PCS Structural Solutions

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STRUCTURAL CALCULATIONS

FOR

HNT PK-12 SCHOOL
3700 E MERCER WAY
MERCER ISLAND, WA 98040

PREPARED BY
PCS STRUCTURAL *SOLUTIONS*



MAY 30, 2025
23-580

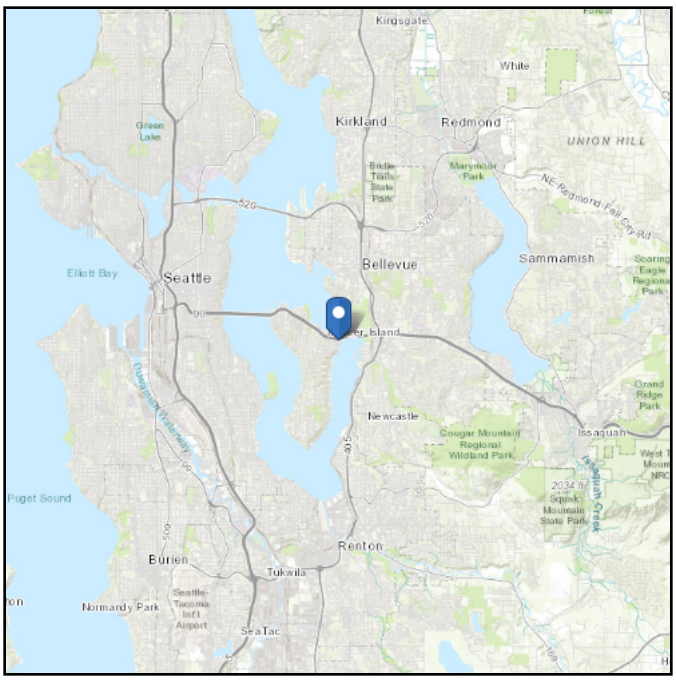
DESIGN CRITERIA

ASCE Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Latitude:**	47.577
Risk Category:	III	**Longitude:**	-122.205
Soil Class:	D - Stiff Soil	**Elevation:**	97.4575959992204 ft (NAVD 88)





Wind

Results:

Wind Speed	105 Vmph
10-year MRI	67 Vmph
25-year MRI	74 Vmph
50-year MRI	78 Vmph
100-year MRI	83 Vmph

Data Source:	ASCE/SEI 7-16, Fig. 26.5-1C and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed:	Thu Apr 11 2024

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (annual exceedance probability = 0.000588, MRI = 1,700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

Seismic

Site Soil Class: D - Stiff Soil

Results:

S_S :	1.396	S_{D1} :	~~N/A~~ Ø.6Ø
S_1 :	0.486	T_L :	6
F_a :	1	PGA :	0.597
F_v :	~~N/A~~ 1.82	PGA_M :	0.657
S_{MS} :	1.396	F_{PGA} :	1.1
S_{M1} :	~~N/A~~ Ø.885	I_e :	1.25
S_{DS} :	0.931	C_v :	1.379

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Thu Apr 11 2024

Date Source: USGS Seismic Design Maps

Ts = SD1 / SDS = Ø.655

T = Ø.44s MAX < 1.5Ts - SITE SPECIFIC GROUND MOTION HAZARD NOT REQUIRED PER 11.4.8. EXCEPTION 2.

The ASCE Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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Project: Hertzl-Ner Tamid K12 School | Job Number: 23-580

Sheet: of | Name: Bret M

Originating Office: Tacoma | Date: 4/11/2024

DESIGN CRITERIA CHECKLIST

CODE: IBC 2021, ASCE 7-16 | LOCATION: Mercer Island, WA

RISK CATEGORY: III (Per ASCE 7-16 Table 1.5-1 & IBC Table

VERTICAL DESIGN CRITERIA

	DEAD	LIVE	PARTITION	CONCENTRATED
ROOF:	20 PSF	25 PSF		
ROOF (PV):	30 PSF	25 PSF		
CLASSROOM:	75 PSF	50 PSF	+ 15 PSF	1000 #
LIBRARY:	75 PSF	80 PSF		1000 #
CORRIDORS (ABOVE LEVEL 1)	75 PSF	80 PSF		
STAIRS	30 PSF	100 PSF		1000#/300#

WIND DESIGN CRITERIA

BASIC WIND SPEED (V) =	105 MPH	(Per ASCE 7-16 Sec. 26.5.1, Fig. 26.5-1A; 1B; 1C & 1D, or as required by Bld'g Dept.)	
EXPOSURE CATEGORY:	C	(Per ACSE 7-16 Section 26.7.3)	
DIRECTIONALITY FACTOR (K_d):	0.85	(Per ASCE 7-16 Table 26.6-1)	
GUST EFFECT FACTOR (G):	0.85	(Per ASCE 7-16 Section 26.11)	
TOPOGRAPHIC FEATURE:	Escarpment	(See ASCE 7-16 Figure 26.8-1)	
HILL HEIGHT (H):	100 FT	(See ASCE 7-16 Figure 26.8-1)	
UPWIND DISTANCE TO HALF HILL (Lh):	220 FT	(See ASCE 7-16 Figure 26.8-1)	
DISTANCE FROM CREST TO SITE (x):	500 FT	UPWIND (See ASCE 7-16 Figure 26.8-1)	
MEAN ROOF HEIGHT:	40 FT	(See ASCE 7-16 Section 26.2 - Definitions)	
ELEVATION:	100 FT	(See ASCE 7-16 Section 26.9)	
ENCLOSURE CLASSIFICATION:	Enclosed	(See ASCE 7-16 Secion 26.2 & Table 26.13-1)	
ROOF TYPE:	Monoslope	(See ASCE 7-16 Figure 27.3-1)	
ROOF SLOPE (__:12):	0.50:12	(Enter vertical rise in 12 horizontal units)	θ (degrees): 2.39

SEISMIC DESIGN CRITERIA

SITE CLASS:	D	(Per IBC Section 1613.2.2, Assumed as "D" or per Geotech.)
IMPORTANCE FACTOR (I_E):	1.25	(Per ASCE 7-16 Table 1.5-2)
STRUCTURAL SYSTEM (R):	8	(Per ASCE 7-16 Table 12.2-1)
OVERSTRENGTH FACTOR (Ω_o):	2.5	(Per ASCE 7-16 Table 12.2-1)

INFORMATION BELOW FROM APPLIED TECHNOLOGY COUNCIL (ATC) "HAZARDS BY LOCATION"

LATITUDE:	47.576	S_S =	1.397	F_a =	1.000
LONGITUDE:	-122.204	S_1 =	0.486	F_v =	1.820

DEFLECTION CRITERIA

FLOOR (LIVE):	L/ 480	ROOF (LIVE):	L/ 360
FLOOR (TOTAL):	L/ 360	ROOF (TOTAL):	L/ 240
WALLS:	L/ 360	SPECIAL:	L/

SOIL DESIGN CRITERIA

REPORT: YES

Subsurface Exploration, Geologic Hazard, and Preliminary Geotechnical Engineering Report for Herzl-Ner Tamid Conservative Congregation K-12 Expansion gy Associated Earth Sciences, Oct 2023

BEARING:	3000 PSF
ACTIVE:	35 PCF
PASSIVE:	300 PCF
COEFFICIENT OF FRICTION:	0.30

MINIMUM FOOTING DIMENSIONS:

CONTINUOUS:	1'-4"
SPREAD:	1'-6"
FROST DEPTH:	1'-6"

PILE TYPE:	NONE
VERTICAL CAPACITY :	N/A
UPLIFT CAPACITY:	N/A

LATERAL CAPACITY:	N/A
SIZE:	N/A

Project: Hertzl-Ner Tamid K12 School | Job Number: 23-580

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MATERIALS

CONCRETE

Footings/Piles:	3000 PSI	Columns:	4000 PSI
Slabs/Walls:	4000 PSI	Beams:	4000 PSI
-	-	-	-

REINFORCING

Steel Grade = 60 f_y = 60 KSI

STRUCTURAL STEEL

W-Flange Beams	ASTM A992	f_y = 50 KSI
Shapes & Plates	ASTM A36	f_y = 36 KSI
Pipes	ASTM A53, Grade B	f_y = 35 KSI
HSS Rect.	ASTM A500, Grade C	f_y = 50 KSI
HSS Round	ASTM A500, Grade C	f_y = 46 KSI

MASONRY

ASTM C90 f'_m = 2000 PSI SOLID GROUTED

PCS Structural Solutions

Project: Hertzl-Ner Tamid K12 School | Job Number: 23-580

Sheet: of | Name: Bret M

Originating Office: Tacoma | Date: 04/11/24

DESIGN CRITERIA - WIND

BASIC WIND SPEED (V):	105 MPH	MEAN ROOF HEIGHT:	40 FT
RISK CATEGORY:	III	GROUND ELEVATION FACTOR (Ke):	1.00
EXPOSURE CATEGORY:	C	ENCLOSURE CLASSIFICATION:	Enclosed
DIRECTIONALITY FACTOR (K_d):	0.85	ROOF TYPE:	Monoslope
GUST EFFECT FACTOR (G):	0.85	ROOF SLOPE (__:12):	0.5:12
		θ (degrees):	2.39

ROOF PRESSURES (Figure 27.3-1)

		External Pressures (q_h*(GC_p)):			Internal Pressures (±q_i*(GC_{pi}))
Wind Direction:	h/L:	Windward (Positive)	Windward (Negative)	Leeward	All Roofs
Normal to Ridge for θ ≥ 10°	≤0.25	N/A	N/A	N/A	3.4
	0.50	N/A	N/A	N/A	
	≥1.0	N/A	N/A	N/A	

			External Pressures (q*(GC_p)):		Internal Pressures (±q_i*(GC_{pi}))
	h/L:	Horizontal Distance from Windward Edge	Positive Pressure	Negative Pressure	All Roofs
Normal to Ridge for θ < 10° and Parallel to Ridge for All θ	≤0.5	0 to h	-2.9	-14.5	3.4
		h to 2h		-8.1	
		>2h		-4.8	
			-2.9	-21.0	
		>h/2		-11.3	

ASCE 7-16 CHAPTER 27: WIND LOADS ON BUILDINGS: MWFRS (DIRECTIONAL PROCEDURE)
PART 1: ENCLOSED AND PARTIALLY ENCLOSED BUILDINGS OF ALL HEIGHTS
HORIZONTAL WALL PRESSURES (Figure 27.3-1)

Windward External Pressures (q_z*(GC_p)):			Leeward & Sidewall External Pressures (q_h*(GC_p)):			Internal Pressures (±q_i*(GC_{pi}))
Height Above Ground Level, z	K_{zt}	Windward wall	L/B:	Leeward wall	Sidewall	All walls
15	0.69	9.6	0-1	-8.1	-11.3	3.4
20	0.71	10.4	2	-4.8		
25	0.72	11.0	≥4	-3.2		
30	0.74	11.7				
40	0.76	12.9				
50	0.79	13.9				
60	0.81	14.9				
70	0.83	15.8				
80	0.85	16.6				
90	0.86	17.4				
100	0.88	17.9				
120	0.90	19.2				
140	0.92	20.3				
160	0.94	21.2				
180	0.95	22.1				
200	0.96	22.8				
250	0.98	24.3				
300	0.99	25.5				
350	0.99	26.5				
400	1.00	27.4				
450	1.00	28.1				
500	1.00	28.7				

NOTES:

1) Minimum Design Wind Loads (Per ASCE 7-16 27.1.5): The wind load used for design of the MWFRS shall not be less than 16 PSF multiplied by the wall area of the building, and 8 PSF multiplied by the roof area of the building projected on a vertical plane normal to the assumed wind direction. Wall and roof loads shall be applied simultaneously.

2) q_i has conservatively been taken equal to q_h

K_{ht} = 0.76

q_h = 19.0 PSF

Project: Hertzl-Ner Tamid K12 School | Job Number: 23-580

Sheet: of | Name: Bret M

Originating Office: Tacoma | Date: 04/11/24

DESIGN CRITERIA - WIND

BASIC WIND SPEED (V):	105 MPH	MEAN ROOF HEIGHT:	40 FT
RISK CATEGORY:	III	GROUND ELEVATION FACTOR (Ke):	1.00
EXPOSURE CATEGORY:	C	ENCLOSURE CLASSIFICATION:	Enclosed
DIRECTIONALITY FACTOR (K_d):	0.85	ROOF TYPE:	Monoslope
GUST EFFECT FACTOR (G):	0.85	ROOF SLOPE (__:12):	0.5:12
		θ (degrees):	2.39

ASCE 7-16 CHAPTER 30: WIND LOADS: COMPONENTS AND CLADDING
PART 1: LOW-RISE BUILDINGS (h≤60 ft)

ROOF SURFACES

Effective Wind Area	POSITIVE PRESSURES	NEGATIVE PRESSURES					
	ZONE						
	ALL ZONES	1'	1	2	3	N/A	N/A
10 SF	16.0	-20.5	-35.7	-47.1	-64.1	N/A	N/A
20 SF	16.0	-20.5	-33.3	-44.0	-58.1	N/A	N/A
50 SF	16.0	-20.5	-30.2	-40.0	-50.1	N/A	N/A
100 SF	16.0	-20.5	-27.9	-37.0	-44.0	N/A	N/A

WALL SURFACES & ROOF OVERHANGS

Effective Wind Area	WALL ZONES				ROOF OVERHANG ZONES					
	POSITIVE PRESSURES		NEGATIVE PRESSURES		NEGATIVE PRESSURES					
	4	5	4	5	1'	1	2	3	N/A	N/A
10 SF	22.4	22.4	-24.3	-30.0	-32.3	-32.3	-43.6	-60.7	N/A	N/A
20 SF	21.4	21.4	-23.3	-28.0	-31.7	-31.7	-39.6	-53.7	N/A	N/A
50 SF	20.0	20.0	-21.9	-25.3	-30.9	-30.9	-34.3	-44.3	N/A	N/A
100 SF	19.0	19.0	-20.9	-23.3	-30.4	-30.4	-30.2	-37.3	N/A	N/A
500 SF	16.7	16.7	-18.6	-18.6	-29.0	-29.0	-20.9	-20.9	N/A	N/A

NOTES:

1) ASCE 7-16 30.2.2: Minimum Design Wind Loads: The design wind pressure for C&C of buildings shall not be less than a net pressure of 16 PSF acting in either direction normal to the surface.

2) q_i has conservatively been taken equal to q_h

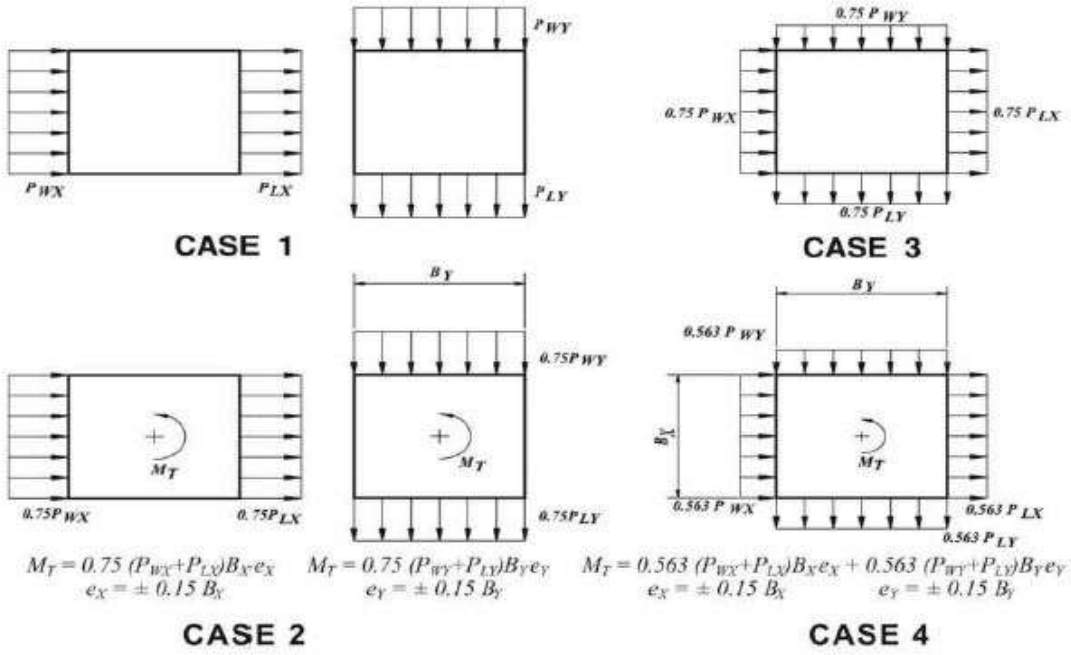
K_{ht} = 0.76

q_h = 19.0 PSF

DESIGN CRITERIA - WIND

FIGURE 27.3-8: Main Wind Force Resisting System, Part 1 (All Heights): Design Wind Load Cases per ASCE 7-16

Diagrams



Notation

P_{WX}, P_{WY} = Windward face design pressure acting in the x, y principal axis, respectively.
P_{LX}, P_{LY} = Leeward face design pressure acting in the x, y principal axis, respectively.
$e(e_X, e_Y)$ = Eccentricity for the x, y principal axis of the structure, respectively.
M_T = Torsional moment per unit height acting about a vertical axis of the building.

Case 1. Full design wind pressure acting on the projected area perpendicular to each principal axis of the structure, considered separately along each principal axis.
Case 2. Three-quarters of the design wind pressure acting on the projected area perpendicular to each principal axis of the structure in conjunction with a torsional moment as shown, considered separately for each principal axis.
Case 3. Wind loading as defined in Case 1, but considered to act simultaneously at 75% of the specified value.
Case 4. Wind loading as defined in Case 2, but considered to act simultaneously at 75% of the specified value.

Notes

1. Design wind pressures for windward and leeward faces shall be determined in accordance with the provisions of Sections 27.3.1 and 27.3.2 as applicable for buildings of all heights.
2. Diagrams show plan views of buildings.

FIGURE 27.3-8 Main Wind Force Resisting System, Part 1 (All Heights): Design Wind Load Cases

DESIGN CRITERIA - WIND

FIGURE 27.3-1 Main Wind Force Resisting System, Part 1 (All Heights): External Pressure Coefficients, Cp, for Enclosed and Partially Enclosed Buildings - Walls and Roofs per ASCE 7-16

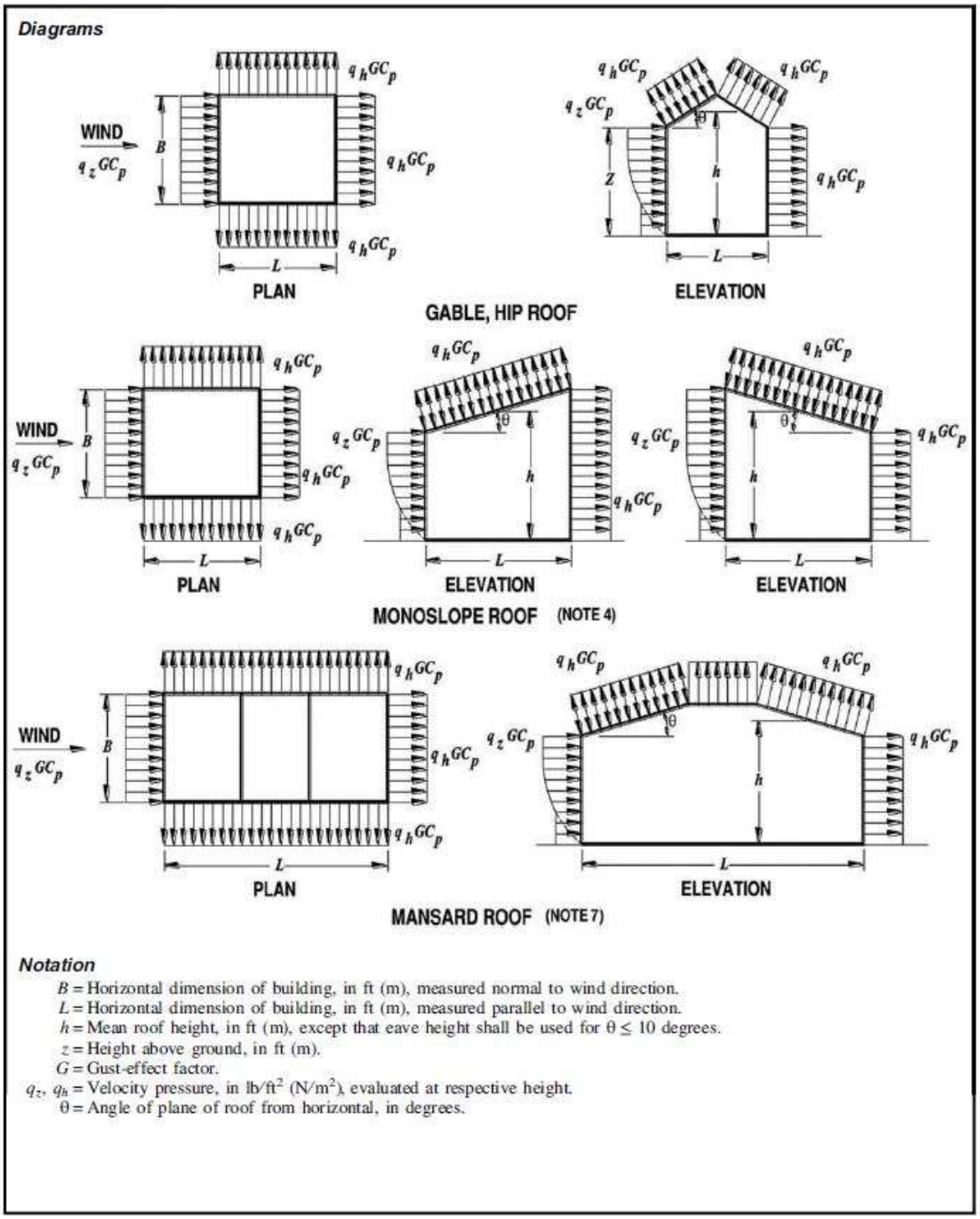
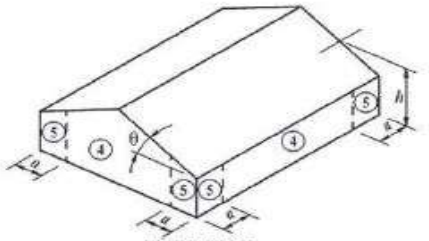


FIGURE 27.3-1 Main Wind Force Resisting System, Part 1 (All Heights): External Pressure Coefficients, C_p, for Enclosed and Partially Enclosed Buildings—Walls and Roofs

DESIGN CRITERIA - WIND

FIGURE 30.3-1: Components and Cladding [h ≤ 60 ft]: External Pressure Coefficients, (GCp), for Enclosed and Partially Enclosed Buildings - Walls

Diagram



Notation

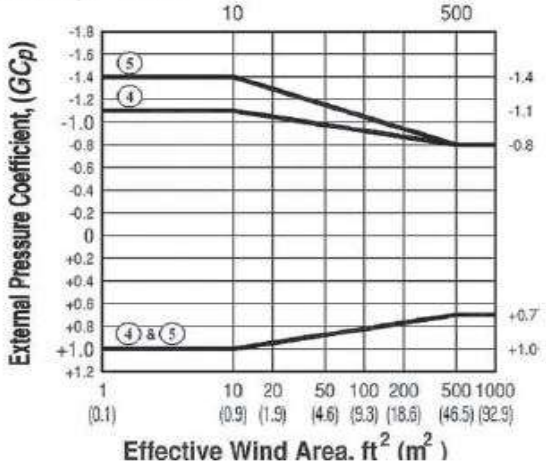
a = 10% of least horizontal dimension or $0.4h$, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m).

Exception: For buildings with $\theta = 0°$ to $7°$ and a least horizontal dimension greater than 300 ft (90 m), dimension a shall be limited to a maximum of $0.8h$.

h = Mean roof height, in ft (m), except that eave height shall be used for $\theta \leq 10°$.

θ = Angle of plane of roof from horizontal, in degrees.

External Pressure Coefficient, (GC_p) - Walls



Notes

1. Vertical scale denotes (GCp) to be used with qh.
2. Horizontal scale denotes effective wind area, in ft^2 (m^2).
3. Plus and minus signs signify pressures acting toward and away from the surfaces, respectively.
4. Each component shall be designed for maximum positive and negative pressures.
5. Values of (GCp) for walls shall be reduced by 10% when $\theta \leq 10°$.

FIGURE 30.3-1 Components and Cladding [$h \leq 60$ ft ($h \leq 18.3$ m)]: External Pressure Coefficients, (GC_p), for Enclosed and Partially Enclosed Buildings—Walls

Project: Hertzl-Ner Tamid K12 School | Job Number: 23-580

Sheet: of | Name: Bret M

Originating Office: Tacoma | Date: 04/11/24

DESIGN CRITERIA - SEISMIC

ASCE 7-16 SECTION 12.8 - EQUIVALENT LATERAL FORCE PROCEDURE

RISK CATEGORY:	III	LATITUDE:	47.576
SITE CLASS:	D	LONGITUDE:	-122.204
IMPORTANCE FACTOR (I_E):	1.25	S_S =	1.397
STRUCTURAL SYSTEM (R):	8	S_1 =	0.486
OVERSTRENGTH FACTOR (Ω_o):	2.5	F_a =	1.000
		F_v =	1.820

ASCE 7-16 SECTION 11.4 SEISMIC GROUND MOTION VALUES

Section 11.4.4 - Coefficients and Risk-Targeted Maximum Considered Earthquake (MCER) Spectral Response Acceleration Parameters

$S_{MS} = F_a * S_S$ = 1.397 $S_{M1} = F_v * S_1$ = 0.885

Section 11.4.5 - Design Spectral Response Acceleration Parameters

$S_{DS} = 2/3 * S_{MS}$ = 0.931 $S_{D1} = 2/3 * S_{M1}$ = 0.590

ASCE 7-16 SECTION 11.6 - SEISMIC DESIGN CATEGORY - SECTION 12.8.2 - PERIOD DETERMINATION

ASCE 7-16 TABLE 11.6-1			
SEISMIC DESIGN CATEGORY BASED ON S_{DS}			
	RISK CATEGORY:		
	I & II	III	IV
< 0.167g	A	A	A
< 0.33g	B	B	C
< 0.50g	C	C	D
>= 0.50g	D	D	D
	D		

ASCE 7-16 TABLE 11.6-2			
SEISMIC DESIGN CATEGORY BASED ON S_{D1}			
	RISK CATEGORY:		
	I & II	III	IV
< 0.067g	A	A	A
< 0.133g	B	B	C
< 0.20g	C	C	D
>= 0.20g	D	D	D
	D		

Each building and structure shall be assigned to the most severe Seismic Design Category in accordance with Table 11.6-1 or Table 11.6-2, irrespective of the fundamental period of vibration of the structure.

PERIOD DETERMINATION:	
C_t =	0.03
h_n =	48 FT
x =	0.75
$T_a = C_t * h_n^x$ =	0.547

ASCE 7-16 SECTION 12.8.1.1 - SEISMIC RESPONSE COEFFICIENT

GENERAL EQUATION:	$C_S = S_{DS}/(R/I)$ =	0.146	<--CONTROLS	EQ. 12.8-2
MAXIMUM:	$CS = 1.5*SD1/(T*(R/I))$ =	0.253		EQ. 12.8-3
MINIMUM:	$C_S = 0.044*S_{DS}*I > 0.01$ =	0.051		EQ. 12.8-5
For structures located where S1 > 0.6g				
	$C_S = 0.5*S_1/(R/I)$ =	0.000		EQ. 12.8-6

ASCE 7-16 SECTION 12.8.1 - SEISMIC BASE SHEAR

$V = C_S * W$ = **0.146*W**

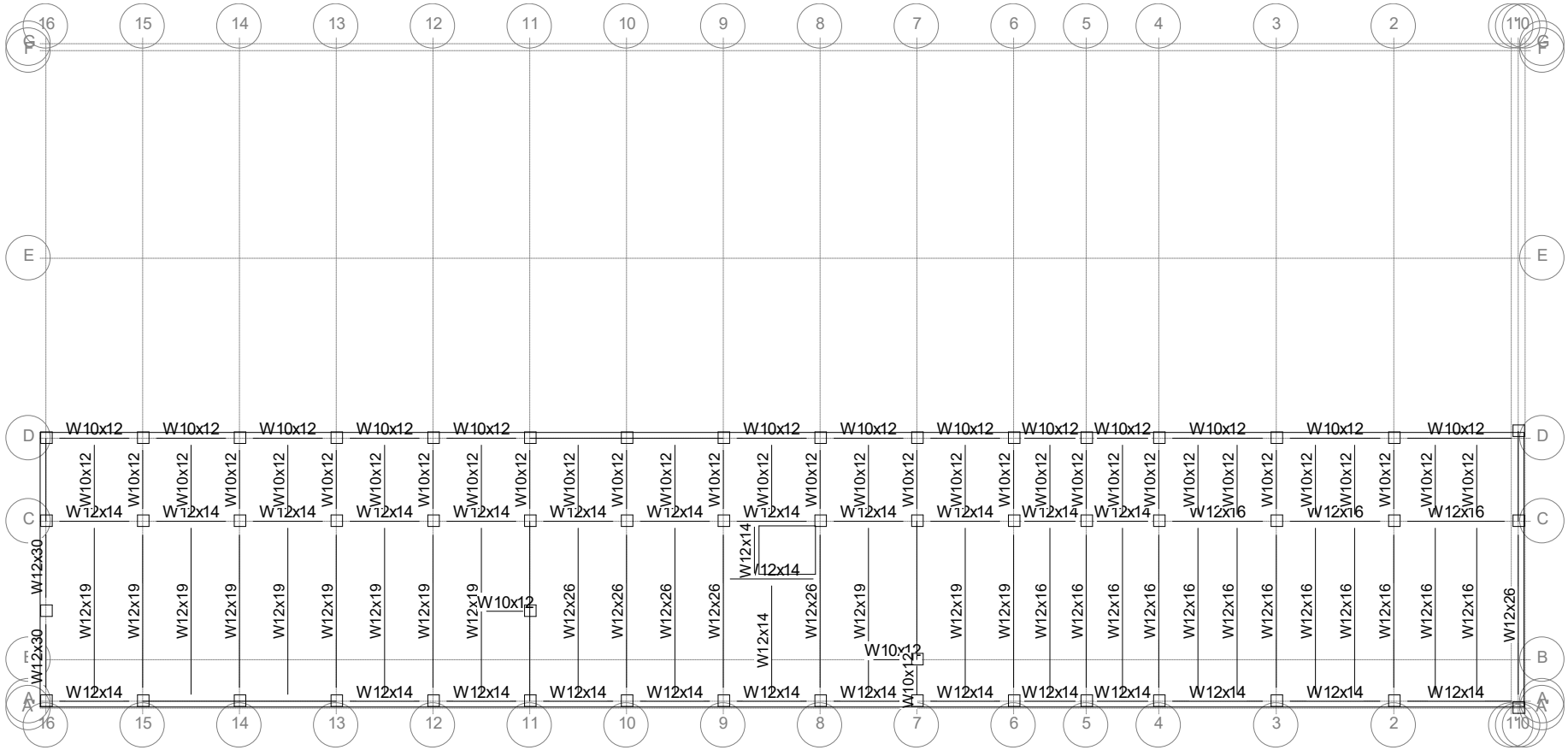
W = the total dead load and applicable portion of other loads as indicated in Section 12.7.2

GRAVITY DESIGN

GRAVITY DESIGN - ROOF AND FLOOR FRAMING

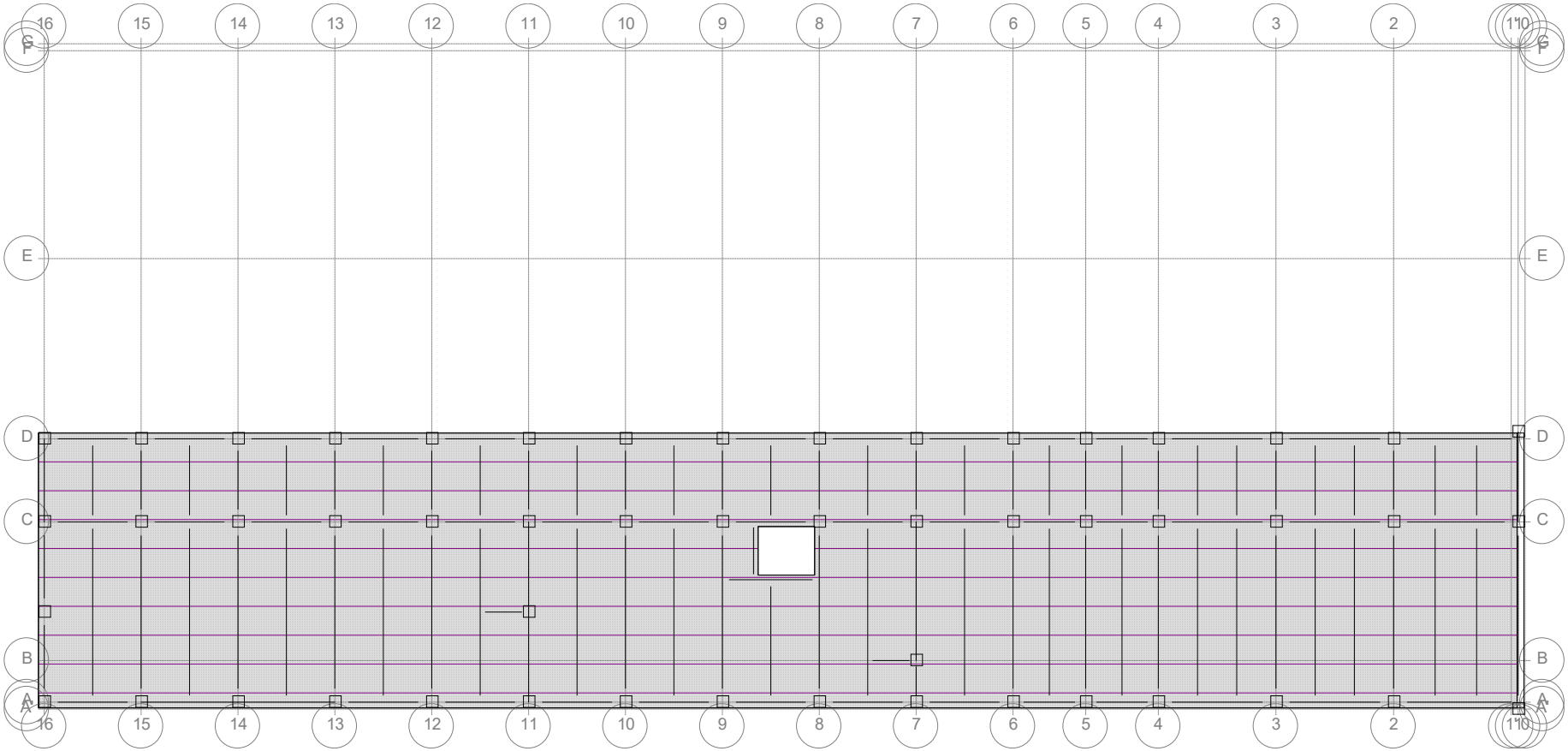
Floor Map

Floor Type: LEVEL 04 **Beam Designs**



Floor Map

Floor Type: LEVEL 04

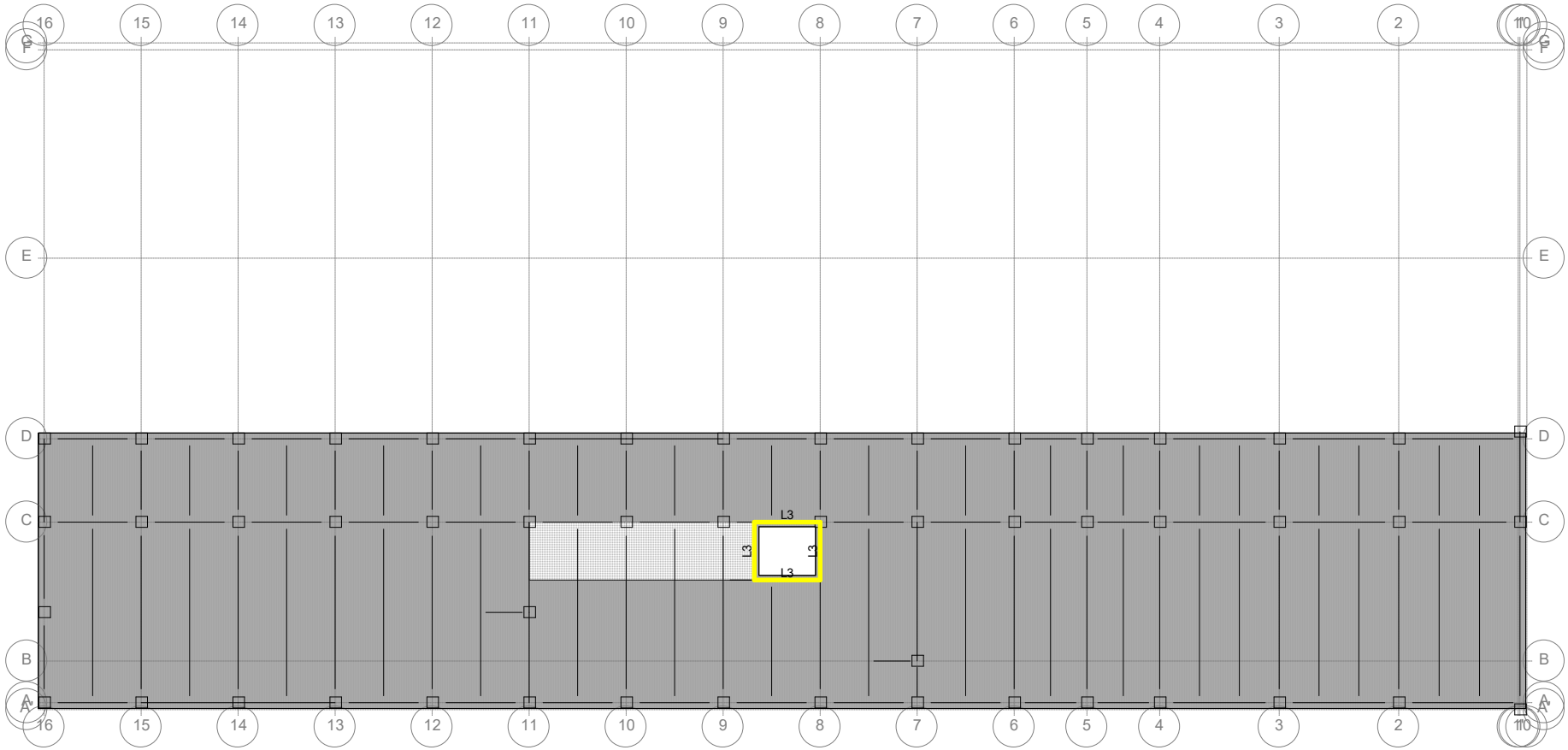


Floor Map

Decks:	Deck Label	Deck Type	Slab Action	Orientation
	1-1/2in B Deck	Noncomposite	One-Way	0.00 degrees

Floor Map

Floor Type: LEVEL 04



Floor Map

Surface Loads

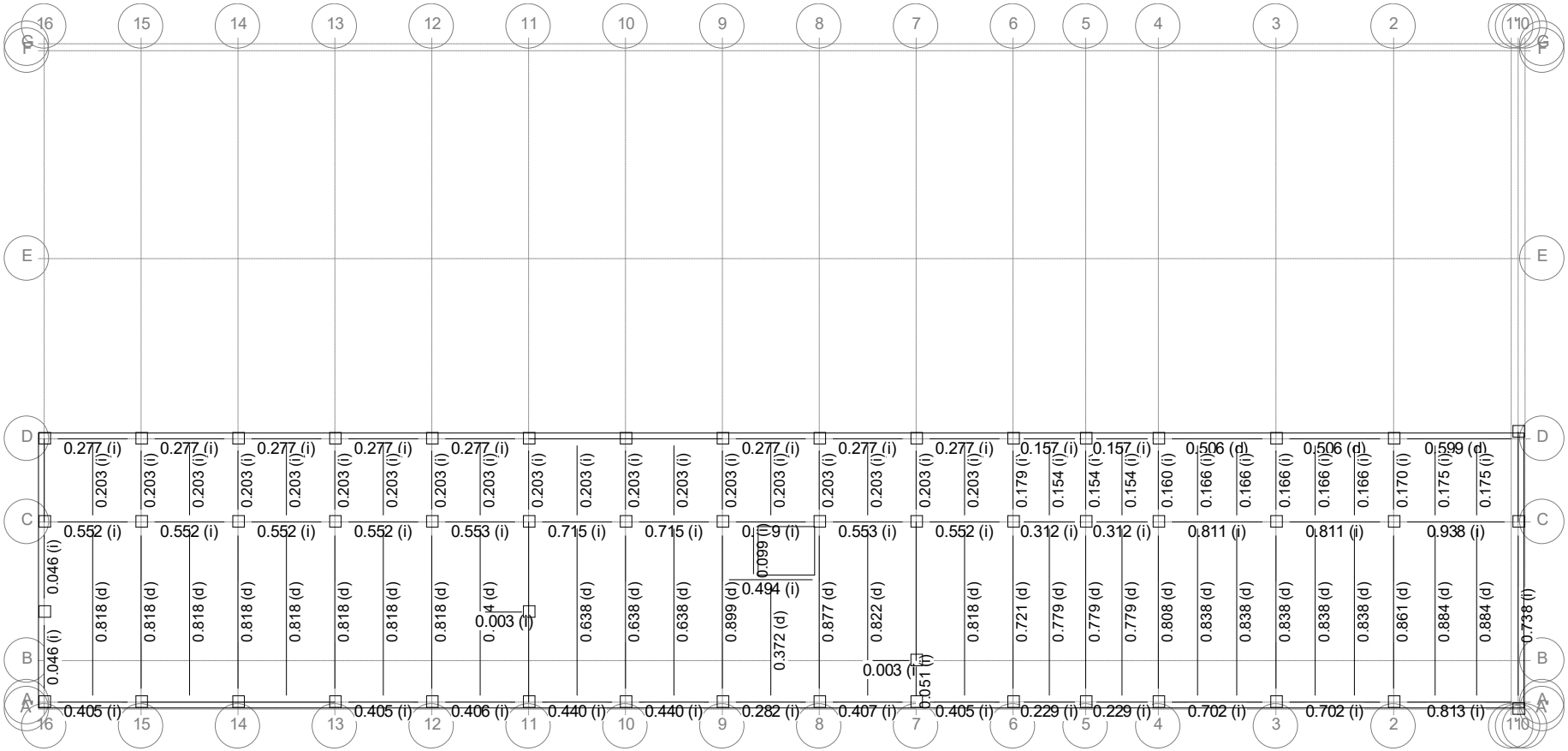
	Label	DL psf	CDL psf	LL psf	Reduction Type	PLL psf	CLL psf	Mass DL psf
	ROOF-PV	25.0	0.0	30.0	Roof	0.0	0.0	31.0
	ROOF-MECH	75.0	0.0	30.0	Roof	0.0	0.0	31.0

Line Loads

	Label	DL k/ft	CDL k/ft	LL k/ft	Reduction Type	PLL k/ft	CLL k/ft	Mass DL k/ft
L3	ELEV PENTHOUSE	0.150	0.000	0.125	Roof	0.000	0.000	0.150

Floor Map

Floor Type: LEVEL 04 **Demand / Capacity Ratios: Controlling**



Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Uplift Checks.ec6

DESCRIPTION: W12x19 Typ Uplift Case

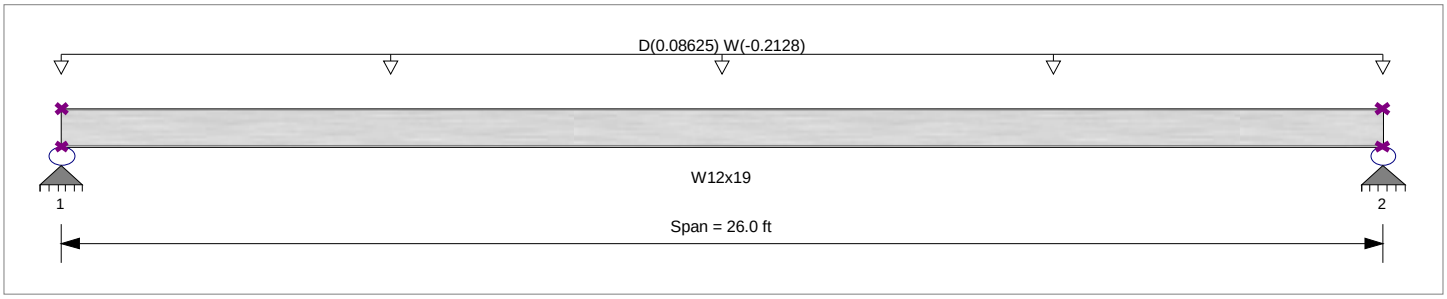
CODE REFERENCES

Calculations per AISC 360-16, IBC 2021
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Load Resistance Factor Design
Beam Bracing : Completely Unbraced
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.0150, W = -0.0370 ksf, Tributary Width = 5.750 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.721 : 1	Maximum Shear Stress Ratio =	0.018 : 1
Section used for this span	W12x19	Section used for this span	W12x19
Mu : Applied	9.973 k-ft	Vu : Applied	1.534 k
Mn * Phi : Allowable	13.840 k-ft	Vn * Phi : Allowable	86.010 k
Load Combination	+0.90D+W	Load Combination	+0.90D+W
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0 in	Ratio =	0 <240.0	n/a
Max Upward Transient Deflection	-0.582 in	Ratio =	535 >=240.	Span: 1 : W Only
Max Downward Total Deflection	0.288 in	Ratio =	1082 >=180.	Span: 1 : D Only
Max Upward Total Deflection	-0.177 in	Ratio =	1766 >=180.	Span: 1 : +0.60D+0.60W

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	Summary of Shear Values VuMax	Vnx	Phi*Vnx
+0.90D+W													
Dsgn. L = 26.00 ft	1	0.721	0.018		-9.97	9.97	15.38	13.84	1.14	1.00	1.53	86.01	86.01

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
1		0.0000	0.000	W Only	-0.5829	13.074

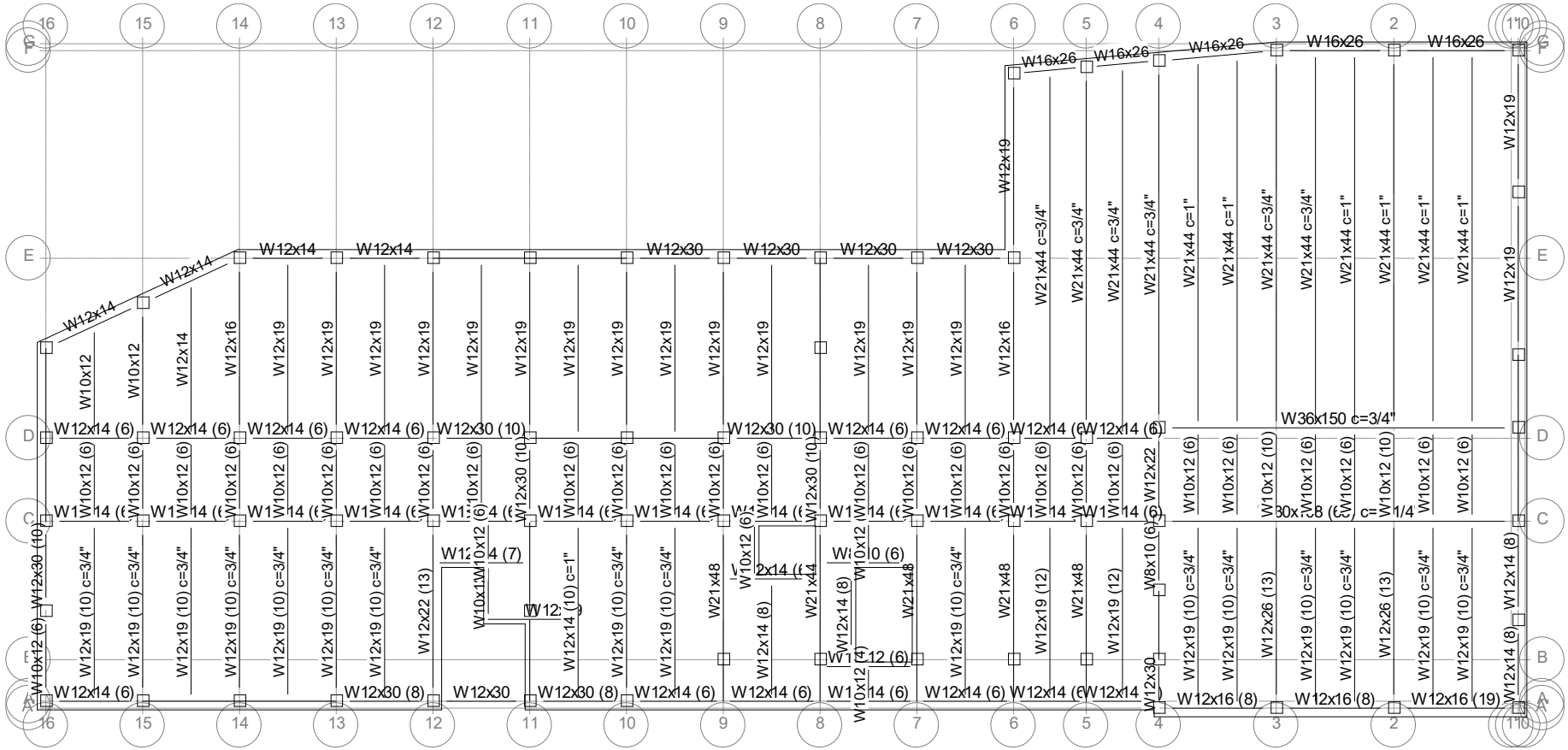
Vertical Reactions

Support notation : Far left is #: Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	1.368	1.368
Max Upward from Load Combinations	0.821	0.821
Max Upward from Load Cases	1.368	1.368
Max Downward from all Load Conditions (Resisting Uplift)	-2.766	-2.766
Max Downward from Load Combinations (Resisting Uplift)	-0.839	-0.839
Max Downward from Load Cases (Resisting Uplift)	-2.766	-2.766
D Only	1.368	1.368
+D+0.60W	-0.291	-0.291
+D+0.450W	0.124	0.124
+0.60D+0.60W	-0.839	-0.839
+0.60D	0.821	0.821
W Only	-2.766	-2.766

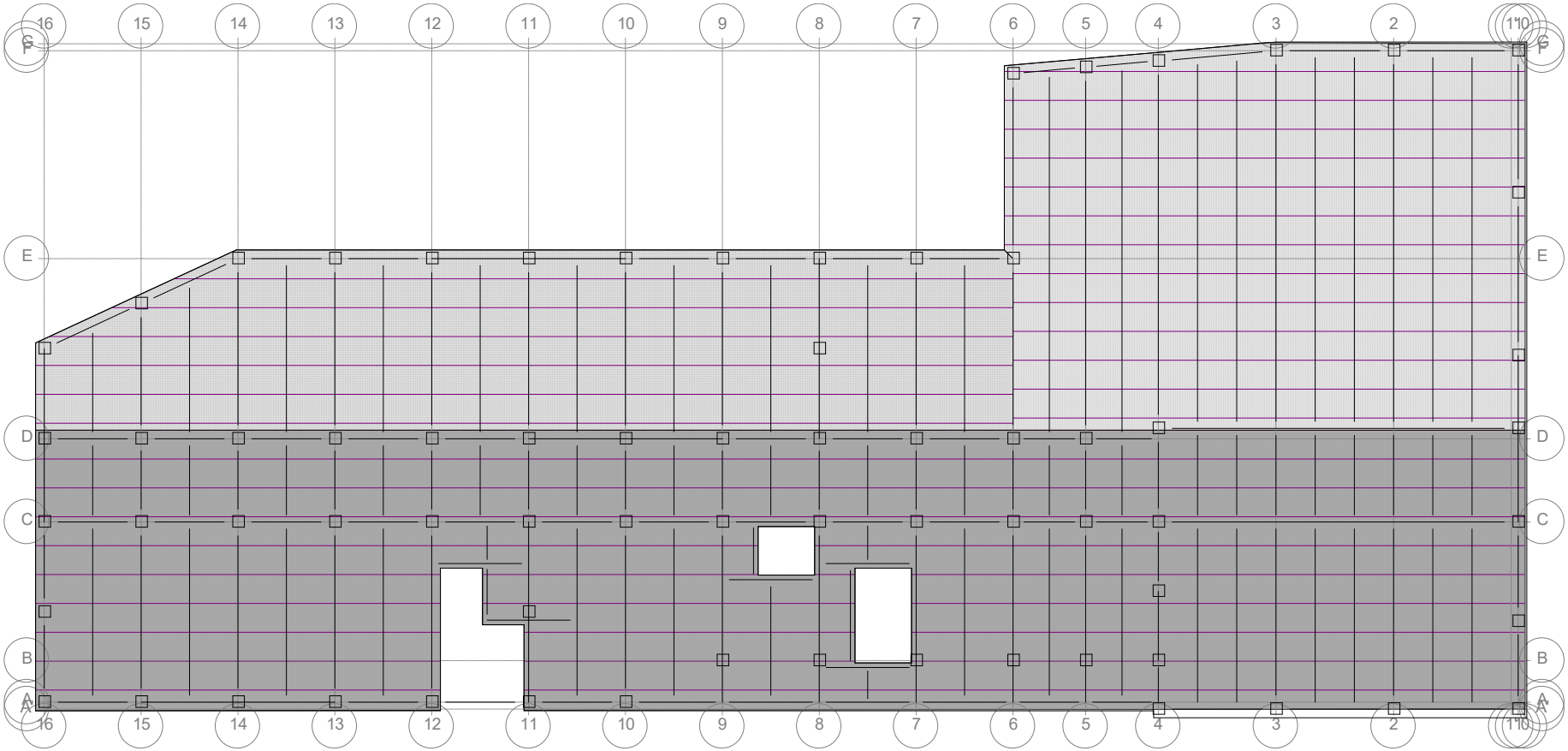
Floor Map

Floor Type: LEVEL 03 **Beam Designs**



Floor Map

Floor Type: LEVEL 03

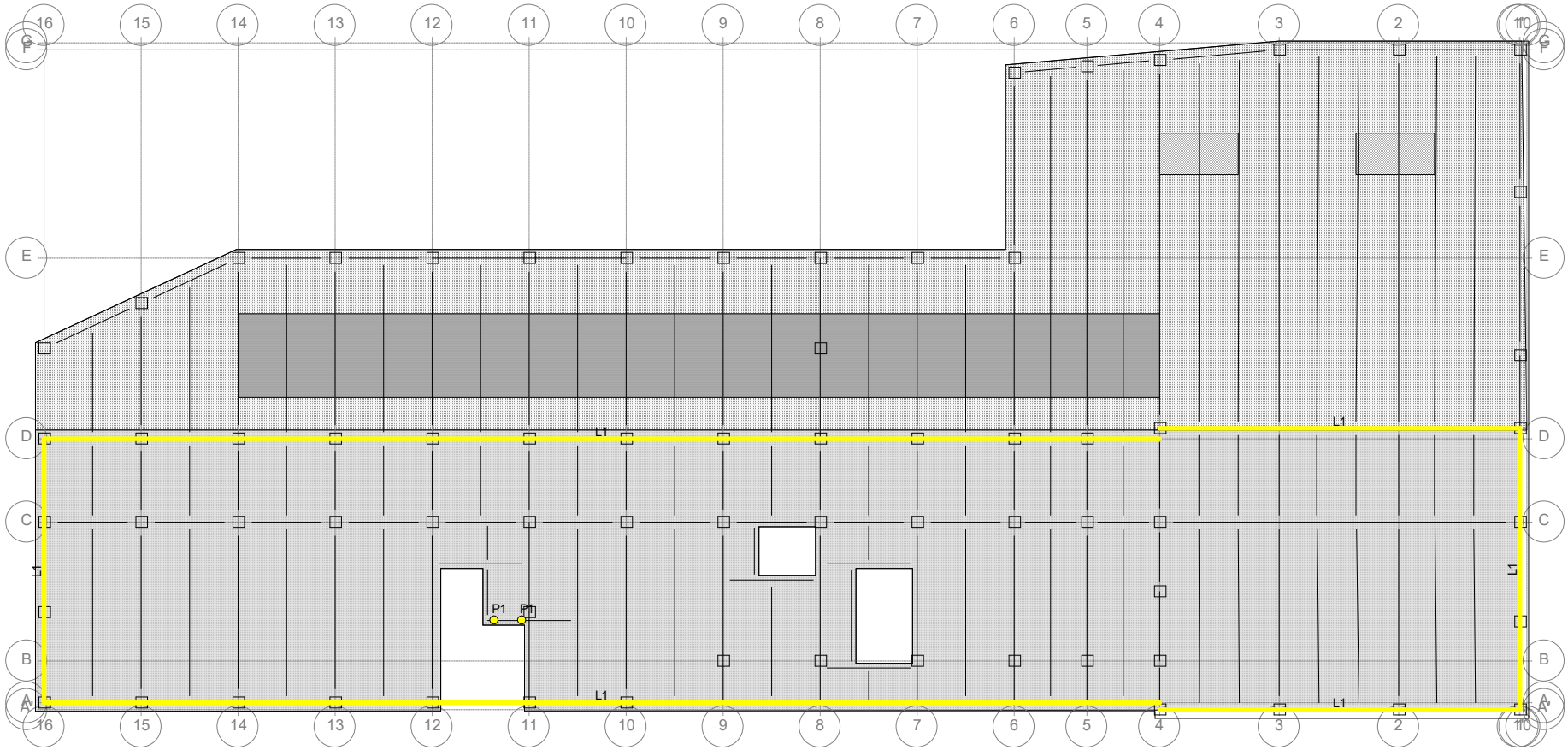


Floor Map

Decks:	Deck Label	Deck Type	Slab Action	Orientation
	1-1/2in B Deck	Noncomposite	One-Way	0.00 degrees
	2-1/2 on W3	VERCO W3 Formlok	One-Way	0.00 degrees

Floor Map

Floor Type: LEVEL 03



Surface Loads

	Label	DL psf	CDL psf	LL psf	Reduction Type	PLL psf	CLL psf	Mass DL psf
	Typical Floor	15.0	0.0	80.0	Reducible	0.0	0.0	29.0
	ROOF	15.0	0.0	30.0	Roof	0.0	0.0	28.0
	ROOF-PV-L3	25.0	0.0	30.0	Roof	0.0	0.0	28.0
	ROOF-MECH-L3	75.0	0.0	30.0	Roof	0.0	0.0	28.0

Line Loads

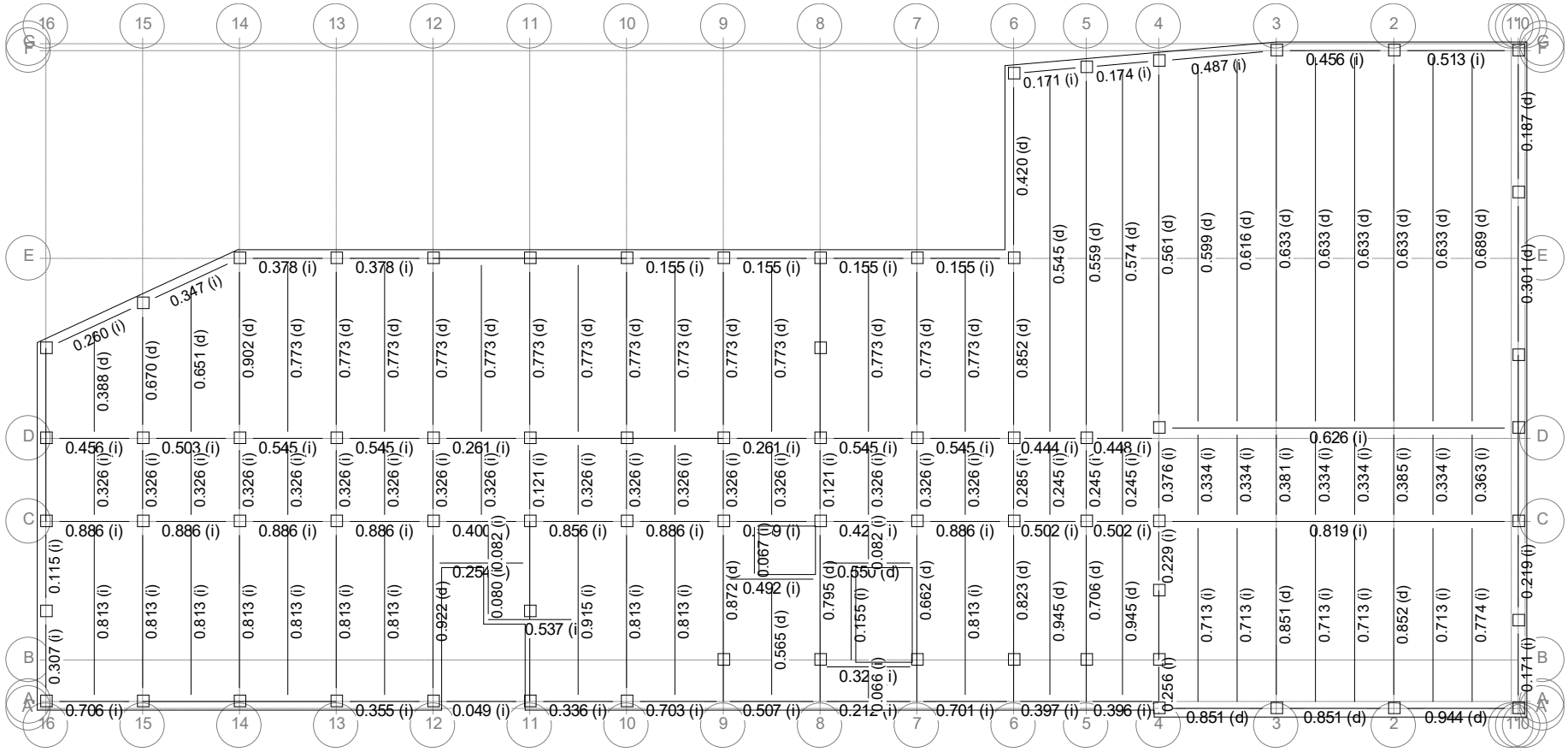
	Label	DL k/ft	CDL k/ft	LL k/ft	Reduction Type	PLL k/ft	CLL k/ft	Mass DL k/ft
L1	12ft Cladding	0.150	0.000	0.000	Reducible	0.000	0.000	0.000

Point Loads

	Label	DL kips	CDL kips	LL kips	Reduction Type	PLL kips	CLL kips	Mass DL kips
P1	Stair	0.750	0.000	1.200	Unreducible	0.000	0.000	0.500

Floor Map

Floor Type: LEVEL 03 **Demand / Capacity Ratios: Controlling**


16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1"10
F E D C B A
0.171 (i) 0.174 (i) 0.487 (i) 0.456 (i) 0.513 (i)
0.420 (d) 0.545 (d) 0.559 (d) 0.574 (d) 0.561 (d) 0.599 (d) 0.616 (d) 0.633 (d) 0.633 (d) 0.633 (d) 0.633 (d) 0.633 (d) 0.689 (d) 0.187 (d) 0.301 (d)
0.260 (i) 0.347 (i) 0.378 (i) 0.378 (i) 0.155 (i) 0.155 (i) 0.155 (i) 0.155 (i)
0.388 (d) 0.670 (d) 0.651 (d) 0.902 (d) 0.773 (d) 0.773 (d) 0.773 (d) 0.773 (d) 0.773 (d) 0.773 (d) 0.773 (d) 0.773 (d) 0.773 (d) 0.773 (d) 0.773 (d) 0.773 (d) 0.773 (d) 0.773 (d) 0.852 (d)
0.456 (i) 0.503 (i) 0.545 (i) 0.545 (i) 0.261 (i) 0.261 (i) 0.545 (i) 0.545 (i) 0.444 (i) 0.448 (i) 0.626 (i)
0.326 (i) 0.326 (i) 0.326 (i) 0.326 (i) 0.326 (i) 0.326 (i) 0.326 (i) 0.326 (i) 0.326 (i) 0.326 (i) 0.326 (i) 0.326 (i) 0.326 (i) 0.326 (i) 0.326 (i) 0.326 (i) 0.121 (i) 0.121 (i) 0.326 (i) 0.326 (i) 0.326 (i) 0.326 (i) 0.285 (i) 0.245 (i) 0.245 (i) 0.245 (i) 0.376 (i) 0.334 (i) 0.334 (i) 0.381 (i) 0.334 (i) 0.334 (i) 0.385 (i) 0.334 (i) 0.363 (i)
0.886 (i) 0.886 (i) 0.886 (i) 0.886 (i) 0.400 (i) 0.856 (i) 0.886 (i) 0.42 (i) 0.886 (i) 0.502 (i) 0.502 (i) 0.819 (i)
0.115 (i) 0.307 (i) 0.813 (i) 0.813 (i) 0.813

