Jeremy Salmon

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Reason: I am the author of this document
Date: 2025.04.04 16:20:18-05'00'

Sloans Lake FSER

1690 Meade Street, Suite 150, Denver CO

Structural Calculations

Prepared by:

Structural Design Group

220 Great Circle Road, Suite 106
Nashville, TN 37228

SDG Project No.: 2024-051.00

COLORADO LICENSED
CHARLES A. MAYNES
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PROFESSIONAL ENGINEER

Engineer's Seal :

Dated: 2/27/2025

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SECTION 1 - DESIGN CRITERIA AND LOADS

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PROJECT DESIGN CRITERIA

PROJECT NAME:	Sloans Lake FSER
SDG PROJECT No.:	2024-051.00
ENGINEER:	dch
RISK CATEGORY:	IV
DESIGN CODE:	IBC 2021
LOCAL AMENDMENTS:	Denver/CO
REFERENCES:	ASCE 7-16
Concrete:	ACI 318-19
Steel:	AISC 360-16
Masonry:	TMS 402-16
Wood:	AWC NDS 2018
Cold-formed Steel:	AISI S100-16

PROJECT LOCATION:

City, State:	Denver, Co
Latitude:	39.7436
Longitude:	-105.0350

WIND LOADS:

Basic Wind Speed, V (mph):	117
ASD Wind Speed, Vasd (mph):	90.63
Exposure:	C
Enclosure Classification:	Enclosed
Site Elevation (ft):	0.00

SNOW LOADS:

Importance Factor, I_s:	1.40
Ground Snow Load, p_g (psf):	35.00
20-year MRI value pg (psf):	15.00
Wind Wind Parameter, W_2	0.35
Terrain Category:	C
Exposure, C_e	1.0
Thermal Factor, C_t	1.0
Flat Roofs, p_f (psf):	34.3
Sloped Roofs, p_s (psf):	N/A

EARTHQUAKE LOADS:

Importance Factor, I_e:	1.50	
Site Class:	D	
Short Period Spectral Response, S_S:	0.217	
1-sec Period Spectral Response S_1:	0.059	
S_{Ms}:		N/A - see SDC Sheet
S_{M1}:		N/A - see SDC Sheet
T_L (sec):	8.000	
T_s (sec):	0.408	
Design Short Period Spectral Response, S_{DS}:	0.231	
Design 1-sec Period Spectral Response, S_{D1}:	0.094	
Seismic Design Category:	C	

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GRAVITY LOADS

BASED ON ASCE 7-16 and IBC 2021

Project:	Sloans Lake FSER
Project No.:	2024-051.00
Engineer:	dch

Comments:

Location:	Live Loads:	Use (psf)	LL (psf)	LL (k)	Notes:
Canopy Roof	Roofs - Ordinary flat, pitched, and curved		20	0	

Location:	Dead Loads (Area Loads):	Quantity	Use (psf)	DL (psf)	Total:	Notes:
Canopy Roof	Rigid Insulation (per inch)			1.5		
	Steel Deck			2.5		
	Adhered/Fastened Membrane			1.5		
	Suspended Channel System			2		
	Roof Misc			10	**17.5**	use 20-psf

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SNOW LOAD CALCULATIONS

BASED ON ASCE 7-16 CHAPTER 7 FOR FLAT, SLOPED AND CURVED ROOFS

Project:	Sloans Lake FSER
Project No.:	2024-051.00
Engineer:	dch

Comments:

ASCE 7 SNOW LOAD PARAMETERS

ASCE7 Importance Factor, I_s:	1.2	
Ground Snow Load, p_g (psf):	35	
Terrain Category:	C	*26.7*
Exposure of Roof:	Partially Exposed	*Table 7-2*
Exposure, C_e	1	
Thermal Factor, C_t	1	*Table 7-3*
Roof Type:	Monoslope	
Slope Angle (deg or slope):	Flat	
Eave to Ridge, W (ft):	60.0	
Tangent of Slope (rad):	0.0000	
Rain Surcharge (psf):	N/A	*7.10*

MINIMUM BALANCED SNOW LOAD (MONOSLOPE, HIP AND GABLE ROOFS WITH SLOPE < 15° AND CURVED ROOFS WITH SLOPE < 10°)

Minimum Balanced p_m (psf):	**24.0**	*7.3.4*

DRIFT PARAMETERS

Ground Snow Load p_g (psf):	35.0
Flat Roof p_f (psf):	34.3
Snow Density, γ (pcf):	18.6
Flat Snow Height, h_b (ft):	1.85

FLAT ROOFS (ROOF WITH ANGLE ≤ 5° OR 1: 12)

Flat Roof p_f (psf):	**34.3**	*=0.7*Ce*Ct*Is*pg*

***NOTE: EVALUATE FOR PONDING INSTABILITY, ASCE 7-10 SECT. 8.4**

SLOPED ROOFS (ROOF WITH ANGLE > 5° OR 1: 12)

Roof Surface Type:	All Other Surfaces	
Roof Angle (deg):	0.0	
Slope Factor, Cs:	1.0	*Figure 7-2a*
Sloped Roof p_s (psf):	**34.3**	*=Cs*pf*

UNBALANCED ROOF SNOW LOADS

Hd (ft):	2.9
Windward (psf):	
Total Leeward (psf)	

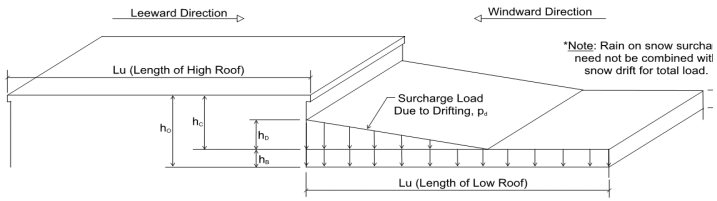
***NOTE: EVALUATE FOR PARTIAL LOADING, ASCE 7 SECT. 7.5**

LOCAL BUILDING CODE PARAMETERS

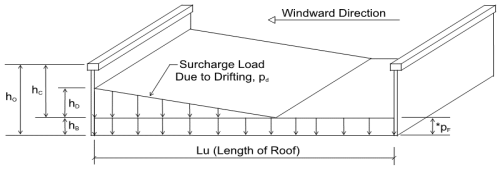
Local Importance Factor, I_s:	1.4
Flat Roof p_f (psf):	
Sloped Roof p_s (psf):	
Rain on Snow Surcharge (psf):	
Applies to Drift? (Y/N):	

CONTROLLING BALANCED SNOW LOADS

CONTROLLING FLAT ROOFS, p_f (psf):	**34.3**
CONTROLLING SLOPED ROOFS, p_s (psf):	**N/A**



Drift at Low Roofs



Drift at Parapets

ROOF PROJECTION EXCEPTIONS (ASCE SECT. 7.8):

Drift not required for either of the following:

Along side where projection is less than (ft):	**15.00**
Clear dist. above roof (ft)>=	**3.85**

SNOW DRIFT LOADS

Location	Projection Type:	Roof Projection, (h_b+h_c):	Roof Length, L_u (ft)		Horizontal Separation of Adj. Str., s (ft)	h_c, (ft)	Design Drift Height, h_d (ft)	Snow Drift Width, W (ft)	Drift Surcharge, p_d (psf)	Total Intensity at Peak (psf)	Intensity at Point, (psf)		Parallel to Edge Beam Load					
			Leeward	Windward							Distance x (ft)	p_{x1} (psf)	Distance x (ft)	Cantilever (ft)	Spacing L (ft)	Spacing R (ft)	Total Dist. Load, w (plf)	Drift Dist. Load, (plf)
Canopy	Low Roof	49	200	17.5		47.15	5.93	17.50	**110.0**	144.3			0.0	1.0	0.0	4.4	424.6	314.8

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SEISMIC DESIGN CATEGORY

BASED ON ASCE 7-16, Chapter 11

Project:	Sloans Lake FSER
Project No.:	2024-051.00
Engineer:	dch

Comments:

GENERAL PARAMETERS

	Importance Factor, I_e:	1.5	
	Latitude:	39.7436	
	Longitude:	-105.0350	
Spectral Response	S_s:	0.217	
Accelerations:	S_1:	0.059	
	Site Class:	D	
	T_L (sec):	8	*Figures 22-14 - 22-17*
	T_s(sec):	**0.408**	*= Sd1/Sds*
	F_a:	1.6	*Table 11.4-1*
	F_v:	2.4	*Table 11.4-2*
	S_{ms}:	0.347	*= Fa*Ss (Eq. 11.4-1)*
	S_{m1}:	0.142	*= Fv*S1 (Eq. 11.4-2)*
	S_{ds}:	**0.231**	*= 2/3*Sms (Eq. 11.4-3)*
	S_{d1}:	**0.094**	*= 2/3*Sm1 (Eq. 11.4-4)*
	Seismic Design Category:	**C**	
	Supp.#3 11.4.8 Penalty:		
	Site-Specific Geotech S_{ds}:		
	Site-Specific Geotech S_{d1}:		
	Seismic Design Category:		

Site Class:

	A	B	B Estimated	C	**D**	D Default	E	F
F_a:	0.800	0.900	1.000	1.300	**1.600**	1.600	2.400	Site Specific
F_v:	0.800	0.800	1.000	1.500	**2.400**	2.400	4.200	Site Specific
S_{ms}:	0.174	0.195	0.217	0.282	**0.347**	0.347	0.521	
S_{m1}:	0.047	0.047	0.059	0.089	**0.142**	0.142	0.248	
S_{ds}:	0.116	0.130	0.145	0.188	**0.231**	0.231	0.347	
S_{d1}:	0.031	0.031	0.039	0.059	**0.094**	0.094	0.165	
SDC (for S_{ds}):	A	A	A	C	**C**	C	D	
SDC (for S_{d1}):	A	A	A	A	**C**	C	D	
Seismic Design Category:	A	A	A	C	**C**	C	D	Site Specific
					Use			

	x	y
R:	8.0	4.5
T or Ta (sec):	0.393	0.393
Cs:	0.043	0.077
Cs,min:	0.015	0.015
Cs:	**0.043**	**0.077**

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SEISMIC BASE SHEAR

Based on ASCE 7-16, Chapter 12 (Regular Building Configurations Only)

Project:	Sloans Lake FSER
Project No.:	2024-051.00
Engineer:	dch

Comments:

BUILDING SYSTEM	***x-Dir.***	***y-Dir.***	
Risk Category:	IV		
Importance Factor, I_e:	1.50		
S_{ds}:	0.231		
S_{d1}:	0.094		
Seismic Design Category:	C		
Seismic Force Resisting System:	H1a	H1a	*Table 12.2-1*
Steel systems not specifically detailed for seismic resistance (Moment Frames)			***x-Dir.***
Steel systems not specifically detailed for seismic resistance (Moment Frames)			***y-Dir.***
Response Modification Factor, R:	3	3	*Table 12.2-1*
Overstrength Factor, Ω_0:	3	3	*Table 12.2-1*
Deflection Amplification Factor, C_d:	3	3	*Table 12.2-1*
T_L (sec):	8		*Figures 22-12 - 22-16*
Redundancy Factor, ρ:	1	1	*12.3.4*
Period from Analysis, T (sec):			
Number of Seismic Levels =	1		
Height of Structure, h_n (ft):	18.17		*Modeled Building Height*
Seismic Weight, ΣW_x (kips):	17.78		*12.7.2*
Snow to Include in Seismic Weight(psf):	6.9		*12.7.2 - Include 20% of pf if pf>30 psf*
Average Story Height, havg (ft):	18.17		
Period Coefficient, C_t:	0.028	0.028	*Table 12.8-2*
Period Exponent, x:	0.8	0.8	*Table 12.8-2*
Upper Limit $T_{a,1}$ (sec):	0.285	0.285	*12.8-7*
Upper Limit $T_{a,2}$ (sec):			*12.8-8*
Upper Limit Coefficient, C_u:	1.70		*Table 12.8-1*
Design Period T (sec):	0.285	0.285	*Minimum of T and Max($T_{a,1}$,$T_{a,2}$)*
Seismic Response Coefficient, C_s:	**0.116**	**0.116**	*12.8.1.1*
SEISMIC BASE SHEAR			
Seismic Base Shear, V (kips):	**2.06**	**2.06**	*12.8-1*
SEISMIC SHEAR VERTICAL DISTRIBUTION			
Distribution Exponent, k =	**1.000**	**1.000**	*12.8.3*
Distribution Exponent, k(drift) =	**1.000**	**1.000**	*12.8.3*
SEISMIC DRIFT			
Design Period (Drift), T (sec):	0.285	0.285	
Seismic Response Coefficient, C_s:	**0.116**	**0.116**	*12.8.1.1*
Seismic Base Shear (Drift), V (kips):	**2.06**	**2.06**	*12.8-1*
Allowable Story Drift Ratio, Δ_a/h_n:	**0.01**	**0.01**	*Table 12.12-1*

Seismic Level x	Story Height, h (ft)	Weight, W (kips)	Elevation, H (ft)	Vertical Distribution Factor C_v		Seismic Force		Vertical Distribution Factor C_v (Drift)		Seismic Force (Drift)		Allowable Elastic Story Drift, Δ_{ae} (in)	
				x-Dir.	y-Dir.	F_x (kips)	F_y (kips)	x-Dir.	y-Dir.	F_x (kips)	F_y (kips)	x-Dir.	y-Dir.
1	18.17	17.8	18.17	1.00	1.00	2.06	2.06	1.00	1.00	2.06	2.06	**1.090**	**1.090**
			0.00										
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	18.17	17.8				2.1	2.1			2.1	2.1		

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WIND DESIGN CRITERIA

Project Name:	Sloans Lake FSER
SDG Project No.:	2024-051.00
Engineer:	dch
Risk Category:	IV
Design Code:	IBC 2021
Reference Standard:	ASCE 7-16

WIND CRITERIA

Basic Wind Speed, V (mph):	140	*Section 26.5*
ASD Wind Speed, Vasd (mph):	108.4	*IBC EQ 16-17*
MWF/CC Wind Directionality Factor, K_d:	0.85	*Section 26.6*
Exposure:	C	*Section 26.7*
Topographic Factor, K_{zt}:	1.00	*Section 26.8*
Ground Elevation, $z_{g(ft)}$:	1.00	*Section 26.9*
Enclosure Classification:	Enclosed	*Section 26.12*
Ground Elevation Factor, K_e:	1.00	*Table 26.9-1*
K_z constant:	2.01	*Table 26.10-1*
α:	9.50	*Table 26.11-1*
z_g:	900.00	*Table 26.11-1*
z_{min}:	15.00	*Table 26.11-1*
Internal Pressure Coefficient, GC_{pi}:	0.18	*Table 26.13-1*

SERVICEABILITY CRITERIA:

Serviceability Wind Speed (mph):	77	
Drift Limit (L/xxx):	L/400	
Drift Ratio (%):	0.827%	*(Using Ultimate wind speed)*
$V_{Serviceability}^2 / V_{ult}^2$:	0.303	

H, ft:	18.17
Serviceabllity Absolute Limit, in:	0.375
Drift at Ult Loads, in:	1.240
Drift Ratio (%):	0.569%

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MWFRS OPEN BUILDINGS - ALL HEIGHTS

ASCE 7-16 Chapters 26 and 27

MWFRS Directional Procedure - Part 1 for Open Buildings

Comments:

Project:	Sloans Lake FSER
Project No.:	2024-051.00
Engineer:	dch

TORNADO LOADS FALSE

WIND CRITERIA

Risk Category:	IV
Wind Speed, V (mph):	140.0
Exposure:	C
Ground Elevation Factor, K_e:	1.00
Topographic Factor, K_{zt}:	1.00
Velocity Press. Coeff., K_h:	0.860
Velocity Pressure, q_h (psf):	36.7

BUILDING CRITERIA

Mean Roof Height, h (ft):	16.00
Least Horz. Dim. (ft):	17.50
Roof Type:	Monoslope
Slope or degrees:	Flat
Wind Flow:	Clear Wind Flow
Gust Factor, G:	0.85
Wind Dir. Factor, K_d:	0.85
Roof Angle, θ (deg):	0.00
Zone Width, a (ft):	3.00

MWFRS Wind Loads Perp. To Ridge Line

Case	γ = 0				γ = 180			
	C_{NW}	psf	C_{NL}	psf	C_{NW}	psf	C_{NL}	psf
Case A	1.20	37.4	0.30	9.4	1.20	37.4	0.30	9.4
Case B	-1.10	-34.3	-0.10	-3.1	-1.10	-34.3	-0.10	-3.1

Wind Pressure Resultants in Principle directions

Case	C_{NW}		C_{NL}		C_{NW}		C_{NL}	
	Horz.	Vert.	Horz.	Vert.	Horz.	Vert.	Horz.	Vert.
Case A	0.0	37.4	0.0	9.4	0.0	37.4	0.0	9.4
Case B	0.0	-34.3	0.0	-3.1	0.0	-34.3	0.0	-3.1
Notes:	**See figure 27.3-4**							
	Fascia panels are to be considered parapets, see Sect. 27.3.4							

MWFRS Roof Pressures Parallel to Ridge Line (γ = 90°, 270°)

Pressure Resultants

Dist. From Windward Edge	Case A		Case B		Case A		Case B	
	C_{NW}	psf	C_{NW}	psf	Horz.	Vert.	Horz.	Vert.
<= 16'	-0.8	-25.0	0.8	25.0	0.0	-25.0	0.0	25.0
> 16', <= 32'	-0.6	-18.7	0.5	15.6	0.0	-18.7	0.0	15.6
>32'	-0.3	-9.4	0.3	9.4	0.0	-9.4	0.0	9.4
Note:	**See Figure 27.3-7**							

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OPEN BUILDINGS C&C WIND LOAD CALCULATIONS

ASCE 7-16 Chapter 30 - Part 5: Open Buildings

for Open Buildings of all heights having pitched free roofs, monoslope free roofs or troughed free roofs.

Project:	Sloans Lake FSER
Project No.:	2024-051.00
Engineer:	dch

Comments:

TORNADO LOADS FALSE

WIND CRITERIA

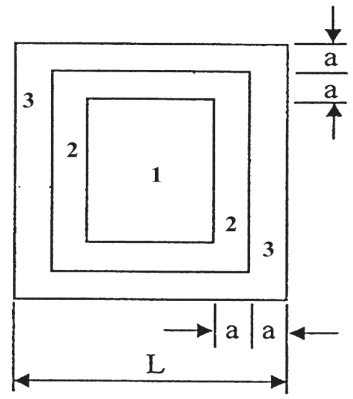
Risk Category:	IV
Ult. Wind Speed, Vult (mph):	140.0
Exposure:	C
Topographic Factor, K_{zt}:	1.00
Ground Elevation Factor, K_e:	1.00
Velocity Press. Coeff., K_h:	0.87
Velocity Pressure, q_z (psf):	37.2

BUILDING CRITERIA

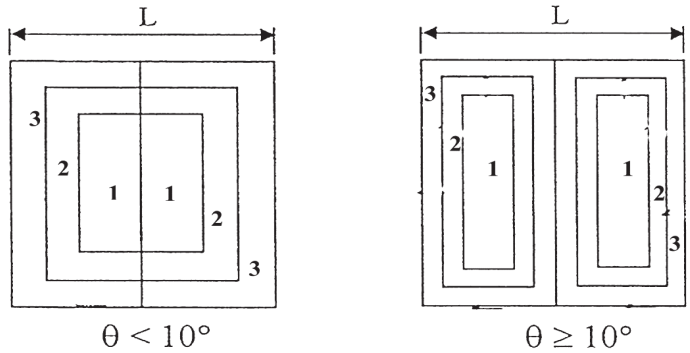
Mean Roof Height, h (ft):	17.00
Least Horz. Dim. (ft):	18.00
Roof Type:	Monoslope
Slope or degrees:	Flat
Wind Flow:	Obstructed
Gust Factor:	0.85
Wind Dir. Factor, K_d:	0.85
Roof Angle, θ (deg):	0.0
Zone Width, a (ft):	3.00

Figure 30.8-1 - Monoslope Roofs - Obstructed Wind Flow

Effective Wind Area (ft^2)	Zone 1			Zone 2			Zone 3		
	C_N	Positive p (psf)	Negative p (psf)	C_N	Positive p (psf)	Negative p (psf)	C_N	Positive p (psf)	Negative p (psf)
≤ 9	0.5 / -1.2	15.8	-37.9	0.8 / -1.8	25.3	-56.9	1 / -3.6	31.6	-113.7
> 9, ≤ 36	0.5 / -1.2	15.8	-37.9	0.8 / -1.8	25.3	-56.9	0.8 / -1.8	25.3	-56.9
> 36	0.5 / -1.2	15.8	-37.9	0.5 / -1.2	15.8	-37.9	0.5 / -1.2	15.8	-37.9



Monoslope Free Roof Zones



Troughed Free Roof Zones

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SOLID FREESTANDING WALLS & SIGNS WIND LOAD CALCULATIONS

ASCE 7-16 Chapter 29.3 for Solid Freestanding Walls and Soild Freestanding Signs

Project:	Sloans Lake FSER
Project No.:	2024-051.00
Engineer:	dch

Comments:

TORNADO CRITERIA

TORNADO LOADS	FALSE

WIND CRITERIA

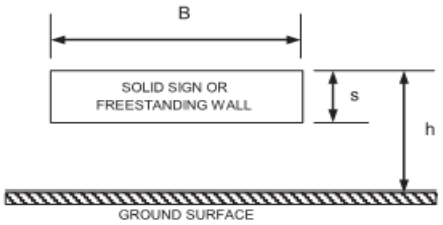
Risk Category:	IV
Ult. Wind Speed, Vult, mph:	140
Exposure:	C
Topographic Factor, K_{zt}:	1.00
Velocity Press. Coeff., K_h:	0.85
Velocity Pressure, q_z (psf):	29.87

SIGN/WALL CRITERIA

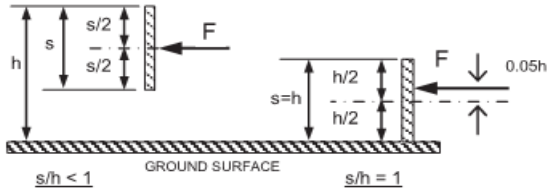
Elevation at top of Sign/Wall, h (ft):	10.00
Sign/Wall Height, s (ft):	10.00
Width, B (ft):	34.00
Return Corner, Lr (ft):	0
T/Structure Elevation, h_s (ft):	0.00
Gust Factor, G:	0.85
Wind Dir. Factor, K_d:	0.85
Gross Area, A_s (ft^2):	340
Aspect Ratio, B/s:	3.40
Return Aspect Ratio, Lr/s:	0.00
Clearance Ratio, s/(h-h_s):	1.00

OPENING CRITERIA

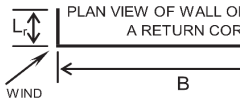
Opening Length (ft):	0.00
Opening Width (ft):	0.00
Opening Area (ft^2):	0.0
Solid/Gross Ratio ε:	100%
Opening Reduction Factor:	1.00



ELEVATION VIEW

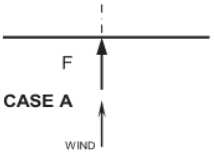


CROSS-SECTION VIEW



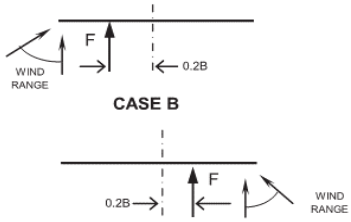
Case A:

Net Force Coefficient, C_f:	1.37
Opening Red. Factor:	1.00
Pressure p (psf):	**34.7**
Gross Area, A_s (ft^2):	340.0
Force, F (kips):	**11.78**
Height of Force, h_F (ft):	**5.50**
Distance from Edge, x_F (ft):	**17.00**



Case B: Case not required for B/s>=2.0

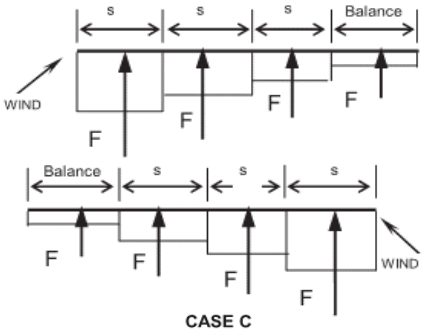
Net Force Coefficient, C_f:	1.37
Opening Red. Factor:	1.00
Pressure p (psf):	**34.7**
Gross Area, A_s (ft^2):	340.0
Force, F (kips):	**11.78**
Height of Force, h_F (ft):	**5.50**
Distance from Edge, x_F (ft):	**10.20**



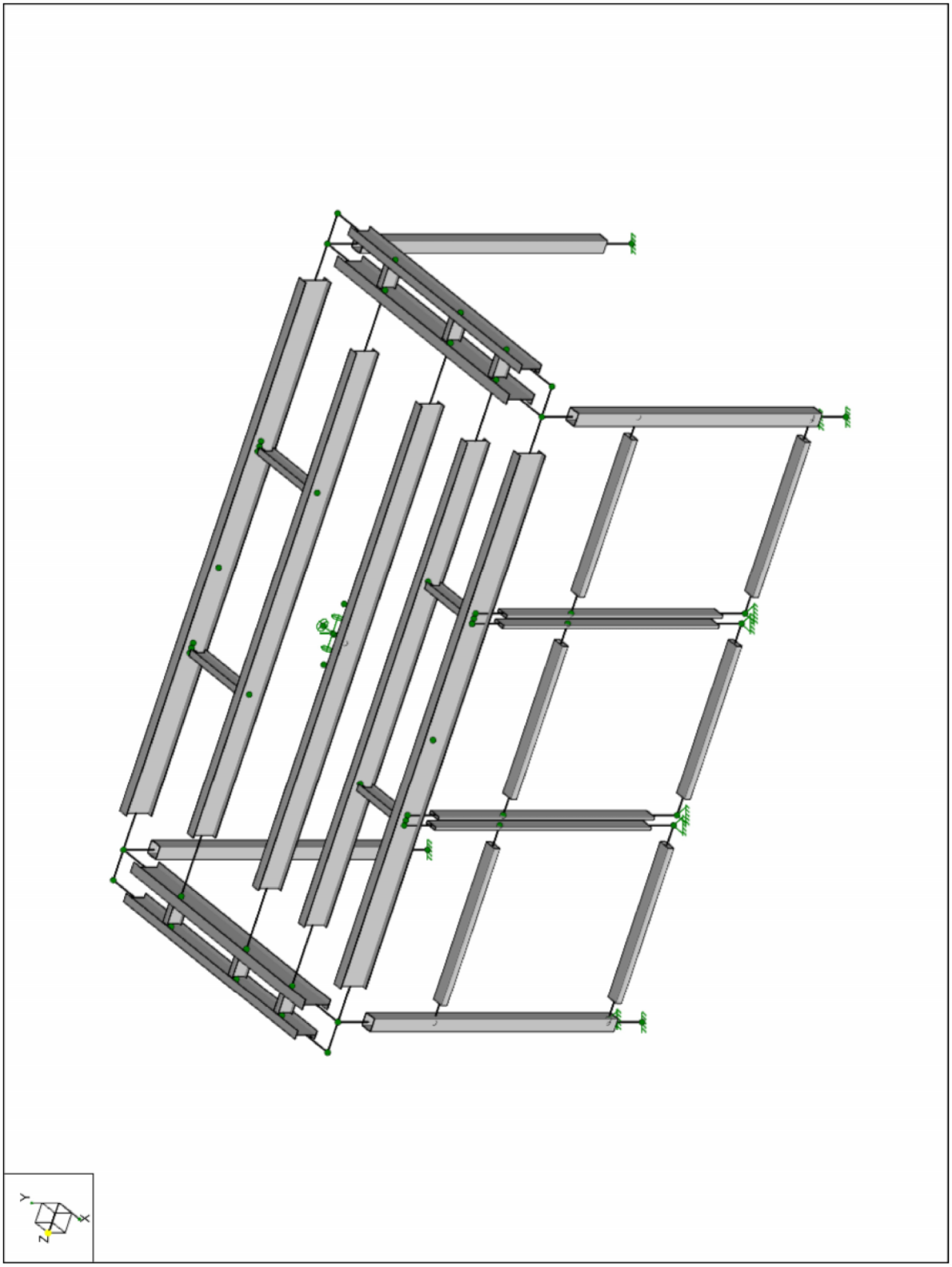
Case C:

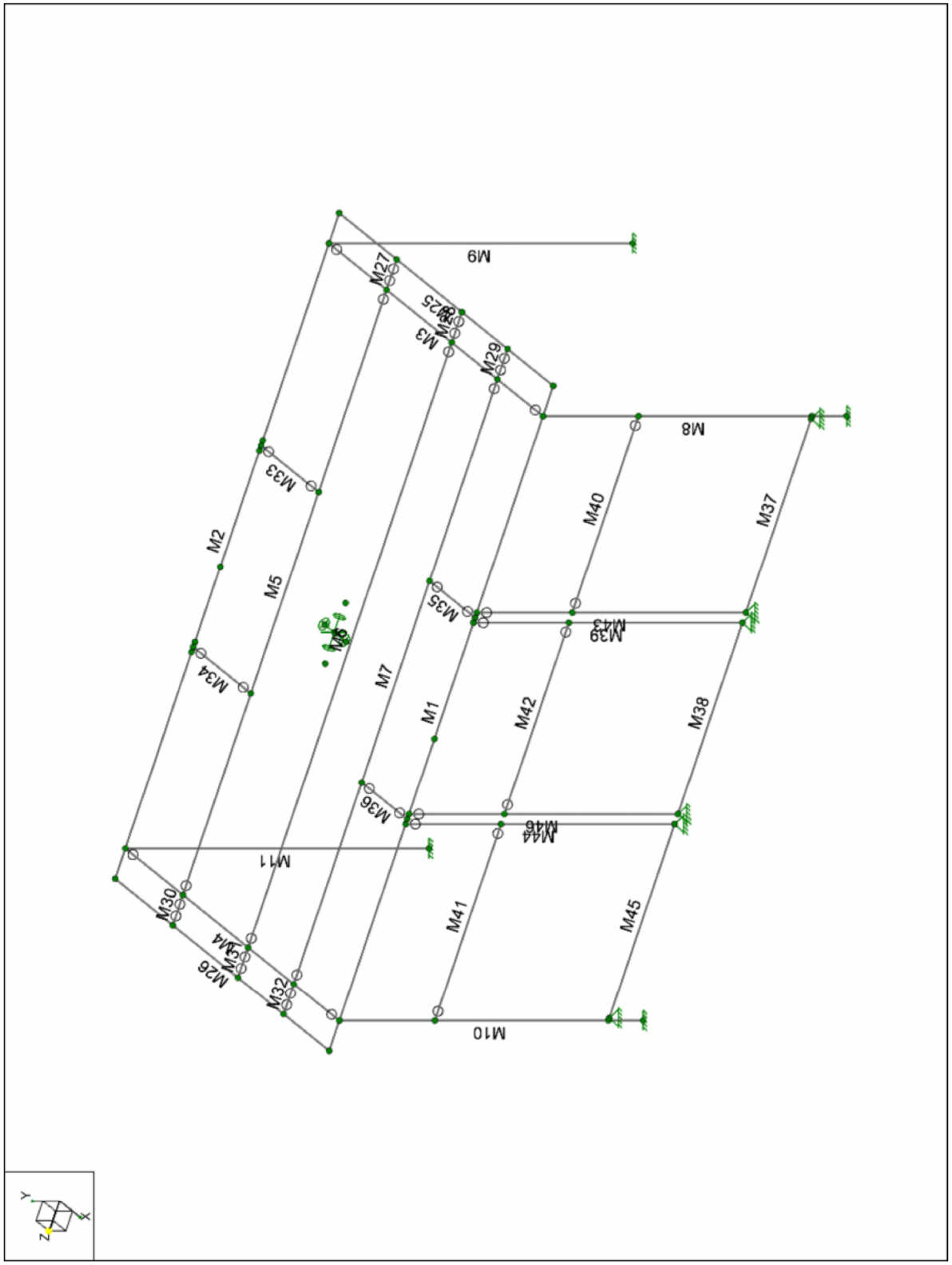
Return Corner Red. Factor:	1.00
Opening Red. Factor:	1.00
Clearance Ratio Red. Factor:	0.80
Height of Force, h_F (ft):	**5.50**

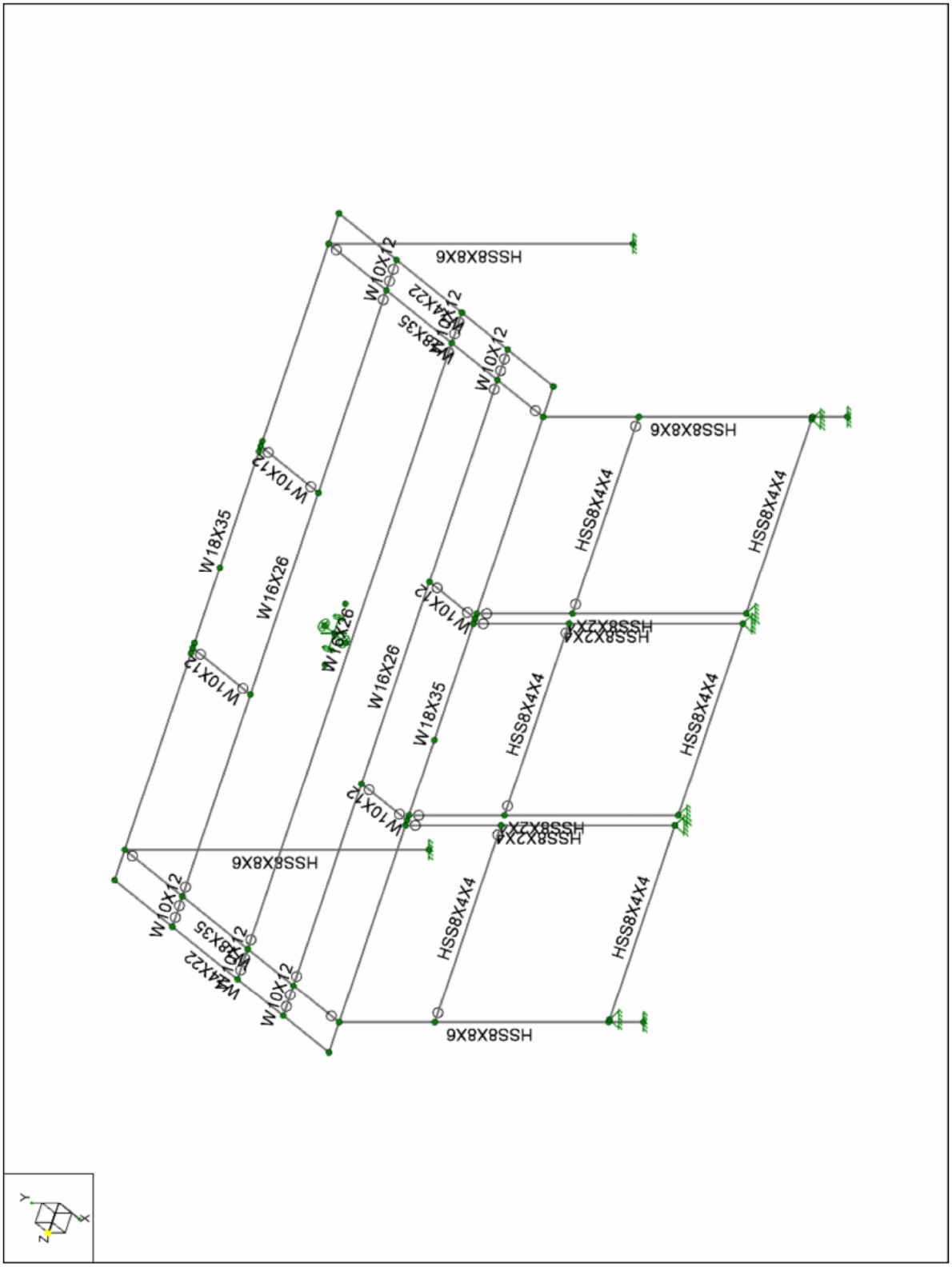
Region (horizontal distance from windward edge)	Net Force Coefficient, C_f	Pressure, p (psf)	Region Gross Area (ft^2)	Force, F (kips)	Distance From Edge, x_F (ft)
0 to 10 -ft	2.18	**55.24**	100.0	**5.52**	**5.00**
10 to 20 -ft	1.42	**36.15**	100.0	**3.62**	**15.00**
20 to 30 -ft	0.97	**24.58**	100.0	**2.46**	**25.00**
30 to 34 -ft	0.88	**22.34**	40.0	**0.89**	**32.00**

