30 at 100.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n22}):	[Kip]	37.90	Cl.E3
Factored torsional or flexural-torsional buckling strength(ϕP_{n11}):	[Kip]	80.97	Cl.E4

Flexural Design ✔

Bending about major axis, M33

Ratio	: 0.01			
Capacity	: 44.67 [Kip*ft]	Reference	:	Cl.F2.2
Demand	: -0.33 [Kip*ft]	Ctrl Eq.	:	D30 at 100.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored lateral-torsional buckling strength(ϕM_n):	[Kip*ft]	44.67	Cl.F2.2
Factored compression flange local buckling strength(ϕM_n):	[Kip*ft]	46.90	Cl.F3.1

Bending about minor axis, M22

Ratio	: 0.02			
Capacity	: 6.46 [Kip*ft]	Reference	:	Cl.F6.2
Demand	: 0.13 [Kip*ft]	Ctrl Eq.	:	D30 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength about a geometric axis(ϕM_n):	[Kip*ft]	6.53	Cl.F6.1
Factored compression flange local buckling strength about a geometric ...	[Kip*ft]	6.46	Cl.F6.2

Shear Design ✔

Shear in major axis 33

Ratio	:	0.00			
Capacity	:	44.91 [Kip]	Reference	:	Cl.G1
Demand	:	0.02 [Kip]	Ctrl Eq.	:	D30 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕVn):	[Kip]	44.91	Cl.G1

Shear in minor axis 22

Ratio	:	0.00			
Capacity	:	56.40 [Kip]	Reference	:	Cl.G1
Demand	:	0.12 [Kip]	Ctrl Eq.	:	D30 at 100.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕVn):	[Kip]	56.40	Cl.G1

Combined Actions Design ✔

Combined flexure and axial

Ratio	:	0.03			
Ctrl Eq.	:	D30 at 100.00%	Reference	:	Eq.H1-1b

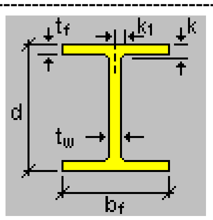
Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.03	Eq.H1-1b

Member : 3 - OK

Section information

Section name: W 14X43 **(US)**

Dimensions



bf	=	8.000	[in]	Width
d	=	13.700	[in]	Depth
k	=	1.120	[in]	Distance k
k1	=	1.000	[in]	Distance k1
tf	=	0.530	[in]	Flange thickness
tw	=	0.305	[in]	Web thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	12.600	
Moment of Inertia (local axes) (I)	[in4]	428.000	45.200
Moment of Inertia (principal axes) (I')	[in4]	428.000	45.200
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	5.828	1.894
Radius of gyration (principal axes) (r')	[in]	5.828	1.894
Saint-Venant torsion constant. (J)	[in4]	1.050	
Section warping constant. (Cw)	[in6]	1950.000	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	62.600	11.300
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	62.600	11.300
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	62.600	11.300
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	62.600	11.300
Plastic section modulus (local axis) (Z)	[in3]	69.600	17.300
Plastic section modulus (principal axis) (Z')	[in3]	69.600	17.300
Polar radius of gyration. (ro)	[in]	6.128	
Area for shear (Aw)	[in2]	8.480	4.180
Torsional constant. (C)	[in3]	1.733	

Material : A992 Gr50

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	65.00
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11153.85

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[ft]	30.58

Distance between member lateral bracing points

Length (Lb) [ft]	
Top	Bottom
30.58	30.58

Laterally unbraced length

Length [ft]			Effective length factor		
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
30.58	30.58	30.58	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	:	0.00			
Capacity	:	567.00 [Kip]	Reference	:	Cl.D2
Demand	:	0.01 [Kip]	Ctrl Eq.	:	D31 at 100.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕP_n):	[Kip]	567.00	Cl.D2

Axial Compression Design ✔

Compression in the major axis 33

Ratio	:	0.00			
Capacity	:	424.30 [Kip]	Reference	:	Cl.E3
Demand	:	1.78 [Kip]	Ctrl Eq.	:	D8 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n33}):	[Kip]	424.30	Cl.E3

Compression in the minor axis 22

Ratio	:	0.02			
Capacity	:	75.81 [Kip]	Reference	:	Cl.E3
Demand	:	1.78 [Kip]	Ctrl Eq.	:	D8 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n22}):	[Kip]	75.81	Cl.E3
Factored torsional or flexural-torsional buckling strength(ϕP_{n11}):	[Kip]	303.62	Cl.E4

Flexural Design ✔

Bending about major axis, M33

Ratio	:	0.22			
Capacity	:	130.20 [Kip*ft]	Reference	:	Cl.F2.2
Demand	:	-28.50 [Kip*ft]	Ctrl Eq.	:	D8 at 82.02%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength(ϕM_n):	[Kip*ft]	261.00	Cl.F2.1
Factored lateral-torsional buckling strength(ϕM_n):	[Kip*ft]	130.20	Cl.F2.2

Bending about minor axis, M22

Ratio	:	0.01			
Capacity	:	64.88 [Kip*ft]	Reference	:	Cl.F6.1
Demand	:	0.89 [Kip*ft]	Ctrl Eq.	:	D17 at 100.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength about a geometric axis(ϕM_n):	[Kip*ft]	64.88	Cl.F6.1

Shear Design ✔

Shear in major axis 33

Ratio	:	0.00			
Capacity	:	228.96 [Kip]	Reference	:	Cl.G1
Demand	:	0.27 [Kip]	Ctrl Eq.	:	D18 at 82.02%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	228.96	Cl.G1

Shear in minor axis 22

Ratio	:	0.06			
Capacity	:	125.40 [Kip]	Reference	:	Cl.G1
Demand	:	7.38 [Kip]	Ctrl Eq.	:	D8 at 82.02%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	125.40	Cl.G1

Combined Actions Design ✔

Combined flexure and axial

Ratio	:	0.11			
Ctrl Eq.	:	D8 at 82.02%	Reference	:	Eq.H1-3a(H1-1b)