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Uplift Checks.ec6

DESCRIPTION: Gym Roof Beam Wind Uplift Case

CODE REFERENCES

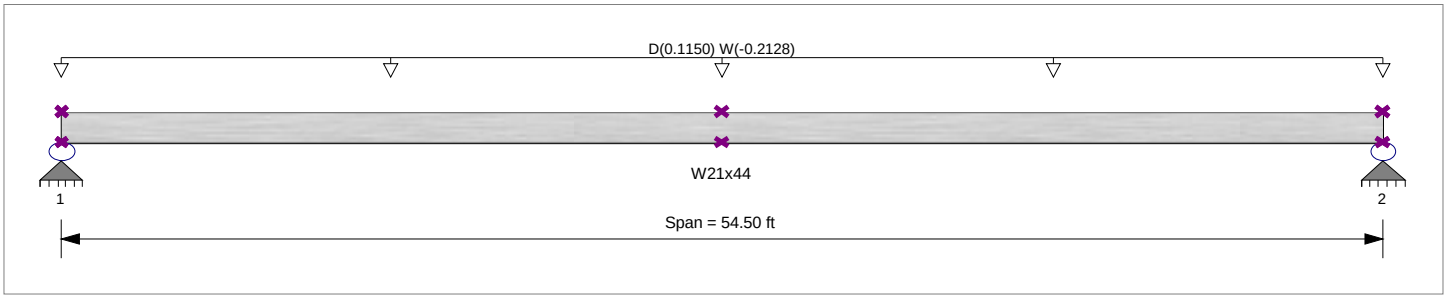
Calculations per AISC 360-16, IBC 2021
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Load Resistance Factor Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam bracing is defined Beam-by-Beam	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		

Unbraced Lengths

Span # 1, Braced @ Mid Span



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.020, W = -0.0370 ksf, Tributary Width = 5.750 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.959 : 1	Maximum Shear Stress Ratio =	0.028 : 1
Section used for this span	W21x44	Section used for this span	W21x44
Mu : Applied	82.647 k-ft	Vu : Applied	6.066 k
Mn * Phi : Allowable	86.207 k-ft	Vn * Phi : Allowable	217.350 k
Load Combination	+1.40D	Load Combination	+1.40D
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Upward Transient Deflection	-1.735 in	Ratio =	376 >=360	Span: 1 : W Only
Max Downward Total Deflection	1.297 in	Ratio =	504 >=240.	Span: 1 : D Only
Max Upward Total Deflection	-0.263 in	Ratio =	2486 >=240.	Span: 1 : +0.60D+0.60W

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	Summary of Shear Values VuMax	Vnx	Phi*Vnx
+1.40D													
Dsgn. L = 27.25 ft	1	0.953	0.028	82.65		82.65	96.38	86.74	1.30	1.00	6.07	217.35	217.35
Dsgn. L = 27.25 ft	1	0.959	0.028	82.65		82.65	95.79	86.21	1.30	1.00	6.07	217.35	217.35
+1.20D													
Dsgn. L = 27.25 ft	1	0.817	0.024	70.84		70.84	96.38	86.74	1.30	1.00	5.20	217.35	217.35
Dsgn. L = 27.25 ft	1	0.822	0.024	70.84		70.84	95.79	86.21	1.30	1.00	5.20	217.35	217.35
+1.20D+0.50W													
Dsgn. L = 27.25 ft	1	0.361	0.011	31.35		31.35	96.38	86.74	1.30	1.00	2.30	217.35	217.35
Dsgn. L = 27.25 ft	1	0.364	0.011	31.35		31.35	95.79	86.21	1.30	1.00	2.30	217.35	217.35
+1.20D+W													
Dsgn. L = 27.25 ft	1	0.122	0.003		-8.15	8.15	73.97	66.57	1.00	1.00	0.60	217.35	217.35
Dsgn. L = 27.25 ft	1	0.122	0.003		-8.15	8.15	73.97	66.57	1.00	1.00	0.60	217.35	217.35
+0.90D+W													
Dsgn. L = 27.25 ft	1	0.388	0.009		-25.86	25.86	73.97	66.57	1.00	1.00	1.90	217.35	217.35
Dsgn. L = 27.25 ft	1	0.388	0.009		-25.86	25.86	73.97	66.57	1.00	1.00	1.90	217.35	217.35
+0.90D													
Dsgn. L = 27.25 ft	1	0.613	0.018	53.13		53.13	96.38	86.74	1.30	1.00	3.90	217.35	217.35
Dsgn. L = 27.25 ft	1	0.616	0.018	53.13		53.13	95.79	86.21	1.30	1.00	3.90	217.35	217.35

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Uplift Checks.ec6

DESCRIPTION: Gym Roof Beam Wind Uplift Case

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
1		0.0000	0.000	W Only	-1.7354	27.406

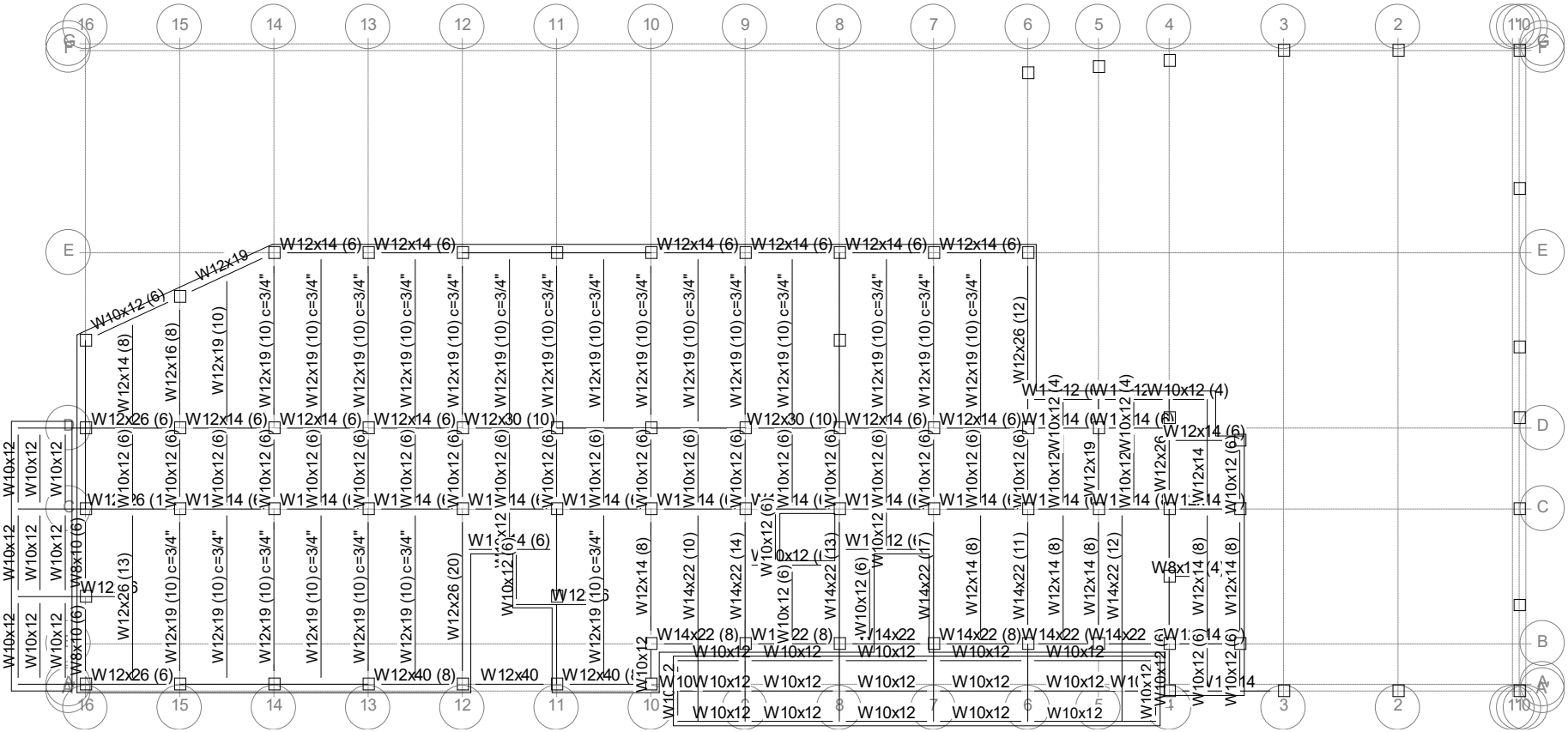
Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	4.333	4.333
Max Upward from Load Combinations	2.600	2.600
Max Upward from Load Cases	4.333	4.333
Max Downward from all Load Conditions (Resisting Uplift)	-5.797	-5.797
Max Downward from Load Combinations (Resisting Uplift)	-0.879	-0.879
Max Downward from Load Cases (Resisting Uplift)	-5.797	-5.797
D Only	4.333	4.333
+D+0.60W	0.854	0.854
+D+0.450W	1.724	1.724
+0.60D+0.60W	-0.879	-0.879
+0.60D	2.600	2.600
W Only	-5.797	-5.797

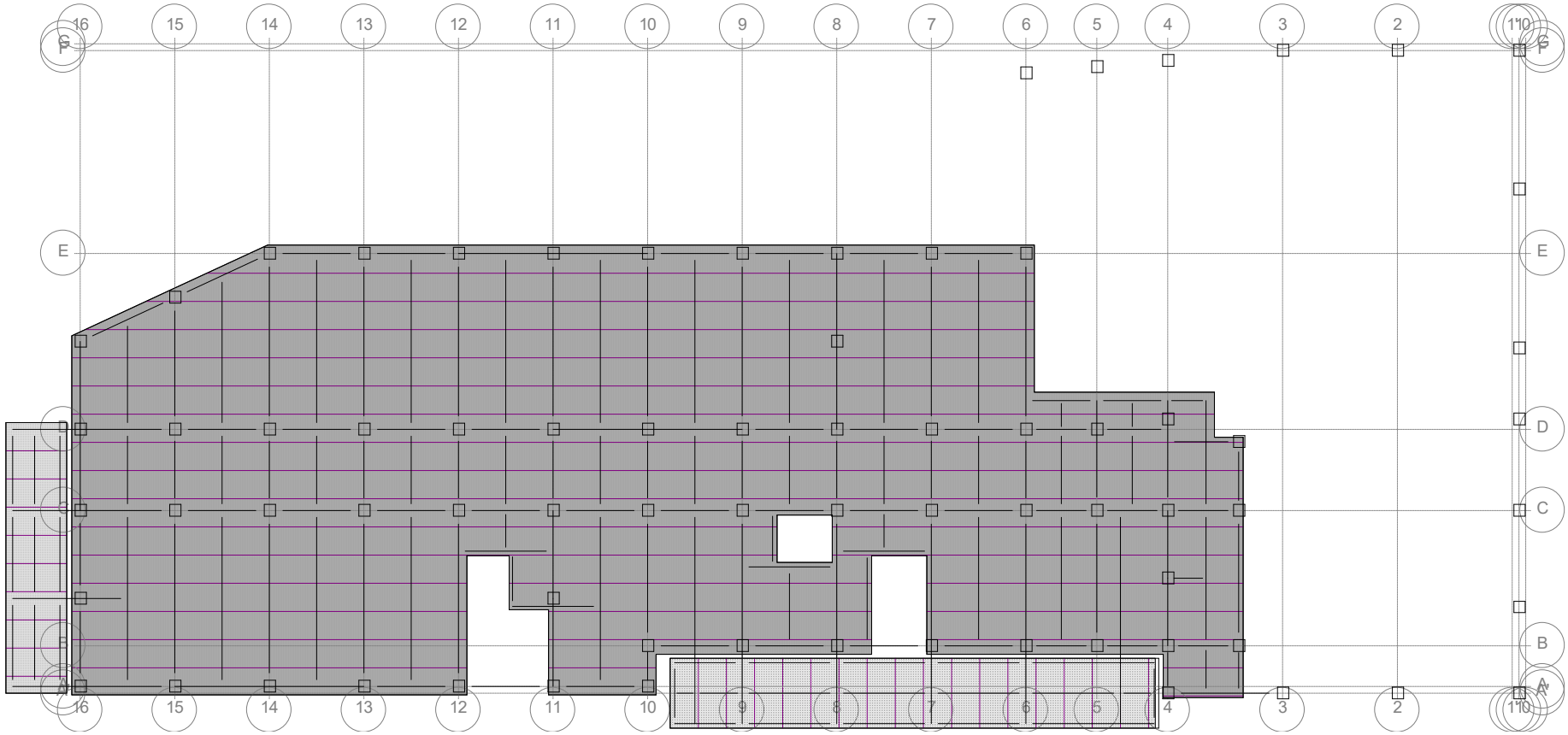
Floor Map

Floor Type: LEVEL 02 **Beam Designs**



Floor Map

Floor Type: LEVEL 02

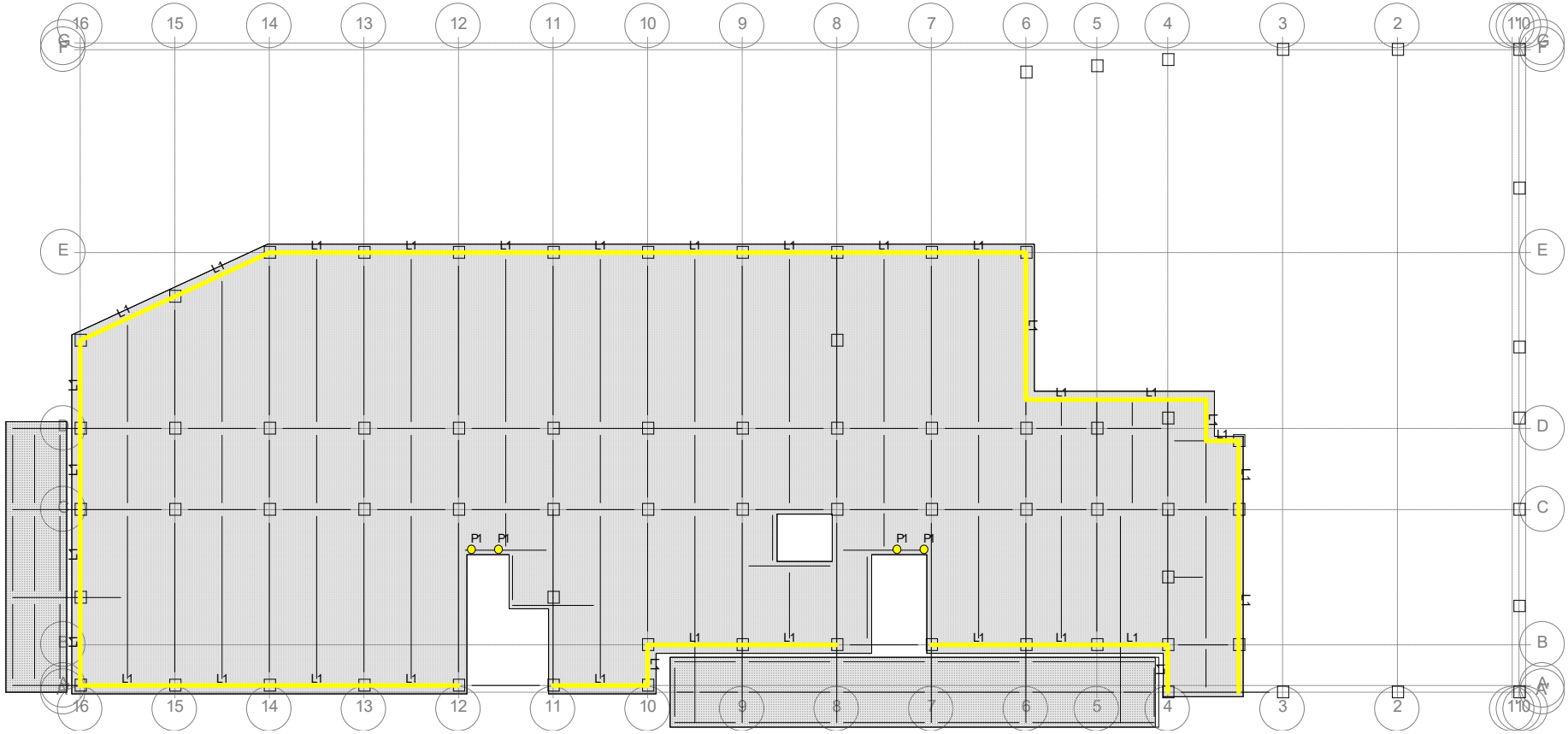


Floor Map

Decks:	Deck Label	Deck Type	Slab Action	Orientation
	1-1/2in B Deck	Noncomposite	One-Way	0.00 degrees
	1-1/2in B Deck	Noncomposite	One-Way	90.00 degrees
	2-1/2 on W3	VERCO W3 Formlok	One-Way	0.00 degrees

Floor Map

Floor Type: LEVEL 02



Surface Loads

	Label	DL psf	CDL psf	LL psf	Reduction Type	PLL psf	CLL psf	Mass DL psf
	Typical Floor	15.0	0.0	80.0	Reducible	0.0	0.0	29.0
	ROOF	15.0	0.0	25.0	Roof	0.0	0.0	28.0

Line Loads

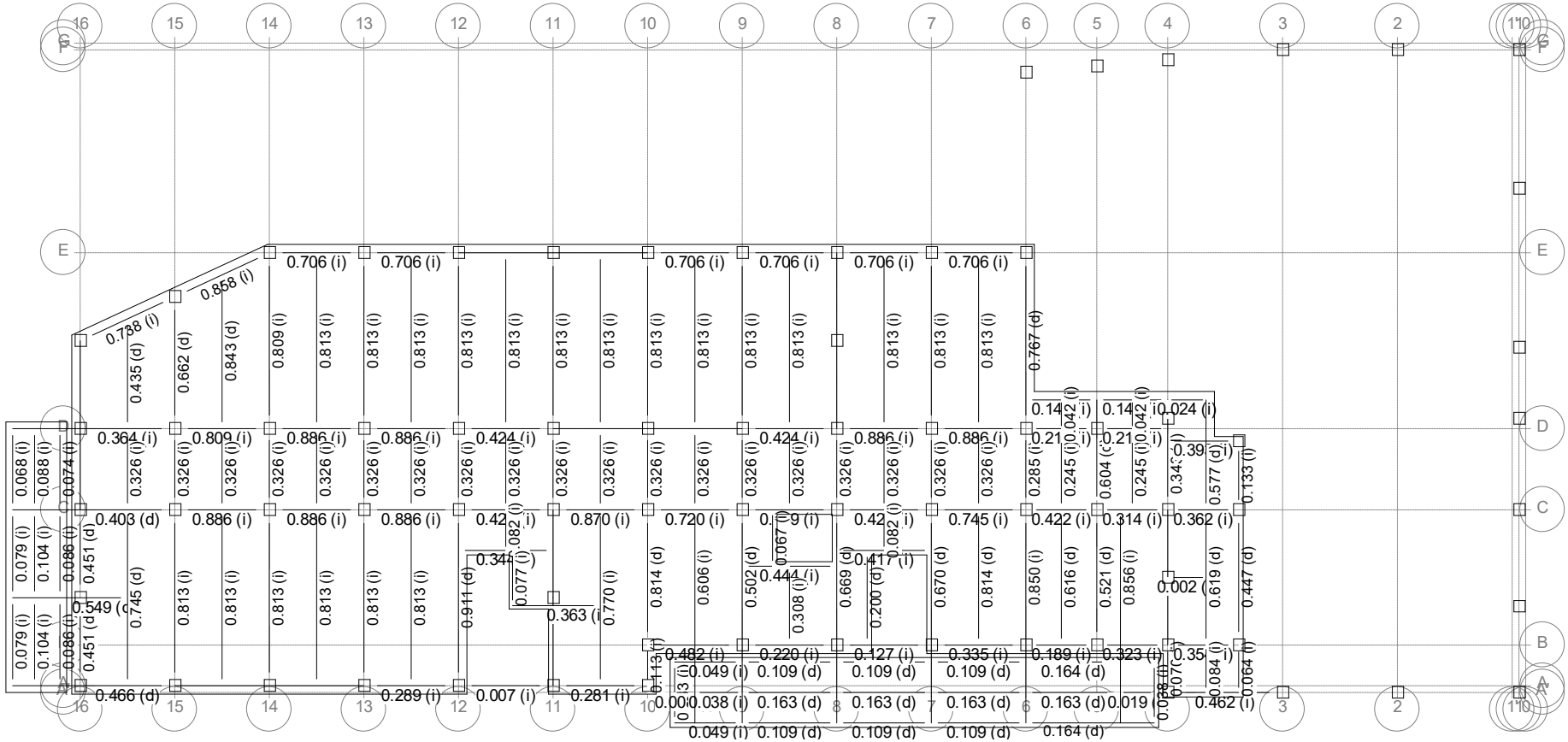
	Label	DL k/ft	CDL k/ft	LL k/ft	Reduction Type	PLL k/ft	CLL k/ft	Mass DL k/ft
L1	12ft Cladding	0.150	0.000	0.000	Reducible	0.000	0.000	0.000

Point Loads

	Label	DL kips	CDL kips	LL kips	Reduction Type	PLL kips	CLL kips	Mass DL kips
P1	Stair	0.750	0.000	1.200	Unreducible	0.000	0.000	0.500

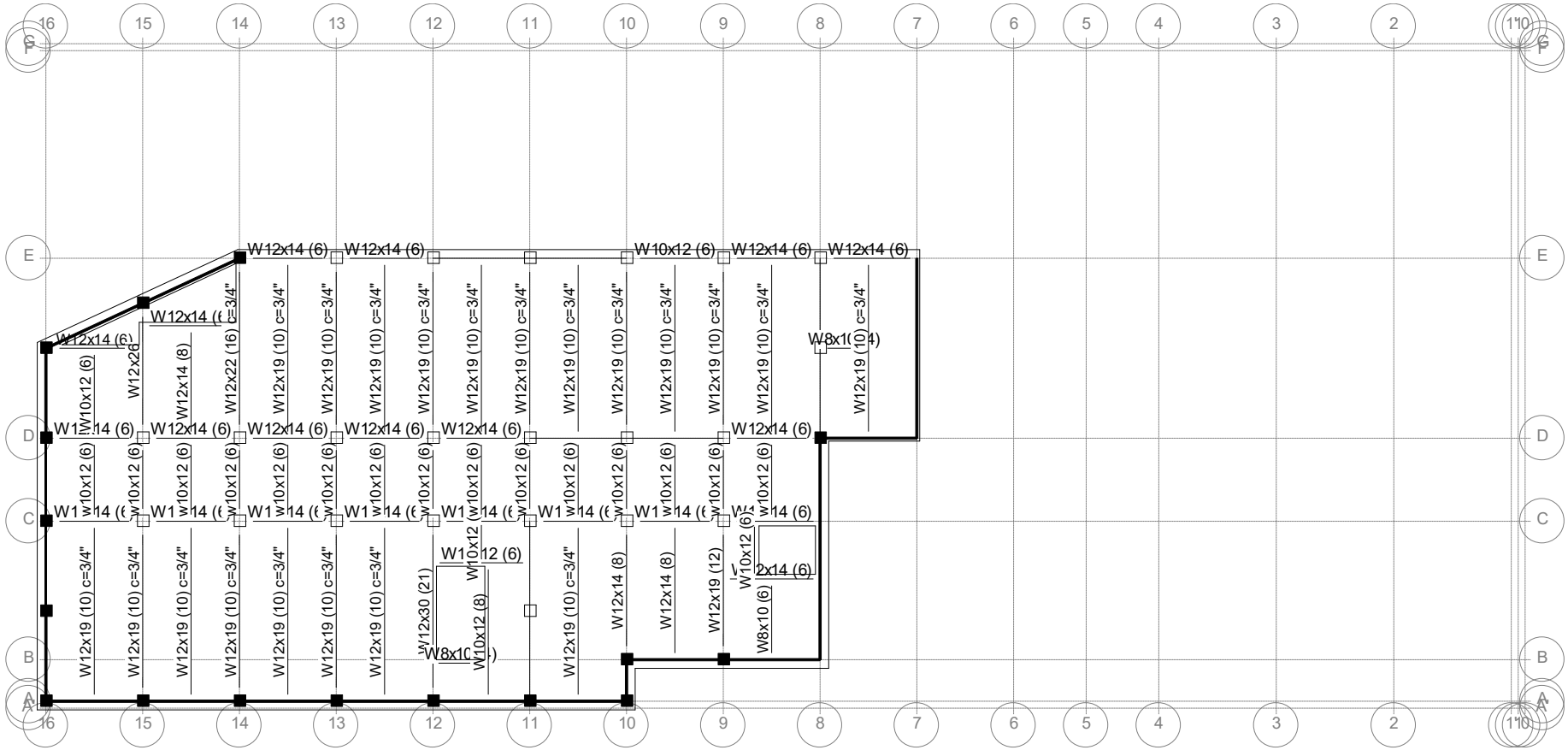
Floor Map

Floor Type: LEVEL 02 **Demand / Capacity Ratios: Controlling**



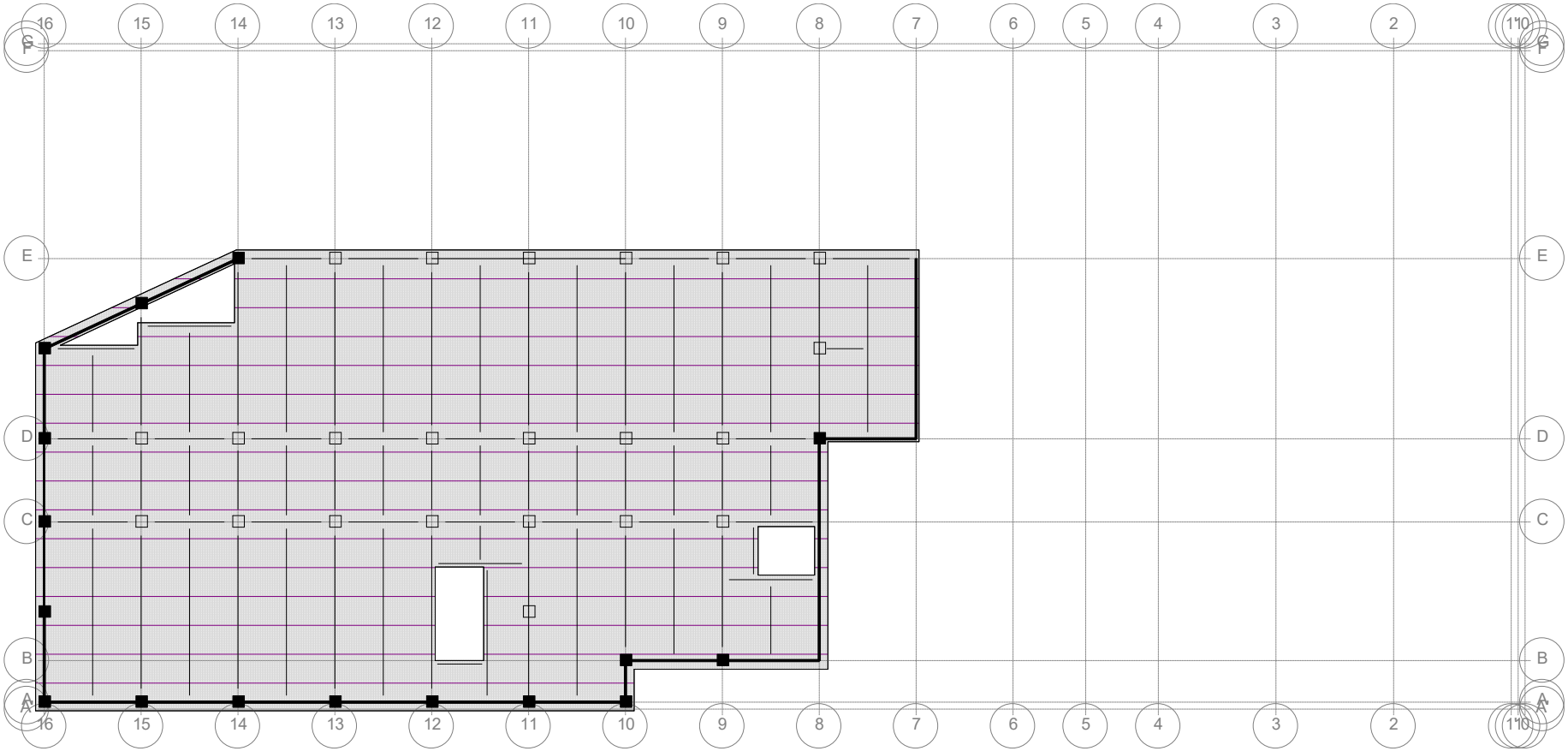
Floor Map

Floor Type: LEVEL 01 **Beam Designs**



Floor Map

Floor Type: LEVEL 01

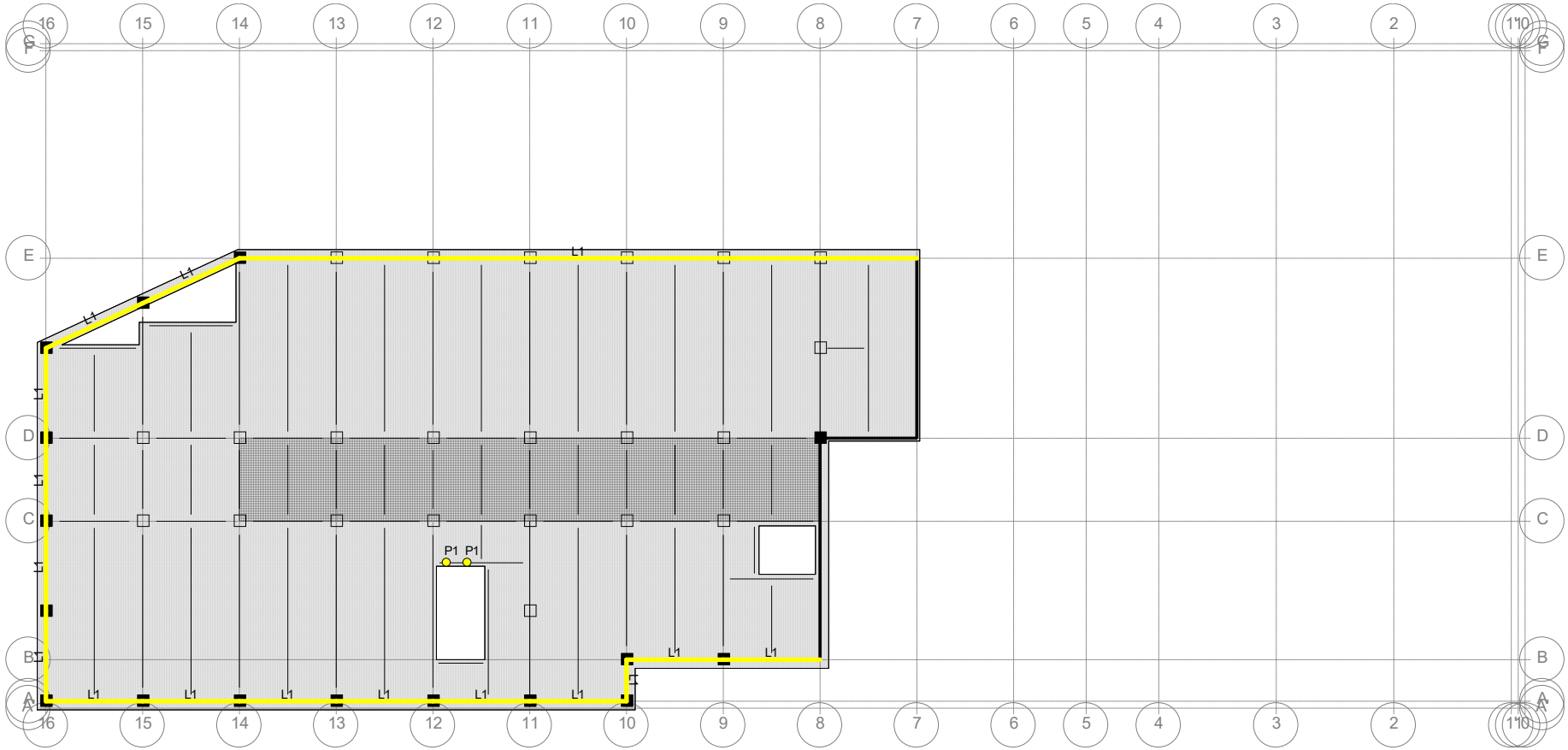


Floor Map

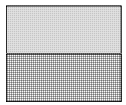
Decks:	Deck Label	Deck Type	Slab Action	Orientation
	2-1/2 on W3	VERCO W3 Formlok	One-Way	0.00 degrees

Floor Map

Floor Type: LEVEL 01



Surface Loads

	Label	DL psf	CDL psf	LL psf	Reduction Type	PLL psf	CLL psf	Mass DL psf
	Typical Floor	15.0	0.0	80.0	Reducible	0.0	0.0	29.0
	L1 Corridor	15.0	0.0	100.0	Reducible	0.0	0.0	29.0

Line Loads

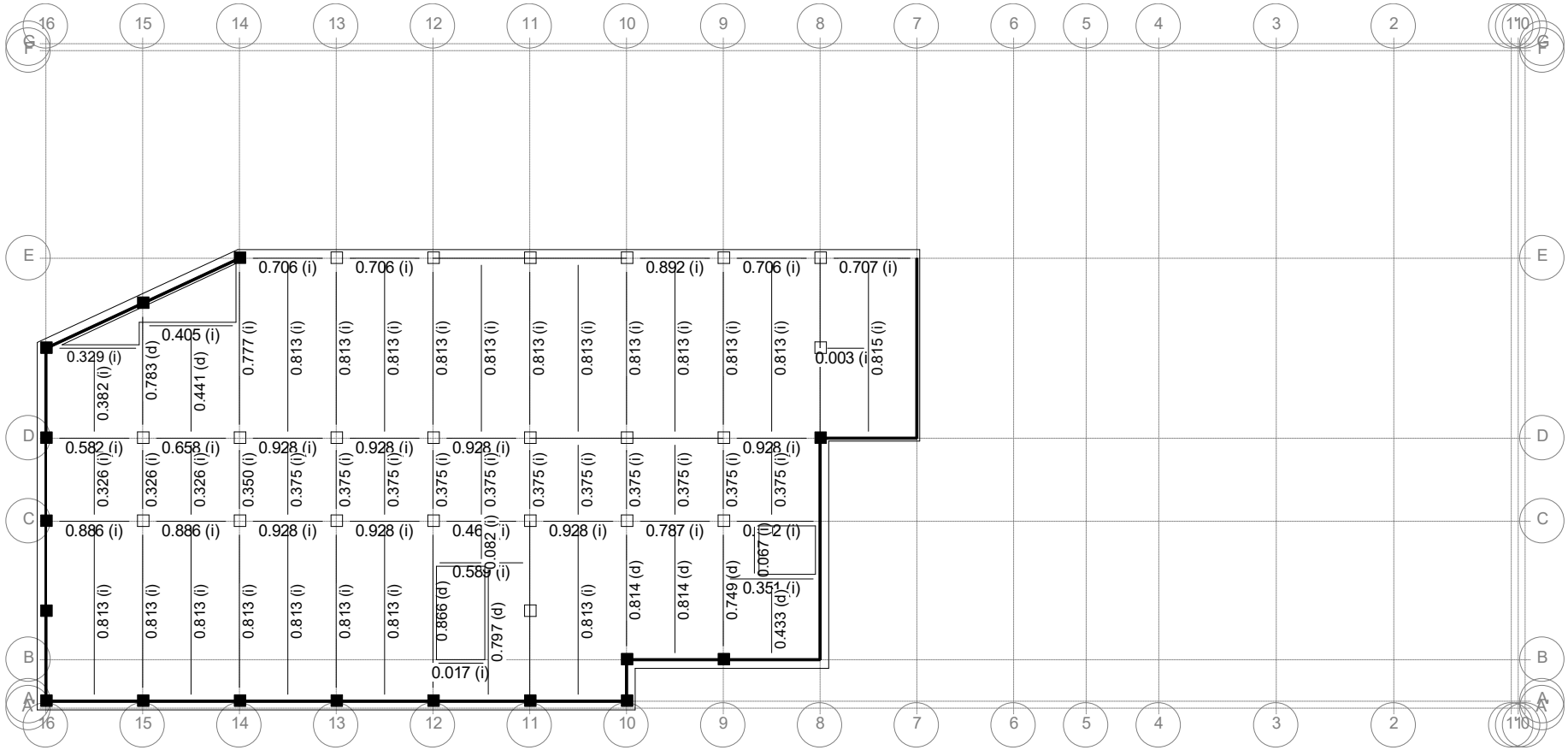
	Label	DL k/ft	CDL k/ft	LL k/ft	Reduction Type	PLL k/ft	CLL k/ft	Mass DL k/ft
L1	12ft Cladding	0.150	0.000	0.000	Reducible	0.000	0.000	0.000

Point Loads

	Label	DL kips	CDL kips	LL kips	Reduction Type	PLL kips	CLL kips	Mass DL kips
P1	Stair	0.750	0.000	1.200	Unreducible	0.000	0.000	0.500

Floor Map

Floor Type: LEVEL 01 **Demand / Capacity Ratios: Controlling**



PLW3-36 FormLok® Composite Steel Deck-Slab (LRFD)

with 5.5 in. 150 pcf 4000 psi NWC

Maximum Unshored Span

Gage	1 Span	2 Span	3 Span
22	9'-6"	9'-1"	10'-4"
21	10'-0"	10'-10"	11'-3"
20	10'-4"	11'-8"	12'-0"
19	10'-10"	13'-0"	13'-5"
18	11'-4"	14'-1"	14'-0"
16	12'-2"	15'-9"	15'-0"

Maximum Unshored Span based on:

Construction Live Load w/ Concrete	20.00	psf			
Constructio	50.00	psf	Minimum end bearing	3.00	in.
Concentrated Construction Load	150.00	plf	Minimum interior bearing	5.50	in.
Concrete Ponding Allowance	2.00	psf	Maximum Deflection L/	240	≤ 0.75 in.
Concrete Volume	1.23	yd^3 / 100 ft^2 (Note: Does not include allowance for ponding)			

Composite Steel Deck Properties (steel deck only)

Gage	F_y ksi	w_{dd} psf	S_e^+ $in.^3/ft$	S_e^- $in.^3/ft$	I_d^+ $in.^4/ft$	I_d^- $in.^4/ft$	ϕVn kip/ft
22	50	1.90	0.393	0.410	0.736	0.730	2.074
21	50	2.10	0.453	0.470	0.824	0.817	2.785
20	50	2.30	0.510	0.528	0.907	0.899	3.587
19	50	2.70	0.636	0.652	1.067	1.061	5.030
18	50	2.90	0.752	0.768	1.213	1.211	6.515
16	50	3.50	0.968	0.966	1.516	1.516	9.422

Superimposed Design Load, ϕWn, / Deflection at L/360, psf [1]

Gage	8'-0"	9'-0"	10'-0"	11'-0"	12'-0"	13'-0"	14'-0"	15'-0"	16'-0"
22	655/963	505/676	397/493	317/370	256/285	209/224	172/179	141/146	117/120
21	721/991	557/696	439/507	352/381	285/293	234/231	193/185	160/150	133/123
20	783/1016	605/714	478/520	384/391	313/301	257/237	213/189	177/154	148/127
19	908/1068	704/750	558/546	450/410	368/316	304/248	254/199	213/162	179/133
18	1025/1114	796/782	633/570	512/428	420/330	348/259	292/208	246/169	208/139
16	1258/1205	980/846	782/617	635/463	523/357	436/280	367/224	311/182	266/150

Notes: [1] For high loads, long term concrete creep should be considered.

Composite Steel Deck-Slab Properties

Gage	w_1 psf	Ic $in.^4/ft$	Iu $in.^4/ft$	Id [1] $in.^4/ft$	ϕMno kip-ft/ft	ϕVno kip/ft
22	51.9	5.59	17.00	11.29	5.74	5.64
21	52.1	6.03	17.21	11.62	6.27	6.28
20	52.3	6.43	17.40	11.91	6.77	6.99
19	52.7	7.23	17.80	12.51	7.77	7.57
18	52.9	7.95	18.17	13.06	8.71	7.57
16	53.5	9.34	18.90	14.12	10.58	7.57

Min. Temperature & Shrinkage

Gage	As min [2] $in.^2/ft$	or Dramix® Steel Fiber 4D 65/60BG, lbs/cy
22	0.028	18
21	0.028	18
20	0.028	18
19	0.028	18
18	0.028	18
16	0.028	18

Notes: [1] Id = (Ic + Iu)/2

[2] Minimum area of steel for temperature and shrinkage

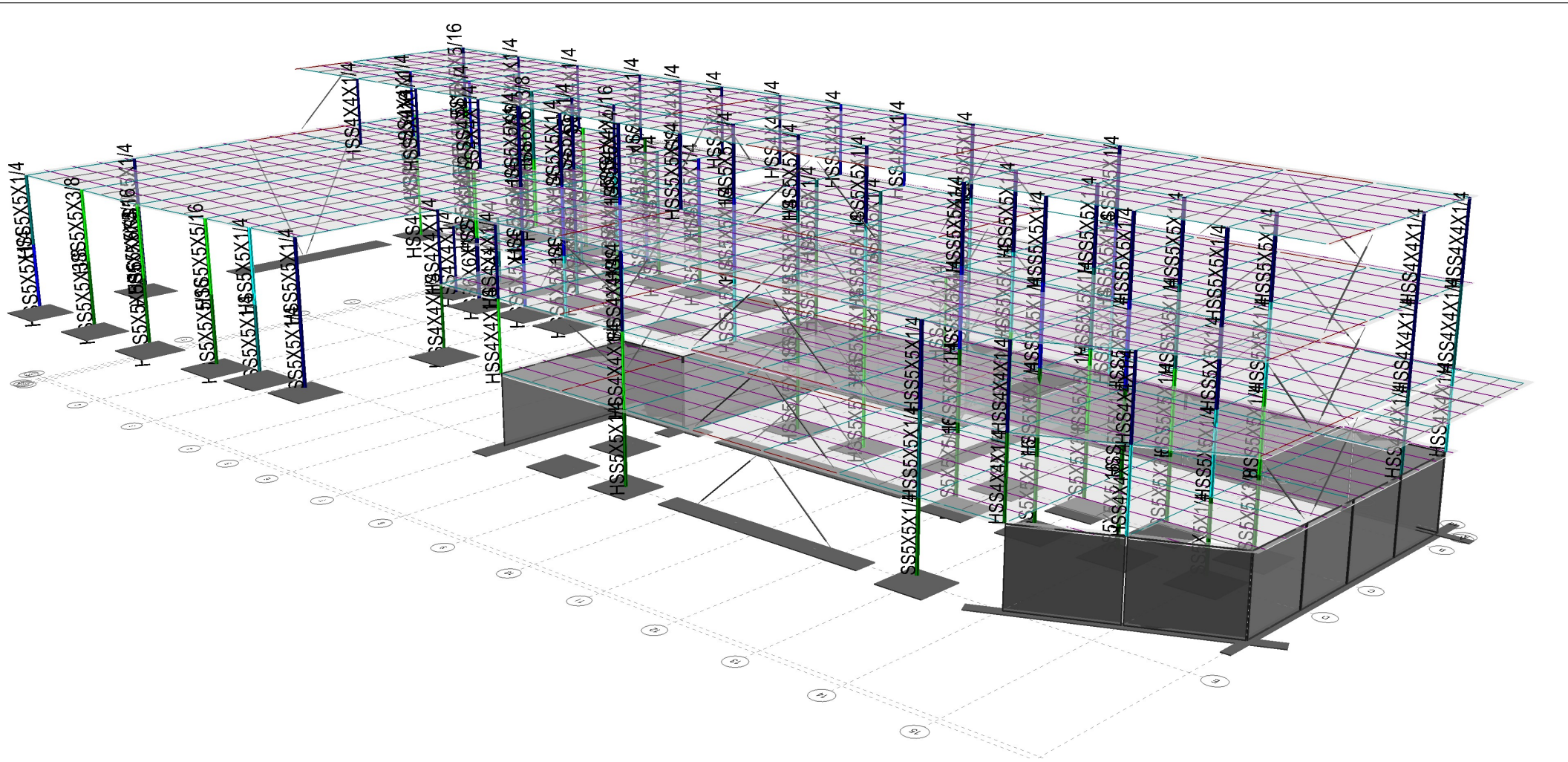
Composite Deck-Slab V4.0 is based on:

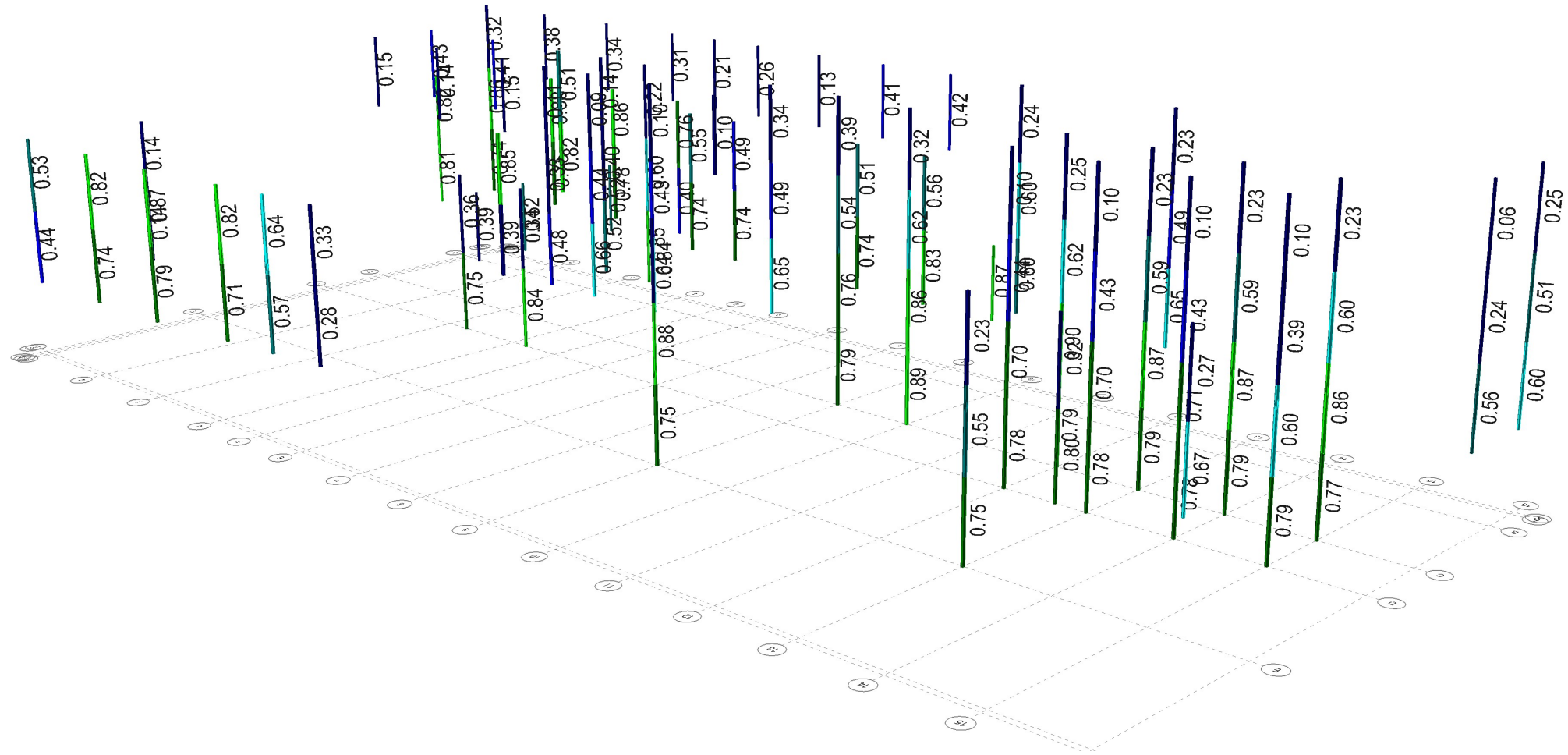
ANSI/SDI C-2017, IAPMO UES ER-2018, and IAPMO UES ER-0423

Date: 5/22/2024

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GRAVITY DESIGN - COLUMNS AND BASE PLATES


HSS4X4X1/4
HSS5X5X1/4
HSS5X5X3/8
HSS5X5X5/16



Gravity Column Design Summary

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

Column Line 16-A

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
ROOF	4.3	2.4	-1.5	1	0.25 Eq H1-1b	0.0	50	HSS4X4X1/4
LEVEL 03	25.1	2.4	-1.5	1	0.51 Eq H1-1a	0.0	50	HSS4X4X1/4
LEVEL 02	47.6	0.0	0.0	1	0.60 Eq Axial	0.0	50	HSS4X4X1/4
LEVEL 01								Frame

Column Line -440.84ft--238.86ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
ROOF	3.2	0.0	-0.8	4	0.06 Eq H1-1b	0.0	50	HSS4X4X1/4
LEVEL 03	19.0	0.0	-0.0	1	0.24 Eq H1-1a	0.0	50	HSS4X4X1/4
LEVEL 02	44.1	0.0	0.0	1	0.56 Eq Axial	0.0	50	HSS4X4X1/4
LEVEL 01								Frame

Column Line 15-C

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
ROOF	13.5	1.8	3.3	2	0.23 Eq H1-1b	0.0	50	HSS5X5X1/4
LEVEL 03	60.6	1.7	2.6	2	0.60 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 02	96.4	-1.4	2.3	3	0.86 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 01	132.9	0.0	1.7	1	0.77 Eq H1-1a	0.0	50	HSS5X5X3/8

Column Line 15-D

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
ROOF	5.0	0.8	1.5	2	0.10 Eq H1-1b	0.0	50	HSS5X5X1/4
LEVEL 03	32.6	2.0	-2.3	5	0.39 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 02	65.4	1.0	-2.1	5	0.60 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 01	95.7	0.2	-1.3	1	0.79 Eq H1-1a	0.0	50	HSS5X5X1/4

Column Line -426.84ft--194.36ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
LEVEL 03	6.1	-2.5	1.5	3	0.27 Eq H1-1b	90.0	50	HSS4X4X1/4
LEVEL 02	41.4	-2.4	0.5	1	0.67 Eq H1-1a	90.0	50	HSS4X4X1/4
LEVEL 01								Frame

Column Line 14-C

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
ROOF	13.5	1.8	3.3	2	0.23 Eq H1-1b	0.0	50	HSS5X5X1/4
LEVEL 03	60.6	1.3	2.6	2	0.59 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 02	98.5	1.2	2.3	2	0.87 Eq H1-1a	0.0	50	HSS5X5X1/4

LEVEL 01	135.7	0.1	1.6	1	0.79 Eq H1-1a	0.0	50	HSS5X5X3/8

Column Line 14-D

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
ROOF	7.6	0.6	1.3	2	0.10 Eq H1-1b	0.0	50	HSS5X5X1/4
LEVEL 03	34.7	1.9	-3.3	5	0.43 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 02	74.0	1.5	-2.7	5	0.71 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 01	110.7	0.7	-1.8	1	0.78 Eq H1-1a	0.0	50	HSS5X5X5/16

Column Line 14-E

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
LEVEL 03	7.9	1.3	3.4	2	0.32 Eq H1-1b	0.0	50	HSS4X4X1/4
LEVEL 02	48.7	0.1	3.5	1	0.80 Eq H1-1a	0.0	50	HSS4X4X1/4
LEVEL 01								Frame

Column Line 13-C

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
ROOF	13.5	1.8	3.3	2	0.23 Eq H1-1b	0.0	50	HSS5X5X1/4
LEVEL 03	60.6	1.3	2.6	2	0.59 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 02	98.5	1.2	2.3	2	0.87 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 01	136.4	0.0	1.5	1	0.79 Eq H1-1a	0.0	50	HSS5X5X3/8

Column Line 13-D

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
ROOF	7.6	0.6	1.3	2	0.10 Eq H1-1b	0.0	50	HSS5X5X1/4
LEVEL 03	35.5	-1.8	-3.3	4	0.43 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 02	75.7	-1.2	-2.4	4	0.70 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 01	114.4	0.0	-1.5	1	0.78 Eq H1-1a	0.0	50	HSS5X5X5/16

Column Line 13-E

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
LEVEL 03	8.8	1.4	4.0	2	0.23 Eq H1-1b	0.0	50	HSS5X5X1/4
LEVEL 02	50.7	1.2	3.7	2	0.55 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 01	83.4	0.0	3.3	1	0.75 Eq H1-1a	0.0	50	HSS5X5X1/4

Column Line 12-A

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
ROOF	10.0	-2.4	-3.0	1	0.23 Eq H1-1b	0.0	50	HSS5X5X1/4
LEVEL 03	39.3	-2.7	-3.2	1	0.49 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 02	62.4	-2.4	-2.9	1	0.65 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 01								Frame

Gravity Column Design Summary

Column Line 12-C

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
ROOF	13.5	-2.4	3.3	3	0.25 Eq H1-1b	0.0	50	HSS5X5X1/4
LEVEL 03	57.5	-2.1	3.5	3	0.62 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 02	94.9	-1.9	3.3	3	0.90 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 01	129.0	-1.2	2.3	1	0.79 Eq H1-1a	0.0	50	HSS5X5X3/8

Column Line 12-D

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
ROOF	7.6	0.6	1.3	2	0.10 Eq H1-1b	0.0	50	HSS5X5X1/4
LEVEL 03	35.7	1.8	-3.3	5	0.44 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 02	76.0	-1.2	-2.4	4	0.70 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 01	114.7	0.0	-1.5	1	0.78 Eq H1-1a	0.0	50	HSS5X5X5/16

Column Line 10-A

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
ROOF	11.3	1.5	-4.0	5	0.24 Eq H1-1b	0.0	50	HSS5X5X1/4
LEVEL 03	52.6	-2.5	-3.7	1	0.60 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 02	65.1	-2.4	-0.7	1	0.60 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 01								Frame

Column Line 10-B

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
LEVEL 02	29.7	4.9	-4.9	10	0.87 Eq H1-1a	0.0	50	HSS4X4X1/4
LEVEL 01								Frame

Column Line 10-C

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
ROOF	26.9	0.7	2.9	2	0.32 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 03	66.2	-1.5	1.8	3	0.62 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 02	99.0	-1.3	1.6	3	0.86 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 01	132.7	-0.4	0.9	1	0.89 Eq H1-1a	0.0	50	HSS5X5X5/16

Column Line 9-A

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
ROOF	16.8	-0.6	-3.5	1	0.42 Eq H1-1a	0.0	50	HSS4X4X1/4

Column Line 9-B

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
LEVEL 03	71.8	0.0	0.0	1	0.56 Eq Axial	0.0	50	HSS5X5X1/4
LEVEL 02	106.3	0.0	0.0	1	0.83 Eq Axial	0.0	50	HSS5X5X1/4
LEVEL 01								Frame

Gravity Column Design Summary

Column Line 9-C

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
ROOF	26.6	-1.2	4.8	6	0.39 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 03	55.2	-1.5	2.1	3	0.54 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 02	84.4	-1.4	2.0	3	0.76 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 01	115.1	-0.8	1.2	1	0.79 Eq H1-1a	0.0	50	HSS5X5X5/16

Column Line 9-E

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
LEVEL 03	9.0	-3.6	1.3	3	0.34 Eq H1-1b	90.0	50	HSS4X4X1/4
LEVEL 02	50.9	-3.3	1.3	2	0.88 Eq H1-1a	90.0	50	HSS4X4X1/4
LEVEL 01	83.5	-3.3	0.0	1	0.75 Eq H1-1a	90.0	50	HSS5X5X1/4

Column Line 8-A

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
ROOF	16.4	0.4	-3.5	1	0.41 Eq H1-1a	0.0	50	HSS4X4X1/4

Column Line 8-B

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
LEVEL 03	66.1	0.0	0.0	1	0.51 Eq Axial	0.0	50	HSS5X5X1/4
LEVEL 02	95.1	0.0	0.0	1	0.74 Eq Axial	0.0	50	HSS5X5X1/4

Column Line 8-C

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
ROOF	26.5	0.3	3.9	2	0.34 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 03	50.4	0.8	2.5	2	0.49 Eq H1-1a	0.0	50	HSS5X5X1/4
LEVEL 02	77.9	0.1	1.3	1	0.65 Eq H1-1a	0.0	50	HSS5X5X1/4

Column Line 8-D

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
ROOF	5.0	-0.8	1.6	3	0.10 Eq H1-1b	0.0	50	HSS5X5X1/4
LEVEL 03								Frame
LEVEL 02								Frame
LEVEL 01								Frame

Column Line 7-A

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
ROOF	7.8	-0.8	-0.6	12	0.13 Eq H1-1b	0.0	50	HSS4X4X1/4

Column Line 7-D

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy	Size
ROOF	7.6	0.6	1.3	2	0.10 Eq H1-1b	0.0	50	HSS5X5X1/4

LEVEL 03	35.5	-1.8	-3.3	4	0.43 Eq H1-1a	0.0	50 HSS5X5X1/4
LEVEL 02	75.7	0.0	-1.7	1	0.64 Eq H1-1a	0.0	50 HSS5X5X1/4

Column Line 7-E

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
LEVEL 03	9.0	-3.6	1.3	3	0.34 Eq H1-1b	90.0	50 HSS4X4X1/4
LEVEL 02	50.9	-3.8	0.0	1	0.84 Eq H1-1a	90.0	50 HSS4X4X1/4

Column Line 6-A

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
ROOF	11.9	-1.0	-2.3	12	0.26 Eq H1-1b	0.0	50 HSS4X4X1/4

Column Line 6-B

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
LEVEL 03	63.1	0.0	0.0	1	0.49 Eq Axial	0.0	50 HSS5X5X1/4
LEVEL 02	95.0	0.0	0.0	1	0.74 Eq Axial	0.0	50 HSS5X5X1/4

Column Line 6-C

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
ROOF	14.8	-1.2	1.8	15	0.22 Eq H1-1b	0.0	50 HSS4X4X5/16
LEVEL 03	46.2	-1.2	1.3	3	0.60 Eq H1-1a	0.0	50 HSS4X4X5/16
LEVEL 02	73.6	-0.6	0.8	1	0.85 Eq H1-1a	0.0	50 HSS4X4X5/16

Column Line 6-D

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
ROOF	6.7	0.8	1.2	2	0.09 Eq H1-1b	0.0	50 HSS5X5X1/4
LEVEL 03	33.1	-2.6	-3.3	4	0.44 Eq H1-1a	0.0	50 HSS5X5X1/4
LEVEL 02	69.9	-1.7	-2.1	1	0.66 Eq H1-1a	0.0	50 HSS5X5X1/4

Column Line 6-E

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
LEVEL 03	8.1	-3.0	-2.4	1	0.36 Eq H1-1b	90.0	50 HSS4X4X1/4
LEVEL 02	37.4	-3.0	-2.4	1	0.75 Eq H1-1a	90.0	50 HSS4X4X1/4

Column Line -300.84ft--161.19ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
LEVEL 03	9.4	-1.5	2.4	1	0.33 Eq H1-1a	90.0	50 HSS5X5X1/4
LEVEL 02	9.6	-0.7	1.2	1	0.28 Eq H1-1a	90.0	50 HSS5X5X1/4

Column Line 5-A

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
ROOF	10.0	0.6	-2.0	8	0.21 Eq H1-1b	0.0	50 HSS4X4X1/4

Gravity Column Design Summary

Column Line 5-B

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
LEVEL 03	54.3	2.3	-1.9	5	0.55 Eq H1-1a	0.0	50 HSS5X5X1/4
LEVEL 02	82.2	1.4	-1.8	1	0.74 Eq H1-1a	0.0	50 HSS5X5X1/4

Column Line 5-C

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
ROOF	12.5	0.8	1.7	14	0.14 Eq H1-1b	0.0	50 HSS5X5X1/4
LEVEL 03	40.8	1.1	1.5	2	0.40 Eq H1-1a	0.0	50 HSS5X5X1/4
LEVEL 02	63.2	0.1	0.8	1	0.52 Eq H1-1a	0.0	50 HSS5X5X1/4

Column Line 5-D

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
ROOF	5.8	0.7	-1.7	5	0.11 Eq H1-1b	0.0	50 HSS5X5X1/4
LEVEL 03	37.3	0.0	-1.4	1	0.33 Eq H1-1a	0.0	50 HSS5X5X1/4
LEVEL 02	62.6	0.0	0.0	1	0.49 Eq Axial	0.0	50 HSS5X5X1/4

Column Line -290.34ft--160.28ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
LEVEL 03	21.9	-4.3	0.0	1	0.64 Eq H1-1a	90.0	50 HSS5X5X1/4
LEVEL 02	22.1	-2.1	0.0	1	0.57 Eq H1-1a	90.0	50 HSS5X5X1/4

Column Line 4-A'

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
LEVEL 03	36.9	7.2	-8.1	1	0.76 Eq H1-1a	0.0	50 HSS5X5X1/4
LEVEL 02	45.3	1.0	-0.7	1	0.40 Eq H1-1a	0.0	50 HSS5X5X1/4

Column Line 4-A

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
ROOF	13.5	1.8	-2.1	8	0.31 Eq H1-1b	0.0	50 HSS4X4X1/4

Column Line 4-C

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
ROOF	13.5	26.8	-1.6	5	0.51 Eq H1-1b	0.0	50 HSS6X6X3/8
LEVEL 03	128.0	19.9	-1.0	4	0.82 Eq H1-1a	0.0	50 HSS6X6X3/8
LEVEL 02							Frame

Column Line 4-D

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
ROOF	6.7	0.9	0.9	8	0.15 Eq H1-1b	0.0	50 HSS4X4X1/4

Column Line -279.84ft--212.36ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size

LEVEL 03	105.3	37.4	6.0	6	0.85 Eq H1-1a	0.0	50 HSS6X6X1/2
LEVEL 02	127.4	0.0	0.0	1	0.39 Eq Axial	0.0	50 HSS6X6X1/2

Column Line -279.84ft--159.36ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
LEVEL 03	30.5	-5.3	3.5	1	0.82 Eq H1-1a	90.0	50 HSS5X5X5/16
LEVEL 02	30.8	-2.7	1.8	1	0.71 Eq H1-1a	90.0	50 HSS5X5X5/16

Column Line -269.34ft--245.86ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
LEVEL 02	18.4	-3.1	-2.6	10	0.52 Eq H1-1a	0.0	50 HSS4X4X1/4

Column Line -269.34ft--225.86ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
LEVEL 02	19.3	-3.2	2.3	6	0.52 Eq H1-1a	0.0	50 HSS4X4X1/4

Column Line -269.34ft--215.69ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
LEVEL 02	14.3	-3.7	1.6	1	0.39 Eq H1-1b	0.0	50 HSS4X4X1/4

Column Line 3-A'

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
LEVEL 03	56.8	-0.8	-13.4	1	0.86 Eq H1-1a	0.0	50 HSS6X6X5/16
LEVEL 02	59.9	-0.8	-7.0	1	0.78 Eq H1-1a	0.0	50 HSS6X6X5/16

Column Line 3-A

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
ROOF	18.5	0.0	-2.1	1	0.34 Eq H1-1a	0.0	50 HSS4X4X1/4

Column Line 3-C

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
ROOF	19.6	1.6	1.7	14	0.41 Eq H1-1a	0.0	50 HSS4X4X1/4

Column Line 3-D

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
ROOF	7.6	0.6	1.0	8	0.14 Eq H1-1b	0.0	50 HSS4X4X1/4

Column Line 3-F

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
LEVEL 03	36.3	-6.1	-0.4	1	0.87 Eq H1-1a	90.0	50 HSS5X5X5/16
LEVEL 02	36.6	-3.1	-0.2	1	0.79 Eq H1-1a	90.0	50 HSS5X5X5/16

Column Line 2-A'

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size

LEVEL 03	58.2	0.7	-13.9	1	0.88 Eq H1-1a	0.0	50 HSS6X6X5/16
LEVEL 02	58.5	0.4	-7.0	1	0.75 Eq H1-1a	0.0	50 HSS6X6X5/16

Column Line 2-A

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
ROOF	15.8	1.3	-2.2	8	0.38 Eq H1-1a	0.0	50 HSS4X4X1/4

Column Line 2-C

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
ROOF	20.3	1.8	1.7	14	0.43 Eq H1-1a	0.0	50 HSS4X4X1/4

Column Line 2-D

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
ROOF	7.8	0.7	1.0	8	0.15 Eq H1-1b	0.0	50 HSS4X4X1/4

Column Line 2-F

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
LEVEL 03	39.0	-6.6	0.5	1	0.82 Eq H1-1a	90.0	50 HSS5X5X3/8
LEVEL 02	39.3	-3.3	0.3	1	0.75 Eq H1-1a	90.0	50 HSS5X5X3/8

Column Line 1-A'

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
ROOF	10.6	0.0	-4.3	1	0.32 Eq H1-1a	0.0	50 HSS5X5X5/16
LEVEL 03	31.6	-8.7	-1.0	1	0.86 Eq H1-1a	0.0	50 HSS5X5X5/16
LEVEL 02	31.9	-4.4	-0.5	1	0.74 Eq H1-1a	0.0	50 HSS5X5X5/16

Column Line -227.84ft--240.19ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
LEVEL 03	13.3	0.0	-0.5	1	0.82 Eq H1-1a	0.0	50 HSS4X4X3/16
LEVEL 02	13.4	0.0	-0.2	1	0.81 Eq H1-1a	0.0	50 HSS4X4X3/16

Column Line -227.84ft--178.36ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
LEVEL 03	4.5	0.0	0.0	1	0.14 Eq Axial	90.0	50 HSS5X5X1/4
LEVEL 02	6.2	0.0	0.0	1	0.14 Eq Axial	90.0	50 HSS5X5X1/4

Column Line 1-F

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
LEVEL 03	14.9	-1.1	-5.1	1	0.53 Eq H1-1a	90.0	50 HSS5X5X1/4
LEVEL 02	15.2	-0.5	-2.5	1	0.44 Eq H1-1a	90.0	50 HSS5X5X1/4

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)	4.000
Minimum Dimension From Side of Column to Edge of Plate (in)	4.000
Increment of Plate Dimensions (in)	0.500
Increment of Plate Thickness (in)	0.250
Minimum Footing Dimension Parallel to Web (ft)	4.00
Minimum Footing Dimension Perpendicular to Web (ft)	4.00
Keep Base Plate Square:	Y

Column Line	Column Size	Fy (ksi)	N (in)	B (in)	tp (in)	
16-A	HSS4X4X1/4	36	12.00	12.00	0.750	
-440.84ft--238.86ft	HSS4X4X1/4	36	12.00	12.00	0.750	
15-C	HSS5X5X3/8	36	13.00	13.00	1.000	
15-D	HSS5X5X1/4	36	13.00	13.00	1.000	
-426.84ft--194.36ft	HSS4X4X1/4	36	12.00	12.00	0.750	
14-C	HSS5X5X3/8	36	13.00	13.00	1.000	
14-D	HSS5X5X5/16	36	13.00	13.00	1.000	
14-E	HSS4X4X1/4	36	12.00	12.00	0.750	
13-C	HSS5X5X3/8	36	13.00	13.00	1.000	
13-D	HSS5X5X5/16	36	13.00	13.00	1.000	
13-E	HSS5X5X1/4	36	13.00	13.00	0.750	
12-A	HSS5X5X1/4	36	13.00	13.00	0.750	
12-C	HSS5X5X3/8	36	13.00	13.00	1.000	
12-D	HSS5X5X5/16	36	13.00	13.00	1.000	
10-A	HSS5X5X1/4	36	13.00	13.00	0.750	
10-B	HSS4X4X1/4	36	12.00	12.00	0.500	
10-C	HSS5X5X5/16	36	13.00	13.00	1.000	
9-B	HSS5X5X1/4	36	13.00	13.00	1.000	
9-C	HSS5X5X5/16	36	13.00	13.00	1.000	
9-E	HSS5X5X1/4	36	13.00	13.00	0.750	
8-B	HSS5X5X1/4	36	13.00	10.00	1.000	Fail
8-C	HSS5X5X1/4	36	10.00	13.00	1.000	Fail
7-D	HSS5X5X1/4	36	13.00	10.00	1.000	Fail
7-E	HSS4X4X1/4	36	12.00	10.00	0.750	Fail
6-B	HSS5X5X1/4	36	13.00	13.00	1.000	
6-C	HSS4X4X5/16	36	12.00	12.00	0.750	
6-D	HSS5X5X1/4	36	13.00	13.00	0.750	

Columns supported on concrete wall - see alternate rectangular base plate design. Pu = 95 kips max.