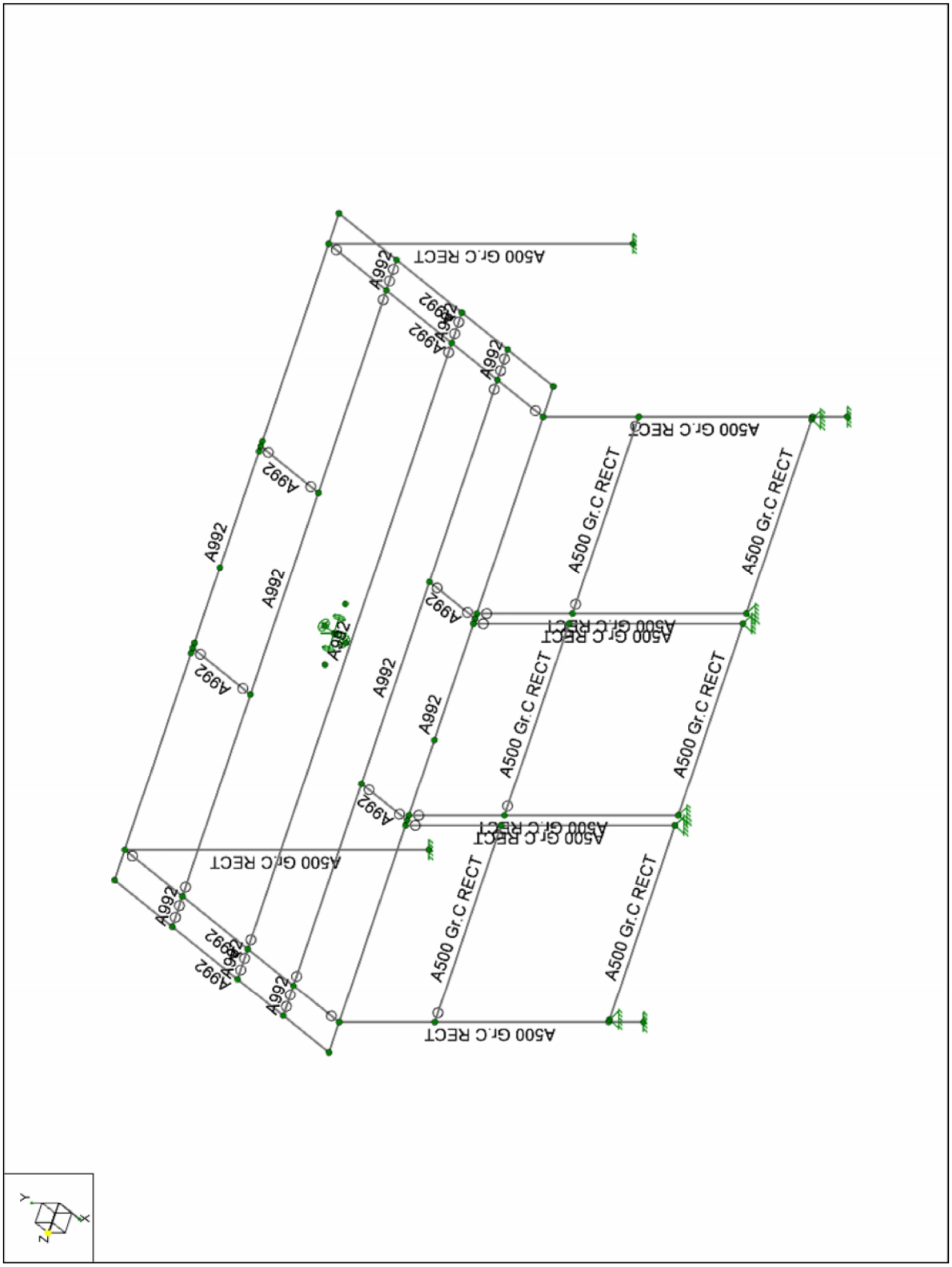


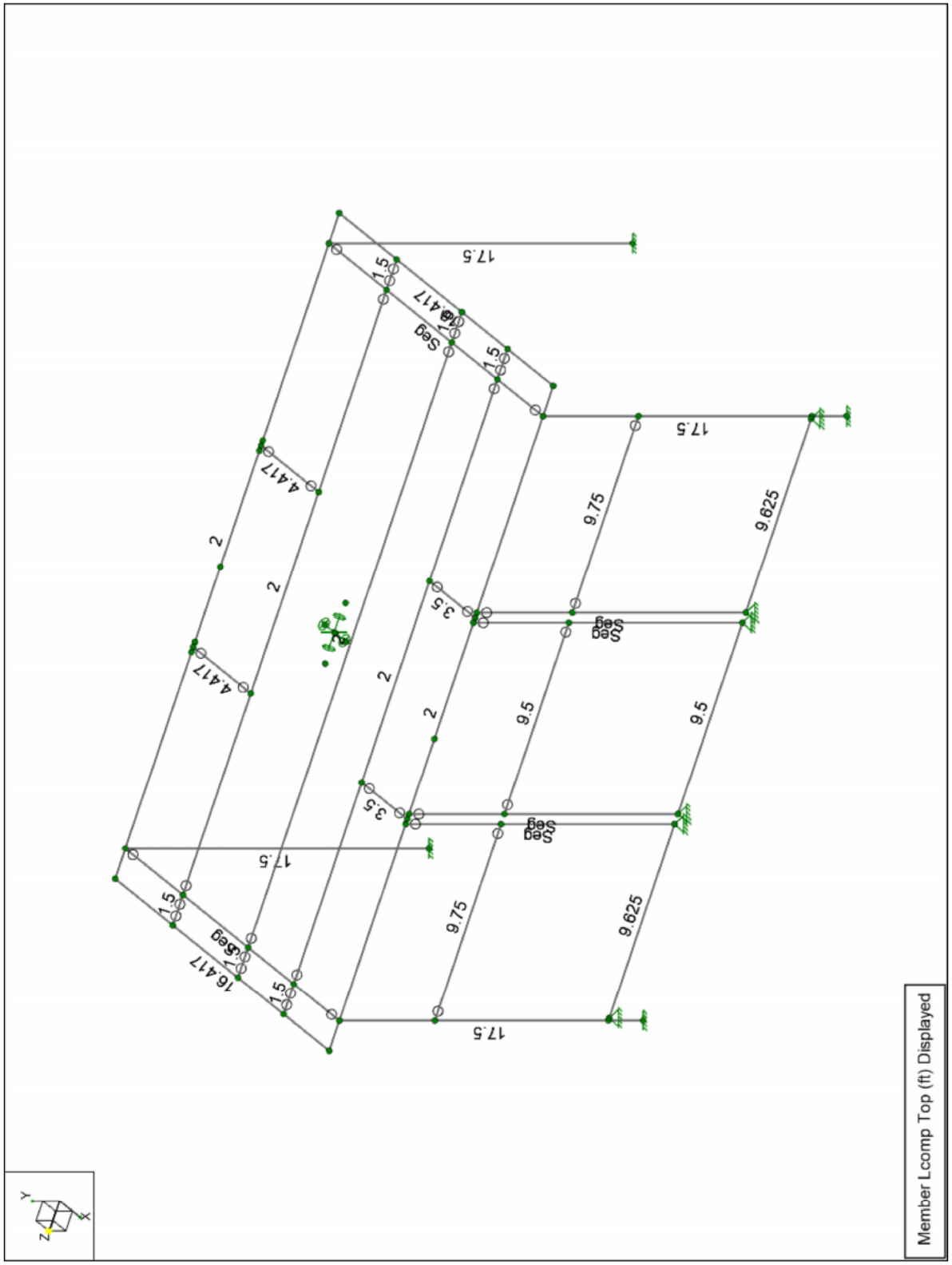
SECTION 2 - FREESTANDING CANOPY DESIGN

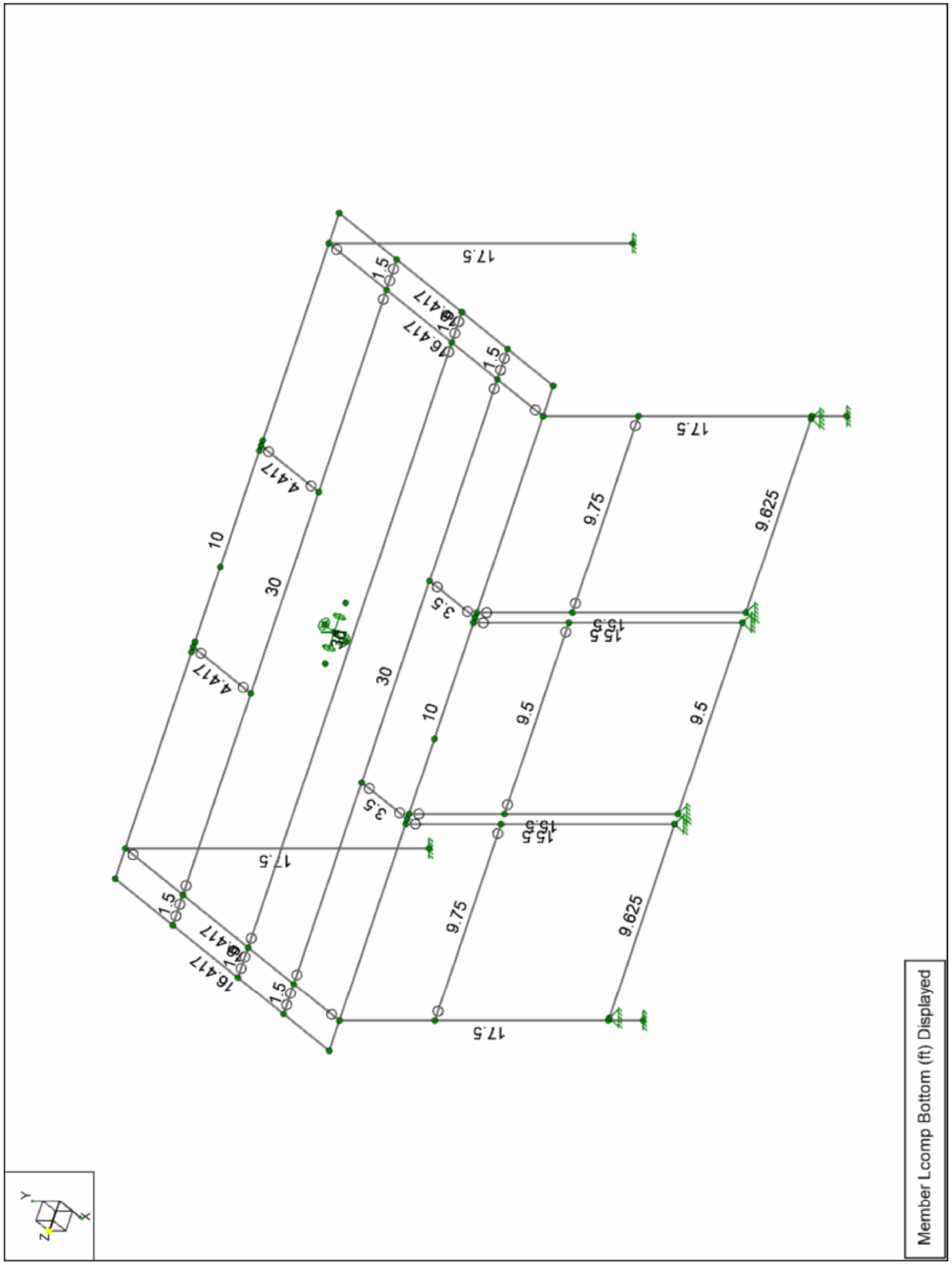

Y
X
Z

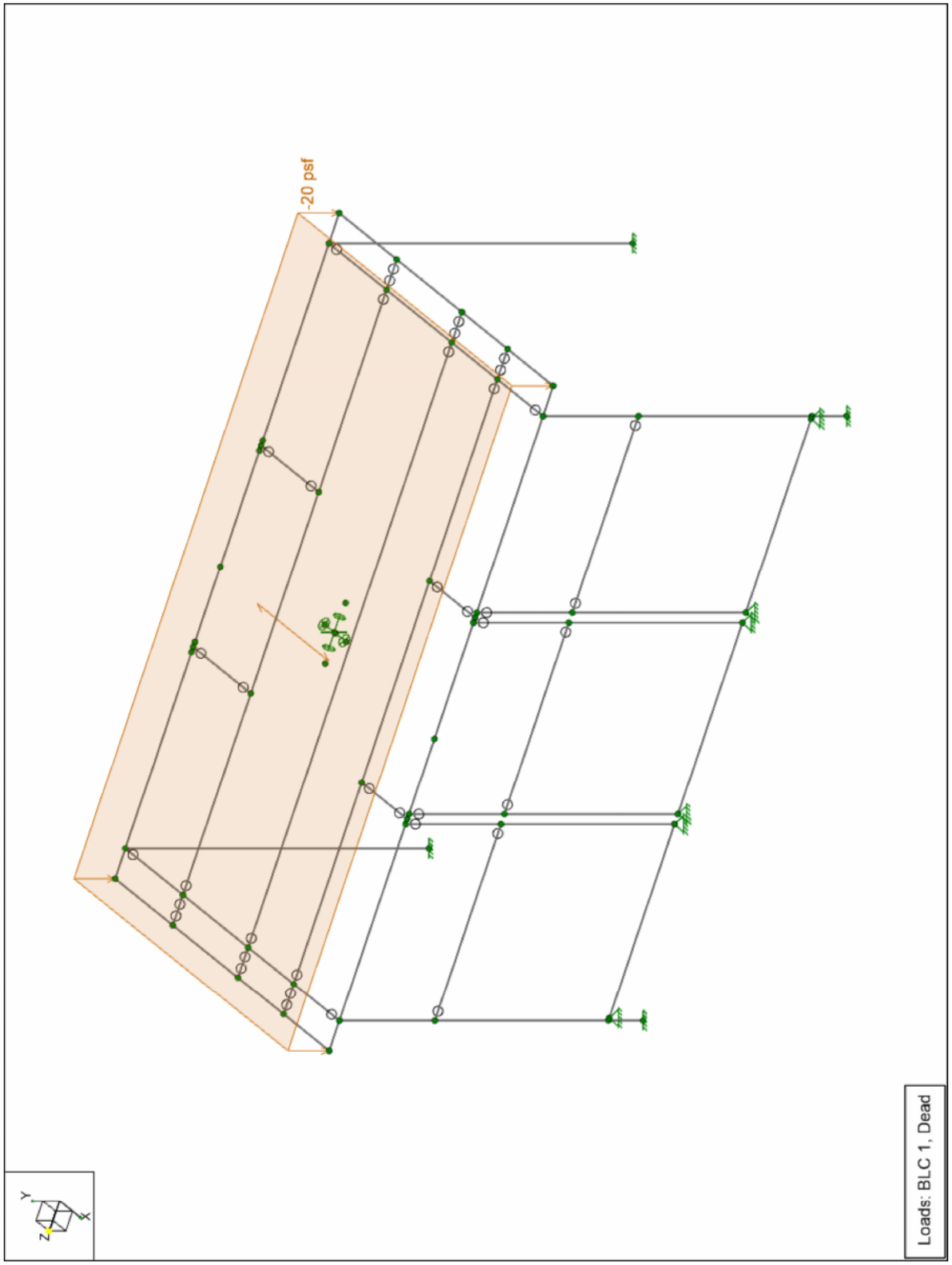

M9
M27
M25
M3
M29
M8
M33
M2
M40
M37
M5
M35
M43
M39
M34
M7
M1
M42
M38
M36
M44
M46
M11
M30
M41
M45
M4
M26
M32
M10

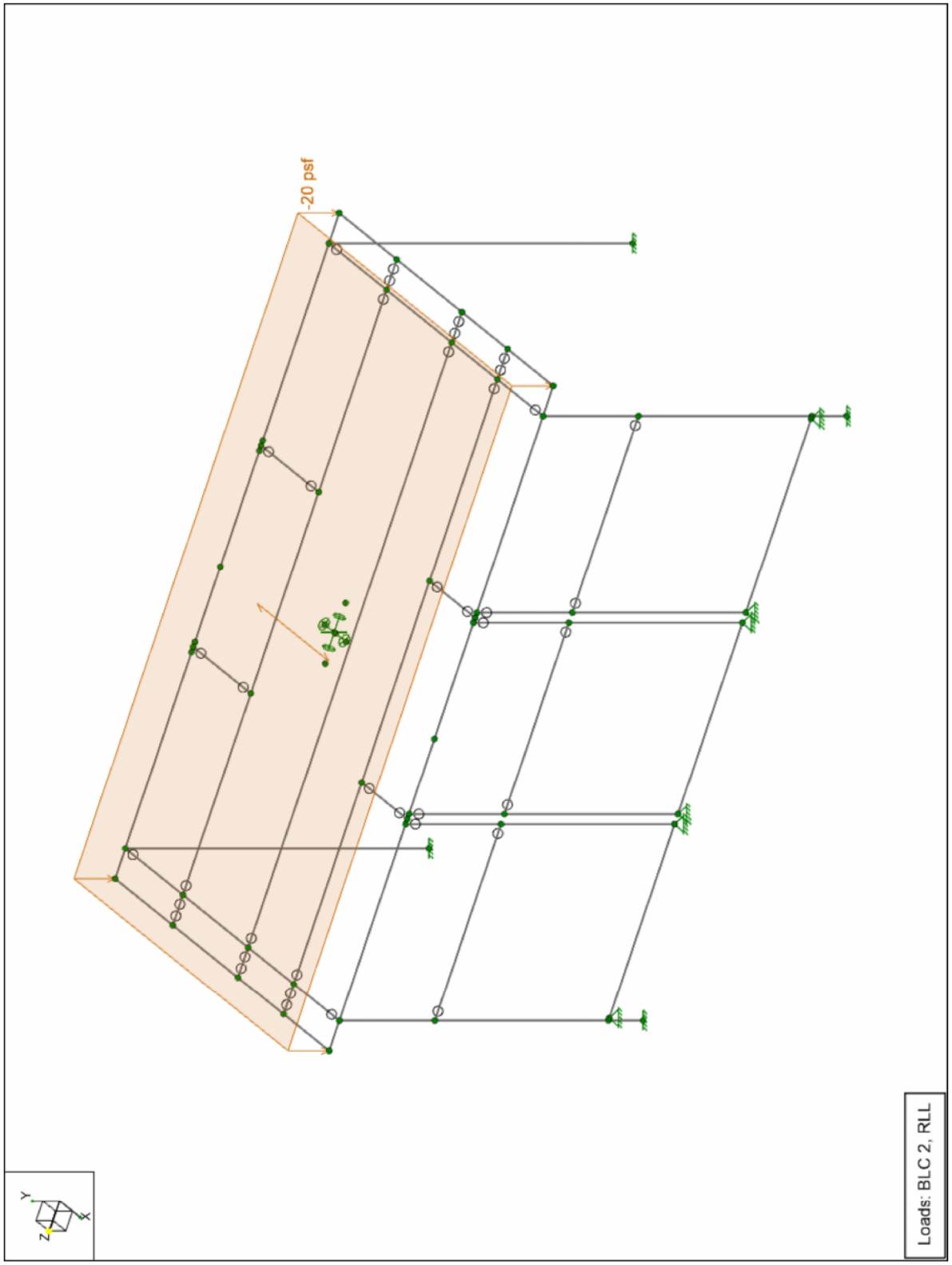

HSS8X8X6
W10X12
W24X22
W8X35
W10X12
HSS8X8X6
HSS8X4X4
HSS8X4X4
W10X12
W18X35
W16X26
W10X12
W16X26
W10X12
W16X26
W18X35
HSS8X4X4
HSS8X4X4
W10X12
HSS8X8X6
HSS8X4X4
HSS8X4X4
W10X12
W8X35
W24X22
W10X12
HSS8X8X6
Y
X
Z

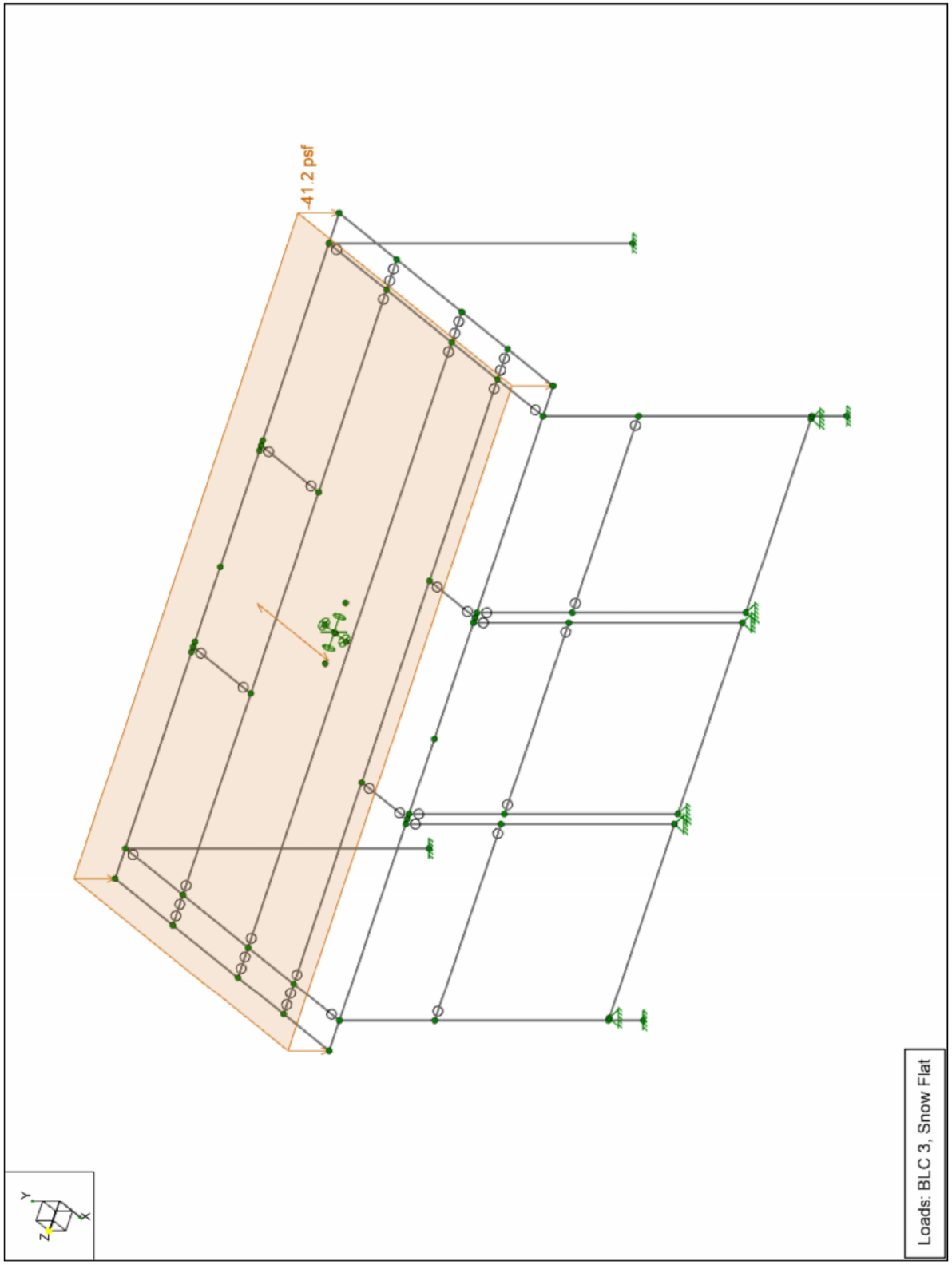

A992
A500 Gr.C RECT
Y
X
Z

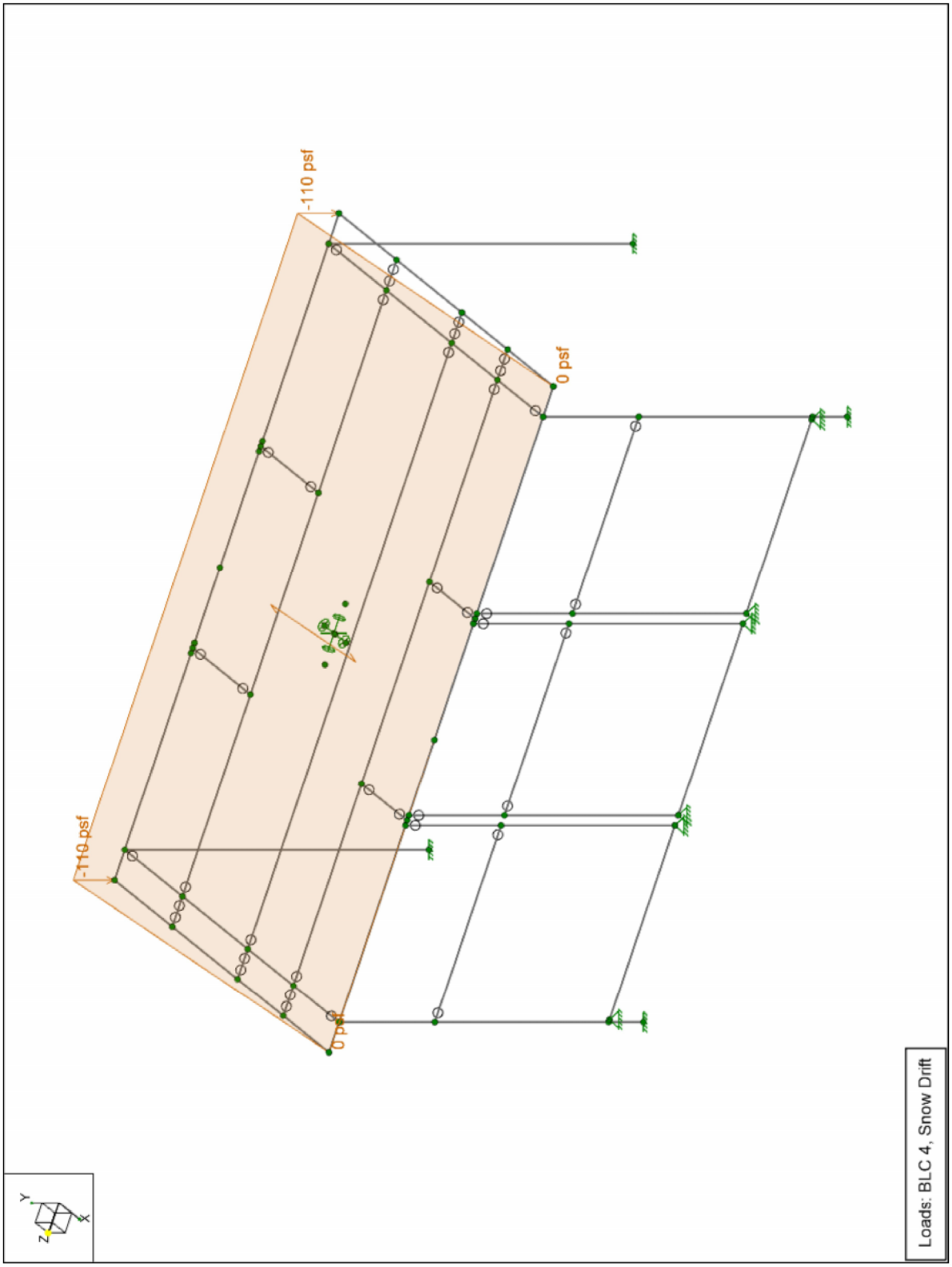

17.5
1.5
16.417
Seg
1.5
17.5
4.417
2
2
4.417
3.5
Seg
Seg
2
2
9.5
9.5
3.5
Seg
Seg
17.5
1.5
16.417
Seg
1.5
9.75
9.625
9.75
9.625
17.5
Y
X
Z
Member Lcomp Top (ft) Displayed

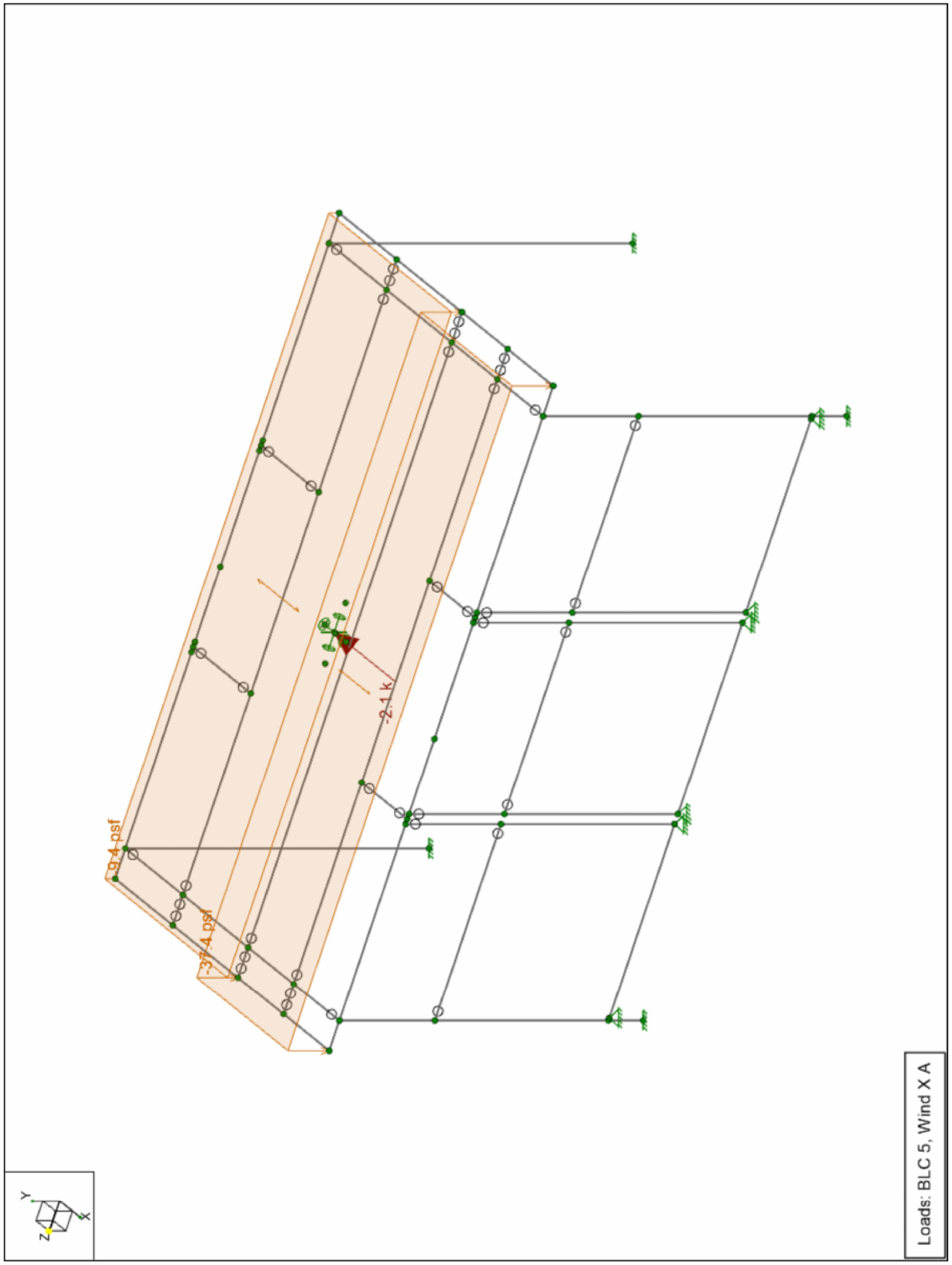

17.5
1.5
16.417
1.5
17.5
4.417
10
30
4.417
30
10
3.5
15.5
9.75
9.625
17.5
3.5
15.5
9.5
9.5
17.5
1.5
16.417
1.5
9.75
9.625
17.5
Member Lcomp Bottom (ft) Displayed