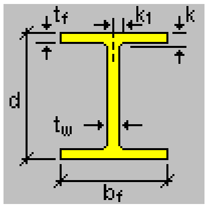
Intermediate results	Unit	Value	Reference
Interaction for doubly symmetric members for in-plane bending:	--	0.11	Eq.H1-3a(H1-1b)
Interaction for doubly symmetric members for out-of-plane bending:	--	0.08	Eq.H1-3b

Member : 4 - OK

Section information

Section name: W 10X12 **(US)**

Dimensions



bf	=	3.960	[in]	Width
d	=	9.870	[in]	Depth
k	=	0.510	[in]	Distance k
k1	=	0.563	[in]	Distance k1
tf	=	0.210	[in]	Flange thickness
tw	=	0.190	[in]	Web thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	3.540	
Moment of Inertia (local axes) (I)	[in4]	53.800	2.180
Moment of Inertia (principal axes) (I')	[in4]	53.800	2.180
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	3.898	0.785
Radius of gyration (principal axes) (r')	[in]	3.898	0.785
Saint-Venant torsion constant. (J)	[in4]	0.055	
Section warping constant. (Cw)	[in6]	50.900	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	10.900	1.100
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	10.900	1.100
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	10.900	1.100
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	10.900	1.100
Plastic section modulus (local axis) (Z)	[in3]	12.600	1.740
Plastic section modulus (principal axis) (Z')	[in3]	12.600	1.740
Polar radius of gyration. (ro)	[in]	3.977	
Area for shear (Aw)	[in2]	1.660	1.880
Torsional constant. (C)	[in3]	0.222	

Material : A992 Gr50

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	65.00
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11153.85

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[ft]	9.50

Distance between member lateral bracing points

Length (Lb) [ft]	
Top	Bottom
9.50	9.50

Laterally unbraced length

Length [ft]			Effective length factor		
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
9.50	9.50	9.50	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design

Axial tension

Ratio	:	0.00			
Capacity	:	159.30 [Kip]	Reference	:	Cl.D2
Demand	:	0.07 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕP_n):	[Kip]	159.30	Cl.D2

Axial Compression Design

Compression in the major axis 33

Ratio	:	0.00			
Capacity	:	138.63 [Kip]	Reference	:	Cl.E3
Demand	:	0.07 [Kip]	Ctrl Eq.	:	D20 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n33}):	[Kip]	138.63	Cl.E3

Compression in the minor axis 22

Ratio	:	0.00			
Capacity	:	37.90 [Kip]	Reference	:	Cl.E3
Demand	:	0.07 [Kip]	Ctrl Eq.	:	D20 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n22}):	[Kip]	37.90	Cl.E3
Factored torsional or flexural-torsional buckling strength(ϕP_{n11}):	[Kip]	80.97	Cl.E4

Flexural Design

Bending about major axis, M33

Ratio	:	0.01			
Capacity	:	38.31 [Kip*ft]	Reference	:	Cl.F2.2
Demand	:	-0.28 [Kip*ft]	Ctrl Eq.	:	D30 at 100.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored lateral-torsional buckling strength(ϕMn):	[Kip*ft]	38.31	Cl.F2.2
Factored compression flange local buckling strength(ϕMn):	[Kip*ft]	46.90	Cl.F3.1

Bending about minor axis, M22

Ratio	:	0.12			
Capacity	:	6.46 [Kip*ft]	Reference	:	Cl.F6.2
Demand	:	-0.78 [Kip*ft]	Ctrl Eq.	:	D17 at 100.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength about a geometric axis(ϕMn):	[Kip*ft]	6.53	Cl.F6.1
Factored compression flange local buckling strength about a geometric ...	[Kip*ft]	6.46	Cl.F6.2

Shear Design ✔

Shear in major axis 33

Ratio	:	0.01			
Capacity	:	44.91 [Kip]	Reference	:	Cl.G1
Demand	:	0.49 [Kip]	Ctrl Eq.	:	D11 at 100.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕVn):	[Kip]	44.91	Cl.G1

Shear in minor axis 22

Ratio	:	0.00			
Capacity	:	56.40 [Kip]	Reference	:	Cl.G1
Demand	:	0.12 [Kip]	Ctrl Eq.	:	D30 at 100.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕVn):	[Kip]	56.40	Cl.G1

Combined Actions Design ✔

Combined flexure and axial

Ratio	:	0.12			
Ctrl Eq.	:	D17 at 100.00%	Reference	:	Eq.H1-1b

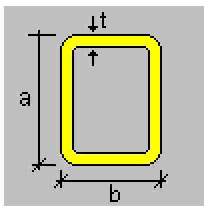
Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.12	Eq.H1-1b

Member : 5 - OK

Section information

Section name: HSS_SQR 5X5X3_8 **(US)**

Dimensions



a	=	5.000	[in]	Height
b	=	5.000	[in]	Width
T	=	0.349	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	6.180	
Moment of Inertia (local axes) (I)	[in4]	21.700	21.700
Moment of Inertia (principal axes) (I')	[in4]	21.700	21.700
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	1.874	1.874
Radius of gyration (principal axes) (r')	[in]	1.874	1.874
Saint-Venant torsion constant. (J)	[in4]	36.100	
Section warping constant. (Cw)	[in6]	0.000	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	8.680	8.680
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	8.680	8.680
Plastic section modulus (local axis) (Z)	[in3]	10.600	10.600
Plastic section modulus (principal axis) (Z')	[in3]	10.600	10.600
Polar radius of gyration. (ro)	[in]	2.646	
Area for shear (Aw)	[in2]	2.759	2.759
Torsional constant. (C)	[in3]	14.931	

Material : A500 GrC rectangular

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	62.00
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11153.85

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[ft]	17.00

Distance between member lateral bracing points

Length (Lb) [ft]	
Top	Bottom
17.00	17.00

Laterally unbraced length

	Length [ft]			Effective length factor	
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
17.00	17.00	17.00	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	:	0.01			
Capacity	:	278.10 [Kip]	Reference	:	Cl.D2
Demand	:	2.66 [Kip]	Ctrl Eq.	:	D8 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕP_n):	[Kip]	278.10	Cl.D2