Base Plate Design Summary

6-E	HSS4X4X1/4	36	12.00	12.00	0.750
-300.84ft--161.19ft	HSS5X5X1/4	36	13.00	13.00	0.250
5-B	HSS5X5X1/4	36	13.00	13.00	0.750
5-C	HSS5X5X1/4	36	13.00	13.00	0.750
5-D	HSS5X5X1/4	36	13.00	13.00	0.750
-290.34ft--160.28ft	HSS5X5X1/4	36	13.00	13.00	0.500
4-A'	HSS5X5X1/4	36	13.00	13.00	0.750
-279.84ft--212.36ft	HSS6X6X1/2	36	14.00	14.00	1.000
-279.84ft--159.36ft	HSS5X5X5/16	36	13.00	13.00	0.500
-269.34ft--245.86ft	HSS4X4X1/4	36	12.00	12.00	0.500
-269.34ft--225.86ft	HSS4X4X1/4	36	12.00	12.00	0.500
-269.34ft--215.69ft	HSS4X4X1/4	36	12.00	12.00	0.500
3-A'	HSS6X6X5/16	36	14.00	14.00	0.750
3-F	HSS5X5X5/16	36	13.00	13.00	0.500
2-A'	HSS6X6X5/16	36	14.00	14.00	0.750
2-F	HSS5X5X3/8	36	13.00	13.00	0.500
1-A'	HSS5X5X5/16	36	13.00	13.00	0.500
-227.84ft--240.19ft	HSS4X4X3/16	36	12.00	12.00	0.500
-227.84ft--178.36ft	HSS5X5X1/4	36	13.00	13.00	0.250
1-F	HSS5X5X1/4	36	13.00	13.00	0.500

BASE PLATE FOR COLUMN ON 10" WALL

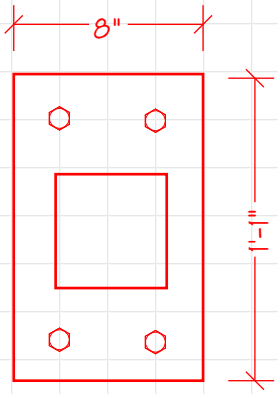
Pu = 95 KIPS

BEARING

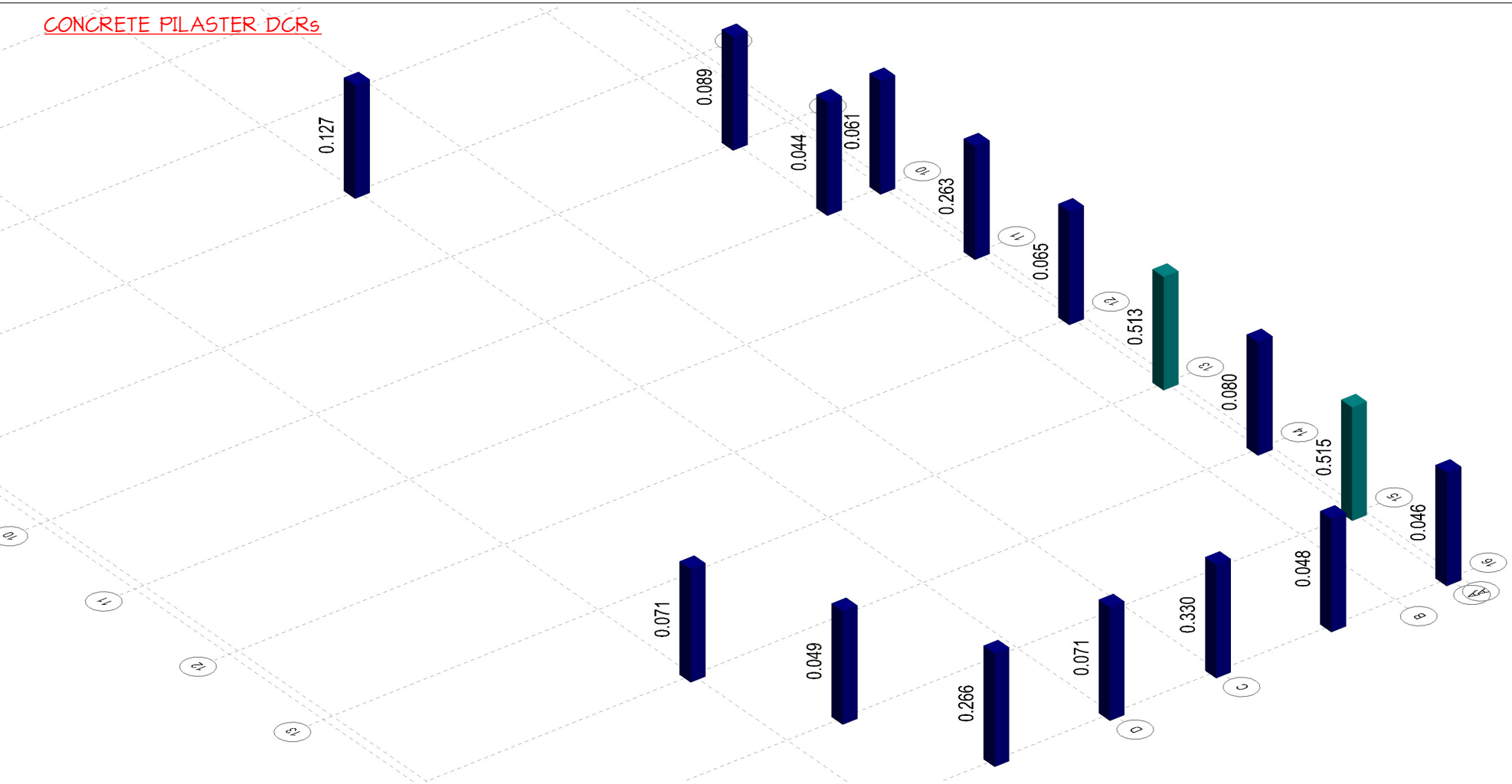
Ø0.65 * Ø0.85 * f'c = 2.2 ksi
Pu / (8" * 13") = Ø.91 ksi < 2.2 ksi - **OK!**

PLATE BENDING
Mu = 4" * 8" * Ø.91 ksi * 4" / 2 = 58.2 k-in
φMn = Ø.9 * 8" * 1"^2 / 6 * 50 ksi = 60.0 k-in - **OK!**

- USE 1" THICK 50 KSI PLATE



CONCRETE PILASTER DCRs



Load Combinations

LOAD CASES:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
Rfp	PosRoofLiveLoad	RAMUSER
O1	EARTH PRESSURE	RAMUSERNODAL_O
O2	SEISMIC EARTH	RAMUSERNODAL_O
E1	EQ	EQ_ASCE716_X_+E_F
E2	EQ	EQ_ASCE716_X_-E_F
E3	EQ	EQ_ASCE716_Y_+E_F
E4	EQ	EQ_ASCE716_Y_-E_F
Dyn1	DYN	Dyn_ASCE716_CQC_X_+E
Dyn2	DYN	Dyn_ASCE716_CQC_X_-E
Dyn3	DYN	Dyn_ASCE716_CQC_Y_+E
Dyn4	DYN	Dyn_ASCE716_CQC_Y_-E

COMBINATION CRITERIA:

Combination Code:	IBC 2021 / ASCE 7-16
Roof Live Load:	Unreducible
Live Load factor f1 (0.5 or 1.0)	0.500
Sds (for Ev)	0.931
RhoX	1.300
RhoY	1.300

GENERATED COMBINATIONS:

1	*	1.400 D
2	*	1.200 D + 1.600 Lp + 0.500 Rfp
3	*	1.200 D + 1.600 Lp
4	*	1.200 D + 0.500 Lp + 1.600 Rfp
5	*	1.200 D + 1.600 Rfp
6	*	1.386 D + 0.500 Lp + 1.300 E1
7	*	1.386 D + 0.500 Lp + 1.300 E2
8	*	1.386 D + 0.500 Lp + 1.300 E3
9	*	1.386 D + 0.500 Lp + 1.300 E4
10	*	1.386 D + 0.500 Lp - 1.300 E1
11	*	1.386 D + 0.500 Lp - 1.300 E2
12	*	1.386 D + 0.500 Lp - 1.300 E3
13	*	1.386 D + 0.500 Lp - 1.300 E4
14	*	1.386 D + 1.300 E1
15	*	1.386 D + 1.300 E2
16	*	1.386 D + 1.300 E3

17	*	1.386 D + 1.300 E4
18	*	1.386 D - 1.300 E1
19	*	1.386 D - 1.300 E2
20	*	1.386 D - 1.300 E3
21	*	1.386 D - 1.300 E4
22	*	0.714 D + 1.300 E1
23	*	0.714 D + 1.300 E2
24	*	0.714 D + 1.300 E3
25	*	0.714 D + 1.300 E4
26	*	0.714 D - 1.300 E1
27	*	0.714 D - 1.300 E2
28	*	0.714 D - 1.300 E3
29	*	0.714 D - 1.300 E4
30	*	1.386 D + 0.500 Lp + 1.300 Dyn1
31	*	1.386 D + 0.500 Lp + 1.300 Dyn2
32	*	1.386 D + 0.500 Lp + 1.300 Dyn3
33	*	1.386 D + 0.500 Lp + 1.300 Dyn4
34	*	1.386 D + 0.500 Lp - 1.300 Dyn1
35	*	1.386 D + 0.500 Lp - 1.300 Dyn2
36	*	1.386 D + 0.500 Lp - 1.300 Dyn3
37	*	1.386 D + 0.500 Lp - 1.300 Dyn4
38	*	1.386 D + 1.300 Dyn1
39	*	1.386 D + 1.300 Dyn2
40	*	1.386 D + 1.300 Dyn3
41	*	1.386 D + 1.300 Dyn4
42	*	1.386 D - 1.300 Dyn1
43	*	1.386 D - 1.300 Dyn2
44	*	1.386 D - 1.300 Dyn3
45	*	1.386 D - 1.300 Dyn4
46	*	0.714 D + 1.300 Dyn1
47	*	0.714 D + 1.300 Dyn2
48	*	0.714 D + 1.300 Dyn3
49	*	0.714 D + 1.300 Dyn4
50	*	0.714 D - 1.300 Dyn1
51	*	0.714 D - 1.300 Dyn2
52	*	0.714 D - 1.300 Dyn3
53	*	0.714 D - 1.300 Dyn4

CUSTOM COMBINATIONS:

54	*	1.386 D + 0.500 Lp + 2.08 Dyn1

55	*	1.386 D + 0.500 Lp + 2.08 Dyn2
56	*	1.386 D + 0.500 Lp + 2.08 Dyn3
57	*	1.386 D + 0.500 Lp + 2.08 Dyn4
58	*	1.386 D + 0.500 Lp - 2.08 Dyn1
59	*	1.386 D + 0.500 Lp - 2.08 Dyn2
60	*	1.386 D + 0.500 Lp - 2.08 Dyn3
61	*	1.386 D + 0.500 Lp - 2.08 Dyn4
62	*	1.386 D + 2.08 Dyn1
63	*	1.386 D + 2.08 Dyn2
64	*	1.386 D + 2.08 Dyn3
65	*	1.386 D + 2.08 Dyn4
66	*	1.386 D - 2.08 Dyn1
67	*	1.386 D - 2.08 Dyn2
68	*	1.386 D - 2.08 Dyn3
69	*	1.386 D - 2.08 Dyn4
70	*	0.714 D + 2.08 Dyn1
71	*	0.714 D + 2.08 Dyn2
72	*	0.714 D + 2.08 Dyn3
73	*	0.714 D + 2.08 Dyn4
74	*	0.714 D - 2.08 Dyn1
75	*	0.714 D - 2.08 Dyn2
76	*	0.714 D - 2.08 Dyn3
77	*	1.386 D + 0.500 Lp + 2.08 Dyn1 + 1.6O1 + 1.0O2
78	*	1.386 D + 0.500 Lp + 2.08 Dyn2 + 1.6O1 + 1.0O2
79	*	1.386 D + 0.500 Lp + 2.08 Dyn3 + 1.6O1 + 1.0O2
80	*	1.386 D + 0.500 Lp + 2.08 Dyn4 + 1.6O1 + 1.0O2
81	*	1.386 D + 0.500 Lp - 2.08 Dyn1 + 1.6O1 + 1.0O2
82	*	1.386 D + 0.500 Lp - 2.08 Dyn2 + 1.6O1 + 1.0O2
83	*	1.386 D + 0.500 Lp - 2.08 Dyn3 + 1.6O1 + 1.0O2
84	*	1.386 D + 0.500 Lp - 2.08 Dyn4 + 1.6O1 + 1.0O2
85	*	1.386 D + 2.08 Dyn1 + 1.6O1 + 1.0O2
86	*	1.386 D + 2.08 Dyn2 + 1.6O1 + 1.0O2
87	*	1.386 D + 2.08 Dyn3 + 1.6O1 + 1.0O2
88	*	1.386 D + 2.08 Dyn4 + 1.6O1 + 1.0O2
89	*	1.386 D - 2.08 Dyn1 + 1.6O1 + 1.0O2
90	*	1.386 D - 2.08 Dyn2 + 1.6O1 + 1.0O2
91	*	1.386 D - 2.08 Dyn3 + 1.6O1 + 1.0O2
92	*	1.386 D - 2.08 Dyn4 + 1.6O1 + 1.0O2
93	*	0.714 D + 2.08 Dyn1 + 1.6O1 + 1.0O2

94	*	0.714 D + 2.08 Dyn2 + 1.6O1 + 1.0O2
95	*	0.714 D + 2.08 Dyn3 + 1.6O1 + 1.0O2
96	*	0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2
97	*	0.714 D - 2.08 Dyn1 + 1.6O1 + 1.0O2
98	*	0.714 D - 2.08 Dyn2 + 1.6O1 + 1.0O2
99	*	0.714 D - 2.08 Dyn3 + 1.6O1 + 1.0O2

Concrete Column Design Summary

Location: 16 - A

No.	Level	Section	f'c	Longitudinal	Rho %	Ld/Cap	Transverse	Ld/Cap
142	LEVEL 01	20x20	4.00	8-#8 (3 x 1)	1.58	0.05	#4@ 15.0" 0'-0"-12'-0"	0.02

Location: -440.84ft - -238.86ft

No.	Level	Section	f'c	Longitudinal	Rho %	Ld/Cap	Transverse	Ld/Cap
148	LEVEL 01	20x20	4.00	8-#8 (3 x 1)	1.58	0.05	#4@ 15.0" 0'-0"-12'-0"	0.23

Location: 16 - C

No.	Level	Section	f'c	Longitudinal	Rho %	Ld/Cap	Transverse	Ld/Cap
143	LEVEL 01	20x20	4.00	8-#8 (3 x 1)	1.58	0.33	#4@ 3.0" 0'-0"-12'-0"	0.13

Location: 16 - D

No.	Level	Section	f'c	Longitudinal	Rho %	Ld/Cap	Transverse	Ld/Cap
144	LEVEL 01	20x20	4.00	8-#8 (3 x 1)	1.58	0.07	#4@ 3.0" 0'-0"-12'-0"	0.12

Location: -440.84ft - -200.86ft

No.	Level	Section	f'c	Longitudinal	Rho %	Ld/Cap	Transverse	Ld/Cap
145	LEVEL 01	20x20	4.00	8-#8 (3 x 1)	1.58	0.27	#4@ 3.0" 0'-0"-12'-0"	0.02

Location: 15 - A

No.	Level	Section	f'c	Longitudinal	Rho %	Ld/Cap	Transverse	Ld/Cap
141	LEVEL 01	20x20	4.00	8-#8 (3 x 1)	1.58	0.52	#4@ 3.0" 0'-0"-12'-0"	0.06

Location: -426.84ft - -194.36ft

No.	Level	Section	f'c	Longitudinal	Rho %	Ld/Cap	Transverse	Ld/Cap
146	LEVEL 01	20x20	4.00	8-#8 (3 x 1)	1.58	0.05	#4@ 15.0" 0'-0"-12'-0"	0.17

Location: 14 - A

No.	Level	Section	f'c	Longitudinal	Rho %	Ld/Cap	Transverse	Ld/Cap
140	LEVEL 01	20x20	4.00	8-#8 (3 x 1)	1.58	0.08	#4@ 15.0" 0'-0"-12'-0"	0.18

Location: 14 - E

No.	Level	Section	f'c	Longitudinal	Rho %	Ld/Cap	Transverse	Ld/Cap
147	LEVEL 01	20x20	4.00	8-#8 (3 x 1)	1.58	0.07	#4@ 15.0" 0'-0"-12'-0"	0.12

Location: 13 - A

No.	Level	Section	f'c	Longitudinal	Rho %	Ld/Cap	Transverse	Ld/Cap
139	LEVEL 01	20x20	4.00	8-#8 (3 x 1)	1.58	0.51	#4@ 3.0" 0'-0"-12'-0"	0.07

Location: 12 - A

No.	Level	Section	f'c	Longitudinal	Rho %	Ld/Cap	Transverse	Ld/Cap
138	LEVEL 01	20x20	4.00	8-#8 (3 x 1)	1.58	0.06	#4@ 15.0" 0'-0"-12'-0"	0.18

Location: 11 - A

No.	Level	Section	f'c	Longitudinal	Rho %	Ld/Cap	Transverse	Ld/Cap
137	LEVEL 01	20x20	4.00	8-#8 (3 x 1)	1.58	0.26	#4@ 3.0" 0'-0"-12'-0"	0.06

Location: 10 - A

No.	Level	Section	f'c	Longitudinal	Rho %	Ld/Cap	Transverse	Ld/Cap
136	LEVEL 01	20x20	4.00	8-#8 (3 x 1)	1.58	0.06	#4@ 15.0" 0'-0"-12'-0"	0.02

Location: 10 - B

No.	Level	Section	f'c	Longitudinal	Rho %	Ld/Cap	Transverse	Ld/Cap
135	LEVEL 01	20x20	4.00	8-#8 (3 x 1)	1.58	0.04	#4@ 15.0" 0'-0"-12'-0"	0.02

Location: 9 - B

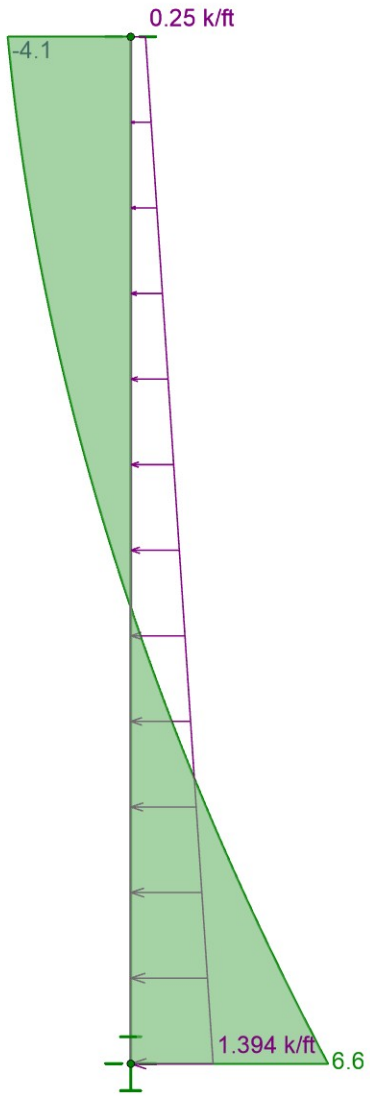
No.	Level	Section	f'c	Longitudinal	Rho %	Ld/Cap	Transverse	Ld/Cap
134	LEVEL 01	20x20	4.00	8-#8 (3 x 1)	1.58	0.09	#4@ 15.0" 0'-0"-12'-0"	0.16

Location: 8 - D

No.	Level	Section	f'c	Longitudinal	Rho %	Ld/Cap	Transverse	Ld/Cap
151	LEVEL 01	20x20	4.00	8-#8 (3 x 1)	1.58	0.13	#4@ 3.0" 0'-0"-12'-0"	0.01

GRAVITY DESIGN - FOUNDATIONS

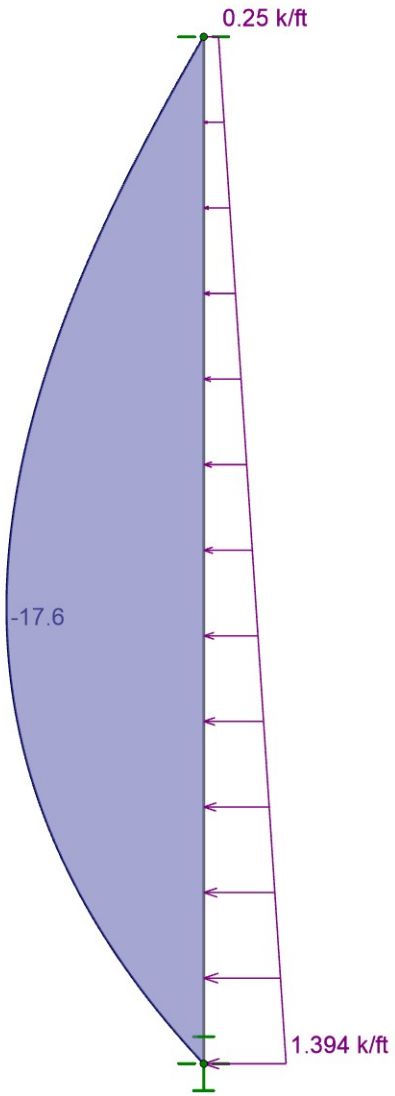
BASEMENT WALL OUT-OF-PLANE DESIGN



Loads: LC 1, 1.6H+1.0E+0.5L
Results for LC 1, 1.6H+1.0E+0.5L
Member y Shear Forces (kips)

IRISA A NEMETSCHEK COMPANY	<Licensed Company>		SK-2
	jjesse		May 21, 2025 at 02:01 PM
			Wall Demands.r3d

BASEMENT WALL OUT-OF-PLANE DESIGN



Loads: LC 1, 1.6H+1.0E+0.5L
Results for LC 1, 1.6H+1.0E+0.5L
Member z Bending Moments (kip-ft)

IRISA A NEMETSCHEK COMPANY	<Licensed Company>		SK-1
	jjesse		May 21, 2025 at 02:01 PM
			Wall Demands.r3d

HNT Pk-12

Reinforced Concrete Section (ACI 318-19)

PCS / ENG / May 13, 2025

DESIGN OK!

Description: 13' Tall Pin-Pin Basement wall w/250 psf LL surcharge, 1' strip.

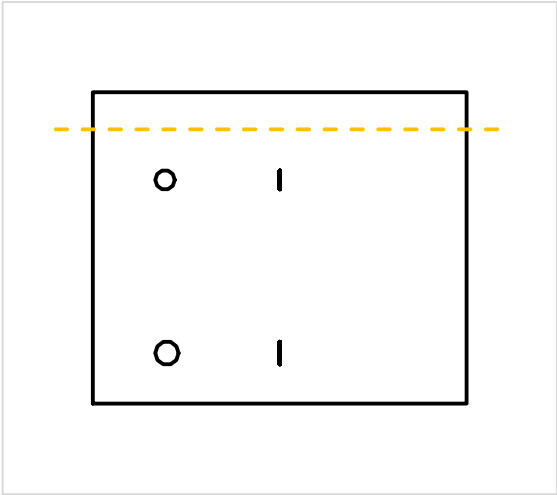
Properties

Moment, Mu	18	kip-ft
Shear, Vu	7	kips
Axial Load (+C)	0	kips

USE 1 LAYER (1) #5 TOP
& 1 LAYER (1) #6 BOT

Width	12	in
Height	10	in
Length	13	ft
Member Type	Wall	
f'_c	4500	psi
β_1	0.825	-
f_y	60	ksi
E_s	29000	ksi

Bottom Cover	1.25	in
Top Cover	2.5	in
Side Cover	2	in



Flexure

	Bar Size	Count	Depth	Bar Area	Layer A	d	db	Horz. Clr	
Top Layer, As'	#5	1	auto	0.31	0.3	2.81	0.63	11.38	-OK-
As1'	#5	0	auto	0.31	0.0	4.44	0.63	INF	
As1'	#5	0	4.50	0.31	0.0	4.50	0.63	INF	
Bottom Layer, As	#6	1	auto	0.44	0.4	8.38	0.75	11.25	-OK-

s_{max}	18.0	-OK-
d	8.4	in
c	1.19	in
Tensile Strain	0.0181	-
ϕ	0.90	-
M_n	21	kip-ft
ϕM_n	**19**	kip-ft
DCR	**93%**	-OK-

Strain Compatability

Layer	d (in)	ε	σ (ksi)	A (in^2)	P (k)	M (k-in)
Comp Block	0.5	0.003	3.825	12	45	-
A_s'	2.8	-0.004	-60.0	0	-19	43
A_{s2}'	4.4	-0.008	-60.0	0	0	0
A_{s2}	4.5	-0.008	-60.0	0	0	0
A_s	8.4	-0.018	-60.0	0	-26	208
Axial Force	5.00	-	-	-	0	0
				∑:	0	251

Out-of-Plane Shear

Shear Reinf	No	Yes/No	ϕ	0.75	-	
f_{yt}	60	ksi	λ_s	1.00	-	
Stirrup Size	#4	-	V_c	9	kips	*1.31√f'c*
Spacing	8	in	V_s	0	kips	*0.00√f'c*
Max Spacing	4.19	-OK-	$V_{s.req}$	0	kips	*0.00√f'c*
Legs	2	-	V_c+V_s	9	kips	*1.31√f'c - CONTROLS*
Av/s	0.050	sq.in/in	$V_{n,max}$	63	kips	*9.31√f'c*
			V_n	9	kips	*1.31√f'c*
			ϕV_n	7	kips	*0.98√f'c*
			DCR	100%	-OK-	

Warnings

Beam Bracing:	-OK-
Flexural Analysis:	-OK-
Deep Beam:	-OK-

HNT Pk-12

ENG / PCS / May 14, 2025

Concentric Spread Footing Design

Footing Schedule								Detailing Checks					
Mark	Width	Length	Thickness	Flexure X-X		Flexure Y-Y		Min. Reinf. - X in^2		Min. Reinf. - Y in^2		Bar Spacing	
5	*ft*	*ft*	*in*	*Bar Size*	*Count*	*Bar Size*	*Count*					in	in
F3.0	3	3	12	#4	(4)	#4	(4)	0.8	0.8	0.8	0.8	10.5	10.5
F4.0	4	4	12	#5	(4)	#5	(4)	1.0	1.2	1.0	1.2	14.46	14.5
F5.0	5	5	14	#5	(5)	#5	(5)	1.5	1.6	1.5	1.6	13.84	13.8
F6.0	6	6	14	#6	(6)	#6	(6)	1.8	2.6	1.8	2.6	13.45	13.5
F7.0	7	7	18	#6	(7)	#6	(7)	2.7	3.1	2.7	3.1	13.21	13.2

Material Properties		
q_a	3000	*psf*
f'c	3000	*psi*
fy	60	*ksi*
Cover	3	*in*

Design for Soil Capacity?	**NO**
ASD-to-LRFD Conversion	**1.5**

SDS	**1.106**	-
P	**1.0**	-

Footing Properties							Axial Loads					Flexure X-X		Flexure X-X		*47*	DCR				
Mark	ID	W	L	t	b_1	b_2	P_{DL}	P_{LL}	$P_{SL/LLr/R}$	P_W	P_{EQ}	Bar Size	Count	Bar Size	Count	Run?	Bearing	Shear	Punching	M_x	M_y
	47	*ft*	*ft*	*in*	*in*	*in*	*kips*	*kips*	*kips*	*kips*	*kips*	-	-	-	-	*x*	-	-	-	-	-
F5.0	16-A	5	5	14	12	12	22.1	7.6	2.0		29.2	#5	(5)	#5	(5)	x	60%	26%	30%	33%	31%
F5.0	16-B-3.5	5	5	14	12	12	21.9	6.8	3.2		3.2	#5	(5)	#5	(5)	x	41%	18%	21%	23%	21%
F5.0	16-C	5	5	14	12	12	27.9	9.8	3.3		47.9	#5	(5)	#5	(5)	x	84%	38%	44%	48%	45%
F5.0	16-D	5	5	14	12	12	23.6	8.3	2.2		7.7	#5	(5)	#5	(5)	x	47%	20%	23%	25%	24%
F5.0	16-C'	5	5	14	12	12	16.6	4.7	0.7		51.8	#5	(5)	#5	(5)	x	70%	34%	39%	42%	40%
F5.0	15-A	5	5	14	12	12	33.2	12.9	2.2		0.0	#5	(5)	#5	(5)	x	61%	29%	33%	36%	34%
F7.0	15-C	7	7	18	12	12	63.8	32.3	5.4		0.0	#6	(7)	#6	(7)	x	65%	36%	46%	45%	43%
F6.0	15-D	6	6	14	12	12	44.8	24.5	4.7		0.0	#6	(6)	#6	(6)	x	64%	46%	54%	44%	41%
F5.0	15-C'	5	5	14	12	12	21.7	7.5	1.7		1.5	#5	(5)	#5	(5)	x	39%	18%	21%	23%	21%
F5.0	14-A	5	5	14	12	12	34.0	13.1	2.2		0.1	#5	(5)	#5	(5)	x	63%	29%	34%	37%	35%
F7.0	14-C	7	7	18	12	12	65.8	33.3	6.7		0.0	#6	(7)	#6	(7)	x	67%	37%	48%	47%	44%
F6.0	14-D	6	6	14	12	12	52.6	27.7	6.4		0.0	#6	(6)	#6	(6)	x	74%	53%	63%	51%	48%
F5.0	14-E	5	5	14	12	12	30.0	12.7	3.2		31.4	#5	(5)	#5	(5)	x	78%	32%	37%	40%	38%
F5.0	13-A	5	5	14	12	12	33.9	12.9	2.2		0.0	#5	(5)	#5	(5)	x	62%	29%	34%	37%	34%
F7.0	13-C	7	7	18	12	12	65.8	33.8	6.7		0.0	#6	(7)	#6	(7)	x	68%	38%	48%	47%	45%
F6.0	13-D	6	6	14	12	12	54.4	28.7	6.5		0.0	#6	(6)	#6	(6)	x	77%	55%	65%	53%	49%
F5.0	13-E	5	5	14	12	12	38.3	21.8	5.0		0.0	#5	(5)	#5	(5)	x	80%	39%	45%	49%	46%
F5.0	12-A	5	5	14	12	12	28.1	10.5	2.2		3.9	#5	(5)	#5	(5)	x	53%	24%	28%	30%	28%
F7.0	12-C	7	7	18	12	12	39.5	21.9	4.9		88.9	#6	(7)	#6	(7)	x	72%	38%	48%	47%	45%
F5.0	10-A	5	5	14	12	12	6.3	4.2	0.0		0.0	#5	(5)	#5	(5)	x	14%	7%	8%	8%	8%

F5.0	10-B	5	5	14	12	12	8.2	6.7	0.0	0.0	#5	(5)	#5	(5)	x	20%	10%	11%	12%	11%
F7.0	10-C	7	7	18	12	12	65.3	31.3	6.3	0.0	#6	(7)	#6	(7)	x	66%	36%	46%	45%	43%
F5.0	9-B	5	5	14	12	12	8.0	6.4	0.0	0.0	#5	(5)	#5	(5)	x	19%	9%	11%	12%	11%
F6.0	9-C	6	6	14	12	12	53.9	27.2	5.1	0.0	#6	(6)	#6	(6)	x	75%	53%	63%	51%	48%
F6.0	7-B	6	6	14	12	12	41.1	22.4	11.2	10.0	#6	(6)	#6	(6)	x	66%	43%	52%	42%	39%
F6.0	7-C	6	6	14	12	12	34.2	21.7	6.1	10.0	#6	(6)	#6	(6)	x	56%	38%	45%	37%	34%
F6.0	6-B	6	6	14	12	12	42.5	24.4	9.8	0.0	#6	(6)	#6	(6)	x	63%	45%	54%	44%	41%
F6.0	6-C	6	6	14	12	12	31.8	18.4	3.7	0.0	#6	(6)	#6	(6)	x	47%	33%	40%	32%	30%
F5.0	6-D	5	5	14	12	12	32.1	17.6	6.6	0.0	#5	(5)	#5	(5)	x	67%	33%	38%	41%	39%
F4.0	6-E	4	4	12	12	12	16.5	9.5	4.6	0.0	#5	(4)	#5	(4)	x	56%	24%	26%	24%	22%
F4.0	6-F'	4	4	12	12	12	3.6	0.0	3.2	0.0	#5	(4)	#5	(4)	x	14%	6%	7%	6%	6%
F6.0	5-B	6	6	14	12	12	36.1	21.9	7.7	0.0	#6	(6)	#6	(6)	x	54%	39%	47%	38%	35%
F5.0	5-C	5	5	14	12	12	26.5	16.1	3.2	0.0	#5	(5)	#5	(5)	x	57%	28%	32%	35%	33%
F5.0	5-D	5	5	14	12	12	29.0	14.5	8.5	0.0	#5	(5)	#5	(5)	x	62%	29%	34%	37%	35%
F4.0	5-F'	4	4	12	12	12	8.5	0.0	7.3	0.0	#5	(4)	#5	(4)	x	33%	14%	15%	14%	13%
F4.0	4-F'	4	4	12	12	12	12.7	0.0	9.6	0.0	#5	(4)	#5	(4)	x	47%	20%	21%	20%	18%
F5.0	3-A'	5	5	14	12	12	28.6	14.3	5.7	0.0	#5	(5)	#5	(5)	x	58%	28%	32%	35%	33%
F5.0	3-F'	5	5	14	12	12	14.3	0.0	12.1	0.0	#5	(5)	#5	(5)	x	35%	17%	20%	21%	20%
F5.0	2-A'	5	5	14	12	12	27.8	14.0	5.8	0.0	#5	(5)	#5	(5)	x	57%	27%	32%	34%	32%
F5.0	2-F'	5	5	14	12	12	16.0	0.0	12.5	0.0	#5	(5)	#5	(5)	x	38%	18%	21%	23%	22%
F4.0	1-A'	4	4	12	12	12	14.8	7.8	3.3	0.0	#5	(4)	#5	(4)	x	48%	21%	22%	21%	19%
F3.0	1-B-3.5	3	3	12	12	12	6.4	3.6	0.0	0.0	#4	(4)	#4	(4)	x	37%	6%	8%	8%	7%
F4.0	1-E-3.5'	4	4	12	12	12	2.3	0.0	2.1	0.0	#5	(4)	#5	(4)	x	9%	4%	4%	4%	4%
F4.0	1-F'	4	4	12	12	12	5.8	0.0	5.1	0.0	#5	(4)	#5	(4)	x	23%	10%	10%	10%	9%
F3.0	3.4-B	3	3	12	12	12	8.0	6.4	0.0	0.0	#4	(4)	#4	(4)	x	53%	8%	11%	11%	11%
F3.0	3.4-D	3	3	12	12	12	8.2	6.7	0.0	0.0	#4	(4)	#4	(4)	x	55%	9%	12%	12%	11%
F3.0	3.4-C	3	3	12	12	12	6.3	4.2	0.0	0.0	#4	(4)	#4	(4)	x	39%	6%	8%	8%	8%

LATERAL DESIGN

LFRS DESCRIPTION

THE LATERAL FORCE RESISTING SYSTEM CONSISTS OF BUCKLING RESTRAINED BRACED FRAMES EXTENDING FROM THE FOUNDATION TO THE ROOF. BETWEEN THE FOUNDATION LEVEL AND LEVEL 1, SPECIAL REINFORCED CONCRETE BEARING SHEAR WALLS RESIST LATERAL FORCES.

THE LEVEL 1 DIAPHRAGM ACTS AS A TRANSFER DIAPHRAGM FOR LATERAL FORCES FROM THE BRACED FRAMES AT THIS LEVEL.

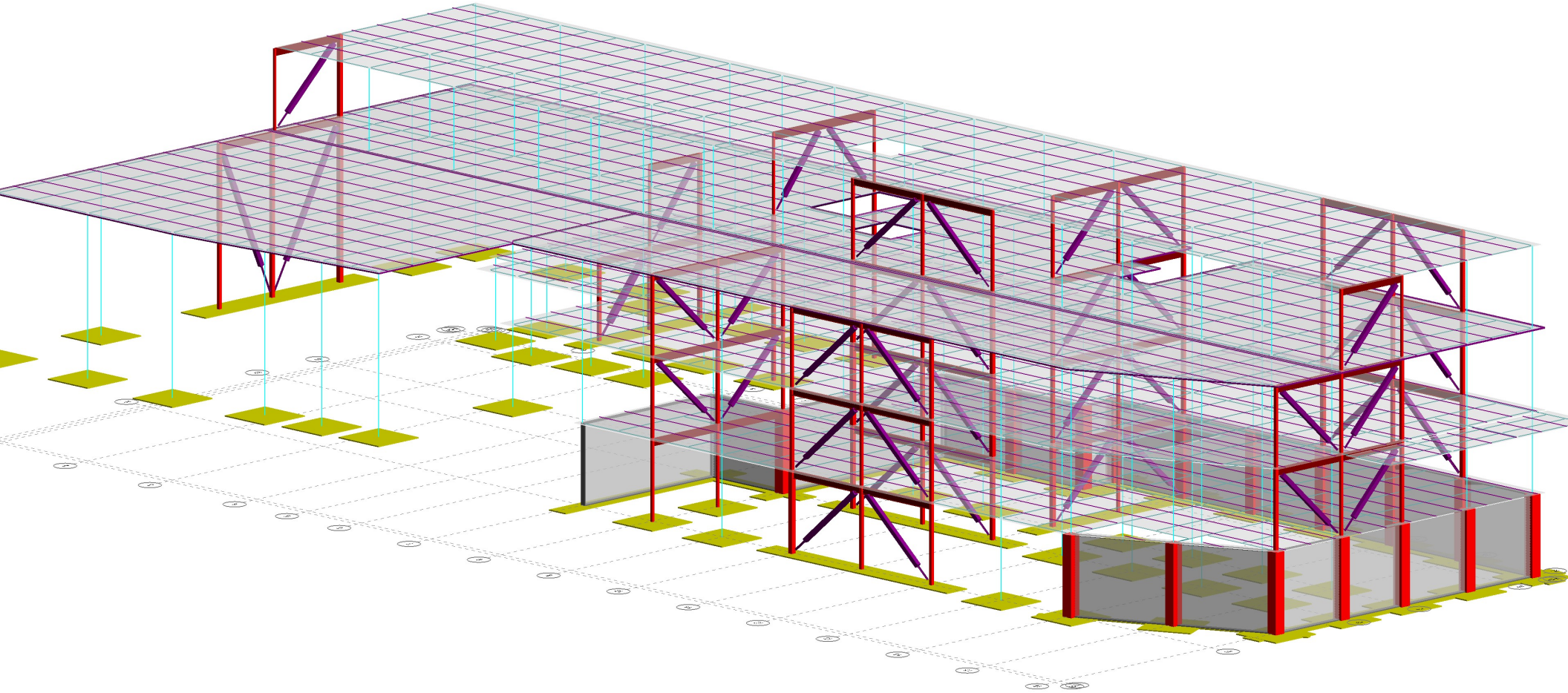
A 3D FINITE ELEMENT MODEL OF THE LFRS RESISTING WAS CREATED USING RAM SS. MODAL RESPONSE SPECTRUM ANALYSIS WAS USED FOR ANALYSIS.

FOR THE DESIGN OF LEVEL 1 AND THE LFRS BELOW LEVEL 1, DYNAMIC FORCES CALCULATED USING R = 8 ARE AMPLFIIED BY 8/5 TO BE CONSISTENT WITH THE REQUIRED RESPONSE MODIFICATION FACTOR FOR BEARING SHEAR WALLS. THIS IS SHOWN IN LOAD COMBINATIONS FOR THE DESIGN OF CONCRETE WALLS AS 2.Ø8, EQUAL TO RHO (1.3) TIMES 8 / 5.

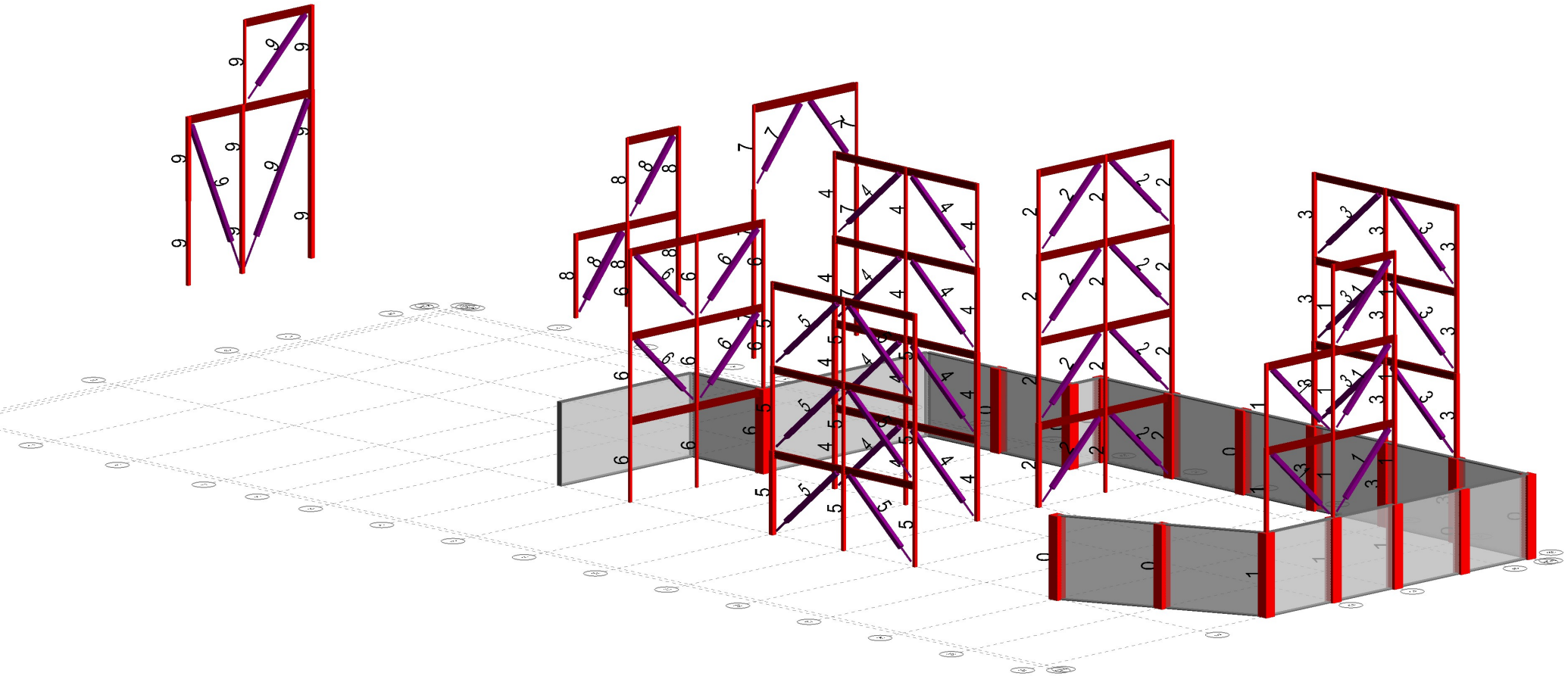
BRACED FRAMES LOADS ARE TRANSFERRED IN THEIR ENTIRETY IN THE LEVEL 1 SLAB. FRAMES NOT SUPPORTED ON CONCRETE WALLS ARE CONTINUED TO THE FOUNDATION WITH SIZES EQUAL OR GREATER THAN THE LEVEL ABOVE TO ACCOUNT FOR THE VARIATION IN DIAPHRAGM STIFFNESS AT THE TRANSFER LEVEL.

LATERAL DESIGN - ANALYSIS

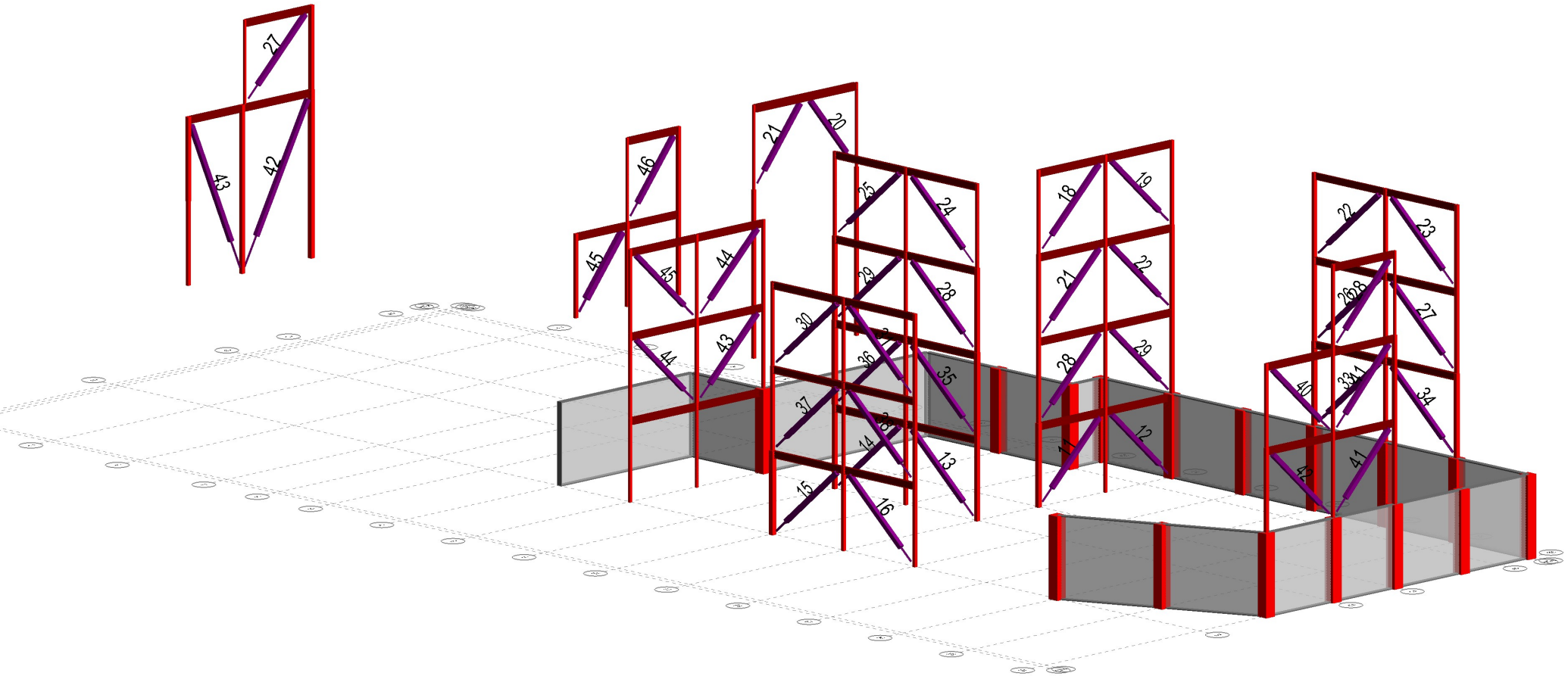
3D VIEW OF FEA MODEL



FRAME NUMBER MAP



BRACE NUMBER MAP



Criteria, Mass and Exposure Data

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes Scale Factor: 1.60
Ground Level: Base
Mesh Criteria :
Max. Distance Between Nodes on Mesh Line (ft) : 4.00
Merge Node Tolerance (in) : 0.0100
Geometry Tolerance (in) : 0.0050
Walls Out-of-plane Stiffness Included in Analysis.
Rotational Fixities Released at Wall Foundation Nodes.
Sign considered for Dynamic Load Case Results.
Rigid Links Included at Fixed Beam-to-Wall Locations
Eigenvalue Analysis : Ritz Vectors (Load Dependent)

DIAPHRAGM DATA:

Story	Diaph #	Diaph Type
ROOF	1	Pseudo - Flexible
LEVEL 03	1	Semirigid
LEVEL 02	1	Rigid
	2	Flexible / None
	3	Flexible / None
LEVEL 01	1	Rigid

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

Semirigid Diaphragm Parameters:

Use Slab Edges for Exterior Boundary
Calculate Diaphragm Mass
Hard Node Density Factor: 1.00

STORY MASS DATA:

Includes Self Mass of:

Walls (Half mass of walls above and below)
Slabs/Deck

Calculated Values:

Story	Diaph #	Weight kips	Mass k-s2/ft	MMI ft-k-s2	Xm ft	Ym ft	EccX ft	EccY ft
ROOF	1	292.80	9.09	35668	-334.38	-232.83	10.73	1.98
LEVEL 03	1	917.06	28.48	126678	-328.30	-222.09	10.78	4.88
LEVEL 02	1	806.64	25.05	65826	-360.72	-219.84	8.67	3.35

	2	23.01	0.71	314	-317.59	-252.86	3.62	0.52
	3	11.16	0.35	49	-447.34	-232.86	0.45	2.00
LEVEL 01	1	808.56	25.11	46610	-381.75	-221.89	6.38	3.32

Story	Diaph #	Combine
ROOF	1	None
LEVEL 03	1	None
LEVEL 02	1	None
	2	1-LEVEL 02
	3	1-LEVEL 02
LEVEL 01	1	None

Combined/Merged Values:

Story	Diaph #	Weight	Mass	MMI	Xm	Ym	EccX	EccY
		kips	k-s2/ft	ft-k-s2	ft	ft	ft	ft
ROOF	1	292.8	9.09	35668	-334.38	-232.83	10.73	1.98
LEVEL 03	1	917.1	28.48	126678	-328.30	-222.09	10.78	4.88
LEVEL 02	1	840.8	26.11	70926	-360.69	-220.92	8.67	3.35
LEVEL 01	1	808.6	25.11	46610	-381.75	-221.89	6.38	3.32

Distributed Mass Values for Pseudo-Flexible or Meshed Diaphragms:

Story	Diaph #	Total Weight	Total Mass
		kips	k-s2/ft
LEVEL 03	1	12.10	0.376

WIND EXPOSURE DATA:

Calculated Values:

Story	Diaph #	Building Extents (ft)				Expose	Parapet
		Min X	Max X	Min Y	Max Y		ft
ROOF	1	-441.68	-227.01	-252.69	-213.03	Full	0.00
LEVEL 03	1	-442.09	-226.59	-254.11	-156.61	Full	0.00
LEVEL 02	1	-442.09	-268.68	-253.53	-186.61	Full	0.00
	2	-353.51	-281.18	-258.03	-247.69	Full	0.00
	3	-451.84	-442.84	-252.86	-212.86	Full	0.00
LEVEL 01	1	-442.09	-314.43	-253.11	-186.61	Full	0.00

STORY GRAVITY LOADS DATA:

Includes Weight of:

Beams
Columns
Walls
Slabs/Deck

Live Load Reduction (Calculated)

Reducible : 60.00 %
Storage : 0.00 %
Roof : 0.00 %

Calculated Values:

Story	Diaph #	Dead kips	Xc ft	Yc ft	Live kips	Xc ft	Yc ft
ROOF	1	297.28	-335.49	-232.68	0.00	0.00	0.00
	None	0.36	-227.84	-237.09	0.00	0.00	0.00
LEVEL 03	1	912.53	-326.81	-222.74	267.45	-373.84	-240.03
	None	2.17	-377.55	-251.86	0.00	0.00	0.00
LEVEL 02	1	792.16	-360.12	-220.02	318.81	-349.34	-231.86
	2	17.42	-317.78	-252.83	0.00	0.00	0.00
	3	8.69	-447.31	-232.84	0.00	0.00	0.00
	None	4.46	-267.40	-212.19	0.00	0.00	0.00
LEVEL 01	1	1065.01	-383.80	-224.37	246.04	-381.34	-231.86

Story	Diaph #	Roof kips	Xc ft	Yc ft	Combine
ROOF	1	215.91	-334.33	-232.82	None
	None	0.00	0.00	0.00	1-ROOF
LEVEL 03	1	189.26	-311.78	-191.92	None
	None	0.00	0.00	0.00	1-LEVEL 03
LEVEL 02	1	0.00	0.00	0.00	None
	2	18.56	-317.59	-252.86	1-LEVEL 02
	3	9.00	-447.34	-232.86	1-LEVEL 02
	None	0.00	0.00	0.00	2-LEVEL 02
LEVEL 01	1	0.00	0.00	0.00	None

User Specified Values:

Story	Diaph #	Dead kips	Xc ft	Yc ft	Live kips	Xc ft	Yc ft
ROOF	1	297.64	-335.36	-232.68	0.00	0.00	0.00
LEVEL 03	1	914.70	-326.94	-222.81	267.45	-373.84	-240.03
LEVEL 02	1	818.27	-360.14	-220.86	318.81	-349.34	-231.86
	2	0.00	0.00	0.00	0.00	0.00	0.00
	3	0.00	0.00	0.00	0.00	0.00	0.00
LEVEL 01	1	1065.01	-383.80	-224.37	246.04	-381.34	-231.86

Criteria, Mass and Exposure Data

Story	Diaph #	Roof kips	Xc ft	Yc ft
ROOF	1	215.9	-334.33	-232.82
LEVEL 03	1	189.3	-311.78	-191.92
LEVEL 02	1	27.6	-359.97	-246.33
	2	0.0	0.00	0.00
	3	0.0	0.00	0.00
LEVEL 01	1	0.0	0.00	0.00

Loads and Applied Forces

LOAD CASE: EQ

Seismic ASCE 7-16 Equivalent Lateral Force
Importance Factor: 1.25 TL: 6.00 s
Site Class D: Stiff Soil
Ss: 1.397 g S1: 0.486 g
Use Specified: SDs: 0.931 g SD1: 0.590 g
Use Specified Seismic Design Category: D
Provisions for: Force
Ground Level: Base

Dir	Eccent	R	Ta Equation	Building Period-T
X	+ And -	8.00	Std,Ct=0.030,x=0.75	Calculated
Y	+ And -	8.00	Std,Ct=0.030,x=0.75	Calculated

Dir	Ta	Cu	T	T - used	Cs Eq12.8-2	Cs - used	k
X	0.547	1.400	0.468	0.468	0.145	0.145	1.000

Dir	Ta	Cu	T	T - used	Cs Eq12.8-2	Cs - used	k
Y	0.547	1.400	0.456	0.456	0.145	0.145	1.000

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

Total Building Weight (kips) = 2859.23
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
ROOF	1	48.00	75.97	0.00	-334.38	-230.84
LEVEL 03	1	36.00	178.45	0.00	-328.30	-217.21
LEVEL 02	1	24.00	109.07	0.00	-360.69	-217.57
LEVEL 02	2	24.00	0.00	0.00	-317.59	-252.34
LEVEL 02	3	24.00	0.00	0.00	-447.34	-230.86
LEVEL 01	1	12.00	52.44	0.00	-381.75	-218.56

Applied Loads for Pseudo-Flexible or Semirigid Diaphragms:

Story	Diaph #	Sum Fx	Sum Fy
		kips	kips
ROOF	1	75.966	0.000
LEVEL 03	1	178.446	0.000

	254.41	0.00

APPLIED STORY FORCES

Type: EQ_ASCE716_X_+E_F

Level	Ht	Fx	Fy
	ft	kips	kips
ROOF	48.00	75.97	0.00
LEVEL 03	36.00	178.45	0.00
LEVEL 02	24.00	109.07	0.00
LEVEL 01	12.00	52.44	0.00
		415.93	0.00

APPLIED DIAPHRAGM FORCES

Type: EQ_ASCE716_X_-E_F

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
ROOF	1	48.00	75.97	0.00	-334.38	-234.81
LEVEL 03	1	36.00	178.45	0.00	-328.30	-226.96
LEVEL 02	1	24.00	109.07	0.00	-360.69	-224.26
LEVEL 02	2	24.00	0.00	0.00	-317.59	-253.38
LEVEL 02	3	24.00	0.00	0.00	-447.34	-234.86
LEVEL 01	1	12.00	52.44	0.00	-381.75	-225.21

Applied Loads for Pseudo-Flexible or Semirigid Diaphragms:

Story	Diaph #	Sum Fx	Sum Fy
		kips	kips
ROOF	1	75.966	0.000
LEVEL 03	1	178.446	0.000
		254.41	0.00

APPLIED STORY FORCES

Type: EQ_ASCE716_X_-E_F

Level	Ht	Fx	Fy
	ft	kips	kips
ROOF	48.00	75.97	0.00
LEVEL 03	36.00	178.45	0.00
LEVEL 02	24.00	109.07	0.00
LEVEL 01	12.00	52.44	0.00

	415.93	0.00

APPLIED DIAPHRAGM FORCES

Type: EQ_ASCE716_Y_+E_F

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
ROOF	1	48.00	0.00	75.97	-323.65	-232.83
LEVEL 03	1	36.00	0.00	178.45	-317.52	-222.09
LEVEL 02	1	24.00	0.00	109.07	-352.02	-220.92
LEVEL 02	2	24.00	0.00	0.00	-313.98	-252.86
LEVEL 02	3	24.00	0.00	0.00	-446.89	-232.86
LEVEL 01	1	12.00	0.00	52.44	-375.37	-221.89

Applied Loads for Pseudo-Flexible or Semirigid Diaphragms:

Story	Diaph #	Sum Fx	Sum Fy
		kips	kips
ROOF	1	0.000	75.966
LEVEL 03	1	0.000	178.446
		0.00	254.41

APPLIED STORY FORCES

Type: EQ_ASCE716_Y_+E_F

Level	Ht	Fx	Fy
	ft	kips	kips
ROOF	48.00	0.00	75.97
LEVEL 03	36.00	0.00	178.45
LEVEL 02	24.00	0.00	109.07
LEVEL 01	12.00	0.00	52.44
		0.00	415.93

APPLIED DIAPHRAGM FORCES

Type: EQ_ASCE716_Y_-E_F

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
ROOF	1	48.00	0.00	75.97	-345.11	-232.83
LEVEL 03	1	36.00	0.00	178.45	-339.07	-222.09
LEVEL 02	1	24.00	0.00	109.07	-369.36	-220.92
LEVEL 02	2	24.00	0.00	0.00	-321.21	-252.86
LEVEL 02	3	24.00	0.00	0.00	-447.79	-232.86

LEVEL 01	1	12.00	0.00	52.44	-388.13	-221.89

Applied Loads for Pseudo-Flexible or Semirigid Diaphragms:

Story	Diaph #	Sum Fx	Sum Fy
		kips	kips
ROOF	1	0.000	75.966
LEVEL 03	1	0.000	178.446
		0.00	254.41

APPLIED STORY FORCES

Type: EQ_ASCE716_Y_-E_F

Level	Ht	Fx	Fy
	ft	kips	kips
ROOF	48.00	0.00	75.97
LEVEL 03	36.00	0.00	178.45
LEVEL 02	24.00	0.00	109.07
LEVEL 01	12.00	0.00	52.44
		0.00	415.93

LOAD CASE: DYN

Dynamic Response Spectra for ASCE 7-16
Damping Ratio: 0.050
Scale Factors (X-Dir): +Ecc Case: 0.2030 -Ecc Case: 0.2250
Scale Factors (Y-Dir): +Ecc Case: 0.1640 -Ecc Case: 0.1580
Design Spectral Acceleration Parameters : Use
SMS : 1.676 g SM1 = 0.885 g
SDS : 1.117 SD1: 0.590
To : 0.106 sec Ts : 0.528 sec TL : 6.000 sec
Modal Combination Technique: CQC
Ground Level: Base

Dir	Eccent
X	+ And -
Y	+ And -

DIRECTION

Type: Dyn_ASCE716_CQC_X_+E
Type: Dyn_ASCE716_CQC_X_-E
Type: Dyn_ASCE716_CQC_Y_+E
Type: Dyn_ASCE716_CQC_Y_-E

GENERATED RESPONSE SPECTRA CURVE

Period	Spectral Acceleration (S(T))
0.0000(To)	0.4469 g
0.1056(To)	1.1173 g
0.5280(Ts)	1.1173 g
0.5280 < T < 6.0000 (TL)	0.5900 g/T
T > 6.0000	3.5400 g/(T*T)

LOAD MULTIPLIERS FOR ECCENTRIC LOADING ON SEMIRIGID DIAPHRAGM:SEISMIC AND RESPONSE SPECTRA LOAD CASES

Story : LEVEL 03 Diaph. #: 1

Loading Direction	Top Region	Bottom Region	Left Region	Right Region
+X	1.32	0.76	---	---
-X	0.68	1.24	---	---
+Y	---	---	0.80	1.19
-Y	---	---	1.20	0.81