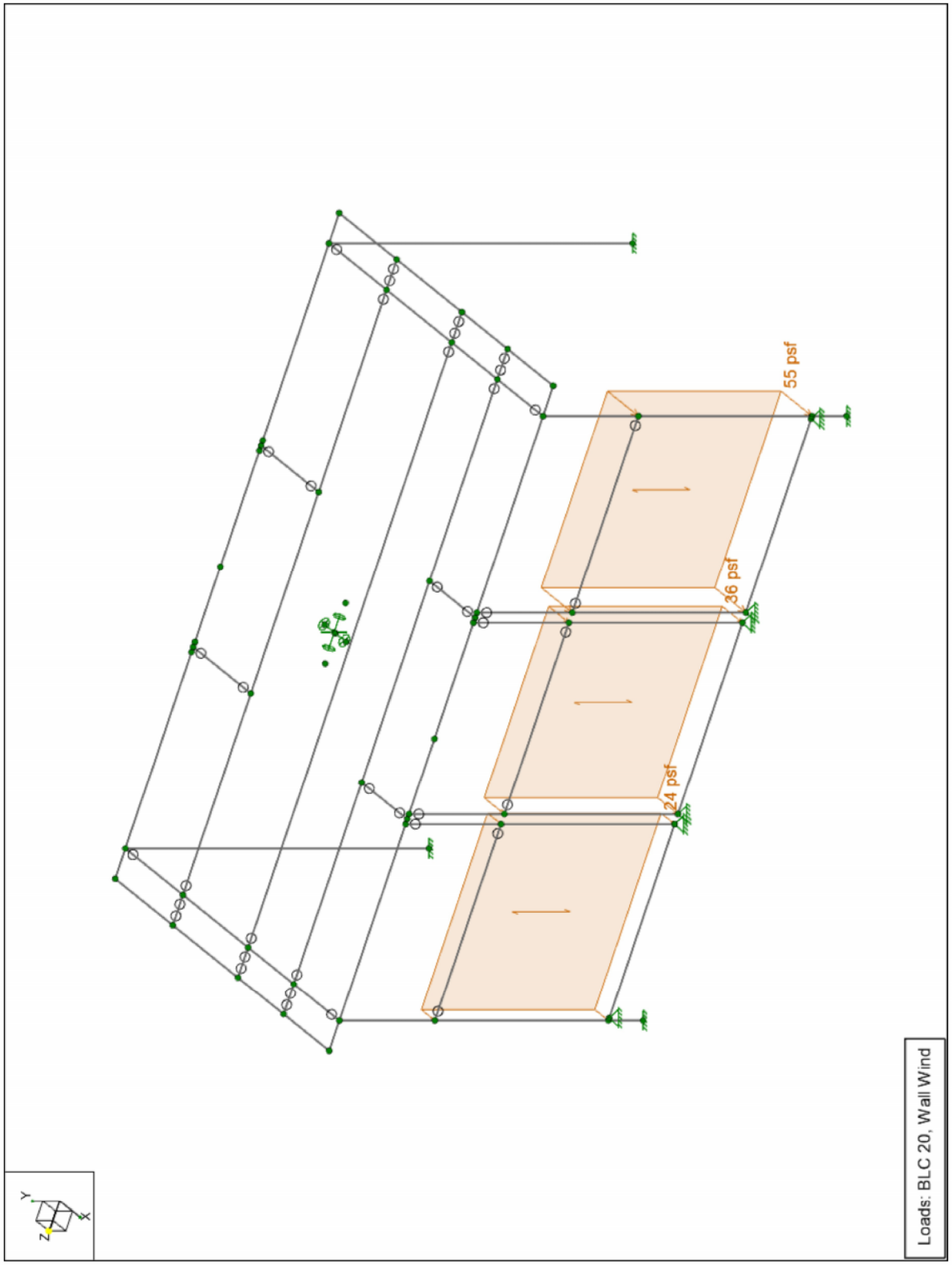

-20 psf
Y
X
Z
Loads: BLC 1, Dead

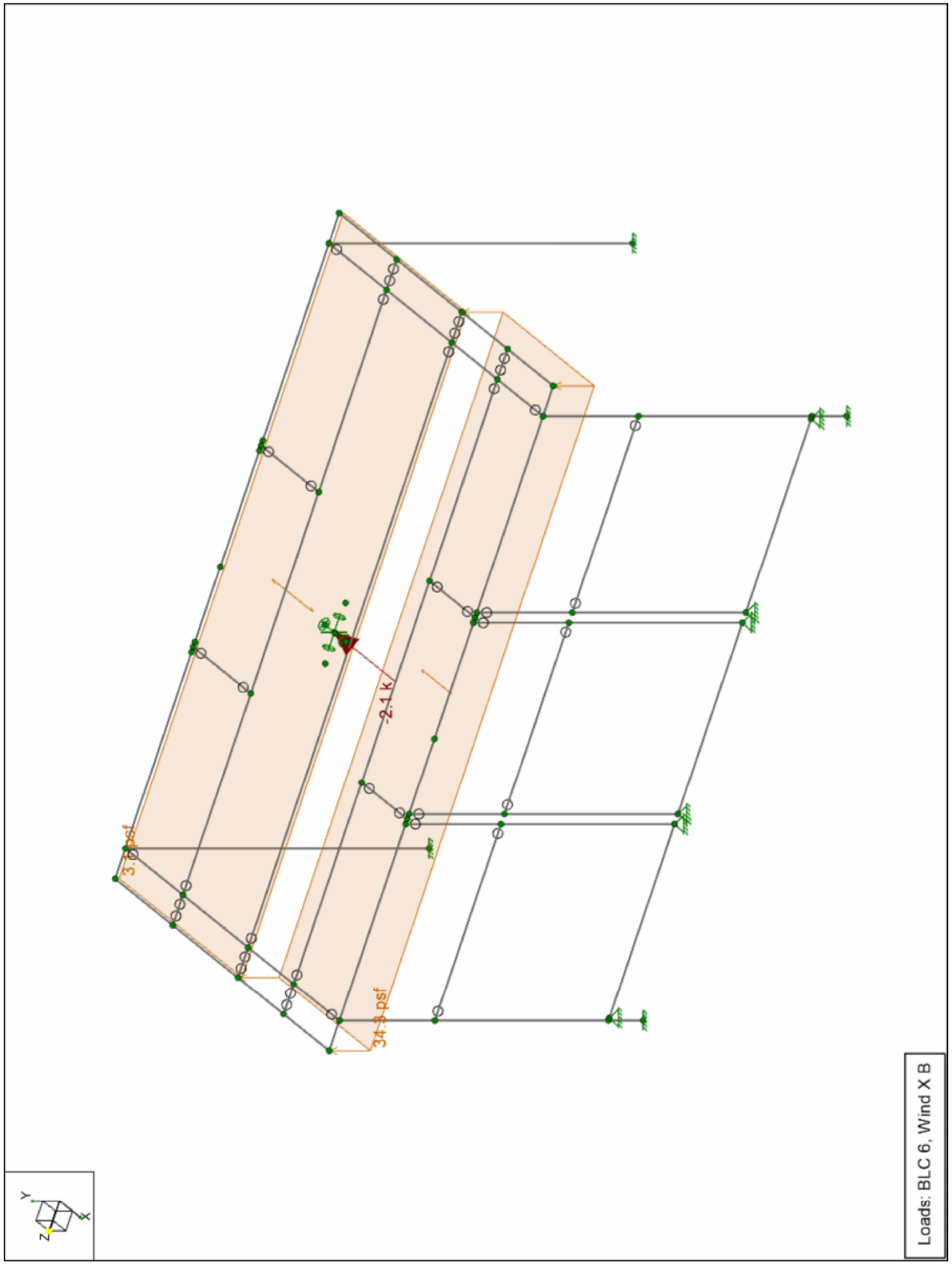

-20 psf
Y
X
Z
Loads: BLC 2, RLL

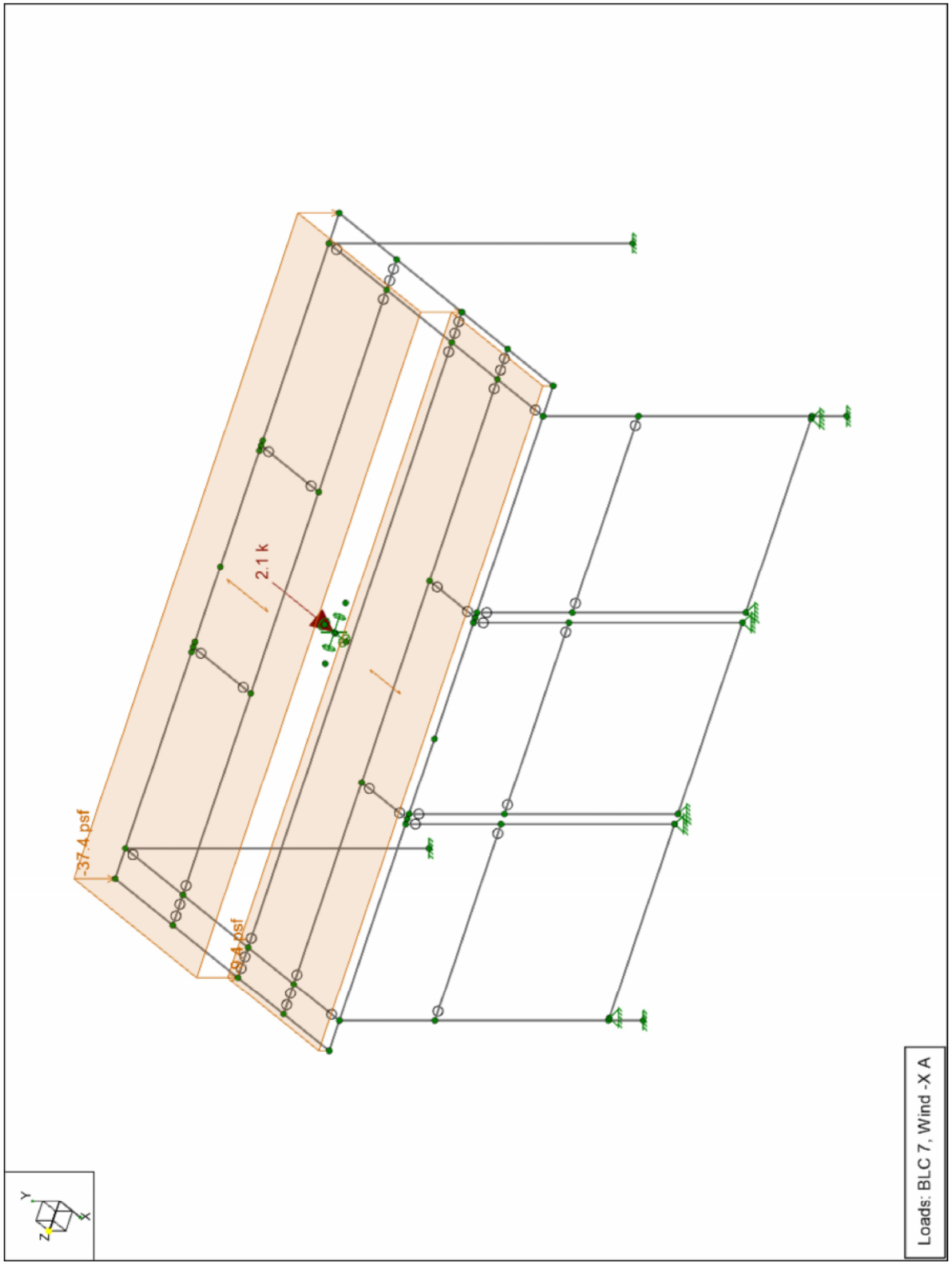

-41.2 psf
Y
X
Z
Loads: BLC 3, Snow Flat

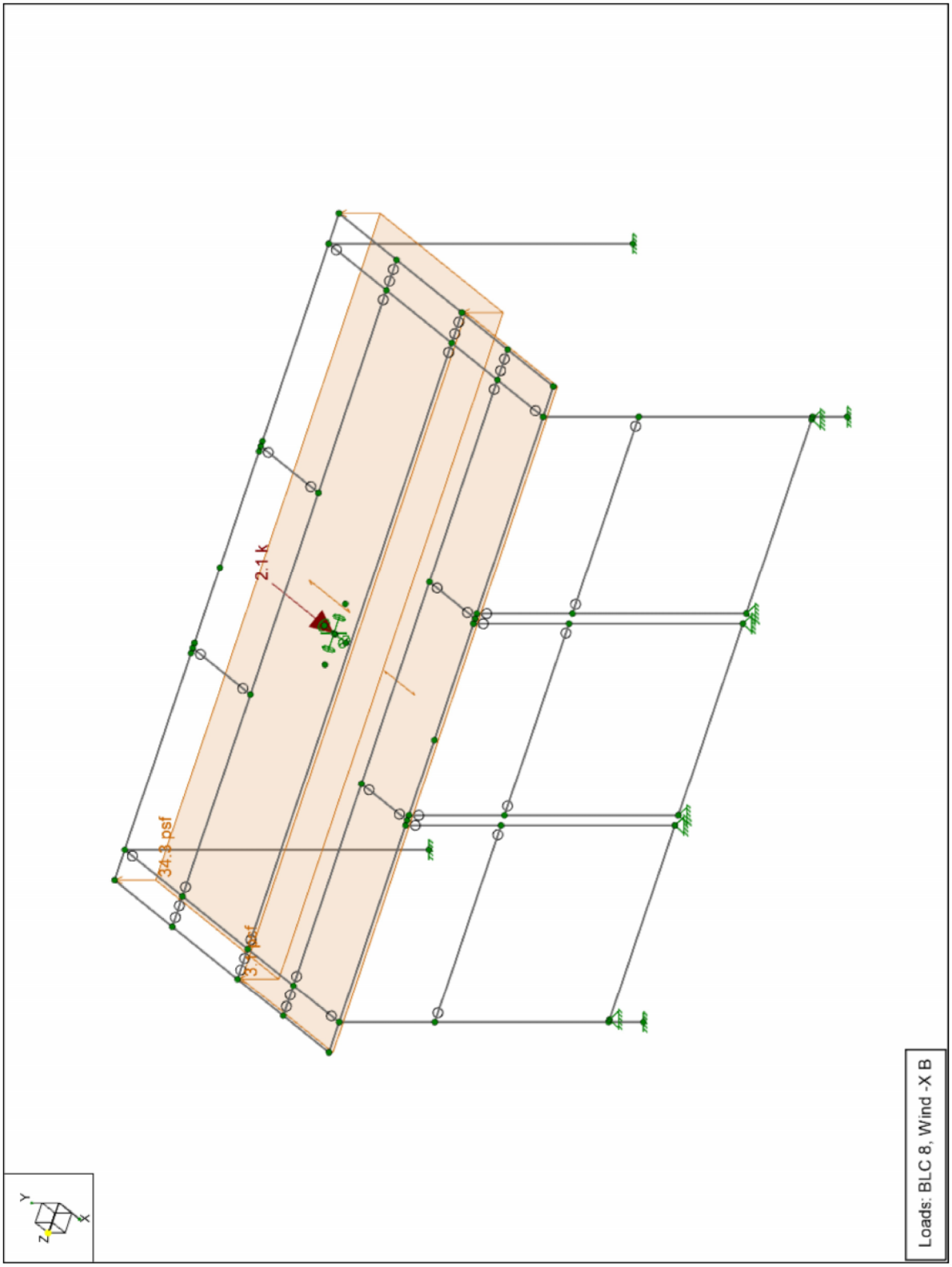

-110 psf
-110 psf
0 psf
0 psf
Y
X
Z
Loads: BLC 4, Snow Drift

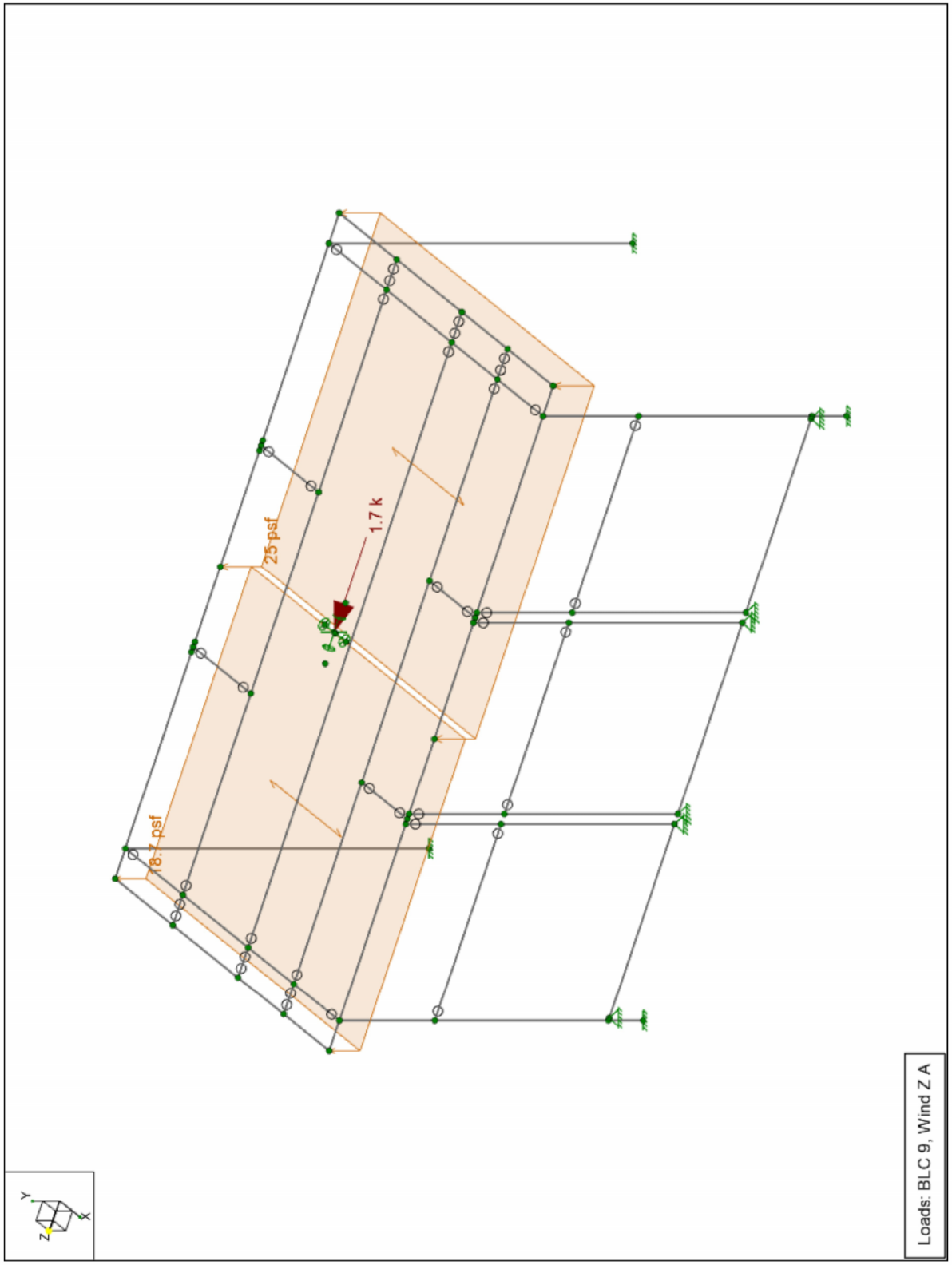

-9.4 psf
-37.4 psf
-2.1 k
Loads: BLC 5, Wind X A
Y
X
Z

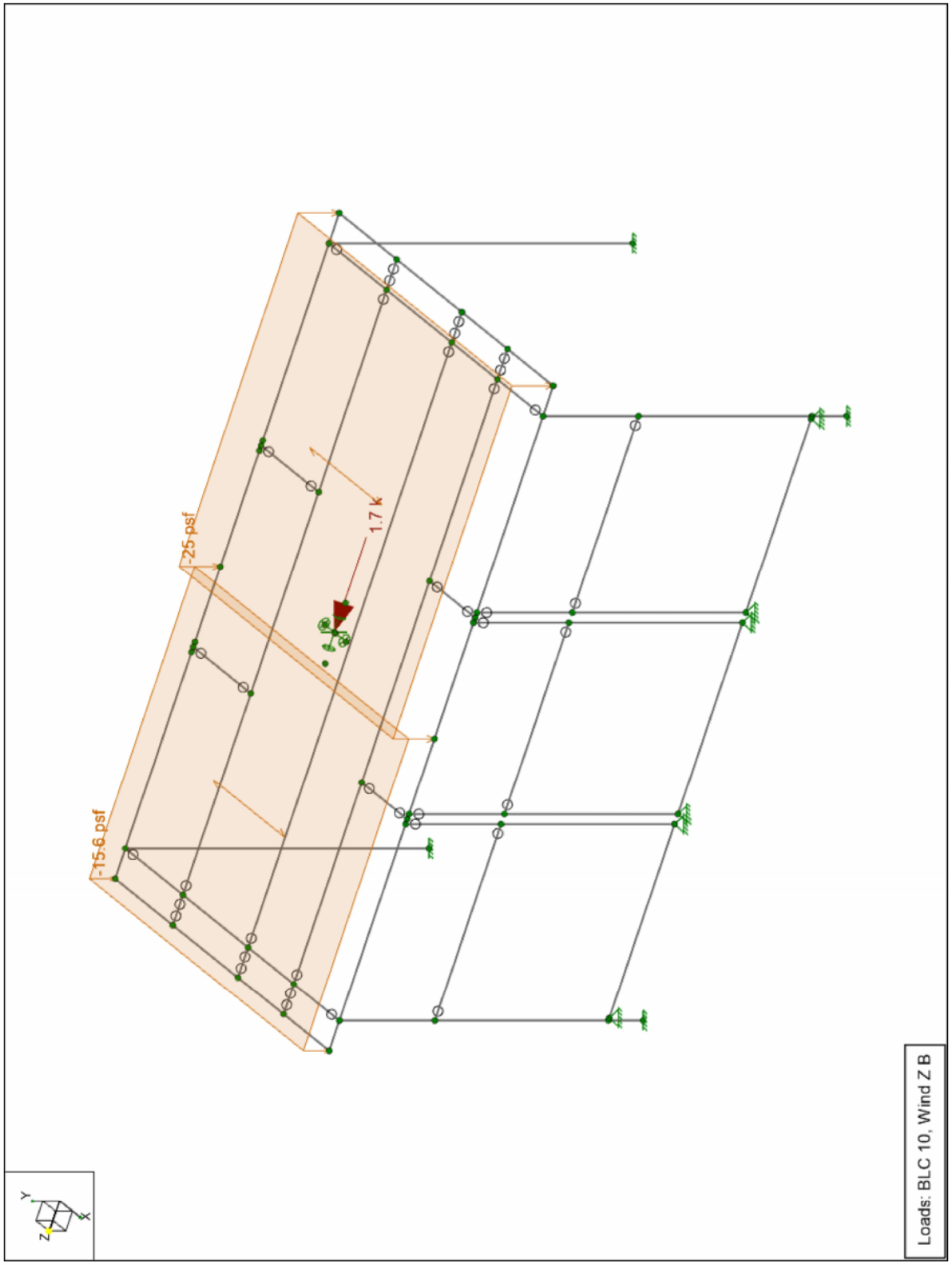

55 psf
36 psf
24 psf
Loads: BLC 20, Wall Wind

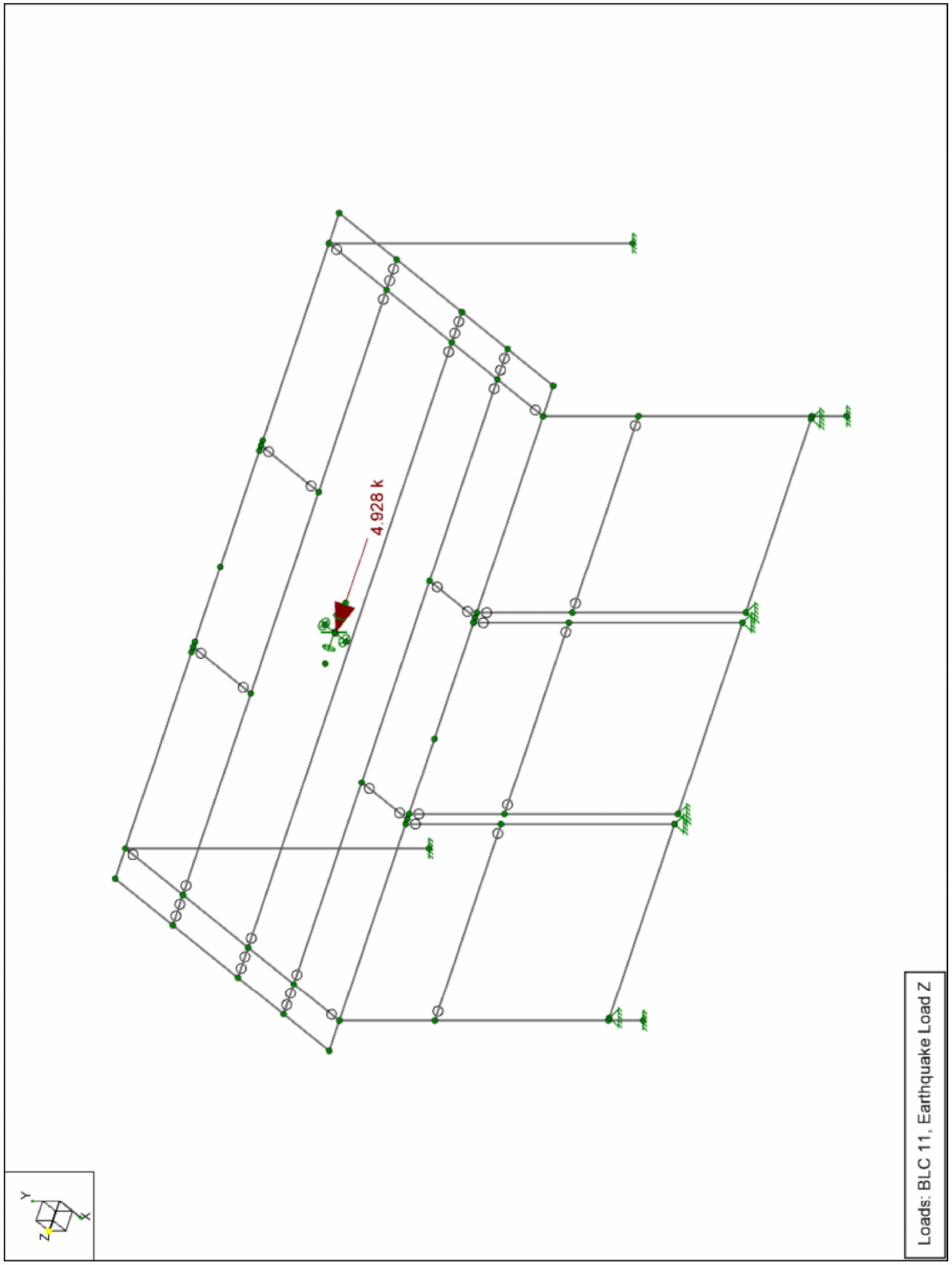

3.5 psf
-2.1 k
34.3 psf
Y
X
Z
Loads: BLC 6, Wind X B

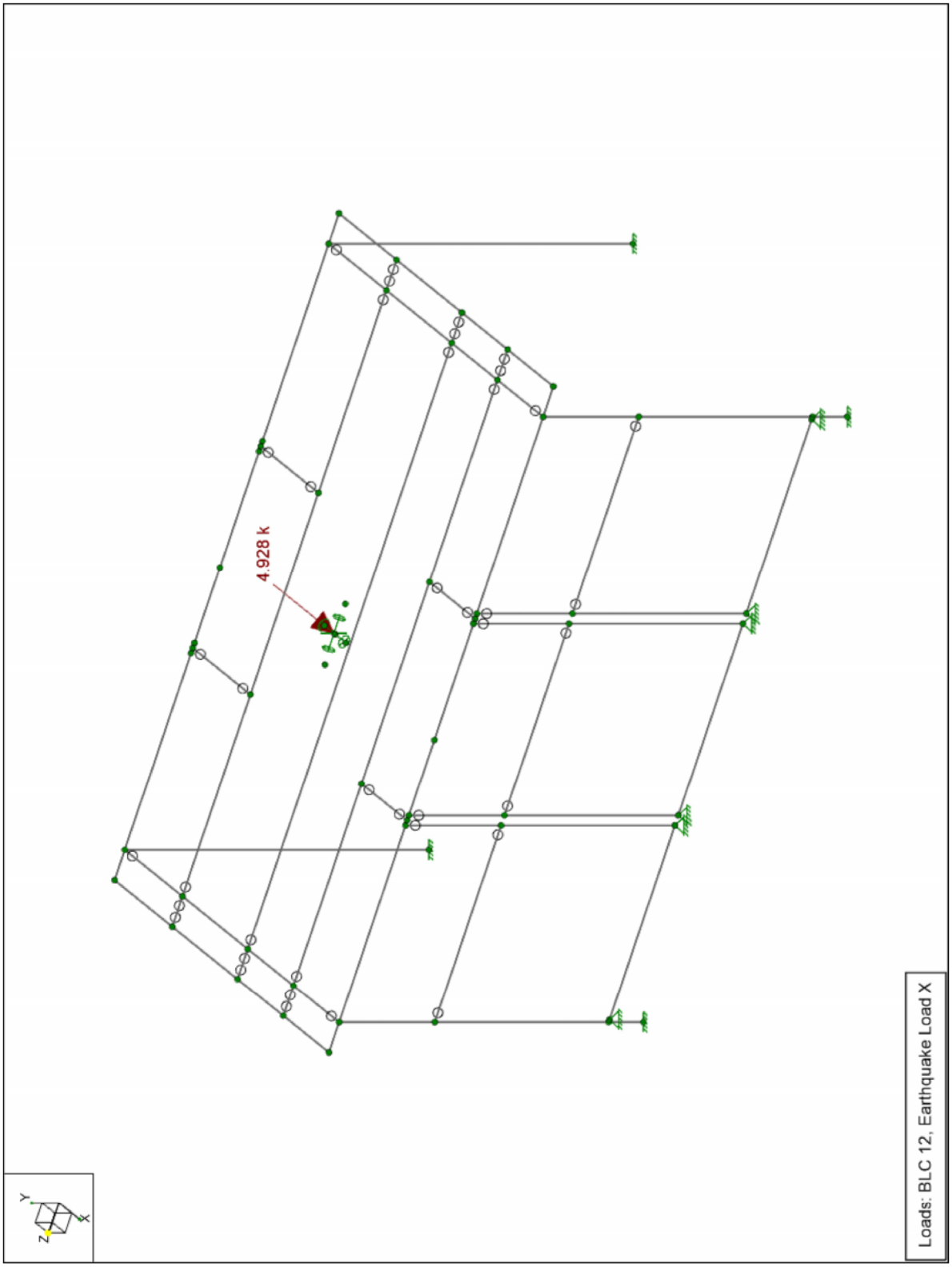

-37.4 psf
-9.4 psf
2.1 k
Loads: BLC 7, Wind -X A

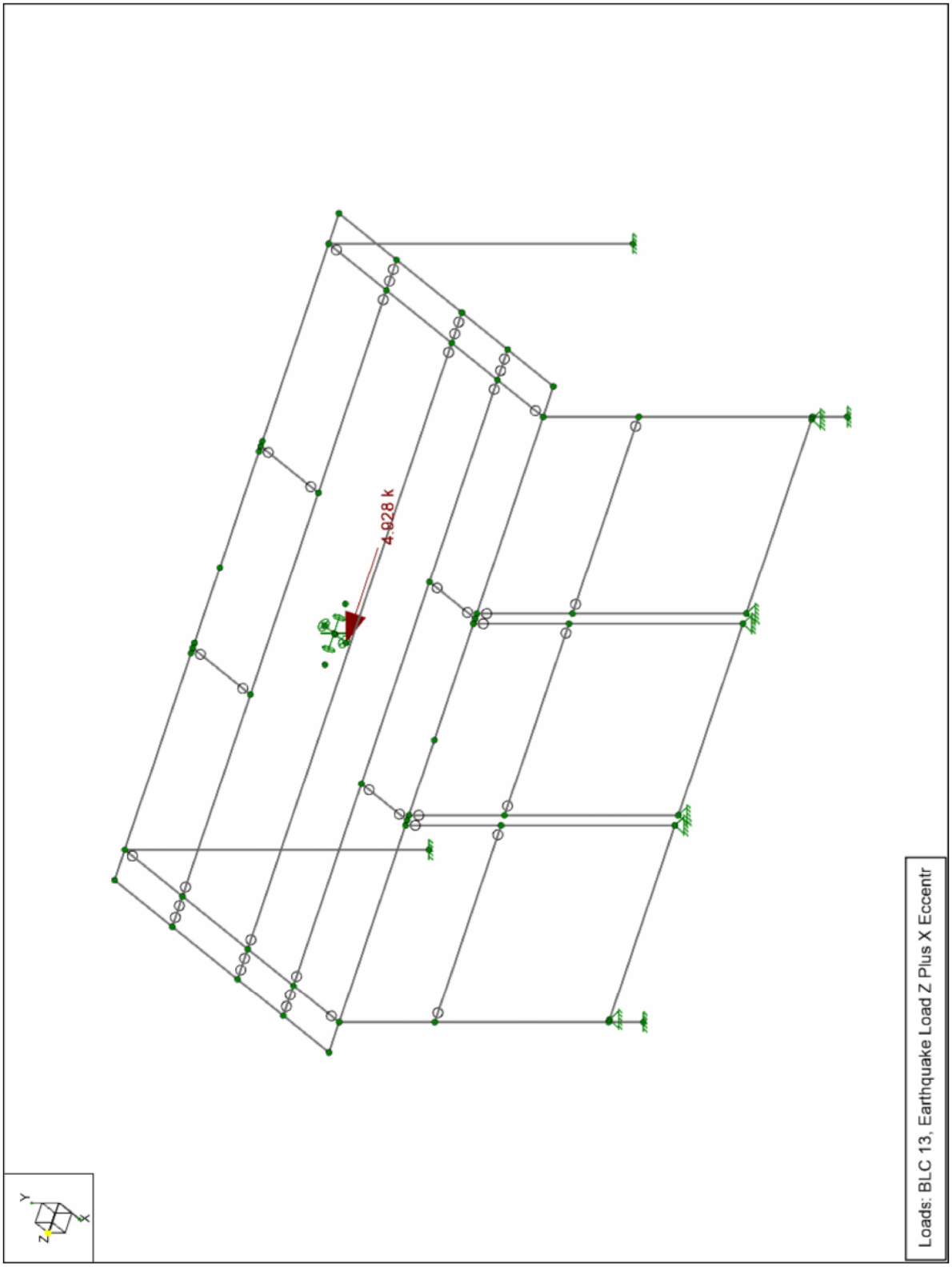

34.3 psf
37 psf
2.1 k
Loads: BLC 8, Wind -X B

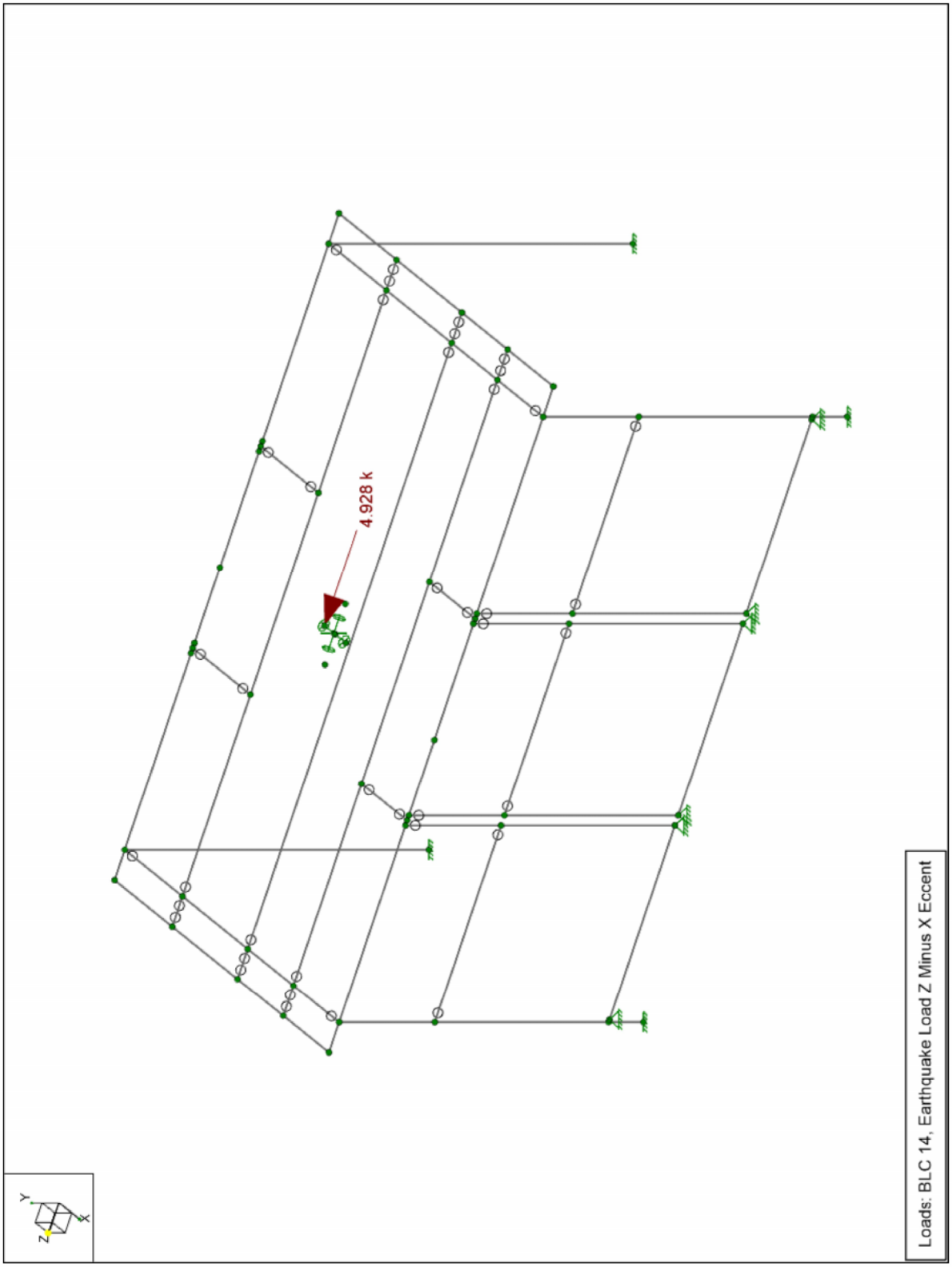

18.7 psf
25 psf
1.7 k
Loads: BLC 9, Wind Z A

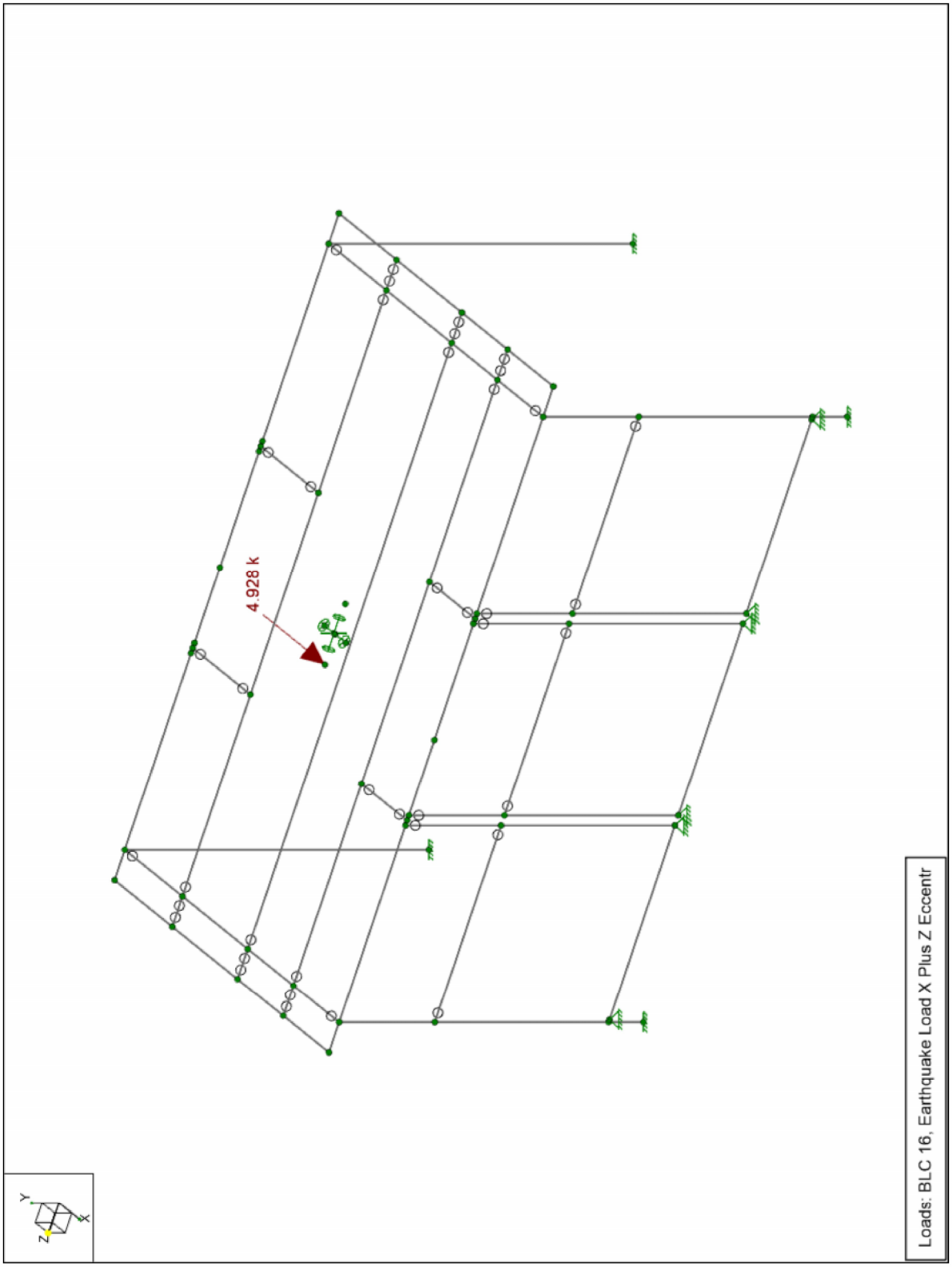

-15.6 psf
-25 psf
1.7 k
Loads: BLC 10, Wind Z B

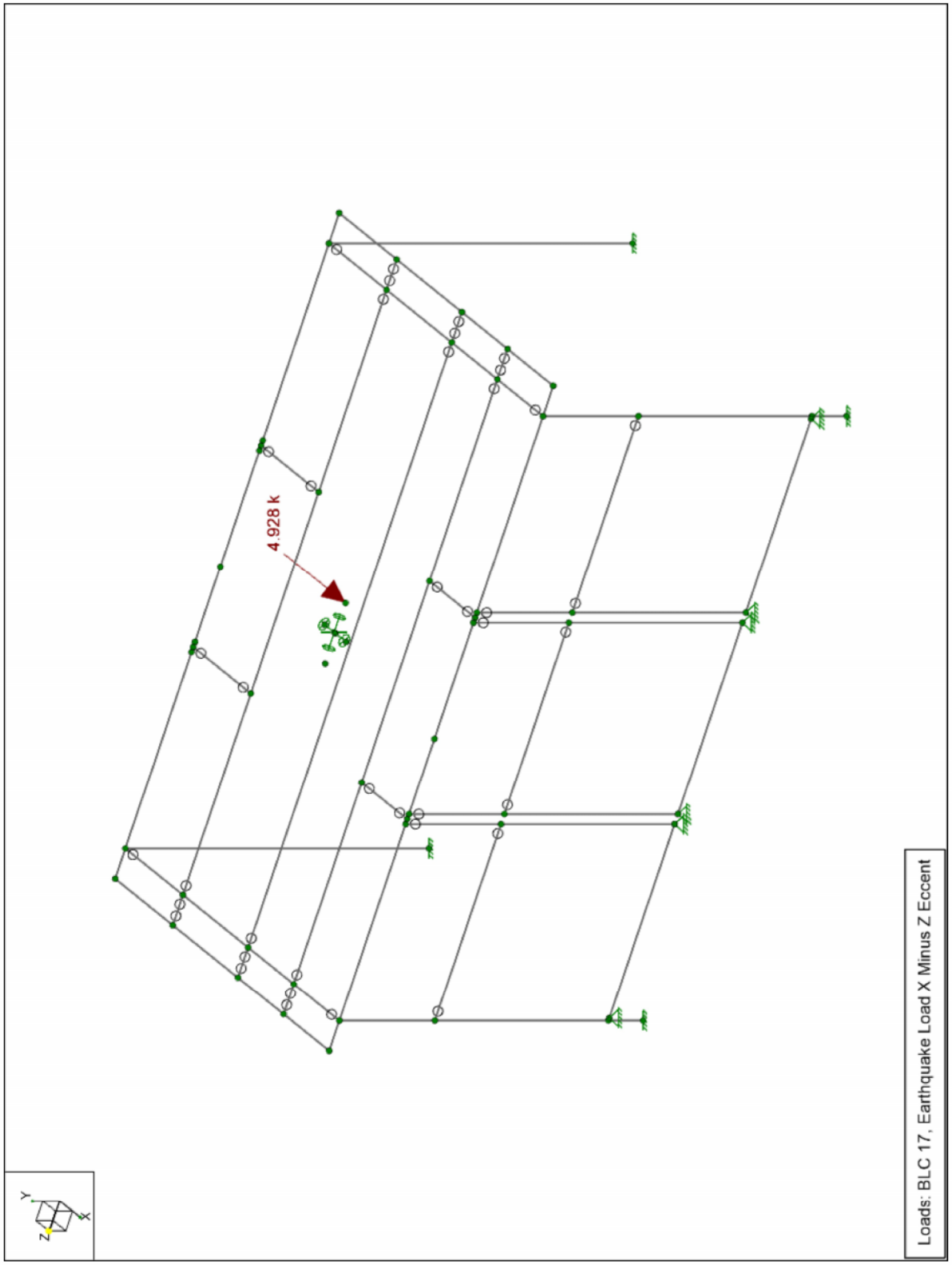

4.928 k
Loads: BLC 11, Earthquake Load Z

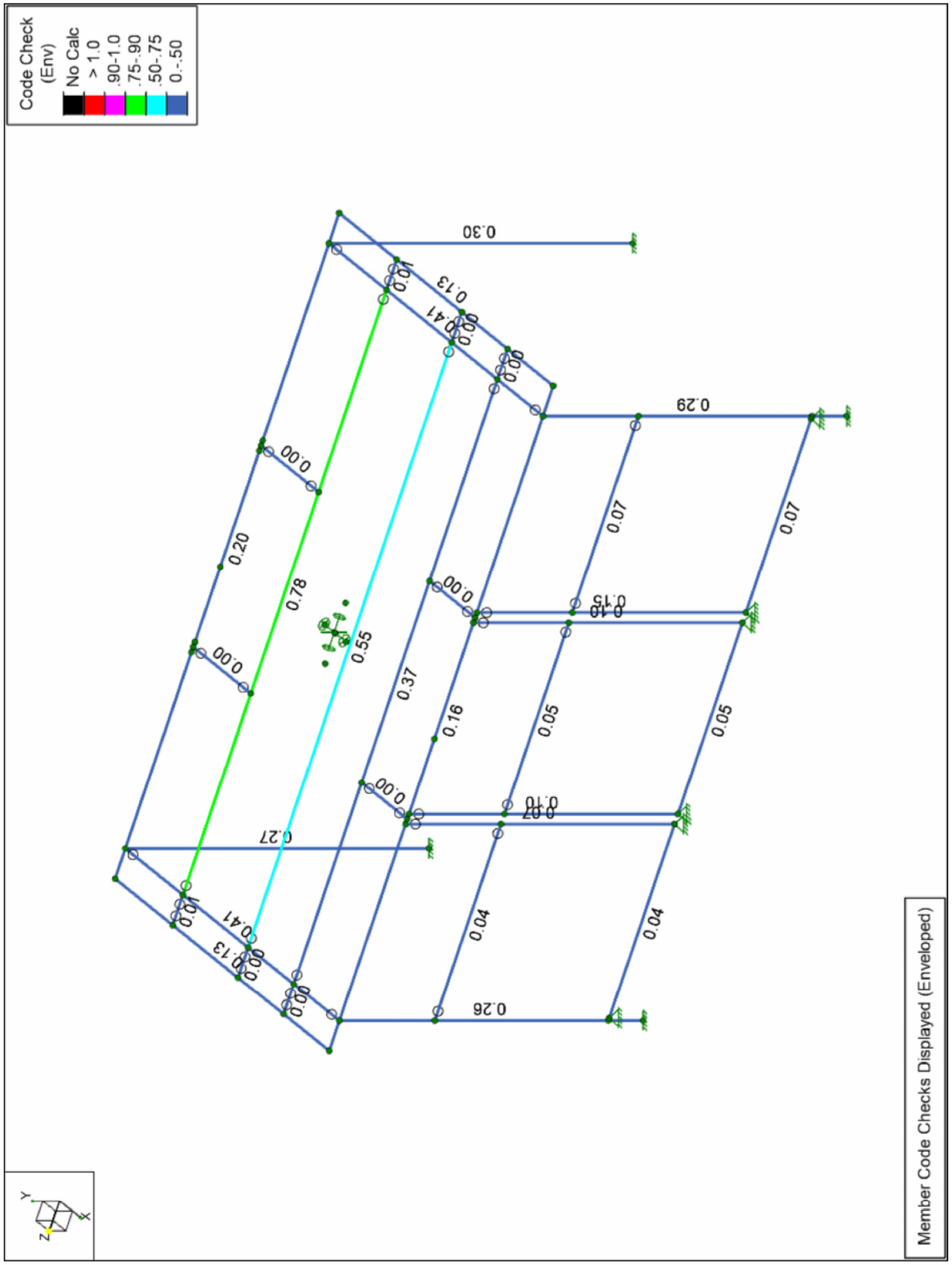

4.928 k
Loads: BLC 12, Earthquake Load X


4.028 k
Loads: BLC 13, Earthquake Load Z Plus X Eccentr


4.928 k
Loads: BLC 14, Earthquake Load Z Minus X Eccent
Y
X
Z


4.928 k
Loads: BLC 16, Earthquake Load X Plus Z Eccentr


4.928 k
Loads: BLC 17, Earthquake Load X Minus Z Eccent


Code Check (Env)
No Calc
> 1.0
.90-1.0
.75-.90
.50-.75
0.-.50
0.30
0.13
0.41
0.00
0.29
0.00
0.07
0.07
0.20
0.78
0.00
0.15
0.10
0.55
0.37
0.16
0.05
0.05
0.00
0.07
0.10
0.27
0.41
0.13
0.04
0.04
0.26
Member Code Checks Displayed (Enveloped)

Model Settings

Number of Reported Sections	5
Number of Internal Sections	100
Member Area Load Mesh Size (in^2)	144
Consider Shear Deformation	Yes
Consider Torsional Warping	Yes
Approximate Mesh Size (in)	24
Transfer Forces Between Intersecting Wood Walls	Yes
Increase Wood Wall Nailing Capacity for Wind Loads	Yes
Include P-Delta for Walls	Yes
Optimize Masonry and Wood Walls	Yes
Maximum Number of Iterations	3
Single	No
Multiple (Optimum)	Yes
Maximum	No

Global Axis corresponding to vertical direction	Y
Convert Existing Data	Yes
Default Global Plane for z-axis	XZ
Plate Local Axis Orientation	Global

Hot Rolled Steel	AISC 15th (360-16): LRFD
Stiffness Adjustment	Yes (Iterative)
Notional Annex	None
Connections	None
Cold Formed Steel	AISI S100-20: ASD
Stiffness Adjustment	Yes (Iterative)
Wood	AWC NDS-18 / SDPWS-21 ASD
Temperature	< 100F
Concrete	ACI 318-19
Masonry	TMS 402-16: ASD
Aluminum	AA ADM1-20: ASD
Structure Type	Building
Stiffness Adjustment	Yes (Iterative)
Stainless	AISC 14th (360-10): ASD
Stiffness Adjustment	Yes (Iterative)

Compression Stress Block	Rectangular Stress Block
Analyze using Cracked Sections	Yes
Leave room for horizontal rebar splices (2*d bar spacing)	No
List forces which were ignored for design in the Detail Report	Yes

Column Min Steel	1
Column Max Steel	8
Rebar Material Spec	ASTM A615
Warn if beam-column framing arrangement is not understood	No
Number of Shear Regions	4
Region 2 & 3 Spacing Increase Increment (in)	4

Code	ASCE 7-16
Risk Category	IV
Drift Cat	High Drift Design

Model Settings (Continued)

Base Elevation (ft)	
Include the weight of the structure in base shear calcs	No
S_1 (g)	0.059
SD_1 (g)	0.094
SD_S (g)	0.231
T_L (sec)	8
T Z (sec)	
T X (sec)	
C_tZ	0.02
C_tX	0.02
C_tExp. Z	0.75
C_tExp. X	0.75
R Z	1.25
R X	1.25
Ω_0Z	1.25
Ω_0X	1.25
C_dZ	1.25
C_dX	1.25
ρ Z	1
ρ X	1

Basic Load Cases

	BLC Description	Category	Y Gravity	Nodal	Distributed	Area(Member)
1	Dead	DL	-1			1
2	RLL	RLL				1
3	Snow Flat	SL				1
4	Snow Drift	SLN				1
5	Wind X A	WL+X		1		2
6	Wind X B	WL+Y		1		2
7	Wind -X A	WL-X		1		2
8	Wind -X B	WL-Y		1		2
9	Wind Z A	WL+Z		1		2
10	Wind Z B	WL-Z		1		2
11	Earthquake Load Z	ELZ		1		
12	Earthquake Load X	ELX		1		
13	Earthquake Load Z Plus X Eccentr	ELZ+X		1		
14	Earthquake Load Z Minus X Eccent	ELZ-X		1		
15	SL Defl	OL1				1
16	Earthquake Load X Plus Z Eccentr	ELX+Z		1		
17	Earthquake Load X Minus Z Eccent	ELX-Z		1		
18	BLC 1 Transient Area Loads	None			83	
19	BLC 2 Transient Area Loads	None			83	
20	Wall Wind	WL				3
21	BLC 3 Transient Area Loads	None			83	
22	BLC 4 Transient Area Loads	None			83	
23	BLC 5 Transient Area Loads	None			85	
24	BLC 6 Transient Area Loads	None			84	
25	BLC 7 Transient Area Loads	None			85	
26	BLC 8 Transient Area Loads	None			85	
27	BLC 9 Transient Area Loads	None			88	
28	BLC 10 Transient Area Loads	None			88	
30	BLC 20 Transient Area Loads	None			22	

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	Dead		Y	DL	1												
2	Roof Live		Y	RLL	1												
3	Snow		Y	SL	1												
4	WL+X - Wind Load +X		Y	WL+X	1	WL	-1										
5	WL+Y - Wind Load +Y		Y	WL+Y	1	WL	-1										
6	WL-X - Wind Load -X		Y	WL-X	1	WL	1										
7	WL-Y - Wind Load -Y		Y	WL-Y	1	WL	1										
8	WL+Z - Wind Load +Z		Y	WL+Z	1												
9	WL-Z - Wind Load -Z		Y	WL-Z	1												
10	ELX		Y	ELX	1												
11	ELZ		Y	ELZ	1												
12	WL+X		Y	WL+X	0.31	WL	-0.31										
13	WL+Y		Y	WL+Y	0.31	WL	-0.31										
14	WL+Z		Y	WL+Z	0.31												
15	WL-X		Y	WL-X	0.31	WL	0.31										
16	WL-Y		Y	WL-Y	0.31	WL	0.31										
17	WL-Z		Y	WL-Z	0.31												
18	Wall WL		Y	WL	1												
19	WL Wall Serv		Y	WL	0.4												
20	IBC 16-1	Yes	Y	DL	1.4												
21	IBC 16-3 (a)	Yes	Y	DL	1.2	RLL	1.6										
22	IBC 16-3 (c)	Yes	Y	DL	1.2	SL	1.6	SLN	1.6								

Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
23	IBC 16-3 (d) (a)	Yes	Y	DL	1.2	SL	1.6	SLN	1.6	WL+X	0.5	WL	-0.5				
24		Yes	Y	DL	1.2	SL	1.6	SLN	1.6	WL+Y	0.5	WL	-0.5				
25	IBC 16-3 (d) (b)	Yes	Y	DL	1.2	SL	1.6	SLN	1.6	WL+Z	0.5						
26	IBC 16-3 (d) (c)	Yes	Y	DL	1.2	SL	1.6	SLN	1.6	WL-X	0.5	WL	0.5				
27		Yes	Y	DL	1.2	SL	1.6	SLN	1.6	WL-Y	0.5	WL	0.5				
28	IBC 16-3 (d) (d)	Yes	Y	DL	1.2	SL	1.6	SLN	1.6	WL-Z	0.5						
29	IBC 16-3 (f) (a)	Yes	Y	DL	1.2	WL+X	0.5	WL	-0.5								
30		Yes	Y	DL	1.2	WL+Y	0.5	WL	-0.5								
31	IBC 16-3 (f) (b)	Yes	Y	DL	1.2	WL+Z	0.5										
32	IBC 16-3 (f) (c)	Yes	Y	DL	1.2	WL-X	0.5	WL	0.5								
33		Yes	Y	DL	1.2	WL-Y	0.5	WL	0.5								
34	IBC 16-3 (f) (d)	Yes	Y	DL	1.2	WL-Z	0.5										
35	IBC 16-4 (a) (a)	Yes	Y	DL	1.2	WL+X	1	RLL	0.5	WL	-1						
36		Yes	Y	DL	1.2	WL+Y	1	RLL	0.5	WL	-1						
37	IBC 16-4 (a) (b)	Yes	Y	DL	1.2	WL+Z	1	RLL	0.5								
38	IBC 16-4 (a) (c)	Yes	Y	DL	1.2	WL-X	1	RLL	0.5	WL	1						
39		Yes	Y	DL	1.2	WL-Y	1	RLL	0.5	WL	1						
40	IBC 16-4 (a) (d)	Yes	Y	DL	1.2	WL-Z	1	RLL	0.5								
41	IBC 16-4 (b) (a)	Yes	Y	DL	1.2	WL+X	1	SL	0.5	WL	-1						
42		Yes	Y	DL	1.2	WL+Y	1	SL	0.5	WL	-1						
43	IBC 16-4 (b) (b)	Yes	Y	DL	1.2	WL+Z	1	SL	0.5								
44	IBC 16-4 (b) (c)	Yes	Y	DL	1.2	WL-X	1	SL	0.5	WL	1						
45		Yes	Y	DL	1.2	WL-Y	1	SL	0.5	WL	1						
46	IBC 16-4 (b) (d)	Yes	Y	DL	1.2	WL-Z	1	SL	0.5								
47	IBC 16-4 (c) (a)	Yes	Y	DL	1.2	WL+X	1	WL	-1								
48		Yes	Y	DL	1.2	WL+Y	1	WL	-1								
49	IBC 16-4 (c) (b)	Yes	Y	DL	1.2	WL+Z	1										
50	IBC 16-4 (c) (c)	Yes	Y	DL	1.2	WL-X	1	WL	1								
51		Yes	Y	DL	1.2	WL-Y	1	WL	1								
52	IBC 16-4 (c) (d)	Yes	Y	DL	1.2	WL-Z	1										
53	IBC 16-6 (a)	Yes	Y	DL	0.9	WL+X	1	WL	-1								
54		Yes	Y	DL	0.9	WL+Y	1	WL	-1								
55	IBC 16-6 (b)	Yes	Y	DL	0.9	WL+Z	1										
56	IBC 16-6 (c)	Yes	Y	DL	0.9	WL-X	1	WL	1								
57		Yes	Y	DL	0.9	WL-Y	1	WL	1								
58	IBC 16-6 (d)	Yes	Y	DL	0.9	WL-Z	1										
59	IBC 21/ASCE Strength 6 (a)	Yes	Y	DL	1.2	Sds*DL	0.2	ELX	1	LL	0.5	LLS	1	SL	0.2	SLN	0.2