Axial Compression Design ✔

Compression in the major axis 33

Ratio	:	0.02			
Capacity	:	116.91 [Kip]	Reference	:	Cl.E3
Demand	:	1.92 [Kip]	Ctrl Eq.	:	D1 at 100.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n33}):	[Kip]	116.91	Cl.E3

Compression in the minor axis 22

Ratio	:	0.02			
Capacity	:	116.91 [Kip]	Reference	:	Cl.E3
Demand	:	1.92 [Kip]	Ctrl Eq.	:	D1 at 100.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n22}):	[Kip]	116.91	Cl.E3

Flexural Design ✔

Bending about major axis, M33

Ratio	:	0.05			
Capacity	:	39.75 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	-1.95 [Kip*ft]	Ctrl Eq.	:	D17 at 49.02%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength(ϕM_n):	[Kip*ft]	39.75	Cl.F7.1
Factored lateral-torsional buckling strength(ϕM_n):	[Kip*ft]	39.75	Cl.F7.4

Bending about minor axis, M22

Ratio	:	0.03			
Capacity	:	39.75 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	1.33 [Kip*ft]	Ctrl Eq.	:	D17 at 49.02%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength about a geometric axis(ϕM_n):	[Kip*ft]	39.75	Cl.F7.1

Shear Design ✔

Shear in major axis 33

Ratio	:	0.01			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	0.39 [Kip]	Ctrl Eq.	:	D17 at 21.59%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	74.50	Cl.G1

Shear in minor axis 22

Ratio	:	0.01			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	0.60 [Kip]	Ctrl Eq.	:	D17 at 21.59%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	74.50	Cl.G1

Torsion Design

Torsion

Ratio	:	0.01			
Capacity	:	33.59 [Kip*ft]	Reference	:	Cl.H3.1
Demand	:	-0.21 [Kip*ft]	Ctrl Eq.	:	D17 at 49.02%

Intermediate results	Unit	Value	Reference
Factored torsion capacity(ϕT_n):	[Kip*ft]	33.59	Cl.H3.1

Combined Actions Design

Combined flexure and axial

Ratio	:	0.09			
Ctrl Eq.	:	D17 at 49.02%	Reference	:	Eq.H1-1b

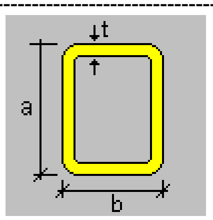
Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.09	Eq.H1-1b

Member : 6 - OK

Section information

Section name: HSS_SQR 5X5X3_8 **(US)**

Dimensions



a	=	5.000	[in]	Height
b	=	5.000	[in]	Width
T	=	0.349	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	6.180	
Moment of Inertia (local axes) (I)	[in4]	21.700	21.700
Moment of Inertia (principal axes) (I')	[in4]	21.700	21.700
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	1.874	1.874
Radius of gyration (principal axes) (r')	[in]	1.874	1.874

Saint-Venant torsion constant. (J)	[in4]	36.100	
Section warping constant. (Cw)	[in6]	0.000	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	8.680	8.680
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	8.680	8.680
Plastic section modulus (local axis) (Z)	[in3]	10.600	10.600
Plastic section modulus (principal axis) (Z')	[in3]	10.600	10.600
Polar radius of gyration. (ro)	[in]	2.646	
Area for shear (Aw)	[in2]	2.759	2.759
Torsional constant. (C)	[in3]	14.931	

Material : A500 GrC rectangular

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	62.00
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11153.85

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[ft]	17.00

Distance between member lateral bracing points

Length (Lb) [ft]	
Top	Bottom
17.00	17.00

Laterally unbraced length

Length [ft]			Effective length factor		
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
17.00	17.00	17.00	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	:	0.00			
Capacity	:	278.10 [Kip]	Reference	:	Cl.D2
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕPn):	[Kip]	278.10	Cl.D2

Axial Compression Design ✔

Compression in the major axis 33

Ratio	: 0.12		
Capacity	: 116.91 [Kip]	Reference	: Cl.E3
Demand	: 13.98 [Kip]	Ctrl Eq.	: D8 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕPn33):	[Kip]	116.91	Cl.E3

Compression in the minor axis 22

Ratio	: 0.12		
Capacity	: 116.91 [Kip]	Reference	: Cl.E3
Demand	: 13.98 [Kip]	Ctrl Eq.	: D8 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕPn22):	[Kip]	116.91	Cl.E3

Flexural Design ✔

Bending about major axis, M33

Ratio	: 0.11		
Capacity	: 39.75 [Kip*ft]	Reference	: Cl.F7.1
Demand	: -4.25 [Kip*ft]	Ctrl Eq.	: D8 at 100.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength(ϕMn):	[Kip*ft]	39.75	Cl.F7.1
Factored lateral-torsional buckling strength(ϕMn):	[Kip*ft]	39.75	Cl.F7.4

Bending about minor axis, M22

Ratio	: 0.03		
Capacity	: 39.75 [Kip*ft]	Reference	: Cl.F7.1
Demand	: 1.19 [Kip*ft]	Ctrl Eq.	: D18 at 78.41%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength about a geometric axis(ϕMn):	[Kip*ft]	39.75	Cl.F7.1

Shear Design

Shear in major axis 33

Ratio	: 0.01		
Capacity	: 74.50 [Kip]	Reference	: Cl.G1
Demand	: 0.46 [Kip]	Ctrl Eq.	: D18 at 50.98%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕVn):	[Kip]	74.50	Cl.G1

Shear in minor axis 22

Ratio	: 0.02		
Capacity	: 74.50 [Kip]	Reference	: Cl.G1
Demand	: 1.40 [Kip]	Ctrl Eq.	: D8 at 78.41%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕVn):	[Kip]	74.50	Cl.G1

Torsion Design

Torsion

Ratio	: 0.00		
Capacity	: 33.59 [Kip*ft]	Reference	: Cl.H3.1
Demand	: -0.09 [Kip*ft]	Ctrl Eq.	: D30 at 50.98%

Intermediate results	Unit	Value	Reference
Factored torsion capacity(ϕTn):	[Kip*ft]	33.59	Cl.H3.1