Periods and Modes

CRITERIA:

Rigid End Zones: Ignore Effects
P-Delta: Yes Scale Factor: 1.60
Ground Level: Base
Mesh Criteria :
Max. Distance Between Nodes on Mesh Line (ft) : 4.00
Merge Node Tolerance (in) : 0.0100
Geometry Tolerance (in) : 0.0050
Walls Out-of-plane Stiffness Included in Analysis.
Rotational Fixities Released at Wall Foundation Nodes.
Sign considered for Dynamic Load Case Results.
Rigid Links Included at Fixed Beam-to-Wall Locations
Eigenvalue Analysis : Ritz Vectors (Load Dependent)

Load Case: Eigen Solution

FREQUENCIES AND PERIODS:

Mode	Period (T) sec	Cyclic Frequency (f) Hz	Circular Frequency (ω) rad/sec	Eigenvalue (rad/sec)**2
1	0.4678	2.1377	13.4317	180.4099
2	0.4558	2.1941	13.7861	190.0563
3	0.4331	2.3089	14.5070	210.4537
4	0.3007	3.3257	20.8959	436.6373
5	0.2403	4.1607	26.1426	683.4358
6	0.2051	4.8765	30.6400	938.8106
7	0.1854	5.3925	33.8823	1148.0080
8	0.1713	5.8378	36.6802	1345.4339
9	0.1657	6.0332	37.9079	1437.0099
10	0.1596	6.2673	39.3787	1550.6841
11	0.1525	6.5578	41.2038	1697.7506
12	0.1346	7.4307	46.6882	2179.7846
13	0.1202	8.3227	52.2931	2734.5658
14	0.0944	10.5933	66.5594	4430.1510
15	0.0858	11.6554	73.2332	5363.1005
16	0.0696	14.3776	90.3371	8160.7925
17	0.0565	17.6908	111.1549	12355.4083
18	0.0511	19.5575	122.8833	15100.3000
19	0.0475	21.0526	132.2774	17497.3159
20	0.0432	23.1531	145.4754	21163.0928
21	0.0357	28.0251	176.0871	31006.6712
22	0.0296	33.8170	212.4786	45147.1391

23	0.0251	39.8725	250.5266	62763.5753
24	0.0168	59.5934	374.4363	140202.5273
25	0.0100	100.2815	630.0872	397009.8269

MODAL PARTICIPATION FACTORS:

Mode	X-Dir	Y-Dir	Rotation
1	16.6346	12.4663	4.8137
2	15.3475	-20.6384	-0.5772
3	12.0533	8.4994	-12.4395
4	-1.6465	-3.8368	-12.0960
5	-0.4053	-3.5964	3.6344
6	1.1367	1.5773	-19.0409
7	-4.6660	-0.7239	6.1077
8	2.0746	-8.8725	-1.0589
9	0.1997	1.6250	-8.1129
10	5.5150	2.3170	46.6563
11	-8.1004	0.8442	18.3478
12	0.9884	3.2189	-25.5758
13	0.4136	-0.2962	43.2484
14	1.1252	-0.1863	4.2942
15	-0.0992	-0.1736	13.9814
16	-0.1207	0.1770	-2.1598
17	0.0570	-0.1492	3.2958
18	0.0684	-0.0514	-1.6787
19	0.1092	-0.2845	0.8602
20	8.0812	-14.1836	-12.7168
21	-13.5244	-8.9460	15.2933
22	0.1553	-0.2303	1.5781
23	5.5257	-0.4962	57.6213
24	-0.0657	0.1760	-0.7080
25	-0.0610	0.1641	0.4777

MODAL DIRECTION FACTORS:

Mode	X-Dir	Y-Dir	Rotation
1	45.23	54.38	0.39
2	35.65	64.35	0.00
3	25.26	72.19	2.54
4	35.03	62.54	2.43
5	64.18	35.60	0.22
6	2.92	91.11	5.97
7	96.75	2.66	0.59

8	5.57	94.42	0.01
9	4.85	94.06	1.09
10	26.94	37.03	36.03
11	76.17	18.47	5.36
12	9.58	79.64	10.78
13	19.32	49.99	30.68
14	92.56	7.12	0.32
15	40.12	56.71	3.17
16	61.21	38.71	0.08
17	53.46	46.36	0.18
18	43.49	56.46	0.04
19	86.52	13.46	0.02
20	24.44	71.72	3.84
21	65.20	27.99	6.82
22	39.39	60.57	0.04
23	10.58	0.10	89.32
24	44.08	55.91	0.01
25	43.29	56.71	0.00

MODAL EFFECTIVE MASS FACTORS:

Mode	X-Dir		Y-Dir		Rotation	
	%Mass	%SumM	%Mass	%SumM	%Mass	%SumM
1	25.97	25.97	14.58	14.58	0.24	0.24
2	22.11	48.07	39.97	54.56	0.00	0.24
3	13.63	61.71	6.78	61.34	1.58	1.82
4	0.25	61.96	1.38	62.72	1.49	3.31
5	0.02	61.98	1.21	63.93	0.13	3.45
6	0.12	62.10	0.23	64.17	3.70	7.15
7	2.04	64.14	0.05	64.22	0.38	7.53
8	0.40	64.55	7.39	71.60	0.01	7.54
9	0.00	64.55	0.25	71.85	0.67	8.21
10	2.85	67.40	0.50	72.35	22.22	30.44
11	6.16	73.56	0.07	72.42	3.44	33.88
12	0.09	73.65	0.97	73.39	6.68	40.55
13	0.02	73.67	0.01	73.40	19.10	59.65
14	0.12	73.79	0.00	73.41	0.19	59.84
15	0.00	73.79	0.00	73.41	2.00	61.83
16	0.00	73.79	0.00	73.41	0.05	61.88
17	0.00	73.79	0.00	73.41	0.11	61.99
18	0.00	73.79	0.00	73.41	0.03	62.02

19	0.00	73.79	0.01	73.42	0.01	62.03
20	6.13	79.92	18.88	92.30	1.65	63.68
21	17.17	97.09	7.51	99.81	2.39	66.07
22	0.00	97.09	0.00	99.82	0.03	66.09
23	2.87	99.95	0.02	99.84	33.90	99.99
24	0.00	99.95	0.00	99.84	0.01	100.00
25	0.00	99.95	0.00	99.84	0.00	100.00

MODE SHAPES:

Mode Shapes for Rigid Diaphragms:

Story	Diaph. #	Dir	Mode 1	Mode 2	Mode 3
LEVEL 02	1	X	1.228703E-01	1.239559E-01	1.156333E-01
		Y	5.866352E-02	-1.759019E-01	1.326307E-01
		R	6.787966E-05	-7.198162E-06	-1.728341E-04
LEVEL 01	1	X	3.929900E-03	4.683935E-03	3.324824E-03
		Y	2.594837E-04	-5.071842E-03	3.884523E-03
		R	-1.536689E-08	-1.429691E-06	-3.884844E-06

Story	Diaph. #	Dir	Mode 4	Mode 5	Mode 6
LEVEL 02	1	X	-1.789881E-02	-1.656354E-02	5.263166E-02
		Y	-9.746399E-02	-1.080303E-01	8.493822E-02
		R	-1.690042E-04	5.043406E-05	-2.647682E-04
LEVEL 01	1	X	-5.267043E-04	-1.443912E-04	1.658234E-03
		Y	-1.271039E-03	-3.583700E-03	4.522674E-03
		R	-2.343443E-06	1.229818E-06	-5.621296E-06

Story	Diaph. #	Dir	Mode 7	Mode 8	Mode 9
LEVEL 02	1	X	-1.868222E-01	1.003591E-01	1.535045E-02
		Y	-2.455976E-02	-4.889352E-01	1.411288E-01
		R	8.339221E-05	-1.254508E-05	-1.130435E-04
LEVEL 01	1	X	-7.622260E-03	6.438191E-03	-4.243205E-06
		Y	-5.193710E-05	-1.720524E-02	5.627637E-03
		R	4.141812E-06	-3.628301E-06	-2.041880E-06

Story	Diaph. #	Dir	Mode 10	Mode 11	Mode 12
LEVEL 02	1	X	2.807683E-01	-5.052674E-01	9.115086E-02
		Y	2.082496E-01	8.989934E-02	2.553453E-01

		R	6.505801E-04	2.507367E-04	-3.557868E-04
LEVEL 01	1	X	9.318062E-03	-2.043703E-02	2.547078E-03
		Y	-2.282469E-05	4.847402E-03	1.157584E-02
		R	1.101213E-05	1.210084E-05	-7.322144E-06

Story	Diaph. #	Dir	Mode 13	Mode 14	Mode 15
LEVEL 02	1	X	1.993329E-02	1.492469E-01	-1.288152E-02
		Y	-3.528227E-02	-1.079836E-02	-1.308580E-02
		R	6.003043E-04	6.143442E-05	1.929559E-04
LEVEL 01	1	X	-5.512055E-04	7.014706E-03	-1.867776E-03
		Y	-5.179443E-03	-2.695357E-03	-1.619138E-03
		R	1.440128E-05	-1.353328E-06	6.347615E-06

Story	Diaph. #	Dir	Mode 16	Mode 17	Mode 18
LEVEL 02	1	X	-1.977056E-02	1.101740E-02	4.702456E-03
		Y	1.426325E-02	-1.699016E-02	4.651150E-03
		R	-3.112644E-05	4.634409E-05	-2.200470E-05
LEVEL 01	1	X	-1.864222E-03	1.302486E-03	2.163870E-03
		Y	2.883789E-03	-4.046324E-03	-2.047419E-03
		R	1.027053E-06	1.895620E-07	-2.531859E-06

Story	Diaph. #	Dir	Mode 19	Mode 20	Mode 21
LEVEL 02	1	X	-6.531099E-04	-1.695884E-02	1.928863E-02
		Y	-3.067888E-03	2.048780E-02	8.685370E-03
		R	1.428628E-05	-7.280470E-06	-1.351731E-05
LEVEL 01	1	X	4.936311E-03	3.388715E-01	-5.575703E-01
		Y	-1.119667E-02	-5.838047E-01	-3.646101E-01
		R	-3.284988E-06	-2.617578E-04	3.486839E-04

Story	Diaph. #	Dir	Mode 22	Mode 23	Mode 24
LEVEL 02	1	X	-5.593780E-03	-4.469090E-03	-3.185757E-04
		Y	-3.628757E-03	4.746676E-04	1.991853E-03
		R	2.056844E-05	-1.792917E-05	-1.208963E-05
LEVEL 01	1	X	6.718311E-03	2.246595E-01	-2.811327E-03
		Y	-9.331143E-03	-2.052201E-02	6.773778E-03

		R	2.557726E-06	1.263537E-03	3.205840E-06

Story	Diaph. #	Dir	Mode 25
LEVEL 02	1	X	1.413094E-03
		Y	-1.755014E-03
		R	5.775291E-06
LEVEL 01	1	X	-2.534295E-03
		Y	6.843384E-03
		R	1.459668E-06

Note 1: Mode shapes are normalized with respect to building mass matrix: Qi^T x M x Qi = 1 where Qi: ith mode shape and M is the building mass matrix.
Normalized mode shapes are consistent with units of "kip" and "in".

Note 2: Mode shapes for meshed diaphragms are not included by default.
Turn on "Include Results for All Nodes" to include mode shapes for meshed diaphragms.
This may substantionally increase the length of the report for large models.

Note 3: The model includes one or more Flexible or Pseudo-flexible diaphragm. The Eigenvalue analysis results may represent member local modes rather than story modes.

Load Case: DYN Dyn_ASCE716_CQC_X_+E

FREQUENCIES AND PERIODS:

Mode	Period (T)	Cyclic Frequency (f)	Circular Frequency (ω)	Eigenvalue
	sec	Hz	rad/sec	(rad/sec)**2
1	0.4624	2.1625	13.5877	184.6244
2	0.4556	2.1949	13.7910	190.1913
3	0.4391	2.2773	14.3087	204.7386
4	0.2984	3.3516	21.0585	443.4591
5	0.2410	4.1500	26.0750	679.9049
6	0.2047	4.8858	30.6986	942.4068
7	0.1853	5.3964	33.9066	1149.6607
8	0.1714	5.8356	36.6660	1344.3973
9	0.1659	6.0278	37.8738	1434.4255
10	0.1564	6.3923	40.1638	1613.1286
11	0.1529	6.5413	41.1002	1689.2268
12	0.1349	7.4123	46.5730	2169.0409
13	0.1180	8.4746	53.2475	2835.2936
14	0.0924	10.8210	67.9904	4622.6886
15	0.0839	11.9151	74.8649	5604.7599

16	0.0669	14.9444	93.8983	8816.8836
17	0.0546	18.3011	114.9894	13222.5627
18	0.0506	19.7460	124.0676	15392.7666
19	0.0469	21.3412	134.0908	17980.3522
20	0.0435	22.9648	144.2918	20820.1218
21	0.0363	27.5665	173.2052	30000.0361
22	0.0291	34.4120	216.2169	46749.7560
23	0.0245	40.8777	256.8423	65967.9594
24	0.0164	60.7918	381.9661	145898.0744
25	0.0099	100.7335	632.9275	400597.2079

MODAL PARTICIPATION FACTORS:

Mode	X-Dir	Y-Dir	Rotation
1	7.5702	20.4552	4.2443
2	24.1028	-9.0589	-2.2900
3	-4.6759	-12.3766	11.2177
4	-1.1621	-3.9373	-10.9964
5	-0.2795	-3.4340	3.2113
6	1.5166	1.5867	-17.0725
7	-4.8197	-0.1058	5.6546
8	1.1070	-8.9139	-1.2357
9	1.2284	-2.0030	2.1583
10	-2.7311	1.7941	41.9779
11	9.3622	1.3389	19.4051
12	-0.3597	3.1703	-23.2555
13	-0.5550	0.4094	-46.1172
14	1.0964	-0.0476	4.4018
15	-0.0953	0.1771	-13.5633
16	0.1456	-0.2295	3.8673
17	0.0909	-0.1361	2.9568
18	0.0424	-0.0185	-1.5967
19	-0.0474	-0.0067	1.0897
20	-8.8681	13.5711	14.4162
21	12.7435	9.8831	-16.6182
22	0.0740	-0.0385	1.5102
23	-6.1036	0.2836	-56.8826
24	-0.0010	-0.0269	0.6817
25	0.0039	0.0180	0.4872

MODAL DIRECTION FACTORS:

Mode	X-Dir	Y-Dir	Rotation

1	10.90	88.78	0.32
2	87.69	12.22	0.09
3	8.29	89.47	2.24
4	32.47	65.37	2.16
5	66.42	33.40	0.18
6	3.56	91.28	5.15
7	97.07	2.39	0.54
8	3.53	96.45	0.02
9	6.57	93.34	0.09
10	22.85	46.16	30.99
11	82.75	10.37	6.88
12	8.40	81.96	9.64
13	14.86	47.62	37.53
14	97.75	1.88	0.36
15	30.83	65.96	3.22
16	56.65	43.07	0.28
17	58.88	40.96	0.16
18	40.76	59.20	0.04
19	81.58	18.40	0.02
20	29.36	65.67	4.97
21	57.90	34.12	7.99
22	39.21	60.76	0.03
23	12.95	0.04	87.01
24	40.81	59.18	0.01
25	45.37	54.63	0.00

MODAL EFFECTIVE MASS FACTORS:

Mode	X-Dir		Y-Dir		Rotation	
	%Mass	%SumM	%Mass	%SumM	%Mass	%SumM
1	5.38	5.38	39.27	39.27	0.19	0.19
2	54.52	59.90	7.70	46.97	0.06	0.25
3	2.05	61.95	14.38	61.34	1.34	1.59
4	0.13	62.08	1.45	62.80	1.29	2.88
5	0.01	62.08	1.11	63.91	0.11	2.99
6	0.22	62.30	0.24	64.14	3.11	6.10
7	2.18	64.48	0.00	64.14	0.34	6.44
8	0.11	64.59	7.46	71.60	0.02	6.46
9	0.14	64.74	0.38	71.98	0.05	6.51
10	0.70	65.44	0.30	72.28	18.81	25.32
11	8.23	73.66	0.17	72.45	4.02	29.34

12	0.01	73.67	0.94	73.39	5.77	35.11
13	0.03	73.70	0.02	73.40	22.70	57.81
14	0.11	73.82	0.00	73.41	0.21	58.01
15	0.00	73.82	0.00	73.41	1.96	59.98
16	0.00	73.82	0.00	73.41	0.16	60.14
17	0.00	73.82	0.00	73.41	0.09	60.23
18	0.00	73.82	0.00	73.41	0.03	60.26
19	0.00	73.82	0.00	73.41	0.01	60.27
20	7.38	81.20	17.28	90.70	2.22	62.49
21	15.24	96.44	9.17	99.87	2.95	65.43
22	0.00	96.44	0.00	99.87	0.02	65.46
23	3.50	99.94	0.01	99.87	34.53	99.99
24	0.00	99.94	0.00	99.87	0.00	100.00
25	0.00	99.94	0.00	99.87	0.00	100.00

MODE SHAPES:

Mode Shapes for Rigid Diaphragms:

Story	Diaph. #	Dir	Mode 1	Mode 2	Mode 3
LEVEL 02	1	X	5.520594E-02	1.953235E-01	-4.863232E-02
		Y	1.313529E-01	-7.832135E-02	-1.692895E-01
		R	6.404383E-05	-3.302055E-05	1.681912E-04
LEVEL 01	1	X	1.446877E-03	6.733607E-03	-9.822585E-04
		Y	2.499206E-03	-2.866070E-03	-5.160167E-03
		R	6.127030E-07	-2.496430E-06	3.138488E-06

Story	Diaph. #	Dir	Mode 4	Mode 5	Mode 6
LEVEL 02	1	X	-9.976622E-03	-1.262932E-02	6.458922E-02
		Y	-1.007125E-01	-1.020915E-01	8.628670E-02
		R	-1.653897E-04	4.797100E-05	-2.554032E-04
LEVEL 01	1	X	-2.414730E-04	-3.889716E-05	2.135580E-03
		Y	-1.442610E-03	-3.414988E-03	4.404788E-03
		R	-2.345967E-06	1.148253E-06	-5.583617E-06

Story	Diaph. #	Dir	Mode 7	Mode 8	Mode 9
LEVEL 02	1	X	-1.931483E-01	5.328653E-02	6.220193E-02
		Y	4.109731E-03	-4.892271E-01	-1.704535E-01
		R	8.279905E-05	-1.653389E-05	3.330702E-05

LEVEL 01	1	X	-8.038316E-03	4.627294E-03	3.237860E-03
		Y	9.504715E-04	-1.684838E-02	-6.564157E-03
		R	4.382468E-06	-3.161946E-06	-7.342214E-07

Story	Diaph. #	Dir	Mode 10	Mode 11	Mode 12
LEVEL 02	1	X	-1.855766E-01	5.557870E-01	-1.235251E-02
		Y	1.750167E-01	1.216978E-01	2.495954E-01
		R	6.262001E-04	2.951680E-04	-3.492483E-04
LEVEL 01	1	X	-8.654193E-03	2.093353E-02	-1.625967E-03
		Y	2.409668E-03	-2.253862E-03	1.216849E-02
		R	1.624968E-05	-5.306181E-07	-5.701328E-06

Story	Diaph. #	Dir	Mode 13	Mode 14	Mode 15
LEVEL 02	1	X	-3.472328E-02	1.491320E-01	-1.917396E-02
		Y	4.135117E-02	-5.505751E-04	1.210307E-02
		R	-6.891204E-04	6.768408E-05	-2.017745E-04
LEVEL 01	1	X	1.396898E-04	7.014750E-03	3.866324E-04
		Y	6.265563E-03	-2.109708E-03	2.010228E-03
		R	-1.619431E-05	-1.149601E-06	-6.032039E-06

Story	Diaph. #	Dir	Mode 16	Mode 17	Mode 18
LEVEL 02	1	X	2.596079E-02	1.773259E-02	2.008131E-03
		Y	-1.809985E-02	-1.520751E-02	2.977444E-03
		R	5.914479E-05	4.502361E-05	-2.291753E-05
LEVEL 01	1	X	2.256946E-03	2.012430E-03	1.307650E-03
		Y	-3.893771E-03	-4.158803E-03	-7.741909E-04
		R	-5.577684E-07	-1.494068E-07	-1.889578E-06

Story	Diaph. #	Dir	Mode 19	Mode 20	Mode 21
LEVEL 02	1	X	-9.082230E-04	1.899580E-02	-1.781856E-02
		Y	-3.433505E-03	-2.016605E-02	-9.961678E-03
		R	1.525520E-05	8.143960E-06	1.480514E-05
LEVEL 01	1	X	-1.490690E-03	-3.597057E-01	5.103134E-01
		Y	-1.237001E-04	5.588778E-01	4.031277E-01
		R	1.833724E-06	2.977942E-04	-3.774494E-04

Story	Diaph. #	Dir	Mode 22	Mode 23	Mode 24
LEVEL 02	1	X	-2.745145E-03	6.230754E-03	1.418688E-03
		Y	-2.352796E-03	-3.417220E-04	-1.217325E-03
		R	1.956393E-05	1.887137E-05	1.118203E-05
LEVEL 01	1	X	3.336594E-03	-2.983963E-01	-1.034721E-04
		Y	-1.579215E-03	1.192751E-02	-7.957137E-04
		R	4.771036E-06	-1.247056E-03	-1.166428E-06

Story	Diaph. #	Dir	Mode 25
LEVEL 02	1	X	1.346041E-03
		Y	-2.342619E-03
		R	7.769151E-06
LEVEL 01	1	X	2.159888E-04
		Y	9.536412E-04
		R	-5.184831E-07

Note 1: Mode shapes are normalized with respect to building mass matrix: Qi^T x M x Qi = 1 where Qi: ith mode shape and M is the building mass matrix.
Normalized mode shapes are consistent with units of "kip" and "in".

Note 2: Mode shapes for meshed diaphragms are not included by default.
Turn on "Include Results for All Nodes" to include mode shapes for meshed diaphragms.
This may substantionally increase the length of the report for large models.

Note 3: The model includes one or more Flexible or Pseudo-flexible diaphragm. The Eigenvalue analysis results may represent member local modes rather than story modes.

Load Case: DYN Dyn_ASCE716_CQC_X_-E

FREQUENCIES AND PERIODS:

Mode	Period (T) sec	Cyclic Frequency (f) Hz	Circular Frequency (ω) rad/sec	Eigenvalue (rad/sec)**2
1	0.4757	2.1023	13.2090	174.4775
2	0.4560	2.1929	13.7786	189.8509
3	0.4238	2.3595	14.8249	219.7767
4	0.3027	3.3039	20.7591	430.9411
5	0.2396	4.1728	26.2188	687.4238
6	0.2047	4.8847	30.6914	941.9604
7	0.1859	5.3793	33.7989	1142.3647

8	0.1713	5.8389	36.6866	1345.9074
9	0.1654	6.0473	37.9962	1443.7098
10	0.1616	6.1897	38.8912	1512.5237
11	0.1493	6.6978	42.0838	1771.0454
12	0.1321	7.5684	47.5537	2261.3500
13	0.1198	8.3459	52.4385	2749.8002
14	0.0967	10.3409	64.9738	4221.5888
15	0.0874	11.4457	71.9157	5171.8650
16	0.0705	14.1786	89.0866	7936.4144
17	0.0577	17.3165	108.8030	11838.0898
18	0.0514	19.4557	122.2438	14943.5460
19	0.0481	20.7939	130.6519	17069.9073
20	0.0429	23.3046	146.4272	21440.9295
21	0.0351	28.4595	178.8160	31975.1653
22	0.0298	33.5414	210.7469	44414.2376
23	0.0256	38.9980	245.0315	60040.4182
24	0.0172	57.9764	364.2762	132697.1605
25	0.0100	99.6373	626.0397	391925.6720

MODAL PARTICIPATION FACTORS:

Mode	X-Dir	Y-Dir	Rotation
1	18.9086	7.7450	4.7810
2	10.0125	-23.6491	0.0411
3	-14.0331	-5.8607	11.4087
4	2.0815	3.7270	11.1147
5	0.5286	3.7435	-3.2679
6	0.8279	1.6244	-16.5772
7	-4.3724	-1.3170	4.8253
8	-3.1581	8.6668	-1.6553
9	-2.4928	-1.7270	2.9119
10	-6.9761	-2.4557	-37.7044
11	5.9952	-1.9709	-23.5072
12	2.1876	2.8315	-26.4112
13	-0.1902	0.4147	-45.7942
14	1.0778	-0.3494	5.2940
15	0.2972	0.1386	-15.6206
16	-0.1097	0.1060	-0.6418
17	0.0312	-0.1496	3.4648
18	0.0601	-0.0275	-2.0016
19	0.1271	-0.4135	0.7955

20	7.3765	-14.6416	-11.1780
21	14.2140	8.0715	-12.8274
22	0.1249	-0.5713	1.7384
23	4.7015	-0.7687	58.4968
24	-0.0696	0.3465	-0.7337
25	0.0659	-0.3217	-0.4747

MODAL DIRECTION FACTORS:

Mode	X-Dir	Y-Dir	Rotation
1	57.86	41.72	0.42
2	15.16	84.83	0.00
3	32.12	65.58	2.30
4	37.73	60.06	2.21
5	62.35	37.46	0.19
6	2.67	92.46	4.87
7	95.01	4.60	0.40
8	9.87	90.07	0.06
9	8.96	90.90	0.15
10	43.99	30.62	25.39
11	44.71	45.72	9.57
12	18.53	69.17	12.30
13	23.14	39.87	36.98
14	84.70	14.79	0.52
15	47.13	48.63	4.25
16	57.20	42.79	0.01
17	52.57	47.21	0.22
18	50.16	49.78	0.06
19	90.90	9.08	0.02
20	20.53	76.54	2.93
21	72.15	22.97	4.88
22	37.72	62.23	0.05
23	7.61	0.22	92.17
24	49.39	50.60	0.01
25	42.15	57.85	0.00

MODAL EFFECTIVE MASS FACTORS:

Mode	X-Dir		Y-Dir		Rotation	
	%Mass	%SumM	%Mass	%SumM	%Mass	%SumM
1	33.55	33.55	5.63	5.63	0.24	0.24
2	9.41	42.96	52.49	58.12	0.00	0.24
3	18.48	61.44	3.22	61.34	1.39	1.63

4	0.41	61.85	1.30	62.64	1.32	2.95
5	0.03	61.87	1.32	63.96	0.11	3.07
6	0.06	61.94	0.25	64.21	2.93	6.00
7	1.79	63.73	0.16	64.37	0.25	6.25
8	0.94	64.67	7.05	71.42	0.03	6.28
9	0.58	65.25	0.28	71.70	0.09	6.37
10	4.57	69.82	0.57	72.26	15.17	21.54
11	3.37	73.19	0.36	72.63	5.90	27.44
12	0.45	73.64	0.75	73.38	7.44	34.88
13	0.00	73.65	0.02	73.40	22.38	57.26
14	0.11	73.75	0.01	73.41	0.30	57.56
15	0.01	73.76	0.00	73.41	2.60	60.17
16	0.00	73.76	0.00	73.41	0.00	60.17
17	0.00	73.76	0.00	73.41	0.13	60.30
18	0.00	73.76	0.00	73.41	0.04	60.34
19	0.00	73.77	0.02	73.43	0.01	60.35
20	5.11	78.87	20.12	93.55	1.33	61.68
21	18.96	97.83	6.11	99.66	1.76	63.44
22	0.00	97.83	0.03	99.69	0.03	63.47
23	2.07	99.91	0.06	99.75	36.52	99.99
24	0.00	99.91	0.01	99.76	0.01	100.00
25	0.00	99.91	0.01	99.77	0.00	100.00

MODE SHAPES:

Mode Shapes for Rigid Diaphragms:

Story	Diaph. #	Dir	Mode 1	Mode 2	Mode 3
LEVEL 02	1	X	1.353305E-01	8.072594E-02	-1.387061E-01
		Y	1.697909E-02	-1.994834E-01	-1.091441E-01
		R	7.268165E-05	1.248230E-06	1.704406E-04
LEVEL 01	1	X	4.477684E-03	3.325171E-03	-4.160580E-03
		Y	-8.881081E-04	-5.468282E-03	-3.146860E-03
		R	-7.265212E-08	-8.818832E-07	4.059800E-06

Story	Diaph. #	Dir	Mode 4	Mode 5	Mode 6
LEVEL 02	1	X	2.503267E-02	2.030127E-02	4.251670E-02
		Y	9.371003E-02	1.137502E-01	8.820772E-02
		R	1.672692E-04	-4.878298E-05	-2.482228E-04
LEVEL 01	1	X	7.943684E-04	2.372582E-04	1.188194E-03

		Y	1.130523E-03	3.716656E-03	4.589034E-03
		R	2.230042E-06	-1.216548E-06	-5.097273E-06
Story	Diaph. #	Dir	Mode 7	Mode 8	Mode 9
LEVEL 02	1	X	-1.734268E-01	-1.516640E-01	-1.323246E-01
		Y	-5.333617E-02	4.770586E-01	-1.530328E-01
		R	7.079885E-05	-2.749421E-05	4.287210E-05
LEVEL 01	1	X	-6.920874E-03	-8.311076E-03	-4.396507E-03
		Y	-1.008244E-03	1.747697E-02	-4.648579E-03
		R	3.537177E-06	3.316323E-06	1.926612E-06
Story	Diaph. #	Dir	Mode 10	Mode 11	Mode 12
LEVEL 02	1	X	-3.569156E-01	3.964767E-01	1.912964E-01
		Y	-1.921116E-01	-1.884888E-01	2.190468E-01
		R	-5.669215E-04	-3.478530E-04	-3.945312E-04
LEVEL 01	1	X	-1.241367E-02	1.673794E-02	6.696200E-03
		Y	4.780403E-04	-6.709901E-03	9.967588E-03
		R	-8.281261E-06	-1.307252E-05	-9.453259E-06
Story	Diaph. #	Dir	Mode 13	Mode 14	Mode 15
LEVEL 02	1	X	7.504410E-03	1.377836E-01	4.590377E-02
		Y	4.262622E-02	-2.254069E-02	1.099096E-02
		R	-6.841086E-04	8.095577E-05	-2.317558E-04
LEVEL 01	1	X	1.535465E-03	6.430996E-03	3.452486E-03
		Y	6.003483E-03	-3.390185E-03	1.384436E-03
		R	-1.634353E-05	-7.517859E-07	-7.828760E-06
Story	Diaph. #	Dir	Mode 16	Mode 17	Mode 18
LEVEL 02	1	X	-1.739329E-02	5.183244E-03	4.492717E-03
		Y	9.219608E-03	-1.681288E-02	8.464561E-03
		R	-1.072226E-05	5.222410E-05	-2.859776E-05
LEVEL 01	1	X	-1.701159E-03	7.721325E-04	1.944455E-03
		Y	2.068675E-03	-3.857264E-03	-1.718404E-03
		R	1.372343E-06	5.797941E-07	-2.554414E-06
Story	Diaph. #	Dir	Mode 19	Mode 20	Mode 21

LEVEL 02	1	X	-3.606510E-03	-1.508780E-02	-2.062644E-02
		Y	-9.293396E-04	2.062905E-02	-7.413610E-03
		R	1.516786E-05	-7.944567E-06	1.395480E-05
LEVEL 01	1	X	6.102137E-03	3.186839E-01	5.976490E-01
		Y	-1.639865E-02	-6.023984E-01	3.287070E-01
		R	-4.354081E-06	-2.286023E-04	-2.949176E-04

Story	Diaph. #	Dir	Mode 22	Mode 23	Mode 24
LEVEL 02	1	X	-1.057159E-02	-2.303185E-03	1.229623E-03
		Y	-3.200396E-03	6.203077E-04	1.688110E-03
		R	2.496800E-05	-2.012489E-05	-1.340905E-05
LEVEL 01	1	X	5.831402E-03	1.393237E-01	-3.249100E-03
		Y	-2.310594E-02	-3.153486E-02	1.366469E-02
		R	2.034406E-06	1.283459E-03	3.197008E-06

Story	Diaph. #	Dir	Mode 25
LEVEL 02	1	X	-1.356418E-03
		Y	2.146054E-03
		R	-6.089149E-06
LEVEL 01	1	X	2.905014E-03
		Y	-1.324364E-02
		R	-1.584586E-06

Note 1: Mode shapes are normalized with respect to building mass matrix: Qi^T x M x Qi = 1 where Qi: ith mode shape and M is the building mass matrix.
Normalized mode shapes are consistent with units of "kip" and "in".

Note 2: Mode shapes for meshed diaphragms are not included by default.
Turn on "Include Results for All Nodes" to include mode shapes for meshed diaphragms.
This may substantionally increase the length of the report for large models.

Note 3: The model includes one or more Flexible or Pseudo-flexible diaphragm. The Eigenvalue analysis results may represent member local modes rather than story modes.

Load Case: DYN Dyn_ASCE716_CQC_Y_+E

FREQUENCIES AND PERIODS:

Mode	Period (T)	Cyclic Frequency (f)	Circular Frequency (ω)	Eigenvalue
	sec	Hz	rad/sec	(rad/sec)**2

1	0.4860	2.0576	12.9286	167.1482
2	0.4554	2.1958	13.7964	190.3416
3	0.4190	2.3866	14.9955	224.8646
4	0.3006	3.3264	20.9002	436.8200
5	0.2401	4.1644	26.1660	684.6588
6	0.2034	4.9152	30.8833	953.7799
7	0.1853	5.3957	33.9020	1149.3449
8	0.1748	5.7198	35.9385	1291.5768
9	0.1688	5.9241	37.2220	1385.4750
10	0.1572	6.3620	39.9734	1597.8767
11	0.1524	6.5608	41.2227	1699.3102
12	0.1317	7.5958	47.7257	2277.7392
13	0.1146	8.7225	54.8054	3003.6265
14	0.0945	10.5835	66.4983	4422.0176
15	0.0817	12.2378	76.8922	5912.4134
16	0.0687	14.5565	91.4613	8365.1659
17	0.0548	18.2455	114.6397	13142.2700
18	0.0523	19.1305	120.2005	14448.1530
19	0.0471	21.2497	133.5157	17826.4466
20	0.0444	22.5228	141.5148	20026.4475
21	0.0351	28.5180	179.1838	32106.8204
22	0.0295	33.9477	213.2995	45496.6895
23	0.0248	40.2903	253.1513	64085.5606
24	0.0168	59.6652	374.8875	140540.6697
25	0.0100	99.8597	627.4372	393677.4334

MODAL PARTICIPATION FACTORS:

Mode	X-Dir	Y-Dir	Rotation
1	7.8693	18.0431	6.0285
2	23.4599	-10.6346	-2.2420
3	-6.7343	-14.5551	10.0137
4	1.6286	4.3673	11.7062
5	-0.4040	-3.4602	1.9605
6	-1.2300	-1.6714	14.4757
7	-4.8596	-0.2110	6.5544
8	-0.0893	8.9090	20.3863
9	1.2549	1.3974	10.1652
10	-6.5528	1.9646	-38.2599
11	7.3501	0.5762	-23.0476
12	0.9037	2.9095	-11.0446

13	0.1962	-1.9878	46.8850
14	1.1369	-0.2082	4.5282
15	-0.0653	-0.2833	15.4198
16	-0.1253	0.1991	-1.5461
17	0.0542	-0.1680	3.4672
18	-0.0068	0.0737	-1.6056
19	-0.2054	0.2367	1.5622
20	-7.8270	14.1121	16.0829
21	13.8984	8.9065	-10.6238
22	-0.1908	-0.0182	1.4484
23	4.8763	-1.9709	57.8647
24	0.1219	-0.0299	-0.7503
25	0.1125	-0.0371	0.5293

MODAL DIRECTION FACTORS:

Mode	X-Dir	Y-Dir	Rotation
1	12.60	86.75	0.65
2	83.27	16.64	0.08
3	10.23	88.00	1.78
4	34.41	63.14	2.45
5	66.73	33.20	0.07
6	2.42	93.88	3.71
7	97.22	2.04	0.73
8	0.91	91.82	7.27
9	6.86	91.31	1.83
10	38.34	35.44	26.22
11	65.02	25.79	9.19
12	18.05	79.77	2.18
13	11.67	49.46	38.86
14	93.54	6.08	0.38
15	42.50	53.35	4.15
16	61.96	37.99	0.05
17	55.71	44.07	0.22
18	41.10	58.86	0.05
19	67.39	32.58	0.03
20	22.97	70.90	6.14
21	68.78	27.78	3.43
22	52.75	47.23	0.02
23	8.24	1.39	90.37
24	44.63	55.36	0.01

25	40.00	59.99	0.01

MODAL EFFECTIVE MASS FACTORS:

Mode	X-Dir		Y-Dir		Rotation	
	%Mass	%SumM	%Mass	%SumM	%Mass	%SumM
1	5.81	5.81	30.55	30.55	0.39	0.39
2	51.65	57.46	10.61	41.17	0.05	0.44
3	4.26	61.72	19.88	61.05	1.07	1.51
4	0.25	61.97	1.79	62.84	1.46	2.97
5	0.02	61.98	1.12	63.96	0.04	3.02
6	0.14	62.12	0.26	64.22	2.24	5.25
7	2.22	64.34	0.00	64.23	0.46	5.71
8	0.00	64.34	7.45	71.68	4.44	10.15
9	0.15	64.49	0.18	71.86	1.10	11.25
10	4.03	68.52	0.36	72.22	15.62	26.87
11	5.07	73.59	0.03	72.25	5.67	32.54
12	0.08	73.66	0.79	73.05	1.30	33.84
13	0.00	73.67	0.37	73.42	23.46	57.30
14	0.12	73.79	0.00	73.42	0.22	57.52
15	0.00	73.79	0.01	73.43	2.54	60.06
16	0.00	73.79	0.00	73.43	0.03	60.09
17	0.00	73.79	0.00	73.44	0.13	60.21
18	0.00	73.79	0.00	73.44	0.03	60.24
19	0.00	73.80	0.01	73.44	0.03	60.27
20	5.75	79.54	18.69	92.13	2.76	63.03
21	18.13	97.67	7.44	99.57	1.20	64.23
22	0.00	97.68	0.00	99.57	0.02	64.25
23	2.23	99.91	0.36	99.94	35.74	99.99
24	0.00	99.91	0.00	99.94	0.01	100.00
25	0.00	99.91	0.00	99.94	0.00	100.00

MODE SHAPES:

Mode Shapes for Rigid Diaphragms:

Story	Diaph. #	Dir	Mode 1	Mode 2	Mode 3
LEVEL 02	1	X	5.047515E-02	1.903261E-01	-7.114044E-02
		Y	8.893230E-02	-9.209469E-02	-1.955404E-01
		R	9.080984E-05	-3.232674E-05	1.500085E-04
LEVEL 01	1	X	1.435004E-03	6.612361E-03	-1.640592E-03
		Y	1.276515E-03	-3.189080E-03	-5.544610E-03
		R	1.090405E-06	-2.446003E-06	2.986503E-06

Story	Diaph. #	Dir	Mode 4	Mode 5	Mode 6
LEVEL 02	1	X	1.729754E-02	-1.567823E-02	-5.514506E-02
		Y	1.082047E-01	-1.052138E-01	-9.833459E-02
		R	1.760367E-04	2.924744E-05	2.165883E-04
LEVEL 01	1	X	4.476437E-04	-9.834523E-05	-1.667944E-03
		Y	1.558736E-03	-3.320420E-03	-4.385885E-03
		R	2.538573E-06	7.570655E-07	4.687582E-06

Story	Diaph. #	Dir	Mode 7	Mode 8	Mode 9
LEVEL 02	1	X	-1.958859E-01	-1.632262E-02	5.570555E-02
		Y	-2.025404E-03	4.951027E-01	1.368944E-01
		R	9.629362E-05	3.033437E-04	1.522799E-04
LEVEL 01	1	X	-8.094593E-03	-3.537524E-03	1.375160E-03
		Y	7.201077E-04	1.466126E-02	3.151522E-03
		R	4.628255E-06	8.972820E-06	3.028266E-06

Story	Diaph. #	Dir	Mode 10	Mode 11	Mode 12
LEVEL 02	1	X	-3.516869E-01	4.643118E-01	8.151445E-02
		Y	1.031494E-01	1.982976E-02	2.347390E-01
		R	-5.761348E-04	-3.408674E-04	-1.660235E-04
LEVEL 01	1	X	-1.378259E-02	1.836245E-02	1.739456E-03
		Y	1.044455E-02	-2.439798E-04	9.828397E-03
		R	-7.186487E-06	-1.307600E-05	-2.486494E-06

Story	Diaph. #	Dir	Mode 13	Mode 14	Mode 15
LEVEL 02	1	X	-4.594986E-03	1.501881E-01	-7.922303E-03
		Y	-2.283910E-01	-1.669931E-02	-4.288352E-02
		R	7.012767E-04	6.966274E-05	2.290395E-04
LEVEL 01	1	X	-3.873832E-04	7.081375E-03	-1.744528E-03
		Y	-1.320121E-02	-2.931054E-03	-2.865351E-03
		R	1.549849E-05	-1.233427E-06	7.358747E-06

Story	Diaph. #	Dir	Mode 16	Mode 17	Mode 18
LEVEL 02	1	X	-1.904704E-02	9.231633E-03	1.746068E-03

		Y	1.781335E-02	-1.921139E-02	8.510774E-03
		R	-2.476268E-05	5.279501E-05	-2.450519E-05
LEVEL 01	1	X	-2.187915E-03	1.431411E-03	-6.424340E-04
		Y	3.414614E-03	-4.742152E-03	2.085676E-03
		R	1.800669E-06	-1.734558E-07	1.605889E-07

Story	Diaph. #	Dir	Mode 19	Mode 20	Mode 21
LEVEL 02	1	X	-5.052968E-04	1.805173E-02	-1.916096E-02
		Y	-4.294394E-03	-2.212937E-02	-9.784411E-03
		R	1.796283E-05	9.951538E-06	1.369809E-05
LEVEL 01	1	X	-8.227510E-03	-3.291865E-01	5.723992E-01
		Y	9.432042E-03	5.557524E-01	3.819478E-01
		R	8.148534E-06	3.310017E-04	-2.472770E-04

Story	Diaph. #	Dir	Mode 22	Mode 23	Mode 24
LEVEL 02	1	X	-4.060694E-03	-4.016674E-03	-2.819091E-03
		Y	-2.073339E-03	4.318599E-03	6.827782E-04
		R	1.612657E-05	-2.079553E-05	-8.454329E-06
LEVEL 01	1	X	-7.795024E-03	1.982809E-01	5.218157E-03
		Y	-1.447064E-03	-1.782782E-01	-1.108129E-03
		R	8.300405E-06	1.270845E-03	-4.158410E-06

Story	Diaph. #	Dir	Mode 25
LEVEL 02	1	X	-7.150940E-04
		Y	-5.973903E-03
		R	1.152139E-05
LEVEL 01	1	X	4.851257E-03
		Y	-7.805535E-04
		R	-4.916349E-06

Note 1: Mode shapes are normalized with respect to building mass matrix: Qi^T x M x Qi = 1 where Qi: ith mode shape and M is the building mass matrix.
Normalized mode shapes are consistent with units of "kip" and "in".

Note 2: Mode shapes for meshed diaphragms are not included by default.
Turn on "Include Results for All Nodes" to include mode shapes for meshed diaphragms.
This may substantionally increase the length of the report for large models.

Note 3: The model includes one or more Flexible or Pseudo-flexible diaphragm. The Eigenvalue analysis results may represent member local modes rather than story modes.

Load Case: DYN Dyn_ASCE716_CQC_Y_-E

FREQUENCIES AND PERIODS:

Mode	Period (T) sec	Cyclic Frequency (f) Hz	Circular Frequency (ω) rad/sec	Eigenvalue (rad/sec)**2
1	0.4671	2.1409	13.4520	180.9559
2	0.4564	2.1911	13.7669	189.5280
3	0.4284	2.3341	14.6654	215.0751
4	0.3007	3.3254	20.8944	436.5759
5	0.2408	4.1532	26.0953	680.9645
6	0.2055	4.8661	30.5747	934.8125
7	0.1855	5.3910	33.8727	1147.3613
8	0.1732	5.7742	36.2807	1316.2870
9	0.1628	6.1428	38.5962	1489.6663
10	0.1548	6.4597	40.5875	1647.3471
11	0.1493	6.6966	42.0758	1770.3712
12	0.1388	7.2055	45.2737	2049.7042
13	0.1184	8.4470	53.0742	2816.8723
14	0.0942	10.6142	66.6911	4447.7019
15	0.0889	11.2514	70.6946	4997.7237
16	0.0702	14.2457	89.5082	8011.7195
17	0.0586	17.0650	107.2223	11496.6195
18	0.0504	19.8487	124.7133	15553.4098
19	0.0488	20.5094	128.8645	16606.0520
20	0.0423	23.6360	148.5096	22055.1006
21	0.0365	27.4037	172.1827	29646.8904
22	0.0298	33.5530	210.8196	44444.9082
23	0.0250	39.9531	251.0327	63017.3933
24	0.0167	59.9157	376.4617	141723.4119
25	0.0098	101.9750	640.7278	410532.0922

MODAL PARTICIPATION FACTORS:

Mode	X-Dir	Y-Dir	Rotation
1	15.7160	-15.8601	5.4561
2	17.3975	18.6326	-2.4638
3	10.3855	-7.6223	-11.1511
4	1.6473	3.2914	10.5950
5	-0.3982	-3.7349	4.6908

6	1.0380	1.7428	-18.9020
7	-4.4773	-1.1596	5.0093
8	3.2619	-7.9676	13.5680
9	-1.4465	1.9790	11.3975
10	-8.7136	-3.1266	-19.8179
11	3.5749	-3.8299	-24.5468
12	1.3414	1.6833	-37.1352
13	-0.5020	-1.1653	-45.4986
14	-1.1162	0.1721	-4.0560
15	-0.1123	-0.0929	13.5363
16	-0.1160	0.1535	-2.7817
17	0.0516	-0.1161	2.9046
18	0.0727	-0.0349	-1.8605
19	-0.0568	0.0747	0.8732
20	7.6940	-14.4980	-7.9416
21	-13.5482	-8.1959	19.6226
22	0.0976	0.0832	1.4703
23	5.9021	0.9814	57.1261
24	0.0079	-0.0543	-0.6791
25	0.0135	-0.0676	0.4378

MODAL DIRECTION FACTORS:

Mode	X-Dir	Y-Dir	Rotation
1	40.12	59.34	0.54
2	45.98	53.92	0.10
3	20.18	77.62	2.20
4	35.45	62.54	2.01
5	61.44	38.17	0.39
6	4.52	89.15	6.33
7	95.45	4.12	0.43
8	10.86	85.80	3.33
9	7.68	90.04	2.28
10	72.81	20.05	7.13
11	23.87	65.63	10.50
12	10.69	64.96	24.34
13	18.99	44.55	36.46
14	91.78	7.91	0.31
15	40.77	56.02	3.20
16	56.89	42.97	0.14
17	52.07	47.78	0.15

18	53.45	46.50	0.05
19	93.71	6.28	0.01
20	22.87	75.70	1.43
21	65.63	23.46	10.91
22	45.62	54.35	0.03
23	12.06	0.35	87.60
24	44.39	55.60	0.01
25	44.66	55.33	0.00

MODAL EFFECTIVE MASS FACTORS:

Mode	X-Dir		Y-Dir		Rotation	
	%Mass	%SumM	%Mass	%SumM	%Mass	%SumM
1	23.18	23.18	23.61	23.61	0.32	0.32
2	28.40	51.58	32.58	56.19	0.06	0.38
3	10.12	61.71	5.45	61.64	1.33	1.71
4	0.25	61.96	1.02	62.66	1.20	2.91
5	0.01	61.98	1.31	63.97	0.23	3.14
6	0.10	62.08	0.29	64.25	3.81	6.96
7	1.88	63.96	0.13	64.38	0.27	7.22
8	1.00	64.96	5.96	70.33	1.96	9.19
9	0.20	65.15	0.37	70.70	1.39	10.57
10	7.13	72.28	0.92	71.62	4.19	14.77
11	1.20	73.48	1.38	73.00	6.43	21.20
12	0.17	73.65	0.27	73.26	14.72	35.92
13	0.02	73.67	0.13	73.39	22.09	58.01
14	0.12	73.79	0.00	73.39	0.18	58.18
15	0.00	73.79	0.00	73.39	1.96	60.14
16	0.00	73.79	0.00	73.40	0.08	60.22
17	0.00	73.79	0.00	73.40	0.09	60.31
18	0.00	73.79	0.00	73.40	0.04	60.35
19	0.00	73.79	0.00	73.40	0.01	60.36
20	5.56	79.35	19.73	93.12	0.67	61.03
21	17.23	96.57	6.30	99.43	4.11	65.14
22	0.00	96.57	0.00	99.43	0.02	65.16
23	3.27	99.84	0.09	99.52	34.83	99.99
24	0.00	99.84	0.00	99.52	0.00	100.00
25	0.00	99.84	0.00	99.52	0.00	100.00

MODE SHAPES:

Mode Shapes for Rigid Diaphragms:

Story	Diaph. #	Dir	Mode 1	Mode 2	Mode 3

LEVEL 02	1	X	1.161502E-01	1.405118E-01	1.029889E-01
		Y	-1.628691E-01	1.505587E-01	-1.571335E-02
		R	8.276269E-05	-3.610407E-05	-1.667411E-04
LEVEL 01	1	X	4.420685E-03	4.172233E-03	3.383758E-03
		Y	-5.348757E-03	3.207773E-03	2.156031E-04
		R	1.751722E-07	-1.870400E-06	-3.757908E-06

Story	Diaph. #	Dir	Mode 4	Mode 5	Mode 6
LEVEL 02	1	X	1.832933E-02	-1.713289E-02	4.927477E-02
		Y	8.620467E-02	-1.104424E-01	8.492530E-02
		R	1.594668E-04	7.008881E-05	-2.830049E-04
LEVEL 01	1	X	6.034554E-04	-1.736938E-04	1.514251E-03
		Y	9.940247E-04	-3.844044E-03	4.885162E-03
		R	2.099220E-06	1.654368E-06	-5.851459E-06

Story	Diaph. #	Dir	Mode 7	Mode 8	Mode 9
LEVEL 02	1	X	-1.782640E-01	1.458682E-01	-8.536958E-02
		Y	-4.444383E-02	-4.224429E-01	7.975056E-02
		R	7.342958E-05	2.054539E-04	1.696736E-04
LEVEL 01	1	X	-7.195523E-03	7.571748E-03	-3.825991E-03
		Y	-7.248045E-04	-1.694141E-02	1.831089E-03
		R	3.768536E-06	9.382823E-07	4.900960E-06

Story	Diaph. #	Dir	Mode 10	Mode 11	Mode 12
LEVEL 02	1	X	-5.042214E-01	2.425346E-01	1.197312E-01
		Y	-2.431302E-01	-3.475565E-01	9.612532E-02
		R	-3.005252E-04	-3.644827E-04	-5.550021E-04
LEVEL 01	1	X	-1.826756E-02	1.144905E-02	4.815065E-03
		Y	-2.148530E-03	-1.065748E-02	7.212010E-03
		R	-7.585927E-07	-1.188983E-05	-1.290103E-05

Story	Diaph. #	Dir	Mode 13	Mode 14	Mode 15
LEVEL 02	1	X	-2.788368E-02	-1.483901E-01	-1.565162E-02
		Y	-1.405707E-01	5.775462E-03	1.070357E-02
		R	-6.792227E-04	-6.255796E-05	2.012037E-04

LEVEL 01	1	X	1.302568E-03	-6.977404E-03	-1.904633E-03
		Y	-4.051412E-04	2.593775E-03	-1.109433E-03
		R	-1.690114E-05	1.329281E-06	6.260494E-06

Story	Diaph. #	Dir	Mode 16	Mode 17	Mode 18
LEVEL 02	1	X	-2.000726E-02	1.127725E-02	6.752799E-03
		Y	8.300367E-03	-1.347702E-02	2.376857E-03
		R	-4.243396E-05	4.362341E-05	-2.620808E-05
LEVEL 01	1	X	-1.563629E-03	9.384344E-04	2.138696E-03
		Y	2.401391E-03	-3.081973E-03	-1.041833E-03
		R	2.494150E-07	7.077177E-07	-2.903590E-06

Story	Diaph. #	Dir	Mode 19	Mode 20	Mode 21
LEVEL 02	1	X	-2.997150E-04	-1.464582E-02	2.013666E-02
		Y	-2.261473E-03	1.892493E-02	5.976514E-03
		R	1.219412E-05	-7.491315E-06	-1.438656E-05
LEVEL 01	1	X	-2.042783E-03	3.219923E-01	-5.593431E-01
		Y	3.247779E-03	-6.086404E-01	-2.998867E-01
		R	1.513398E-06	-1.598056E-04	4.413162E-04

Story	Diaph. #	Dir	Mode 22	Mode 23	Mode 24
LEVEL 02	1	X	-3.353731E-03	-4.706610E-03	-2.346554E-04
		Y	-2.537906E-03	-3.159627E-03	2.050759E-03
		R	1.878489E-05	-1.815757E-05	-1.126780E-05
LEVEL 01	1	X	4.072826E-03	2.398868E-01	3.042442E-04
		Y	3.729358E-03	1.358781E-01	-2.669516E-03
		R	5.015530E-06	1.251274E-03	1.343913E-06

Story	Diaph. #	Dir	Mode 25
LEVEL 02	1	X	1.324413E-03
		Y	1.483141E-03
		R	7.028932E-06
LEVEL 01	1	X	6.509772E-04
		Y	-2.826991E-03
		R	-5.333100E-07

Note 1: Mode shapes are normalized with respect to building mass matrix: Qi^T x M x Qi = 1 where Qi: ith mode shape and M is the building mass matrix.
Normalized mode shapes are consistent with units of "kip" and "in".

Note 2: Mode shapes for meshed diaphragms are not included by default.
Turn on "Include Results for All Nodes" to include mode shapes for meshed diaphragms.
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Note 3: The model includes one or more Flexible or Pseudo-flexible diaphragm. The Eigenvalue analysis results may represent member local modes rather than story modes.

HNT Pk-12

Story Drifts

JDJ / PCS / May 13, 2025

	MRSA
+X	Dyn1
-X	Dyn2
+Y	Dyn3
-Y	Dyn4

Drift Limit	1.50%

Cd:	5
Ie:	1.25

FRAME 1

				DISPLACEMENT		INELASTIC Δ		DRIFT	
LEVEL	HEIGHT	NODE	ORIENT	+e	-e	+e	-e	+e	-e
-	ft	-	-	in	in	in	in	-	-
ROOF	12	1	Y	0.54	0.65	2.17	2.61	0.73%	0.77%
LEVEL 3	12	17	Y	0.28	0.37	1.12	1.50	0.42%	0.54%
LEVEL 2	12	43	Y	0.13	0.18	0.51	0.72	0.36%	0.50%

FRAME 2

				DISPLACEMENT		INELASTIC Δ		DRIFT	
LEVEL	HEIGHT	NODE	ORIENT	+e	-e	+e	-e	+e	-e
-	ft	-	-	in	in	in	in	-	-
ROOF	12	6	Y	0.33	0.44	1.32	1.77	0.19%	0.24%
LEVEL 3	12	24	Y	0.26	0.36	1.05	1.43	0.39%	0.54%
LEVEL 2	12	50	Y	0.12	0.16	0.49	0.65	0.33%	0.43%
LEVEL 1	12	81	Y	0.00	0.00	0.02	0.02	0.01%	0.01%

FRAME 3

				DISPLACEMENT		INELASTIC Δ		DRIFT	
LEVEL	HEIGHT	NODE	ORIENT	+e	-e	+e	-e	+e	-e
-	ft	-	-	in	in	in	in	-	-
ROOF	12	4	X	0.54	0.55	2.14	2.20	0.41%	0.41%
LEVEL 3	12	21	X	0.39	0.40	1.55	1.60	0.54%	0.55%
LEVEL 2	12	47	X	0.19	0.20	0.78	0.80	0.54%	0.56%

FRAME 4

				DISPLACEMENT		INELASTIC Δ		DRIFT	
LEVEL	HEIGHT	NODE	ORIENT	+e	-e	+e	-e	+e	-e
-	ft	-	-	in	in	in	in	-	-
ROOF	12	10	X	0.64	0.62	2.56	2.47	0.50%	0.48%
LEVEL 3	12	29	X	0.46	0.45	1.85	1.78	0.71%	0.69%
LEVEL 2	12	55	X	0.21	0.20	0.83	0.79	0.56%	0.53%
LEVEL 1	12	88	X	0.01	0.01	0.03	0.03	0.02%	0.02%

FRAME 5

				DISPLACEMENT		INELASTIC Δ		DRIFT	
LEVEL	HEIGHT	NODE	ORIENT	+e	-e	+e	-e	+e	-e
-	ft	-	-	in	in	in	in	-	-
LEVEL 3	12	28	X	0.45	0.41	1.78	1.64	0.63%	0.59%
LEVEL 2	12	54	X	0.22	0.20	0.87	0.80	0.58%	0.53%
LEVEL 1	12	85	X	0.01	0.01	0.03	0.03	0.02%	0.02%

FRAME 6

				DISPLACEMENT		INELASTIC Δ		DRIFT	
LEVEL	HEIGHT	NODE	ORIENT	+e	-e	+e	-e	+e	-e
-	ft	-	-	in	in	in	in	-	-
LEVEL 3	12	33	Y	0.30	0.34	1.19	1.37	0.46%	0.53%
LEVEL 2	12	59	Y	0.13	0.15	0.53	0.60	0.36%	0.41%
LEVEL 1	12	94	Y	0.00	0.00	0.02	0.02	0.01%	0.01%

FRAME 7
ORIENTATION Y

				DISPLACEMENT		INELASTIC Δ		DRIFT	
LEVEL	HEIGHT	NODE	ORIENT	+e	-e	+e	-e	+e	-e
-	ft	-	-	in	in	in	in	-	-
ROOF	12	13	Y	0.38	0.40	1.52	1.61	1.05%	1.12%

FRAME 8
ORIENTATION Y

				DISPLACEMENT		INELASTIC Δ		DRIFT	
LEVEL	HEIGHT	NODE	ORIENT	+e	-e	+e	-e	+e	-e
-	ft	-	-	in	in	in	in	-	-
LEVEL 3	12	38	Y	0.38	0.31	1.53	1.26	0.63%	0.49%
LEVEL 2	12	64	Y	0.15	0.14	0.62	0.56	0.42%	0.38%
BASE	12	99	Y	0.00	0.00	0.02	0.02	0.01%	0.01%

FRAME 9
ORIENTATION Y

				DISPLACEMENT		INELASTIC Δ		DRIFT	
LEVEL	HEIGHT	NODE	ORIENT	+e	-e	+e	-e	+e	-e
-	ft	-	-	in	in	in	in	-	-
LEVEL 3	12	16	Y	0.72	0.43	2.87	1.72	0.49%	0.34%
LEVEL 2	12	39	Y	0.54	0.31	2.15	1.24	1.50%	0.86%
BASE	12	103	Y	0.00	0.00	0.00	0.00	0.00%	0.00%

HNT Pk-12

TORSIONAL IRREGULARITY CHECKS

JDJ / PCS / May 13, 2025

X-DIRECTION

ROOF

CASE: Dyn1 DIRECTION: X

	WEST EDGE		*EAST EDGE*	
NODE 1	1	**0.645**	15	**0.839**
NODE 2	2	**0.563**	16	**0.768**
MAX		0.645		0.839
AVG		0.604		0.803
MAX/AVG		1.07		1.04

CASE: Dyn2 DIRECTION: X

	WEST EDGE		*EAST EDGE*	
NODE 1	1	**0.634**	15	**0.849**
NODE 2	2	**0.547**	16	**0.743**
MAX		0.634		0.849
AVG		0.590		0.796
MAX/AVG		1.07		1.07

LEVEL 03

CASE: Dyn1 DIRECTION: X

	WEST EDGE		*EAST EDGE*	
NODE 1	24	**0.529**	39	**0.546**
NODE 2	28	**0.446**	42	**0.527**
MAX		0.529		0.546
AVG		0.487		0.536
MAX/AVG		1.09		1.02

CASE: Dyn2 DIRECTION: X

	WEST EDGE		*EAST EDGE*	
NODE 1	**24**	**0.569**	**39**	**0.553**
NODE 2	**28**	**0.410**	**42**	**0.489**
MAX		0.569		0.553
AVG		0.489		0.521
MAX/AVG		1.16		1.06

Y-DIRECTION

ROOF

CASE: Dyn3 DIRECTION: Y

	SOUTH EDGE		*NORTH EDGE*	
NODE 1	3	**0.441**	9	**0.398**
NODE 2	5	**0.439**	11	**0.417**
MAX		0.441		0.417
AVG		0.440		0.408
MAX/AVG		1.00		1.02

CASE: Dyn4 DIRECTION: Y

	SOUTH EDGE		*NORTH EDGE*	
NODE 1	3	**0.604**	9	**0.551**
NODE 2	5	**0.615**	11	**0.527**
MAX		0.615		0.551
AVG		0.609		0.539
MAX/AVG		1.01		1.02

LEVEL 03

CASE: Dyn3 DIRECTION: Y

	SOUTH EDGE		*NORTH EDGE*	
NODE 1	17	**0.279**	19	**0.275**
NODE 2	39	**0.538**	42	**0.542**
MAX		0.538		0.542
AVG		0.409		0.409
MAX/AVG		1.32		1.33

-> Amplify eccentricity 22%, 6.1% offset

CASE: Dyn4 DIRECTION: Y

	SOUTH EDGE		*NORTH EDGE*	
NODE 1	**17**	**0.375**	**19**	**0.369**
NODE 2	**39**	**0.309**	**42**	**0.312**
MAX		0.375		0.369
AVG		0.342		0.340
MAX/AVG		1.10		1.08

LEVEL 02

CASE: Dyn1 **DIRECTION:** X

	WEST EDGE		*EAST EDGE*	
NODE 1	**43**	**0.204**	**63**	**0.197**
NODE 2	**45**	**0.213**	**65**	**0.204**
MAX		0.213		0.204
AVG		0.208		0.200
MAX/AVG		1.02		1.02

CASE: Dyn3 **DIRECTION:** Y

	SOUTH EDGE		*NORTH EDGE*	
NODE 1	**46**	**0.125**	**49**	**0.121**
NODE 2	**63**	**0.154**	**60**	**0.133**
MAX		0.154		0.133
AVG		0.140		0.127
MAX/AVG		1.11		1.04

CASE: Dyn2 **DIRECTION:** X

	WEST EDGE		*EAST EDGE*	
NODE 1	**43**	**0.198**	**63**	**0.200**
NODE 2	**45**	**0.198**	**65**	**0.198**
MAX		0.198		0.200
AVG		0.198		0.199
MAX/AVG		1.00		1.00

CASE: Dyn4 **DIRECTION:** Y

	SOUTH EDGE		*NORTH EDGE*	
NODE 1	**46**	**0.175**	**49**	**0.165**
NODE 2	**63**	**0.140**	**60**	**0.151**
MAX		0.175		0.165
AVG		0.158		0.158
MAX/AVG		1.11		1.04

LEVEL 01

CASE: Dyn1 **DIRECTION:** X

	WEST EDGE		*EAST EDGE*	
NODE 1	**69**	**0.006**	**92**	**0.006**
NODE 2	**77**	**0.008**	**99**	**0.008**
MAX		0.008		0.008
AVG		0.007		0.007
MAX/AVG		1.14		1.13

CASE: Dyn3 **DIRECTION:** Y

	SOUTH EDGE		*NORTH EDGE*	
NODE 1	**69**	**0.004**	**79**	**0.004**
NODE 2	**92**	**0.004**	**99**	**0.004**
MAX		0.004		0.004
AVG		0.004		0.004
MAX/AVG		1.07		1.07

CASE: Dyn2 **DIRECTION:** X

	WEST EDGE		*EAST EDGE*	
NODE 1	**69**	**0.006**	**92**	**0.006**
NODE 2	**77**	**0.008**	**99**	**0.008**
MAX		0.008		0.008
AVG		0.007		0.007
MAX/AVG		1.10		1.09

CASE: Dyn4 **DIRECTION:** Y

	SOUTH EDGE		*NORTH EDGE*	
NODE 1	**69**	**0.005**	**79**	**0.005**
NODE 2	**92**	**0.004**	**99**	**0.004**
MAX		0.005		0.005
AVG		0.005		0.005
MAX/AVG		1.06		1.04