60	IBC 21/ASCE Strength 6 (b)	Yes	Y	DL	1.2	Sds*DL	0.2	ELX+Z	1	LL	0.5	LLS	1	SL	0.2	SLN	0.2
61	IBC 21/ASCE Strength 6 (c)	Yes	Y	DL	1.2	Sds*DL	0.2	ELX-Z	1	LL	0.5	LLS	1	SL	0.2	SLN	0.2
62	IBC 21/ASCE Strength 6 (d)	Yes	Y	DL	1.2	Sds*DL	0.2	ELZ	1	LL	0.5	LLS	1	SL	0.2	SLN	0.2
63	IBC 21/ASCE Strength 6 (e)	Yes	Y	DL	1.2	Sds*DL	0.2	ELZ+X	1	LL	0.5	LLS	1	SL	0.2	SLN	0.2
64	IBC 21/ASCE Strength 6 (f)	Yes	Y	DL	1.2	Sds*DL	0.2	ELZ-X	1	LL	0.5	LLS	1	SL	0.2	SLN	0.2
65	IBC 21/ASCE Strength 6 (g)	Yes	Y	DL	1.2	Sds*DL	0.2	ELX	-1	LL	0.5	LLS	1	SL	0.2	SLN	0.2
66	IBC 21/ASCE Strength 6 (h)	Yes	Y	DL	1.2	Sds*DL	0.2	ELX+Z	-1	LL	0.5	LLS	1	SL	0.2	SLN	0.2
67	IBC 21/ASCE Strength 6 (i)	Yes	Y	DL	1.2	Sds*DL	0.2	ELX-Z	-1	LL	0.5	LLS	1	SL	0.2	SLN	0.2
68	IBC 21/ASCE Strength 6 (j)	Yes	Y	DL	1.2	Sds*DL	0.2	ELZ	-1	LL	0.5	LLS	1	SL	0.2	SLN	0.2
69	IBC 21/ASCE Strength 6 (k)	Yes	Y	DL	1.2	Sds*DL	0.2	ELZ+X	-1	LL	0.5	LLS	1	SL	0.2	SLN	0.2
70	IBC 21/ASCE Strength 6 (l)	Yes	Y	DL	1.2	Sds*DL	0.2	ELZ-X	-1	LL	0.5	LLS	1	SL	0.2	SLN	0.2
71	IBC 21/ASCE Strength 7 (a)	Yes	Y	DL	0.9	Sds*DL	-0.2	ELX	1								
72	IBC 21/ASCE Strength 7 (b)	Yes	Y	DL	0.9	Sds*DL	-0.2	ELX+Z	1								
73	IBC 21/ASCE Strength 7 (c)	Yes	Y	DL	0.9	Sds*DL	-0.2	ELX-Z	1								
74	IBC 21/ASCE Strength 7 (d)	Yes	Y	DL	0.9	Sds*DL	-0.2	ELZ	1								
75	IBC 21/ASCE Strength 7 (e)	Yes	Y	DL	0.9	Sds*DL	-0.2	ELZ+X	1								
76	IBC 21/ASCE Strength 7 (f)	Yes	Y	DL	0.9	Sds*DL	-0.2	ELZ-X	1								
77	IBC 21/ASCE Strength 7 (g)	Yes	Y	DL	0.9	Sds*DL	-0.2	ELX	-1								

Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
78	IBC 21/ASCE Strength 7 (h)	Yes	Y	DL	0.9	Sds*DL	-0.2	ELX+Z	-1								
79	IBC 21/ASCE Strength 7 (i)	Yes	Y	DL	0.9	Sds*DL	-0.2	ELX-Z	-1								
80	IBC 21/ASCE Strength 7 (j)	Yes	Y	DL	0.9	Sds*DL	-0.2	ELZ	-1								
81	IBC 21/ASCE Strength 7 (k)	Yes	Y	DL	0.9	Sds*DL	-0.2	ELZ+X	-1								
82	IBC 21/ASCE Strength 7 (l)	Yes	Y	DL	0.9	Sds*DL	-0.2	ELZ-X	-1								

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	0.3	0.65	0.527	42	1.4	58	1.3
5	A500 Gr.B RECT	29000	11154	0.3	0.65	0.527	46	1.4	58	1.3
6	A500 Gr.C RND	29000	11154	0.3	0.65	0.527	46	1.4	62	1.3
7	A500 Gr.C RECT	29000	11154	0.3	0.65	0.527	50	1.4	62	1.3
8	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
9	A1085	29000	11154	0.3	0.65	0.49	50	1.4	65	1.3
10	A913 Gr.65	29000	11154	0.3	0.65	0.49	65	1.1	80	1.1

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N46	N50		W18x35	Beam	Wide Flange	A992	Typical
2	M2	N44	N49		W18x35	Beam	Wide Flange	A992	Typical
3	M3	N6	N5		W18x35	Beam	Wide Flange	A992	Typical
4	M4	N8	N7		W18x35	Beam	Wide Flange	A992	Typical
5	M5	N9	N10		W16x26	Beam	Wide Flange	A992	Typical
6	M6	N11	N12		W16x26	Beam	Wide Flange	A992	Typical
7	M7	N13	N14		W16x26	Beam	Wide Flange	A992	Typical
8	M8	D.1-19	N6		HSS Column	Column	Tube	A500 Gr.C RECT	Typical
9	M9	D.1-18	N5		HSS Column	Column	Tube	A500 Gr.C RECT	Typical
10	M10	B.1-19	N8		HSS Column	Column	Tube	A500 Gr.C RECT	Typical
11	M11	B.1-18	N7		HSS Column	Column	Tube	A500 Gr.C RECT	Typical
12	M25	N44	N46		W14x22	Beam	Wide Flange	A992	Typical
13	M26	N49	N50		W14x22	Beam	Wide Flange	A992	Typical
14	M27	N9	N51		W10x12	Beam	Wide Flange	A992	Typical
15	M28	N11	N52		W10x12	Beam	Wide Flange	A992	Typical
16	M29	N13	N53		W10x12	Beam	Wide Flange	A992	Typical
17	M30	N10	N54		W10x12	Beam	Wide Flange	A992	Typical
18	M31	N12	N56		W10x12	Beam	Wide Flange	A992	Typical
19	M32	N14	N55		W10x12	Beam	Wide Flange	A992	Typical
20	M33	N24	N57		W10x12	Beam	Wide Flange	A992	Typical
21	M34	N26	N58		W10x12	Beam	Wide Flange	A992	Typical
22	M35	N61	N59		W10x12	Beam	Wide Flange	A992	Typical
23	M36	N62	N60		W10x12	Beam	Wide Flange	A992	Typical
24	M37	N75	N71	90	Wind Beam	Beam	Tube	A500 Gr.C RECT	Typical
25	M38	N70	N72	90	Wind Beam	Beam	Tube	A500 Gr.C RECT	Typical
26	M39	N70	N77		Wind Col	Column	Tube	A500 Gr.C RECT	Typical
27	M40	N66	N73	90	Wind Beam	Beam	Tube	A500 Gr.C RECT	Typical
28	M41	N74	N67	90	Wind Beam	Beam	Tube	A500 Gr.C RECT	Typical
29	M42	N68	N69	90	Wind Beam	Beam	Tube	A500 Gr.C RECT	Typical
30	M43	N71	N78		Wind Col	Column	Tube	A500 Gr.C RECT	Typical
31	M44	N65	N79		Wind Col	Column	Tube	A500 Gr.C RECT	Typical
32	M45	N65	N76	90	Wind Beam	Beam	Tube	A500 Gr.C RECT	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
33	M46	N72	N80		Wind Col	Column	Tube	A500 Gr.C RECT	Typical

Member Advanced Data

	Label	I Release	J Release	Col-Wall Vert Release	Physical	Deflection Ratio Options	Seismic DR
1	M1				Yes	Default	None
2	M2				Yes	Default	None
3	M3	BenPIN	BenPIN		Yes	Default	None
4	M4	BenPIN	BenPIN		Yes	Default	None
5	M5	BenPIN	BenPIN		Yes	Default	None
6	M6	BenPIN	BenPIN		Yes	Default	None
7	M7	BenPIN	BenPIN		Yes	Default	None
8	M8				Yes	** NA **	None
9	M9				Yes	** NA **	None
10	M10				Yes	** NA **	None
11	M11				Yes	** NA **	None
12	M25				Yes	Default	None
13	M26				Yes	Default	None
14	M27	BenPIN	BenPIN		Yes	Default	None
15	M28	BenPIN	BenPIN		Yes	Default	None
16	M29	BenPIN	BenPIN		Yes	Default	None
17	M30	BenPIN	BenPIN		Yes	Default	None
18	M31	BenPIN	BenPIN		Yes	Default	None
19	M32	BenPIN	BenPIN		Yes	Default	None
20	M33	BenPIN	BenPIN		Yes	Default	None
21	M34	BenPIN	BenPIN		Yes	Default	None
22	M35	BenPIN	BenPIN		Yes	Default	None
23	M36	BenPIN	BenPIN		Yes	Default	None
24	M37				Yes	Default	None
25	M38				Yes	Default	None
26	M39		BenPIN		Yes	** NA **	None
27	M40	BenPIN	BenPIN		Yes	Default	None
28	M41	BenPIN	BenPIN		Yes	Default	None
29	M42	BenPIN	BenPIN		Yes	Default	None
30	M43		BenPIN		Yes	** NA **	None
31	M44		BenPIN		Yes	** NA **	None
32	M45				Yes	Default	None
33	M46		BenPIN		Yes	** NA **	None

Hot Rolled Steel Design Parameters

	Label	Shape	Length [ft]	Lb y-y [ft]	Lcomp top [ft]	Lcomp bot [ft]	Channel Conn.	a [ft]	Function
1	M1	W18x35	33	2	Lbyy	10	N/A	N/A	Lateral
2	M2	W18x35	33	2	Lbyy	10	N/A	N/A	Lateral
3	M3	W18x35	16.417		Segment		N/A	N/A	Lateral
4	M4	W18x35	16.417		Segment		N/A	N/A	Lateral
5	M5	W16x26	30	2	Lbyy		N/A	N/A	Lateral
6	M6	W16x26	30	2	Lbyy		N/A	N/A	Lateral
7	M7	W16x26	30	2	Lbyy		N/A	N/A	Lateral
8	M8	HSS Column	17.5		Lbyy		N/A	N/A	Lateral
9	M9	HSS Column	17.5		Lbyy		N/A	N/A	Lateral
10	M10	HSS Column	17.5		Lbyy		N/A	N/A	Lateral
11	M11	HSS Column	17.5		Lbyy		N/A	N/A	Lateral
12	M25	W14x22	16.417		Lbyy		N/A	N/A	Lateral
13	M26	W14x22	16.417		Lbyy		N/A	N/A	Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length [ft]	Lb y-y [ft]	Lcomp top [ft]	Lcomp bot [ft]	Channel Conn.	a [ft]	Function
14	M27	W10x12	1.5		Lbyy		N/A	N/A	Lateral
15	M28	W10x12	1.5		Lbyy		N/A	N/A	Lateral
16	M29	W10x12	1.5		Lbyy		N/A	N/A	Lateral
17	M30	W10x12	1.5		Lbyy		N/A	N/A	Lateral
18	M31	W10x12	1.5		Lbyy		N/A	N/A	Lateral
19	M32	W10x12	1.5		Lbyy		N/A	N/A	Lateral
20	M33	W10x12	4.417		Lbyy		N/A	N/A	Lateral
21	M34	W10x12	4.417		Lbyy		N/A	N/A	Lateral
22	M35	W10x12	3.5		Lbyy		N/A	N/A	Lateral
23	M36	W10x12	3.5		Lbyy		N/A	N/A	Lateral
24	M37	Wind Beam	9.625		Lbyy		N/A	N/A	Lateral
25	M38	Wind Beam	9.5		Lbyy		N/A	N/A	Lateral
26	M39	Wind Col	15.5	Segment	Lbyy		N/A	N/A	Lateral
27	M40	Wind Beam	9.75		Lbyy		N/A	N/A	Lateral
28	M41	Wind Beam	9.75		Lbyy		N/A	N/A	Lateral
29	M42	Wind Beam	9.5		Lbyy		N/A	N/A	Lateral
30	M43	Wind Col	15.5	Segment	Lbyy		N/A	N/A	Lateral
31	M44	Wind Col	15.5	Segment	Lbyy		N/A	N/A	Lateral
32	M45	Wind Beam	9.625		Lbyy		N/A	N/A	Lateral
33	M46	Wind Col	15.5	Segment	Lbyy		N/A	N/A	Lateral

Diaphragms

	Node Label	Plane	Inactive	No Wind/Drift
1	N8	ZX		

Member Point Loads

No Data to Print...