Combined Actions Design

Combined flexure and axial

Ratio	: 0.16		
Ctrl Eq.	: D8 at 100.00%	Reference	: Eq.H1-1b

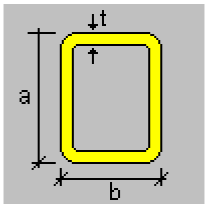
Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.16	Eq.H1-1b

Member : 8 - OK

Section information

Section name: HSS_SQR 5X5X3_8 **(US)**

Dimensions



a	=	5.000	[in]	Height
b	=	5.000	[in]	Width
T	=	0.349	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	6.180	
Moment of Inertia (local axes) (I)	[in4]	21.700	21.700
Moment of Inertia (principal axes) (I')	[in4]	21.700	21.700
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	1.874	1.874
Radius of gyration (principal axes) (r')	[in]	1.874	1.874
Saint-Venant torsion constant. (J)	[in4]	36.100	
Section warping constant. (Cw)	[in6]	0.000	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	8.680	8.680
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	8.680	8.680
Plastic section modulus (local axis) (Z)	[in3]	10.600	10.600
Plastic section modulus (principal axis) (Z')	[in3]	10.600	10.600
Polar radius of gyration. (ro)	[in]	2.646	
Area for shear (Aw)	[in2]	2.759	2.759
Torsional constant. (C)	[in3]	14.931	

Material : A500 GrC rectangular

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	62.00
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11153.85

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[ft]	5.50

Distance between member lateral bracing points

Length (Lb) [ft]	
Top	Bottom
5.50	5.50

Laterally unbraced length

Length [ft]			Effective length factor		
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
5.50	5.50	5.50	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	:	0.00			
Capacity	:	278.10 [Kip]	Reference	:	Cl.D2
Demand	:	0.14 [Kip]	Ctrl Eq.	:	D8 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕPn):	[Kip]	278.10	Cl.D2

Axial Compression Design ✔

Compression in the major axis 33

Ratio	:	0.00			
Capacity	:	253.98 [Kip]	Reference	:	Cl.E3
Demand	:	0.44 [Kip]	Ctrl Eq.	:	D19 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕPn33):	[Kip]	253.98	Cl.E3

Compression in the minor axis 22

Ratio	:	0.00			
Capacity	:	253.98 [Kip]	Reference	:	Cl.E3
Demand	:	0.44 [Kip]	Ctrl Eq.	:	D19 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕPn22):	[Kip]	253.98	Cl.E3

Flexural Design ✔

Bending about major axis, M33

Ratio	:	0.04			
Capacity	:	39.75 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	-1.47 [Kip*ft]	Ctrl Eq.	:	D17 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength(ϕM_n):	[Kip*ft]	39.75	Cl.F7.1

Bending about minor axis, M22

Ratio	:	0.03			
Capacity	:	39.75 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	-1.10 [Kip*ft]	Ctrl Eq.	:	D17 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength about a geometric axis(ϕM_n):	[Kip*ft]	39.75	Cl.F7.1

Shear Design ✔

Shear in major axis 33

Ratio	:	0.01			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	0.58 [Kip]	Ctrl Eq.	:	D18 at 100.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	74.50	Cl.G1

Shear in minor axis 22

Ratio	:	0.01			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	1.07 [Kip]	Ctrl Eq.	:	D17 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	74.50	Cl.G1

Torsion Design ✔

Torsion

Ratio	:	0.01			
Capacity	:	33.59 [Kip*ft]	Reference	:	Cl.H3.1
Demand	:	0.17 [Kip*ft]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored torsion capacity(ϕT_n):	[Kip*ft]	33.59	Cl.H3.1

Combined Actions Design ✔

Combined flexure and axial

Ratio	:	0.07			
Ctrl Eq.	:	D17 at 0.00%	Reference	:	Eq.H1-1b

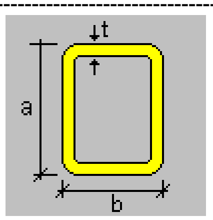
Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.07	Eq.H1-1b

Member : 9 - OK

Section information

Section name: HSS_SQR 5X5X3_8 **(US)**

Dimensions



a	=	5.000	[in]	Height
b	=	5.000	[in]	Width
T	=	0.349	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	6.180	
Moment of Inertia (local axes) (I)	[in4]	21.700	21.700
Moment of Inertia (principal axes) (I')	[in4]	21.700	21.700
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	1.874	1.874
Radius of gyration (principal axes) (r')	[in]	1.874	1.874
Saint-Venant torsion constant. (J)	[in4]	36.100	
Section warping constant. (Cw)	[in6]	0.000	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	8.680	8.680
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	8.680	8.680
Plastic section modulus (local axis) (Z)	[in3]	10.600	10.600
Plastic section modulus (principal axis) (Z')	[in3]	10.600	10.600
Polar radius of gyration. (ro)	[in]	2.646	
Area for shear (Aw)	[in2]	2.759	2.759
Torsional constant. (C)	[in3]	14.931	

Material : A500 GrC rectangular

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	62.00
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11153.85

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[ft]	17.00

Distance between member lateral bracing points

Length (Lb) [ft]	
Top	Bottom
17.00	17.00

Laterally unbraced length

	Length [ft]			Effective length factor	
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
17.00	17.00	17.00	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	:	0.00			
Capacity	:	278.10 [Kip]	Reference	:	Cl.D2
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕP_n):	[Kip]	278.10	Cl.D2

Axial Compression Design ✔

Compression in the major axis 33

Ratio	:	0.11			
Capacity	:	116.91 [Kip]	Reference	:	Cl.E3
Demand	:	13.02 [Kip]	Ctrl Eq.	:	D8 at 100.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n33}):	[Kip]	116.91	Cl.E3

Compression in the minor axis 22

Ratio	:	0.11			
Capacity	:	116.91 [Kip]	Reference	:	Cl.E3
Demand	:	13.02 [Kip]	Ctrl Eq.	:	D8 at 100.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n22}):	[Kip]	116.91	Cl.E3

Flexural Design ✔

Bending about major axis, M33

Ratio	:	0.34			
Capacity	:	39.75 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	13.45 [Kip*ft]	Ctrl Eq.	:	D8 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength(ϕM_n):	[Kip*ft]	39.75	Cl.F7.1
Factored lateral-torsional buckling strength(ϕM_n):	[Kip*ft]	39.75	Cl.F7.4