Design Criteria

Code: **ASCE 7-16**
Procedure: **Ch. 27 Directional Procedure MWFRS**

Wind Speed: **105 mph**
Exposure: **C**
Risk Category: **III**

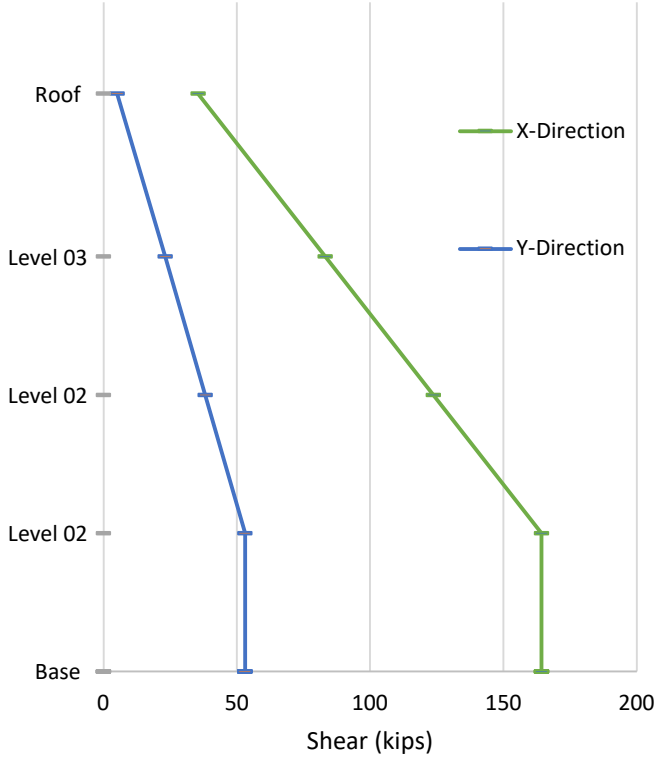
Base Shear - WIND LOAD

X-Direction		
Shear	**164**	***kips***
OTM	**4168**	***k-ft***

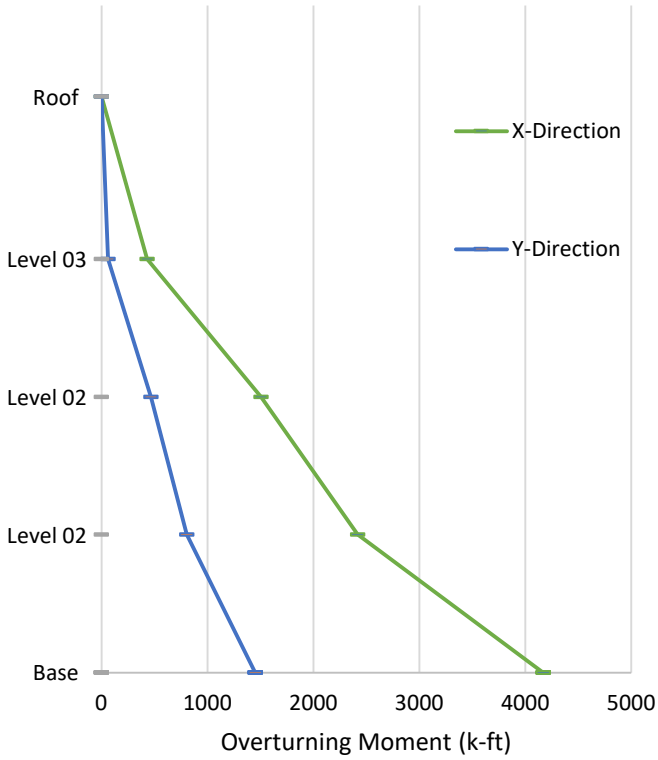
Y-Direction		
Shear	**53**	***kips***
OTM	**1451**	***k-ft***

- WIND LOAD << SEISMIC BASE SHEAR - SEISMIC BASE SHEAR CONTROLS

Cumulative Shear



Cumulative Overturning Moment



LATERAL DESIGN - BRB DESIGN

Load Combinations

LOAD COMBINATION CRITERIA:

Roof Live Load:	Unreducible
Live Load factor f1 (0.5 or 1.0)	0.500
Sds (for Ev)	0.931
RhoX	1.300
RhoY	1.300

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
Ln	NegLiveLoad	RAMUSER
Rfp	PosRoofLiveLoad	RAMUSER
Rfn	NegRoofLiveLoad	RAMUSER
E1	EQ	EQ_ASCE716_X_+E_F
E2	EQ	EQ_ASCE716_X_-E_F
E3	EQ	EQ_ASCE716_Y_+E_F
E4	EQ	EQ_ASCE716_Y_-E_F
Dyn1	DYN	Dyn_ASCE716_CQC_X_+E
Dyn2	DYN	Dyn_ASCE716_CQC_X_-E
Dyn3	DYN	Dyn_ASCE716_CQC_Y_+E
Dyn4	DYN	Dyn_ASCE716_CQC_Y_-E

LOAD COMBINATIONS: IBC 2021 / ASCE 7-16 LRFD

1	*	1.400 D
2	*	1.200 D + 1.600 Lp + 0.500 Rfp
3	*	1.200 D + 1.600 Ln + 0.500 Rfn
4	*	1.200 D + 1.600 Lp
5	*	1.200 D + 1.600 Ln
6	*	1.200 D + 0.500 Lp + 1.600 Rfp
7	*	1.200 D + 0.500 Ln + 1.600 Rfn
8	*	1.200 D + 1.600 Rfp
9	*	1.200 D + 1.600 Rfn
10	*	1.386 D + 0.500 Lp + 1.300 E1
11	*	1.386 D + 0.500 Lp + 1.300 E2
12	*	1.386 D + 0.500 Lp + 1.300 E3
13	*	1.386 D + 0.500 Lp + 1.300 E4
14	*	1.386 D + 0.500 Lp - 1.300 E1
15	*	1.386 D + 0.500 Lp - 1.300 E2
16	*	1.386 D + 0.500 Lp - 1.300 E3
17	*	1.386 D + 0.500 Lp - 1.300 E4

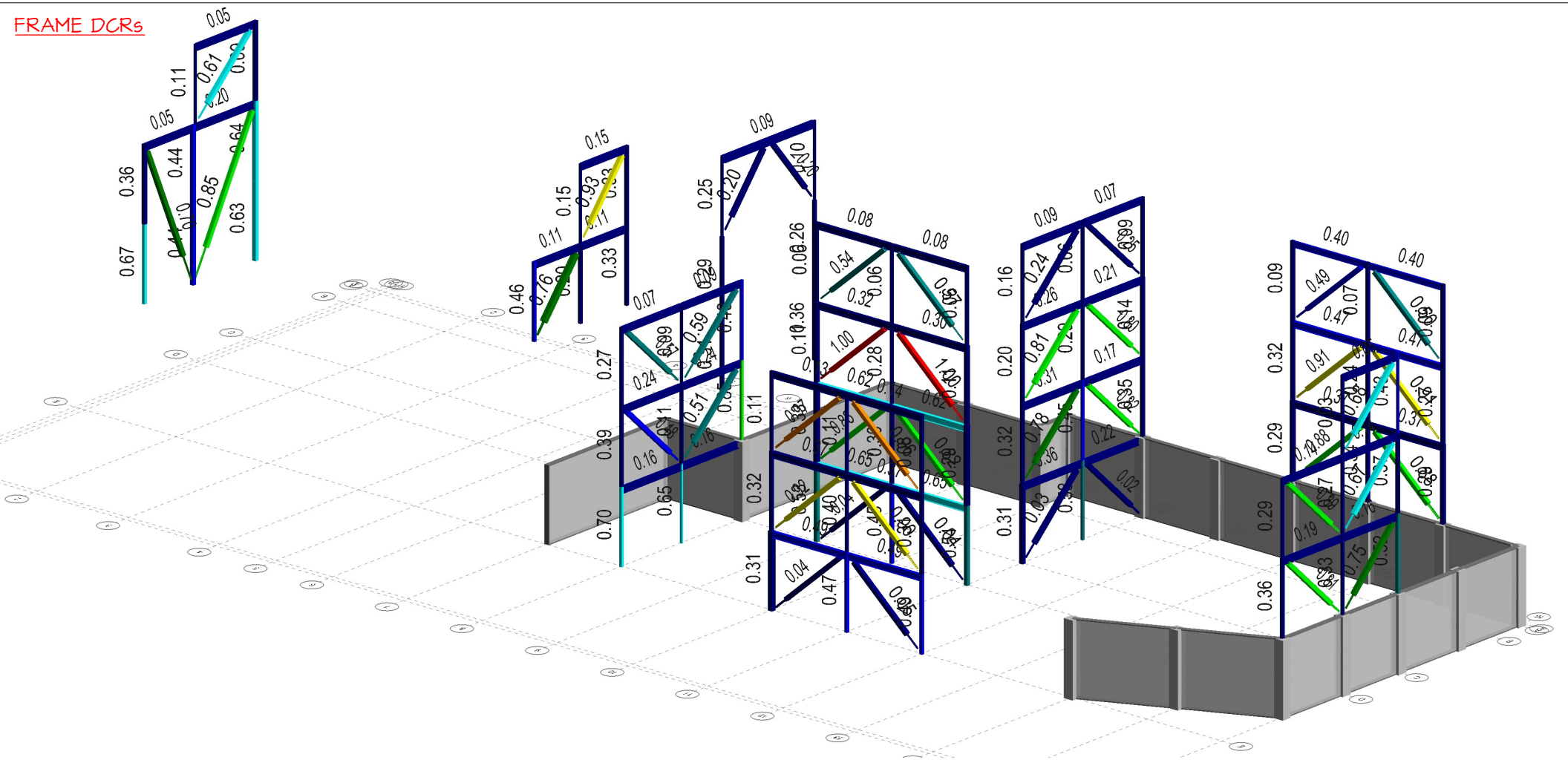
18	*	1.386 D + 0.500 Ln + 1.300 E1
19	*	1.386 D + 0.500 Ln + 1.300 E2
20	*	1.386 D + 0.500 Ln + 1.300 E3
21	*	1.386 D + 0.500 Ln + 1.300 E4
22	*	1.386 D + 0.500 Ln - 1.300 E1
23	*	1.386 D + 0.500 Ln - 1.300 E2
24	*	1.386 D + 0.500 Ln - 1.300 E3
25	*	1.386 D + 0.500 Ln - 1.300 E4
26	*	1.386 D + 1.300 E1
27	*	1.386 D + 1.300 E2
28	*	1.386 D + 1.300 E3
29	*	1.386 D + 1.300 E4
30	*	1.386 D - 1.300 E1
31	*	1.386 D - 1.300 E2
32	*	1.386 D - 1.300 E3
33	*	1.386 D - 1.300 E4
34	*	0.714 D + 1.300 E1
35	*	0.714 D + 1.300 E2
36	*	0.714 D + 1.300 E3
37	*	0.714 D + 1.300 E4
38	*	0.714 D - 1.300 E1
39	*	0.714 D - 1.300 E2
40	*	0.714 D - 1.300 E3
41	*	0.714 D - 1.300 E4
42	*	1.386 D + 0.500 Lp + 1.300 Dyn1
43	*	1.386 D + 0.500 Lp + 1.300 Dyn2
44	*	1.386 D + 0.500 Lp + 1.300 Dyn3
45	*	1.386 D + 0.500 Lp + 1.300 Dyn4
46	*	1.386 D + 0.500 Lp - 1.300 Dyn1
47	*	1.386 D + 0.500 Lp - 1.300 Dyn2
48	*	1.386 D + 0.500 Lp - 1.300 Dyn3
49	*	1.386 D + 0.500 Lp - 1.300 Dyn4
50	*	1.386 D + 0.500 Ln + 1.300 Dyn1
51	*	1.386 D + 0.500 Ln + 1.300 Dyn2
52	*	1.386 D + 0.500 Ln + 1.300 Dyn3
53	*	1.386 D + 0.500 Ln + 1.300 Dyn4
54	*	1.386 D + 0.500 Ln - 1.300 Dyn1
55	*	1.386 D + 0.500 Ln - 1.300 Dyn2
56	*	1.386 D + 0.500 Ln - 1.300 Dyn3

Load Combinations

57	*	1.386 D + 0.500 Ln - 1.300 Dyn4
58	*	1.386 D + 1.300 Dyn1
59	*	1.386 D + 1.300 Dyn2
60	*	1.386 D + 1.300 Dyn3
61	*	1.386 D + 1.300 Dyn4
62	*	1.386 D - 1.300 Dyn1
63	*	1.386 D - 1.300 Dyn2
64	*	1.386 D - 1.300 Dyn3
65	*	1.386 D - 1.300 Dyn4
66	*	0.714 D + 1.300 Dyn1
67	*	0.714 D + 1.300 Dyn2
68	*	0.714 D + 1.300 Dyn3
69	*	0.714 D + 1.300 Dyn4
70	*	0.714 D - 1.300 Dyn1
71	*	0.714 D - 1.300 Dyn2
72	*	0.714 D - 1.300 Dyn3
73	*	0.714 D - 1.300 Dyn4

* = Load combination currently selected to use

FRAME DCRs



Code Check Summary

CRITERIA:

Rigid End Zones:		Ignore Effects	
Member Force Output:		At Face of Joint	
P-Delta:	Yes	Scale Factor:	1.60
Ground Level:	Base		

Mesh Criteria :

Max. Distance Between Nodes on Mesh Line (ft) : 4.00
Merge Node Tolerance (in) : 0.0100
Geometry Tolerance (in) : 0.0050

Walls Out-of-plane Stiffness Included in Analysis.
Rotational Fixities Released at Wall Foundation Nodes.
Sign considered for Dynamic Load Case Results.
Rigid Links Included at Fixed Beam-to-Wall Locations
Eigenvalue Analysis : Ritz Vectors (Load Dependent)

LOAD COMBINATION CRITERIA:

Live Load factor f1 (0.5 or 1.0)	0.500
Sds (for Ev)	0.931
RhoX	1.300
RhoY	1.300

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
Ln	NegLiveLoad	RAMUSER
Rfp	PosRoofLiveLoad	RAMUSER
Rfn	NegRoofLiveLoad	RAMUSER
Dyn1	DYN	Dyn_ASCE716_CQC_X_+E
Dyn2	DYN	Dyn_ASCE716_CQC_X_-E
Dyn3	DYN	Dyn_ASCE716_CQC_Y_+E
Dyn4	DYN	Dyn_ASCE716_CQC_Y_-E

LOAD COMBINATIONS: IBC 2021 / ASCE 7-16 LRFD

1	*	1.400 D
2	*	1.200 D + 1.600 Lp + 0.500 Rfp
3	*	1.200 D + 1.600 Ln + 0.500 Rfn
4	*	1.200 D + 1.600 Lp
5	*	1.200 D + 1.600 Ln
6	*	1.200 D + 0.500 Lp + 1.600 Rfp
7	*	1.200 D + 0.500 Ln + 1.600 Rfn
8	*	1.200 D + 1.600 Rfp

9	*	1.200 D + 1.600 Rfn
10	*	1.386 D + 0.500 Lp + 1.300 Dyn1
11	*	1.386 D + 0.500 Lp + 1.300 Dyn2
12	*	1.386 D + 0.500 Lp + 1.300 Dyn3
13	*	1.386 D + 0.500 Lp + 1.300 Dyn4
14	*	1.386 D + 0.500 Lp - 1.300 Dyn1
15	*	1.386 D + 0.500 Lp - 1.300 Dyn2
16	*	1.386 D + 0.500 Lp - 1.300 Dyn3
17	*	1.386 D + 0.500 Lp - 1.300 Dyn4
18	*	1.386 D + 0.500 Ln + 1.300 Dyn1
19	*	1.386 D + 0.500 Ln + 1.300 Dyn2
20	*	1.386 D + 0.500 Ln + 1.300 Dyn3
21	*	1.386 D + 0.500 Ln + 1.300 Dyn4
22	*	1.386 D + 0.500 Ln - 1.300 Dyn1
23	*	1.386 D + 0.500 Ln - 1.300 Dyn2
24	*	1.386 D + 0.500 Ln - 1.300 Dyn3
25	*	1.386 D + 0.500 Ln - 1.300 Dyn4
26	*	1.386 D + 1.300 Dyn1
27	*	1.386 D + 1.300 Dyn2
28	*	1.386 D + 1.300 Dyn3
29	*	1.386 D + 1.300 Dyn4
30	*	1.386 D - 1.300 Dyn1
31	*	1.386 D - 1.300 Dyn2
32	*	1.386 D - 1.300 Dyn3
33	*	1.386 D - 1.300 Dyn4
34	*	0.714 D + 1.300 Dyn1
35	*	0.714 D + 1.300 Dyn2
36	*	0.714 D + 1.300 Dyn3
37	*	0.714 D + 1.300 Dyn4
38	*	0.714 D - 1.300 Dyn1
39	*	0.714 D - 1.300 Dyn2
40	*	0.714 D - 1.300 Dyn3
41	*	0.714 D - 1.300 Dyn4

* = Load combination currently selected to use

Frame #1:

Level: ROOF

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size

66	38.84	0.04	-0.39	0.00	-0.04	17	0.43 H1-1a	50	HSS4X4X5/16
67	2.82	0.06	0.99	0.00	0.08	13	0.03 H1-1b	50	HSS5X5X3/8

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
186	11.04	3.77	0.03	-2.13	-0.00	25	0.05 H1-1b	50	W12X30

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
28	46.74	0.00	0.00	0.00	0.00	13	0.68 Axial	38	CoreBRB_2.00

Level: LEVEL 03

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
61	90.74	-0.13	0.56	-0.01	-0.11	17	0.37 H1-1a	50	HSS6X6X3/8
62	48.06	0.00	0.00	0.11	-0.01	13	0.27 Axial	50	HSS5X5X3/8
79	43.92	-0.33	-1.61	0.17	-0.01	13	0.29 H1-1a	50	HSS5X5X3/8

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
173	-8.20	15.40	-0.41	6.97	-0.00	13	0.14 H1-1b	50	W12X30
174	26.49	0.00	0.00	2.55	0.22	13	0.14 Axial	50	W12X30

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
40	-60.70	0.00	0.00	0.00	0.00	13	0.89 Axial	38	CoreBRB_2.00
41	45.68	0.00	0.00	0.00	0.00	13	0.67 Axial	38	CoreBRB_2.00

Level: LEVEL 02

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
61	167.02	0.12	0.47	-0.07	0.05	17	0.52 H1-1a	50	HSS6X6X1/2
62	59.59	0.00	0.00	-0.00	-0.00	13	0.33 Axial	50	HSS5X5X3/8
79	113.04	0.13	0.82	-0.09	0.02	13	0.36 H1-1a	50	HSS6X6X1/2

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
173	0.00	21.82	0.00	-7.27	0.00	2	0.16 H1-1b	50	W12X30
174	0.00	25.60	0.00	-7.88	0.00	2	0.19 H1-1b	50	W12X30

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
41	76.45	0.00	0.00	0.00	0.00	13	0.75 Axial	38	CoreBRB_3.00

42	-82.68	0.00	0.00	0.00	0.00	13	0.81	Axial	38	CoreBRB_3.00

Frame #2:

Level: ROOF

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
76	20.10	0.00	0.00	0.00	0.06	6	0.16	Axial	50	HSS5X5X1/4
131	12.23	0.00	0.00	0.00	-0.07	6	0.09	Axial	50	HSS5X5X1/4
142	7.99	0.00	0.00	-0.00	0.00	6	0.06	Axial	50	HSS5X5X1/4

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
296	0.02	11.64	-0.00	-3.58	0.00	6	0.07	H1-3a (H1-1b)	50	W12X30
297	0.02	14.95	0.00	-4.77	0.00	6	0.09	H1-3a (H1-1b)	50	W12X30

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
18	-16.39	0.00	0.00	0.00	0.00	13	0.24	Axial	38	CoreBRB_2.00
19	-17.33	0.00	0.00	0.00	0.00	13	0.25	Axial	38	CoreBRB_2.00

Level: LEVEL 03

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
58	34.50	0.00	0.00	0.01	-0.12	17	0.14	Axial	50	HSS6X6X3/8
59	37.40	0.00	0.00	0.12	-0.04	2	0.29	Axial	50	HSS5X5X1/4
60	50.74	0.00	0.00	-0.03	0.13	2	0.20	Axial	50	HSS6X6X3/8

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
167	0.02	0.00	-0.00	-19.86	-0.00	2	0.21	Shear	50	W12X30
168	0.03	41.81	0.00	-10.64	0.00	4	0.26	H1-3a (H1-1b)	50	W12X30

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
21	55.35	0.00	0.00	0.00	0.00	13	0.81	Axial	38	CoreBRB_2.00
22	-54.95	0.00	0.00	0.00	0.00	13	0.80	Axial	38	CoreBRB_2.00

Level: LEVEL 02

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size

58	84.39	0.30	-0.84	0.15	-0.04	17	0.35 H1-1a	50	HSS6X6X3/8
59	58.45	0.00	0.00	0.00	-0.00	2	0.45 Axial	50	HSS5X5X1/4
60	110.18	0.21	2.94	-0.28	-0.07	13	0.32 H1-1a	50	HSS6X6X5/8

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
167	0.00	23.53	0.00	-12.59	0.00	2	0.17 H1-1b	50	W12X30
168	0.00	49.70	0.00	-12.79	-0.00	2	0.31 H1-1b	50	W12X30

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
28	66.93	0.00	0.00	0.00	0.00	13	0.78 Axial	38	CoreBRB_2.50
29	-70.31	0.00	0.00	0.00	0.00	13	0.82 Axial	38	CoreBRB_2.50

Level: LEVEL 01

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
59	74.50	0.00	0.00	-0.00	0.00	2	0.58 Axial	50	HSS5X5X1/4
60	179.55	0.22	2.94	0.29	-0.03	13	0.31 H1-1a	50	HSS8X8X5/8

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
167	0.00	29.54	0.00	-9.09	0.00	2	0.22 H1-1b	50	W12X30
168	0.00	58.28	0.00	-14.22	0.00	2	0.36 H1-1b	50	W12X30

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
11	2.92	0.00	0.00	0.00	0.00	13	0.03 Axial	38	CoreBRB_2.50
12	-1.52	0.00	0.00	0.00	0.00	13	0.02 Axial	38	CoreBRB_2.50

Frame #3:

Level: ROOF

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
127	15.34	0.00	0.00	-0.08	-0.00	6	0.09 Axial	50	HSS6X6X1/4
128	15.40	0.00	0.00	0.00	-0.00	6	0.07 Axial	50	HSS6X6X5/16
129	15.34	0.00	0.00	0.07	-0.00	6	0.09 Axial	50	HSS6X6X1/4

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
250	0.03	26.40	0.00	-4.04	-0.00	6	0.40 H1-3a (H1-1b)	50	W12X14

251	0.03	26.40	0.00	-4.04	-0.00	6	0.40 H1-3a (H1-1b)	50	W12X14

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
22	33.66	0.00	0.00	0.00	0.00	11	0.49 Axial	38	CoreBRB_2.00
23	-34.38	0.00	0.00	0.00	0.00	11	0.50 Axial	38	CoreBRB_2.00

Level: LEVEL 03

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
63	61.23	-1.14	0.81	-0.13	-0.04	15	0.27 H1-1a	50	HSS6X6X3/8
64	52.40	0.00	0.00	0.01	0.06	2	0.24 Axial	50	HSS6X6X5/16
65	60.86	1.10	-1.02	0.11	0.03	11	0.32 H1-1a	50	HSS6X6X5/16

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
175	0.03	76.27	0.00	12.19	-0.00	2	0.47 H1-3a (H1-1b)	50	W12X30
176	0.02	76.21	0.00	-12.16	-0.00	2	0.47 H1-3a (H1-1b)	50	W12X30

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
26	77.70	0.00	0.00	0.00	0.00	11	0.91 Axial	38	CoreBRB_2.50
27	-77.45	0.00	0.00	0.00	0.00	11	0.91 Axial	38	CoreBRB_2.50

Level: LEVEL 02

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
63	137.29	-1.13	0.81	0.09	-0.07	15	0.29 H1-1a	50	HSS7X7X5/8
64	85.70	0.00	0.00	-0.00	-0.00	2	0.34 Axial	50	HSS6X6X3/8
65	139.05	1.09	-1.02	-0.09	0.08	11	0.29 H1-1a	50	HSS7X7X5/8

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
175	0.00	79.80	0.00	-13.12	0.00	2	0.37 H1-1b	50	W12X40
176	0.00	79.80	0.00	-13.12	0.00	2	0.37 H1-1b	50	W12X40

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
33	165.20	0.00	0.00	0.00	0.00	11	0.88 Axial	38	CoreBRB_5.50
34	-165.02	0.00	0.00	0.00	0.00	11	0.88 Axial	38	CoreBRB_5.50

Frame #4:

Level: ROOF

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
77	7.78	0.00	0.00	-0.06	0.00	6	0.06 Axial	50	HSS5X5X1/4
79	7.93	0.00	0.00	-0.00	0.04	6	0.06 Axial	50	HSS5X5X1/4
81	7.78	0.00	0.00	0.08	-0.01	6	0.06 Axial	50	HSS5X5X1/4

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
222	0.01	13.50	0.02	-2.27	0.01	6	0.08 H1-3a (H1-1b)	50	W12X30
223	0.01	13.50	0.06	-2.27	-0.01	6	0.08 H1-3a (H1-1b)	50	W12X30

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
24	-43.80	0.00	0.00	0.00	0.00	10	0.57 Axial	38	CoreBRB_2.25
25	41.47	0.00	0.00	0.00	0.00	10	0.54 Axial	38	CoreBRB_2.25

Level: LEVEL 03

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
70	54.33	0.00	0.00	0.41	-0.04	10	0.11 Axial	50	HSS7X7X5/8
71	35.90	0.00	0.00	0.04	-0.01	2	0.28 Axial	50	HSS5X5X1/4
72	55.95	0.00	0.00	-0.22	-0.14	14	0.11 Axial	50	HSS7X7X5/8

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
169	0.04	49.05	0.01	-7.50	-0.00	2	0.30 H1-3a (H1-1b)	50	W12X30
170	66.46	35.77	0.12	7.50	-0.00	14	0.32 H1-3b	50	W12X30

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
28	-111.24	0.00	0.00	0.00	0.00	10	1.00 Axial	38	CoreBRB_3.25
29	111.40	0.00	0.00	0.00	0.00	10	1.00 Axial	38	CoreBRB_3.25

Level: LEVEL 02

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
70	157.81	4.15	-0.13	-0.36	0.09	10	0.33 H1-1a	50	HSS8X8X1/2
71	76.54	0.00	0.00	-0.00	0.00	2	0.30 Axial	50	HSS6X6X3/8

72	159.67	-5.04	0.51	-0.36	-0.09	14	0.29 H1-1a	50	HSS8X8X5/8

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
169	0.00	99.78	0.00	-14.38	0.00	2	0.62 H1-1b	50	W12X30
170	0.00	99.78	0.00	-14.38	-0.00	2	0.62 H1-1b	50	W12X30

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
35	-90.96	0.00	0.00	0.00	0.00	10	0.82 Axial	38	CoreBRB_3.25
36	91.85	0.00	0.00	0.00	0.00	10	0.83 Axial	38	CoreBRB_3.25

Level: LEVEL 01

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
70	248.25	4.16	-0.14	0.39	-0.06	10	0.53 H1-1a	50	HSS7X7X5/8
71	115.63	0.00	0.00	0.00	-0.00	2	0.45 Axial	50	HSS6X6X3/8
72	249.48	-5.04	0.51	0.42	-0.04	14	0.54 H1-1a	50	HSS7X7X5/8

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
169	0.00	104.49	0.00	-15.05	-0.00	2	0.65 H1-1b	50	W12X30
170	0.00	104.49	0.00	-15.05	0.00	2	0.65 H1-1b	50	W12X30

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
13	-3.97	0.00	0.00	0.00	0.00	10	0.04 Axial	38	CoreBRB_3.25
14	4.31	0.00	0.00	0.00	0.00	10	0.04 Axial	38	CoreBRB_3.25

Frame #5:

Level: LEVEL 03

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
73	14.62	0.00	0.00	0.20	-0.01	6	0.11 Axial	50	HSS5X5X1/4
74	14.59	0.00	0.00	0.00	-0.00	8	0.11 Axial	50	HSS5X5X1/4
75	7.65	3.73	-1.16	-0.23	-0.05	15	0.08 H1-1b	50	HSS6X6X1/2

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
162	39.78	10.77	0.47	-3.22	-0.00	10	0.14 H1-1b	50	W12X30
163	35.92	10.59	0.42	3.22	0.00	14	0.13 H1-1b	50	W12X30

Brace	Pu	Mux	Muy	Vux	Vuy	LC	Interact.	Fy	Size

#	kip	kip-ft	kip-ft	kip	kip			ksi	
30	83.10	0.00	0.00	0.00	0.00	10	0.97 Axial	38	CoreBRB_2.50
31	-82.17	0.00	0.00	0.00	0.00	10	0.96 Axial	38	CoreBRB_2.50

Level: LEVEL 02

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
73	92.01	3.13	-0.07	-0.34	-0.02	10	0.32 H1-1a	50	HSS6X6X1/2
74	51.22	0.00	0.00	0.00	-0.00	2	0.40 Axial	50	HSS5X5X1/4
75	91.49	-2.37	-0.21	0.19	0.08	14	0.31 H1-1a	50	HSS6X6X1/2

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
162	0.00	79.80	0.00	-13.12	0.00	2	0.37 H1-1b	50	W12X40
163	0.00	79.80	0.00	-13.12	0.00	2	0.37 H1-1b	50	W12X40

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
37	94.01	0.00	0.00	0.00	0.00	10	0.92 Axial	38	CoreBRB_3.00
38	-92.41	0.00	0.00	0.00	0.00	10	0.90 Axial	38	CoreBRB_3.00

Level: LEVEL 01

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
73	179.95	3.13	-0.07	0.32	-0.02	10	0.31 H1-1a	50	HSS9X9X1/2
74	84.27	0.00	0.00	0.00	0.00	2	0.47 Axial	50	HSS6X6X1/4
75	178.21	-2.37	-0.21	0.20	0.02	14	0.49 H1-1a	50	HSS6X6X5/8

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
162	0.00	79.51	0.00	-13.03	-0.00	2	0.49 H1-1b	50	W12X30
163	0.00	79.51	0.00	-13.03	-0.00	2	0.49 H1-1b	50	W12X30

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
15	3.91	0.00	0.00	0.00	0.00	10	0.04 Axial	38	CoreBRB_3.00
16	-4.63	0.00	0.00	0.00	0.00	10	0.05 Axial	38	CoreBRB_3.00

Frame #6:

Level: LEVEL 03

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
76	31.72	-0.03	-0.84	0.01	0.11	21	0.27 H1-1a	50	HSS5X5X1/4

77	52.02	0.09	0.63	0.01	-0.04	17	0.43 H1-1a	50	HSS5X5X1/4
78	7.48	0.00	0.00	0.27	-0.02	6	0.09 Axial	50	HSS4X4X1/4

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
171	16.33	0.00	0.00	2.42	0.23	17	0.09 Axial	50	W12X30
172	13.43	0.00	0.00	-2.31	-0.00	21	0.07 Axial	50	W12X30

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
44	40.43	0.00	0.00	0.00	0.00	13	0.59 Axial	38	CoreBRB_2.00
45	-38.71	0.00	0.00	0.00	0.00	13	0.57 Axial	38	CoreBRB_2.00

Level: LEVEL 02

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
76	83.48	0.08	0.72	0.01	-0.05	13	0.39 H1-1a	50	HSS5X5X1/2
77	107.49	0.07	-0.38	0.05	0.01	17	0.85 H1-1a	50	HSS5X5X1/4
78	24.82	0.00	0.00	-0.04	0.01	2	0.11 Axial	50	HSS5X5X1/2

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
171	0.00	31.75	0.00	-9.77	0.00	2	0.24 H1-1b	50	W12X30
172	0.00	31.75	0.00	-9.77	-0.00	2	0.24 H1-1b	50	W12X30

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
43	43.32	0.00	0.00	0.00	0.00	13	0.51 Axial	38	CoreBRB_2.50
44	-41.20	0.00	0.00	0.00	0.00	13	0.48 Axial	38	CoreBRB_2.50

Level: LEVEL 01

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
154	105.52	0.08	0.72	0.08	-0.01	13	0.70 H1-1a	50	HSS5X5X5/16
155	40.13	-0.03	0.04	0.04	-0.01	2	0.65 H1-1a	50	HSS4X4X3/16

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
354	0.00	32.00	0.00	-9.85	-0.00	2	0.16 H1-1b	50	W12X40
355	0.00	32.00	0.00	-9.85	0.00	2	0.16 H1-1b	50	W12X40

Frame #7:

Level: ROOF

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
84	19.60	0.00	-0.00	0.00	-0.03	8	0.25 H1-1a	50	HSS4X4X1/4
141	7.65	0.00	0.00	0.00	0.05	6	0.10 Axial	50	HSS4X4X1/4

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
294	0.00	29.23	0.00	-5.85	-0.00	6	0.09 H1-3a (H1-1b)	50	W12X58

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
20	16.86	0.00	0.00	0.00	0.00	16	0.20 Axial	38	CoreBRB_2.50
21	17.11	0.00	0.00	0.00	0.00	12	0.20 Axial	38	CoreBRB_2.50

Level: LEVEL 03

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
66	59.09	-0.72	-1.12	0.05	-0.07	16	0.26 H1-1a	50	HSS6X6X3/8
67	47.07	0.37	0.89	0.16	-0.04	12	0.29 H1-1a	50	HSS6X6X1/4

Level: LEVEL 02

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
66	90.69	0.01	-0.05	-0.17	-0.06	2	0.36 H1-1a	50	HSS6X6X3/8
67	78.87	0.01	-0.03	-0.11	-0.04	2	0.31 H1-1a	50	HSS6X6X3/8

Frame #8:

Level: LEVEL 03

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
108	95.05	-1.05	-1.75	-0.19	-0.20	16	0.33 H1-1a	50	HSS6X6X1/2
109	11.85	0.00	0.00	0.51	0.20	2	0.15 Axial	50	HSS4X4X1/4

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
177	37.57	0.00	0.00	-5.64	0.00	16	0.15 Axial	50	W12X30

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
46	111.81	0.00	0.00	0.00	0.00	12	0.93 Axial	38	CoreBRB_3.50

Level: LEVEL 02

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
105	147.48	0.00	0.00	-0.00	0.00	2	0.46 Axial	50	HSS6X6X1/2
108	113.43	-1.05	-1.75	-0.24	-0.14	16	0.33 H1-1a	50	HSS6X6X5/8
109	63.58	0.00	0.00	-0.01	-0.05	16	0.20 Axial	50	HSS6X6X1/2

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
177	0.00	17.04	0.00	-6.82	-0.00	2	0.11 H1-1b	50	W12X30
207	0.00	17.04	0.00	-6.82	-0.00	2	0.11 H1-1b	50	W12X30

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
45	156.75	0.00	0.00	0.00	0.00	12	0.76 Axial	38	CoreBRB_6.00

Frame #9:

Level: ROOF

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
45	3.05	0.20	1.36	0.01	0.12	11	0.11 H1-1b	50	HSS4X4X1/4
46	38.11	0.00	0.00	-0.01	-0.17	16	0.09 Axial	50	HSS7X7X1/2

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
201	0.05	8.40	0.02	-4.93	-0.00	6	0.05 H1-3a (H1-1b)	50	W12X30

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
27	42.02	0.00	0.00	0.00	0.00	12	0.61 Axial	38	CoreBRB_2.00

Level: LEVEL 03

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
68	198.21	0.17	1.48	0.09	0.02	16	0.64 H1-1a	50	HSS8X8X1/2
69	95.61	0.00	0.00	-0.00	-0.00	12	0.44 Axial	50	HSS7X7X1/2
80	68.72	0.72	-4.96	0.27	0.04	12	0.36 H1-1a	50	HSS7X7X1/2

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
164	12.57	12.90	0.03	-19.55	-0.14	12	0.20 Shear	50	W12X30
165	11.54	0.00	0.00	-1.59	0.06	12	0.05 Axial	50	W12X30

Brace	Pu	Mux	Muy	Vux	Vuy	LC	Interact.	Fy	Size

#	kip	kip-ft	kip-ft	kip	kip				ksi	
42	87.06	0.00	0.00	0.00	0.00	12	0.85	Axial	38	CoreBRB_3.00
43	-71.91	0.00	0.00	0.00	0.00	12	0.70	Axial	38	CoreBRB_3.00

Level: LEVEL 02

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
68	198.98	0.17	-0.45	0.09	0.02	16	0.63	H1-1a	50	HSS8X8X1/2
69	96.27	0.00	0.00	-0.00	0.00	12	0.44	Axial	50	HSS7X7X1/2
80	69.18	-0.71	1.38	0.27	0.04	28	0.67	H1-1a	50	HSS6X6X3/8

HNT PK-12

BRB DESIGN

Properties

Fy Max	46	*ksi*
Ω	2.5	-
SDS	0.931	

Brace Forces

								Expected Strength, C			Expected Strength, T			From Analysis		
Frame ID	ID	Brace Height	Brace Width	Brace Angle	Core Area	β	ω	P Max	Px	Py	T Max	Tx	Ty	EQ Max	ΩEQ	Brace DCR
-	-	*ft*	*ft*	*deg*	*in²*	-	-	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	-
1	BRB-1	11	12	42.5	2.00	1.32	1.38	168	124	113	127	94	86	37	93	70%
	BRB-2	12	13	42.7	2.00	1.35	1.4	174	128	118	129	95	87	47	118	89%
	BRB-3	11.5	13	41.5	3.00	1.11	1.39	213	159	141	192	144	127	64	160	81%
2	BRB-4	11	13	40.2	2.00	1.33	1.39	170	130	110	128	98	83	13	33	25%
	BRB-5	12	13	42.7	2.00	1.31	1.37	165	121	112	126	93	85	42	105	80%
	BRB-6	12	13	42.7	2.50	1.35	1.4	217	160	147	161	118	109	53	133	81%
	BRB-7	12.5	13	43.9	2.50	1.38	1.43	227	164	157	164	119	114	2	5	3%
3	BRB-8	11.5	14	39.4	2.00	1.28	1.33	157	121	99	122	95	78	27	68	51%
	BRB-9	12	14	40.6	2.50	1.3	1.36	203	154	132	156	119	102	60	150	91%
	BRB-10	11.5	14	39.4	5.00	1.12	1.35	348	269	221	311	240	197	128	320	97%
4	BRB-11	10.75	14	37.5	2.25	1.36	1.41	198	157	121	146	116	89	34	85	57%
	BRB-12	12	14	40.6	3.25	1.33	1.38	274	208	179	206	157	134	85	213	99%
	BRB-13	12	14	40.6	3.25	1.32	1.38	272	207	177	206	157	134	71	178	83%
	BRB-14	12.5	14	41.8	3.25	1.34	1.4	280	209	187	209	156	139	3	8	4%
5	BRB-15	12	14	40.6	2.50	1.35	1.4	217	165	141	161	122	105	64	160	97%
	BRB-16	12	14	40.6	3.00	1.32	1.38	251	191	164	190	145	124	73	183	92%
	BRB-17	12.5	14	41.8	3.00	1.34	1.39	257	192	171	192	143	128	3	8	4%
6	BRB-18	12	13	42.7	2.00	1.32	1.38	168	123	114	127	93	86	32	80	61%
	BRB-19	12	13	42.7	2.50	1.35	1.4	217	160	147	161	118	109	36	90	55%
7	BRB-20	11.5	10	49.0	2.50	1.44	1.46	242	159	182	168	110	127	13	33	20%
8	BRB-21	12	10	50.2	3.50	1.11	1.44	257	165	198	232	148	178	86	215	93%
	BRB-22	12	10	50.2	6.00	1.14	1.45	456	292	350	400	256	307	119	298	75%
9	BRB-23	11	13.5	39.2	2.00	1.38	1.43	182	141	115	132	102	83	31	78	59%
	BRB-24	24.5	13.5	61.1	3.00	1.12	1.3	201	97	176	179	87	157	66	165	84%

BRB BASE REACTIONS BASED ON GREATER OF OVERSTRENGTH SEISMIC LOADS AND EXPECTED BRACE STRENGTHS

Base Reactions

Frame-ID	Frame Grid	Col Grid	DL	LL	SL	EQ-MAX	ΩEQ	PUC Max	TUC Max	Pu Max	Tu Max	Vu Max	
-	-	-	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	
		C	10	6	5	75	188	214.5	259.0	232	-252	-	
1	16	D	26	12	7	12	30	157.8	41.2	201	-23	303.1	-V
		C'	36	16	6	91	228	300.2	372.3	359	-347	-	
		C	50	27	6	71	178	526.6	391.3	611	-356	163.6	
2	11	B.4	22	17	3	2	5	0	135.3	40	-120	-	
		A	21	12	4	51	128	526.6	391.3	562	-376	163.6	
		15	36	22	5	98	245	452.5	376.5	514	-351	268.7	
3	A	14	40	22	5	0	0	0	75.9	67	-47	-	
		13	40	22	5	98	245	452.5	376.5	520	-348	268.7	
		9	55	28	7	123	308	663.5	496.8	755	-458	209.2	
4	D	10	54	28	7	0	0	0	166.7	90	-128	-	
		11	55	28	7	123	308	663.5	496.8	755	-458	209.2	
		12	39	22	5	91	228	476.2	356.5	542	-329	191.7	
5	E	11	38	22	5	0	0	0	119.8	65	-93	-	
		10	39	22	5	91	228	476.2	356.5	542	-329	191.7	
		E	31	19	4	41	103	195.3	261.1	249	-239	-	
6	8	D.5	16	12	3	5	13	65.8	0	95	11	-	
		D	31	17	6	46	115	195.3	261.1	248	-239	-	
7	7	B	41	23	12	10	25	182.4	126.7	253	-97	-	
		C	34	22	7	10	25	182.4	126.7	242	-102	-	
		C	75	31	16	66	165	350.5	307.4	473	-254	292.1	
8	4	C.5	10	9	0	35	88	197.7	307.4	216	-300	-	
		B	16	12	2	92	230	178.1	197.7	207	-186	-	
		D.4	3	0	2	50	125	157.1	176.0	162	-174	-	
9	1	D	45	12	21	28	70	133.5	0	206	32	183.5	
		C	64	25	14	78	195	240.2	290.7	344	-245	-	

Maximum Tension	-458	kips	Min Shear	164	kips
Maximum Compression	755	kips	Maximum Shear	292	kips
			Max Shear-V	303.1	kips

BRB BEAM DESIGN FORCES BASED ON EXPECTED BRACE STRENGTHS

Beam Forces

Frame-ID	Story	Beam	MDL	MLL	MSL	Vu	MEQ	VEQ	PEQ	Mu	Pu
-	-	-	*k-ft*	*k-ft*	*k-ft*	*k*	*k-ft*	*k*	*k*	*k-ft*	*kips*
1	Roof	W12x30	2	0	2	1	0	0	124	3	124
	L3	W12x30	9	7	0	5	0	0	128	16	128
	L2	W12x40	11	8	0	6	0	0	159	19	159
2	Roof	W12x30	4	0	4	2	0	0	130	6	130
	L3	W12x30	14	15	0	7	0	0	121	27	121
	L2	W12x40	13	15	0	6	0	0	160	26	160
	L1	W12x40	13	15	0	6	0	0	164	26	164
3	Roof	W12x30	11	0	6	2	0	0	121	16	121
	L3	W12x40	28	27	0	9	0	0	154	52	154
	L2	W12x40	29	28	0	9	0	0	269	54	269
4	Roof	W12x30	5	0	4	1	0	0	157	8	157
	L3	W12x30	19	13	7	5	0	0	208	34	208
	L2	W12x40	33	37	0	9	0	0	207	64	207
	L1	W12x40	33	37	0	9	0	0	209	64	209
5	L3	W12x30	6	0	7	1	0	0	165	10	165
	L2	W12x40	29	28	0	8	0	0	191	54	191
	L1	W12x40	29	28	0	9	0	0	192	54	192
6	L3	W12x30	2	0	3	2	0	0	123	3	123
	L2	W12x40	11	12	0	6	0	0	160	21	160
	L1	W12x40	11	12	0	6	0	0	278	21	278
7	Roof	W12x30	11	0	9	3	-279	-27.87	79	-262	79
8	L3	W12x30	5	5	0	4	0	0	165	9	165
	L2	W12x30	6	6	0	4	0	0	292	11	292
9	Roof	W12x30	3	0	3	3	0	0	141	5	141
	L3	W12x30	10	5	1	5	0	0	97	17	97

PCS Structural Solutions

Project:	HNT Pk-12	Job No:	23-580
Subject:	Wide-Flange Section	Name:	JDJ
Office:	Seattle	Date:	5/13/2025

Run	Level	Description	Shape	Material	KLx	Kly	KLz	Lb	Cb	Cm	Pu	Tu	Mu,x	Mu,y	Vu,x	Vu,y	Max DCR
x	*25*	-	-	-	*ft*	*ft*	*ft*	*ft*	-	-	*kips*	*kips*	*k-ft*	*k-ft*	*k*	*k*	-
	Roof	BF-1, Roof	W12X30	A992	12	12	12	1	1	1	123.54	123.54	3	0	1	0	63%
	L3	BF-1, L3	W12X30	A992	12	12	12	1	1	1	127.77	127.77	16	0	5	0	72%
	L2	BF-1, L2	W12X40	A992	12	12	12	1	1	1	159.48	159.48	19	0	6	0	54%
	Roof	BF-2, Roof	W12X30	A992	13	13	26	1	1	1	129.84	129.84	6	0	2	0	75%
	L3	BF-2, L3	W12X30	A992	13	13	13	1	1	1	121.33	121.33	27	0	7	0	82%
	L2	BF-2, L2	W12X40	A992	13	13	13	1	1	1	159.71	159.71	26	0	6	0	60%
	L1	BF-2, L1	W12X40	A992	13	13	13	1	1	1	163.59	163.59	26	0	6	0	61%
	Roof	BF-3, Roof	W12X30	A992	14	7	14	7	1	1	121.03	121.03	16	0	2	0	49%
	L3	BF-3, L3	W12X40	A992	14	7	14	1	1	1	154.37	154.37	52	0	9	0	57%
	L2	BF-3, L2	W12X40	A992	14	7	14	1	1	1	268.72	268.72	54	0	9	0	83%
	Roof	BF-4, Roof	W12X30	A992	14	7	14	7	1	1	157.42	157.42	8	0	1	0	55%
	L3	BF-4, L3	W12X30	A992	14	7	14	1	1	1	208.33	208.33	34	0	5	0	88%
	L2	BF-4, L2	W12X40	A992	14	7	14	1	1	1	206.77	206.77	64	0	9	0	74%
	L1	BF-4, L1	W12X40	A992	14	7	14	1	1	1	209.21	209.21	64	0	9	0	74%
	L3	BF-5, L3	W12X30	A992	14	7	14	1	1	1	165.02	165.02	10	0	1	0	59%
	L2	BF-5, L2	W12X40	A992	14	7	14	1	1	1	190.86	190.86	54	0	8	0	66%
	L1	BF-5, L1	W12X40	A992	14	7	14	1	1	1	191.73	191.73	54	0	9	0	66%
	L3	BF-6, L3	W12X30	A992	13	13	13	1	1	1	123.14	123.14	3	0	2	0	70%
	L2	BF-6, L2	W12X40	A992	13	13	13	1	1	1	159.71	159.71	21	0	6	0	58%
	L1	BF-6, L1	W12X40	A992	13	13	13	1	1	1	278.01	278.01	21	0	6	0	94%
	Roof	BF-7, Roof	W12X58	A992	20	10	20	10	1	1	79.324	79.324	262	0	31	0	91%
	L3	BF-8, L3	W12X30	A992	10	10	10	1	1	1	164.75	164.75	9	0	4	0	72%
	L2	BF-8, L2	W12X40	A992	10	10	10	1	1	1	292.07	292.07	11	0	4	0	78%
	Roof	BF-9, Roof	W12X30	A992	13	13	13	1	1	1	140.75	140.75	5	0	3	0	80%
	L3	BF-9, L3	W12X30	A992	13.67	13.67	13.67	1	1	1	96.969	96.969	17	0	5	0	67%

PCS Structural Solutions

Project:	HNT Pk-12	Job No:	23-580
Subject:	Wide-Flange Section	Name:	JDJ
Office:	Seattle	Date:	5/13/2025

WIDE-FLANGE SECTION DESIGN (AISC 360-16)

Description — **DESIGN OK!**

L1 - BF-6, L1

Properties

Shape	W12X40	-	W	40	plf
Material	A992	-	A	11.7	in^2
Fy	50	***ksi***	d	11.9	in
Fu	65	***ksi***	b_f	8.01	in
			t_w	0.295	in
KLx	13.0	***ft***	t_f	0.515	in
Kly	13.0	***ft***	k_{des}	1.02	in
KLz	13.0	***ft***	$b_f/2t_f$	7.77	-
			h/t_w	33.6	-
Lb	1.0	***ft***	I_x	307	in^4
Cb	1.0	-	Z_x	57	in^3
Cm	1.0	-	S_x	51.5	in^3

Load Cases

Case -	Pu *kips*	Tu *kips*	Mu,x *kip-ft*	Mu,y *kip-ft*	Vu,x *kips*	Vu,y *kips*	Max DCR -	Case Selected
1	278.01288	278	21.248	0	6	0	94%	◉
2							0%	○
3							0%	○
4							0%	○

Strong Axis Flexure - AISC F2-F5 — **ϕMnx = 213.8 kip-ft**

Weak Axis Flexure - AISC F6 — **ϕMny = 63 kip-ft**

Compression - AISC E3 & E4 — **ϕPn = 328.1 kips**

Flange Slenderness

b/t	7.77	-
0.56√E/Fy	13.5	-
Flange:	Nonslender	-

Web Slenderness

h/tw	33.6	-
1.49√E/Fy	35.9	-
Web:	Nonslender	-

Flexural and Torsional Buckling

KLx/rx	30.4	-
KLy/ry	80	-
$F_{e,\ Flexural}$	44	ksi
$F_{e,\ Torsional}$	27355	ksi

Slender Areas

Fn	31	
λ/λr	0.58	
Fel	334.4	
be	8.01	

4.71√E/Fy	113.4	-		λ/λr	0.9
Ae	11.70			Fel	126.6
Fcr	31	ksi		he	10.87
Pn	365	kips		Ae	11.46
ϕ	0.9	-			
ϕPn	**328.1**	kips			

Tension - AISC D2 **ϕTn = 526.5 kips**

Major-Axis Shear - AISC G2 **ϕVnx = 105.3 kips**

Minor-Axis Shear - AISC G7 **ϕVny = 111.4 kips/flange**

2nd Order Amplification - AISC Appendix 8 **B1,x = 1.08 - B1,y = 2.16**

DCR - AISC H1 **Max DCR = 94.3%**

$P_u/\phi P_n$	**84.7%**	$B_1M_{u,x}/\phi M_n$	**10.8%**
$T_u/\phi T_n$	**52.8%**	$B_1M_{u,y}/\phi M_n$	**0.0%**
$V_{u,x}/\phi V_n$	**5.7%**	P-M Interaction	**94.3%**
$V_{u,y}/\phi V_n$	**0.0%**	Max DCR	**94.3%**

BRB COLUMN DESIGN BASED ON GREATER OF OVERSTRENGTH SEISMIC LOAD AND EXPECTED BRACE STRENGTHS

Column Design

								(C)	(T)								
BF	COL #	DL	LL	SL	EQ MAX	EQ MIN	EQ(ABS)	ECL MAX	ECL MIN	ΩE	C MAX	T MAX	P MAX	P MIN	COLUMN	ϕPn	DCR
-	-	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	-		-
1	1	2	0	2	32	-5	32	88	-118	80	88	-118	91	-117	HSS6x6x1/2	323	28%
	2	10	6	2	75	-10	75	218	-264	187.5	218	-264	235	-257	HSS6x6x1/2	323	73%
	3	2	0	1	0	0	0	0	0	0	0	0	3	1	HSS5x5x3/8	180	2%
	4	9	5	3	26	5	26	118	-90	65	118	-90	134	-84	HSS5x5x3/8	180	74%
	5	26	12	5	18	4	18	155	-62	45	155	-62	198	-43	HSS5x5x1/2	224	88%
	6	4	16	3	-5	-26	26	90	-118	65	90	-118	104	-115	HSS6x6x1/2	323	32%
	7	15	10	3	7	-50	50	181	-241	125	181	-241	207	-230	HSS6x6x1/2	323	64%
	8	37	16	7	13	-91	91	318	-393	227.5	318	-393	379	-367	HSS6x6x5/8	382	99%
2	1	35	20	6	36	-18	36	227	-172	90	227	-172	287	-147	HSS6x6x1/2	323	89%
	2	50	26	6	69	-28	69	375	-281	172.5	375	-281	459	-245	HSS7x7x5/8	502	91%
	3	17	13	2	2	-1	2	0	-94	5	5	-94	35	-82	HSS5x5x5/16	156	23%
	4	22	17	2	1	-1	1	0	-136	2.5	2.5	-136	42	-120	HSS5x5x3/8	180	23%
	5	21	12	4	18	-36	36	228	-172	90	228	-172	264	-157	HSS6x6x1/2	323	82%
	6	24	10	4	21	-51	51	-	-	127.5	128	-127.5	167	-110	CONC	500	33%
3	1	36	22	5	14	-56	56	234	-182	140	234	-182	296	-156	HSS6x6x1/2	323	92%
	2	40	22	5	0	0	0	0	-80	0	0	-80	67	-51	HSS6x6x3/8	255	26%
	3	40	22	5	56	-14	56	234	-182	140	234	-182	301	-153	HSS6x6x1/2	323	93%
4	1	35	19	7	75	-14	75	308	-230	187.5	308	-230	367	-205	HSS7x7x1/2	419	88%
	2	55	28	7	120	-22	120	485	-364	300	485	-364	577	-325	HSS8x8x5/8	623	93%
	3	35	19	7	1	0	1	0	-122	2.5	2.5	-122	62	-97	HSS6x6x3/8	255	24%
	4	54	28	7	1	0	1	0	-168	2.5	2.5	-168	93	-129	HSS6x6x3/8	255	36%
	5	35	19	7	14	-76	76	308	-229	190	308	-229	367	-204	HSS7x7x1/2	419	88%
	6	55	28	7	22	-120	120	485	-364	300	485	-364	577	-325	HSS8x8x5/8	623	93%
5	1	21	14	5	9	-42	42	142	-105	105	142	-105	179	-90	HSS6x6x1/2	323	55%
	2	38	22	5	20	-88	88	305	-229	220	305	-229	370	-202	HSS6x6x5/8	382	97%
	3	21	14	5	0	0	0	0	-77	0	0	-77	37	-62	HSS6x6x3/8	255	15%
	4	38	22	5	0	0	0	0	-119	0	0	-119	65	-92	HSS6x6x3/8	255	25%
	5	21	14	5	42	-9	42	142	-105	105	142	-105	179	-90	HSS6x6x1/2	323	55%
	6	38	22	5	88	-20	88	305	-228	220	305	-228	370	-201	HSS6x6x5/8	382	97%

BRB COLUMN DESIGN BASED ON GREATER OF OVERSTRENGTH SEISMIC LOAD AND EXPECTED BRACE STRENGTHS

BF	COL #	DL	LL	SL	EQ MAX	EQ MIN	EQ(ABS)	ECL MAX	ECL MIN	ΩE	C MAX	T MAX	P MAX	P MIN	COLUMN	ϕPn	DCR
-	-	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	*kips*	-		-
6	1	17	12	4	41	-9	41	195	-261	102.5	195	-261	225	-249	HSS5x5x1/2	224	101%
	2	31	18	4	41	-9	41	195	-261	102.5	195	-261	248	-239	HSS6x6x1/2	323	77%
	3	9	7	2	1	0	1	28	0	2.5	28	-2.5	44	4	HSS5x5x1/2	224	20%
	4	16	12	2	4	-1	4	66	0	10	66	-10	95	1	HSS5x5x1/2	224	42%
	5	30	17	5	10	-45	45	195	-261	112.5	195	-261	246	-240	HSS6x6x1/2	323	76%
	6	35	15	5	6	-31	31	-	-	77.5	77.5	-77.5	135	-53	CONC	500	27%
7	1	3	0	2	0	0	0	0	-28	0	0	-28	5	-26	HSS6x6x3/8	255	2%
	2	40	23	11	3	-10	10	186	-129	25	186	-129	255	-100	HSS6x6x3/8	255	100%
	3	8	0	6	0	0	0	0	-28	0	0	-28	12	-22	HSS6x6x3/8	255	5%
	4	34	22	6	10	-3	10	186	-129	25	186	-129	245	-105	HSS6x6x3/8	255	96%
8	1	15	12	2	0	0	0	0	0	0	0	0	27	11	HSS6x6x1/2	323	8%
	2	4	4	0	0	0	0	0	0	0	0	0	8	3	HSS5x5x1/2	224	3%
	3	9	9	0	34	-28	34	129	-153	85	129	-153	146	-147	HSS5x5x1/2	224	65%
	4	65	26	16	67	12	67	178	-198	167.5	178	-198	284	-152	HSS6x6x1/2	323	88%
	5	75	31	16	67	12	67	178	-198	167.5	178	-198	301	-144	HSS6x6x1/2	323	93%
9	1	2	0	2	50	9	50	184	-164	125	184	-164	187	-163	-	-	
	2	2	0	2	0	0	0	0	0	0	0	0	3	1	HSS4x4x5/16	93.2	3%
	3	45	11	20	20	5	20	154	-112	50	154	-112	226	-80	-	-	
	4	7	0	5	-5	-21	21	112	-154	52.5	112	-154	123	-149	HSS5x5x5/16	156	79%
	5	64	24	14	-15	-77	77	268	-329	192.5	268	-329	372	-283	-	-	

BRB BASE PLATE DESIGN

- SEE BRB ANALYSIS AND STEEL DESIGN FOR MAXIMUM ANCHORAGE FORCES
  - Pu MAX (GREATER OF 2.5EQ AND PUC, (1.2+0.2SDS)D+0.5L+0.2S+EQ)
    - MAX ON FOOTING = 755 KIPS
    - MAS ON PILASTER = 562 KIPS
  - MAX WITH (6) ANCHORS
    - Tu MAX (GREATER OF 2.5EQ AND TUC, (0.9-0.2SDS)D-EQ) = 458 KIPS
  - MAX WITH (4) ANCHORS
    - Tu MAX (GREATER OF 2.5EQ AND TUC, (0.9-0.2SDS)D-EQ) = 376 KIPS

ANCHORAGE

STEEL ANCHOR STRENGTH
TRY (4) 1-1/2"Ø GR105 ANCHOR RODS
φNsa = 0.75 * Ase * futa
= 0.75 * (4) * 1.41 SQ. IN * 125 KSI
= 528 KIPS > 458 KIPS **- OK!**

PULLOUT STRENGTH
Abrg = 3.5^2 * PI()/4 - 1.5^2* PI()/4 = 7.85 SQ. IN (STANDARD F844 WASHER)
Np = 8 * Abrg * 3 KSI = 188 KIPS
φNpn = (4) * 0.75 * 0.7 * 1.0 * 188 KIPS
= 394 KIPS > 376 KIPS - **OK!**

BREAKOUT REINFORCING
REQ'D VERTICAL LEGS OF #5 BARS:
TU / ANCHOR = 94 KIPS
φTn = 0.75 * 0.31 SQ. IN * 60 KSI = 14 KIPS / BAR
Nreq = 94 KIPS / 14K = 6.7 -> **(7) REQ'D PER ANCHOR**

BEARING (MAX ON GRADE BEAM)
φBn = 0.65 * 2 * 0.85 * 3KSI * 12.5" * 19.5" = 808 KIPS > 755 KIPS - **OK!**

BEARING (MAX ON PILASTER/WALL)
φBn = 0.65 * 0.85 * 4KSI * SQRT(13.5" * 20" / (12.5" * 19.5")) * 12.5" * 19.5" = 566 KIPS > 562 KIPS - **OK!**

PLATE BENDING STRENGTH
Mu = 6.5" * 12.5" * 6.5" / 2 * 755K / (12.5" * 19.5") = 818K-IN
φMn = 0.9 * 50 KSI * 12.5 * 2.5^2 / 4 = 875 K-IN > 818K-IN - **OK!**

Shear Lug Design

HNT Pk-12

Maximum Shear Capacity based on Peak Tension Load and (2) Lug Faces

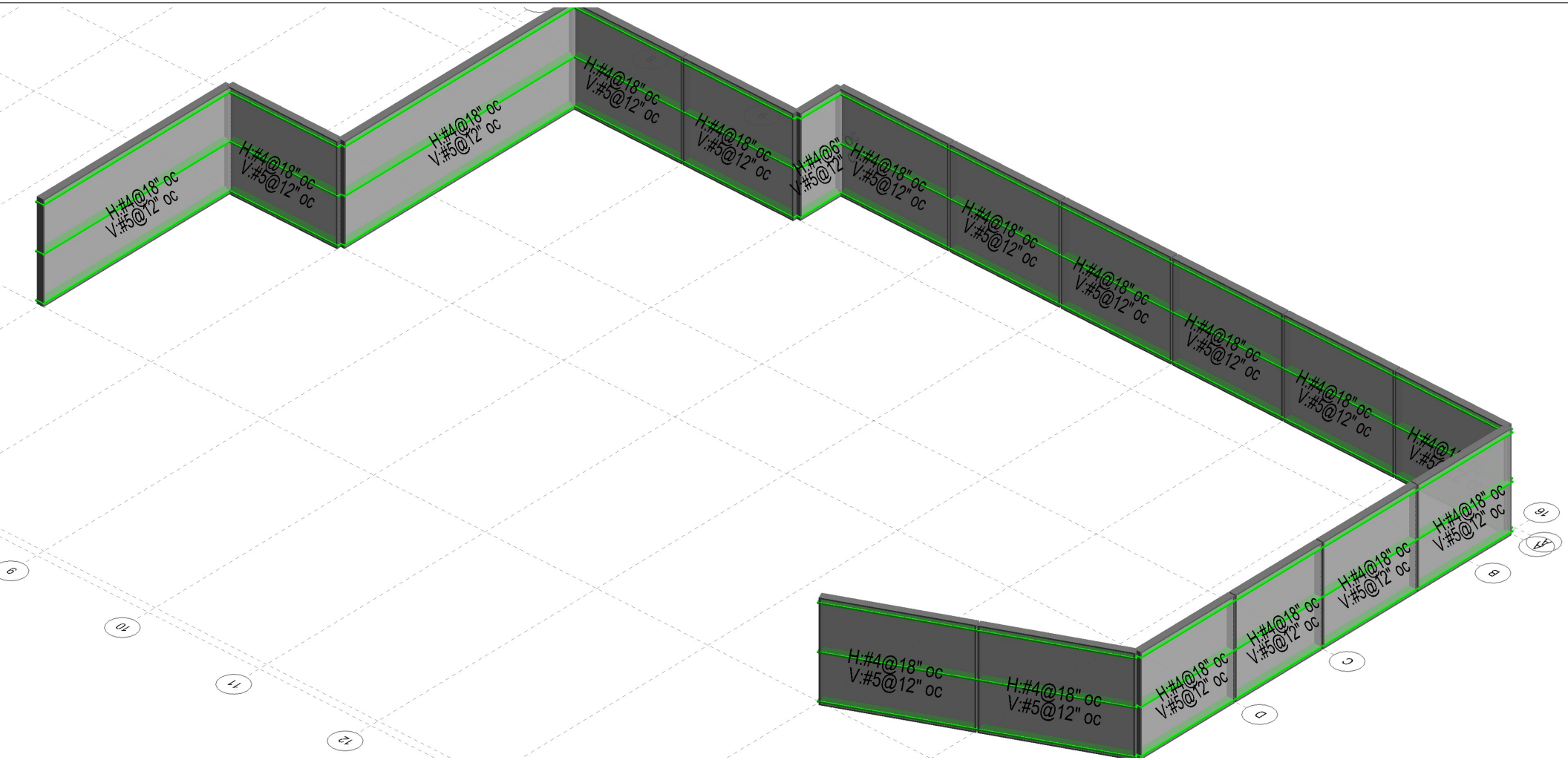
Base Plate Loads			
Tu	254	kips	(Input as Positive)
Pu	473	kips	(Input as Positive)
Vu / Shear Lug	148	kips	(Input as Positive)
Anchor Strength, fu	125	ksi	
Number of Anchors in Tension	4	-	
Anchor Diameter	1.5	in	
Base Plate Width	14	in	
Base Plate Length	24	in	
Abp	336	sq. in	
Anchors in Tension?	YES		