Member Distributed Loads (BLC 18 : BLC 1 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.044	-0.037	0	2.062
2	M1	Y	-0.037	-0.034	2.062	4.125
3	M1	Y	-0.034	-0.034	4.125	6.188
4	M1	Y	-0.034	-0.034	6.188	8.25
5	M1	Y	-0.034	-0.034	8.25	10.312
6	M1	Y	-0.034	-0.034	10.312	12.375
7	M1	Y	-0.034	-0.034	12.375	14.438
8	M1	Y	-0.034	-0.034	14.438	16.5
9	M1	Y	-0.034	-0.034	16.5	18.562
10	M1	Y	-0.034	-0.034	18.562	20.625
11	M1	Y	-0.034	-0.034	20.625	22.688
12	M1	Y	-0.034	-0.034	22.688	24.75
13	M1	Y	-0.034	-0.034	24.75	26.812
14	M1	Y	-0.034	-0.034	26.812	28.875
15	M1	Y	-0.034	-0.037	28.875	30.938
16	M1	Y	-0.037	-0.044	30.938	33
17	M2	Y	-0.056	-0.046	0	2.062
18	M2	Y	-0.046	-0.042	2.062	4.125
19	M2	Y	-0.042	-0.043	4.125	6.188
20	M2	Y	-0.043	-0.043	6.188	8.25
21	M2	Y	-0.043	-0.043	8.25	10.312
22	M2	Y	-0.043	-0.043	10.312	12.375
23	M2	Y	-0.043	-0.043	12.375	14.438

Member Distributed Loads (BLC 18 : BLC 1 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
24	M2	Y	-0.043	-0.043	14.438	16.5
25	M2	Y	-0.043	-0.043	16.5	18.562
26	M2	Y	-0.043	-0.043	18.562	20.625
27	M2	Y	-0.043	-0.043	20.625	22.688
28	M2	Y	-0.043	-0.043	22.688	24.75
29	M2	Y	-0.043	-0.043	24.75	26.812
30	M2	Y	-0.043	-0.042	26.812	28.875
31	M2	Y	-0.042	-0.046	28.875	30.938
32	M2	Y	-0.046	-0.056	30.938	33
33	M5	Y	-0.086	-0.091	0	2
34	M5	Y	-0.091	-0.095	2	4
35	M5	Y	-0.095	-0.096	4	6
36	M5	Y	-0.096	-0.096	6	8
37	M5	Y	-0.096	-0.095	8	10
38	M5	Y	-0.095	-0.095	10	12
39	M5	Y	-0.095	-0.095	12	14
40	M5	Y	-0.095	-0.095	14	16
41	M5	Y	-0.095	-0.095	16	18
42	M5	Y	-0.095	-0.095	18	20
43	M5	Y	-0.095	-0.096	20	22
44	M5	Y	-0.096	-0.096	22	24
45	M5	Y	-0.096	-0.095	24	26
46	M5	Y	-0.095	-0.091	26	28
47	M5	Y	-0.091	-0.086	28	30
48	M6	Y	-0.077	-0.082	0	2
49	M6	Y	-0.082	-0.085	2	4
50	M6	Y	-0.085	-0.086	4	6
51	M6	Y	-0.086	-0.086	6	8
52	M6	Y	-0.086	-0.086	8	10
53	M6	Y	-0.086	-0.086	10	12
54	M6	Y	-0.086	-0.086	12	14
55	M6	Y	-0.086	-0.086	14	16
56	M6	Y	-0.086	-0.086	16	18
57	M6	Y	-0.086	-0.086	18	20
58	M6	Y	-0.086	-0.086	20	22
59	M6	Y	-0.086	-0.086	22	24
60	M6	Y	-0.086	-0.085	24	26
61	M6	Y	-0.085	-0.082	26	28
62	M6	Y	-0.082	-0.077	28	30
63	M7	Y	-0.063	-0.068	0	2
64	M7	Y	-0.068	-0.071	2	4
65	M7	Y	-0.071	-0.072	4	6
66	M7	Y	-0.072	-0.072	6	8
67	M7	Y	-0.072	-0.071	8	10
68	M7	Y	-0.071	-0.07	10	12
69	M7	Y	-0.07	-0.07	12	14
70	M7	Y	-0.07	-0.07	14	16
71	M7	Y	-0.07	-0.07	16	18
72	M7	Y	-0.07	-0.071	18	20
73	M7	Y	-0.071	-0.072	20	22
74	M7	Y	-0.072	-0.072	22	24
75	M7	Y	-0.072	-0.071	24	26
76	M7	Y	-0.071	-0.068	26	28
77	M7	Y	-0.068	-0.063	28	30
78	M27	Y	-0.094	-0.094	0	1.5

Member Distributed Loads (BLC 18 : BLC 1 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
79	M28	Y	-0.085	-0.085	2.776e-16	1.5
80	M29	Y	-0.07	-0.07	0	1.5
81	M30	Y	-0.094	-0.094	1.11e-16	1.5
82	M31	Y	-0.085	-0.085	0	1.5
83	M32	Y	-0.07	-0.07	0	1.5

Member Distributed Loads (BLC 19 : BLC 2 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.044	-0.037	0	2.062
2	M1	Y	-0.037	-0.034	2.062	4.125
3	M1	Y	-0.034	-0.034	4.125	6.188
4	M1	Y	-0.034	-0.034	6.188	8.25
5	M1	Y	-0.034	-0.034	8.25	10.312
6	M1	Y	-0.034	-0.034	10.312	12.375
7	M1	Y	-0.034	-0.034	12.375	14.438
8	M1	Y	-0.034	-0.034	14.438	16.5
9	M1	Y	-0.034	-0.034	16.5	18.562
10	M1	Y	-0.034	-0.034	18.562	20.625
11	M1	Y	-0.034	-0.034	20.625	22.688
12	M1	Y	-0.034	-0.034	22.688	24.75
13	M1	Y	-0.034	-0.034	24.75	26.812
14	M1	Y	-0.034	-0.034	26.812	28.875
15	M1	Y	-0.034	-0.037	28.875	30.938
16	M1	Y	-0.037	-0.044	30.938	33
17	M2	Y	-0.056	-0.046	0	2.062
18	M2	Y	-0.046	-0.042	2.062	4.125
19	M2	Y	-0.042	-0.043	4.125	6.188
20	M2	Y	-0.043	-0.043	6.188	8.25
21	M2	Y	-0.043	-0.043	8.25	10.312
22	M2	Y	-0.043	-0.043	10.312	12.375
23	M2	Y	-0.043	-0.043	12.375	14.438
24	M2	Y	-0.043	-0.043	14.438	16.5
25	M2	Y	-0.043	-0.043	16.5	18.562
26	M2	Y	-0.043	-0.043	18.562	20.625
27	M2	Y	-0.043	-0.043	20.625	22.688
28	M2	Y	-0.043	-0.043	22.688	24.75
29	M2	Y	-0.043	-0.043	24.75	26.812
30	M2	Y	-0.043	-0.042	26.812	28.875
31	M2	Y	-0.042	-0.046	28.875	30.938
32	M2	Y	-0.046	-0.056	30.938	33
33	M5	Y	-0.086	-0.091	0	2
34	M5	Y	-0.091	-0.095	2	4
35	M5	Y	-0.095	-0.096	4	6
36	M5	Y	-0.096	-0.096	6	8
37	M5	Y	-0.096	-0.095	8	10
38	M5	Y	-0.095	-0.095	10	12
39	M5	Y	-0.095	-0.095	12	14
40	M5	Y	-0.095	-0.095	14	16
41	M5	Y	-0.095	-0.095	16	18
42	M5	Y	-0.095	-0.095	18	20
43	M5	Y	-0.095	-0.096	20	22
44	M5	Y	-0.096	-0.096	22	24
45	M5	Y	-0.096	-0.095	24	26
46	M5	Y	-0.095	-0.091	26	28
47	M5	Y	-0.091	-0.086	28	30

Member Distributed Loads (BLC 19 : BLC 2 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
48	M6	Y	-0.077	-0.082	0	2
49	M6	Y	-0.082	-0.085	2	4
50	M6	Y	-0.085	-0.086	4	6
51	M6	Y	-0.086	-0.086	6	8
52	M6	Y	-0.086	-0.086	8	10
53	M6	Y	-0.086	-0.086	10	12
54	M6	Y	-0.086	-0.086	12	14
55	M6	Y	-0.086	-0.086	14	16
56	M6	Y	-0.086	-0.086	16	18
57	M6	Y	-0.086	-0.086	18	20
58	M6	Y	-0.086	-0.086	20	22
59	M6	Y	-0.086	-0.086	22	24
60	M6	Y	-0.086	-0.085	24	26
61	M6	Y	-0.085	-0.082	26	28
62	M6	Y	-0.082	-0.077	28	30
63	M7	Y	-0.063	-0.068	0	2
64	M7	Y	-0.068	-0.071	2	4
65	M7	Y	-0.071	-0.072	4	6
66	M7	Y	-0.072	-0.072	6	8
67	M7	Y	-0.072	-0.071	8	10
68	M7	Y	-0.071	-0.07	10	12
69	M7	Y	-0.07	-0.07	12	14
70	M7	Y	-0.07	-0.07	14	16
71	M7	Y	-0.07	-0.07	16	18
72	M7	Y	-0.07	-0.071	18	20
73	M7	Y	-0.071	-0.072	20	22
74	M7	Y	-0.072	-0.072	22	24
75	M7	Y	-0.072	-0.071	24	26
76	M7	Y	-0.071	-0.068	26	28
77	M7	Y	-0.068	-0.063	28	30
78	M27	Y	-0.094	-0.094	0	1.5
79	M28	Y	-0.085	-0.085	2.776e-16	1.5
80	M29	Y	-0.07	-0.07	0	1.5
81	M30	Y	-0.094	-0.094	1.11e-16	1.5
82	M31	Y	-0.085	-0.085	0	1.5
83	M32	Y	-0.07	-0.07	0	1.5

Member Distributed Loads (BLC 21 : BLC 3 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.091	-0.076	0	2.062
2	M1	Y	-0.076	-0.069	2.062	4.125
3	M1	Y	-0.069	-0.071	4.125	6.188
4	M1	Y	-0.071	-0.071	6.188	8.25
5	M1	Y	-0.071	-0.071	8.25	10.312
6	M1	Y	-0.071	-0.07	10.312	12.375
7	M1	Y	-0.07	-0.069	12.375	14.438
8	M1	Y	-0.069	-0.069	14.438	16.5
9	M1	Y	-0.069	-0.069	16.5	18.562
10	M1	Y	-0.069	-0.07	18.562	20.625
11	M1	Y	-0.07	-0.071	20.625	22.688
12	M1	Y	-0.071	-0.071	22.688	24.75
13	M1	Y	-0.071	-0.071	24.75	26.812
14	M1	Y	-0.071	-0.069	26.812	28.875
15	M1	Y	-0.069	-0.076	28.875	30.938
16	M1	Y	-0.076	-0.091	30.938	33

Member Distributed Loads (BLC 21 : BLC 3 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
17	M2	Y	-0.115	-0.096	0	2.062
18	M2	Y	-0.096	-0.087	2.062	4.125
19	M2	Y	-0.087	-0.089	4.125	6.188
20	M2	Y	-0.089	-0.089	6.188	8.25
21	M2	Y	-0.089	-0.089	8.25	10.312
22	M2	Y	-0.089	-0.088	10.312	12.375
23	M2	Y	-0.088	-0.088	12.375	14.438
24	M2	Y	-0.088	-0.088	14.438	16.5
25	M2	Y	-0.088	-0.088	16.5	18.562
26	M2	Y	-0.088	-0.088	18.562	20.625
27	M2	Y	-0.088	-0.089	20.625	22.688
28	M2	Y	-0.089	-0.089	22.688	24.75
29	M2	Y	-0.089	-0.089	24.75	26.812
30	M2	Y	-0.089	-0.087	26.812	28.875
31	M2	Y	-0.087	-0.096	28.875	30.938
32	M2	Y	-0.096	-0.115	30.938	33
33	M5	Y	-0.176	-0.188	0	2
34	M5	Y	-0.188	-0.196	2	4
35	M5	Y	-0.196	-0.198	4	6
36	M5	Y	-0.198	-0.198	6	8
37	M5	Y	-0.198	-0.197	8	10
38	M5	Y	-0.197	-0.195	10	12
39	M5	Y	-0.195	-0.195	12	14
40	M5	Y	-0.195	-0.195	14	16
41	M5	Y	-0.195	-0.195	16	18
42	M5	Y	-0.195	-0.197	18	20
43	M5	Y	-0.197	-0.198	20	22
44	M5	Y	-0.198	-0.198	22	24
45	M5	Y	-0.198	-0.196	24	26
46	M5	Y	-0.196	-0.188	26	28
47	M5	Y	-0.188	-0.176	28	30
48	M6	Y	-0.158	-0.169	0	2
49	M6	Y	-0.169	-0.176	2	4
50	M6	Y	-0.176	-0.178	4	6
51	M6	Y	-0.178	-0.178	6	8
52	M6	Y	-0.178	-0.178	8	10
53	M6	Y	-0.178	-0.178	10	12
54	M6	Y	-0.178	-0.177	12	14
55	M6	Y	-0.177	-0.178	14	16
56	M6	Y	-0.178	-0.178	16	18
57	M6	Y	-0.178	-0.178	18	20
58	M6	Y	-0.178	-0.178	20	22
59	M6	Y	-0.178	-0.178	22	24
60	M6	Y	-0.178	-0.176	24	26
61	M6	Y	-0.176	-0.169	26	28
62	M6	Y	-0.169	-0.158	28	30
63	M7	Y	-0.129	-0.14	0	2
64	M7	Y	-0.14	-0.146	2	4
65	M7	Y	-0.146	-0.147	4	6
66	M7	Y	-0.147	-0.148	6	8
67	M7	Y	-0.148	-0.146	8	10
68	M7	Y	-0.146	-0.145	10	12
69	M7	Y	-0.145	-0.145	12	14
70	M7	Y	-0.145	-0.145	14	16
71	M7	Y	-0.145	-0.145	16	18

Member Distributed Loads (BLC 21 : BLC 3 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
72	M7	Y	-0.145	-0.146	18	20
73	M7	Y	-0.146	-0.148	20	22
74	M7	Y	-0.148	-0.147	22	24
75	M7	Y	-0.147	-0.146	24	26
76	M7	Y	-0.146	-0.14	26	28
77	M7	Y	-0.14	-0.129	28	30
78	M27	Y	-0.194	-0.194	0	1.5
79	M28	Y	-0.175	-0.175	2.776e-16	1.5
80	M29	Y	-0.144	-0.144	0	1.5
81	M30	Y	-0.194	-0.194	1.11e-16	1.5
82	M31	Y	-0.175	-0.175	0	1.5
83	M32	Y	-0.144	-0.144	0	1.5

Member Distributed Loads (BLC 22 : BLC 4 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M2	Y	-0.223	-0.222	24.75	26.812
2	M2	Y	-0.222	-0.218	26.812	28.875
3	M2	Y	-0.218	-0.238	28.875	30.938
4	M2	Y	-0.238	-0.287	30.938	33
5	M5	Y	-0.339	-0.363	0	2
6	M5	Y	-0.363	-0.378	2	4
7	M5	Y	-0.378	-0.381	4	6
8	M5	Y	-0.381	-0.382	6	8
9	M5	Y	-0.382	-0.379	8	10
10	M5	Y	-0.379	-0.376	10	12
11	M5	Y	-0.376	-0.376	12	14
12	M5	Y	-0.376	-0.376	14	16
13	M5	Y	-0.376	-0.376	16	18
14	M5	Y	-0.376	-0.379	18	20
15	M5	Y	-0.379	-0.382	20	22
16	M5	Y	-0.382	-0.381	22	24
17	M5	Y	-0.381	-0.378	24	26
18	M5	Y	-0.378	-0.363	26	28
19	M5	Y	-0.363	-0.339	28	30
20	M6	Y	-0.19	-0.203	0	2
21	M6	Y	-0.203	-0.211	2	4
22	M6	Y	-0.211	-0.213	4	6
23	M6	Y	-0.213	-0.214	6	8
24	M6	Y	-0.214	-0.213	8	10
25	M6	Y	-0.213	-0.213	10	12
26	M6	Y	-0.213	-0.213	12	14
27	M6	Y	-0.213	-0.213	14	16
28	M6	Y	-0.213	-0.213	16	18
29	M6	Y	-0.213	-0.213	18	20
30	M6	Y	-0.213	-0.214	20	22
31	M6	Y	-0.214	-0.213	22	24
32	M6	Y	-0.213	-0.211	24	26
33	M6	Y	-0.211	-0.203	26	28
34	M6	Y	-0.203	-0.19	28	30
35	M7	Y	-0.074	-0.08	0	2
36	M7	Y	-0.08	-0.083	2	4
37	M7	Y	-0.083	-0.084	4	6
38	M7	Y	-0.084	-0.084	6	8
39	M7	Y	-0.084	-0.083	8	10
40	M7	Y	-0.083	-0.083	10	12

Member Distributed Loads (BLC 22 : BLC 4 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
41	M7	Y	-0.083	-0.082	12	14
42	M7	Y	-0.082	-0.082	14	16
43	M7	Y	-0.082	-0.083	16	18
44	M7	Y	-0.083	-0.083	18	20
45	M7	Y	-0.083	-0.084	20	22
46	M7	Y	-0.084	-0.084	22	24
47	M7	Y	-0.084	-0.083	24	26
48	M7	Y	-0.083	-0.08	26	28
49	M7	Y	-0.08	-0.074	28	30
50	M27	Y	-0.374	-0.374	1.11e-16	1.5
51	M28	Y	-0.21	-0.21	0	1.5
52	M29	Y	-0.082	-0.082	0	1.5
53	M30	Y	-0.374	-0.374	0	1.5
54	M31	Y	-0.21	-0.21	2.776e-16	1.5
55	M32	Y	-0.082	-0.082	0	1.5
56	M1	Y	-0.013	-0.011	0	2.062
57	M1	Y	-0.011	-0.01	2.062	4.125
58	M1	Y	-0.01	-0.01	4.125	6.188
59	M1	Y	-0.01	-0.01	6.188	8.25
60	M1	Y	-0.01	-0.01	8.25	10.312
61	M1	Y	-0.01	-0.01	10.312	12.375
62	M1	Y	-0.01	-0.01	12.375	14.438
63	M1	Y	-0.01	-0.01	14.438	16.5
64	M1	Y	-0.01	-0.01	16.5	18.562
65	M1	Y	-0.01	-0.01	18.562	20.625
66	M1	Y	-0.01	-0.01	20.625	22.688
67	M1	Y	-0.01	-0.01	22.688	24.75
68	M1	Y	-0.01	-0.01	24.75	26.812
69	M1	Y	-0.01	-0.01	26.812	28.875
70	M1	Y	-0.01	-0.011	28.875	30.938
71	M1	Y	-0.011	-0.013	30.938	33
72	M2	Y	-0.287	-0.238	0	2.062
73	M2	Y	-0.238	-0.218	2.062	4.125
74	M2	Y	-0.218	-0.222	4.125	6.188
75	M2	Y	-0.222	-0.223	6.188	8.25
76	M2	Y	-0.223	-0.222	8.25	10.312
77	M2	Y	-0.222	-0.219	10.312	12.375
78	M2	Y	-0.219	-0.218	12.375	14.438
79	M2	Y	-0.218	-0.218	14.438	16.5
80	M2	Y	-0.218	-0.218	16.5	18.562
81	M2	Y	-0.218	-0.219	18.562	20.625
82	M2	Y	-0.219	-0.222	20.625	22.688
83	M2	Y	-0.222	-0.223	22.688	24.75

Member Distributed Loads (BLC 23 : BLC 5 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.083	-0.069	0	2.062
2	M1	Y	-0.069	-0.063	2.062	4.125
3	M1	Y	-0.063	-0.064	4.125	6.188
4	M1	Y	-0.064	-0.064	6.188	8.25
5	M1	Y	-0.064	-0.064	8.25	10.312
6	M1	Y	-0.064	-0.063	10.312	12.375
7	M1	Y	-0.063	-0.063	12.375	14.438
8	M1	Y	-0.063	-0.063	14.438	16.5
9	M1	Y	-0.063	-0.063	16.5	18.562

Member Distributed Loads (BLC 23 : BLC 5 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
10	M1	Y	-0.063	-0.063	18.562	20.625
11	M1	Y	-0.063	-0.064	20.625	22.688
12	M1	Y	-0.064	-0.064	22.688	24.75
13	M1	Y	-0.064	-0.064	24.75	26.812
14	M1	Y	-0.064	-0.063	26.812	28.875
15	M1	Y	-0.063	-0.069	28.875	30.938
16	M1	Y	-0.069	-0.083	30.938	33
17	M6	Y	-0.08	-0.086	0	2
18	M6	Y	-0.086	-0.09	2	4
19	M6	Y	-0.09	-0.09	4	6
20	M6	Y	-0.09	-0.091	6	8
21	M6	Y	-0.091	-0.09	8	10
22	M6	Y	-0.09	-0.09	10	12
23	M6	Y	-0.09	-0.09	12	14
24	M6	Y	-0.09	-0.09	14	16
25	M6	Y	-0.09	-0.09	16	18
26	M6	Y	-0.09	-0.09	18	20
27	M6	Y	-0.09	-0.091	20	22
28	M6	Y	-0.091	-0.09	22	24
29	M6	Y	-0.09	-0.09	24	26
30	M6	Y	-0.09	-0.086	26	28
31	M6	Y	-0.086	-0.08	28	30
32	M7	Y	-0.117	-0.127	0	2
33	M7	Y	-0.127	-0.133	2	4
34	M7	Y	-0.133	-0.134	4	6
35	M7	Y	-0.134	-0.134	6	8
36	M7	Y	-0.134	-0.133	8	10
37	M7	Y	-0.133	-0.132	10	12
38	M7	Y	-0.132	-0.131	12	14
39	M7	Y	-0.131	-0.131	14	16
40	M7	Y	-0.131	-0.132	16	18
41	M7	Y	-0.132	-0.133	18	20
42	M7	Y	-0.133	-0.134	20	22
43	M7	Y	-0.134	-0.134	22	24
44	M7	Y	-0.134	-0.133	24	26
45	M7	Y	-0.133	-0.127	26	28
46	M7	Y	-0.127	-0.117	28	30
47	M28	Y	-0.065	-0.065	0	1.5
48	M29	Y	-0.131	-0.131	0	1.5
49	M31	Y	-0.065	-0.065	0	1.5
50	M32	Y	-0.131	-0.131	0	1.5
51	M2	Y	-0.026	-0.022	0	2.062
52	M2	Y	-0.022	-0.02	2.062	4.125
53	M2	Y	-0.02	-0.02	4.125	6.188
54	M2	Y	-0.02	-0.02	6.188	8.25
55	M2	Y	-0.02	-0.02	8.25	10.312
56	M2	Y	-0.02	-0.02	10.312	12.375
57	M2	Y	-0.02	-0.02	12.375	14.438
58	M2	Y	-0.02	-0.02	14.438	16.5
59	M2	Y	-0.02	-0.02	16.5	18.562
60	M2	Y	-0.02	-0.02	18.562	20.625
61	M2	Y	-0.02	-0.02	20.625	22.688
62	M2	Y	-0.02	-0.02	22.688	24.75
63	M2	Y	-0.02	-0.02	24.75	26.812
64	M2	Y	-0.02	-0.02	26.812	28.875

Member Distributed Loads (BLC 23 : BLC 5 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
65	M2	Y	-0.02	-0.022	28.875	30.938
66	M2	Y	-0.022	-0.026	30.938	33
67	M5	Y	-0.04	-0.043	0	2
68	M5	Y	-0.043	-0.045	2	4
69	M5	Y	-0.045	-0.045	4	6
70	M5	Y	-0.045	-0.045	6	8
71	M5	Y	-0.045	-0.045	8	10
72	M5	Y	-0.045	-0.044	10	12
73	M5	Y	-0.044	-0.044	12	14
74	M5	Y	-0.044	-0.044	14	16
75	M5	Y	-0.044	-0.045	16	18
76	M5	Y	-0.045	-0.045	18	20
77	M5	Y	-0.045	-0.045	20	22
78	M5	Y	-0.045	-0.045	22	24
79	M5	Y	-0.045	-0.045	24	26
80	M5	Y	-0.045	-0.043	26	28
81	M5	Y	-0.043	-0.04	28	30
82	M27	Y	-0.044	-0.044	0	1.5
83	M28	Y	-0.024	-0.024	1.11e-16	1.5
84	M30	Y	-0.044	-0.044	0	1.5
85	M31	Y	-0.023	-0.023	3.886e-16	1.5

Member Distributed Loads (BLC 24 : BLC 6 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	0.076	0.063	0	2.062
2	M1	Y	0.063	0.058	2.062	4.125
3	M1	Y	0.058	0.059	4.125	6.188
4	M1	Y	0.059	0.059	6.188	8.25
5	M1	Y	0.059	0.059	8.25	10.312
6	M1	Y	0.059	0.058	10.312	12.375
7	M1	Y	0.058	0.058	12.375	14.438
8	M1	Y	0.058	0.058	14.438	16.5
9	M1	Y	0.058	0.058	16.5	18.562
10	M1	Y	0.058	0.058	18.562	20.625
11	M1	Y	0.058	0.059	20.625	22.688
12	M1	Y	0.059	0.059	22.688	24.75
13	M1	Y	0.059	0.059	24.75	26.812
14	M1	Y	0.059	0.058	26.812	28.875
15	M1	Y	0.058	0.063	28.875	30.938
16	M1	Y	0.063	0.076	30.938	33
17	M6	Y	0.061	0.065	0	2
18	M6	Y	0.065	0.068	2	4
19	M6	Y	0.068	0.069	4	6
20	M6	Y	0.069	0.069	6	8
21	M6	Y	0.069	0.069	8	10
22	M6	Y	0.069	0.069	10	12
23	M6	Y	0.069	0.069	12	14
24	M6	Y	0.069	0.069	14	16
25	M6	Y	0.069	0.069	16	18
26	M6	Y	0.069	0.069	18	20
27	M6	Y	0.069	0.069	20	22
28	M6	Y	0.069	0.069	22	24
29	M6	Y	0.069	0.068	24	26
30	M6	Y	0.068	0.065	26	28
31	M6	Y	0.065	0.061	28	30

Member Distributed Loads (BLC 24 : BLC 6 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
32	M7	Y	0.108	0.116	0	2
33	M7	Y	0.116	0.122	2	4
34	M7	Y	0.122	0.123	4	6
35	M7	Y	0.123	0.123	6	8
36	M7	Y	0.123	0.122	8	10
37	M7	Y	0.122	0.121	10	12
38	M7	Y	0.121	0.121	12	14
39	M7	Y	0.121	0.121	14	16
40	M7	Y	0.121	0.121	16	18
41	M7	Y	0.121	0.122	18	20
42	M7	Y	0.122	0.123	20	22
43	M7	Y	0.123	0.123	22	24
44	M7	Y	0.123	0.122	24	26
45	M7	Y	0.122	0.116	26	28
46	M7	Y	0.116	0.108	28	30
47	M28	Y	0.068	0.068	1.11e-16	1.5
48	M29	Y	0.12	0.12	0	1.5
49	M31	Y	0.06	0.06	0	1.5
50	M32	Y	0.12	0.12	0	1.5
51	M2	Y	0.009	0.007	0	2.062
52	M2	Y	0.007	0.007	2.062	4.125
53	M2	Y	0.007	0.007	4.125	6.188
54	M2	Y	0.007	0.007	6.188	8.25
55	M2	Y	0.007	0.007	8.25	10.312
56	M2	Y	0.007	0.007	10.312	12.375
57	M2	Y	0.007	0.007	12.375	14.438
58	M2	Y	0.007	0.007	14.438	16.5
59	M2	Y	0.007	0.007	16.5	18.562
60	M2	Y	0.007	0.007	18.562	20.625
61	M2	Y	0.007	0.007	20.625	22.688
62	M2	Y	0.007	0.007	22.688	24.75
63	M2	Y	0.007	0.007	24.75	26.812
64	M2	Y	0.007	0.007	26.812	28.875
65	M2	Y	0.007	0.007	28.875	30.938
66	M2	Y	0.007	0.009	30.938	33
67	M5	Y	0.013	0.014	0	2
68	M5	Y	0.014	0.015	2	4
69	M5	Y	0.015	0.015	4	6
70	M5	Y	0.015	0.015	6	8
71	M5	Y	0.015	0.015	8	10
72	M5	Y	0.015	0.015	10	12
73	M5	Y	0.015	0.015	12	14
74	M5	Y	0.015	0.015	14	16
75	M5	Y	0.015	0.015	16	18
76	M5	Y	0.015	0.015	18	20
77	M5	Y	0.015	0.015	20	22
78	M5	Y	0.015	0.015	22	24
79	M5	Y	0.015	0.015	24	26
80	M5	Y	0.015	0.014	26	28
81	M5	Y	0.014	0.013	28	30
82	M27	Y	0.015	0.015	0	1.5
83	M30	Y	0.015	0.015	0	1.5
84	M31	Y	0.008	0.008	3.886e-16	1.5

Member Distributed Loads (BLC 25 : BLC 7 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.016	-0.016	6.188	8.25
2	M1	Y	-0.016	-0.016	8.25	10.312
3	M1	Y	-0.016	-0.016	10.312	12.375
4	M1	Y	-0.016	-0.016	12.375	14.438
5	M1	Y	-0.016	-0.016	14.438	16.5
6	M1	Y	-0.016	-0.016	16.5	18.562
7	M1	Y	-0.016	-0.016	18.562	20.625
8	M1	Y	-0.016	-0.016	20.625	22.688
9	M1	Y	-0.016	-0.016	22.688	24.75
10	M1	Y	-0.016	-0.016	24.75	26.812
11	M1	Y	-0.016	-0.016	26.812	28.875
12	M1	Y	-0.016	-0.017	28.875	30.938
13	M1	Y	-0.017	-0.021	30.938	33
14	M7	Y	-0.03	-0.032	0	2
15	M7	Y	-0.032	-0.033	2	4
16	M7	Y	-0.033	-0.034	4	6
17	M7	Y	-0.034	-0.034	6	8
18	M7	Y	-0.034	-0.033	8	10
19	M7	Y	-0.033	-0.033	10	12
20	M7	Y	-0.033	-0.033	12	14
21	M7	Y	-0.033	-0.033	14	16
22	M7	Y	-0.033	-0.033	16	18
23	M7	Y	-0.033	-0.033	18	20
24	M7	Y	-0.033	-0.034	20	22
25	M7	Y	-0.034	-0.034	22	24
26	M7	Y	-0.034	-0.033	24	26
27	M7	Y	-0.033	-0.032	26	28
28	M7	Y	-0.032	-0.03	28	30
29	M28	Y	-0.016	-0.016	0	1.5
30	M29	Y	-0.033	-0.033	0	1.5
31	M31	Y	-0.016	-0.016	0	1.5
32	M32	Y	-0.033	-0.033	0	1.5
33	M2	Y	-0.105	-0.087	0	2.062
34	M2	Y	-0.087	-0.079	2.062	4.125
35	M2	Y	-0.079	-0.081	4.125	6.188
36	M2	Y	-0.081	-0.081	6.188	8.25
37	M2	Y	-0.081	-0.081	8.25	10.312
38	M2	Y	-0.081	-0.08	10.312	12.375
39	M2	Y	-0.08	-0.08	12.375	14.438
40	M2	Y	-0.08	-0.08	14.438	16.5
41	M2	Y	-0.08	-0.08	16.5	18.562
42	M2	Y	-0.08	-0.08	18.562	20.625
43	M2	Y	-0.08	-0.081	20.625	22.688
44	M2	Y	-0.081	-0.081	22.688	24.75
45	M2	Y	-0.081	-0.081	24.75	26.812
46	M2	Y	-0.081	-0.079	26.812	28.875
47	M2	Y	-0.079	-0.087	28.875	30.938
48	M2	Y	-0.087	-0.105	30.938	33
49	M5	Y	-0.16	-0.171	0	2
50	M5	Y	-0.171	-0.178	2	4
51	M5	Y	-0.178	-0.18	4	6
52	M5	Y	-0.18	-0.18	6	8
53	M5	Y	-0.18	-0.179	8	10
54	M5	Y	-0.179	-0.177	10	12
55	M5	Y	-0.177	-0.177	12	14