Bending about minor axis, M22

Ratio	:	0.06			
Capacity	:	39.75 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	-2.40 [Kip*ft]	Ctrl Eq.	:	D12 at 49.02%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength about a geometric axis(ϕM_n):	[Kip*ft]	39.75	Cl.F7.1

Shear Design ✔

Shear in major axis 33

Ratio	:	0.01			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	0.81 [Kip]	Ctrl Eq.	:	D12 at 21.59%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕVn):	[Kip]	74.50	Cl.G1

Shear in minor axis 22

Ratio	: 0.06		
Capacity	: 74.50 [Kip]	Reference	: Cl.G1
Demand	: 4.13 [Kip]	Ctrl Eq.	: D8 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕVn):	[Kip]	74.50	Cl.G1

Torsion Design ✔

Torsion

Ratio	: 0.01		
Capacity	: 33.59 [Kip*ft]	Reference	: Cl.H3.1
Demand	: 0.23 [Kip*ft]	Ctrl Eq.	: D19 at 49.02%

Intermediate results	Unit	Value	Reference
Factored torsion capacity(ϕTn):	[Kip*ft]	33.59	Cl.H3.1

Combined Actions Design ✔

Combined flexure and axial

Ratio	: 0.39		
Ctrl Eq.	: D8 at 0.00%	Reference	: Eq.H1-1b

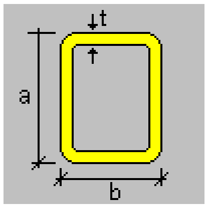
Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.39	Eq.H1-1b

Member : 10 - OK

Section information

Section name: HSS_SQR 5X5X3_8 **(US)**

Dimensions



a	=	5.000	[in]	Height
b	=	5.000	[in]	Width
T	=	0.349	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	6.180	
Moment of Inertia (local axes) (I)	[in4]	21.700	21.700
Moment of Inertia (principal axes) (I')	[in4]	21.700	21.700
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	1.874	1.874
Radius of gyration (principal axes) (r')	[in]	1.874	1.874
Saint-Venant torsion constant. (J)	[in4]	36.100	
Section warping constant. (Cw)	[in6]	0.000	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	8.680	8.680
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	8.680	8.680
Plastic section modulus (local axis) (Z)	[in3]	10.600	10.600
Plastic section modulus (principal axis) (Z')	[in3]	10.600	10.600
Polar radius of gyration. (ro)	[in]	2.646	
Area for shear (Aw)	[in2]	2.759	2.759
Torsional constant. (C)	[in3]	14.931	

Material : A500 GrC rectangular

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	62.00
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11153.85

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[ft]	9.50

Distance between member lateral bracing points

Length (Lb) [ft]	
Top	Bottom
9.50	9.50

Laterally unbraced length

Length [ft]			Effective length factor		
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
9.50	9.50	9.50	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design

Axial tension

Ratio	:	0.00			
Capacity	:	278.10 [Kip]	Reference	:	Cl.D2
Demand	:	0.25 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕP_n):	[Kip]	278.10	Cl.D2

Axial Compression Design

Compression in the major axis 33

Ratio	:	0.00			
Capacity	:	212.16 [Kip]	Reference	:	Cl.E3
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n33}):	[Kip]	212.16	Cl.E3

Compression in the minor axis 22

Ratio	:	0.00			
Capacity	:	212.16 [Kip]	Reference	:	Cl.E3
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n22}):	[Kip]	212.16	Cl.E3

Flexural Design

Bending about major axis, M33

Ratio	:	0.05			
Capacity	:	39.75 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	-2.19 [Kip*ft]	Ctrl Eq.	:	D12 at 100.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength(ϕM_n):	[Kip*ft]	39.75	Cl.F7.1

Bending about minor axis, M22

Ratio	:	0.04			
Capacity	:	39.75 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	1.42 [Kip*ft]	Ctrl Eq.	:	D17 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength about a geometric axis(ϕM_n):	[Kip*ft]	39.75	Cl.F7.1

Shear Design ✔

Shear in major axis 33

Ratio	:	0.01			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	1.06 [Kip]	Ctrl Eq.	:	D17 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	74.50	Cl.G1

Shear in minor axis 22

Ratio	:	0.02			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	1.47 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	74.50	Cl.G1

Torsion Design ✔

Torsion

Ratio	:	0.00			
Capacity	:	33.59 [Kip*ft]	Reference	:	Cl.H3.1
Demand	:	-0.06 [Kip*ft]	Ctrl Eq.	:	D11 at 0.00%

Intermediate results	Unit	Value	Reference
Factored torsion capacity(ϕT_n):	[Kip*ft]	33.59	Cl.H3.1

Combined Actions Design

Combined flexure and axial

Ratio	:	0.08			
Ctrl Eq.	:	D17 at 0.00%	Reference	:	Eq.H1-1b

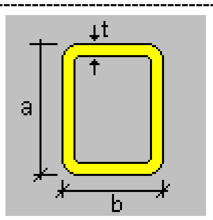
Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.08	Eq.H1-1b

Member : 12 - OK

Section information

Section name: HSS_SQR 5X5X3_8 **(US)**

Dimensions



a	=	5.000	[in]	Height
b	=	5.000	[in]	Width
T	=	0.349	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	6.180	
Moment of Inertia (local axes) (I)	[in4]	21.700	21.700
Moment of Inertia (principal axes) (I')	[in4]	21.700	21.700
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	1.874	1.874
Radius of gyration (principal axes) (r')	[in]	1.874	1.874
Saint-Venant torsion constant. (J)	[in4]	36.100	
Section warping constant. (Cw)	[in6]	0.000	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	8.680	8.680
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	8.680	8.680
Plastic section modulus (local axis) (Z)	[in3]	10.600	10.600
Plastic section modulus (principal axis) (Z')	[in3]	10.600	10.600
Polar radius of gyration. (ro)	[in]	2.646	
Area for shear (Aw)	[in2]	2.759	2.759
Torsional constant. (C)	[in3]	14.931	