Shear Lug Properties		
Anchor Embed	36	in
Shear Lug Embed Depth	5.5	in
Shear Lug Depth (Btwn 2 Lugs)	18.5	in
Shear Lug Flange Width	14	in
Shear Lug Flange Thickness	2	in
Stiffener Thickness	0.0	in
17.11.1.1.8	OK	- Anchor Depth Must be 2.5 > Than Shear Lug Depth
Shear Stress Plane, fv	0.57	ksi
Stress Limit	0.80	ksi
DCR	71%	-

Bearing Design		
Phi	0.65	-
f'c	4000	psi
Nsa	176	kips
Gamma Bearing	0.638	-
Effective Bearing Area	124.0	sq. in
V,brg	538.4	kips
ϕVn	349.9	kips
DCR	42%	-

Lug Bending		
Moment	629	k-in
Moment Strength	630	k-in
DCR	100%	-

LATERAL DESIGN - CONCRETE WALL DESIGN


H:#4@18" oc
V:#5@12" oc
9
10
11
12
A
B
C
D
15

Section Cut Design Summary

Section Cut ID: **SC1H:1 (Horizontal)**
Story: LEVEL 01
Ag = 3704 in2 Imaj = 42364472 in4 Imin = 30871 in4
Major Axis Orientation: 24.90 degrees (CCW from global X-axis)
Wall Design Group: 1
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.135 OK
Beta = 6.4 deg CCW from Major axis
Pu = 1.87 kips phiPn = 13.81 kips
Mu = 463.60 kip-ft phiMn = 3430.02 kip-ft
Controlling Load Combo: 0.714 D - 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 121)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC1H:1A:
Length = 15.44 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 476.75 kip phiVn =286.05 kip OK
Factored Shear Force: Vu =111.20 kip
Special Seismic Provisions: Ve = 111.20 kip
Ωv = 1.00 ωv = 1.00 Mpr = 55361.00 kip-ft Mpr LC: 72
hwcs = 12.00 ft ns = 1 Mpr/Mu = 219.29 Mu = 252.46 kip-ft
Controlling Load Combo: 1.386 D + 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 106)
Code Ref: 18.10.4.1

Segment SC1H:1B:
Length = 15.44 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 428.37 kip phiVn =257.02 kip OK
Factored Shear Force: Vu =132.03 kip
Special Seismic Provisions: Ve = 132.03 kip
Ωv = 1.00 ωv = 1.00 Mpr = 55361.00 kip-ft Mpr LC: 72
hwcs = 12.00 ft ns = 1 Mpr/Mu = 219.29 Mu = 252.46 kip-ft

Controlling Load Combo: 0.714 D + 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 115)
Code Ref: 11.5.4.3

Out-of-Plane Shear Results:

Segment SC1H:1A:
Length = 15.44 ft
Effective depth = 7.69 in
Vu = -52.35 kip phiVn = 104.21 kip OK
Controlling Load Combo: 0.714 D - 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 118)
Code Ref: 22.5

Segment SC1H:1B:
Length = 15.44 ft
Effective depth = 7.69 in
Vu = -44.38 kip phiVn = 102.06 kip OK
Controlling Load Combo: 0.714 D - 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 121)
Code Ref: 22.5

Reinforcement Checks:

Segment SC1H:1A:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.563% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Segment SC1H:1B:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.563% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Section Cut Design Summary

Section Cut ID: **SC1H:2 (Horizontal)**
Story: LEVEL 01
Ag = 3704 in2 Imaj = 42364472 in4 Imin = 30871 in4
Major Axis Orientation: 24.90 degrees (CCW from global X-axis)
Wall Design Group: 1
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.477 OK
Beta = 27.9 deg CCW from Major axis
Pu = 6.11 kips phiPn = 12.82 kips
Mu = 432.27 kip-ft phiMn = 905.99 kip-ft
Controlling Load Combo: 0.714 D - 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 121)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC1H:2A:
Length = 15.44 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 476.75 kip phiVn =286.05 kip OK
Factored Shear Force: Vu =103.32 kip
Special Seismic Provisions: Ve = 103.31 kip
Ωv = 1.00 ωv = 1.00 Mpr = 51760.15 kip-ft Mpr LC: 72
hwcs = 12.00 ft ns = 1 Mpr/Mu = 262.23 Mu = 197.38 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 114)
Code Ref: 18.10.4.1

Segment SC1H:2B:
Length = 15.44 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 476.75 kip phiVn =286.05 kip OK
Factored Shear Force: Vu =103.33 kip
Special Seismic Provisions: Ve = 103.33 kip
Ωv = 1.00 ωv = 1.00 Mpr = 51760.15 kip-ft Mpr LC: 72
hwcs = 12.00 ft ns = 1 Mpr/Mu = 262.23 Mu = 197.38 kip-ft

Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 98)
Code Ref: 18.10.4.1

Out-of-Plane Shear Results:

Segment SC1H:2A:
Length = 15.44 ft
Effective depth = 7.69 in
Vu = 0.30 kip phiVn = 104.85 kip OK
Controlling Load Combo: 0.714 D - 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 118)
Code Ref: 22.5

Segment SC1H:2B:
Length = 15.44 ft
Effective depth = 7.69 in
Vu = -3.37 kip phiVn = 102.32 kip OK
Controlling Load Combo: 0.714 D - 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 121)
Code Ref: 22.5

Reinforcement Checks:

Segment SC1H:2A:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.563% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Segment SC1H:2B:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.563% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Section Cut Design Summary

Section Cut ID: **SC1H:3 (Horizontal)**
Story: LEVEL 01
Ag = 3704 in2 Imaj = 42364472 in4 Imin = 30871 in4
Major Axis Orientation: 24.90 degrees (CCW from global X-axis)
Wall Design Group: 1
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.065 OK
Beta = 3.5 deg CCW from Major axis
Pu = 18.93 kips phiPn = 292.37 kips
Mu = 421.71 kip-ft phiMn = 6514.16 kip-ft
Controlling Load Combo: 0.714 D - 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 121)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC1H:3A:
Length = 15.44 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 476.75 kip phiVn =286.05 kip OK
Factored Shear Force: Vu =104.42 kip
Special Seismic Provisions: Ve = 104.41 kip
Ωv = 1.00 ωv = 1.00 Mpr = 24720.01 kip-ft Mpr LC: 39
hwcs = 12.00 ft ns = 1 Mpr/Mu = 266.47 Mu = 92.77 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 114)
Code Ref: 18.10.4.1

Segment SC1H:3B:
Length = 15.44 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 476.75 kip phiVn =286.05 kip OK
Factored Shear Force: Vu =-106.36 kip
Special Seismic Provisions: Ve = 106.36 kip
Ωv = 1.00 ωv = 1.00 Mpr = 24720.01 kip-ft Mpr LC: 39
hwcs = 12.00 ft ns = 1 Mpr/Mu = 266.47 Mu = 92.77 kip-ft

Controlling Load Combo: 0.714 D - 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 118)
Code Ref: 18.10.4.1

Out-of-Plane Shear Results:

Segment SC1H:3A:
Length = 15.44 ft
Effective depth = 7.69 in
Vu = 30.62 kip phiVn = 105.19 kip OK
Controlling Load Combo: 0.714 D - 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 118)
Code Ref: 22.5

Segment SC1H:3B:
Length = 15.44 ft
Effective depth = 7.69 in
Vu = 23.29 kip phiVn = 103.37 kip OK
Controlling Load Combo: 0.714 D - 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 121)
Code Ref: 22.5

Reinforcement Checks:

Segment SC1H:3A:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.563% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Segment SC1H:3B:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.563% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Section Cut Design Summary

Section Cut ID: **SC3H:1 (Horizontal)**
Story: LEVEL 01
Ag = 3360 in2 Imaj = 31610877 in4 Imin = 28000 in4
Major Axis Orientation: 0.00 degrees (CCW from global X-axis)
Wall Design Group: 3
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.113 OK
Beta = 182.7 deg CCW from Major axis
Pu = 34.24 kips phiPn = 303.66 kips
Mu = 800.94 kip-ft phiMn = 7102.22 kip-ft
Controlling Load Combo: 0.714 D - 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 119)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC3H:1A:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 432.42 kip phiVn =259.45 kip OK
Factored Shear Force: Vu =-83.55 kip
Special Seismic Provisions: Ve = 83.54 kip
Ωv = 1.00 ωv = 1.00 Mpr = 36987.10 kip-ft Mpr LC: 73
hwcs = 12.00 ft ns = 1 Mpr/Mu = 106.20 Mu = 348.29 kip-ft
Controlling Load Combo: 1.386 D + 0.500 Lp - 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 102)
Code Ref: 18.10.4.1

Segment SC3H:1B:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 387.48 kip phiVn =232.49 kip OK
Factored Shear Force: Vu =-77.38 kip
Special Seismic Provisions: Ve = 77.37 kip
Ωv = 1.00 ωv = 1.00 Mpr = 36987.10 kip-ft Mpr LC: 73
hwcs = 12.00 ft ns = 1 Mpr/Mu = 106.20 Mu = 348.29 kip-ft

Controlling Load Combo: 0.714 D - 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 118)
Code Ref: 11.5.4.3

Out-of-Plane Shear Results:

Segment SC3H:1A:
Length = 14.00 ft
Effective depth = 7.69 in
Vu = 39.89 kip phiVn = 95.09 kip OK
Controlling Load Combo: 0.714 D + 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 115)
Code Ref: 22.5

Segment SC3H:1B:
Length = 14.00 ft
Effective depth = 7.69 in
Vu = 37.73 kip phiVn = 93.01 kip OK
Controlling Load Combo: 0.714 D - 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 119)
Code Ref: 22.5

Reinforcement Checks:

Segment SC3H:1A:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Segment SC3H:1B:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Section Cut ID: **SC3H:2 (Horizontal)**
Story: LEVEL 01
Ag = 3360 in2 Imaj = 31610877 in4 Imin = 28000 in4
Major Axis Orientation: 0.00 degrees (CCW from global X-axis)
Wall Design Group: 3
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.326 OK
Beta = 348.4 deg CCW from Major axis
Pu = 77.18 kips phiPn = 236.62 kips
Mu = 685.68 kip-ft phiMn = 2102.16 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 115)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC3H:2A:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 432.42 kip phiVn =259.45 kip OK
Factored Shear Force: Vu = 80.62 kip
Special Seismic Provisions: Ve = 80.61 kip
Ωv = 1.00 ωv = 1.00 Mpr = 2645.23 kip-ft Mpr LC: 37
hwcs = 12.00 ft ns = 1 Mpr/Mu = 181.27 Mu = 14.59 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 114)
Code Ref: 18.10.4.1

Segment SC3H:2B:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 432.42 kip phiVn =259.45 kip OK
Factored Shear Force: Vu = 76.83 kip
Special Seismic Provisions: Ve = 76.83 kip
Ωv = 1.00 ωv = 1.00 Mpr = 2645.23 kip-ft Mpr LC: 37
hwcs = 12.00 ft ns = 1 Mpr/Mu = 181.27 Mu = 14.59 kip-ft

Controlling Load Combo: 0.714 D + 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 114)
Code Ref: 18.10.4.1

Out-of-Plane Shear Results:

Segment SC3H:2A:
Length = 14.00 ft
Effective depth = 7.69 in
Vu = 3.68 kip phiVn = 95.54 kip OK
Controlling Load Combo: 0.714 D + 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 115)
Code Ref: 22.5

Segment SC3H:2B:
Length = 14.00 ft
Effective depth = 7.69 in
Vu = 5.44 kip phiVn = 95.43 kip OK
Controlling Load Combo: 0.714 D - 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 119)
Code Ref: 22.5

Reinforcement Checks:

Segment SC3H:2A:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Segment SC3H:2B:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Section Cut ID: **SC3H:3 (Horizontal)**
Story: LEVEL 01
Ag = 3360 in2 Imaj = 31610877 in4 Imin = 28000 in4
Major Axis Orientation: 0.00 degrees (CCW from global X-axis)
Wall Design Group: 3
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.037 OK
Beta = 357.3 deg CCW from Major axis
Pu = 144.81 kips phiPn = 3964.49 kips
Mu = 442.07 kip-ft phiMn = 12103.14 kip-ft
Controlling Load Combo: 1.386 D + 0.500 Lp - 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 105)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC3H:3A:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 432.42 kip phiVn =259.45 kip OK
Factored Shear Force: Vu = 87.19 kip
Special Seismic Provisions: Ve = 87.19 kip
Ωv = 1.00 ωv = 1.00 Mpr = 19738.61 kip-ft Mpr LC: 93
hwcs = 12.00 ft ns = 1 Mpr/Mu = 162.71 Mu = 121.31 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 114)
Code Ref: 18.10.4.1

Segment SC3H:3B:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 432.42 kip phiVn =259.45 kip OK
Factored Shear Force: Vu = 87.30 kip
Special Seismic Provisions: Ve = 87.30 kip
Ωv = 1.00 ωv = 1.00 Mpr = 19738.61 kip-ft Mpr LC: 93
hwcs = 12.00 ft ns = 1 Mpr/Mu = 162.71 Mu = 121.31 kip-ft

Controlling Load Combo: 0.714 D + 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 114)
Code Ref: 18.10.4.1

Out-of-Plane Shear Results:

Segment SC3H:3A:
Length = 14.00 ft
Effective depth = 7.69 in
Vu = -20.48 kip phiVn = 95.83 kip OK
Controlling Load Combo: 0.714 D - 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 121)
Code Ref: 22.5

Segment SC3H:3B:
Length = 14.00 ft
Effective depth = 7.69 in
Vu = -17.70 kip phiVn = 96.40 kip OK
Controlling Load Combo: 0.714 D - 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 119)
Code Ref: 22.5

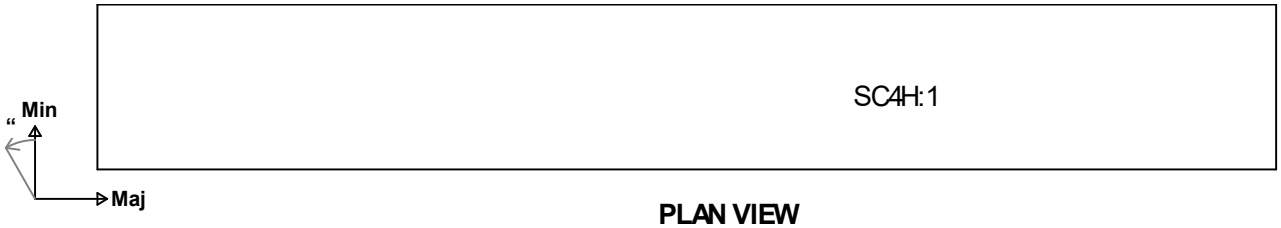
Reinforcement Checks:

Segment SC3H:3A:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Segment SC3H:3B:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Section Cut Design Summary

Section Cut ID: **SC4H:1 (Horizontal)**
Story: LEVEL 01
Ag = 720 in2 Imaj = 311040 in4 Imin = 6000 in4
Major Axis Orientation: 90.00 degrees (CCW from global X-axis)
Wall Design Group: 4
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.101 OK
Beta = 358.1 deg CCW from Major axis
Pu = 10.22 kips phiPn = 100.97 kips
Mu = 87.26 kip-ft phiMn = 861.92 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC4H:1:
Length = 6.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@6" oc
Shear Capacity: α_c= 2.00 Vn = 364.29 kip phiVn =218.58 kip OK
Factored Shear Force: Vu = 68.21 kip
Special Seismic Provisions: Ve = 204.62 kip
Ωv = 3.00 ωv = 1.00 Mpr = 1615.46 kip-ft Mpr LC: 38
hwcs = 12.00 ft ns = 1 Mpr/Mu = 130.95 Mu = 12.34 kip-ft
Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 101)
Code Ref: 18.10.4.4

Out-of-Plane Shear Results:
Segment SC4H:1:
Length = 6.00 ft
Effective depth = 7.69 in
Vu = 8.17 kip phiVn = 34.13 kip OK
Controlling Load Combo: 0.714 D - 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 119)

Code Ref: 22.5

Reinforcement Checks:

Segment SC4H:1:

Thickness : 10.00 in

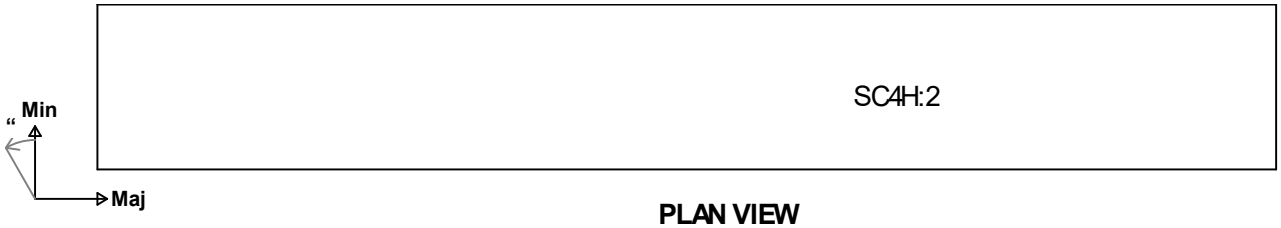
Min Vert Reinf Ratio: 0.120% Actual: 0.597% (11.6.1) OK

Min web reinforcement ratio: 0.250% Actual: 0.511% (18.10.2.1) OK

Min Number of Reinf Curtains: 2 Actual: 2 (18.10.2.2) OK

Section Cut Design Summary

Section Cut ID: **SC4H:2 (Horizontal)**
Story: LEVEL 01
Ag = 720 in2 Imaj = 311040 in4 Imin = 6000 in4
Major Axis Orientation: 90.00 degrees (CCW from global X-axis)
Wall Design Group: 4
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.031 OK
Beta = 176.1 deg CCW from Major axis
Pu = 10.89 kips phiPn = 348.80 kips
Mu = 35.94 kip-ft phiMn = 1151.21 kip-ft
Controlling Load Combo: 0.714 D - 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 121)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC4H:2:
Length = 6.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@6" oc
Shear Capacity: α_c= 2.00 Vn = 364.29 kip phiVn =218.58 kip OK
Factored Shear Force: Vu = 19.07 kip
Special Seismic Provisions: Ve = 57.20 kip
Ωv = 3.00 ωv = 1.00 Mpr = 424.61 kip-ft Mpr LC: 38
hwcs = 12.00 ft ns = 1 Mpr/Mu = 221.68 Mu = 1.92 kip-ft
Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 101)
Code Ref: 18.10.4.4

Out-of-Plane Shear Results:
Segment SC4H:2:
Length = 6.00 ft
Effective depth = 7.69 in
Vu = 6.15 kip phiVn = 34.11 kip OK
Controlling Load Combo: 0.714 D - 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 119)

Code Ref: 22.5

Reinforcement Checks:

Segment SC4H:2:

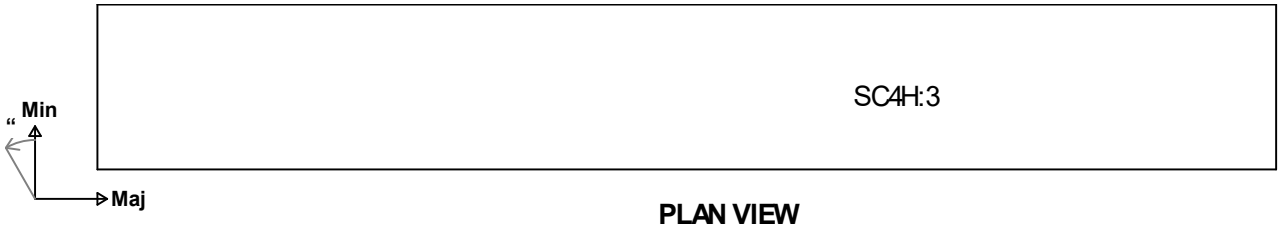
Thickness : 10.00 in

Min Vert Reinf Ratio: 0.120% Actual: 0.597% (11.6.1) OK

Min Number of Reinf Curtains: 2 Actual: 2 (18.10.2.2) OK

Section Cut Design Summary

Section Cut ID: **SC4H:3 (Horizontal)**
Story: LEVEL 01
Ag = 720 in2 Imaj = 311040 in4 Imin = 6000 in4
Major Axis Orientation: 90.00 degrees (CCW from global X-axis)
Wall Design Group: 4
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.019 OK
Beta = 180.9 deg CCW from Major axis
Pu = 26.62 kips phiPn = 1399.37 kips
Mu = 9.17 kip-ft phiMn = 481.80 kip-ft
Controlling Load Combo: 1.200 D + 1.600 Lp + 0.500 Rfp (LC 2)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC4H:3:
Length = 6.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@6" oc
Shear Capacity: α_c= 2.00 Vn = 364.29 kip phiVn =218.58 kip OK
Factored Shear Force: Vu =-28.46 kip
Special Seismic Provisions: Ve = 85.36 kip
Ωv = 3.00 ωv = 1.00 Mpr = 921.32 kip-ft Mpr LC: 72
hwcs = 12.00 ft ns = 1 Mpr/Mu = 225.88 Mu = 4.08 kip-ft
Controlling Load Combo: 0.714 D - 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 121)
Code Ref: 18.10.4.4

Out-of-Plane Shear Results:
Segment SC4H:3:
Length = 6.00 ft
Effective depth = 7.69 in
Vu = -2.55 kip phiVn = 34.04 kip OK
Controlling Load Combo: 0.714 D + 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 114)

Code Ref: 22.5

Reinforcement Checks:

Segment SC4H:3:

Thickness : 10.00 in

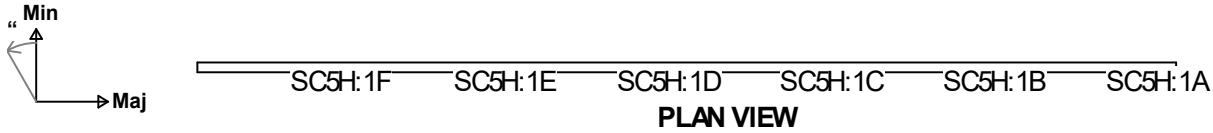
Min Vert Reinf Ratio: 0.120% Actual: 0.597% (11.6.1) OK

Min web reinforcement ratio: 0.250% Actual: 0.511% (18.10.2.1) OK

Min Number of Reinf Curtains: 2 Actual: 2 (18.10.2.2) OK

Section Cut Design Summary

Section Cut ID: **SC5H:1 (Horizontal)**
Story: LEVEL 01
Ag = 10080 in2 Imaj = 853493684 in4 Imin = 84000 in4
Major Axis Orientation: 0.00 degrees (CCW from global X-axis)
Wall Design Group: 5
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.145 OK
Beta = 181.2 deg CCW from Major axis
Pu = 139.67 kips phiPn = 962.76 kips
Mu = 6767.83 kip-ft phiMn = 46652.23 kip-ft
Controlling Load Combo: 0.714 D - 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 119)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC5H:1A:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 388.78 kip phiVn =233.27 kip OK
Factored Shear Force: Vu =-76.77 kip
Special Seismic Provisions: Ve = 76.77 kip
Ωv = 1.00 ωv = 1.00 Mpr = 126957.00 kip-ft Mpr LC: 72
hwcs = 12.00 ft ns = 1 Mpr/Mu = 134.89 Mu = 941.18 kip-ft
Controlling Load Combo: 0.714 D - 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 119)
Code Ref: 11.5.4.3

Segment SC5H:1B:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 432.42 kip phiVn =259.45 kip OK
Factored Shear Force: Vu = 90.18 kip
Special Seismic Provisions: Ve = 90.17 kip
Ωv = 1.00 ωv = 1.00 Mpr = 126957.00 kip-ft Mpr LC: 72
hwcs = 12.00 ft ns = 1 Mpr/Mu = 134.89 Mu = 941.18 kip-ft

Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 98)
Code Ref: 18.10.4.1

Segment SC5H:1C:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 432.42 kip phiVn =259.45 kip OK
Factored Shear Force: Vu =111.42 kip
Special Seismic Provisions: Ve = 111.41 kip
Ωv = 1.00 ωv = 1.00 Mpr = 126957.00 kip-ft Mpr LC: 72
hwcs = 12.00 ft ns = 1 Mpr/Mu = 134.89 Mu = 941.18 kip-ft
Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 99)
Code Ref: 18.10.4.1

Segment SC5H:1D:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 432.42 kip phiVn =259.45 kip OK
Factored Shear Force: Vu = 62.87 kip
Special Seismic Provisions: Ve = 62.87 kip
Ωv = 1.00 ωv = 1.00 Mpr = 126957.00 kip-ft Mpr LC: 72
hwcs = 12.00 ft ns = 1 Mpr/Mu = 134.89 Mu = 941.18 kip-ft
Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 99)
Code Ref: 18.10.4.1

Segment SC5H:1E:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 381.75 kip phiVn =229.05 kip OK
Factored Shear Force: Vu = 60.66 kip
Special Seismic Provisions: Ve = 60.66 kip
Ωv = 1.00 ωv = 1.00 Mpr = 126957.00 kip-ft Mpr LC: 72
hwcs = 12.00 ft ns = 1 Mpr/Mu = 134.89 Mu = 941.18 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 115)
Code Ref: 11.5.4.3

Segment SC5H:1F:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 377.41 kip phiVn =226.45 kip OK
Factored Shear Force: Vu =118.19 kip

Special Seismic Provisions: Ve = 118.19 kip

Ωv = 1.00	ωv = 1.00	Mpr = 126957.00 kip-ft	Mpr LC: 72
hwcs = 12.00 ft	ns = 1	Mpr/Mu = 134.89	Mu = 941.18 kip-ft

Controlling Load Combo: 0.714 D + 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 115)
Code Ref: 11.5.4.3

Out-of-Plane Shear Results:

Segment SC5H:1A:

Length =	14.00 ft			
Effective depth =	7.69 in			
Vu =	40.11 kip	phiVn =	95.18 kip	OK

Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 22.5

Segment SC5H:1B:

Length =	14.00 ft			
Effective depth =	7.69 in			
Vu =	48.57 kip	phiVn =	96.39 kip	OK

Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 22.5

Segment SC5H:1C:

Length =	14.00 ft			
Effective depth =	7.69 in			
Vu =	48.84 kip	phiVn =	92.85 kip	OK

Controlling Load Combo: 0.714 D - 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 119)
Code Ref: 22.5

Segment SC5H:1D:

Length =	14.00 ft			
Effective depth =	7.69 in			
Vu =	48.83 kip	phiVn =	93.42 kip	OK

Controlling Load Combo: 0.714 D - 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 119)
Code Ref: 22.5

Segment SC5H:1E:

Length =	14.00 ft			
Effective depth =	7.69 in			
Vu =	48.49 kip	phiVn =	93.31 kip	OK

Controlling Load Combo: 0.714 D + 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 115)
Code Ref: 22.5

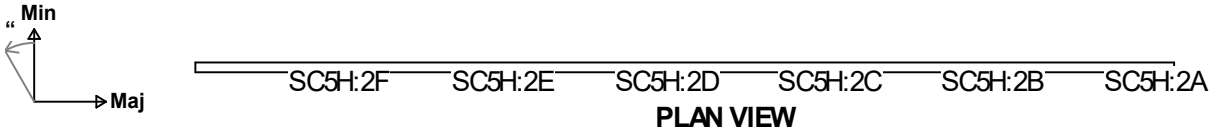
Segment SC5H:1F:
Length = 14.00 ft
Effective depth = 7.69 in
Vu = 38.05 kip phiVn = 90.81 kip OK
Controlling Load Combo: 0.714 D + 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 115)
Code Ref: 22.5

Reinforcement Checks:
Segment SC5H:1A:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC5H:1B:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC5H:1C:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC5H:1D:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Segment SC5H:1E:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC5H:1F:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Section Cut Design Summary

Section Cut ID: **SC5H:2 (Horizontal)**
Story: LEVEL 01
Ag = 10080 in2 Imaj = 853493684 in4 Imin = 84000 in4
Major Axis Orientation: 0.00 degrees (CCW from global X-axis)
Wall Design Group: 5
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.515 OK
Beta = 186.2 deg CCW from Major axis
Pu = 142.41 kips phiPn = 276.75 kips
Mu = 5510.33 kip-ft phiMn = 10708.17 kip-ft
Controlling Load Combo: 0.714 D - 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 119)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC5H:2A:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 432.42 kip phiVn =259.45 kip OK
Factored Shear Force: Vu = 84.79 kip
Special Seismic Provisions: Ve = 84.78 kip
Ωv = 1.00 ωv = 1.00 Mpr = 128975.43 kip-ft Mpr LC: 73
hwcs = 12.00 ft ns = 1 Mpr/Mu = 150.78 Mu = 855.39 kip-ft
Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 99)
Code Ref: 18.10.4.1

Segment SC5H:2B:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 432.42 kip phiVn =259.45 kip OK
Factored Shear Force: Vu = 84.64 kip
Special Seismic Provisions: Ve = 84.63 kip
Ωv = 1.00 ωv = 1.00 Mpr = 128975.43 kip-ft Mpr LC: 73
hwcs = 12.00 ft ns = 1 Mpr/Mu = 150.78 Mu = 855.39 kip-ft

Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 98)
Code Ref: 18.10.4.1

Segment SC5H:2C:

Length = 14.00 ft	Thick = 10.00 in	f'c = 4000 psi	fy = 60 ksi	
Vert Bar Pat: #5@12" oc	Horiz Bar Pat: #4@18" oc			
Shear Capacity:	α_c= 2.00	Vn = 383.37 kip	phiVn =230.02 kip	OK
Factored Shear Force:	Vu =-111.26 kip			
Special Seismic Provisions:	Ve = 111.26 kip			
Ωv = 1.00	ωv = 1.00	Mpr = 128975.43 kip-ft	Mpr LC: 73	
hwcs = 12.00 ft	ns = 1	Mpr/Mu = 150.78	Mu = 855.39 kip-ft	

Controlling Load Combo: 0.714 D - 2.08 Dyn2 (LC 95)
Code Ref: 11.5.4.3

Segment SC5H:2D:

Length = 14.00 ft	Thick = 10.00 in	f'c = 4000 psi	fy = 60 ksi	
Vert Bar Pat: #5@12" oc	Horiz Bar Pat: #4@18" oc			
Shear Capacity:	α_c= 2.00	Vn = 432.42 kip	phiVn =259.45 kip	OK
Factored Shear Force:	Vu = 50.72 kip			
Special Seismic Provisions:	Ve = 50.71 kip			
Ωv = 1.00	ωv = 1.00	Mpr = 128975.43 kip-ft	Mpr LC: 73	
hwcs = 12.00 ft	ns = 1	Mpr/Mu = 150.78	Mu = 855.39 kip-ft	

Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 99)
Code Ref: 18.10.4.1

Segment SC5H:2E:

Length = 14.00 ft	Thick = 10.00 in	f'c = 4000 psi	fy = 60 ksi	
Vert Bar Pat: #5@12" oc	Horiz Bar Pat: #4@18" oc			
Shear Capacity:	α_c= 2.00	Vn = 389.87 kip	phiVn =233.92 kip	OK
Factored Shear Force:	Vu = 49.34 kip			
Special Seismic Provisions:	Ve = 49.34 kip			
Ωv = 1.00	ωv = 1.00	Mpr = 128975.43 kip-ft	Mpr LC: 73	
hwcs = 12.00 ft	ns = 1	Mpr/Mu = 150.78	Mu = 855.39 kip-ft	

Controlling Load Combo: 1.386 D + 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 107)
Code Ref: 11.5.4.3

Segment SC5H:2F:

Length = 14.00 ft	Thick = 10.00 in	f'c = 4000 psi	fy = 60 ksi	
Vert Bar Pat: #5@12" oc	Horiz Bar Pat: #4@18" oc			
Shear Capacity:	α_c= 2.00	Vn = 381.70 kip	phiVn =229.02 kip	OK
Factored Shear Force:	Vu =106.75 kip			

Special Seismic Provisions: Ve = 106.74 kip

Ωv = 1.00	ωv = 1.00	Mpr = 128975.43 kip-ft	Mpr LC: 73
hwcs = 12.00 ft	ns = 1	Mpr/Mu = 150.78	Mu = 855.39 kip-ft

Controlling Load Combo: 0.714 D + 2.08 Dyn2 (LC 91)
Code Ref: 11.5.4.3

Out-of-Plane Shear Results:

Segment SC5H:2A:

Length =	14.00 ft			
Effective depth =	7.69 in			
Vu =	3.84 kip	phiVn =	96.65 kip	OK

Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 22.5

Segment SC5H:2B:

Length =	14.00 ft			
Effective depth =	7.69 in			
Vu =	-0.76 kip	phiVn =	97.06 kip	OK

Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 22.5

Segment SC5H:2C:

Length =	14.00 ft			
Effective depth =	7.69 in			
Vu =	-0.89 kip	phiVn =	94.23 kip	OK

Controlling Load Combo: 0.714 D - 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 119)
Code Ref: 22.5

Segment SC5H:2D:

Length =	14.00 ft			
Effective depth =	7.69 in			
Vu =	-0.89 kip	phiVn =	94.48 kip	OK

Controlling Load Combo: 0.714 D - 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 119)
Code Ref: 22.5

Segment SC5H:2E:

Length =	14.00 ft			
Effective depth =	7.69 in			
Vu =	-0.73 kip	phiVn =	94.40 kip	OK

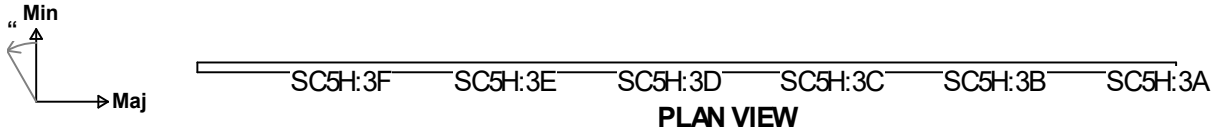
Controlling Load Combo: 0.714 D + 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 115)
Code Ref: 22.5

Segment SC5H:2F:
Length = 14.00 ft
Effective depth = 7.69 in
Vu = 4.44 kip phiVn = 92.71 kip OK
Controlling Load Combo: 0.714 D + 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 114)
Code Ref: 22.5

Reinforcement Checks:
Segment SC5H:2A:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC5H:2B:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC5H:2C:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC5H:2D:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Segment SC5H:2E:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC5H:2F:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Section Cut ID: **SC5H:3 (Horizontal)**
Story: LEVEL 01
Ag = 10080 in2 Imaj = 853493684 in4 Imin = 84000 in4
Major Axis Orientation: 0.00 degrees (CCW from global X-axis)
Wall Design Group: 5
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.054 OK
Beta = 181.7 deg CCW from Major axis
Pu = 140.42 kips phiPn = 2590.48 kips
Mu = 2620.21 kip-ft phiMn = 48339.08 kip-ft
Controlling Load Combo: 0.714 D - 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 119)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC5H:3A:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 432.42 kip phiVn =259.45 kip OK
Factored Shear Force: Vu = 90.18 kip
Special Seismic Provisions: Ve = 90.17 kip
Ωv = 1.00 ωv = 1.00 Mpr = 194228.17 kip-ft Mpr LC: 34
hwcs = 12.00 ft ns = 1 Mpr/Mu = 195.19 Mu = 995.06 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 115)
Code Ref: 18.10.4.1

Segment SC5H:3B:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 432.42 kip phiVn =259.45 kip OK
Factored Shear Force: Vu = 86.08 kip
Special Seismic Provisions: Ve = 86.07 kip
Ωv = 1.00 ωv = 1.00 Mpr = 194228.17 kip-ft Mpr LC: 34
hwcs = 12.00 ft ns = 1 Mpr/Mu = 195.19 Mu = 995.06 kip-ft

Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 98)
Code Ref: 18.10.4.1

Segment SC5H:3C:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 432.42 kip phiVn =259.45 kip OK
Factored Shear Force: Vu =139.23 kip
Special Seismic Provisions: Ve = 139.23 kip
Ωv = 1.00 ωv = 1.00 Mpr = 194228.17 kip-ft Mpr LC: 34
hwcs = 12.00 ft ns = 1 Mpr/Mu = 195.19 Mu = 995.06 kip-ft
Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 99)
Code Ref: 18.10.4.1

Segment SC5H:3D:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 432.42 kip phiVn =259.45 kip OK
Factored Shear Force: Vu = 44.51 kip
Special Seismic Provisions: Ve = 44.50 kip
Ωv = 1.00 ωv = 1.00 Mpr = 194228.17 kip-ft Mpr LC: 34
hwcs = 12.00 ft ns = 1 Mpr/Mu = 195.19 Mu = 995.06 kip-ft
Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 99)
Code Ref: 18.10.4.1

Segment SC5H:3E:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 387.42 kip phiVn =232.45 kip OK
Factored Shear Force: Vu = 41.57 kip
Special Seismic Provisions: Ve = 41.56 kip
Ωv = 1.00 ωv = 1.00 Mpr = 194228.17 kip-ft Mpr LC: 34
hwcs = 12.00 ft ns = 1 Mpr/Mu = 195.19 Mu = 995.06 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 115)
Code Ref: 11.5.4.3

Segment SC5H:3F:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 432.42 kip phiVn =259.45 kip OK
Factored Shear Force: Vu =-132.90 kip

Special Seismic Provisions: Ve = 132.89 kip

Ωv = 1.00	ωv = 1.00	Mpr = 194228.17 kip-ft	Mpr LC: 34
hwcs = 12.00 ft	ns = 1	Mpr/Mu = 195.19	Mu = 995.06 kip-ft

Controlling Load Combo: 1.386 D + 0.500 Lp - 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 103)
Code Ref: 18.10.4.1

Out-of-Plane Shear Results:

Segment SC5H:3A:

Length =	14.00 ft			
Effective depth =	7.69 in			
Vu =	-19.87 kip	phiVn =	134.65 kip	OK

Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 22.5

Segment SC5H:3B:

Length =	14.00 ft			
Effective depth =	7.69 in			
Vu =	-29.00 kip	phiVn =	134.66 kip	OK

Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 22.5

Segment SC5H:3C:

Length =	14.00 ft			
Effective depth =	7.69 in			
Vu =	-29.30 kip	phiVn =	96.46 kip	OK

Controlling Load Combo: 0.714 D - 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 119)
Code Ref: 22.5

Segment SC5H:3D:

Length =	14.00 ft			
Effective depth =	7.69 in			
Vu =	-29.30 kip	phiVn =	96.61 kip	OK

Controlling Load Combo: 0.714 D - 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 119)
Code Ref: 22.5

Segment SC5H:3E:

Length =	14.00 ft			
Effective depth =	7.69 in			
Vu =	-28.92 kip	phiVn =	96.58 kip	OK

Controlling Load Combo: 0.714 D + 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 115)
Code Ref: 22.5

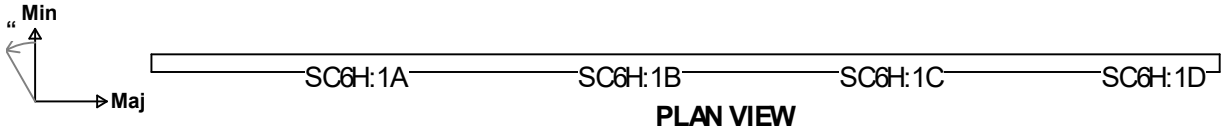
Segment SC5H:3F:
Length = 14.00 ft
Effective depth = 7.69 in
Vu = -18.72 kip phiVn = 95.86 kip OK
Controlling Load Combo: 0.714 D + 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 115)
Code Ref: 22.5

Reinforcement Checks:
Segment SC5H:3A:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC5H:3B:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC5H:3C:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC5H:3D:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Segment SC5H:3E:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC5H:3F:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Section Cut Design Summary

Section Cut ID: **SC6H:1 (Horizontal)**
Story: LEVEL 01
Ag = 6120 in2 Imaj = 191017427 in4 Imin = 51000 in4
Major Axis Orientation: 90.00 degrees (CCW from global X-axis)
Wall Design Group: 6
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.129 OK
Beta = 2.4 deg CCW from Major axis
Pu = 48.54 kips phiPn = 376.54 kips
Mu = 1934.39 kip-ft phiMn = 15006.93 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC6H:1A:
Length = 13.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 401.53 kip phiVn =240.92 kip OK
Factored Shear Force: Vu =104.43 kip
Special Seismic Provisions: Ve = 104.43 kip
Ωv = 1.00 ωv = 1.00 Mpr = 44741.09 kip-ft Mpr LC: 90
hwcs = 12.00 ft ns = 1 Mpr/Mu = 398.76 Mu = 112.20 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 18.10.4.1

Segment SC6H:1B:
Length = 13.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 356.90 kip phiVn =214.14 kip OK
Factored Shear Force: Vu =102.65 kip
Special Seismic Provisions: Ve = 102.65 kip
Ωv = 1.00 ωv = 1.00 Mpr = 44741.09 kip-ft Mpr LC: 90
hwcs = 12.00 ft ns = 1 Mpr/Mu = 398.76 Mu = 112.20 kip-ft

Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 11.5.4.3

Segment SC6H:1C:
Length = 12.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 331.15 kip phiVn =198.69 kip OK
Factored Shear Force: Vu = 64.69 kip
Special Seismic Provisions: Ve = 64.69 kip
Ωv = 1.00 ωv = 1.00 Mpr = 44741.09 kip-ft Mpr LC: 90
hwcs = 12.00 ft ns = 1 Mpr/Mu = 398.76 Mu = 112.20 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 11.5.4.3

Segment SC6H:1D:
Length = 13.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 401.53 kip phiVn =240.92 kip OK
Factored Shear Force: Vu = 48.07 kip
Special Seismic Provisions: Ve = 48.07 kip
Ωv = 1.00 ωv = 1.00 Mpr = 44741.09 kip-ft Mpr LC: 90
hwcs = 12.00 ft ns = 1 Mpr/Mu = 398.76 Mu = 112.20 kip-ft
Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 101)
Code Ref: 18.10.4.1

Out-of-Plane Shear Results:

Segment SC6H:1A:
Length = 13.00 ft
Effective depth = 7.69 in
Vu = -34.50 kip phiVn = 108.79 kip OK
Controlling Load Combo: 0.714 D + 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 114)
Code Ref: 22.5

Segment SC6H:1B:
Length = 13.00 ft
Effective depth = 7.69 in
Vu = -43.92 kip phiVn = 88.04 kip OK
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 22.5

Segment SC6H:1C:

Length = 12.00 ft
Effective depth = 7.69 in
Vu = -39.90 kip phiVn = 82.25 kip OK
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 22.5

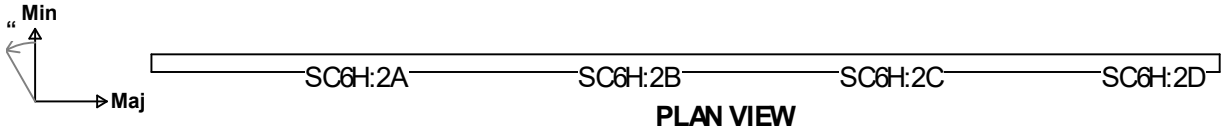
Segment SC6H:1D:
Length = 13.00 ft
Effective depth = 7.69 in
Vu = -34.02 kip phiVn = 88.05 kip OK
Controlling Load Combo: 0.714 D - 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 121)
Code Ref: 22.5

Reinforcement Checks:
Segment SC6H:1A:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.551% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC6H:1B:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.551% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC6H:1C:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.554% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC6H:1D:
Thickness : 10.00 in

Min Vert Reinf Ratio: 0.120% Actual: 0.551% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Section Cut Design Summary

Section Cut ID: **SC6H:2 (Horizontal)**
Story: LEVEL 01
Ag = 6120 in2 Imaj = 191017427 in4 Imin = 51000 in4
Major Axis Orientation: 90.00 degrees (CCW from global X-axis)
Wall Design Group: 6
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.447 OK
Beta = 10.6 deg CCW from Major axis
Pu = 41.68 kips phiPn = 93.24 kips
Mu = 1677.73 kip-ft phiMn = 3753.56 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC6H:2A:
Length = 13.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 401.53 kip phiVn =240.92 kip OK
Factored Shear Force: Vu = 74.89 kip
Special Seismic Provisions: Ve = 74.89 kip
Ωv = 1.00 ωv = 1.00 Mpr = 43290.33 kip-ft Mpr LC: 90
hwcs = 12.00 ft ns = 1 Mpr/Mu = 337.43 Mu = 128.29 kip-ft
Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 101)
Code Ref: 18.10.4.1

Segment SC6H:2B:
Length = 13.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 358.20 kip phiVn =214.92 kip OK
Factored Shear Force: Vu =109.96 kip
Special Seismic Provisions: Ve = 109.95 kip
Ωv = 1.00 ωv = 1.00 Mpr = 43290.33 kip-ft Mpr LC: 90
hwcs = 12.00 ft ns = 1 Mpr/Mu = 337.43 Mu = 128.29 kip-ft

Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 11.5.4.3

Segment SC6H:2C:
Length = 12.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 331.75 kip phiVn =199.05 kip OK
Factored Shear Force: Vu = 58.38 kip
Special Seismic Provisions: Ve = 58.38 kip
Ωv = 1.00 ωv = 1.00 Mpr = 43290.33 kip-ft Mpr LC: 90
hwcs = 12.00 ft ns = 1 Mpr/Mu = 337.43 Mu = 128.29 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 11.5.4.3

Segment SC6H:2D:
Length = 13.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 401.53 kip phiVn =240.92 kip OK
Factored Shear Force: Vu = 81.48 kip
Special Seismic Provisions: Ve = 81.47 kip
Ωv = 1.00 ωv = 1.00 Mpr = 43290.33 kip-ft Mpr LC: 90
hwcs = 12.00 ft ns = 1 Mpr/Mu = 337.43 Mu = 128.29 kip-ft
Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 101)
Code Ref: 18.10.4.1

Out-of-Plane Shear Results:

Segment SC6H:2A:
Length = 13.00 ft
Effective depth = 7.69 in
Vu = -4.87 kip phiVn = 109.32 kip OK
Controlling Load Combo: 0.714 D + 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 114)
Code Ref: 22.5

Segment SC6H:2B:
Length = 13.00 ft
Effective depth = 7.69 in
Vu = 0.14 kip phiVn = 88.79 kip OK
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 22.5

Segment SC6H:2C:

Length = 12.00 ft
Effective depth = 7.69 in
Vu = -0.23 kip phiVn = 82.59 kip OK
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 22.5

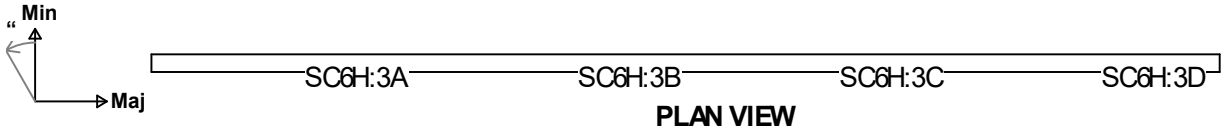
Segment SC6H:2D:
Length = 13.00 ft
Effective depth = 7.69 in
Vu = -4.05 kip phiVn = 88.27 kip OK
Controlling Load Combo: 0.714 D - 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 121)
Code Ref: 22.5

Reinforcement Checks:
Segment SC6H:2A:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.551% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC6H:2B:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.551% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC6H:2C:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.554% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC6H:2D:
Thickness : 10.00 in

Min Vert Reinf Ratio: 0.120% Actual: 0.551% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Section Cut Design Summary

Section Cut ID: **SC6H:3 (Horizontal)**
Story: LEVEL 01
Ag = 6120 in2 Imaj = 191017427 in4 Imin = 51000 in4
Major Axis Orientation: 90.00 degrees (CCW from global X-axis)
Wall Design Group: 6
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.046 OK
Beta = 7.1 deg CCW from Major axis
Pu = 54.97 kips phiPn = 1203.48 kips
Mu = 353.39 kip-ft phiMn = 7736.72 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC6H:3A:
Length = 13.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 401.53 kip phiVn =240.92 kip OK
Factored Shear Force: Vu = 67.81 kip
Special Seismic Provisions: Ve = 67.81 kip
Ωv = 1.00 ωv = 1.00 Mpr = 64493.95 kip-ft Mpr LC: 37
hwcs = 12.00 ft ns = 1 Mpr/Mu = 283.31 Mu = 227.64 kip-ft
Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 101)
Code Ref: 18.10.4.1

Segment SC6H:3B:
Length = 13.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 360.94 kip phiVn =216.57 kip OK
Factored Shear Force: Vu =119.40 kip
Special Seismic Provisions: Ve = 119.39 kip
Ωv = 1.00 ωv = 1.00 Mpr = 64493.95 kip-ft Mpr LC: 37
hwcs = 12.00 ft ns = 1 Mpr/Mu = 283.31 Mu = 227.64 kip-ft

Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 11.5.4.3

Segment SC6H:3C:
Length = 12.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 333.93 kip phiVn =200.36 kip OK
Factored Shear Force: Vu = 56.12 kip
Special Seismic Provisions: Ve = 56.11 kip
Ωv = 1.00 ωv = 1.00 Mpr = 64493.95 kip-ft Mpr LC: 37
hwcs = 12.00 ft ns = 1 Mpr/Mu = 283.31 Mu = 227.64 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 11.5.4.3

Segment SC6H:3D:
Length = 13.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 401.53 kip phiVn =240.92 kip OK
Factored Shear Force: Vu = 94.97 kip
Special Seismic Provisions: Ve = 94.97 kip
Ωv = 1.00 ωv = 1.00 Mpr = 64493.95 kip-ft Mpr LC: 37
hwcs = 12.00 ft ns = 1 Mpr/Mu = 283.31 Mu = 227.64 kip-ft
Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 101)
Code Ref: 18.10.4.1

Out-of-Plane Shear Results:

Segment SC6H:3A:
Length = 13.00 ft
Effective depth = 7.69 in
Vu = 16.29 kip phiVn = 109.97 kip OK
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 22.5

Segment SC6H:3B:
Length = 13.00 ft
Effective depth = 7.69 in
Vu = 25.86 kip phiVn = 90.37 kip OK
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 22.5

Segment SC6H:3C:

Length = 12.00 ft
Effective depth = 7.69 in
Vu = 23.34 kip phiVn = 83.85 kip OK
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 22.5

Segment SC6H:3D:
Length = 13.00 ft
Effective depth = 7.69 in
Vu = 17.52 kip phiVn = 90.11 kip OK
Controlling Load Combo: 0.714 D - 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 121)
Code Ref: 22.5

Reinforcement Checks:
Segment SC6H:3A:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.551% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC6H:3B:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.551% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC6H:3C:
Thickness : 10.00 in
Min Vert Reinf Ratio: 0.120% Actual: 0.554% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK
Segment SC6H:3D:
Thickness : 10.00 in

Min Vert Reinf Ratio: 0.120% Actual: 0.551% (11.6.1) OK
Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK
Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK
Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Section Cut ID: **SC7H:1 (Horizontal)**
Story: LEVEL 01
Ag = 3840 in2 Imaj = 47185916 in4 Imin = 32000 in4
Major Axis Orientation: 90.00 degrees (CCW from global X-axis)
Wall Design Group: 7
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.135 OK
Beta = 357.3 deg CCW from Major axis
Pu = 51.46 kips phiPn = 382.22 kips
Mu = 1161.63 kip-ft phiMn = 8628.87 kip-ft
Controlling Load Combo: 0.714 D - 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 119)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC7H:1:
Length = 32.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 988.38 kip phiVn =593.03 kip OK
Factored Shear Force: Vu =268.72 kip
Special Seismic Provisions: Ve = 268.72 kip
Ωv = 1.00 ωv = 1.00 Mpr = 38995.09 kip-ft Mpr LC: 37
hwcs = 12.00 ft ns = 1 Mpr/Mu = 197.02 Mu = 197.93 kip-ft
Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 101)
Code Ref: 18.10.4.1

Out-of-Plane Shear Results:
Segment SC7H:1:
Length = 32.00 ft
Effective depth = 7.69 in
Vu = 106.99 kip phiVn = 174.23 kip OK
Controlling Load Combo: 0.714 D - 2.08 Dyn2 + 1.6O1 + 1.0O2 (LC 119)
Code Ref: 22.5

Reinforcement Checks:

Segment SC7H:1:

Thickness : 10.00 in

Min Vert Reinf Ratio: 0.120% Actual: 0.527% (11.6.1) OK

Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK

Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK

Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK

Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK

Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Section Cut Design Summary

Section Cut ID: **SC7H:2 (Horizontal)**
Story: LEVEL 01
Ag = 3840 in2 Imaj = 47185916 in4 Imin = 32000 in4
Major Axis Orientation: 90.00 degrees (CCW from global X-axis)
Wall Design Group: 7
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.482 OK
Beta = 325.1 deg CCW from Major axis
Pu = 65.71 kips phiPn = 136.36 kips
Mu = 404.00 kip-ft phiMn = 838.33 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn3 + 1.6O1 + 1.0O2 (LC 116)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC7H:2:
Length = 32.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 988.38 kip phiVn =593.03 kip OK
Factored Shear Force: Vu =211.21 kip
Special Seismic Provisions: Ve = 211.21 kip
Ωv = 1.00 ωv = 1.00 Mpr = 24350.39 kip-ft Mpr LC: 93
hwcs = 12.00 ft ns = 1 Mpr/Mu = 198.24 Mu = 122.83 kip-ft
Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 101)
Code Ref: 18.10.4.1

Out-of-Plane Shear Results:
Segment SC7H:2:
Length = 32.00 ft
Effective depth = 7.69 in
Vu = 1.68 kip phiVn = 175.33 kip OK
Controlling Load Combo: 0.714 D + 2.08 Dyn3 + 1.6O1 + 1.0O2 (LC 116)
Code Ref: 22.5

Reinforcement Checks:

Segment SC7H:2:

Thickness : 10.00 in

Min Vert Reinf Ratio: 0.120% Actual: 0.527% (11.6.1) OK

Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK

Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK

Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK

Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK

Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Section Cut Design Summary

Section Cut ID: **SC7H:3 (Horizontal)**
Story: LEVEL 01
Ag = 3840 in2 Imaj = 47185916 in4 Imin = 32000 in4
Major Axis Orientation: 90.00 degrees (CCW from global X-axis)
Wall Design Group: 7
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.043 OK
Beta = 184.3 deg CCW from Major axis
Pu = 71.74 kips phiPn = 1651.59 kips
Mu = 408.36 kip-ft phiMn = 9400.78 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC7H:3:
Length = 32.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 988.38 kip phiVn =593.03 kip OK
Factored Shear Force: Vu =193.61 kip
Special Seismic Provisions: Ve = 193.60 kip
Ωv = 1.00 ωv = 1.00 Mpr = 4721.77 kip-ft Mpr LC: 72
hwcs = 12.00 ft ns = 1 Mpr/Mu = 147.79 Mu = 31.95 kip-ft
Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 101)
Code Ref: 18.10.4.1

Out-of-Plane Shear Results:
Segment SC7H:3:
Length = 32.00 ft
Effective depth = 7.69 in
Vu = -61.22 kip phiVn = 177.19 kip OK
Controlling Load Combo: 0.714 D + 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 114)
Code Ref: 22.5

Reinforcement Checks:

Segment SC7H:3:

Thickness : 10.00 in

Min Vert Reinf Ratio: 0.120% Actual: 0.527% (11.6.1) OK

Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK

Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK

Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK

Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK

Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Section Cut Design Summary

Section Cut ID: **SC8H:1 (Horizontal)**
Story: LEVEL 01
Ag = 1680 in2 Imaj = 3951360 in4 Imin = 14000 in4
Major Axis Orientation: 0.00 degrees (CCW from global X-axis)
Wall Design Group: 8
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.131 OK
Beta = 181.9 deg CCW from Major axis
Pu = -2.89 kips phiPn = -22.01 kips
Mu = 377.06 kip-ft phiMn = 2875.14 kip-ft
Controlling Load Combo: 0.714 D - 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 118)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC8H:1:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 389.33 kip phiVn =233.60 kip OK
Factored Shear Force: Vu =-80.79 kip
Special Seismic Provisions: Ve = 80.78 kip
Ωv = 1.00 ωv = 1.00 Mpr = 5522.08 kip-ft Mpr LC: 73
hwcs = 12.00 ft ns = 1 Mpr/Mu = 88.99 Mu = 62.05 kip-ft
Controlling Load Combo: 0.714 D - 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 118)
Code Ref: 11.5.4.3

Out-of-Plane Shear Results:
Segment SC8H:1:
Length = 14.00 ft
Effective depth = 7.69 in
Vu = 31.15 kip phiVn = 74.75 kip OK
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 22.5

Reinforcement Checks:

Segment SC8H:1:

Thickness : 10.00 in

Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK

Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK

Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK

Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK

Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK

Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Section Cut Design Summary

Section Cut ID: **SC8H:2 (Horizontal)**
Story: LEVEL 01
Ag = 1680 in2 Imaj = 3951360 in4 Imin = 14000 in4
Major Axis Orientation: 0.00 degrees (CCW from global X-axis)
Wall Design Group: 8
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.145 OK
Beta = 344.8 deg CCW from Major axis
Pu = 15.90 kips phiPn = 109.40 kips
Mu = 116.63 kip-ft phiMn = 802.73 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC8H:2:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 432.42 kip phiVn =259.45 kip OK
Factored Shear Force: Vu = 79.55 kip
Special Seismic Provisions: Ve = 79.54 kip
Ωv = 1.00 ωv = 1.00 Mpr = 9879.46 kip-ft Mpr LC: 36
hwcs = 12.00 ft ns = 1 Mpr/Mu = 215.69 Mu = 45.80 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 114)
Code Ref: 18.10.4.1

Out-of-Plane Shear Results:
Segment SC8H:2:
Length = 14.00 ft
Effective depth = 7.69 in
Vu = 9.71 kip phiVn = 76.67 kip OK
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 22.5

Reinforcement Checks:

Segment SC8H:2:

Thickness : 10.00 in

Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK

Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK

Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK

Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK

Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK

Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Section Cut Design Summary

Section Cut ID: **SC8H:3 (Horizontal)**
Story: LEVEL 01
Ag = 1680 in2 Imaj = 3951360 in4 Imin = 14000 in4
Major Axis Orientation: 0.00 degrees (CCW from global X-axis)
Wall Design Group: 8
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.041 OK
Beta = 357.1 deg CCW from Major axis
Pu = 69.05 kips phiPn = 1699.02 kips
Mu = 188.16 kip-ft phiMn = 4630.21 kip-ft
Controlling Load Combo: 1.386 D + 0.500 Lp + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 101)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC8H:3:
Length = 14.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 432.42 kip phiVn =259.45 kip OK
Factored Shear Force: Vu = 90.88 kip
Special Seismic Provisions: Ve = 90.87 kip
Ωv = 1.00 ωv = 1.00 Mpr = 3862.04 kip-ft Mpr LC: 90
hwcs = 12.00 ft ns = 1 Mpr/Mu = 138.47 Mu = 27.89 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 114)
Code Ref: 18.10.4.1

Out-of-Plane Shear Results:
Segment SC8H:3:
Length = 14.00 ft
Effective depth = 7.69 in
Vu = -11.14 kip phiVn = 79.34 kip OK
Controlling Load Combo: 0.714 D - 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 121)
Code Ref: 22.5

Reinforcement Checks:

Segment SC8H:3:

Thickness : 10.00 in

Min Vert Reinf Ratio: 0.120% Actual: 0.548% (11.6.1) OK

Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK

Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK

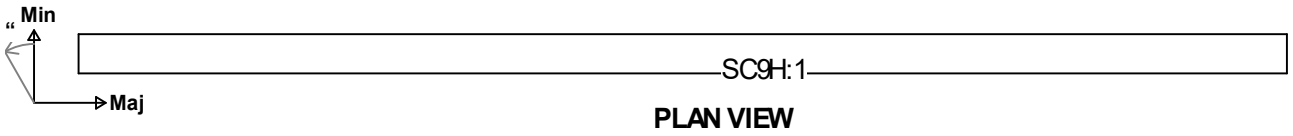
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK

Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK

Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Section Cut Design Summary

Section Cut ID: **SC9H:1 (Horizontal)**
Story: LEVEL 01
Ag = 3120 in2 Imaj = 25309438 in4 Imin = 26000 in4
Major Axis Orientation: 90.00 degrees (CCW from global X-axis)
Wall Design Group: 9
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.068 OK
Beta = 0.1 deg CCW from Major axis
Pu = 65.89 kips phiPn = 975.90 kips
Mu = 1356.50 kip-ft phiMn = 20092.13 kip-ft
Controlling Load Combo: 0.714 D - 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 118)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC9H:1:
Length = 26.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 803.06 kip phiVn =481.84 kip OK
Factored Shear Force: Vu =158.95 kip
Special Seismic Provisions: Ve = 158.95 kip
Ωv = 1.00 ωv = 1.00 Mpr = 37644.47 kip-ft Mpr LC: 69
hwcs = 12.00 ft ns = 1 Mpr/Mu = 86.40 Mu = 435.70 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 18.10.4.1

Out-of-Plane Shear Results:
Segment SC9H:1:
Length = 26.00 ft
Effective depth = 7.69 in
Vu = -2.06 kip phiVn = 143.79 kip OK
Controlling Load Combo: 0.714 D - 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 121)
Code Ref: 22.5

Reinforcement Checks:

Segment SC9H:1:

Thickness : 10.00 in

Min Vert Reinf Ratio: 0.120% Actual: 0.531% (11.6.1) OK

Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK

Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK

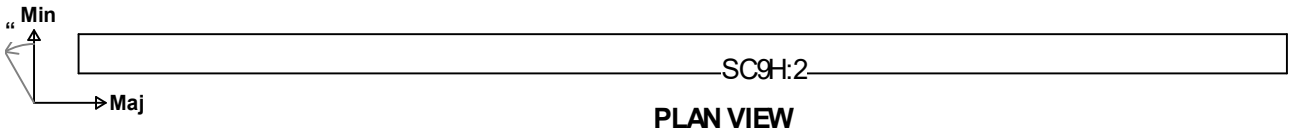
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK

Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK

Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Section Cut Design Summary

Section Cut ID: **SC9H:2 (Horizontal)**
Story: LEVEL 01
Ag = 3120 in2 Imaj = 25309438 in4 Imin = 26000 in4
Major Axis Orientation: 90.00 degrees (CCW from global X-axis)
Wall Design Group: 9
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.038 OK
Beta = 0.6 deg CCW from Major axis
Pu = 139.02 kips phiPn = 3665.94 kips
Mu = 783.89 kip-ft phiMn = 20671.45 kip-ft
Controlling Load Combo: 1.386 D + 0.500 Lp - 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 102)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC9H:2:
Length = 26.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 803.06 kip phiVn =481.84 kip OK
Factored Shear Force: Vu =134.82 kip
Special Seismic Provisions: Ve = 134.81 kip
Ωv = 1.00 ωv = 1.00 Mpr = 35148.08 kip-ft Mpr LC: 39
hwcs = 12.00 ft ns = 1 Mpr/Mu = 124.02 Mu = 283.40 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 18.10.4.1

Out-of-Plane Shear Results:
Segment SC9H:2:
Length = 26.00 ft
Effective depth = 7.69 in
Vu = 1.35 kip phiVn = 143.53 kip OK
Controlling Load Combo: 0.714 D - 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 118)
Code Ref: 22.5

Reinforcement Checks:

Segment SC9H:2:

Thickness : 10.00 in

Min Vert Reinf Ratio: 0.120% Actual: 0.531% (11.6.1) OK

Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK

Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK

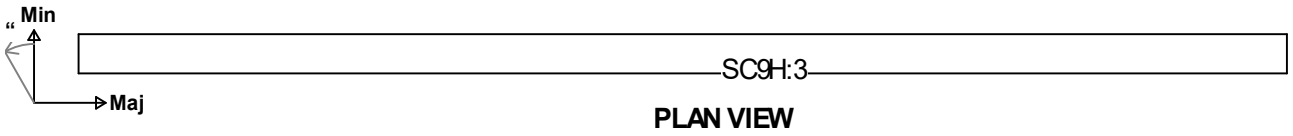
Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK

Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK

Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

Section Cut Design Summary

Section Cut ID: **SC9H:3 (Horizontal)**
Story: LEVEL 01
Ag = 3120 in2 Imaj = 25309438 in4 Imin = 26000 in4
Major Axis Orientation: 90.00 degrees (CCW from global X-axis)
Wall Design Group: 9
Wall Type: Cast-In-Place
Design Status: PASS