Member Distributed Loads (BLC 25 : BLC 7 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
56	M5	Y	-0.177	-0.177	14	16
57	M5	Y	-0.177	-0.177	16	18
58	M5	Y	-0.177	-0.178	18	20
59	M5	Y	-0.178	-0.18	20	22
60	M5	Y	-0.18	-0.18	22	24
61	M5	Y	-0.18	-0.178	24	26
62	M5	Y	-0.178	-0.171	26	28
63	M5	Y	-0.171	-0.16	28	30
64	M6	Y	-0.1	-0.106	0	2
65	M6	Y	-0.106	-0.11	2	4
66	M6	Y	-0.11	-0.111	4	6
67	M6	Y	-0.111	-0.112	6	8
68	M6	Y	-0.112	-0.112	8	10
69	M6	Y	-0.112	-0.112	10	12
70	M6	Y	-0.112	-0.111	12	14
71	M6	Y	-0.111	-0.111	14	16
72	M6	Y	-0.111	-0.112	16	18
73	M6	Y	-0.112	-0.112	18	20
74	M6	Y	-0.112	-0.112	20	22
75	M6	Y	-0.112	-0.111	22	24
76	M6	Y	-0.111	-0.11	24	26
77	M6	Y	-0.11	-0.106	26	28
78	M6	Y	-0.106	-0.1	28	30
79	M27	Y	-0.176	-0.176	0	1.5
80	M28	Y	-0.093	-0.093	1.11e-16	1.5
81	M30	Y	-0.176	-0.176	0	1.5
82	M31	Y	-0.093	-0.093	3.886e-16	1.5
83	M1	Y	-0.021	-0.017	0	2.062
84	M1	Y	-0.017	-0.016	2.062	4.125
85	M1	Y	-0.016	-0.016	4.125	6.188

Member Distributed Loads (BLC 26 : BLC 8 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M2	Y	0.096	0.08	0	2.062
2	M2	Y	0.08	0.073	2.062	4.125
3	M2	Y	0.073	0.074	4.125	6.188
4	M2	Y	0.074	0.074	6.188	8.25
5	M2	Y	0.074	0.074	8.25	10.312
6	M2	Y	0.074	0.073	10.312	12.375
7	M2	Y	0.073	0.073	12.375	14.438
8	M2	Y	0.073	0.073	14.438	16.5
9	M2	Y	0.073	0.073	16.5	18.562
10	M2	Y	0.073	0.073	18.562	20.625
11	M2	Y	0.073	0.074	20.625	22.688
12	M2	Y	0.074	0.075	22.688	24.75
13	M2	Y	0.075	0.074	24.75	26.812
14	M2	Y	0.074	0.073	26.812	28.875
15	M2	Y	0.073	0.08	28.875	30.938
16	M2	Y	0.08	0.096	30.938	33
17	M5	Y	0.147	0.157	0	2
18	M5	Y	0.157	0.163	2	4
19	M5	Y	0.163	0.165	4	6
20	M5	Y	0.165	0.165	6	8
21	M5	Y	0.165	0.164	8	10
22	M5	Y	0.164	0.162	10	12

Member Distributed Loads (BLC 26 : BLC 8 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
23	M5	Y	0.162	0.162	12	14
24	M5	Y	0.162	0.162	14	16
25	M5	Y	0.162	0.162	16	18
26	M5	Y	0.162	0.164	18	20
27	M5	Y	0.164	0.165	20	22
28	M5	Y	0.165	0.165	22	24
29	M5	Y	0.165	0.163	24	26
30	M5	Y	0.163	0.157	26	28
31	M5	Y	0.157	0.147	28	30
32	M6	Y	0.083	0.088	0	2
33	M6	Y	0.088	0.091	2	4
34	M6	Y	0.091	0.092	4	6
35	M6	Y	0.092	0.093	6	8
36	M6	Y	0.093	0.093	8	10
37	M6	Y	0.093	0.093	10	12
38	M6	Y	0.093	0.092	12	14
39	M6	Y	0.092	0.092	14	16
40	M6	Y	0.092	0.093	16	18
41	M6	Y	0.093	0.093	18	20
42	M6	Y	0.093	0.093	20	22
43	M6	Y	0.093	0.092	22	24
44	M6	Y	0.092	0.091	24	26
45	M6	Y	0.091	0.088	26	28
46	M6	Y	0.088	0.083	28	30
47	M27	Y	0.161	0.161	0	1.5
48	M28	Y	0.086	0.086	1.11e-16	1.5
49	M30	Y	0.162	0.162	0	1.5
50	M31	Y	0.086	0.086	3.886e-16	1.5
51	M1	Y	0.007	0.006	0	2.062
52	M1	Y	0.006	0.005	2.062	4.125
53	M1	Y	0.005	0.005	4.125	6.188
54	M1	Y	0.005	0.005	6.188	8.25
55	M1	Y	0.005	0.005	8.25	10.312
56	M1	Y	0.005	0.005	10.312	12.375
57	M1	Y	0.005	0.005	12.375	14.438
58	M1	Y	0.005	0.005	14.438	16.5
59	M1	Y	0.005	0.005	16.5	18.562
60	M1	Y	0.005	0.005	18.562	20.625
61	M1	Y	0.005	0.005	20.625	22.688
62	M1	Y	0.005	0.005	22.688	24.75
63	M1	Y	0.005	0.005	24.75	26.812
64	M1	Y	0.005	0.005	26.812	28.875
65	M1	Y	0.005	0.006	28.875	30.938
66	M1	Y	0.006	0.007	30.938	33
67	M7	Y	0.01	0.011	0	2
68	M7	Y	0.011	0.011	2	4
69	M7	Y	0.011	0.011	4	6
70	M7	Y	0.011	0.011	6	8
71	M7	Y	0.011	0.011	8	10
72	M7	Y	0.011	0.011	10	12
73	M7	Y	0.011	0.011	12	14
74	M7	Y	0.011	0.011	14	16
75	M7	Y	0.011	0.011	16	18
76	M7	Y	0.011	0.011	18	20
77	M7	Y	0.011	0.011	20	22

Member Distributed Loads (BLC 26 : BLC 8 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
78	M7	Y	0.011	0.011	22	24
79	M7	Y	0.011	0.011	24	26
80	M7	Y	0.011	0.011	26	28
81	M7	Y	0.011	0.01	28	30
82	M28	Y	0.005	0.005	0	1.5
83	M29	Y	0.011	0.011	0	1.5
84	M31	Y	0.005	0.005	0	1.5
85	M32	Y	0.011	0.011	0	1.5

Member Distributed Loads (BLC 27 : BLC 9 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	0.008	0.024	16.5	18.562
2	M1	Y	0.024	0.032	18.562	20.625
3	M1	Y	0.032	0.033	20.625	22.688
4	M1	Y	0.033	0.033	22.688	24.75
5	M1	Y	0.033	0.033	24.75	26.812
6	M1	Y	0.033	0.032	26.812	28.875
7	M1	Y	0.032	0.035	28.875	30.938
8	M1	Y	0.035	0.042	30.938	33
9	M2	Y	0.01	0.03	16.5	18.562
10	M2	Y	0.03	0.041	18.562	20.625
11	M2	Y	0.041	0.041	20.625	22.688
12	M2	Y	0.041	0.041	22.688	24.75
13	M2	Y	0.041	0.041	24.75	26.812
14	M2	Y	0.041	0.04	26.812	28.875
15	M2	Y	0.04	0.044	28.875	30.938
16	M2	Y	0.044	0.053	30.938	33
17	M5	Y	0.019	0.066	15	17.143
18	M5	Y	0.066	0.087	17.143	19.286
19	M5	Y	0.087	0.086	19.286	21.429
20	M5	Y	0.086	0.106	21.429	23.571
21	M5	Y	0.106	0.106	23.571	25.714
22	M5	Y	0.106	0.081	25.714	27.857
23	M5	Y	0.081	0.076	27.857	30
24	M6	Y	0.036	0.056	15	17.143
25	M6	Y	0.056	0.07	17.143	19.286
26	M6	Y	0.07	0.075	19.286	21.429
27	M6	Y	0.075	0.095	21.429	23.571
28	M6	Y	0.095	0.094	23.571	25.714
29	M6	Y	0.094	0.073	25.714	27.857
30	M6	Y	0.073	0.068	27.857	30
31	M7	Y	0.017	0.047	15	17.143
32	M7	Y	0.047	0.063	17.143	19.286
33	M7	Y	0.063	0.063	19.286	21.429
34	M7	Y	0.063	0.079	21.429	23.571
35	M7	Y	0.079	0.079	23.571	25.714
36	M7	Y	0.079	0.06	25.714	27.857
37	M7	Y	0.06	0.056	27.857	30
38	M30	Y	0.088	0.088	0	1.5
39	M31	Y	0.079	0.079	3.886e-16	1.5
40	M32	Y	0.065	0.065	0	1.5
41	M1	Y	0.052	0.043	0	2.2
42	M1	Y	0.043	0.039	2.2	4.4
43	M1	Y	0.039	0.04	4.4	6.6
44	M1	Y	0.04	0.051	6.6	8.8

Member Distributed Loads (BLC 27 : BLC 9 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
45	M1	Y	0.051	0.05	8.8	11
46	M1	Y	0.05	0.04	11	13.2
47	M1	Y	0.04	0.04	13.2	15.4
48	M1	Y	0.04	0.02	15.4	17.6
49	M1	Y	0.02	-0.0002453	17.6	19.8
50	M2	Y	0.066	0.054	0	2.2
51	M2	Y	0.054	0.05	2.2	4.4
52	M2	Y	0.05	0.051	4.4	6.6
53	M2	Y	0.051	0.064	6.6	8.8
54	M2	Y	0.064	0.063	8.8	11
55	M2	Y	0.063	0.05	11	13.2
56	M2	Y	0.05	0.05	13.2	15.4
57	M2	Y	0.05	0.025	15.4	17.6
58	M2	Y	0.025	-0.0003098	17.6	19.8
59	M5	Y	0.107	0.114	0	2
60	M5	Y	0.114	0.119	2	4
61	M5	Y	0.119	0.12	4	6
62	M5	Y	0.12	0.12	6	8
63	M5	Y	0.12	0.119	8	10
64	M5	Y	0.119	0.119	10	12
65	M5	Y	0.119	0.121	12	14
66	M5	Y	0.121	0.061	14	16
67	M5	Y	0.061	0.0002066	16	18
68	M6	Y	0.096	0.103	0	2
69	M6	Y	0.103	0.107	2	4
70	M6	Y	0.107	0.108	4	6
71	M6	Y	0.108	0.108	6	8
72	M6	Y	0.108	0.107	8	10
73	M6	Y	0.107	0.104	10	12
74	M6	Y	0.104	0.105	12	14
75	M6	Y	0.105	0.055	14	16
76	M6	Y	0.055	0.0001822	16	18
77	M7	Y	0.078	0.085	0	2
78	M7	Y	0.085	0.089	2	4
79	M7	Y	0.089	0.089	4	6
80	M7	Y	0.089	0.089	6	8
81	M7	Y	0.089	0.089	8	10
82	M7	Y	0.089	0.088	10	12
83	M7	Y	0.088	0.088	12	14
84	M7	Y	0.088	0.044	14	16
85	M7	Y	0.044	0.0001765	16	18
86	M27	Y	0.118	0.118	1.11e-16	1.5
87	M28	Y	0.106	0.106	0	1.5
88	M29	Y	0.088	0.088	0	1.5

Member Distributed Loads (BLC 28 : BLC 10 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M6	Y	-0.047	-0.059	17.143	19.286
2	M6	Y	-0.059	-0.062	19.286	21.429
3	M6	Y	-0.062	-0.079	21.429	23.571
4	M6	Y	-0.079	-0.079	23.571	25.714
5	M6	Y	-0.079	-0.06	25.714	27.857
6	M6	Y	-0.06	-0.057	27.857	30
7	M7	Y	-0.014	-0.039	15	17.143
8	M7	Y	-0.039	-0.052	17.143	19.286

Member Distributed Loads (BLC 28 : BLC 10 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
9	M7	Y	-0.052	-0.053	19.286	21.429
10	M7	Y	-0.053	-0.066	21.429	23.571
11	M7	Y	-0.066	-0.066	23.571	25.714
12	M7	Y	-0.066	-0.05	25.714	27.857
13	M7	Y	-0.05	-0.047	27.857	30
14	M30	Y	-0.073	-0.073	0	1.5
15	M31	Y	-0.066	-0.066	3.886e-16	1.5
16	M32	Y	-0.055	-0.055	0	1.5
17	M1	Y	-0.052	-0.043	0	2.2
18	M1	Y	-0.043	-0.039	2.2	4.4
19	M1	Y	-0.039	-0.04	4.4	6.6
20	M1	Y	-0.04	-0.051	6.6	8.8
21	M1	Y	-0.051	-0.05	8.8	11
22	M1	Y	-0.05	-0.04	11	13.2
23	M1	Y	-0.04	-0.04	13.2	15.4
24	M1	Y	-0.04	-0.02	15.4	17.6
25	M1	Y	-0.02	0.0002453	17.6	19.8
26	M2	Y	-0.066	-0.054	0	2.2
27	M2	Y	-0.054	-0.05	2.2	4.4
28	M2	Y	-0.05	-0.051	4.4	6.6
29	M2	Y	-0.051	-0.064	6.6	8.8
30	M2	Y	-0.064	-0.063	8.8	11
31	M2	Y	-0.063	-0.05	11	13.2
32	M2	Y	-0.05	-0.05	13.2	15.4
33	M2	Y	-0.05	-0.025	15.4	17.6
34	M2	Y	-0.025	0.0003098	17.6	19.8
35	M5	Y	-0.107	-0.114	0	2
36	M5	Y	-0.114	-0.119	2	4
37	M5	Y	-0.119	-0.12	4	6
38	M5	Y	-0.12	-0.12	6	8
39	M5	Y	-0.12	-0.119	8	10
40	M5	Y	-0.119	-0.119	10	12
41	M5	Y	-0.119	-0.121	12	14
42	M5	Y	-0.121	-0.061	14	16
43	M5	Y	-0.061	-0.0002066	16	18
44	M6	Y	-0.096	-0.103	0	2
45	M6	Y	-0.103	-0.107	2	4
46	M6	Y	-0.107	-0.108	4	6
47	M6	Y	-0.108	-0.108	6	8
48	M6	Y	-0.108	-0.107	8	10
49	M6	Y	-0.107	-0.104	10	12
50	M6	Y	-0.104	-0.105	12	14
51	M6	Y	-0.105	-0.055	14	16
52	M6	Y	-0.055	-0.0001822	16	18
53	M7	Y	-0.078	-0.085	0	2
54	M7	Y	-0.085	-0.089	2	4
55	M7	Y	-0.089	-0.089	4	6
56	M7	Y	-0.089	-0.089	6	8
57	M7	Y	-0.089	-0.089	8	10
58	M7	Y	-0.089	-0.088	10	12
59	M7	Y	-0.088	-0.088	12	14
60	M7	Y	-0.088	-0.044	14	16
61	M7	Y	-0.044	-0.0001765	16	18
62	M27	Y	-0.118	-0.118	1.11e-16	1.5
63	M28	Y	-0.106	-0.106	0	1.5

Member Distributed Loads (BLC 28 : BLC 10 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
64	M29	Y	-0.088	-0.088	0	1.5
65	M1	Y	-0.007	-0.02	16.5	18.562
66	M1	Y	-0.02	-0.027	18.562	20.625
67	M1	Y	-0.027	-0.027	20.625	22.688
68	M1	Y	-0.027	-0.027	22.688	24.75
69	M1	Y	-0.027	-0.027	24.75	26.812
70	M1	Y	-0.027	-0.027	26.812	28.875
71	M1	Y	-0.027	-0.029	28.875	30.938
72	M1	Y	-0.029	-0.035	30.938	33
73	M2	Y	-0.009	-0.025	16.5	18.562
74	M2	Y	-0.025	-0.034	18.562	20.625
75	M2	Y	-0.034	-0.034	20.625	22.688
76	M2	Y	-0.034	-0.034	22.688	24.75
77	M2	Y	-0.034	-0.034	24.75	26.812
78	M2	Y	-0.034	-0.034	26.812	28.875
79	M2	Y	-0.034	-0.037	28.875	30.938
80	M2	Y	-0.037	-0.044	30.938	33
81	M5	Y	-0.016	-0.055	15	17.143
82	M5	Y	-0.055	-0.073	17.143	19.286
83	M5	Y	-0.073	-0.071	19.286	21.429
84	M5	Y	-0.071	-0.089	21.429	23.571
85	M5	Y	-0.089	-0.088	23.571	25.714
86	M5	Y	-0.088	-0.068	25.714	27.857
87	M5	Y	-0.068	-0.064	27.857	30
88	M6	Y	-0.03	-0.047	15	17.143

Member Distributed Loads (BLC 30 : BLC 20 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, psf, k-ft/ft]	End Magnitude [k/ft, F, psf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M38	X	0.18	0.18	3.83e-15	9.5
2	M42	X	0.18	0.18	5.274e-15	9.5
3	M37	X	0.267	0.273	0	1.925
4	M37	X	0.273	0.28	1.925	3.85
5	M37	X	0.28	0.287	3.85	5.775
6	M37	X	0.287	0.29	5.775	7.7
7	M37	X	0.29	0.291	7.7	9.625
8	M40	X	0.267	0.268	0	1.95
9	M40	X	0.268	0.27	1.95	3.9
10	M40	X	0.27	0.273	3.9	5.85
11	M40	X	0.273	0.275	5.85	7.8
12	M40	X	0.275	0.278	7.8	9.75
13	M41	X	0.121	0.12	0	1.95
14	M41	X	0.12	0.118	1.95	3.9
15	M41	X	0.118	0.115	3.9	5.85
16	M41	X	0.115	0.114	5.85	7.8
17	M41	X	0.114	0.116	7.8	9.75
18	M45	X	0.125	0.126	0	1.925
19	M45	X	0.126	0.128	1.925	3.85
20	M45	X	0.128	0.118	3.85	5.775
21	M45	X	0.118	0.118	5.775	7.7
22	M45	X	0.118	0.142	7.7	9.625

Member Area Loads (BLC 1 : Dead)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N44	N46	N50	N49	Y	A-B	-20	-20	-20	-20	Yes

Member Area Loads (BLC 2 : RLL)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N44	N46	N50	N49	Y	A-B	-20	-20	-20	-20	Yes

Member Area Loads (BLC 3 : Snow Flat)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N44	N46	N50	N49	Y	A-B	-41.2	-41.2	-41.2	-41.2	Yes

Member Area Loads (BLC 4 : Snow Drift)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N49	N50	N46	N44	Y	A-B	-110	0	0	-110	Yes

Member Area Loads (BLC 5 : Wind X A)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N56	N50	N46	N52	Y	A-B	-37.4	-37.4	-37.4	-37.4	Yes
2	N49	N56	N52	N44	Y	A-B	-9.4	-9.4	-9.4	-9.4	Yes

Member Area Loads (BLC 6 : Wind X B)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N50	N56	N52	N46	Y	A-B	34.3	34.3	34.3	34.3	Yes
2	N49	N56	N52	N44	Y	A-B	3.1	3.1	3.1	3.1	Yes

Member Area Loads (BLC 7 : Wind -X A)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N49	N56	N52	N44	Y	A-B	-37.4	-37.4	-37.4	-37.4	Yes
2	N56	N50	N46	N52	Y	A-B	-9.4	-9.4	-9.4	-9.4	Yes

Member Area Loads (BLC 8 : Wind -X B)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N49	N56	N52	N44	Y	A-B	34.3	34.3	34.3	34.3	Yes
2	N56	N50	N46	N52	Y	A-B	3.1	3.1	3.1	3.1	Yes

Member Area Loads (BLC 9 : Wind Z A)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N49	N50	N17	N16	Y	A-B	18.7	18.7	18.7	18.7	Yes
2	N16	N17	N46	N44	Y	A-B	25	25	25	25	Yes

Member Area Loads (BLC 10 : Wind Z B)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N16	N17	N46	N44	Y	A-B	-25	-25	-25	-25	Yes
2	N49	N50	N17	N16	Y	A-B	-15.6	-15.6	-15.6	-15.6	Yes

Member Area Loads (BLC 15 : SL Defl)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N7	N8	N6	N5	Y	A-B	-17.6	-17.6	-17.6	-17.6	Yes

Member Area Loads (BLC 20 : Wall Wind)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N70	N68	N69	N72	X	A-B	36	36	36	36	Yes
2	N63	N66	N73	N71	X	A-B	55	55	55	55	Yes
3	N65	N74	N67	N64	X	A-B	24	24	24	24	Yes

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

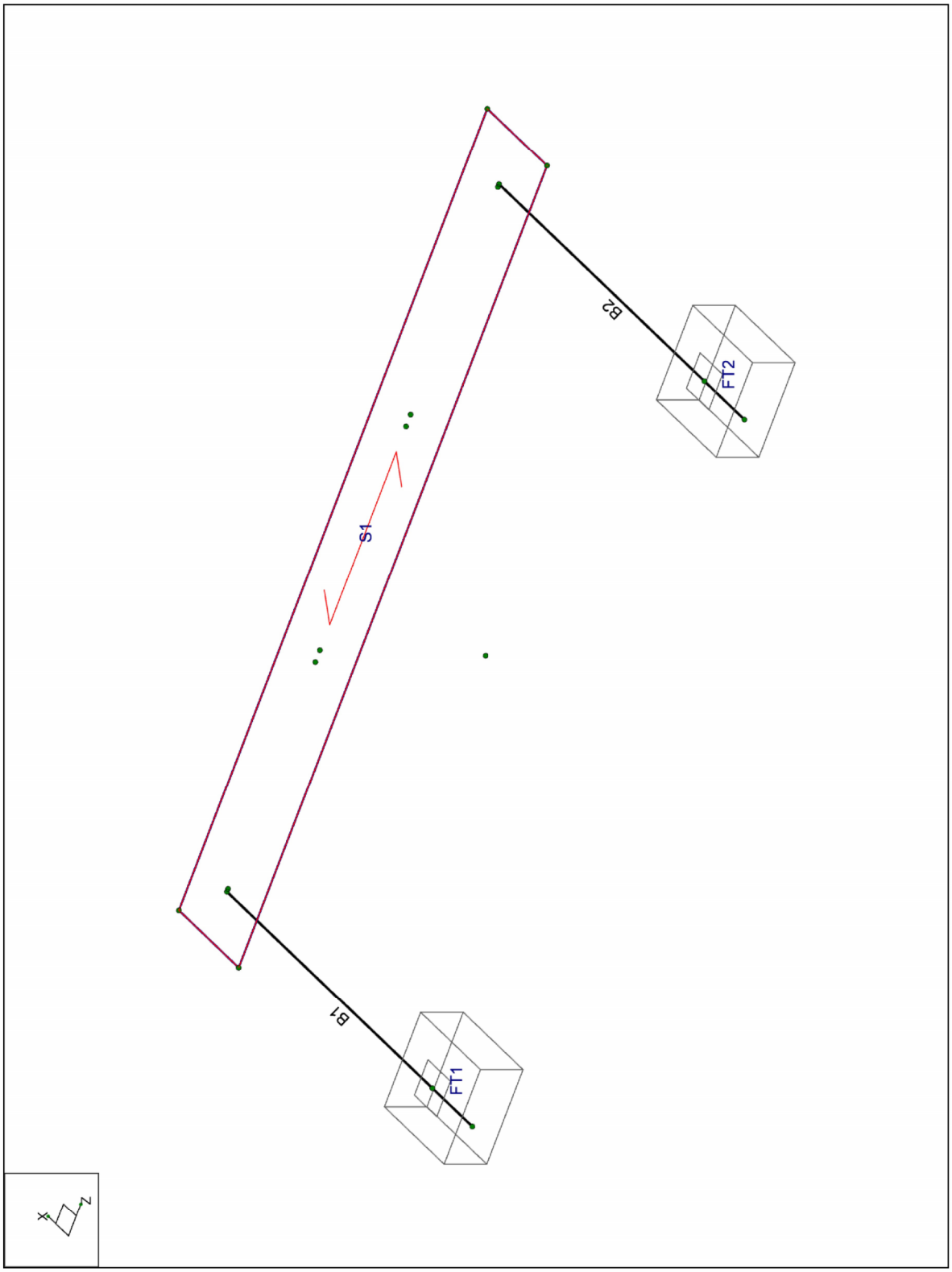
	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	M1	W18X35	0.164	0	44	0.047	1.375	z	44	119.55	463.5	30.225	249.375	1	H1-1b
2	M2	W18X35	0.202	16.5	26	0.059	1.719	y	26	119.55	463.5	30.225	249.375	1	H1-1b
3	M3	W18X35	0.408	7.011	26	0.133	16.417	y	26	89.06	463.5	30.225	249.375	1.044	H1-1b
4	M4	W18X35	0.408	7.011	26	0.133	16.417	y	26	89.06	463.5	30.225	249.375	1.044	H1-1b
5	M5	W16X26	0.783	15	26	0.162	0	y	26	81.389	345.6	20.55	165.75	1	H1-1b
6	M6	W16X26	0.552	15	26	0.114	0	y	26	81.389	345.6	20.55	165.75	1	H1-1b
7	M7	W16X26	0.373	15	23	0.077	30	y	23	81.389	345.6	20.55	165.75	1	H1-1b
8	M8	HSS8X8X6	0.294	0	44	0.02	11.849	y	44	334.663	468	110.25	110.25	1.976	H1-1b
9	M9	HSS8X8X6	0.296	0	44	0.015	17.5	y	44	334.663	468	110.25	110.25	1.691	H1-1b
10	M10	HSS8X8X6	0.257	0	41	0.016	11.849	y	44	334.663	468	110.25	110.25	1.815	H1-1b
11	M11	HSS8X8X6	0.265	0	41	0.015	17.5	z	64	334.663	468	110.25	110.25	1.693	H1-1b
12	M25	W14X22	0.133	9.406	26	0.015	4.275	y	23	40.746	292.05	16.462	41.485	1.13	H1-1b
13	M26	W14X22	0.133	9.406	26	0.015	4.275	y	23	40.746	292.05	16.462	41.506	1.13	H1-1b
14	M27	W10X12	0.007	0.75	26	0.029	1.5	y	26	141.439	159.3	6.458	46.904	1.136	H1-1b
15	M28	W10X12	0.005	0.75	26	0.018	1.5	y	26	141.439	159.3	6.458	46.904	1.136	H1-1b
16	M29	W10X12	0.003	0.75	23	0.028	1.5	y	23	141.439	159.3	6.458	46.904	1.136	H1-1b
17	M30	W10X12	0.007	0.75	26	0.029	1.5	y	26	141.439	159.3	6.458	46.904	1.136	H1-1b
18	M31	W10X12	0.005	0.75	26	0.018	1.5	y	26	141.439	159.3	6.458	46.904	1.136	H1-1b
19	M32	W10X12	0.003	0.75	23	0.028	1.5	y	23	141.439	159.3	6.458	46.904	1.136	H1-1b
20	M33	W10X12	0	4.417	82	0.016	4.417	z	26	110.618	159.3	6.458	46.904	1.136	H1-1b*
21	M34	W10X12	0	4.417	82	0.016	4.417	z	26	110.618	159.3	6.458	46.904	1.136	H1-1b*
22	M35	W10X12	0	3.5	82	0.013	3.5	z	23	122.66	159.3	6.458	46.904	1.136	H1-1b*
23	M36	W10X12	0	3.5	82	0.013	3.5	z	23	122.66	159.3	6.458	46.904	1.136	H1-1b*
24	M37	HSS8X4X4	0.074	4.813	48	0.015	9.625	y	57	165.347	235.8	28.331	49.875	1.138	H1-1b
25	M38	HSS8X4X4	0.047	4.849	41	0.011	0	y	44	166.868	235.8	28.331	49.875	1.14	H1-1b
26	M39	HSS8X2X4	0.096	9.849	41	0.01	15.5	y	41	46.124	193.5	11.677	36.3	1.408	H1-1b
27	M40	HSS8X4X4	0.074	4.875	44	0.044	9.75	y	44	163.82	235.8	28.331	49.875	1.136	H1-1b
28	M41	HSS8X4X4	0.037	4.875	41	0.024	0	y	44	163.82	235.8	28.331	49.875	1.136	H1-1b
29	M42	HSS8X4X4	0.05	4.75	48	0.012	9.5	y	41	166.868	235.8	28.331	49.875	1.136	H1-1b
30	M43	HSS8X2X4	0.147	10.01	44	0.014	15.5	y	45	121.443	193.5	11.677	36.3	1.647	H1-1b
31	M44	HSS8X2X4	0.071	10.01	41	0.008	15.5	y	41	121.443	193.5	11.677	36.3	1.592	H1-1b
32	M45	HSS8X4X4	0.037	4.813	51	0.007	0	y	44	165.347	235.8	28.331	49.875	1.138	H1-1b
33	M46	HSS8X2X4	0.097	9.849	41	0.008	15.5	y	51	46.124	193.5	11.677	36.3	1.415	H1-1b

Envelope X-Direction Story Drift - Strength

	Story (Elevation)		Story Drift[in]	Loc (Z,X)	LC	Drift Ratio (%)	Loc (Z,X)	LC	2nd/1st Ratio	Loc (Z,X)	LC
1	Diaph.: 1 (15.5 ft)	max	2.523	30, 16.417	50	1.357	30, 16.417	56	1.129	30, 16.417	60
2		min	-2.523	30, 16.417	56	0.003	0, 0	52	0.617	0, 0	58

Envelope Z-Direction Story Drift - Strength

	Story (Elevation)		Story Drift[in]	Loc (Z,X)	LC	Drift Ratio (%)	Loc (Z,X)	LC	2nd/1st Ratio	Loc (Z,X)	LC
1	Diaph.: 1 (15.5 ft)	max	2.424	30, 16.417	53	1.303	30, 16.417	59	1.088	30, 0	60
2		min	-2.424	30, 16.417	59	0	0, 0	61	1	0, 0	49


B1
B2
FT1
FT2
S1
Z
X

Concrete Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	f'c [ksi]	Lambda	Flex Steel [ksi]	Shear Steel [ksi]
1	Conc3000NW	3156	1372	0.15	0.6	0.145	3	1	60	60
2	Conc3500NW	3409	1482	0.15	0.6	0.145	3.5	1	60	60
3	Conc4000NW	3644	1584	0.15	0.6	0.145	4	1	60	60
4	Conc3000LW	2085	907	0.15	0.6	0.11	3	0.75	60	60
5	Conc3500LW	2252	979	0.15	0.6	0.11	3.5	0.75	60	60
6	Conc4000LW	2408	1047	0.15	0.6	0.11	4	0.75	60	60
7	Conc3000NW WWR	3156	1372	0.15	0.6	0.145	3	1	70	60
8	Conc3500NW WWR	3409	1482	0.15	0.6	0.145	3.5	1	70	60
9	Conc4000NW WWR	3644	1584	0.15	0.6	0.145	4	1	70	60

Design Rules - Mat Slab

	Label	Max Bending Chk	Max Shear Chk	Top Bar	Bottom Bar	Min Top Bar Spacing [in]	Max Top Bar Spacing [in]	Min Bot Bar Spacing [in]	Max Bot Bar Spacing [in]	Spacing Increment [in]	Top Cover [in]	Bottom Cover [in]	Side Cover [in]	Rebar Options
1	Typical	1	1	#6	#6	3	18	3	18	1	2	3	2	Optimize

Design Rules - Footing

	Label	Max Bending Chk	Max Shear Chk	Top Bar	Bottom Bar	Top Cover [in]	Bottom Cover [in]
1	Typical	1	1	#6	#6	3	3

Spread Footing Definitions - General

	Label	Min Steel Ratio	Max Steel Ratio	Material	Design Rules	Equal Bar Spacing	Group Design	Concrete Bearing	Force Top Bar
1	F4	0.002	0.007	Conc3000NW	Typical			Yes	

Spread Footing Definitions - Geometry

	Label	Max Length [ft]	Min Length [ft]	Max Width [ft]	Min Width [ft]	L/W Increment [ft]	Max Thickness [in]	Min Thickness [in]	Thick Increment [in]	Force Square
1	F4	4	4	4	4	0.5	24	24	1	Yes

Spread Footing Definitions - Pedestal

	Label	Type	Shape	Height [in]	E/BL	ex [in]	ez [in]	BLx [ft]	BLz [ft]
1	F4	Pedestal	CRECT18X18	0	Use ex,ez	0	0	0	0

Spread Footing Definitions - Soil

	Label	Overburden [psf]	Passive [k]	Friction Coefficient	Gross/Net
1	F4	200	0	0.4	Net

Soil Definitions

	Label	Layers	Subgrade Modulus [k/ft³]	Allowable Bearing [psf]	Default
1	Default	Single	100	3000	Yes

Spread Footings

	Label	Node Label	Definition	Support Angle [deg]
1	FT1	N5	F4	0
2	FT2	N6	F4	0

Slab

	Label	Thickness [in]	Material	Local Axis Angle [deg]	Analysis Offset [in]	Passive Pressure [psf]	Soil Overburden [psf]	Icr Factor
1	S1	24	Conc4000NW	0	0	0	0	0.25

Design Strips

	Label	Rebar Angle from Plan Horizontal (deg)	No. of Design Cuts	Design Rule
1	DS1	0	50	Typical

Load Category

	Category	Node Loads	Distributed Loads
1	DL	26	1
2	WL	40	
3	SL	20	
4	RLL	20	
5	SLN	20	
6	ELX	29	
7	ELZ	38	
8	WL+X	30	
9	WL+Y	30	
10	WL+Z	34	
11	WL-X	30	
12	WL-Y	30	
13	WL-Z	34	
14	ELZ+X	38	
15	ELZ-X	40	
16	ELX+Z	40	
17	ELX-Z	40	
18	OL1	18	

Nodal Loads (Cat 1: DL)

	Node Label	Direction	Magnitude [k, k-ft]
1	R3D_D.1-18	Y	5.035
2	R3D_D.1-18	Z	-0.188
3	R3D_D.1-18	MX	-1.09
4	R3D_D.1-18	MZ	0.002
5	R3D_D.1-19	Y	4.477
6	R3D_D.1-19	Z	0.004
7	R3D_D.1-19	MX	0.025
8	R3D_D.1-19	MZ	-0.007
9	R3D_B.1-18	Y	5.035
10	R3D_B.1-18	Z	0.188
11	R3D_B.1-18	MX	1.09
12	R3D_B.1-18	MZ	0.002
13	R3D_B.1-19	Y	4.477
14	R3D_B.1-19	Z	-0.004
15	R3D_B.1-19	MX	-0.025
16	R3D_B.1-19	MZ	-0.007
17	R3D_N65	Y	0.832
18	R3D_N65	Z	-0.006
19	R3D_N70	Y	0.78
20	R3D_N70	Z	-0.005
21	R3D_N71	Y	0.832
22	R3D_N71	Z	0.006