Material : A500 GrC rectangular

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	62.00
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11153.85

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[ft]	17.00

Distance between member lateral bracing points

Length (Lb) [ft]	
Top	Bottom
17.00	17.00

Laterally unbraced length

Length [ft]			Effective length factor		
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
17.00	17.00	17.00	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	:	0.00			
Capacity	:	278.10 [Kip]	Reference	:	Cl.D2
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕP_n):	[Kip]	278.10	Cl.D2

Axial Compression Design ✔

Compression in the major axis 33

Ratio	:	0.05			
Capacity	:	116.91 [Kip]	Reference	:	Cl.E3
Demand	:	6.09 [Kip]	Ctrl Eq.	:	D8 at 100.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n33}):	[Kip]	116.91	Cl.E3

Compression in the minor axis 22

Ratio	:	0.05			
Capacity	:	116.91 [Kip]	Reference	:	Cl.E3
Demand	:	6.09 [Kip]	Ctrl Eq.	:	D8 at 100.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n22}):	[Kip]	116.91	Cl.E3

Flexural Design ✔

Bending about major axis, M33

Ratio	:	0.15			
Capacity	:	39.75 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	-6.15 [Kip*ft]	Ctrl Eq.	:	D8 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength(ϕM_n):	[Kip*ft]	39.75	Cl.F7.1
Factored lateral-torsional buckling strength(ϕM_n):	[Kip*ft]	39.75	Cl.F7.4

Bending about minor axis, M22

Ratio	:	0.01			
Capacity	:	39.75 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	-0.33 [Kip*ft]	Ctrl Eq.	:	D30 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength about a geometric axis(ϕM_n):	[Kip*ft]	39.75	Cl.F7.1

Shear Design ✔

Shear in major axis 33

Ratio	:	0.00			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	0.14 [Kip]	Ctrl Eq.	:	D30 at 21.59%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕVn):	[Kip]	74.50	Cl.G1

Shear in minor axis 22

Ratio	:	0.02			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	1.78 [Kip]	Ctrl Eq.	:	D8 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕVn):	[Kip]	74.50	Cl.G1

Torsion Design

Torsion

Ratio	:	0.00			
Capacity	:	33.59 [Kip*ft]	Reference	:	Cl.H3.1
Demand	:	0.05 [Kip*ft]	Ctrl Eq.	:	D32 at 0.00%

Intermediate results	Unit	Value	Reference
Factored torsion capacity(ϕTn):	[Kip*ft]	33.59	Cl.H3.1

Combined Actions Design

Combined flexure and axial

Ratio	:	0.18			
Ctrl Eq.	:	D8 at 0.00%	Reference	:	Eq.H1-1b

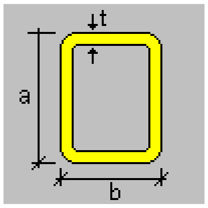
Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.18	Eq.H1-1b

Member : 13 - OK

Section information

Section name: HSS_SQR 5X5X3_8 **(US)**

Dimensions



a	=	5.000	[in]	Height
b	=	5.000	[in]	Width
T	=	0.349	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	6.180	
Moment of Inertia (local axes) (I)	[in4]	21.700	21.700
Moment of Inertia (principal axes) (I')	[in4]	21.700	21.700
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	1.874	1.874
Radius of gyration (principal axes) (r')	[in]	1.874	1.874
Saint-Venant torsion constant. (J)	[in4]	36.100	
Section warping constant. (Cw)	[in6]	0.000	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	8.680	8.680
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	8.680	8.680
Plastic section modulus (local axis) (Z)	[in3]	10.600	10.600
Plastic section modulus (principal axis) (Z')	[in3]	10.600	10.600
Polar radius of gyration. (ro)	[in]	2.646	
Area for shear (Aw)	[in2]	2.759	2.759
Torsional constant. (C)	[in3]	14.931	

Material : A500 GrC rectangular

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	62.00
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11153.85

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[ft]	17.00

Distance between member lateral bracing points

Length (Lb) [ft]	
Top	Bottom
17.00	17.00

Laterally unbraced length

	Length [ft]			Effective length factor	
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
17.00	17.00	17.00	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design

Axial tension

Ratio	: 0.00			
Capacity	: 278.10 [Kip]	Reference	:	Cl.D2
Demand	: 0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕP_n):	[Kip]	278.10	Cl.D2

Axial Compression Design

Compression in the major axis 33

Ratio	: 0.07			
Capacity	: 116.91 [Kip]	Reference	:	Cl.E3
Demand	: 8.08 [Kip]	Ctrl Eq.	:	D8 at 100.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n33}):	[Kip]	116.91	Cl.E3

Compression in the minor axis 22

Ratio	: 0.07			
Capacity	: 116.91 [Kip]	Reference	:	Cl.E3
Demand	: 8.08 [Kip]	Ctrl Eq.	:	D8 at 100.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n22}):	[Kip]	116.91	Cl.E3

Flexural Design

Bending about major axis, M33

Ratio	:	0.35			
Capacity	:	39.75 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	-14.02 [Kip*ft]	Ctrl Eq.	:	D8 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength(ϕMn):	[Kip*ft]	39.75	Cl.F7.1
Factored lateral-torsional buckling strength(ϕMn):	[Kip*ft]	39.75	Cl.F7.4

Bending about minor axis, M22

Ratio	:	0.01			
Capacity	:	39.75 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	-0.21 [Kip*ft]	Ctrl Eq.	:	D32 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength about a geometric axis(ϕMn):	[Kip*ft]	39.75	Cl.F7.1

Shear Design ✔

Shear in major axis 33

Ratio	:	0.00			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	0.11 [Kip]	Ctrl Eq.	:	D32 at 21.59%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕVn):	[Kip]	74.50	Cl.G1

Shear in minor axis 22

Ratio	:	0.06			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	4.16 [Kip]	Ctrl Eq.	:	D8 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕVn):	[Kip]	74.50	Cl.G1

Torsion Design ✔

Torsion

Ratio	:	0.00			
Capacity	:	33.59 [Kip*ft]	Reference	:	Cl.H3.1
Demand	:	0.08 [Kip*ft]	Ctrl Eq.	:	D30 at 0.00%