PLAN VIEW

Axial/Flexural Results:
Interaction: 0.027 OK
Beta = 359.4 deg CCW from Major axis
Pu = 163.88 kips phiPn = 6003.76 kips
Mu = 238.33 kip-ft phiMn = 8731.35 kip-ft
Controlling Load Combo: 1.200 D + 1.600 Lp + 0.500 Rfp (LC 2)
Code Ref: 11.4.2.1

In-Plane Shear Results:
Segment SC9H:3:
Length = 26.00 ft Thick = 10.00 in f'c = 4000 psi fy = 60 ksi
Vert Bar Pat: #5@12" oc Horiz Bar Pat: #4@18" oc
Shear Capacity: α_c= 2.00 Vn = 803.06 kip phiVn =481.84 kip OK
Factored Shear Force: Vu =127.23 kip
Special Seismic Provisions: Ve = 127.22 kip
Ωv = 1.00 ωv = 1.00 Mpr = 11614.25 kip-ft Mpr LC: 96
hwcs = 12.00 ft ns = 1 Mpr/Mu = 167.80 Mu = 69.22 kip-ft
Controlling Load Combo: 0.714 D + 2.08 Dyn4 + 1.6O1 + 1.0O2 (LC 117)
Code Ref: 18.10.4.1

Out-of-Plane Shear Results:
Segment SC9H:3:
Length = 26.00 ft
Effective depth = 7.69 in
Vu = 2.26 kip phiVn = 143.55 kip OK
Controlling Load Combo: 0.714 D - 2.08 Dyn1 + 1.6O1 + 1.0O2 (LC 118)
Code Ref: 22.5

Reinforcement Checks:

Segment SC9H:3:

Thickness : 10.00 in

Min Vert Reinf Ratio: 0.120% Actual: 0.531% (11.6.1) OK

Max Vert Bar Spacing Limit: 18.00 in Actual: 12.00 in (11.7.2.1) OK

Min Vert Bar Spacing Limit: 1.00 in Actual: 11.38 in (25.2.1) OK

Min Longit Reinf Ratio Limit: 0.218% Actual: 0.511% (18.10.4.3) OK

Min Number of Reinf Curtains: 1 Actual: 2 (11.7.2.3) OK

Min Number of Reinf Curtains: 1 Actual: 2 (18.10.2.2) OK

LATERAL DESIGN - FOUNDATIONS

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: Foundations.ec6

DESCRIPTION: Grid C' Foundation

Code References

Calculations per ACI 318-19, IBC 2021
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	4.0	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	300.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	2.50	ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

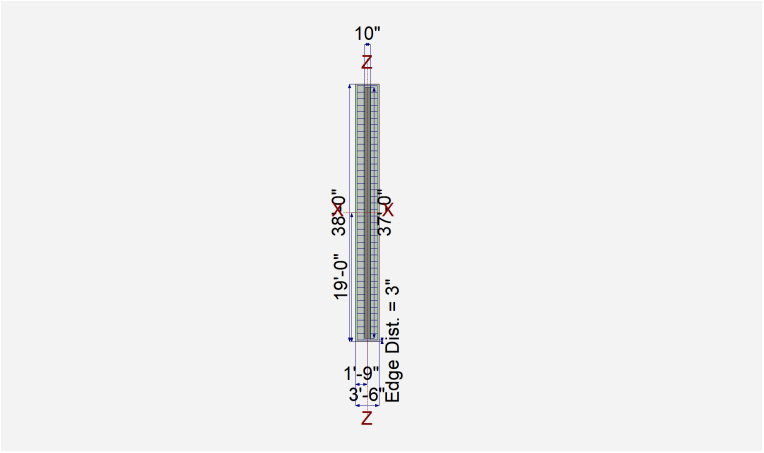
Width parallel to X-X Axis	=	3.50 ft
Length parallel to Z-Z Axis	=	38.0 ft
Footing Thickness	=	14.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	10.0 in
pz : parallel to Z-Z Axis	=	444.0 in
Height	=	6.0 in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in



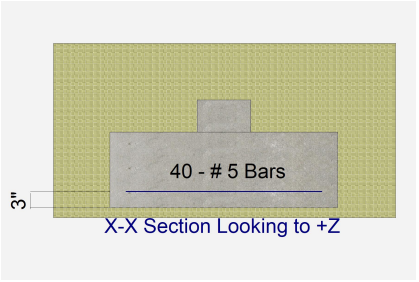
Reinforcing

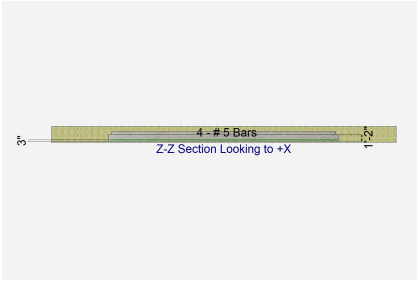
Bars parallel to X-X Axis			
Number of Bars	=		40.0
Reinforcing Bar Size	=	#	5
Bars parallel to Z-Z Axis			
Number of Bars	=		4.0
Reinforcing Bar Size	=	#	5

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation

	Bars along X-X Axis
# Bars required within zone	16.9 %
# Bars required on each side of zone	83.1 %





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	121.0	10.0	47.0					k
OB : Overburden	=								ksf
M-xx	=	390.0	53.0	218.0			682.0	36.0	k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=						117.0	25.0	k

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: Foundations.ec6

LIC# : KW-06014122, Build:20.25.02.26 PCS STRUCTURAL SOLUTIONS (c) ENERCALC, LLC 1982-2025

DESCRIPTION: Grid C' Foundation

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.6850	Soil Bearing	2.740 ksf	4.0 ksf	+D+0.750L+0.5250E+H about X-X axi
PASS	1.952	Overturning - X-X	925.57 k-ft	1,806.71 k-ft	+0.60D+0.70E+H
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.09374	Z Flexure (+X)	1.470 k-ft/ft	15.683 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.09374	Z Flexure (-X)	1.470 k-ft/ft	15.683 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.02359	X Flexure (+Z)	0.4007 k-ft/ft	16.983 k-ft/ft	+1.20D+L+E+1.60H
PASS	0.003584	X Flexure (-Z)	0.06087 k-ft/ft	16.983 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1184	1-way Shear (+X)	5.263 psi	44.436 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1184	1-way Shear (-X)	5.263 psi	44.436 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	n/a	1-way Shear (+Z)	0.0 psi	45.671 psi	n/a
PASS	n/a	1-way Shear (-Z)	0.0 psi	45.671 psi	n/a
PASS	0.1223	2-way Punching	10.503 psi	85.859 psi	+1.20D+0.50Lr+1.60L+1.60H

Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, +D+H	4.0	n/a	35.411	0.6420	1.741	n/a	n/a	0.435
X-X, +D+L+H	4.0	n/a	40.042	0.7391	2.351	n/a	n/a	0.588
X-X, +D+Lr+H	4.0	n/a	37.084	0.6549	1.879	n/a	n/a	0.470
X-X, +D+0.750Lr+0.750L+H	4.0	n/a	40.008	0.7245	2.302	n/a	n/a	0.576
X-X, +D+0.750L+H	4.0	n/a	39.095	0.7148	2.198	n/a	n/a	0.550
X-X, +0.60D+0.60H	4.0	n/a	35.411	0.3852	1.045	n/a	n/a	0.261
X-X, +D+0.70E+0.60H	4.0	n/a	79.541	0.0	2.428	n/a	n/a	0.607
X-X, +D+0.750L+0.5250E+H	4.0	n/a	67.614	0.1737	2.740	n/a	n/a	0.685
X-X, +0.60D+0.70E+H	4.0	n/a	116.803	0.0	1.941	n/a	n/a	0.485
Z-Z, +D+H	4.0	0.0	n/a	n/a	n/a	1.192	1.192	0.298
Z-Z, +D+L+H	4.0	0.0	n/a	n/a	n/a	1.545	1.545	0.386
Z-Z, +D+Lr+H	4.0	0.0	n/a	n/a	n/a	1.267	1.267	0.317
Z-Z, +D+0.750Lr+0.750L+H	4.0	0.0	n/a	n/a	n/a	1.513	1.513	0.378
Z-Z, +D+0.750L+H	4.0	0.0	n/a	n/a	n/a	1.457	1.457	0.364
Z-Z, +0.60D+0.60H	4.0	0.0	n/a	n/a	n/a	0.7150	0.7150	0.179
Z-Z, +D+0.70E+0.60H	4.0	0.0	n/a	n/a	n/a	1.192	1.192	0.298
Z-Z, +D+0.750L+0.5250E+H	4.0	0.0	n/a	n/a	n/a	1.457	1.457	0.364
Z-Z, +0.60D+0.70E+H	4.0	0.0	n/a	n/a	n/a	0.7150	0.7150	0.179

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
X-X, +D+H	467.667 k-ft	3,011.19 k-ft	6.439	OK
X-X, +D+L+H	685.67 k-ft	3,904.19 k-ft	5.694	OK
X-X, +D+Lr+H	520.67 k-ft	3,201.19 k-ft	6.148	OK
X-X, +D+0.750Lr+0.750L+H	670.92 k-ft	3,823.44 k-ft	5.699	OK
X-X, +D+0.750L+H	631.17 k-ft	3,680.94 k-ft	5.832	OK
X-X, +0.60D+0.60H	280.60 k-ft	1,806.71 k-ft	6.439	OK
X-X, +D+0.70E+0.60H	1,050.50 k-ft	3,011.19 k-ft	2.866	OK
X-X, +D+0.750L+0.5250E+H	1,091.59 k-ft	3,680.94 k-ft	3.372	OK
X-X, +0.60D+0.70E+H	925.57 k-ft	1,806.71 k-ft	1.952	OK
Z-Z, +D+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+L+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+Lr+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750Lr+0.750L+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750L+H	None	0.0 k-ft	Infinity	OK

Project Title:
Engineer:
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General Footing

Project File: Foundations.ec6

DESCRIPTION: Grid C' Foundation

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Z-Z, +0.60D+0.60H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.70E+0.60H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750L+0.5250E+H	None	0.0 k-ft	Infinity	OK
Z-Z, +0.60D+0.70E+H	None	0.0 k-ft	Infinity	OK

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D+1.60H	0.2372	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.40D+1.60H	0.05163	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.3288	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.06087	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60L+1.60H	0.3207	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60L+1.60H	0.06011	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60Lr+L+1.60H	0.3035	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60Lr+L+1.60H	0.05568	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60Lr+1.60H	0.2317	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60Lr+1.60H	0.04423	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+L+1.60H	0.2776	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+L+1.60H	0.05325	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60H	0.2058	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60H	0.04180	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+0.50Lr+L+1.60H	0.2857	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+0.50Lr+L+1.60H	0.05401	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +0.90D+1.60H	0.1587	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +0.90D+1.60H	0.02705	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+L+E+1.60H	0.4007	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+L+E+1.60H	0.04465	-Z	Top	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +0.90D+E+0.90H	0.2877	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +0.90D+E+0.90H	0.03349	-Z	Top	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
Z-Z, +1.40D+1.60H	1.090	-X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +1.40D+1.60H	1.090	+X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	1.470	-X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	1.470	+X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +1.20D+1.60L+1.60H	1.437	-X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +1.20D+1.60L+1.60H	1.437	+X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	1.355	-X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	1.355	+X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +1.20D+1.60Lr+1.60H	1.041	-X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +1.20D+1.60Lr+1.60H	1.041	+X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +1.20D+L+1.60H	1.248	-X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +1.20D+L+1.60H	1.248	+X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +1.20D+1.60H	0.9342	-X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +1.20D+1.60H	0.9342	+X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +1.20D+0.50Lr+L+1.60H	1.282	-X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +1.20D+0.50Lr+L+1.60H	1.282	+X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +0.90D+1.60H	0.7006	-X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +0.90D+1.60H	0.7006	+X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +1.20D+L+E+1.60H	1.248	-X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +1.20D+L+E+1.60H	1.248	+X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +0.90D+E+0.90H	0.7006	-X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK
Z-Z, +0.90D+E+0.90H	0.7006	+X	Bottom	0.3024	ACI 7.6.1.1	0.3263	15.683	OK

One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	3.90 psi	3.90 psi	3.90 psi	44.44 psi	0.09	OK
+1.20D+0.50Lr+1.60L+1.60H	5.26 psi	5.26 psi	5.26 psi	44.44 psi	0.12	OK
+1.20D+1.60L+1.60H	5.14 psi	5.14 psi	5.14 psi	44.44 psi	0.12	OK
+1.20D+1.60Lr+L+1.60H	4.85 psi	4.85 psi	4.85 psi	44.44 psi	0.11	OK
+1.20D+1.60Lr+1.60H	3.73 psi	3.73 psi	3.73 psi	44.44 psi	0.08	OK
+1.20D+L+1.60H	4.47 psi	4.47 psi	4.47 psi	44.44 psi	0.10	OK
+1.20D+1.60H	3.34 psi	3.34 psi	3.34 psi	44.44 psi	0.08	OK
+1.20D+0.50Lr+L+1.60H	4.59 psi	4.59 psi	4.59 psi	44.44 psi	0.10	OK

Project Title:
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General Footing

Project File: Foundations.ec6

DESCRIPTION: Grid C' Foundation

One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D+1.60H	2.51 psi	2.51 psi	2.51 psi	44.44 psi	0.06	OK
+1.20D+L+E+1.60H	4.47 psi	4.47 psi	4.47 psi	44.44 psi	0.10	OK
+0.90D+E+0.90H	2.51 psi	2.51 psi	2.51 psi	44.44 psi	0.06	OK

One Way Shear Z

Load Combination...	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+0.50Lr+1.60L+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+1.60L+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+1.60Lr+L+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+1.60Lr+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+L+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+0.50Lr+L+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+0.90D+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+L+E+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+0.90D+E+0.90H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	7.79 psi	85.86 psi	0.09068	OK
+1.20D+0.50Lr+1.60L+1.60H	10.50 psi	85.86 psi	0.1223	OK
+1.20D+1.60L+1.60H	10.26 psi	85.86 psi	0.1195	OK
+1.20D+1.60Lr+L+1.60H	9.68 psi	85.86 psi	0.1128	OK
+1.20D+1.60Lr+1.60H	7.44 psi	85.86 psi	0.08663	OK
+1.20D+L+1.60H	8.92 psi	85.86 psi	0.1039	OK
+1.20D+1.60H	6.67 psi	85.86 psi	0.07773	OK
+1.20D+0.50Lr+L+1.60H	9.16 psi	85.86 psi	0.1066	OK
+0.90D+1.60H	5.01 psi	85.86 psi	0.0583	OK
+1.20D+L+E+1.60H	8.92 psi	85.86 psi	0.1039	OK
+0.90D+E+0.90H	5.01 psi	85.86 psi	0.0583	OK

Project Title:
Engineer:
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General Footing

Project File: Foundations.ec6

DESCRIPTION: Grid A Foundation

Code References

Calculations per ACI 318-19, IBC 2021
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	4.0	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	300.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	2.50	ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=		ksf
when max. length or width is greater than	=		ft

Dimensions

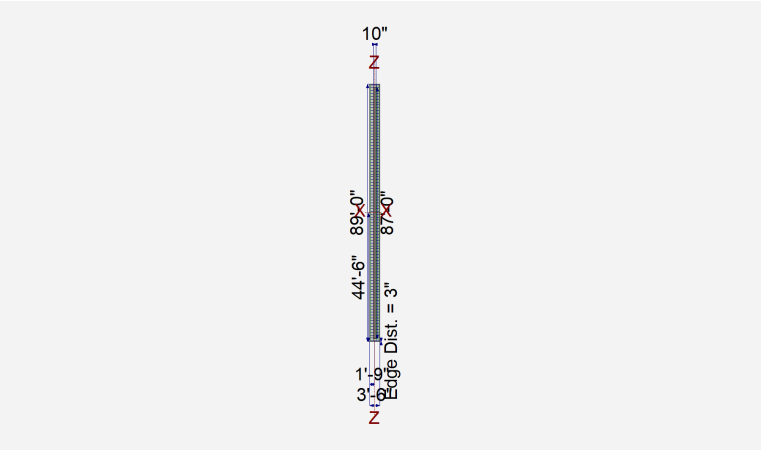
Width parallel to X-X Axis	=	3.50 ft
Length parallel to Z-Z Axis	=	89.0 ft
Footing Thickness	=	14.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	10.0 in
pz : parallel to Z-Z Axis	=	1,044.0 in
Height	=	6.0 in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in



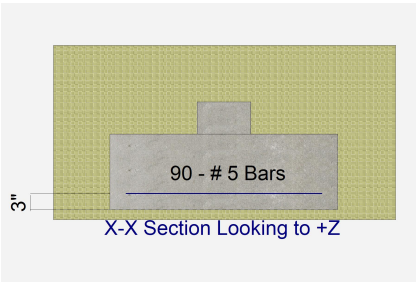
Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		90.0
Reinforcing Bar Size	=	#	5
Bars parallel to Z-Z Axis			
Number of Bars	=		4.0
Reinforcing Bar Size	=	#	5

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation

	Bars along X-X Axis
# Bars required within zone	7.6 %
# Bars required on each side of zone	92.4 %





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	460.0	30.0	208.0					k
OB : Overburden	=								ksf
M-xx	=	-428.0	53.0	-390.0			12,827.0	36.0	k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=						220.0		k

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: Foundations.ec6

LIC# : KW-06014122, Build:20.25.02.26 PCS STRUCTURAL SOLUTIONS (c) ENERCALC, LLC 1982-2025

DESCRIPTION: Grid A Foundation

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9143	Soil Bearing	3.657 ksf	4.0 ksf	+D+0.70E+0.60H about X-X axis
PASS	1.605	Overturning - X-X	9,271.57 k-ft	14,881.7 k-ft	+0.60D+0.70E+H
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.1678	Z Flexure (+X)	2.531 k-ft/ft	15.084 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1678	Z Flexure (-X)	2.531 k-ft/ft	15.084 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1467	X Flexure (+Z)	2.492 k-ft/ft	16.983 k-ft/ft	+1.20D+L+E+1.60H
PASS	0.08939	X Flexure (-Z)	1.518 k-ft/ft	16.983 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.2067	1-way Shear (+X)	9.061 psi	43.846 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.2067	1-way Shear (-X)	9.061 psi	43.846 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	n/a	1-way Shear (+Z)	0.0 psi	45.671 psi	n/a
PASS	n/a	1-way Shear (-Z)	0.0 psi	45.671 psi	n/a
PASS	0.2282	2-way Punching	19.111 psi	83.732 psi	+1.20D+0.50Lr+1.60L+1.60H

Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, +D+H	4.0	n/a	-8.588	1.842	1.674	n/a	n/a	0.461
X-X, +D+L+H	4.0	n/a	-12.417	2.594	2.259	n/a	n/a	0.649
X-X, +D+Lr+H	4.0	n/a	-7.041	1.927	1.782	n/a	n/a	0.482
X-X, +D+0.750Lr+0.750L+H	4.0	n/a	-10.653	2.470	2.193	n/a	n/a	0.618
X-X, +D+0.750L+H	4.0	n/a	-11.672	2.406	2.113	n/a	n/a	0.602
X-X, +0.60D+0.60H	4.0	n/a	-8.588	1.105	1.005	n/a	n/a	0.276
X-X, +D+0.70E+0.60H	4.0	n/a	193.428	0.0	3.657	n/a	n/a	0.914
X-X, +D+0.750L+0.5250E+H	4.0	n/a	106.439	0.9218	3.597	n/a	n/a	0.899
X-X, +0.60D+0.70E+H	4.0	n/a	329.157	0.0	3.635	n/a	n/a	0.909
Z-Z, +D+H	4.0	0.0	n/a	n/a	n/a	1.758	1.758	0.440
Z-Z, +D+L+H	4.0	0.0	n/a	n/a	n/a	2.426	2.426	0.607
Z-Z, +D+Lr+H	4.0	0.0	n/a	n/a	n/a	1.855	1.855	0.464
Z-Z, +D+0.750Lr+0.750L+H	4.0	0.0	n/a	n/a	n/a	2.331	2.331	0.583
Z-Z, +D+0.750L+H	4.0	0.0	n/a	n/a	n/a	2.259	2.259	0.565
Z-Z, +0.60D+0.60H	4.0	0.0	n/a	n/a	n/a	1.055	1.055	0.264
Z-Z, +D+0.70E+0.60H	4.0	0.0	n/a	n/a	n/a	1.758	1.758	0.440
Z-Z, +D+0.750L+0.5250E+H	4.0	0.0	n/a	n/a	n/a	2.259	2.259	0.565
Z-Z, +0.60D+0.70E+H	4.0	0.0	n/a	n/a	n/a	1.055	1.055	0.264

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
X-X, +D+H	428.0 k-ft	24,410.8 k-ft	57.035	OK
X-X, +D+L+H	818.0 k-ft	33,666.8 k-ft	41.157	OK
X-X, +D+Lr+H	428.0 k-ft	25,798.8 k-ft	60.278	OK
X-X, +D+0.750Lr+0.750L+H	720.50 k-ft	32,393.8 k-ft	44.960	OK
X-X, +D+0.750L+H	720.50 k-ft	31,352.8 k-ft	43.515	OK
X-X, +0.60D+0.60H	256.80 k-ft	14,646.5 k-ft	57.035	OK
X-X, +D+0.70E+0.60H	9,257.17 k-ft	24,802.8 k-ft	2.679	OK
X-X, +D+0.750L+0.5250E+H	6,962.68 k-ft	32,037.3 k-ft	4.601	OK
X-X, +0.60D+0.70E+H	9,271.57 k-ft	14,881.7 k-ft	1.605	OK
Z-Z, +D+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+L+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+Lr+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750Lr+0.750L+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750L+H	None	0.0 k-ft	Infinity	OK

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General Footing

Project File: Foundations.ec6

DESCRIPTION: Grid A Foundation

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Z-Z, +0.60D+0.60H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.70E+0.60H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750L+0.5250E+H	None	0.0 k-ft	Infinity	OK
Z-Z, +0.60D+0.70E+H	None	0.0 k-ft	Infinity	OK

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D+1.60H	0.9403	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.40D+1.60H	1.055	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	1.295	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	1.518	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60L+1.60H	1.269	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60L+1.60H	1.497	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60Lr+L+1.60H	1.180	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60Lr+L+1.60H	1.342	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60Lr+1.60H	0.8919	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60Lr+1.60H	0.9705	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+L+1.60H	1.095	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+L+1.60H	1.274	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60H	0.8068	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60H	0.9033	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+0.50Lr+L+1.60H	1.122	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+0.50Lr+L+1.60H	1.295	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +0.90D+1.60H	0.6066	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +0.90D+1.60H	0.6760	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+L+E+1.60H	2.492	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+L+E+1.60H	0.1219	-Z	Top	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +0.90D+E+0.90H	2.353	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +0.90D+E+0.90H	0.1404	-Z	Top	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
Z-Z, +1.40D+1.60H	1.795	-X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +1.40D+1.60H	1.795	+X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	2.531	-X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	2.531	+X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +1.20D+1.60L+1.60H	2.488	-X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +1.20D+1.60L+1.60H	2.488	+X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	2.269	-X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	2.269	+X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +1.20D+1.60Lr+1.60H	1.676	-X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +1.20D+1.60Lr+1.60H	1.676	+X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +1.20D+L+1.60H	2.132	-X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +1.20D+L+1.60H	2.132	+X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +1.20D+1.60H	1.539	-X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +1.20D+1.60H	1.539	+X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +1.20D+0.50Lr+L+1.60H	2.175	-X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +1.20D+0.50Lr+L+1.60H	2.175	+X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +0.90D+1.60H	1.154	-X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +0.90D+1.60H	1.154	+X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +1.20D+L+E+1.60H	2.132	-X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +1.20D+L+E+1.60H	2.132	+X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +0.90D+E+0.90H	1.154	-X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK
Z-Z, +0.90D+E+0.90H	1.154	+X	Bottom	0.3024	ACI 7.6.1.1	0.3135	15.084	OK

One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	6.43 psi	6.43 psi	6.43 psi	43.85 psi	0.15	OK
+1.20D+0.50Lr+1.60L+1.60H	9.06 psi	9.06 psi	9.06 psi	43.85 psi	0.21	OK
+1.20D+1.60L+1.60H	8.91 psi	8.91 psi	8.91 psi	43.85 psi	0.20	OK
+1.20D+1.60Lr+L+1.60H	8.12 psi	8.12 psi	8.12 psi	43.85 psi	0.19	OK
+1.20D+1.60Lr+1.60H	6.00 psi	6.00 psi	6.00 psi	43.85 psi	0.14	OK
+1.20D+L+1.60H	7.63 psi	7.63 psi	7.63 psi	43.85 psi	0.17	OK
+1.20D+1.60H	5.51 psi	5.51 psi	5.51 psi	43.85 psi	0.13	OK
+1.20D+0.50Lr+L+1.60H	7.79 psi	7.79 psi	7.79 psi	43.85 psi	0.18	OK

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DESCRIPTION: Grid A Foundation

One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D+1.60H	4.13 psi	4.13 psi	4.13 psi	43.85 psi	0.09	OK
+1.20D+L+E+1.60H	7.63 psi	7.63 psi	7.63 psi	43.85 psi	0.17	OK
+0.90D+E+0.90H	4.13 psi	4.13 psi	4.13 psi	43.85 psi	0.09	OK

One Way Shear Z

Load Combination...	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+0.50Lr+1.60L+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+1.60L+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+1.60Lr+L+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+1.60Lr+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+L+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+0.50Lr+L+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+0.90D+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+L+E+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+0.90D+E+0.90H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	13.55 psi	83.73 psi	0.1619	OK
+1.20D+0.50Lr+1.60L+1.60H	19.11 psi	83.73 psi	0.2282	OK
+1.20D+1.60L+1.60H	18.79 psi	83.73 psi	0.2244	OK
+1.20D+1.60Lr+L+1.60H	17.13 psi	83.73 psi	0.2046	OK
+1.20D+1.60Lr+1.60H	12.65 psi	83.73 psi	0.1511	OK
+1.20D+L+1.60H	16.10 psi	83.73 psi	0.1923	OK
+1.20D+1.60H	11.62 psi	83.73 psi	0.1387	OK
+1.20D+0.50Lr+L+1.60H	16.42 psi	83.73 psi	0.1961	OK
+0.90D+1.60H	8.71 psi	83.73 psi	0.1041	OK
+1.20D+L+E+1.60H	16.10 psi	83.73 psi	0.1923	OK
+0.90D+E+0.90H	8.84 psi	83.73 psi	0.1055	OK

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DESCRIPTION: Grid 16 Foundation

Code References

Calculations per ACI 318-19, IBC 2021
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	4.0	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	300.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	2.50	ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

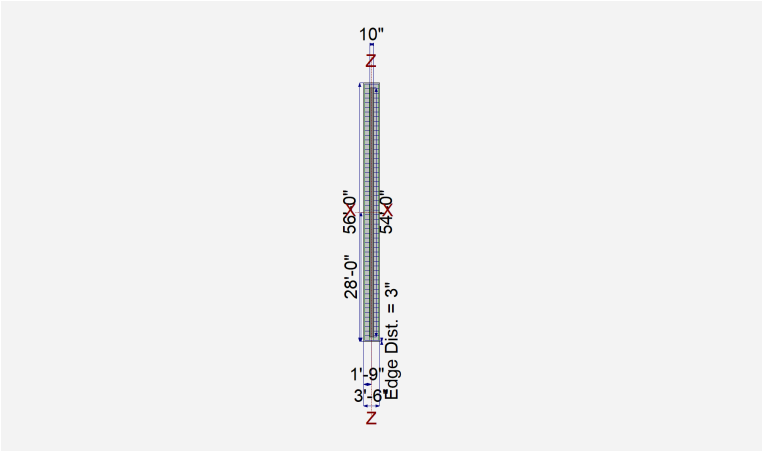
Width parallel to X-X Axis	=	3.50 ft
Length parallel to Z-Z Axis	=	56.0 ft
Footing Thickness	=	14.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	10.0 in
pz : parallel to Z-Z Axis	=	648.0 in
Height	=	6.0 in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in



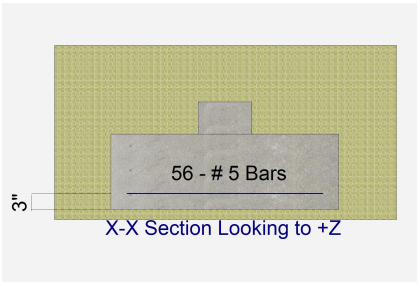
Reinforcing

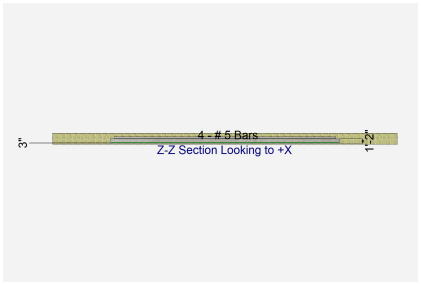
Bars parallel to X-X Axis			
Number of Bars	=		56
Reinforcing Bar Size	=	#	5
Bars parallel to Z-Z Axis			
Number of Bars	=		4
Reinforcing Bar Size	=	#	5

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation

	Bars along X-X Axis
# Bars required within zone	11.8 %
# Bars required on each side of zone	88.2 %





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	213.0	21.0	75.0			17.0		k
OB : Overburden	=								ksf
M-xx	=	132.0	-52.0	49.0			2,084.0	190.0	k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=						104.0	41.0	k

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General Footing

Project File: Foundations.ec6

LIC# : KW-06014122, Build:20.25.02.26 PCS STRUCTURAL SOLUTIONS (c) ENERCALC, LLC 1982-2025

DESCRIPTION: Grid 16 Foundation

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.6435	Soil Bearing	2.574 ksf	4.0 ksf	+D+0.750L+0.5250E+H about X-X axi
PASS	2.524	Overturning - X-X	1,917.67 k-ft	4,840.70 k-ft	+0.60D+0.70E+H
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.1149	Z Flexure (+X)	1.715 k-ft/ft	14.921 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1149	Z Flexure (-X)	1.715 k-ft/ft	14.921 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.09532	X Flexure (+Z)	1.619 k-ft/ft	16.983 k-ft/ft	+1.20D+L+E+1.60H
PASS	0.04622	X Flexure (-Z)	0.7850 k-ft/ft	16.983 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1405	1-way Shear (+X)	6.139 psi	43.683 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1405	1-way Shear (-X)	6.139 psi	43.683 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	n/a	1-way Shear (+Z)	0.0 psi	45.671 psi	n/a
PASS	n/a	1-way Shear (-Z)	0.0 psi	45.671 psi	n/a
PASS	0.1522	2-way Punching	12.893 psi	84.694 psi	+1.20D+0.50Lr+1.60L+1.60H

Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, +D+H	4.0	n/a	17.458	1.158	1.580	n/a	n/a	0.395
X-X, +D+L+H	4.0	n/a	15.357	1.514	1.989	n/a	n/a	0.497
X-X, +D+Lr+H	4.0	n/a	14.034	1.293	1.659	n/a	n/a	0.415
X-X, +D+0.750Lr+0.750L+H	4.0	n/a	13.685	1.526	1.946	n/a	n/a	0.487
X-X, +D+0.750L+H	4.0	n/a	15.791	1.425	1.887	n/a	n/a	0.472
X-X, +0.60D+0.60H	4.0	n/a	17.458	0.6946	0.9481	n/a	n/a	0.237
X-X, +D+0.70E+0.60H	4.0	n/a	79.962	0.4192	2.440	n/a	n/a	0.610
X-X, +D+0.750L+0.5250E+H	4.0	n/a	58.013	0.8289	2.574	n/a	n/a	0.644
X-X, +0.60D+0.70E+H	4.0	n/a	133.108	0.0	1.937	n/a	n/a	0.484
Z-Z, +D+H	4.0	0.0	n/a	n/a	n/a	1.369	1.369	0.342
Z-Z, +D+L+H	4.0	0.0	n/a	n/a	n/a	1.752	1.752	0.438
Z-Z, +D+Lr+H	4.0	0.0	n/a	n/a	n/a	1.476	1.476	0.369
Z-Z, +D+0.750Lr+0.750L+H	4.0	0.0	n/a	n/a	n/a	1.736	1.736	0.434
Z-Z, +D+0.750L+H	4.0	0.0	n/a	n/a	n/a	1.656	1.656	0.414
Z-Z, +0.60D+0.60H	4.0	0.0	n/a	n/a	n/a	0.8213	0.8213	0.205
Z-Z, +D+0.70E+0.60H	4.0	0.0	n/a	n/a	n/a	1.430	1.430	0.358
Z-Z, +D+0.750L+0.5250E+H	4.0	0.0	n/a	n/a	n/a	1.701	1.701	0.425
Z-Z, +0.60D+0.70E+H	4.0	0.0	n/a	n/a	n/a	0.8821	0.8821	0.221

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
X-X, +D+H	390.333 k-ft	7,512.49 k-ft	19.246	OK
X-X, +D+L+H	439.333 k-ft	9,612.49 k-ft	21.880	OK
X-X, +D+Lr+H	390.333 k-ft	8,152.49 k-ft	20.886	OK
X-X, +D+0.750Lr+0.750L+H	427.083 k-ft	9,567.49 k-ft	22.402	OK
X-X, +D+0.750L+H	427.083 k-ft	9,087.49 k-ft	21.278	OK
X-X, +0.60D+0.60H	234.20 k-ft	4,507.50 k-ft	19.246	OK
X-X, +D+0.70E+0.60H	1,867.13 k-ft	7,845.69 k-ft	4.202	OK
X-X, +D+0.750L+0.5250E+H	1,612.18 k-ft	9,337.39 k-ft	5.792	OK
X-X, +0.60D+0.70E+H	1,917.67 k-ft	4,840.70 k-ft	2.524	OK
Z-Z, +D+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+L+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+Lr+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750Lr+0.750L+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750L+H	None	0.0 k-ft	Infinity	OK

Project Title:
Engineer:
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Project Descr:

General Footing

Project File: Foundations.ec6

DESCRIPTION: Grid 16 Foundation

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Z-Z, +0.60D+0.60H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.70E+0.60H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750L+0.5250E+H	None	0.0 k-ft	Infinity	OK
Z-Z, +0.60D+0.70E+H	None	0.0 k-ft	Infinity	OK

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D+1.60H	0.8855	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.40D+1.60H	0.5676	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	1.117	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.7850	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60L+1.60H	1.097	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60L+1.60H	0.7517	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60Lr+L+1.60H	1.039	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60Lr+L+1.60H	0.7530	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60Lr+1.60H	0.8370	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60Lr+1.60H	0.5774	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+L+1.60H	0.9762	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+L+1.60H	0.6464	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60H	0.7747	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+1.60H	0.4708	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+0.50Lr+L+1.60H	0.9957	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+0.50Lr+L+1.60H	0.6797	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +0.90D+1.60H	0.6084	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +0.90D+1.60H	0.3257	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+L+E+1.60H	1.619	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +1.20D+L+E+1.60H	0.08931	-Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +0.90D+E+0.90H	1.205	+Z	Bottom	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
X-X, +0.90D+E+0.90H	0.1401	-Z	Top	0.3024	ACI 7.6.1.1	0.3543	16.983	OK
Z-Z, +1.40D+1.60H	1.310	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.40D+1.60H	1.310	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	1.715	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	1.715	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+1.60L+1.60H	1.667	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+1.60L+1.60H	1.667	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	1.616	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	1.616	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+1.60Lr+1.60H	1.276	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+1.60Lr+1.60H	1.276	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+L+1.60H	1.463	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+L+1.60H	1.463	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+1.60H	1.123	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+1.60H	1.123	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+0.50Lr+L+1.60H	1.511	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+0.50Lr+L+1.60H	1.511	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +0.90D+1.60H	0.8424	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +0.90D+1.60H	0.8424	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+L+E+1.60H	1.540	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+L+E+1.60H	1.540	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +0.90D+E+0.90H	0.9195	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +0.90D+E+0.90H	0.9195	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK

One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	4.69 psi	4.69 psi	4.69 psi	43.68 psi	0.11	OK
+1.20D+0.50Lr+1.60L+1.60H	6.14 psi	6.14 psi	6.14 psi	43.68 psi	0.14	OK
+1.20D+1.60L+1.60H	5.97 psi	5.97 psi	5.97 psi	43.68 psi	0.14	OK
+1.20D+1.60Lr+L+1.60H	5.78 psi	5.78 psi	5.78 psi	43.68 psi	0.13	OK
+1.20D+1.60Lr+1.60H	4.57 psi	4.57 psi	4.57 psi	43.68 psi	0.10	OK
+1.20D+L+1.60H	5.24 psi	5.24 psi	5.24 psi	43.68 psi	0.12	OK
+1.20D+1.60H	4.02 psi	4.02 psi	4.02 psi	43.68 psi	0.09	OK
+1.20D+0.50Lr+L+1.60H	5.41 psi	5.41 psi	5.41 psi	43.68 psi	0.12	OK

Project Title:
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DESCRIPTION: Grid 16 Foundation

One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D+1.60H	3.02 psi	3.02 psi	3.02 psi	43.68 psi	0.07	OK
+1.20D+L+E+1.60H	5.51 psi	5.51 psi	5.51 psi	43.68 psi	0.13	OK
+0.90D+E+0.90H	3.29 psi	3.29 psi	3.29 psi	43.68 psi	0.08	OK

One Way Shear Z

Load Combination...	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+0.50Lr+1.60L+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+1.60L+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+1.60Lr+L+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+1.60Lr+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+L+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+0.50Lr+L+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+0.90D+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+1.20D+L+E+1.60H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK
+0.90D+E+0.90H	0.00 psi	0.00 psi	0.00 psi	45.67 psi	0.00	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	9.85 psi	84.69 psi	0.1163	OK
+1.20D+0.50Lr+1.60L+1.60H	12.89 psi	84.69 psi	0.1522	OK
+1.20D+1.60L+1.60H	12.54 psi	84.69 psi	0.148	OK
+1.20D+1.60Lr+L+1.60H	12.15 psi	84.69 psi	0.1434	OK
+1.20D+1.60Lr+1.60H	9.59 psi	84.69 psi	0.1132	OK
+1.20D+L+1.60H	11.00 psi	84.69 psi	0.1299	OK
+1.20D+1.60H	8.44 psi	84.69 psi	0.0997	OK
+1.20D+0.50Lr+L+1.60H	11.36 psi	84.69 psi	0.1341	OK
+0.90D+1.60H	6.33 psi	84.69 psi	0.07477	OK
+1.20D+L+E+1.60H	11.58 psi	84.69 psi	0.1367	OK
+0.90D+E+0.90H	6.92 psi	84.69 psi	0.08169	OK

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General Footing

Project File: Foundations.ec6

LIC# : KW-06014122, Build:20.25.02.26 PCS STRUCTURAL SOLUTIONS (c) ENERCALC, LLC 1982-2025

DESCRIPTION: Grid 7 Foundation

Code References

Calculations per ACI 318-19, IBC 2021
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	4.0	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	300.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	2.50	ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=		ksf
when max. length or width is greater than	=		ft

Dimensions

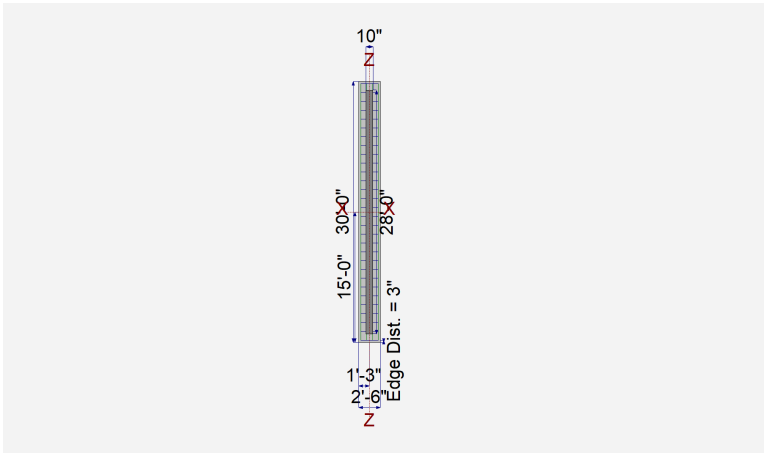
Width parallel to X-X Axis	=	2.50 ft
Length parallel to Z-Z Axis	=	30.0 ft
Footing Thickness	=	14.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	10.0 in
pz : parallel to Z-Z Axis	=	336.0 in
Height	=	6.0 in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in



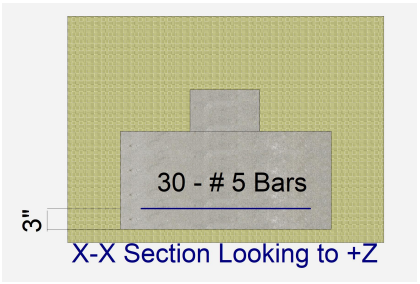
Reinforcing

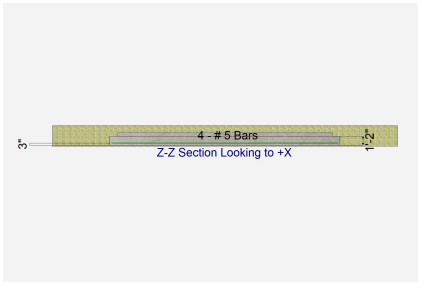
Bars parallel to X-X Axis			
Number of Bars	=		30
Reinforcing Bar Size	=	#	5
Bars parallel to Z-Z Axis			
Number of Bars	=		4.0
Reinforcing Bar Size	=	#	5

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation

	Bars along X-X Axis
# Bars required within zone	15.4 %
# Bars required on each side of zone	84.6 %





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	92.0	8.0	32.0			9.0		k
OB : Overburden	=								ksf
M-xx	=	30.0	3.30	15.0			404.0	231.0	k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=						38.0	37.0	k

Project Title:
Engineer:
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Project Descr:

General Footing

Project File: Foundations.ec6

LIC# : KW-06014122, Build:20.25.02.26 PCS STRUCTURAL SOLUTIONS (c) ENERCALC, LLC 1982-2025

DESCRIPTION: Grid 7 Foundation

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.8523	Soil Bearing	3.409 ksf	4.0 ksf	+D+0.750L+0.5250E+H about X-X axi
PASS	1.732	Overturning - X-X	637.80 k-ft	1,104.89 k-ft	+0.60D+0.70E+H
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.05010	Z Flexure (+X)	0.7476 k-ft/ft	14.921 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.05010	Z Flexure (-X)	0.7476 k-ft/ft	14.921 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.09605	X Flexure (+Z)	2.254 k-ft/ft	23.467 k-ft/ft	+1.20D+L+E+1.60H
PASS	0.01629	X Flexure (-Z)	0.3823 k-ft/ft	23.467 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	n/a	1-way Shear (+X)	0.0 psi	43.683 psi	n/a
PASS	0.0	1-way Shear (-X)	0.0 psi	0.0 psi	n/a
PASS	n/a	1-way Shear (+Z)	0.0 psi	51.091 psi	n/a
PASS	n/a	1-way Shear (-Z)	0.0 psi	51.091 psi	n/a
PASS	n/a	2-way Punching	6.543 psi	43.683 psi	+1.20D+0.50Lr+1.60L+1.60H

Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, +D+H	4.0	n/a	34.490	0.6450	2.349	n/a	n/a	0.587
X-X, +D+L+H	4.0	n/a	28.087	1.032	2.815	n/a	n/a	0.704
X-X, +D+Lr+H	4.0	n/a	32.525	0.7430	2.464	n/a	n/a	0.616
X-X, +D+0.750Lr+0.750L+H	4.0	n/a	28.374	1.009	2.785	n/a	n/a	0.696
X-X, +D+0.750L+H	4.0	n/a	29.406	0.9353	2.698	n/a	n/a	0.675
X-X, +0.60D+0.60H	4.0	n/a	34.490	0.3870	1.409	n/a	n/a	0.352
X-X, +D+0.70E+0.60H	4.0	n/a	53.918	0.1745	2.987	n/a	n/a	0.747
X-X, +D+0.750L+0.5250E+H	4.0	n/a	49.303	0.3506	3.409	n/a	n/a	0.852
X-X, +0.60D+0.70E+H	4.0	n/a	103.906	0.0	3.073	n/a	n/a	0.768
Z-Z, +D+H	4.0	0.0	n/a	n/a	n/a	1.497	1.497	0.374
Z-Z, +D+L+H	4.0	0.0	n/a	n/a	n/a	1.924	1.924	0.481
Z-Z, +D+Lr+H	4.0	0.0	n/a	n/a	n/a	1.604	1.604	0.401
Z-Z, +D+0.750Lr+0.750L+H	4.0	0.0	n/a	n/a	n/a	1.897	1.897	0.474
Z-Z, +D+0.750L+H	4.0	0.0	n/a	n/a	n/a	1.817	1.817	0.454
Z-Z, +0.60D+0.60H	4.0	0.0	n/a	n/a	n/a	0.8981	0.8981	0.225
Z-Z, +D+0.70E+0.60H	4.0	0.0	n/a	n/a	n/a	1.581	1.581	0.395
Z-Z, +D+0.750L+0.5250E+H	4.0	0.0	n/a	n/a	n/a	1.880	1.880	0.470
Z-Z, +0.60D+0.70E+H	4.0	0.0	n/a	n/a	n/a	0.9821	0.9821	0.246

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
X-X, +D+H	322.667 k-ft	1,683.98 k-ft	5.219	OK
X-X, +D+L+H	337.667 k-ft	2,163.98 k-ft	6.409	OK
X-X, +D+Lr+H	325.967 k-ft	1,803.98 k-ft	5.534	OK
X-X, +D+0.750Lr+0.750L+H	336.392 k-ft	2,133.98 k-ft	6.344	OK
X-X, +D+0.750L+H	333.917 k-ft	2,043.98 k-ft	6.121	OK
X-X, +0.60D+0.60H	193.60 k-ft	1,010.39 k-ft	5.219	OK
X-X, +D+0.70E+0.60H	532.73 k-ft	1,778.48 k-ft	3.338	OK
X-X, +D+0.750L+0.5250E+H	579.27 k-ft	2,114.85 k-ft	3.651	OK
X-X, +0.60D+0.70E+H	637.80 k-ft	1,104.89 k-ft	1.732	OK
Z-Z, +D+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+L+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+Lr+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750Lr+0.750L+H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750L+H	None	0.0 k-ft	Infinity	OK

Project Title:
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General Footing

Project File: Foundations.ec6

DESCRIPTION: Grid 7 Foundation

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Z-Z, +0.60D+0.60H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.70E+0.60H	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750L+0.5250E+H	None	0.0 k-ft	Infinity	OK
Z-Z, +0.60D+0.70E+H	None	0.0 k-ft	Infinity	OK

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D+1.60H	1.477	+Z	Bottom	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +1.40D+1.60H	0.1602	-Z	Bottom	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	1.749	+Z	Bottom	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.3823	-Z	Bottom	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +1.20D+1.60L+1.60H	1.721	+Z	Bottom	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +1.20D+1.60L+1.60H	0.3580	-Z	Bottom	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +1.20D+1.60Lr+L+1.60H	1.674	+Z	Bottom	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +1.20D+1.60Lr+L+1.60H	0.3206	-Z	Bottom	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +1.20D+1.60Lr+1.60H	1.443	+Z	Bottom	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +1.20D+1.60Lr+1.60H	0.1287	-Z	Bottom	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +1.20D+L+1.60H	1.583	+Z	Bottom	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +1.20D+L+1.60H	0.2429	-Z	Bottom	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +1.20D+1.60H	1.352	+Z	Bottom	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +1.20D+1.60H	0.05103	-Z	Bottom	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +1.20D+0.50Lr+L+1.60H	1.611	+Z	Bottom	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +1.20D+0.50Lr+L+1.60H	0.2672	-Z	Bottom	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +0.90D+1.60H	1.165	+Z	Bottom	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +0.90D+1.60H	0.1127	-Z	Top	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +1.20D+L+E+1.60H	2.254	+Z	Bottom	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +1.20D+L+E+1.60H	0.1876	-Z	Top	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +0.90D+E+0.90H	1.624	+Z	Bottom	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
X-X, +0.90D+E+0.90H	0.1407	-Z	Top	0.3024	ACI 7.6.1.1	0.4960	23.467	OK
Z-Z, +1.40D+1.60H	0.5741	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.40D+1.60H	0.5741	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.7476	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.7476	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+1.60L+1.60H	0.7291	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+1.60L+1.60H	0.7291	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	0.6994	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	0.6994	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+1.60Lr+1.60H	0.5513	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+1.60Lr+1.60H	0.5513	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+L+1.60H	0.6402	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+L+1.60H	0.6402	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+1.60H	0.4921	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+1.60H	0.4921	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+0.50Lr+L+1.60H	0.6587	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+0.50Lr+L+1.60H	0.6587	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +0.90D+1.60H	0.3690	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +0.90D+1.60H	0.3690	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+L+E+1.60H	0.6818	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +1.20D+L+E+1.60H	0.6818	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +0.90D+E+0.90H	0.4107	-X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK
Z-Z, +0.90D+E+0.90H	0.4107	+X	Bottom	0.3024	ACI 7.6.1.1	0.310	14.921	OK

One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	0.00 psi	0.00 psi	0.00 psi	43.68 psi	0.00	OK
+1.20D+0.50Lr+1.60L+1.60H	0.00 psi	0.00 psi	0.00 psi	43.68 psi	0.00	OK
+1.20D+1.60L+1.60H	0.00 psi	0.00 psi	0.00 psi	43.68 psi	0.00	OK
+1.20D+1.60Lr+L+1.60H	0.00 psi	0.00 psi	0.00 psi	43.68 psi	0.00	OK
+1.20D+1.60Lr+1.60H	0.00 psi	0.00 psi	0.00 psi	43.68 psi	0.00	OK
+1.20D+L+1.60H	0.00 psi	0.00 psi	0.00 psi	43.68 psi	0.00	OK
+1.20D+1.60H	0.00 psi	0.00 psi	0.00 psi	43.68 psi	0.00	OK
+1.20D+0.50Lr+L+1.60H	0.00 psi	0.00 psi	0.00 psi	43.68 psi	0.00	OK

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One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D+1.60H	0.00 psi	0.00 psi	0.00 psi	43.68 psi	0.00	OK
+1.20D+L+E+1.60H	0.00 psi	0.00 psi	0.00 psi	43.68 psi	0.00	OK
+0.90D+E+0.90H	0.00 psi	0.00 psi	0.00 psi	43.68 psi	0.00	OK

One Way Shear Z

Load Combination...	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	0.00 psi	0.00 psi	0.00 psi	51.09 psi	0.00	OK
+1.20D+0.50Lr+1.60L+1.60H	0.00 psi	0.00 psi	0.00 psi	51.09 psi	0.00	OK
+1.20D+1.60L+1.60H	0.00 psi	0.00 psi	0.00 psi	51.09 psi	0.00	OK
+1.20D+1.60Lr+L+1.60H	0.00 psi	0.00 psi	0.00 psi	51.09 psi	0.00	OK
+1.20D+1.60Lr+1.60H	0.00 psi	0.00 psi	0.00 psi	51.09 psi	0.00	OK
+1.20D+L+1.60H	0.00 psi	0.00 psi	0.00 psi	51.09 psi	0.00	OK
+1.20D+1.60H	0.00 psi	0.00 psi	0.00 psi	51.09 psi	0.00	OK
+1.20D+0.50Lr+L+1.60H	0.00 psi	0.00 psi	0.00 psi	51.09 psi	0.00	OK
+0.90D+1.60H	0.00 psi	0.00 psi	0.00 psi	51.09 psi	0.00	OK
+1.20D+L+E+1.60H	0.00 psi	0.00 psi	0.00 psi	51.09 psi	0.00	OK
+0.90D+E+0.90H	0.00 psi	0.00 psi	0.00 psi	51.09 psi	0.00	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	5.02 psi	87.05 psi	0.05772	OK
+1.20D+0.50Lr+1.60L+1.60H	6.54 psi	87.05 psi	0.07516	OK
+1.20D+1.60L+1.60H	6.38 psi	87.05 psi	0.0733	OK
+1.20D+1.60Lr+L+1.60H	6.12 psi	87.05 psi	0.07032	OK
+1.20D+1.60Lr+1.60H	4.83 psi	87.05 psi	0.05543	OK
+1.20D+L+1.60H	5.60 psi	87.05 psi	0.06436	OK
+1.20D+1.60H	4.31 psi	87.05 psi	0.04947	OK
+1.20D+0.50Lr+L+1.60H	5.77 psi	87.05 psi	0.06623	OK
+0.90D+1.60H	3.23 psi	87.05 psi	0.0371	OK
+1.20D+L+E+1.60H	6.00 psi	87.05 psi	0.06893	OK
+0.90D+E+0.90H	3.68 psi	87.05 psi	0.04224	OK

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General Footing

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DESCRIPTION: Grid 11 Grade Beam

Code References

Calculations per ACI 318-19, IBC 2021
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	4.0	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	300.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	2.50	ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

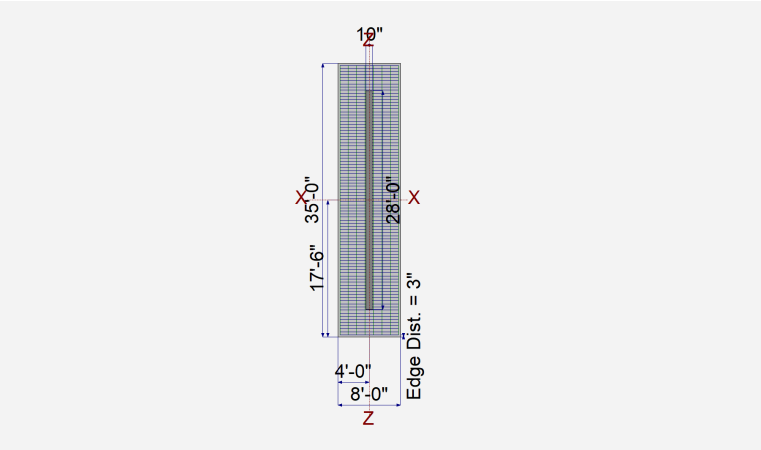
Width parallel to X-X Axis	=	8.0 ft
Length parallel to Z-Z Axis	=	35.0 ft
Footing Thickness	=	36.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	10.0 in
pz : parallel to Z-Z Axis	=	336.0 in
Height	=	2.0 in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in



Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		88.0
Reinforcing Bar Size	=	#	5
Bars parallel to Z-Z Axis			
Number of Bars	=		8
Reinforcing Bar Size	=	#	8

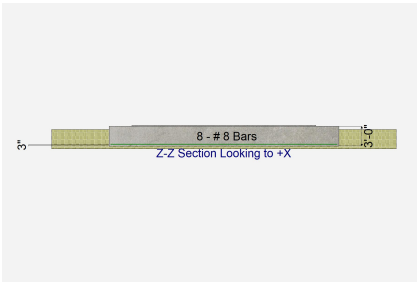
Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation

Bars along X-X Axis

# Bars required within zone	37.2 %
# Bars required on each side of zone	62.8 %





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	145.0	12.50	77.0			14.50		k
OB : Overburden	=								ksf
M-xx	=	-381.0	-5.50	-115.0			1,674.0		k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

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DESCRIPTION: Grid 11 Grade Beam

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.3820	Soil Bearing	1.528 ksf	4.0 ksf	+D+L about X-X axis
PASS	2.737	Overturning - X-X	1,171.80 k-ft	3,207.63 k-ft	+0.60D+0.70E
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.06154	Z Flexure (+X)	6.958 k-ft/ft	113.065 k-ft/ft	+1.20D+0.50Lr+1.60L
PASS	0.06154	Z Flexure (-X)	6.958 k-ft/ft	113.065 k-ft/ft	+1.20D+0.50Lr+1.60L
PASS	0.08435	X Flexure (+Z)	9.663 k-ft/ft	114.562 k-ft/ft	+1.20D+L+E
PASS	0.07761	X Flexure (-Z)	8.891 k-ft/ft	114.562 k-ft/ft	+1.20D+0.50Lr+1.60L
PASS	0.05316	1-way Shear (+X)	2.189 psi	41.185 psi	+1.20D+0.50Lr+1.60L
PASS	0.05316	1-way Shear (-X)	2.189 psi	41.185 psi	+1.20D+0.50Lr+1.60L
PASS	0.06876	1-way Shear (+Z)	2.845 psi	41.370 psi	+1.20D+L+E
PASS	0.06282	1-way Shear (-Z)	2.599 psi	41.370 psi	+1.20D+0.50Lr+1.60L
PASS	0.07856	2-way Punching	6.839 psi	87.049 psi	+1.20D+0.50Lr+1.60L

Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	4.0	n/a	-17.136	1.184	0.7219	n/a	n/a	0.296
X-X, +D+L	4.0	n/a	-17.312	1.528	0.9272	n/a	n/a	0.382
X-X, +D+Lr	4.0	n/a	-16.606	1.232	0.7632	n/a	n/a	0.308
X-X, +D+0.750Lr+0.750L	4.0	n/a	-16.939	1.478	0.9069	n/a	n/a	0.370
X-X, +D+0.750L	4.0	n/a	-17.276	1.442	0.8759	n/a	n/a	0.361
X-X, +0.60D	4.0	n/a	-17.136	0.7103	0.4332	n/a	n/a	0.178
X-X, +D+0.70E	4.0	n/a	34.265	0.5098	1.468	n/a	n/a	0.367
X-X, +D+0.750L+0.5250E	4.0	n/a	14.870	0.9368	1.436	n/a	n/a	0.359
X-X, +0.60D+0.70E	4.0	n/a	66.489	0.03627	1.180	n/a	n/a	0.295
Z-Z, D Only	4.0	0.0	n/a	n/a	n/a	0.9529	0.9529	0.238
Z-Z, +D+L	4.0	0.0	n/a	n/a	n/a	1.228	1.228	0.307
Z-Z, +D+Lr	4.0	0.0	n/a	n/a	n/a	0.9975	0.9975	0.249
Z-Z, +D+0.750Lr+0.750L	4.0	0.0	n/a	n/a	n/a	1.193	1.193	0.298
Z-Z, +D+0.750L	4.0	0.0	n/a	n/a	n/a	1.159	1.159	0.290
Z-Z, +0.60D	4.0	0.0	n/a	n/a	n/a	0.5717	0.5717	0.143
Z-Z, +D+0.70E	4.0	0.0	n/a	n/a	n/a	0.9891	0.9891	0.247
Z-Z, +D+0.750L+0.5250E	4.0	0.0	n/a	n/a	n/a	1.186	1.186	0.297
Z-Z, +0.60D+0.70E	4.0	0.0	n/a	n/a	n/a	0.6080	0.6080	0.152

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
X-X, D Only	381.0 k-ft	4,669.0 k-ft	12.255	OK
X-X, +D+L	496.0 k-ft	6,016.50 k-ft	12.130	OK
X-X, +D+Lr	386.50 k-ft	4,887.75 k-ft	12.646	OK
X-X, +D+0.750Lr+0.750L	471.375 k-ft	5,843.69 k-ft	12.397	OK
X-X, +D+0.750L	467.250 k-ft	5,679.63 k-ft	12.155	OK
X-X, +0.60D	228.60 k-ft	2,801.40 k-ft	12.255	OK
X-X, +D+0.70E	1,171.80 k-ft	5,227.63 k-ft	4.461	OK
X-X, +D+0.750L+0.5250E	878.85 k-ft	6,280.09 k-ft	7.146	OK
X-X, +0.60D+0.70E	1,171.80 k-ft	3,207.63 k-ft	2.737	OK
Z-Z, D Only	None	0.0 k-ft	Infinity	OK
Z-Z, +D+L	None	0.0 k-ft	Infinity	OK
Z-Z, +D+Lr	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750Lr+0.750L	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750L	None	0.0 k-ft	Infinity	OK

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Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Z-Z, +0.60D	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.70E	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750L+0.5250E	None	0.0 k-ft	Infinity	OK
Z-Z, +0.60D+0.70E	None	0.0 k-ft	Infinity	OK

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	2.574	+Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +1.40D	6.307	-Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +1.20D+0.50Lr+1.60L	4.385	+Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +1.20D+0.50Lr+1.60L	8.891	-Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +1.20D+1.60L	4.258	+Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +1.20D+1.60L	8.745	-Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +1.20D+1.60Lr+L	3.895	+Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +1.20D+1.60Lr+L	7.961	-Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +1.20D+1.60Lr	2.613	+Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +1.20D+1.60Lr	5.874	-Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +1.20D+L	3.489	+Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +1.20D+L	7.493	-Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +1.20D	2.207	+Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +1.20D	5.406	-Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +1.20D+0.50Lr+L	3.616	+Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +1.20D+0.50Lr+L	7.639	-Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +0.90D	1.655	+Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +0.90D	4.054	-Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +1.20D+L+E	9.663	+Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +1.20D+L+E	1.953	-Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +0.90D+E	7.829	+Z	Bottom	0.7776	ACI 7.6.1.1	0.790	114.562	OK
X-X, +0.90D+E	1.485	-Z	Top	0.7776	ACI 7.6.1.1	0.790	114.562	OK
Z-Z, +1.40D	4.655	-X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +1.40D	4.655	+X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +1.20D+0.50Lr+1.60L	6.958	-X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +1.20D+0.50Lr+1.60L	6.958	+X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +1.20D+1.60L	6.814	-X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +1.20D+1.60L	6.814	+X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +1.20D+1.60Lr+L	6.214	-X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +1.20D+1.60Lr+L	6.214	+X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +1.20D+1.60Lr	4.448	-X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +1.20D+1.60Lr	4.448	+X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +1.20D+L	5.755	-X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +1.20D+L	5.755	+X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +1.20D	3.990	-X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +1.20D	3.990	+X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +1.20D+0.50Lr+L	5.898	-X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +1.20D+0.50Lr+L	5.898	+X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +0.90D	2.992	-X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +0.90D	2.992	+X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +1.20D+L+E	6.088	-X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +1.20D+L+E	6.088	+X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +0.90D+E	3.325	-X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK
Z-Z, +0.90D+E	3.325	+X	Bottom	0.7776	ACI 7.6.1.1	0.7794	113.065	OK

One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	1.47 psi	1.47 psi	1.47 psi	41.19 psi	0.04	OK
+1.20D+0.50Lr+1.60L	2.19 psi	2.19 psi	2.19 psi	41.19 psi	0.05	OK
+1.20D+1.60L	2.14 psi	2.14 psi	2.14 psi	41.19 psi	0.05	OK
+1.20D+1.60Lr+L	1.96 psi	1.96 psi	1.96 psi	41.19 psi	0.05	OK
+1.20D+1.60Lr	1.40 psi	1.40 psi	1.40 psi	41.19 psi	0.03	OK
+1.20D+L	1.81 psi	1.81 psi	1.81 psi	41.19 psi	0.04	OK
+1.20D	1.26 psi	1.26 psi	1.26 psi	41.19 psi	0.03	OK
+1.20D+0.50Lr+L	1.86 psi	1.86 psi	1.86 psi	41.19 psi	0.05	OK

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: Foundations.ec6

DESCRIPTION: Grid 11 Grade Beam

One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D	0.94 psi	0.94 psi	0.94 psi	41.19 psi	0.02	OK
+1.20D+L+E	1.92 psi	1.92 psi	1.92 psi	41.19 psi	0.05	OK
+0.90D+E	1.05 psi	1.05 psi	1.05 psi	41.19 psi	0.03	OK

One Way Shear Z

Load Combination...	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	1.85 psi	0.72 psi	1.85 psi	41.37 psi	0.04	OK
+1.20D+0.50Lr+1.60L	2.60 psi	1.23 psi	2.60 psi	41.37 psi	0.06	OK
+1.20D+1.60L	2.56 psi	1.20 psi	2.56 psi	41.37 psi	0.06	OK
+1.20D+1.60Lr+L	2.33 psi	1.10 psi	2.33 psi	41.37 psi	0.06	OK
+1.20D+1.60Lr	1.72 psi	0.73 psi	1.72 psi	41.37 psi	0.04	OK
+1.20D+L	2.19 psi	0.98 psi	2.19 psi	41.37 psi	0.05	OK
+1.20D	1.58 psi	0.61 psi	1.58 psi	41.37 psi	0.04	OK
+1.20D+0.50Lr+L	2.23 psi	1.01 psi	2.23 psi	41.37 psi	0.05	OK
+0.90D	1.19 psi	0.46 psi	1.19 psi	41.37 psi	0.03	OK
+1.20D+L+E	0.51 psi	2.85 psi	2.85 psi	41.37 psi	0.07	OK
+0.90D+E	0.50 psi	2.33 psi	2.33 psi	41.37 psi	0.06	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	4.58 psi	87.05 psi	0.05256	OK
+1.20D+0.50Lr+1.60L	6.84 psi	87.05 psi	0.07856	OK
+1.20D+1.60L	6.70 psi	87.05 psi	0.07694	OK
+1.20D+1.60Lr+L	6.11 psi	87.05 psi	0.07016	OK
+1.20D+1.60Lr	4.37 psi	87.05 psi	0.05023	OK
+1.20D+L	5.66 psi	87.05 psi	0.06498	OK
+1.20D	3.92 psi	87.05 psi	0.04505	OK
+1.20D+0.50Lr+L	5.80 psi	87.05 psi	0.0666	OK
+0.90D	2.94 psi	87.05 psi	0.03379	OK
+1.20D+L+E	5.98 psi	87.05 psi	0.06874	OK
+0.90D+E	3.27 psi	87.05 psi	0.03754	OK