Nodal Loads (Cat 1: DL) (Continued)

	Node Label	Direction	Magnitude [k, k-ft]
23	R3D_N72	Y	0.78
24	R3D_N72	Z	0.005
25	R3D_N75	Y	0.088
26	R3D_N76	Y	0.088

Nodal Loads (Cat 4: WL)

	Node Label	Direction	Magnitude [k, k-ft]
1	R3D_D.1-18	X	0.896
2	R3D_D.1-18	Y	0.021
3	R3D_D.1-18	Z	-0.112
4	R3D_D.1-18	MX	-1.024
5	R3D_D.1-18	MY	-0.295
6	R3D_D.1-18	MZ	-15.34
7	R3D_D.1-19	X	1.545
8	R3D_D.1-19	Y	-0.065
9	R3D_D.1-19	Z	0.104
10	R3D_D.1-19	MX	0.949
11	R3D_D.1-19	MY	-0.295
12	R3D_D.1-19	MZ	-18.809
13	R3D_B.1-18	X	0.78
14	R3D_B.1-18	Y	-0.096
15	R3D_B.1-18	Z	-0.108
16	R3D_B.1-18	MX	-1.001
17	R3D_B.1-18	MY	-0.295
18	R3D_B.1-18	MZ	-13.346
19	R3D_B.1-19	X	1.061
20	R3D_B.1-19	Y	0.151
21	R3D_B.1-19	Z	0.103
22	R3D_B.1-19	MX	0.941
23	R3D_B.1-19	MY	-0.295
24	R3D_B.1-19	MZ	-14.848
25	R3D_N65	X	0.787
26	R3D_N65	Y	-0.092
27	R3D_N65	Z	0.005
28	R3D_N70	X	1.17
29	R3D_N70	Y	0.057
30	R3D_N70	Z	0.001
31	R3D_N71	X	1.812
32	R3D_N71	Y	0.086
33	R3D_N71	Z	0.006
34	R3D_N72	X	1.146
35	R3D_N72	Y	-0.061
36	R3D_N72	Z	0.001
37	R3D_N75	X	1.331
38	R3D_N75	Y	-0.004
39	R3D_N76	X	0.595
40	R3D_N76	Y	0.004

Nodal Loads (Cat 5: SL)

	Node Label	Direction	Magnitude [k, k-ft]
1	R3D_D.1-18	Y	5.58
2	R3D_D.1-18	Z	-0.213
3	R3D_D.1-18	MX	-1.236

Nodal Loads (Cat 5: SL) (Continued)

	Node Label	Direction	Magnitude [k, k-ft]
4	R3D_D.1-18	MZ	0.001
5	R3D_D.1-19	Y	4.816
6	R3D_D.1-19	Z	0.007
7	R3D_D.1-19	MX	0.042
8	R3D_D.1-19	MZ	-0.006
9	R3D_B.1-18	Y	5.58
10	R3D_B.1-18	Z	0.213
11	R3D_B.1-18	MX	1.236
12	R3D_B.1-18	MZ	0.001
13	R3D_B.1-19	Y	4.816
14	R3D_B.1-19	Z	-0.007
15	R3D_B.1-19	MX	-0.042
16	R3D_B.1-19	MZ	-0.006
17	R3D_N65	Y	0.415
18	R3D_N70	Y	0.349
19	R3D_N71	Y	0.415
20	R3D_N72	Y	0.349

Nodal Loads (Cat 6: RLL)

	Node Label	Direction	Magnitude [k, k-ft]
1	R3D_D.1-18	Y	2.709
2	R3D_D.1-18	Z	-0.103
3	R3D_D.1-18	MX	-0.6
4	R3D_D.1-18	MZ	0.000486
5	R3D_D.1-19	Y	2.338
6	R3D_D.1-19	Z	0.003
7	R3D_D.1-19	MX	0.02
8	R3D_D.1-19	MZ	-0.003
9	R3D_B.1-18	Y	2.709
10	R3D_B.1-18	Z	0.103
11	R3D_B.1-18	MX	0.6
12	R3D_B.1-18	MZ	0.000485
13	R3D_B.1-19	Y	2.338
14	R3D_B.1-19	Z	-0.003
15	R3D_B.1-19	MX	-0.02
16	R3D_B.1-19	MZ	-0.003
17	R3D_N65	Y	0.201
18	R3D_N70	Y	0.17
19	R3D_N71	Y	0.201
20	R3D_N72	Y	0.17

Nodal Loads (Cat 9: SLN)

	Node Label	Direction	Magnitude [k, k-ft]
1	R3D_D.1-18	Y	10.016
2	R3D_D.1-18	Z	-0.54
3	R3D_D.1-18	MX	-3.13
4	R3D_D.1-18	MZ	-0.001
5	R3D_D.1-19	Y	4.758
6	R3D_D.1-19	Z	0.013
7	R3D_D.1-19	MX	0.076
8	R3D_D.1-19	MZ	-0.01
9	R3D_B.1-18	Y	10.016
10	R3D_B.1-18	Z	0.54

Nodal Loads (Cat 9: SLN) (Continued)

	Node Label	Direction	Magnitude [k, k-ft]
11	R3D_B.1-18	MX	3.13
12	R3D_B.1-18	MZ	-0.001
13	R3D_B.1-19	Y	4.758
14	R3D_B.1-19	Z	-0.013
15	R3D_B.1-19	MX	-0.076
16	R3D_B.1-19	MZ	-0.01
17	R3D_N65	Y	0.092
18	R3D_N70	Y	0.032
19	R3D_N71	Y	0.092
20	R3D_N72	Y	0.032

Nodal Loads (Cat 72: OL1)

	Node Label	Direction	Magnitude [k, k-ft]
1	R3D_D.1-18	Y	2.167
2	R3D_D.1-18	Z	-0.1
3	R3D_D.1-18	MX	-0.577
4	R3D_D.1-18	MZ	-0.001
5	R3D_D.1-19	Y	1.817
6	R3D_D.1-19	MX	0.004
7	R3D_D.1-19	MZ	-0.001
8	R3D_B.1-18	Y	2.167
9	R3D_B.1-18	Z	0.1
10	R3D_B.1-18	MX	0.577
11	R3D_B.1-18	MZ	-0.001
12	R3D_B.1-19	Y	1.817
13	R3D_B.1-19	MX	-0.004
14	R3D_B.1-19	MZ	-0.001
15	R3D_N65	Y	0.19
16	R3D_N70	Y	0.161
17	R3D_N71	Y	0.19
18	R3D_N72	Y	0.161

Nodal Loads (Cat 16: ELX)

	Node Label	Direction	Magnitude [k, k-ft]
1	R3D_D.1-18	X	1.229
2	R3D_D.1-18	Y	-0.058
3	R3D_D.1-18	Z	-0.002
4	R3D_D.1-18	MX	-0.01
5	R3D_D.1-18	MY	0.002
6	R3D_D.1-18	MZ	-21.044
7	R3D_D.1-19	X	1.261
8	R3D_D.1-19	Y	0.066
9	R3D_D.1-19	MX	0.000731
10	R3D_D.1-19	MY	0.002
11	R3D_D.1-19	MZ	-21.187
12	R3D_B.1-18	X	1.23
13	R3D_B.1-18	Y	-0.057
14	R3D_B.1-18	Z	0.004
15	R3D_B.1-18	MX	0.024
16	R3D_B.1-18	MY	0.002
17	R3D_B.1-18	MZ	-21.057
18	R3D_B.1-19	X	1.262
19	R3D_B.1-19	Y	0.065

Nodal Loads (Cat 16: ELX) (Continued)

	Node Label	Direction	Magnitude [k, k-ft]
20	R3D_B.1-19	Z	-0.002
21	R3D_B.1-19	MX	-0.012
22	R3D_B.1-19	MY	0.002
23	R3D_B.1-19	MZ	-21.2
24	R3D_N65	X	-0.027
25	R3D_N65	Y	-0.004
26	R3D_N70	Y	-0.004
27	R3D_N71	X	-0.027
28	R3D_N71	Y	-0.005
29	R3D_N72	Y	-0.003

Nodal Loads (Cat 18: ELZ)

	Node Label	Direction	Magnitude [k, k-ft]
1	R3D_D.1-18	X	-0.009
2	R3D_D.1-18	Y	-0.658
3	R3D_D.1-18	Z	1.194
4	R3D_D.1-18	MX	11.015
5	R3D_D.1-18	MY	0.045
6	R3D_D.1-18	MZ	0.152
7	R3D_D.1-19	X	-0.01
8	R3D_D.1-19	Y	-1.278
9	R3D_D.1-19	Z	1.192
10	R3D_D.1-19	MX	10.911
11	R3D_D.1-19	MY	0.045
12	R3D_D.1-19	MZ	0.156
13	R3D_B.1-18	X	0.009
14	R3D_B.1-18	Y	0.658
15	R3D_B.1-18	Z	1.194
16	R3D_B.1-18	MX	11.015
17	R3D_B.1-18	MY	0.045
18	R3D_B.1-18	MZ	-0.153
19	R3D_B.1-19	X	0.01
20	R3D_B.1-19	Y	1.278
21	R3D_B.1-19	Z	1.192
22	R3D_B.1-19	MX	10.911
23	R3D_B.1-19	MY	0.045
24	R3D_B.1-19	MZ	-0.157
25	R3D_N65	X	-0.001
26	R3D_N65	Y	-1.034
27	R3D_N65	Z	0.064
28	R3D_N70	X	-0.002
29	R3D_N70	Y	0.68
30	R3D_N70	Z	0.014
31	R3D_N71	X	0.001
32	R3D_N71	Y	1.034
33	R3D_N71	Z	0.064
34	R3D_N72	X	0.002
35	R3D_N72	Y	-0.68
36	R3D_N72	Z	0.014
37	R3D_N75	Y	-0.044
38	R3D_N76	Y	0.044

Nodal Loads (Cat 22: WLPX)

	Node Label	Direction	Magnitude [k, k-ft]
1	R3D_D.1-18	X	-0.524
2	R3D_D.1-18	Y	1.987
3	R3D_D.1-18	Z	-0.046
4	R3D_D.1-18	MX	-0.268
5	R3D_D.1-18	MY	-0.000816
6	R3D_D.1-18	MZ	8.968
7	R3D_D.1-19	X	-0.537
8	R3D_D.1-19	Y	3.101
9	R3D_D.1-19	Z	0.003
10	R3D_D.1-19	MX	0.016
11	R3D_D.1-19	MY	-0.000816
12	R3D_D.1-19	MZ	9.026
13	R3D_B.1-18	X	-0.524
14	R3D_B.1-18	Y	1.987
15	R3D_B.1-18	Z	0.045
16	R3D_B.1-18	MX	0.262
17	R3D_B.1-18	MY	-0.000816
18	R3D_B.1-18	MZ	8.974
19	R3D_B.1-19	X	-0.537
20	R3D_B.1-19	Y	3.101
21	R3D_B.1-19	Z	-0.002
22	R3D_B.1-19	MX	-0.011
23	R3D_B.1-19	MY	-0.000816
24	R3D_B.1-19	MZ	9.031
25	R3D_N65	X	0.011
26	R3D_N65	Y	0.368
27	R3D_N70	Y	0.324
28	R3D_N71	X	0.011
29	R3D_N71	Y	0.369
30	R3D_N72	Y	0.324

Nodal Loads (Cat 23: WLPY)

	Node Label	Direction	Magnitude [k, k-ft]
1	R3D_D.1-18	X	-0.524
2	R3D_D.1-18	Y	-1.164
3	R3D_D.1-18	Z	0.015
4	R3D_D.1-18	MX	0.087
5	R3D_D.1-18	MY	-0.000816
6	R3D_D.1-18	MZ	8.966
7	R3D_D.1-19	X	-0.538
8	R3D_D.1-19	Y	-2.653
9	R3D_D.1-19	Z	-0.002
10	R3D_D.1-19	MX	-0.011
11	R3D_D.1-19	MY	-0.000816
12	R3D_D.1-19	MZ	9.03
13	R3D_B.1-18	X	-0.524
14	R3D_B.1-18	Y	-1.164
15	R3D_B.1-18	Z	-0.016
16	R3D_B.1-18	MX	-0.093
17	R3D_B.1-18	MY	-0.000816
18	R3D_B.1-18	MZ	8.972
19	R3D_B.1-19	X	-0.538
20	R3D_B.1-19	Y	-2.652
21	R3D_B.1-19	Z	0.003

Nodal Loads (Cat 23: WLPY) (Continued)

	Node Label	Direction	Magnitude [k, k-ft]
22	R3D_B.1-19	MX	0.016
23	R3D_B.1-19	MY	-0.000816
24	R3D_B.1-19	MZ	9.035
25	R3D_N65	X	0.011
26	R3D_N65	Y	-0.332
27	R3D_N70	Y	-0.295
28	R3D_N71	X	0.011
29	R3D_N71	Y	-0.332
30	R3D_N72	Y	-0.296

Nodal Loads (Cat 24: WLPZ)

	Node Label	Direction	Magnitude [k, k-ft]
1	R3D_D.1-18	X	-0.003
2	R3D_D.1-18	Y	-3.431
3	R3D_D.1-18	Z	0.53
4	R3D_D.1-18	MX	4.488
5	R3D_D.1-18	MY	0.019
6	R3D_D.1-18	MZ	0.065
7	R3D_D.1-19	X	-0.005
8	R3D_D.1-19	Y	-3.201
9	R3D_D.1-19	Z	0.405
10	R3D_D.1-19	MX	3.718
11	R3D_D.1-19	MY	0.019
12	R3D_D.1-19	MZ	0.071
13	R3D_B.1-18	X	0.004
14	R3D_B.1-18	Y	-2.546
15	R3D_B.1-18	Z	0.299
16	R3D_B.1-18	MX	3.147
17	R3D_B.1-18	MY	0.019
18	R3D_B.1-18	MZ	-0.066
19	R3D_B.1-19	X	0.004
20	R3D_B.1-19	Y	-1.934
21	R3D_B.1-19	Z	0.412
22	R3D_B.1-19	MX	3.762
23	R3D_B.1-19	MY	0.019
24	R3D_B.1-19	MZ	-0.065
25	R3D_N65	Y	-0.549
26	R3D_N65	Z	0.022
27	R3D_N70	Y	0.019
28	R3D_N70	Z	0.005
29	R3D_N71	Y	0.098
30	R3D_N71	Z	0.022
31	R3D_N72	Y	-0.397
32	R3D_N72	Z	0.005
33	R3D_N75	Y	-0.015
34	R3D_N76	Y	0.015

Nodal Loads (Cat 25: WL_X)

	Node Label	Direction	Magnitude [k, k-ft]
1	R3D_D.1-18	X	0.523
2	R3D_D.1-18	Y	4.352
3	R3D_D.1-18	Z	-0.196
4	R3D_D.1-18	MX	-1.135

Nodal Loads (Cat 25: WL_X) (Continued)

	Node Label	Direction	Magnitude [k, k-ft]
5	R3D_D.1-18	MY	0.000817
6	R3D_D.1-18	MZ	-8.967
7	R3D_D.1-19	X	0.538
8	R3D_D.1-19	Y	2.37
9	R3D_D.1-19	Z	0.006
10	R3D_D.1-19	MX	0.031
11	R3D_D.1-19	MY	0.000817
12	R3D_D.1-19	MZ	-9.032
13	R3D_B.1-18	X	0.524
14	R3D_B.1-18	Y	4.352
15	R3D_B.1-18	Z	0.197
16	R3D_B.1-18	MX	1.141
17	R3D_B.1-18	MY	0.000816
18	R3D_B.1-18	MZ	-8.973
19	R3D_B.1-19	X	0.538
20	R3D_B.1-19	Y	2.369
21	R3D_B.1-19	Z	-0.006
22	R3D_B.1-19	MX	-0.036
23	R3D_B.1-19	MY	0.000816
24	R3D_B.1-19	MZ	-9.038
25	R3D_N65	X	-0.011
26	R3D_N65	Y	0.103
27	R3D_N70	Y	0.073
28	R3D_N71	X	-0.011
29	R3D_N71	Y	0.102
30	R3D_N72	Y	0.073

Nodal Loads (Cat 26: WL_Y)

	Node Label	Direction	Magnitude [k, k-ft]
1	R3D_D.1-18	X	0.524
2	R3D_D.1-18	Y	-3.902
3	R3D_D.1-18	Z	0.178
4	R3D_D.1-18	MX	1.035
5	R3D_D.1-18	MY	0.000816
6	R3D_D.1-18	MZ	-8.967
7	R3D_D.1-19	X	0.537
8	R3D_D.1-19	Y	-1.719
9	R3D_D.1-19	Z	-0.004
10	R3D_D.1-19	MX	-0.027
11	R3D_D.1-19	MY	0.000816
12	R3D_D.1-19	MZ	-9.024
13	R3D_B.1-18	X	0.525
14	R3D_B.1-18	Y	-3.902
15	R3D_B.1-18	Z	-0.178
16	R3D_B.1-18	MX	-1.029
17	R3D_B.1-18	MY	0.000816
18	R3D_B.1-18	MZ	-8.973
19	R3D_B.1-19	X	0.537
20	R3D_B.1-19	Y	-1.72
21	R3D_B.1-19	Z	0.004
22	R3D_B.1-19	MX	0.022
23	R3D_B.1-19	MY	0.000816
24	R3D_B.1-19	MZ	-9.03
25	R3D_N65	X	-0.011
26	R3D_N65	Y	-0.044

Nodal Loads (Cat 26: WL_Y) (Continued)

	Node Label	Direction	Magnitude [k, k-ft]
27	R3D_N70	Y	-0.022
28	R3D_N71	X	-0.011
29	R3D_N71	Y	-0.045
30	R3D_N72	Y	-0.022

Nodal Loads (Cat 27: WL_Z)

	Node Label	Direction	Magnitude [k, k-ft]
1	R3D_D.1-18	X	-0.005
2	R3D_D.1-18	Y	2.895
3	R3D_D.1-18	Z	0.304
4	R3D_D.1-18	MX	3.191
5	R3D_D.1-18	MY	0.023
6	R3D_D.1-18	MZ	0.079
7	R3D_D.1-19	X	-0.005
8	R3D_D.1-19	Y	2.26
9	R3D_D.1-19	Z	0.414
10	R3D_D.1-19	MX	3.776
11	R3D_D.1-19	MY	0.023
12	R3D_D.1-19	MZ	0.077
13	R3D_B.1-18	X	0.004
14	R3D_B.1-18	Y	2.687
15	R3D_B.1-18	Z	0.521
16	R3D_B.1-18	MX	4.45
17	R3D_B.1-18	MY	0.023
18	R3D_B.1-18	MZ	-0.078
19	R3D_B.1-19	X	0.005
20	R3D_B.1-19	Y	2.532
21	R3D_B.1-19	Z	0.407
22	R3D_B.1-19	MX	3.735
23	R3D_B.1-19	MY	0.023
24	R3D_B.1-19	MZ	-0.083
25	R3D_N65	Y	-0.189
26	R3D_N65	Z	0.022
27	R3D_N70	Y	0.449
28	R3D_N70	Z	0.005
29	R3D_N71	Y	0.611
30	R3D_N71	Z	0.022
31	R3D_N72	Y	-0.092
32	R3D_N72	Z	0.005
33	R3D_N75	Y	-0.015
34	R3D_N76	Y	0.015

Nodal Loads (Cat 44: ELXPZ)

	Node Label	Direction	Magnitude [k, k-ft]
1	R3D_D.1-18	X	1.179
2	R3D_D.1-18	Y	-0.107
3	R3D_D.1-18	Z	0.092
4	R3D_D.1-18	MX	0.863
5	R3D_D.1-18	MY	0.256
6	R3D_D.1-18	MZ	-20.186
7	R3D_D.1-19	X	1.205
8	R3D_D.1-19	Y	0.159
9	R3D_D.1-19	Z	-0.088

Nodal Loads (Cat 44: ELXPZ) (Continued)

	Node Label	Direction	Magnitude [k, k-ft]
10	R3D_D.1-19	MX	-0.813
11	R3D_D.1-19	MY	0.256
12	R3D_D.1-19	MZ	-20.304
13	R3D_B.1-18	X	1.28
14	R3D_B.1-18	Y	-0.007
15	R3D_B.1-18	Z	0.098
16	R3D_B.1-18	MX	0.897
17	R3D_B.1-18	MY	0.256
18	R3D_B.1-18	MZ	-21.916
19	R3D_B.1-19	X	1.318
20	R3D_B.1-19	Y	-0.028
21	R3D_B.1-19	Z	-0.091
22	R3D_B.1-19	MX	-0.825
23	R3D_B.1-19	MY	0.256
24	R3D_B.1-19	MZ	-22.085
25	R3D_N65	X	-0.033
26	R3D_N65	Y	0.072
27	R3D_N65	Z	-0.005
28	R3D_N70	X	-0.01
29	R3D_N70	Y	-0.054
30	R3D_N70	Z	-0.001
31	R3D_N71	X	-0.02
32	R3D_N71	Y	-0.082
33	R3D_N71	Z	-0.005
34	R3D_N72	X	0.01
35	R3D_N72	Y	0.048
36	R3D_N72	Z	-0.001
37	R3D_N75	X	-0.002
38	R3D_N75	Y	0.003
39	R3D_N76	X	0.002
40	R3D_N76	Y	-0.003

Nodal Loads (Cat 45: ELX_Z)

	Node Label	Direction	Magnitude [k, k-ft]
1	R3D_D.1-18	X	1.28
2	R3D_D.1-18	Y	-0.008
3	R3D_D.1-18	Z	-0.097
4	R3D_D.1-18	MX	-0.882
5	R3D_D.1-18	MY	-0.253
6	R3D_D.1-18	MZ	-21.902
7	R3D_D.1-19	X	1.317
8	R3D_D.1-19	Y	-0.026
9	R3D_D.1-19	Z	0.089
10	R3D_D.1-19	MX	0.814
11	R3D_D.1-19	MY	-0.253
12	R3D_D.1-19	MZ	-22.07
13	R3D_B.1-18	X	1.18
14	R3D_B.1-18	Y	-0.106
15	R3D_B.1-18	Z	-0.091
16	R3D_B.1-18	MX	-0.848
17	R3D_B.1-18	MY	-0.253
18	R3D_B.1-18	MZ	-20.198
19	R3D_B.1-19	X	1.206
20	R3D_B.1-19	Y	0.157
21	R3D_B.1-19	Z	0.087

Nodal Loads (Cat 45: ELX_Z) (Continued)

	Node Label	Direction	Magnitude [k, k-ft]
22	R3D_B.1-19	MX	0.802
23	R3D_B.1-19	MY	-0.253
24	R3D_B.1-19	MZ	-20.316
25	R3D_N65	X	-0.02
26	R3D_N65	Y	-0.081
27	R3D_N65	Z	0.005
28	R3D_N70	X	0.01
29	R3D_N70	Y	0.047
30	R3D_N70	Z	0.001
31	R3D_N71	X	-0.033
32	R3D_N71	Y	0.071
33	R3D_N71	Z	0.005
34	R3D_N72	X	-0.01
35	R3D_N72	Y	-0.053
36	R3D_N72	Z	0.001
37	R3D_N75	X	0.002
38	R3D_N75	Y	-0.003
39	R3D_N76	X	-0.002
40	R3D_N76	Y	0.003

Nodal Loads (Cat 42: ELZPX)

	Node Label	Direction	Magnitude [k, k-ft]
1	R3D_D.1-18	X	0.019
2	R3D_D.1-18	Y	-0.631
3	R3D_D.1-18	Z	1.142
4	R3D_D.1-18	MX	10.538
5	R3D_D.1-18	MY	-0.094
6	R3D_D.1-18	MZ	-0.318
7	R3D_D.1-19	X	0.021
8	R3D_D.1-19	Y	-1.328
9	R3D_D.1-19	Z	1.241
10	R3D_D.1-19	MX	11.356
11	R3D_D.1-19	MY	-0.094
12	R3D_D.1-19	MZ	-0.327
13	R3D_B.1-18	X	-0.019
14	R3D_B.1-18	Y	0.631
15	R3D_B.1-18	Z	1.142
16	R3D_B.1-18	MX	10.538
17	R3D_B.1-18	MY	-0.094
18	R3D_B.1-18	MZ	0.318
19	R3D_B.1-19	X	-0.021
20	R3D_B.1-19	Y	1.328
21	R3D_B.1-19	Z	1.241
22	R3D_B.1-19	MX	11.356
23	R3D_B.1-19	MY	-0.094
24	R3D_B.1-19	MZ	0.327
25	R3D_N65	X	0.002
26	R3D_N65	Y	-1.076
27	R3D_N65	Z	0.066
28	R3D_N70	X	0.004
29	R3D_N70	Y	0.708
30	R3D_N70	Z	0.014
31	R3D_N71	X	-0.002
32	R3D_N71	Y	1.076
33	R3D_N71	Z	0.066

Nodal Loads (Cat 42: ELZPX) (Continued)

	Node Label	Direction	Magnitude [k, k-ft]
34	R3D_N72	X	-0.004
35	R3D_N72	Y	-0.708
36	R3D_N72	Z	0.014
37	R3D_N75	Y	-0.045
38	R3D_N76	Y	0.045

Nodal Loads (Cat 43: ELZ_X)

	Node Label	Direction	Magnitude [k, k-ft]
1	R3D_D.1-18	X	-0.036
2	R3D_D.1-18	Y	-0.685
3	R3D_D.1-18	Z	1.246
4	R3D_D.1-18	MX	11.493
5	R3D_D.1-18	MY	0.184
6	R3D_D.1-18	MZ	0.621
7	R3D_D.1-19	X	-0.04
8	R3D_D.1-19	Y	-1.227
9	R3D_D.1-19	Z	1.143
10	R3D_D.1-19	MX	10.466
11	R3D_D.1-19	MY	0.184
12	R3D_D.1-19	MZ	0.639
13	R3D_B.1-18	X	0.037
14	R3D_B.1-18	Y	0.685
15	R3D_B.1-18	Z	1.246
16	R3D_B.1-18	MX	11.493
17	R3D_B.1-18	MY	0.184
18	R3D_B.1-18	MZ	-0.623
19	R3D_B.1-19	X	0.041
20	R3D_B.1-19	Y	1.227
21	R3D_B.1-19	Z	1.143
22	R3D_B.1-19	MX	10.466
23	R3D_B.1-19	MY	0.184
24	R3D_B.1-19	MZ	-0.641
25	R3D_N65	X	-0.005
26	R3D_N65	Y	-0.992
27	R3D_N65	Z	0.061
28	R3D_N70	X	-0.007
29	R3D_N70	Y	0.653
30	R3D_N70	Z	0.013
31	R3D_N71	X	0.005
32	R3D_N71	Y	0.992
33	R3D_N71	Z	0.061
34	R3D_N72	X	0.007
35	R3D_N72	Y	-0.653
36	R3D_N72	Z	0.013
37	R3D_N75	X	-0.001
38	R3D_N75	Y	-0.042
39	R3D_N76	X	0.001
40	R3D_N76	Y	0.042

Distributed Loads (Cat 1: DL)

	Start Point	End Point	Direction	Start Magnitude [k/ft, k-ft/ft]	End Magnitude [k/ft, k-ft/ft]
1	R3D_D.1-19	R3D_B.1-19	Y	0.756	0.756

Load Combination

	Label	Solve	Service	SF	Category	Factor	Category	Factor	Category	Factor	Category	Factor	Category	Factor	Category	Factor	Category	Factor	Category	Factor
1	IBC 21/ASCE Strength 1	Yes			DL	1.4														
2	IBC 21/ASCE Strength 2 (a)	Yes			DL	1.2	LL	1.6	LLS	1.6	HL	1.6	RLL	0.5						
3	IBC 21/ASCE Strength 2 (b)	Yes			DL	1.2	LL	1.6	LLS	1.6	HL	1.6	SL	0.5	SLN	0.5				
4	IBC 21/ASCE Strength 2 (c)	Yes			DL	1.2	LL	1.6	LLS	1.6	HL	1.6	RL	0.5						
5	IBC 21/ASCE Strength 3 (a)	Yes			DL	1.2	RLL	1.6	HL	1.6	LL	0.5	LLS	1						
6	IBC 21/ASCE Strength 3 (b) (a)	Yes			DL	1.2	RLL	1.6	HL	1.6	WL+X	0.5	WL	-0.5						
7	IBC 21/ASCE Strength 3 (b) (b)	Yes			DL	1.2	RLL	1.6	HL	1.6	WL+Y	0.5	WL	-0.5						
8	IBC 21/ASCE Strength 3 (b) (c)	Yes			DL	1.2	RLL	1.6	HL	1.6	WL+Z	0.5								
9	IBC 21/ASCE Strength 3 (b) (d)	Yes			DL	1.2	RLL	1.6	HL	1.6	WL-X	0.5	WL	0.5						
10	Combination 77	Yes			DL	1.2	RLL	1.6	HL	1.6	WL-Y	0.5	WL	0.5						
11	Combination 76	Yes			DL	1.2	RLL	1.6	HL	1.6	WL-Z	0.5								
12	IBC 21/ASCE Strength 3 (c)	Yes			DL	1.2	SL	1.6	SLN	1.6	HL	1.6	LL	0.5	LLS	1				
13	IBC 21/ASCE Strength 3 (d) (a)	Yes			DL	1.2	SL	1.6	SLN	1.6	HL	1.6	WL+X	0.5	WL	-0.5				
14	IBC 21/ASCE Strength 3 (d) (b)	Yes			DL	1.2	SL	1.6	SLN	1.6	HL	1.6	WL+Y	0.5	WL	-0.5				
15	IBC 21/ASCE Strength 3 (d) (c)	Yes			DL	1.2	SL	1.6	SLN	1.6	HL	1.6	WL+Z	0.5						
16	Combination 79	Yes			DL	1.2	SL	1.6	SLN	1.6	HL	1.6	WL-X	0.5	WL	0.5				
17	Combination 78	Yes			DL	1.2	SL	1.6	SLN	1.6	HL	1.6	WL-Y	0.5	WL	0.5				
18	IBC 21/ASCE Strength 3 (d) (d)	Yes			DL	1.2	SL	1.6	SLN	1.6	HL	1.6	WL-Z	0.5						
19	IBC 21/ASCE Strength 3 (e)	Yes			DL	1.2	RL	1.6	HL	1.6	LL	0.5	LLS	1						
20	IBC 21/ASCE Strength 3 (f) (a)	Yes			DL	1.2	RL	1.6	HL	1.6	WL+X	0.5	WL	-0.5						
21	IBC 21/ASCE Strength 3 (f) (b)	Yes			DL	1.2	RL	1.6	HL	1.6	WL+Y	0.5	WL	-0.5						
22	IBC 21/ASCE Strength 3 (f) (c)	Yes			DL	1.2	RL	1.6	HL	1.6	WL+Z	0.5								
23	IBC 21/ASCE Strength 3 (f) (d)	Yes			DL	1.2	RL	1.6	HL	1.6	WL-X	0.5	WL	0.5						
24	Combination 81	Yes			DL	1.2	RL	1.6	HL	1.6	WL-Y	0.5	WL	0.5						
25	Combination 80	Yes			DL	1.2	RL	1.6	HL	1.6	WL-Z	0.5								
26	IBC 21/ASCE Strength 4 (a) (a)	Yes			DL	1.2	WL+X	1	LL	0.5	LLS	1	HL	1.6	RLL	0.5	WL	-1		
27	IBC 21/ASCE Strength 4 (a) (b)	Yes			DL	1.2	WL+Y	1	LL	0.5	LLS	1	HL	1.6	RLL	0.5	WL	-1		
28	IBC 21/ASCE Strength 4 (a) (c)	Yes			DL	1.2	WL+Z	1	LL	0.5	LLS	1	HL	1.6	RLL	0.5				
29	IBC 21/ASCE Strength 4 (a) (d)	Yes			DL	1.2	WL-X	1	LL	0.5	LLS	1	HL	1.6	RLL	0.5	WL	1		
30	Combination 83	Yes			DL	1.2	WL-Y	1	LL	0.5	LLS	1	HL	1.6	RLL	0.5	WL	1		
31	Combination 82	Yes			DL	1.2	WL-Z	1	LL	0.5	LLS	1	HL	1.6	RLL	0.5				
32	IBC 21/ASCE Strength 4 (b) (a)	Yes			DL	1.2	WL+X	1	LL	0.5	LLS	1	HL	1.6	SL	0.5	SLN	0.5	WL	-1
33	IBC 21/ASCE Strength 4 (b) (b)	Yes			DL	1.2	WL+Y	1	LL	0.5	LLS	1	HL	1.6	SL	0.5	SLN	0.5	WL	-1
34	IBC 21/ASCE Strength 4 (b) (c)	Yes			DL	1.2	WL+Z	1	LL	0.5	LLS	1	HL	1.6	SL	0.5	SLN	0.5		
35	IBC 21/ASCE Strength 4 (b) (d)	Yes			DL	1.2	WL-X	1	LL	0.5	LLS	1	HL	1.6	SL	0.5	SLN	0.5	WL	1
36	Combination 85	Yes			DL	1.2	WL-Y	1	LL	0.5	LLS	1	HL	1.6	SL	0.5	SLN	0.5	WL	1
37	Combination 84	Yes			DL	1.2	WL-Z	1	LL	0.5	LLS	1	HL	1.6	SL	0.5	SLN	0.5		
38	IBC 21/ASCE Strength 5 (a) (a)	Yes			DL	0.9	WL+X	1	HL	1.6	WL	-1								
39	IBC 21/ASCE Strength 5 (a) (b)	Yes			DL	0.9	WL+Y	1	HL	1.6	WL	-1								
40	IBC 21/ASCE Strength 5 (a) (c)	Yes			DL	0.9	WL+Z	1	HL	1.6										
41	IBC 21/ASCE Strength 5 (a) (d)	Yes			DL	0.9	WL-X	1	HL	1.6	WL	1								
42	Combination 83	Yes			DL	0.9	WL-Y	1	HL	1.6	WL	1								
43	Combination 82	Yes			DL	0.9	WL-Z	1	HL	1.6										
44	IBC 21/ASCE Strength 5 (b) (a)	Yes			DL	0.9	WL+X	1	HL	0.9	WL	-1								
45	IBC 21/ASCE Strength 5 (b) (b)	Yes			DL	0.9	WL+Y	1	HL	0.9	WL	-1								
46	IBC 21/ASCE Strength 5 (b) (c)	Yes			DL	0.9	WL+Z	1	HL	0.9										
47	IBC 21/ASCE Strength 5 (b) (d)	Yes			DL	0.9	WL-X	1	HL	0.9	WL	1								
48	Combination 85	Yes			DL	0.9	WL-Y	1	HL	0.9	WL	1								
49	Combination 84	Yes			DL	0.9	WL-Z	1	HL	0.9										
50	IBC 21/ASCE Strength 6 (a)	Yes			DL	1.2	Sds*DL	0.2	Om*ELX	1	LL	0.5	LLS	1	HL	1.6	SL	0.2	SLN	0.7
51	IBC 21/ASCE Strength 6 (b)	Yes			DL	1.2	Sds*DL	0.2	Om*ELX+Z	1	LL	0.5	LLS	1	HL	1.6	SL	0.2	SLN	0.7
52	IBC 21/ASCE Strength 6 (c)	Yes			DL	1.2	Sds*DL	0.2	Om*ELX-Z	1	LL	0.5	LLS	1	HL	1.6	SL	0.2	SLN	0.7
53	IBC 21/ASCE Strength 6 (d)	Yes			DL	1.2	Sds*DL	0.2	Om*ELZ	1	LL	0.5	LLS	1	HL	1.6	SL	0.2	SLN	0.7
54	IBC 21/ASCE Strength 6 (e)	Yes			DL	1.2	Sds*DL	0.2	Om*ELZ+X	1	LL	0.5	LLS	1	HL	1.6	SL	0.2	SLN	0.7
55	IBC 21/ASCE Strength 6 (f)	Yes			DL	1.2	Sds*DL	0.2	Om*ELZ-X	1	LL	0.5	LLS	1	HL	1.6	SL	0.2	SLN	0.7