Intermediate results	Unit	Value	Reference
Factored torsion capacity(ϕT_n):	[Kip*ft]	33.59	Cl.H3.1

Combined Actions Design ✔

Combined flexure and axial

Ratio	:	0.39			
Ctrl Eq.	:	D8 at 0.00%	Reference	:	Eq.H1-1b

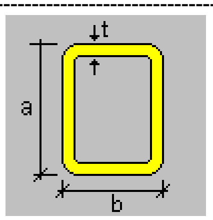
Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.39	Eq.H1-1b

Member : 14 - OK

Section information

Section name: HSS_SQR 5X5X3_8 **(US)**

Dimensions



a	=	5.000	[in]	Height
b	=	5.000	[in]	Width
T	=	0.349	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	6.180	
Moment of Inertia (local axes) (I)	[in4]	21.700	21.700
Moment of Inertia (principal axes) (I')	[in4]	21.700	21.700
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	1.874	1.874
Radius of gyration (principal axes) (r')	[in]	1.874	1.874
Saint-Venant torsion constant. (J)	[in4]	36.100	
Section warping constant. (Cw)	[in6]	0.000	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	8.680	8.680
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	8.680	8.680
Plastic section modulus (local axis) (Z)	[in3]	10.600	10.600
Plastic section modulus (principal axis) (Z')	[in3]	10.600	10.600
Polar radius of gyration. (ro)	[in]	2.646	
Area for shear (Aw)	[in2]	2.759	2.759
Torsional constant. (C)	[in3]	14.931	

Material : A500 GrC rectangular

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	62.00
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11153.85

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[ft]	17.00

Distance between member lateral bracing points

Length (Lb) [ft]	
Top	Bottom
17.00	17.00

Laterally unbraced length

Length [ft]			Effective length factor		
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
17.00	17.00	17.00	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design

Axial tension

Ratio	:	0.01			
Capacity	:	278.10 [Kip]	Reference	:	Cl.D2
Demand	:	2.68 [Kip]	Ctrl Eq.	:	D8 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕP_n):	[Kip]	278.10	Cl.D2

Axial Compression Design

Compression in the major axis 33

Ratio	:	0.01			
Capacity	:	116.91 [Kip]	Reference	:	Cl.E3
Demand	:	0.61 [Kip]	Ctrl Eq.	:	D11 at 100.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n33}):	[Kip]	116.91	Cl.E3

Compression in the minor axis 22

Ratio	:	0.01			
Capacity	:	116.91 [Kip]	Reference	:	Cl.E3
Demand	:	0.61 [Kip]	Ctrl Eq.	:	D11 at 100.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n22}):	[Kip]	116.91	Cl.E3

Flexural Design ✔

Bending about major axis, M33

Ratio	:	0.03			
Capacity	:	39.75 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	-1.25 [Kip*ft]	Ctrl Eq.	:	D17 at 49.02%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength(ϕM_n):	[Kip*ft]	39.75	Cl.F7.1
Factored lateral-torsional buckling strength(ϕM_n):	[Kip*ft]	39.75	Cl.F7.4

Bending about minor axis, M22

Ratio	:	0.02			
Capacity	:	39.75 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	-0.63 [Kip*ft]	Ctrl Eq.	:	D20 at 49.02%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength about a geometric axis(ϕM_n):	[Kip*ft]	39.75	Cl.F7.1

Shear Design ✔

Shear in major axis 33

Ratio	:	0.00			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	0.09 [Kip]	Ctrl Eq.	:	D12 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	74.50	Cl.G1

Shear in minor axis 22

Ratio	:	0.00			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	0.17 [Kip]	Ctrl Eq.	:	D17 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	74.50	Cl.G1

Torsion Design ✔

Torsion

Ratio	:	0.01			
Capacity	:	33.59 [Kip*ft]	Reference	:	Cl.H3.1
Demand	:	0.22 [Kip*ft]	Ctrl Eq.	:	D20 at 49.02%

Intermediate results	Unit	Value	Reference
Factored torsion capacity(ϕT_n):	[Kip*ft]	33.59	Cl.H3.1

Combined Actions Design ✔

Combined flexure and axial

Ratio	:	0.04			
Ctrl Eq.	:	D17 at 49.02%	Reference	:	Eq.H1-1b

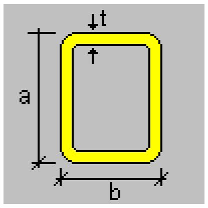
Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.04	Eq.H1-1b

Member : 15 - OK

Section information

Section name: HSS_SQR 5X5X3_8 **(US)**

Dimensions



a	=	5.000	[in]	Height
b	=	5.000	[in]	Width
T	=	0.349	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	6.180	
Moment of Inertia (local axes) (I)	[in4]	21.700	21.700
Moment of Inertia (principal axes) (I')	[in4]	21.700	21.700
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	1.874	1.874
Radius of gyration (principal axes) (r')	[in]	1.874	1.874
Saint-Venant torsion constant. (J)	[in4]	36.100	
Section warping constant. (Cw)	[in6]	0.000	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	8.680	8.680
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	8.680	8.680
Plastic section modulus (local axis) (Z)	[in3]	10.600	10.600
Plastic section modulus (principal axis) (Z')	[in3]	10.600	10.600
Polar radius of gyration. (ro)	[in]	2.646	
Area for shear (Aw)	[in2]	2.759	2.759
Torsional constant. (C)	[in3]	14.931	

Material : A500 GrC rectangular

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	62.00
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11153.85

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[ft]	4.00

Distance between member lateral bracing points

Length (Lb) [ft]	
Top	Bottom
4.00	4.00

Laterally unbraced length

Length [ft]			Effective length factor		
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
4.00	4.00	4.00	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design

Axial tension

Ratio	:	0.00			
Capacity	:	278.10 [Kip]	Reference	:	Cl.D2
Demand	:	0.00 [Kip]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕP_n):	[Kip]	278.10	Cl.D2