Continuous Foundation Design

FOOTING DESIGN

Footing #..... 21
Length (ft):..... 44.00
Width (ft):..... 8.00
Thickness (ft):..... 3.00
Footing Orientation (deg):..... 0.00°
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 150.00 Ec (ksi): 3320.56
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.24 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 33.50

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/ 8.00	H/S	8-#8
2	8.00/22.00	S/S	8-#8
3	22.00/36.00	S/S	8-#8
4	36.00/44.00	S/H	8-#8

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 32.44

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/21.00	H/S	12-#9
2	21.00/23.00	S/S	12-#8
3	23.00/44.00	S/H	12-#9

Transverse Flexure Reinforcement:

Top Bar Depth (in) ..... 32.56 Bottom Bar Depth (in) 31.43

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 6.00	11-#6	11-#6
2	6.00/10.00	6-#7	6-#7
3	10.00/20.00	18-#6	18-#6
4	20.00/24.00	6-#7	6-#7
5	24.00/34.00	18-#6	18-#6
6	34.00/38.00	16-#4	16-#4
7	38.00/44.00	11-#6	11-#6

Longitudinal Shear Reinforcement:

Number of Shear bar legs:.....2

Seg. Num.	Segment Start/End (ft)	Spacing (in)	Quantity
1	0.00/ 4.92	Not Applic.	None
2	11.08/15.00	Not Applic.	None
3	15.00/18.92	Not Applic.	None
4	25.08/29.00	Not Applic.	None
5	29.00/32.86	Not Applic.	None
6	39.14/44.00	Not Applic.	None

Cover (in) Top.....2.00 Bottom.....3.00 Side.....3.00

SUPPORTED MEMBERS

Columns:

Location	Loc. Along Footing (ft):	Size	Column Orientation	Base Plate (LxW) (in):	% Rigid
(12 - E)	8.00	HSS6X6X5/8	0.00	12.00x12.00	50
(11 - E)	22.00	HSS6X6X1/4	0.00	12.00x12.00	50
(10 - E)	36.00	HSS9X9X1/2	0.00	12.00x12.00	50

Brace

Location	Loc. Along Footing (ft):	Brace Orientation
(-384.84,-187.86)	8.00	0.00
(-356.84,-187.86)	36.00	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	230.01	62	4.92			
Provided Shear (kip)	255.82		4.92			
Req. Max Pos. Moment (kip-ft)	1518.46	82	32.86	253.23	62	0.00
Provided Pos. Moment (kip-ft)	1668.84		32.86	667.38		0.00
Req. Max Neg. Moment (kip-ft)	-222.56	66	7.63	-76.56	50	10.00
Provided Neg. Moment (kip-ft)	-930.71		7.63	-1132.85		10.00
Req. Max Punching Shear (kip)	256.40	66	36.00			
Provided Punching Shear (kip)	890.64		36.00			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf).....	4.0	
Soil Subgrade Modulus (ksf / ft).....	96.0	
Max Unfactored Soil Bearing (ksf).....	1.7	Ld Co # 100
Max Average Unfactored Soil Bearing (ksf).....	1.6	

Continuous Foundation Design

FOOTING DESIGN

Footing #..... 1 (below level 1)
Length (ft):..... 39.00
Width (ft):..... 8.00
Thickness (ft):..... 3.00
Footing Orientation (deg):..... 90.00°
Concrete f'c (ksi): 3.00 fct (ksi): CODE Density (pcf): 150.00 Ec (ksi): 3320.56
Reinf. fy (ksi): 60.00

LOADS

Surcharge (ksf) Dead Load: 0.24 Live Load: 0.00

REINFORCEMENT

Top Longitudinal Flexure Reinforcement:

Bar Depth (in) 33.50

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Top Bars
1	0.00/ 7.00	H/S	8-#8
2	7.00/21.00	S/S	8-#8
3	21.00/31.00	S/S	8-#8
4	31.00/39.00	S/H	8-#8

Bottom Longitudinal Flexure Reinforcement:

Bar Depth (in) 32.44

Seg. Num.	Spacing Start/End (ft)	Bar End Condition Start/End	Bot. Bars
1	0.00/20.00	H/S	12-#9
2	20.00/26.00	S/S	12-#9
3	26.00/39.00	S/H	12-#9

Transverse Flexure Reinforcement:

Top Bar Depth (in) ..... 32.56 Bottom Bar Depth (in) 31.43

Seg. Num.	Segment Start/End (ft)	Top Bars	Bot. Bars
1	0.00/ 5.00	9-#6	9-#6
2	5.00/10.00	9-#6	9-#6
3	10.00/19.00	16-#6	16-#6
4	19.00/23.00	6-#7	6-#7
5	23.00/29.00	11-#6	11-#6
6	29.00/34.00	9-#6	9-#6
7	34.00/39.00	9-#6	9-#6

Longitudinal Shear Reinforcement:

Number of Shear bar legs:.....2

Seg. Num.	Segment Start/End (ft)	Spacing (in)	Quantity
1	0.00/ 4.37	Not Applic.	None
2	10.63/14.00	Not Applic.	None
3	14.00/17.89	Not Applic.	None
4	24.11/26.00	Not Applic.	None
5	26.00/28.41	Not Applic.	None
6	34.59/39.00	Not Applic.	None

Cover (in) Top.....2.00 Bottom.....3.00 Side.....3.00

SUPPORTED MEMBERS

Columns:

Location	Loc. Along Footing (ft):	Size	Column Orientation	Base Plate (LxW) (in):	% Rigid
(1 - C)	7.50	HSS8X8X1/2	90.00	12.00x12.00	50
(-227.84 - -212.36)	21.00	HSS7X7X1/2	90.00	12.00x12.00	50
(-227.84 - -201.86)	31.50	HSS6X6X3/8	90.00	12.00x12.00	50

Brace

Location	Loc. Along Footing (ft):	Brace Orientation
(-227.84,-212.36)	21.00	0.00
(-227.84,-212.36)	21.00	0.00

CONCRETE CAPACITY

	Longitudinal	Ld Co #	Loc. (ft)	Transvers	Ld Co #	Loc. (ft)
Req. Max Shear (kip)	223.26	64	2.00			
Provided Shear (kip)	255.82		2.00			
Req. Max Pos. Moment (kip-ft)	1580.86	64	7.92	231.15	64	0.00
Provided Pos. Moment (kip-ft)	1668.84		7.92	546.29		0.00
Req. Max Neg. Moment (kip-ft)	-257.90	79	21.40	-45.94	48	23.00
Provided Neg. Moment (kip-ft)	-930.71		21.40	-691.99		23.00
Req. Max Punching Shear (kip)	260.85	48	7.50			
Provided Punching Shear (kip)	880.15		7.50			

SOIL CAPACITY

Allowable Soil Bearing Capacity (ksf).....	4.0	
Soil Subgrade Modulus (ksf / ft).....	96.0	
Max Unfactored Soil Bearing (ksf).....	1.9	Ld Co # 102
Max Average Unfactored Soil Bearing (ksf).....	1.5	

LATERAL DESIGN - DIAPHRAGMS

PCS Structural Solutions

Project: HNT PK-12 Job No: 23-580

Subject: DIAPHRAGM DESIGN Sheet _____ Name: JDJ

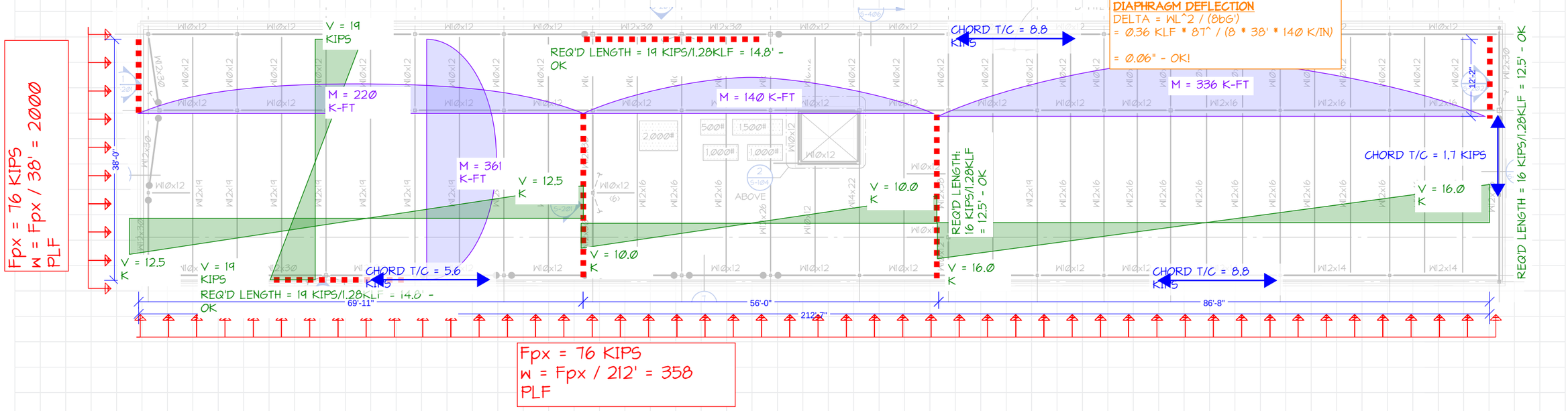
Originating Office: ☒ Seattle ☐ Tacoma ☐ Portland Date: 2025/05/19

ROOF DIAPHRAGM DESIGN

ROOF DECK SHEAR STRENGTH

LRFD Design Seismic Diaphragm Shear Strength ΦSn (plf)

Sidelap Connection Spacing (in.)	Span 5'-10"	Span 6'-10"	Span 7'-10"	Span 8'-10"	Span 9'-10"
4	1793	1793	1793	1535	1239
6	1793	1793	1793	1535	1239
8	1793	1793	1793	1535	1239
12	1784	1736	1699	1535	1239
18	1459	1453	1448	1318	1239
24	1265	1288	1149	1181	1078
36	1049	1107	982	881	941



DIAPHRAGM DEFLECTION

DELTA = WL^2 / (8bG')

= 0.36 KLF * 87^ / (8 * 38' * 140 K/IN)

= 0.06" - OK!

20 ga PLB™-36 Grade 50 Roof Deck

Seismic Diaphragm Shear

For Both Ends Lapped Deck

3/4" Visible Dia. Arc Spot Weld Connections to Supports
36 / 5 Perpendicular Connection Pattern to Supports
PunchLok II Connection (VSC2) Sidelap Connections

A572 GR50 Support Member or Equivalent
0.188 ≤ Support Thickness (in.)
3 in. Minimum Deck End Bearing Length

Note: Support welds at interlocking sidelaps may be 3/8" x 1 1/4" arc seam welds in lieu of arc spot welds.

LRFD Design Seismic Diaphragm Shear Strength ΦSn (plf) Generic 3 Span Condition

Sidelap Connection Spacing (in.)	Span 5'-10"	6'-10"	7'-10"	8'-10"	9'-10"	10'-10"	11'-10"	12'-10"	13'-10"
4	1793	1793	1793	1535	1239	1021	856	727	626
6	1793	1793	1793	1535	1239	1021	856	727	626
8	1793	1793	1793	1535	1239	1021	856	727	626
12	1784	1736	1699	1535	1239	1021	856	727	626
18	1459	1453	1448	1318	1239	1021	856	727	626
24	1265	1288	1149	1181	1078	1021	856	727	626
36	1049	1107	982	881	941	862	794	727	626

Average Connection Spacing to Supports at Parallel Chords & Collectors (in.)

Sidelap Connection Spacing (in.)	Span 5'-10"	6'-10"	7'-10"	8'-10"	9'-10"	10'-10"	11'-10"	12'-10"	13'-10"
4	6	6	6	6	6	6	6	6	6
6	9	9	9	9	9	9	9	9	9
8	12	12	12	12	12	12	12	12	12
12	14	14	13	15	18	18	18	18	18
18	18	16	16	18	20	26	27	26	27
24	23	21	24	21	24	26	28	26	28
36	23	21	24	27	24	26	28	26	28

Seismic or Wind Diaphragm Shear Stiffness, G' (kip/in.) Generic 3 Span Condition

Sidelap Connection Spacing (in.)	Span 5'-10"	6'-10"	7'-10"	8'-10"	9'-10"	10'-10"	11'-10"	12'-10"	13'-10"
4	231	230	229	229	229	228	228	228	228
6	211	210	209	208	207	207	206	206	206
8	196	197	193	194	191	192	189	190	188
12	173	171	169	167	166	165	164	163	163
18	151	152	152	143	144	145	139	140	141
24	137	140	130	133	125	128	122	125	120
36	120	126	116	108	114	107	101	107	102

20 ga PLB™-36 Grade 50 Roof Deck

Diaphragm Shear & Wind Uplift Interaction

For Both Ends Lapped Deck
with MWFRS Design Net Wind Uplift (LRFD) of 3 psf

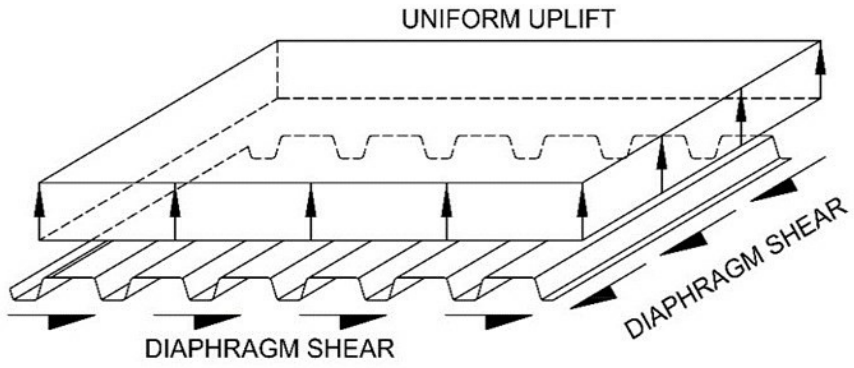
3/4" Visible Dia. Arc Spot Weld Connections to Supports
36 / 5 Perpendicular Connection Pattern to Supports
PunchLok II Connection (VSC2) Sidelap Connections
A572 GR50 Support Member or Equivalent
0.188 ≤ Support Thickness (in.)
3 in. Minimum Deck End Bearing Length
Note: Support welds at interlocking sidelaps may be 3/8" x 1 1/4" arc seam welds in lieu of arc spot welds.

LRFD Design Combined Wind Uplift & Diaphragm Shear Strength ΦSn (plf) Generic 3 Span Condition

Sidelap Connection Spacing (in.)	Span 5'-10"	6'-10"	7'-10"	8'-10"	9'-10"	10'-10"	11'-10"	12'-10"	13'-10"
4	2445	2445	1952	1535	1239	1021	856	727	626
6	2445	2445	1952	1535	1239	1021	856	727	626
8	2445	2445	1952	1535	1239	1021	856	727	626
12	2432	2367	1952	1535	1239	1021	856	727	626
18	1990	1981	1952	1535	1239	1021	856	727	626
24	1725	1756	1567	1535	1239	1021	856	727	626
36	1431	1510	1339	1201	1239	1021	856	727	626

Average Connection Spacing to Supports at Parallel Chords & Collectors (in.)

Sidelap Connection Spacing (in.)	Span 5'-10"	6'-10"	7'-10"	8'-10"	9'-10"	10'-10"	11'-10"	12'-10"	13'-10"
4	6	6	6	6	6	6	6	6	6
6	9	9	9	9	9	9	9	9	9
8	12	12	12	12	12	12	12	12	12
12	14	14	16	18	18	18	18	18	18
18	18	16	16	21	24	26	27	26	27
24	23	21	24	21	24	26	28	26	28
36	23	21	24	27	24	26	28	26	28



V1.0.4 of calculator based on AISI S100-16 (2020) w/S2-20 & AISI S310-16 as modified by IAPMO ER-2018 or ER-0432 Date: 5/17/2024

NOTICE: Design defects that could cause injury or death may result from relying on the information in this document without independent verification by a qualified professional. The information in this document is provided "AS IS". Nucor Corporation and its affiliates expressly disclaim: (i) any and all representations, warranties and conditions and (ii) all liability arising out of or related to this document and the information in it.

PCS Structural Solutions

Project:	HNT Pk-12	Job No:	23-580
Subject:	Wide-Flange Section	Name:	JDJ
Office:	Seattle	Date:	5/19/2025

WIDE-FLANGE SECTION DESIGN (AISC 360-16)

Description — **DESIGN OK!**

ROOF - TYP CHORD

Properties

Shape	W10X12	-	W	12	*plf*
Material	A992	-	A	3.54	in^2
Fy	50	*ksi*	d	9.87	*in*
Fu	65	*ksi*	b_f	3.96	*in*
			t_w	0.19	*in*
KLx	12.0	*ft*	t_f	0.21	*in*
Kly	12.0	*ft*	k_{des}	0.51	*in*
KLz	12.0	*ft*	$b_f/2t_f$	9.43	-
			h/t_w	46.6	-
Lb	1.0	*ft*	I_x	53.8	in^4
Cb	1.0	-	Z_x	12.6	in^3
Cm	1.0	-	S_x	10.9	in^3

Load Cases

Case -	Pu *kips*	Tu *kips*	Mu,x *kip-ft*	Mu,y *kip-ft*	Vu,x *kips*	Vu,y *kips*	Max DCR -	Case Selected
1	8.8	8.8	6	0	4	0	49%	◉
2							0%	○
3							0%	○
4							0%	○

Strong Axis Flexure - AISC F2-F5 — **ϕMnx = 46.9 kip-ft**

Weak Axis Flexure - AISC F6 — **ϕMny = 6.5 kip-ft**

Compression - AISC E7 — **ϕPn = 23.2 kips**

Tension - AISC D2 — **ϕTn = 159.3 kips**

Major-Axis Shear - AISC G2 — **ϕVnx = 56.3 kips**

Minor-Axis Shear - AISC G7 — **ϕVny = 22.5 kips/flange**

2nd Order Amplification - AISC Appendix 8 — **B1,x = 1.01 - B1,y = 1.41**

DCR - AISC H1 — **Max DCR = 49.4%**

PCS Structural Solutions

Project:	HNT Pk-12	Job No:	23-580
Subject:	Wide-Flange Section	Name:	JDJ
Office:	Seattle	Date:	5/19/2025

WIDE-FLANGE SECTION DESIGN (AISC 360-16)

Description — **DESIGN OK!**

ROOF - TYP COLLECTOR

Properties

Shape	W10X12	-	W	12	*plf*
Material	A992	-	A	3.54	in^2
Fy	50	*ksi*	d	9.87	*in*
Fu	65	*ksi*	b_f	3.96	*in*
			t_w	0.19	*in*
KLx	12.0	*ft*	t_f	0.21	*in*
Kly	12.0	*ft*	k_{des}	0.51	*in*
KLz	12.0	*ft*	$b_f/2t_f$	9.43	-
			h/t_w	46.6	-
Lb	1.0	*ft*	I_x	53.8	in^4
Cb	1.0	-	Z_x	12.6	in^3
Cm	1.0	-	S_x	10.9	in^3

Load Cases

Case -	Pu *kips*	Tu *kips*	Mu,x *kip-ft*	Mu,y *kip-ft*	Vu,x *kips*	Vu,y *kips*	Max DCR -	Case Selected
1	19	19	6	0	4	0	93%	◉
2							0%	○
3							0%	○
4							0%	○

Strong Axis Flexure - AISC F2-F5 — **ϕMnx = 46.9 kip-ft**

Weak Axis Flexure - AISC F6 — **ϕMny = 6.5 kip-ft**

Compression - AISC E7 — **ϕPn = 23.2 kips**

Tension - AISC D2 — **ϕTn = 159.3 kips**

Major-Axis Shear - AISC G2 — **ϕVnx = 56.3 kips**

Minor-Axis Shear - AISC G7 — **ϕVny = 22.5 kips/flange**

2nd Order Amplification - AISC Appendix 8 — **B1,x = 1.03 - B1,y = 2.71**

DCR - AISC H1 — **Max DCR = 93.5%**

PCS Structural Solutions

Project:	HNT Pk-12	Job No:	23-580
Subject:	Shear Plate Subject to Axial Load	Name:	JDJ
Office:	Seattle	Date:	5/19/2025

SHEAR PLATE SUBJECT TO COMBINED FORCES (AISC 360-16)

Description

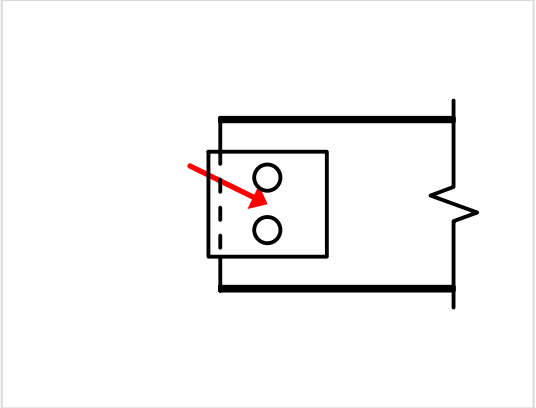
ROOF - CHORD W10

DESIGN OK!

Properties

Shape	W10X12	-
1st Row Edge Dist.	2.50	*in*
Material	A992	-
Fy	50	***ksi***
Fu	65	***ksi***
Web Edge Dist.	2	*in*
A	3.54	*sq. in*
d	9.87	*in*
tw	0.19	*in*
tf	0.21	*in*
bf	3.96	*in*
Support t	0.5	*in*
Support Fu	65	*ksi*

A36 3/8" THICK SHEAR PLATE W/(2) 7/8"Ø A325N BOLTS - WELD TO SUPPORT W/1/4 FILLET EA SIDE



Ultimate Loads

Applied Load, V_u	6.0	*kips*
Applied Load, T_u	9.0	*kips*
Resultant, Ru	10.8	*kips*
Applied Load Angle	56.3	*degrees*

Shear Plate Properties

Thickness	0.38	*in*
Material	A36	-
Fy	50	*ksi*
Fu	65	*ksi*
Height	6	*in*
Width	5	*in*

Bolt Group Properties

Edge Dist. T&B	1.5	*in*
Edge Dist. Right	2.5	*in*
No. of Bolt Rows	2	-
No. of Bolt Columns	1	-
Row Spacing	3	*in*
Column Spacing	3	*in*
Eccentricity, e	2.5	*in*

Limit State Summary

Bolt Group Controlling Capacity	42%
Beam Web Shear Yielding	11%
Beam Tensile Yielding	6%
Beam Tensile Rupture	7%
Beam Web Tension Block Shear	26%
Maximum Plate Thickness*	106%
Shear Yielding of Plate	9%
Plate Flexural Yielding	10%
Tensile Yielding of Plate	9%
Plate Axial-Flexure-Shear Yielding Interaction	3%
Tensile Rupture of Plate	12%
Shear Rupture of Plate	14%
Flexural Rupture of Plate	13%
Plate Axial-Flexure-Shear Rupture Interaction	5%
Plate Block Shear Case 1 - Vertical Shear	12%
Plate Block Shear Case 2 - Beam Axial	12%
Plate Block Shear Case 3 - Axial (2) Shear Planes	11%
Plate Block Shear - Shear and Axial Interaction	3%
Support Shear Rupture at Weld	5%
Plate Compressive Flexural Buckling	9%
Weld Strength	12%
Controlling DCR*	42%

PCS Structural Solutions

Project: HNT PK-12 Job No: 23-580

Subject: DIAPHRAGM DESIGN Sheet _____ Name: JDJ

Originating Office: ☒ Seattle ☐ Tacoma ☐ Portland Date: 2025/05/19

LEVEL 3 DIAPHRAGM DESIGN

DIAPHRAGM FORCE DISTRIBUTION

CONTROLLING DIAPHRAGM FORCE = 214 KIPS

COMPOSITE DECK MASS PORTION = 668 KIPS FLOOR + 64 KIPS EXTERIOR WALL = 732 KIPS
-> 732 K / 919 KIPS * 214 K = **170 KIPS**

BARE DECK MASS PORTION = 187 KIPS
-> 187 K / 919 KIPS * 214 K = **44 KIPS**

Deck-Slab Diaphragm Strength
20 ga W3-36 FormLok® Grade 50 Composite Deck
5.5 in. total slab depth, f'_c = 4000 psi, 145 pcf NWC
Single Mat of W2.9 x W2.9 - 6 x 6

3/4" Steel Headed Stud Anchor at Chords & Collectors for Shear Transfer

Perpendicular Connection Pattern[3]	1 every 3rd rib	
Parallel Connection Attachment (maximum)	1 row at 16	in. o.c.
Minimum Connections to Supporting Members[4]		
Minimum connections to all supports may be any of the following: arc spot welds, fillet welds, PAF's, screws, ShearFlex® anchors, welded studs or other mechanical connections[5].		
Perpendicular Connection Pattern[3]	1 per rib	
Parallel Perimeter Connections for deck spans greater than 5 ft	36	in. o.c.
Governing Deck-Slab Strength and Stiffness		
Available Diaphragm Design Strength Controlled by Connections to Chords and Collectors	$V_a = \Phi Q_N$ = 3160	plf
Deck-Slab Diaphragm Design Shear Stiffness	G' = 1282	kip/in
Deck-Slab Shear Strength		
Reinforced Concrete Slab Design Shear Strength	V_u = 5456	plf
Chords & Collector Shear Transfer Strength		
Chord & Collectors Design Shear Transfer Strength	ΦQ_N = 3160	plf

Fpx = 2.16/7.4 * 44 KIPS = 13 KIPS
w = Fpx / 29' = 448 PLF

Fpx = 31 KIPS
w = Fpx / 26' = 1192 PLF

Fpx = 20 KIPS
w = Fpx / 140' = 142 PLF

3,386 sf

2,156 sf

1,880 sf

REQ'D LENGTH = 13 K/1.3KLF = 10' - OK

COLLECTOR C-3

COLLECTOR C-2

CHORD T/C = 2.5 KIPS

M = 188 K-FT

V = 13 K

V = 7 K + 10K = 27K

0.9 * 0.31 SQ. IN * 60 KSI = 16.7 KIPS -> PROVIDE (1) ADD'L # 5 CHORD BAR

COLLECTOR FORCE ΩT = 2.5(20K) = 50 KIPS - CONTROLS OVER CHORD FORCE

Fpx = 24 KIPS
w = Fpx / 72' = 333 PLF

V = 34 K

V = 85 K

CHORD T/C = 3.8 KIPS

139'-9"

REQ'D LENGTH = 85 K/3.2KLF = 27' - OK

COLLECTOR C-1

COLLECTOR C-1

COLLECTOR C-1

Fpx = 170 KIPS
w = Fpx / 38' = 4474 PLF

REQ'D LENGTH = 34 K/3.2KLF = 10.7' - OK

REQ'D LENGTH = 85 K/3.2KLF = 27' - OK

V-TRANSFER = 18 KIPS
ΩV = 45 KIPS

CHORD T/C = 20.5 KIPS

0.9 * 0.31 SQ. IN * 60 KSI = 16.7 KIPS -> PROVIDE (1) ADD'L # 5 CHORD BAR

M = 807 K-FT

REQ'D LENGTH = 30 K/3.2KLF = 9.4' - OK

69'-11" 212'-7" 91'-8" 51'-8"

Fpx = 170 KIPS
w = Fpx / 212' = 801 PLF

Seattle | 1011 Western Avenue, Suite 810 | Seattle, WA 98104 | 206.292.5076
Tacoma | 1250 Pacific Avenue, Suite 701 | Tacoma, WA 98402 | 253.383.2797
Portland | 101 SW Main Street, Suite 280 | Portland, OR 97204 | 503.232.3746

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PCS Structural Solutions

Project:	HNT Pk-12	Job No:	23-580
Subject:	Wide-Flange Section	Name:	JDJ
Office:	Seattle	Date:	5/19/2025

WIDE-FLANGE SECTION DESIGN (AISC 360-16)

Description — **DESIGN OK!**

LEVEL 3 - COLLECTOR C-1

Properties

Shape	W10X22	-	W	22	*plf*
Material	A992	-	A	6.49	in^2
Fy	50	*ksi*	d	10.2	*in*
Fu	65	*ksi*	b_f	5.75	*in*
			t_w	0.24	*in*
KLx	12.0	*ft*	t_f	0.36	*in*
Kly	12.0	*ft*	k_{des}	0.66	*in*
KLz	12.0	*ft*	$b_f/2t_f$	7.99	-
			h/t_w	36.9	-
Lb	1.0	*ft*	I_x	118	in^4
Cb	1.0	-	Z_x	26	in^3
Cm	1.0	-	S_x	23.2	in^3

Load Cases

Case -	Pu *kips*	Tu *kips*	Mu,x *kip-ft*	Mu,y *kip-ft*	Vu,x *kips*	Vu,y *kips*	Max DCR -	Case Selected
1	55	55	6	0	4	0	51%	◉
2							0%	○
3							0%	○
4							0%	○

Strong Axis Flexure - AISC F2-F5 — **ϕMnx = 97.5 kip-ft**

Weak Axis Flexure - AISC F6 — **ϕMny = 22.9 kip-ft**

Compression - AISC E7 — **ϕPn = 122.5 kips**

Tension - AISC D2 — **ϕTn = 292.1 kips**

Major-Axis Shear - AISC G2 — **ϕVnx = 73.4 kips**

Minor-Axis Shear - AISC G7 — **ϕVny = 55.9 kips/flange**

2nd Order Amplification - AISC Appendix 8 — **B1,x = 1.03 - B1,y = 1.54**

DCR - AISC H1 — **Max DCR = 50.6%**

PCS Structural Solutions

Project:	HNT Pk-12	Job No:	23-580
Subject:	Wide-Flange Section	Name:	JDJ
Office:	Seattle	Date:	5/19/2025

WIDE-FLANGE SECTION DESIGN (AISC 360-16)

Description — **DESIGN OK!**

LEVEL 3 - COLLECTOR C-2

Properties

Shape	W12X14	-	W	14	*plf*
Material	A992	-	A	4.16	in^2
Fy	50	*ksi*	d	11.9	*in*
Fu	65	*ksi*	b_f	3.97	*in*
			t_w	0.2	*in*
KLx	6.0	*ft*	t_f	0.225	*in*
Kly	6.0	*ft*	k_{des}	0.525	*in*
KLz	6.0	*ft*	$b_f/2t_f$	8.82	-
			h/t_w	54.3	-
Lb	1.0	*ft*	I_x	88.6	in^4
Cb	1.0	-	Z_x	17.4	in^3
Cm	1.0	-	S_x	14.9	in^3

Load Cases

Case -	Pu *kips*	Tu *kips*	Mu,x *kip-ft*	Mu,y *kip-ft*	Vu,x *kips*	Vu,y *kips*	Max DCR -	Case Selected
1	50	50	2	0	1	0	57%	◉
2							0%	○
3							0%	○
4							0%	○

Strong Axis Flexure - AISC F2-F5 — **ϕMnx = 65.3 kip-ft**

Weak Axis Flexure - AISC F6 — **ϕMny = 7.1 kip-ft**

Compression - AISC E7 — **ϕPn = 91.9 kips**

Tension - AISC D2 — **ϕTn = 187.2 kips**

Major-Axis Shear - AISC G2 — **ϕVnx = 64.3 kips**

Minor-Axis Shear - AISC G7 — **ϕVny = 24.1 kips/flange**

2nd Order Amplification - AISC Appendix 8 — **B1,x = 1.01 - B1,y = 1.62**

DCR - AISC H1 — **Max DCR = 57.2%**

PCS Structural Solutions

Project:	HNT Pk-12	Job No:	23-580
Subject:	Wide-Flange Section	Name:	JDJ
Office:	Seattle	Date:	5/19/2025

WIDE-FLANGE SECTION DESIGN (AISC 360-16)

Description — **DESIGN OK!**

LEVEL 3 - COLLECTOR C-3

Properties

Shape	W12X30	-	W	30	*plf*
Material	A992	-	A	8.79	in^2
Fy	50	*ksi*	d	12.3	*in*
Fu	65	*ksi*	b_f	6.52	*in*
			t_w	0.26	*in*
KLx	14.0	*ft*	t_f	0.44	*in*
Kly	14.0	*ft*	k_{des}	0.74	*in*
KLz	14.0	*ft*	$b_f/2t_f$	7.41	-
			h/t_w	41.8	-
Lb	1.0	*ft*	I_x	238	in^4
Cb	1.0	-	Z_x	43.1	in^3
Cm	1.0	-	S_x	38.6	in^3

Load Cases

Case -	Pu *kips*	Tu *kips*	Mu,x *kip-ft*	Mu,y *kip-ft*	Vu,x *kips*	Vu,y *kips*	Max DCR -	Case Selected
1	50	50	12.7	0	3	0	38%	◉
2							0%	○
3							0%	○
4							0%	○

Strong Axis Flexure - AISC F2-F5 — **ϕMnx = 161.6 kip-ft**

Weak Axis Flexure - AISC F6 — **ϕMny = 35.9 kip-ft**

Compression - AISC E7 — **ϕPn = 160.4 kips**

Tension - AISC D2 — **ϕTn = 395.6 kips**

Major-Axis Shear - AISC G2 — **ϕVnx = 95.9 kips**

Minor-Axis Shear - AISC G7 — **ϕVny = 77.5 kips/flange**

2nd Order Amplification - AISC Appendix 8 — **B1,x = 1.02 - B1,y = 1.32**

DCR - AISC H1 — **Max DCR = 38.3%**

PCS Structural Solutions

Project:	HNT Pk-12	Job No:	23-580
Subject:	Shear Plate Subject to Axial Load	Name:	JDJ
Office:	Seattle	Date:	5/19/2025

SHEAR PLATE SUBJECT TO COMBINED FORCES (AISC 360-16)

Description

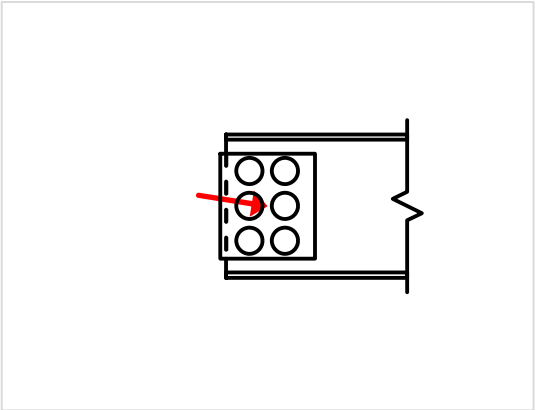
LEVEL 3 - W12X30 COLLECTOR

DESIGN OK!

Properties

Shape	W12X30	-
1st Row Edge Dist.	2.50	*in*
Material	A992	-
Fy	50	***ksi***
Fu	65	***ksi***
Web Edge Dist.	2	*in*
A	8.79	*sq. in*
d	12.3	*in*
tw	0.26	*in*
tf	0.44	*in*
bf	6.52	*in*
Support t	0.5	*in*
Support Fu	65	*ksi*

A36 3/8" THICK SHEAR PLATE W/(6) 7/8"Ø A325N BOLTS - WELD TO SUPPORT W/1/4 FILLET EA SIDE



Ultimate Loads

Applied Load, V_u	8.0	*kips*
Applied Load, T_u	50.0	*kips*
Resultant, Ru	50.6	*kips*
Applied Load Angle	80.9	*degrees*

Shear Plate Properties

Thickness	0.38	*in*
Material	A36	-
Fy	50	*ksi*
Fu	65	*ksi*
Height	9	*in*
Width	8	*in*

Bolt Group Properties

Edge Dist. T&B	1.5	*in*
Edge Dist. Right	2.5	*in*
No. of Bolt Rows	3	-
No. of Bolt Columns	2	-
Row Spacing	3	*in*
Column Spacing	3	*in*
Eccentricity, e	5.5	*in*

Limit State Summary

Bolt Group Controlling Capacity	40%
Beam Web Shear Yielding	8%
Beam Tensile Yielding	13%
Beam Tensile Rupture	20%
Beam Web Tension Block Shear	48%
Maximum Plate Thickness*	44%
Shear Yielding of Plate	8%
Plate Flexural Yielding	6%
Tensile Yielding of Plate	33%
Plate Axial-Flexure-Shear Yielding Interaction	16%
Tensile Rupture of Plate	46%
Shear Rupture of Plate	12%
Flexural Rupture of Plate	8%
Plate Axial-Flexure-Shear Rupture Interaction	30%
Plate Block Shear Case 1 - Vertical Shear	9%
Plate Block Shear Case 2 - Beam Axial	37%
Plate Block Shear Case 3 - Axial (2) Shear Planes	31%
Plate Block Shear - Shear and Axial Interaction	14%
Support Shear Rupture at Weld	19%
Plate Compressive Flexural Buckling	35%
Weld Strength	34%
Controlling DCR*	48%

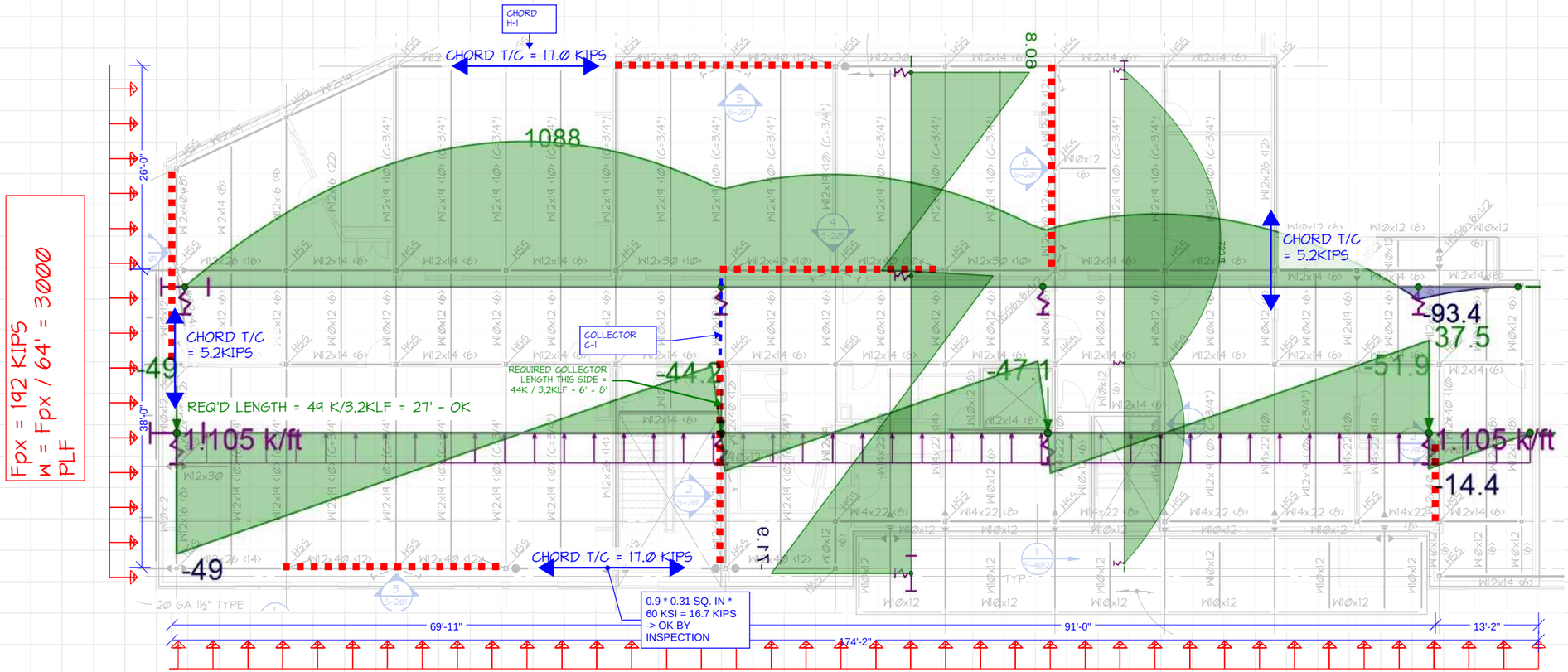
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Project: HNT PK-12 Job No: 23-580

Subject: DIAPHRAGM DESIGN Sheet Name: JDJ

Originating Office: ☒ Seattle ☐ Tacoma ☐ Portland Date: 2025/05/19

LEVEL 2 DIAPHRAGM DESIGN



PCS Structural Solutions

Project:	HNT Pk-12	Job No:	23-580
Subject:	Wide-Flange Section	Name:	JDJ
Office:	Seattle	Date:	5/19/2025

WIDE-FLANGE SECTION DESIGN (AISC 360-16)

Description — **DESIGN OK!**

LEVEL 2 - CHORD H-1

Properties

Shape	W12X14	-		**W**	14	*plf*
Material	A992	-		**A**	4.16	in^2
Fy	50	*ksi*		**d**	11.9	*in*
Fu	65	*ksi*		**b_f**	3.97	*in*
				t_w	0.2	*in*
KLx	14.0	*ft*		**t_f**	0.225	*in*
Kly	7.0	*ft*		**k_{des}**	0.525	*in*
KLz	14.0	*ft*		**$b_f/2t_f$**	8.82	-
				h/t_w	54.3	-
Lb	1.0	*ft*		**I_x**	88.6	in^4
Cb	1.0	-		**Z_x**	17.4	in^3
Cm	1.0	-		**S_x**	14.9	in^3

Load Cases

Case -	Pu *kips*	Tu *kips*	Mu,x *kip-ft*	Mu,y *kip-ft*	Vu,x *kips*	Vu,y *kips*	Max DCR -	Case Selected
1	17	17	44	0	7	0	84%	◉
2							0%	○
3							0%	○
4							0%	○

Strong Axis Flexure - AISC F2-F5 — **ϕMnx = 65.3 kip-ft**

Weak Axis Flexure - AISC F6 — **ϕMny = 7.1 kip-ft**

Compression - AISC E7 — **ϕPn = 73.8 kips**

Tension - AISC D2 — **ϕTn = 187.2 kips**

Major-Axis Shear - AISC G2 — **ϕVnx = 64.3 kips**

Minor-Axis Shear - AISC G7 — **ϕVny = 24.1 kips/flange**

2nd Order Amplification - AISC Appendix 8 — **B1,x = 1.02 - B1,y = 1.22**

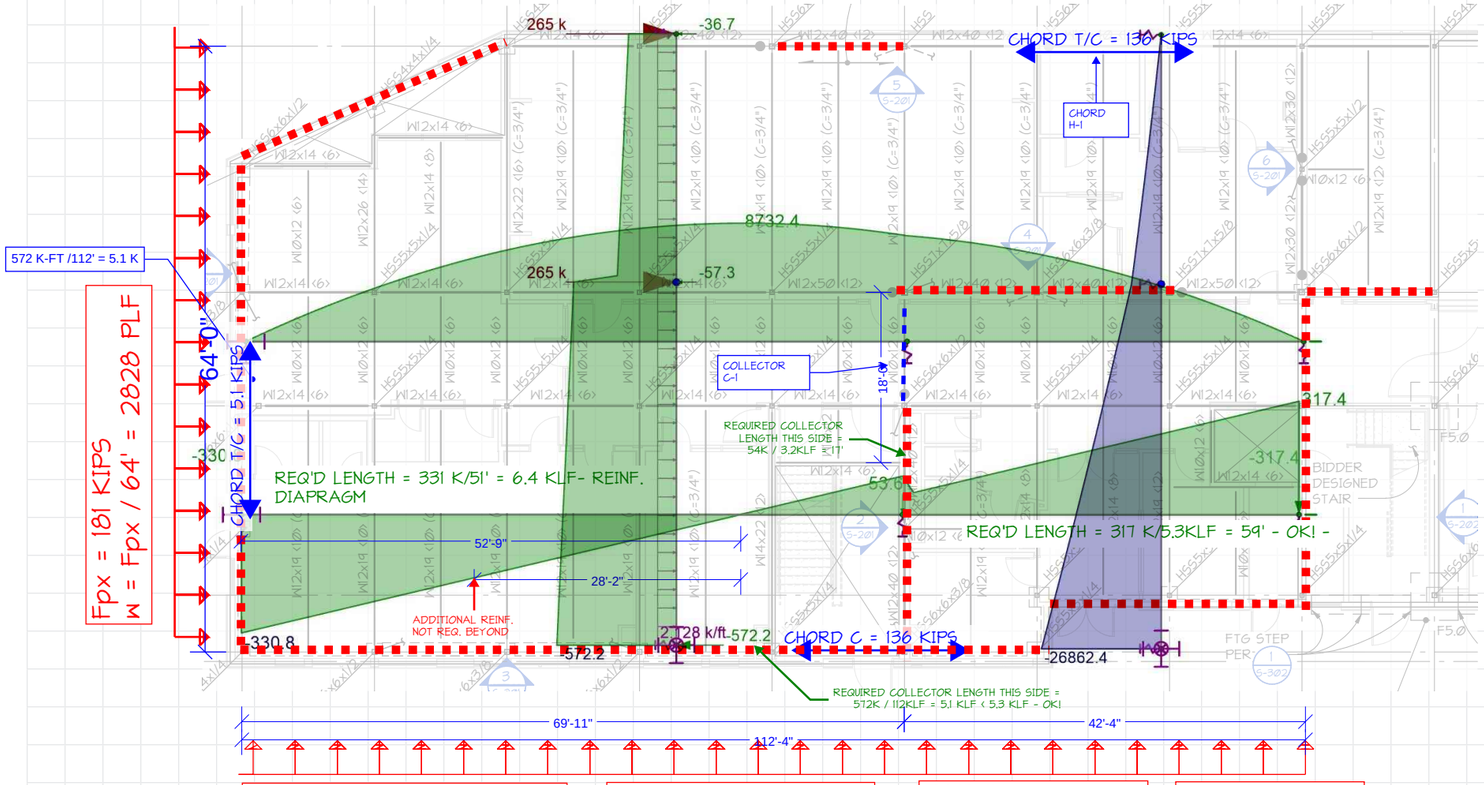
DCR - AISC H1 — **Max DCR = 84.1%**

Project: HNT PK-12 Job No: 23-580

Subject: DIAPHRAGM DESIGN Sheet Name: JDJ

Originating Office: ☒ Seattle ☐ Tacoma ☐ Portland Date: 2025/05/19

LEVEL 1 DIAPHRAGM DESIGN



Fpx = 181 KIPS
w = Fpx / 112' = 1616 PLF

\+

SEISMIC SURCHARGE
w = 1350 PLF

\+

EARTH PRESSURE
w = 1.6(2063 PLF) = 3300

=

TOTAL
w = 6266 PLF

DECK SHEAR STRENGTH

$$V_n = A_{cv}(2\lambda\sqrt{f'_c} + \rho_t f_y)$$

WELDED WIRE FABRIC REINFORCED DECK STRENGTH

= 0.6 * 12" * 3.5" (2 * SQRT(4000 PSI) / 1000 + 0.059 SQ.IN/FT / (3.5" * 12") * 60KSI)

= 5.3 KLF

PCS Structural Solutions

Project:	HNT Pk-12	Job No:	23-580
Subject:	Wide-Flange Section	Name:	JDJ
Office:	Seattle	Date:	5/19/2025

WIDE-FLANGE SECTION DESIGN (AISC 360-16)

Description — **DESIGN OK!**

LEVEL 1 - CHORD H-1

Properties

Shape	W12X40	-		W	40	*plf*
Material	A992	-		A	11.7	in^2
Fy	50	*ksi*		d	11.9	*in*
Fu	65	*ksi*		b_f	8.01	*in*
				t_w	0.295	*in*
KLx	14.0	*ft*		t_f	0.515	*in*
Kly	7.0	*ft*		k_{des}	1.02	*in*
KLz	14.0	*ft*		$b_f/2t_f$	7.77	-
				h/t_w	33.6	-
Lb	1.0	*ft*		I_x	307	in^4
Cb	1.0	-		Z_x	57	in^3
Cm	1.0	-		S_x	51.5	in^3

Load Cases

Case -	Pu *kips*	Tu *kips*	Mu,x *kip-ft*	Mu,y *kip-ft*	Vu,x *kips*	Vu,y *kips*	Max DCR -	Case Selected
1	136	136	44	0	7	0	49%	◉
2							0%	○
3							0%	○
4							0%	○

Strong Axis Flexure - AISC F2-F5 — **ϕMnx = 213.8 kip-ft**

Weak Axis Flexure - AISC F6 — **ϕMny = 63 kip-ft**

Compression - AISC E3 & E4 — **ϕPn = 459.1 kips**

Tension - AISC D2 — **ϕTn = 526.5 kips**

Major-Axis Shear - AISC G2 — **ϕVnx = 105.3 kips**

Minor-Axis Shear - AISC G7 — **ϕVny = 111.4 kips/flange**

2nd Order Amplification - AISC Appendix 8 — **B1,x = 1.05 - B1,y = 1.08**

DCR - AISC H1 — **Max DCR = 48.8%**

PCS Structural Solutions

Project:	HNT Pk-12	Job No:	23-580
Subject:	Wide-Flange Section	Name:	JDJ
Office:	Seattle	Date:	5/19/2025

WIDE-FLANGE SECTION DESIGN (AISC 360-16)

Description — **DESIGN OK!**

LEVEL 1 - COLLECTOR C-1

Properties

Shape	W10X22	-	W	22	*plf*
Material	A992	-	A	6.49	in^2
Fy	50	*ksi*	d	10.2	*in*
Fu	65	*ksi*	b_f	5.75	*in*
			t_w	0.24	*in*
KLx	12.0	*ft*	t_f	0.36	*in*
Kly	12.0	*ft*	k_{des}	0.66	*in*
KLz	12.0	*ft*	$b_f/2t_f$	7.99	-
			h/t_w	36.9	-
Lb	1.0	*ft*	I_x	118	in^4
Cb	1.0	-	Z_x	26	in^3
Cm	1.0	-	S_x	23.2	in^3

Load Cases

Case -	Pu *kips*	Tu *kips*	Mu,x *kip-ft*	Mu,y *kip-ft*	Vu,x *kips*	Vu,y *kips*	Max DCR -	Case Selected
1	75	75	6	0	4	0	67%	◉
2							0%	○
3							0%	○
4							0%	○

Strong Axis Flexure - AISC F2-F5 — **ϕMnx = 97.5 kip-ft**

Weak Axis Flexure - AISC F6 — **ϕMny = 22.9 kip-ft**

Compression - AISC E7 — **ϕPn = 122.5 kips**

Tension - AISC D2 — **ϕTn = 292.1 kips**

Major-Axis Shear - AISC G2 — **ϕVnx = 73.4 kips**

Minor-Axis Shear - AISC G7 — **ϕVny = 55.9 kips/flange**

2nd Order Amplification - AISC Appendix 8 — **B1,x = 1.05 - B1,y = 1.91**

DCR - AISC H1 — **Max DCR = 67%**

MISC

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Misc Members.ec6

DESCRIPTION: Typ Canopy Beam

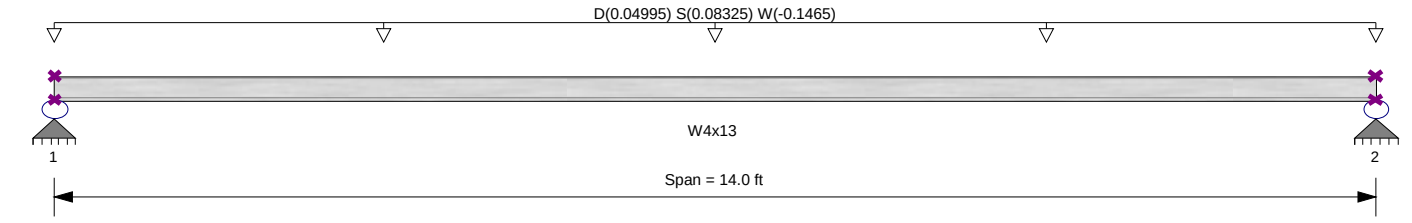
CODE REFERENCES

Calculations per AISC 360-16, IBC 2021
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Load Resistance Factor Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		

Stem Down



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.0150, S = 0.0250, W = -0.0440 ksf, Tributary Width = 3.330 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.259 : 1	Maximum Shear Stress Ratio =	0.042 : 1
Section used for this span	W4x13	Section used for this span	W4x13
Mu : Applied	5.114 k-ft	Vu : Applied	1.461 k
Mn * Phi : Allowable	19.770 k-ft	Vn * Phi : Allowable	34.944 k
Load Combination	+1.20D+1.60S	Load Combination	+1.20D+1.60S
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.220 in	Ratio =	761	>=360	Span: 1 : S Only
Max Upward Transient Deflection	-0.233 in	Ratio =	721	>=360	Span: 1 : +0.60W
Max Downward Total Deflection	0.387 in	Ratio =	434	>=240.	Span: 1 : +D+S
Max Upward Total Deflection	-0.133 in	Ratio =	1264	>=240.	Span: 1 : +0.60D+0.60W

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	Summary of Shear Values VuMax	Vnx	Phi*Vnx
+1.40D													
Dsgn. L = 14.00 ft	1	0.109	0.018	2.16		2.16	21.97	19.77	1.14	1.00	0.62	34.94	34.94
+1.20D													
Dsgn. L = 14.00 ft	1	0.094	0.015	1.85		1.85	21.97	19.77	1.14	1.00	0.53	34.94	34.94
+1.20D+0.50S													
Dsgn. L = 14.00 ft	1	0.145	0.023	2.87		2.87	21.97	19.77	1.14	1.00	0.82	34.94	34.94
+1.20D+0.50W													
Dsgn. L = 14.00 ft	1	0.003	0.000	0.06		0.06	21.97	19.77	1.14	1.00	0.02	34.94	34.94
+1.20D+1.60S													
Dsgn. L = 14.00 ft	1	0.259	0.042	5.11		5.11	21.97	19.77	1.14	1.00	1.46	34.94	34.94
+1.20D+1.60S+0.50W													
Dsgn. L = 14.00 ft	1	0.168	0.027	3.32		3.32	21.97	19.77	1.14	1.00	0.95	34.94	34.94
+1.20D+W													
Dsgn. L = 14.00 ft	1	0.088	0.014		-1.74	1.74	21.97	19.77	1.14	1.00	0.50	34.94	34.94
+1.20D+0.50S+W													
Dsgn. L = 14.00 ft	1	0.036	0.006		-0.72	0.72	21.97	19.77	1.14	1.00	0.21	34.94	34.94
+0.90D+W													
Dsgn. L = 14.00 ft	1	0.111	0.018		-2.20	2.20	21.97	19.77	1.14	1.00	0.63	34.94	34.94
+1.20D+0.20S													
Dsgn. L = 14.00 ft	1	0.114	0.018	2.26		2.26	21.97	19.77	1.14	1.00	0.65	34.94	34.94
+0.90D													
Dsgn. L = 14.00 ft	1	0.070	0.011	1.39		1.39	21.97	19.77	1.14	1.00	0.40	34.94	34.94

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Misc Members.ec6

DESCRIPTION: Typ Canopy Beam

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
1	+D+S	0.3874	7.040		0.0000	0.000

Vertical Reactions

Support notation : Far left is #: Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	1.023	1.023
Max Upward from Load Combinations	1.023	1.023
Max Upward from Load Cases	0.583	0.583
Max Downward from all Load Conditions (Resisting Uplift)	-1.026	-1.026
Max Downward from Load Combinations (Resisting Uplift)	-0.351	-0.351
Max Downward from Load Cases (Resisting Uplift)	-1.026	-1.026
D Only	0.441	0.441
+D+S	1.023	1.023
+D+0.750S	0.878	0.878
+D+0.60W	-0.175	-0.175
+D+0.450W	-0.021	-0.021
+D+0.750S+0.450W	0.416	0.416
+0.60D+0.60W	-0.351	-0.351
+0.60D	0.264	0.264
S Only	0.583	0.583
W Only	-1.026	-1.026

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Misc Members.ec6

LIC# : KW-06014122, Build:20.25.02.26 PCS STRUCTURAL SOLUTIONS (c) ENERCALC, LLC 1982-2025

DESCRIPTION: Canopy Cantilever Tapered End

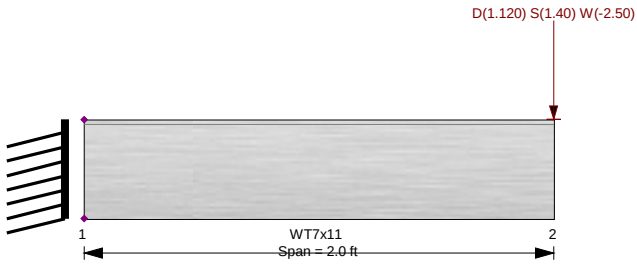
CODE REFERENCES

Calculations per AISC 360-16, IBC 2021
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Load Resistance Factor Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		

Stem Down



Applied Loads

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

Beam self weight calculated and added to loading
Load(s) for Span Number 1
Point Load : D = 1.120, S = 1.40, W = -2.50 k @ 2.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.833 : 1	Maximum Shear Stress Ratio =	0.085 : 1
Section used for this span	WT7x11	Section used for this span	WT7x11
Mu : Applied	7.194 k-ft	Vu : Applied	3.610 k
Mn * Phi : Allowable	8.635 k-ft	Vn * Phi : Allowable	42.663 k
Load Combination	+1.20D+1.60S	Load Combination	+1.20D+1.60S
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.015 in	Ratio =	3,200 >=360	Span: 1 : S Only
Max Upward Transient Deflection	-0.027 in	Ratio =	1,792 >=360	Span: 1 : W Only
Max Downward Total Deflection	0.027 in	Ratio =	1772 >=240.	Span: 1 : +D+S
Max Upward Total Deflection	-0.009 in	Ratio =	5444 >=240.	Span: 1 : +0.60D+0.60W

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	Summary of Shear Values VuMax	Vnx	Phi*Vnx
+1.40D													
Dsgn. L = 2.00 ft	1	0.367	0.037		-3.17	3.17	9.59	8.63	1.00	1.00	1.60	47.40	42.66
+1.20D													
Dsgn. L = 2.00 ft	1	0.314	0.032		-2.71	2.71	9.59	8.63	1.00	1.00	1.37	47.40	42.66
+1.20D+0.50S													
Dsgn. L = 2.00 ft	1	0.476	0.049		-4.11	4.11	9.59	8.63	1.00	1.00	2.07	47.40	42.66
+1.20D+0.50W													
Dsgn. L = 2.00 ft	1	0.025	0.003		-0.21	0.21	9.59	8.63	1.00	1.00	0.12	47.40	42.66
+1.20D+1.60S													
Dsgn. L = 2.00 ft	1	0.833	0.085		-7.19	7.19	9.59	8.63	1.00	1.00	3.61	47.40	42.66
+1.20D+1.60S+0.50W													
Dsgn. L = 2.00 ft	1	0.544	0.055		-4.69	4.69	9.59	8.63	1.00	1.00	2.36	47.40	42.66
+1.20D+W													
Dsgn. L = 2.00 ft	1	0.131	0.027	2.29		2.29	19.40	17.46	1.00	1.00	1.16	47.40	42.66
+1.20D+0.50S+W													
Dsgn. L = 2.00 ft	1	0.051	0.011	0.89		0.89	19.40	17.46	1.00	1.00	0.46	47.40	42.66
+0.90D+W													
Dsgn. L = 2.00 ft	1	0.170	0.035	2.96		2.96	19.40	17.46	1.00	1.00	1.49	47.40	42.66
+1.20D+0.20S													
Dsgn. L = 2.00 ft	1	0.379	0.039		-3.27	3.27	9.59	8.63	1.00	1.00	1.65	47.40	42.66
+0.90D													
Dsgn. L = 2.00 ft	1	0.236	0.024		-2.04	2.04	9.59	8.63	1.00	1.00	1.03	47.40	42.66

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Misc Members.ec6

LIC# : KW-06014122, Build:20.25.02.26 PCS STRUCTURAL SOLUTIONS (c) ENERCALC, LLC 1982-2025

DESCRIPTION: Canopy Cantilever Tapered End

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
1	+D+S	0.0271	2.000		0.0000	0.000

Vertical Reactions

Support notation : Far left is #: Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	2.542	
Max Upward from Load Combinations	2.542	
Max Upward from Load Cases	1.400	
Max Downward from all Load Conditions (Resisting Uplift)	-2.500	
Max Downward from Load Combinations (Resisting Uplift)	-0.815	
Max Downward from Load Cases (Resisting Uplift)	-2.500	
D Only	1.142	
+D+S	2.542	
+D+0.750S	2.192	
+D+0.60W	-0.358	
+D+0.450W	0.017	
+D+0.750S+0.450W	1.067	
+0.60D+0.60W	-0.815	
+0.60D	0.685	
S Only	1.400	
W Only	-2.500	

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Misc Elevators.ec6

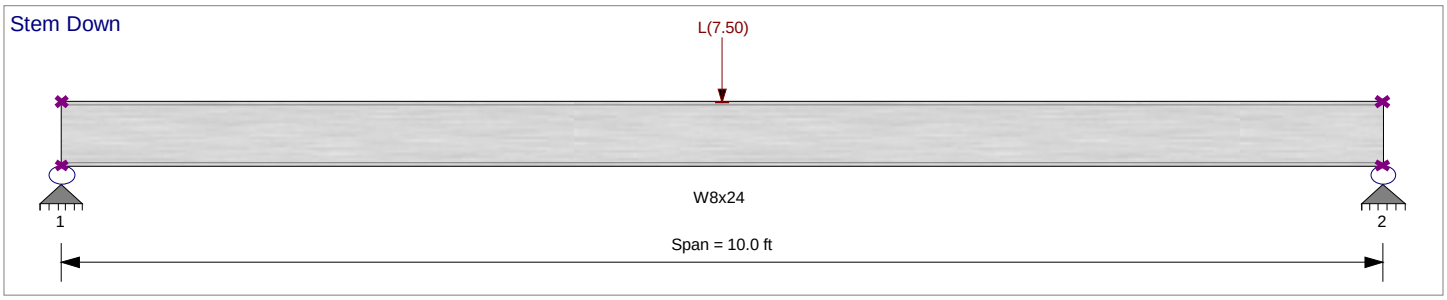
DESCRIPTION: Elevator Hoist and Lifeline Beam

CODE REFERENCES

Calculations per AISC 360-16, IBC 2021
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Load Resistance Factor Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight calculated and added to loading
Load(s) for Span Number 1
Point Load : L = 7.50 k @ 5.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.350 : 1	Maximum Shear Stress Ratio =	0.105 : 1
Section used for this span	W8x24	Section used for this span	W8x24
Mu : Applied	30.360 k-ft	Vu : Applied	6.144 k
Mn * Phi : Allowable	86.625 k-ft	Vn * Phi : Allowable	58.286 k
Load Combination	+1.20D+1.60L	Load Combination	+1.20D+1.60L
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.113 in	Ratio =	1,061	>=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.115 in	Ratio =	1041	>=180	Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio =	0	<180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	Summary of Shear Values VuMax	Vnx	Phi*Vnx
+1.40D													
Dsgn. L = 10.00 ft	1	0.005	0.003	0.42		0.42	96.25	86.63	1.14	1.00	0.17	58.29	58.29
+1.20D+1.60L													
Dsgn. L = 10.00 ft	1	0.350	0.105	30.36		30.36	96.25	86.63	1.31	1.00	6.14	58.29	58.29
+1.20D+L													
Dsgn. L = 10.00 ft	1	0.221	0.067	19.11		19.11	96.25	86.63	1.31	1.00	3.89	58.29	58.29
+1.20D													
Dsgn. L = 10.00 ft	1	0.004	0.002	0.36		0.36	96.25	86.63	1.14	1.00	0.14	58.29	58.29
+0.90D													
Dsgn. L = 10.00 ft	1	0.003	0.002	0.27		0.27	96.25	86.63	1.14	1.00	0.11	58.29	58.29

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
1	+D+L	0.1153	5.029		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	3.870	3.870
Max Upward from Load Combinations	3.870	3.870
Max Upward from Load Cases	3.750	3.750
D Only	0.120	0.120

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Misc Elevators.ec6

DESCRIPTION: Elevator Hoist and Lifeline Beam

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
+D+L	3.870	3.870
+D+0.750L	2.933	2.933
+0.60D	0.072	0.072
L Only	3.750	3.750