Axial Compression Design

Compression in the major axis 33

Ratio	:	0.00			
Capacity	:	265.07 [Kip]	Reference	:	Cl.E3
Demand	:	0.17 [Kip]	Ctrl Eq.	:	D17 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n33}):	[Kip]	265.07	Cl.E3

Compression in the minor axis 22

Ratio	:	0.00			
Capacity	:	265.07 [Kip]	Reference	:	Cl.E3
Demand	:	0.17 [Kip]	Ctrl Eq.	:	D17 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n22}):	[Kip]	265.07	Cl.E3

Flexural Design

Bending about major axis, M33

Ratio	:	0.26			
Capacity	:	39.75 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	-10.39 [Kip*ft]	Ctrl Eq.	:	D8 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength(ϕM_n):	[Kip*ft]	39.75	Cl.F7.1

Bending about minor axis, M22

Ratio	:	0.03			
Capacity	:	39.75 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	-1.01 [Kip*ft]	Ctrl Eq.	:	D12 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength about a geometric axis(ϕM_n):	[Kip*ft]	39.75	Cl.F7.1

Shear Design ✔

Shear in major axis 33

Ratio	:	0.01			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	0.49 [Kip]	Ctrl Eq.	:	D12 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	74.50	Cl.G1

Shear in minor axis 22

Ratio	:	0.04			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	2.78 [Kip]	Ctrl Eq.	:	D8 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	74.50	Cl.G1

Torsion Design ✔

Torsion

Ratio	:	0.00			
Capacity	:	33.59 [Kip*ft]	Reference	:	Cl.H3.1
Demand	:	0.16 [Kip*ft]	Ctrl Eq.	:	D12 at 0.00%

Intermediate results	Unit	Value	Reference
Factored torsion capacity(ϕTn):	[Kip*ft]	33.59	Cl.H3.1

Combined Actions Design ✔

Combined flexure and axial

Ratio	:	0.26			
Ctrl Eq.	:	D8 at 0.00%	Reference	:	Eq.H1-1b

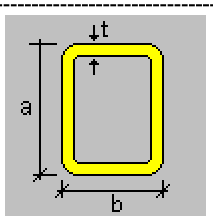
Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.26	Eq.H1-1b

Member : 16 - OK

Section information

Section name: HSS_SQR 5X5X3_8 **(US)**

Dimensions



a	=	5.000	[in]	Height
b	=	5.000	[in]	Width
T	=	0.349	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	6.180	
Moment of Inertia (local axes) (I)	[in4]	21.700	21.700
Moment of Inertia (principal axes) (I')	[in4]	21.700	21.700
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	1.874	1.874
Radius of gyration (principal axes) (r')	[in]	1.874	1.874
Saint-Venant torsion constant. (J)	[in4]	36.100	
Section warping constant. (Cw)	[in6]	0.000	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	8.680	8.680
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	8.680	8.680
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	8.680	8.680
Plastic section modulus (local axis) (Z)	[in3]	10.600	10.600
Plastic section modulus (principal axis) (Z')	[in3]	10.600	10.600
Polar radius of gyration. (ro)	[in]	2.646	
Area for shear (Aw)	[in2]	2.759	2.759
Torsional constant. (C)	[in3]	14.931	

Material : A500 GrC rectangular

Properties	Unit	Value
Yield stress (Fy):	[Kip/in2]	50.00
Tensile strength (Fu):	[Kip/in2]	62.00
Elasticity Modulus (E):	[Kip/in2]	29000.00
Shear modulus for steel (G):	[Kip/in2]	11153.85

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[ft]	4.00

Distance between member lateral bracing points

Length (Lb) [ft]	
Top	Bottom
4.00	4.00

Laterally unbraced length

Length [ft]			Effective length factor		
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
4.00	4.00	4.00	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design ✔

Axial tension

Ratio	:	0.00			
Capacity	:	278.10 [Kip]	Reference	:	Cl.D2
Demand	:	0.22 [Kip]	Ctrl Eq.	:	D17 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(ϕP_n):	[Kip]	278.10	Cl.D2

Axial Compression Design ✔

Compression in the major axis 33

Ratio	:	0.00			
Capacity	:	265.07 [Kip]	Reference	:	Cl.E3
Demand	:	0.03 [Kip]	Ctrl Eq.	:	D31 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n33}):	[Kip]	265.07	Cl.E3

Compression in the minor axis 22

Ratio	:	0.00			
Capacity	:	265.07 [Kip]	Reference	:	Cl.E3
Demand	:	0.03 [Kip]	Ctrl Eq.	:	D31 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(ϕP_{n22}):	[Kip]	265.07	Cl.E3

Flexural Design ✔

Bending about major axis, M33

Ratio	:	0.02			
Capacity	:	39.75 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	0.97 [Kip*ft]	Ctrl Eq.	:	D17 at 12.50%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength(ϕM_n):	[Kip*ft]	39.75	Cl.F7.1

Bending about minor axis, M22

Ratio	:	0.02			
Capacity	:	39.75 [Kip*ft]	Reference	:	Cl.F7.1
Demand	:	-0.92 [Kip*ft]	Ctrl Eq.	:	D18 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength about a geometric axis(ϕM_n):	[Kip*ft]	39.75	Cl.F7.1

Shear Design ✔

Shear in major axis 33

Ratio	:	0.01			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	0.65 [Kip]	Ctrl Eq.	:	D18 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	74.50	Cl.G1

Shear in minor axis 22

Ratio	:	0.01			
Capacity	:	74.50 [Kip]	Reference	:	Cl.G1
Demand	:	0.95 [Kip]	Ctrl Eq.	:	D17 at 100.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(ϕV_n):	[Kip]	74.50	Cl.G1

Torsion Design

Torsion

Ratio	:	0.01			
Capacity	:	33.59 [Kip*ft]	Reference	:	Cl.H3.1
Demand	:	0.21 [Kip*ft]	Ctrl Eq.	:	D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored torsion capacity(ϕT_n):	[Kip*ft]	33.59	Cl.H3.1

Combined Actions Design

Combined flexure and axial

Ratio	:	0.03			
Ctrl Eq.	:	D17 at 6.25%	Reference	:	Eq.H1-1b

Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.03	Eq.H1-1b