Load Combination (Continued)

	Label	Solve	Service	SF	Category	Factor	Category	Factor	Category	Factor	Category	Factor	Category	Factor	Category	Factor	Category	Factor	Category	Factor
56	IBC 21/ASCE Strength 6 (g)	Yes			DL	1.2	Sds*DL	0.2	Om*ELX	-1	LL	0.5	LLS	1	HL	1.6	SL	0.2	SLN	0.7
57	IBC 21/ASCE Strength 6 (h)	Yes			DL	1.2	Sds*DL	0.2	Om*ELX+Z	-1	LL	0.5	LLS	1	HL	1.6	SL	0.2	SLN	0.7
58	IBC 21/ASCE Strength 6 (i)	Yes			DL	1.2	Sds*DL	0.2	Om*ELX-Z	-1	LL	0.5	LLS	1	HL	1.6	SL	0.2	SLN	0.7
59	IBC 21/ASCE Strength 6 (j)	Yes			DL	1.2	Sds*DL	0.2	Om*ELZ	-1	LL	0.5	LLS	1	HL	1.6	SL	0.2	SLN	0.7
60	IBC 21/ASCE Strength 6 (k)	Yes			DL	1.2	Sds*DL	0.2	Om*ELZ+X	-1	LL	0.5	LLS	1	HL	1.6	SL	0.2	SLN	0.7
61	IBC 21/ASCE Strength 6 (l)	Yes			DL	1.2	Sds*DL	0.2	Om*ELZ-X	-1	LL	0.5	LLS	1	HL	1.6	SL	0.2	SLN	0.7
62	IBC 21/ASCE Strength 7 (a) (a)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELX	1	HL	1.6								
63	IBC 21/ASCE Strength 7 (a) (b)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELX+Z	1	HL	1.6								
64	IBC 21/ASCE Strength 7 (a) (c)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELX-Z	1	HL	1.6								
65	IBC 21/ASCE Strength 7 (a) (d)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELZ	1	HL	1.6								
66	IBC 21/ASCE Strength 7 (a) (e)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELZ+X	1	HL	1.6								
67	IBC 21/ASCE Strength 7 (a) (f)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELZ-X	1	HL	1.6								
68	IBC 21/ASCE Strength 7 (a) (g)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELX	-1	HL	1.6								
69	IBC 21/ASCE Strength 7 (a) (h)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELX+Z	-1	HL	1.6								
70	IBC 21/ASCE Strength 7 (a) (i)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELX-Z	-1	HL	1.6								
71	IBC 21/ASCE Strength 7 (a) (j)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELZ	-1	HL	1.6								
72	IBC 21/ASCE Strength 7 (a) (k)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELZ+X	-1	HL	1.6								
73	IBC 21/ASCE Strength 7 (a) (l)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELZ-X	-1	HL	1.6								
74	IBC 21/ASCE Strength 7 (b) (a)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELX	1	HL	0.9								
75	IBC 21/ASCE Strength 7 (b) (b)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELX+Z	1	HL	0.9								
76	IBC 21/ASCE Strength 7 (b) (c)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELX-Z	1	HL	0.9								
77	IBC 21/ASCE Strength 7 (b) (d)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELZ	1	HL	0.9								
78	IBC 21/ASCE Strength 7 (b) (e)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELZ+X	1	HL	0.9								
79	IBC 21/ASCE Strength 7 (b) (f)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELZ-X	1	HL	0.9								
80	IBC 21/ASCE Strength 7 (b) (g)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELX	-1	HL	0.9								
81	IBC 21/ASCE Strength 7 (b) (h)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELX+Z	-1	HL	0.9								
82	IBC 21/ASCE Strength 7 (b) (i)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELX-Z	-1	HL	0.9								
83	IBC 21/ASCE Strength 7 (b) (j)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELZ	-1	HL	0.9								
84	IBC 21/ASCE Strength 7 (b) (k)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELZ+X	-1	HL	0.9								
85	IBC 21/ASCE Strength 7 (b) (l)	Yes			DL	0.9	Sds*DL	-0.2	Om*ELZ-X	-1	HL	0.9								
86	IBC 21/ASCE 1	Yes	Yes	1.5	DL	1														
87	IBC 21/ASCE 2	Yes	Yes	1.5	DL	1	HL	1	LL	1	LLS	1								
88	IBC 21/ASCE 3 (a)	Yes	Yes	1.5	DL	1	HL	1	RLL	1										
89	IBC 21/ASCE 3 (b)	Yes	Yes	1.5	DL	1	HL	1	SL	1										
90	IBC 21/ASCE 3 (c)	Yes	Yes	1.5	DL	1	HL	1	RL	1										
91	IBC 21/ASCE 4 (a)	Yes	Yes	1.5	DL	1	HL	1	LL	0.75	LLS	0.75	RLL	0.75						
92	IBC 21/ASCE 4 (b)	Yes	Yes	1.5	DL	1	HL	1	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75				
93	IBC 21/ASCE 4 (c)	Yes	Yes	1.5	DL	1	HL	1	LL	0.75	LLS	0.75	RL	0.75						
94	IBC 21/ASCE 5 (a) (a)	Yes	Yes	1.5	DL	1	HL	1	WL+X	0.6	WL	-0.6								
95	IBC 21/ASCE 5 (a) (b)	Yes	Yes	1.5	DL	1	HL	1	WL+Y	0.6	WL	-0.6								
96	IBC 21/ASCE 5 (a) (c)	Yes	Yes	1.5	DL	1	HL	1	WL+Z	0.6										
97	IBC 21/ASCE 5 (a) (d)	Yes	Yes	1.5	DL	1	HL	1	WL-X	0.6	WL	0.6								
98	Combination 167	Yes	Yes	1.5	DL	1	HL	1	WL-Y	0.6	WL	0.6								
99	Combination 166	Yes	Yes	1.5	DL	1	HL	1	WL-Z	0.6										
100	IBC 21/ASCE 6 (a) (a)	Yes	Yes	1.5	DL	1	HL	1	WL+X	0.45	LL	0.75	LLS	0.75	RLL	0.75	WL	-0.45		
101	IBC 21/ASCE 6 (a) (b)	Yes	Yes	1.5	DL	1	HL	1	WL+Y	0.45	LL	0.75	LLS	0.75	RLL	0.75	WL	-0.45		
102	IBC 21/ASCE 6 (a) (c)	Yes	Yes	1.5	DL	1	HL	1	WL+Z	0.45	LL	0.75	LLS	0.75	RLL	0.75				
103	IBC 21/ASCE 6 (a) (d)	Yes	Yes	1.5	DL	1	HL	1	WL-X	0.45	LL	0.75	LLS	0.75	RLL	0.75	WL	0.45		
104	Combination 169	Yes	Yes	1.5	DL	1	HL	1	WL-Y	0.45	LL	0.75	LLS	0.75	RLL	0.75	WL	0.45		
105	Combination 168	Yes	Yes	1.5	DL	1	HL	1	WL-Z	0.45	LL	0.75	LLS	0.75	RLL	0.75				
106	IBC 21/ASCE 6 (b) (a)	Yes	Yes	1.5	DL	1	HL	1	WL+X	0.45	LL	0.75	LLS	0.75	SL	0.75	WL	-0.45		
107	IBC 21/ASCE 6 (b) (b)	Yes	Yes	1.5	DL	1	HL	1	WL+Y	0.45	LL	0.75	LLS	0.75	SL	0.75	WL	-0.45		
108	IBC 21/ASCE 6 (b) (c)	Yes	Yes	1.5	DL	1	HL	1	WL+Z	0.45	LL	0.75	LLS	0.75	SL	0.75				
109	IBC 21/ASCE 6 (b) (d)	Yes	Yes	1.5	DL	1	HL	1	WL-X	0.45	LL	0.75	LLS	0.75	SL	0.75	WL	0.45		
110	Combination 166	Yes	Yes	1.5	DL	1	HL	1	WL-Y	0.45	LL	0.75	LLS	0.75	SL	0.75	WL	0.45		

Load Combination (Continued)

	Label	Solve	Service	SF	Category	Factor	Category	Factor	Category	Factor	Category	Factor	Category	Factor	Category	Factor	Category	Factor	Category	Factor
111	Combination 165	Yes	Yes	1.5	DL	1	HL	1	WL-Z	0.45	LL	0.75	LLS	0.75	SL	0.75				
112	IBC 21/ASCE 7 (a) (b)	Yes	Yes		DL	0.6	HL	1	WL+X	0.6	WL	-0.6								
113	IBC 21/ASCE 7 (a) (c)	Yes	Yes		DL	0.6	HL	1	WL+Y	-0.6	WL	-0.6								
114	IBC 21/ASCE 7 (a) (d)	Yes	Yes		DL	0.6	HL	1	WL+Z	-0.6										
115	Combination 168	Yes	Yes		DL	0.6	HL	1	WL-X	0.6	WL	0.6								
116	Combination 167	Yes	Yes		DL	0.6	HL	1	WL-Y	0.6	WL	0.6								
117	Combination 169	Yes	Yes		DL	0.6	HL	1	WL-Z	0.6										
118	IBC 21/ASCE 7 (b) (a)	Yes	Yes		DL	0.6	HL	0.6	WL+X	0.6	WL	-0.6								
119	IBC 21/ASCE 7 (b) (b)	Yes	Yes		DL	0.6	HL	0.6	WL+Y	0.6	WL	-0.6								
120	IBC 21/ASCE 7 (b) (c)	Yes	Yes		DL	0.6	HL	0.6	WL+Z	0.6										
121	IBC 21/ASCE 7 (b) (d)	Yes	Yes		DL	0.6	HL	0.6	WL-X	0.6	WL	0.6								
122	Combination 171	Yes	Yes		DL	0.6	HL	0.6	WL-Y	0.6	WL	0.6								
123	Combination 170	Yes	Yes		DL	0.6	HL	0.6	WL-Z	0.6										
124	IBC 21/ASCE 8 (a)	Yes	Yes	1.5	DL	1	Sds*DL	0.14	HL	1	Om*ELX	0.7								
125	IBC 21/ASCE 8 (b)	Yes	Yes	1.5	DL	1	Sds*DL	0.14	HL	1	Om*ELX+Z	0.7								
126	IBC 21/ASCE 8 (c)	Yes	Yes	1.5	DL	1	Sds*DL	0.14	HL	1	Om*ELX-Z	0.7								
127	IBC 21/ASCE 8 (d)	Yes	Yes	1.5	DL	1	Sds*DL	0.14	HL	1	Om*ELZ	0.7								
128	IBC 21/ASCE 8 (e)	Yes	Yes	1.5	DL	1	Sds*DL	0.14	HL	1	Om*ELZ+X	0.7								
129	IBC 21/ASCE 8 (f)	Yes	Yes	1.5	DL	1	Sds*DL	0.14	HL	1	Om*ELZ-X	0.7								
130	IBC 21/ASCE 8 (g)	Yes	Yes	1.5	DL	1	Sds*DL	0.14	HL	1	Om*ELX	-0.7								
131	IBC 21/ASCE 8 (h)	Yes	Yes	1.5	DL	1	Sds*DL	0.14	HL	1	Om*ELX+Z	-0.7								
132	IBC 21/ASCE 8 (i)	Yes	Yes	1.5	DL	1	Sds*DL	0.14	HL	1	Om*ELX-Z	-0.7								
133	IBC 21/ASCE 8 (j)	Yes	Yes	1.5	DL	1	Sds*DL	0.14	HL	1	Om*ELZ	-0.7								
134	IBC 21/ASCE 8 (k)	Yes	Yes	1.5	DL	1	Sds*DL	0.14	HL	1	Om*ELZ+X	-0.7								
135	IBC 21/ASCE 8 (l)	Yes	Yes	1.5	DL	1	Sds*DL	0.14	HL	1	Om*ELZ-X	-0.7								
136	IBC 21/ASCE 9 (a)	Yes	Yes	1.5	DL	1	Sds*DL	0.105	HL	1	Om*ELX	0.525	LL	0.75	LLS	0.75	SL	0.75		
137	IBC 21/ASCE 9 (b)	Yes	Yes	1.5	DL	1	Sds*DL	0.105	HL	1	Om*ELX+Z	0.525	LL	0.75	LLS	0.75	SL	0.75		
138	IBC 21/ASCE 9 (c)	Yes	Yes	1.5	DL	1	Sds*DL	0.105	HL	1	Om*ELX-Z	0.525	LL	0.75	LLS	0.75	SL	0.75		
139	IBC 21/ASCE 9 (d)	Yes	Yes	1.5	DL	1	Sds*DL	0.105	HL	1	Om*ELZ	0.525	LL	0.75	LLS	0.75	SL	0.75		
140	IBC 21/ASCE 9 (e)	Yes	Yes	1.5	DL	1	Sds*DL	0.105	HL	1	Om*ELZ+X	0.525	LL	0.75	LLS	0.75	SL	0.75		
141	IBC 21/ASCE 9 (f)	Yes	Yes	1.5	DL	1	Sds*DL	0.105	HL	1	Om*ELZ-X	0.525	LL	0.75	LLS	0.75	SL	0.75		
142	IBC 21/ASCE 9 (g)	Yes	Yes	1.5	DL	1	Sds*DL	0.105	HL	1	Om*ELX	-0.525	LL	0.75	LLS	0.75	SL	0.75		
143	IBC 21/ASCE 9 (h)	Yes	Yes	1.5	DL	1	Sds*DL	0.105	HL	1	Om*ELX+Z	-0.525	LL	0.75	LLS	0.75	SL	0.75		
144	IBC 21/ASCE 9 (i)	Yes	Yes	1.5	DL	1	Sds*DL	0.105	HL	1	Om*ELX-Z	-0.525	LL	0.75	LLS	0.75	SL	0.75		
145	IBC 21/ASCE 9 (j)	Yes	Yes	1.5	DL	1	Sds*DL	0.105	HL	1	Om*ELZ	-0.525	LL	0.75	LLS	0.75	SL	0.75		
146	IBC 21/ASCE 9 (k)	Yes	Yes	1.5	DL	1	Sds*DL	0.105	HL	1	Om*ELZ+X	-0.525	LL	0.75	LLS	0.75	SL	0.75		
147	IBC 21/ASCE 9 (l)	Yes	Yes	1.5	DL	1	Sds*DL	0.105	HL	1	Om*ELZ-X	-0.525	LL	0.75	LLS	0.75	SL	0.75		
148	IBC 21/ASCE 10 (a) (a)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	1	Om*ELX	0.7								
149	IBC 21/ASCE 10 (a) (b)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	1	Om*ELX+Z	0.7								
150	IBC 21/ASCE 10 (a) (c)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	1	Om*ELX-Z	0.7								
151	IBC 21/ASCE 10 (a) (d)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	1	Om*ELZ	0.7								
152	IBC 21/ASCE 10 (a) (e)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	1	Om*ELZ+X	0.7								
153	IBC 21/ASCE 10 (a) (f)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	1	Om*ELZ-X	0.7								
154	IBC 21/ASCE 10 (a) (g)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	1	Om*ELX	-0.7								
155	IBC 21/ASCE 10 (a) (h)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	1	Om*ELX+Z	-0.7								
156	IBC 21/ASCE 10 (a) (i)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	1	Om*ELX-Z	-0.7								
157	IBC 21/ASCE 10 (a) (j)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	1	Om*ELZ	-0.7								
158	IBC 21/ASCE 10 (a) (k)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	1	Om*ELZ+X	-0.7								
159	IBC 21/ASCE 10 (a) (l)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	1	Om*ELZ-X	-0.7								
160	IBC 21/ASCE 10 (b) (a)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	0.6	Om*ELX	0.7								
161	IBC 21/ASCE 10 (b) (b)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	0.6	Om*ELX+Z	0.7								
162	IBC 21/ASCE 10 (b) (c)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	0.6	Om*ELX-Z	0.7								
163	IBC 21/ASCE 10 (b) (d)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	0.6	Om*ELZ	0.7								
164	IBC 21/ASCE 10 (b) (e)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	0.6	Om*ELZ+X	0.7								
165	IBC 21/ASCE 10 (b) (f)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	0.6	Om*ELZ-X	0.7								

Load Combination (Continued)

	Label	Solve	Service	SF	Category	Factor	Category	Factor	Category	Factor	Category	Factor	Category	Factor	Category	Factor	Category	Factor	Category	Factor
166	IBC 21/ASCE 10 (b) (g)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	0.6	Om*ELX	-0.7								
167	IBC 21/ASCE 10 (b) (h)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	0.6	Om*ELX+Z	-0.7								
168	IBC 21/ASCE 10 (b) (i)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	0.6	Om*ELX-Z	-0.7								
169	IBC 21/ASCE 10 (b) (j)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	0.6	Om*ELZ	-0.7								
170	IBC 21/ASCE 10 (b) (k)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	0.6	Om*ELZ+X	-0.7								
171	IBC 21/ASCE 10 (b) (l)	Yes	Yes		DL	0.6	Sds*DL	-0.14	HL	0.6	Om*ELZ-X	-0.7								

Envelope Slab Soil Pressures

	Label	Max UC	Max LC	Soil Pressure[psf]	Allowable Bearing[psf]	Node
1	S1	0.278	137*	834.325	3000	N16

Envelope Spread Footing Soil Pressures

	Label	Max UC	Max LC	Soil Pressure[psf]	Allowable Bearing[psf]	Node
1	F4 - N5	0.469	92	1622.042	3461.875	D
2	F4 - N6	0.469	92	1622.032	3461.875	C

Beam Design Results

	Beam	Shape	UC Max Top	Loc[ft]	LC	UC Max Bot	Loc[ft]	LC	Shear UC	Loc[ft]	LC	Phi*Mnz Top[k-ft]	Phi*Mnz Bot[k-ft]	Phi*Vny[k]
1	B1	CRECT24X24	0.508	2.565	13	0.17	0	64*	0.375	0	16	161.101	161.101	78.68
2	B2	CRECT24X24	0.503	2.565	13	0.17	0	63*	0.374	0	16	161.101	161.101	78.772

Strip Reinforcing

	Label	UC Top	LC	Top Bars	Gov Design Cut	UC Top	UC Bot	LC	Bot Bars/Mid Bars	Gov Design Cut	UC Bot	UC Shear	LC	Gov Design Cut	UC Shear
1	DS1	0.101	54*	#6@9in	DS1-X43	0.104	72*		#6@9in	DS1-X47		0.138	16	DS1-X5	

Spread Footing Code Check

	Node	Footing	Bearing Ratio	Bearing Pressure[psf]	Gov LC	UC Max	Muxx[k-ft]	Gov LC	UC Max	Muzz[k-ft]	Gov LC
1	N5	F4	0.469	1622.042	92	0.029	5.607	13	0.036	6.959	13
2	N6	F4	0.469	1622.032	92	0.029	5.627	18	0.034	6.731	13

Spread Footing Shear Code Check

	Node	Footing	UC Shear	Vux[k]	Gov LC	UC Shear	Vuz[k]	Gov LC
1	N5	F4	0	0.015	13	0	0.019	13
2	N6	F4	0	0.015	18	0	0.018	13

Spread Footing Geometry Results

	Node	Footing	Length[ft]	Width[ft]	Thickness[in]	ex[in]	ez[in]	Pedestal Ht[in]	Ped Xdim[in]	Ped Zdim[in]
1	N5	F4	4	4	24	0	0	0	18	18
2	N6	F4	4	4	24	0	0	0	18	18

Spread Footing Reinforcement

	Node	Footing	Bot x Steel[in^2]	Bot z Steel[in^2]	Top x Steel[in^2]	Top z Steel[in^2]
1	N5	F4	2.209	2.209	0	0
2	N6	F4	2.209	2.209	0	0

Spread Footing Pedestal Code Check

	Node	Footing	UC Bend	UC Bend LC	UC Shear	UC Shear LC	UC Punch	UC Punch LC
1	N5	F4	0	1	0	NC	NA	NC
2	N6	F4	0	1	0	NC	NA	NC

Spread Footing Stability

	Node	Footing	OSF-xx	LC	OSF-zz	LC	SR-xx	LC	SR-zz	LC
1	N5	F4	0.531	153*	0.538	119	0.434	116	1.358	159*
2	N6	F4	0.67	153*	0.53	119	0.583	116	1.358	153*

Slab Stability - Overturning

	LC	Slab	Angle[deg]	Mo-xx[k-ft]	Ms-xx[k-ft]	Mo-zz[k-ft]	Ms-zz[k-ft]	Ms-xx/Mo-xx	Ms-zz/Mo-zz
1	86	S1	0	0	1266.038	0	148.932	9.99+	9.99+
2	87	S1	0	0	1266.038	0	148.932	9.99+	9.99+
3	88	S1	0	0	1358.134	0	159.762	9.99+	9.99+
4	89	S1	0	0	1455.755	0	171.241	9.99+	9.99+
5	90	S1	0	0	1266.038	0	148.932	9.99+	9.99+
6	91	S1	0	0	1335.11	0	157.054	9.99+	9.99+
7	92	S1	0	0	1532.826	0	180.295	9.99+	9.99+
8	93	S1	0	0	1266.038	0	148.932	9.99+	9.99+
9	94	S1	0	3.278	1343.427	34.613	148.959	9.99+	4.304
10	95	S1	0	70.179	1266.038	51.594	148.959	9.99+	2.887
11	96	S1	0	74.802	1266.04	7.16	148.959	9.99+	9.99+
12	97	S1	0	1.753	1317.967	37.439	148.932	9.99+	3.978
13	98	S1	0	38.172	1266.04	47.821	148.932	9.99+	3.114
14	99	S1	0	0	1327.058	0	155.611	9.99+	9.99+
15	100	S1	0	2.458	1393.152	25.96	157.09	9.99+	6.051
16	101	S1	0	52.634	1335.11	38.696	157.09	9.99+	4.06
17	102	S1	0	56.101	1335.113	5.37	157.09	9.99+	9.99+
18	103	S1	0	1.314	1374.058	28.079	157.054	9.99+	5.593
19	104	S1	0	28.629	1335.113	35.866	157.054	9.99+	4.379
20	105	S1	0	0	1380.874	0	162.064	9.99+	9.99+
21	106	S1	0	2.458	1466.368	25.96	165.708	9.99+	6.383
22	107	S1	0	52.634	1408.326	38.696	165.708	9.99+	4.282
23	108	S1	0	56.101	1408.331	5.37	165.708	9.99+	9.99+
24	109	S1	0	1.314	1447.276	28.079	165.664	9.99+	5.9
25	110	S1	0	28.629	1408.331	35.866	165.664	9.99+	4.619
26	111	S1	0	0	1454.09	0	170.673	9.99+	9.99+
27	112	S1	0	3.278	837.012	34.613	89.375	9.99+	2.582
28	113	S1	0	3.278	826.524	31.62	109.349	9.99+	3.458
29	114	S1	0	0	806.476	0	96.511	9.99+	9.99+
30	115	S1	0	1.753	811.551	37.439	89.359	9.99+	2.387
31	116	S1	0	38.172	759.624	47.821	89.359	9.99+	1.869
32	117	S1	0	0	820.642	0	96.038	9.99+	9.99+
33	118	S1	0	3.278	837.012	34.613	89.375	9.99+	2.582
34	119	S1	0	70.179	759.623	51.594	89.375	9.99+	1.732
35	120	S1	0	74.802	759.624	7.16	89.375	9.99+	9.99+
36	121	S1	0	1.753	811.551	37.439	89.359	9.99+	2.387
37	122	S1	0	38.172	759.624	47.821	89.359	9.99+	1.869
38	123	S1	0	0	820.642	0	96.038	9.99+	9.99+
39	124*	S1	0	0	1308.668	41.21	153.749	9.99+	3.731
40	125*	S1	0	1.455	1306.982	41.212	153.749	9.99+	3.731
41	126*	S1	0	1.414	1306.984	41.209	153.749	9.99+	3.731
42	127*	S1	0	43.059	1306.984	0.001	153.749	9.99+	9.99+

Slab Stability - Overturning (Continued)

	LC	Slab	Angle[deg]	Mo-xx[k-ft]	Ms-xx[k-ft]	Mo-zz[k-ft]	Ms-zz[k-ft]	Ms-xx/Mo-xx	Ms-zz/Mo-zz
43	128*	S1	0	44.777	1306.984	0	153.749	9.99+	9.99+
44	129*	S1	0	41.34	1306.984	0.002	153.749	9.99+	9.99+
45	130*	S1	0	1.728	1306.984	41.612	153.776	9.99+	3.695
46	131*	S1	0	4.867	1306.984	41.613	153.776	9.99+	3.695
47	132*	S1	0	4.826	1306.982	41.611	153.776	9.99+	3.696
48	133*	S1	0	43.059	1306.982	0.001	153.776	9.99+	9.99+
49	134*	S1	0	44.777	1306.982	0	153.776	9.99+	9.99+
50	135*	S1	0	41.34	1306.982	0.002	153.776	9.99+	9.99+
51	136*	S1	0	0	1440.298	30.908	169.276	9.99+	5.477
52	137*	S1	0	1.091	1439.034	30.909	169.276	9.99+	5.477
53	138*	S1	0	1.06	1439.039	30.907	169.276	9.99+	5.477
54	139*	S1	0	32.294	1439.039	0.001	169.276	9.99+	9.99+
55	140*	S1	0	33.583	1439.039	0	169.276	9.99+	9.99+
56	141*	S1	0	31.005	1439.039	0.001	169.276	9.99+	9.99+
57	142*	S1	0	1.296	1439.039	31.209	169.321	9.99+	5.425
58	143*	S1	0	3.651	1439.039	31.21	169.321	9.99+	5.425
59	144*	S1	0	3.619	1439.034	31.208	169.321	9.99+	5.426
60	145*	S1	0	32.294	1439.034	0.001	169.321	9.99+	9.99+
61	146*	S1	0	33.583	1439.034	0	169.321	9.99+	9.99+
62	147*	S1	0	31.005	1439.034	0.001	169.321	9.99+	9.99+
63	148*	S1	0	0	720.365	41.21	84.543	9.99+	2.052
64	149*	S1	0	1.455	718.679	41.212	84.543	9.99+	2.051
65	150*	S1	0	1.414	718.68	41.209	84.543	9.99+	2.052
66	151*	S1	0	43.059	718.68	0.001	84.543	9.99+	9.99+
67	152*	S1	0	44.777	718.68	0	84.543	9.99+	9.99+
68	153*	S1	0	41.34	718.68	0.002	84.543	9.99+	9.99+
69	154*	S1	0	1.728	718.68	41.612	84.558	9.99+	2.032
70	155*	S1	0	4.867	718.68	41.613	84.558	9.99+	2.032
71	156*	S1	0	4.826	718.679	41.611	84.558	9.99+	2.032
72	157*	S1	0	43.059	718.679	0.001	84.558	9.99+	9.99+
73	158*	S1	0	44.777	718.679	0	84.558	9.99+	9.99+
74	159*	S1	0	41.34	718.679	0.002	84.558	9.99+	9.99+
75	160*	S1	0	0	720.365	41.21	84.543	9.99+	2.052
76	161*	S1	0	1.455	718.679	41.212	84.543	9.99+	2.051
77	162*	S1	0	1.414	718.68	41.209	84.543	9.99+	2.052
78	163*	S1	0	43.059	718.68	0.001	84.543	9.99+	9.99+
79	164*	S1	0	44.777	718.68	0	84.543	9.99+	9.99+
80	165*	S1	0	41.34	718.68	0.002	84.543	9.99+	9.99+
81	166*	S1	0	1.728	718.68	41.612	84.558	9.99+	2.032
82	167*	S1	0	4.867	718.68	41.613	84.558	9.99+	2.032
83	168*	S1	0	4.826	718.679	41.611	84.558	9.99+	2.032
84	169*	S1	0	43.059	718.679	0.001	84.558	9.99+	9.99+
85	170*	S1	0	44.777	718.679	0	84.558	9.99+	9.99+
86	171*	S1	0	41.34	718.679	0.002	84.558	9.99+	9.99+

Slab Stability - Sliding

	LC	Slab	Angle[deg]	Va-xx[k]	Vr-xx[k]	Va-zz[k]	Vr-zz[k]	SR-xx	SR-zz
1	86	S1	0	0	22.342	0	22.342	9.99+	9.99+
2	87	S1	0	0	22.342	0	22.342	9.99+	9.99+
3	88	S1	0	0	23.967	0	23.967	9.99+	9.99+
4	89	S1	0	0	25.69	0	25.69	9.99+	9.99+
5	90	S1	0	0	22.342	0	22.342	9.99+	9.99+
6	91	S1	0	0	23.561	0	23.561	9.99+	9.99+
7	92	S1	0	0	27.05	0	27.05	9.99+	9.99+
8	93	S1	0	0	22.342	0	22.342	9.99+	9.99+

Slab Stability - Sliding (Continued)

	LC	Slab	Angle[deg]	Va-xx[k]	Vr-xx[k]	Va-zz[k]	Vr-zz[k]	SR-xx	SR-zz
9	94	S1	0	6.299	23.694	0.132	23.694	3.761	9.99+
10	95	S1	0	6.3	21.148	0.132	21.148	3.357	9.99+
11	96	S1	0	0	21.268	0.522	21.268	9.99+	9.99+
12	97	S1	0	6.3	23.272	0.132	23.272	3.694	9.99+
13	98	S1	0	6.299	21.713	0.132	21.713	3.447	9.99+
14	99	S1	0	0	23.344	0.524	23.344	9.99+	9.99+
15	100	S1	0	4.725	24.575	0.099	24.575	5.201	9.99+
16	101	S1	0	4.725	22.665	0.099	22.665	4.797	9.99+
17	102	S1	0	0	22.756	0.392	22.756	9.99+	9.99+
18	103	S1	0	4.725	24.258	0.099	24.258	5.134	9.99+
19	104	S1	0	4.725	23.089	0.099	23.089	4.887	9.99+
20	105	S1	0	0	24.313	0.393	24.313	9.99+	9.99+
21	106	S1	0	4.725	25.867	0.099	25.867	5.475	9.99+
22	107	S1	0	4.725	23.957	0.099	23.957	5.07	9.99+
23	108	S1	0	0	24.048	0.392	24.048	9.99+	9.99+
24	109	S1	0	4.725	25.55	0.099	25.55	5.407	9.99+
25	110	S1	0	4.725	24.381	0.099	24.381	5.16	9.99+
26	111	S1	0	0	25.605	0.393	25.605	9.99+	9.99+
27	112	S1	0	6.299	14.757	0.132	14.757	2.343	9.99+
28	113	S1	0	5.037	14.572	0.132	14.572	2.893	9.99+
29	114	S1	0	0	14.479	0.522	14.479	9.99+	9.99+
30	115	S1	0	6.3	14.335	0.132	14.335	2.275	9.99+
31	116	S1	0	6.299	12.776	0.132	12.776	2.028	9.99+
32	117	S1	0	0	14.408	0.524	14.408	9.99+	9.99+
33	118	S1	0	6.299	14.757	0.132	14.757	2.343	9.99+
34	119	S1	0	6.3	12.211	0.132	12.211	1.938	9.99+
35	120	S1	0	0	12.332	0.522	12.332	9.99+	9.99+
36	121	S1	0	6.3	14.335	0.132	14.335	2.275	9.99+
37	122	S1	0	6.299	12.776	0.132	12.776	2.028	9.99+
38	123	S1	0	0	14.408	0.524	14.408	9.99+	9.99+
39	124*	S1	0	2.161	23.095	0.001	23.095	9.99+	9.99+
40	125*	S1	0	2.161	23.095	0.167	23.095	9.99+	9.99+
41	126*	S1	0	2.161	23.095	0.165	23.095	9.99+	9.99+
42	127*	S1	0	0	23.064	2.221	23.064	9.99+	9.99+
43	128*	S1	0	0	23.064	2.312	23.064	9.99+	9.977
44	129*	S1	0	0	23.064	2.131	23.064	9.99+	9.99+
45	130*	S1	0	2.161	23.034	0.001	23.034	9.99+	9.99+
46	131*	S1	0	2.161	23.034	0.167	23.034	9.99+	9.99+
47	132*	S1	0	2.161	23.034	0.165	23.034	9.99+	9.99+
48	133*	S1	0	0	23.064	2.221	23.064	9.99+	9.99+
49	134*	S1	0	0	23.064	2.312	23.064	9.99+	9.977
50	135*	S1	0	0	23.064	2.131	23.064	9.99+	9.99+
51	136*	S1	0	1.621	25.417	0.001	25.417	9.99+	9.99+
52	137*	S1	0	1.621	25.417	0.125	25.417	9.99+	9.99+
53	138*	S1	0	1.621	25.417	0.123	25.417	9.99+	9.99+
54	139*	S1	0	0	25.395	1.666	25.395	9.99+	9.99+
55	140*	S1	0	0	25.395	1.734	25.395	9.99+	9.99+
56	141*	S1	0	0	25.395	1.598	25.395	9.99+	9.99+
57	142*	S1	0	1.621	25.372	0.001	25.372	9.99+	9.99+
58	143*	S1	0	1.621	25.372	0.125	25.372	9.99+	9.99+
59	144*	S1	0	1.621	25.372	0.123	25.372	9.99+	9.99+
60	145*	S1	0	0	25.395	1.666	25.395	9.99+	9.99+
61	146*	S1	0	0	25.395	1.734	25.395	9.99+	9.99+
62	147*	S1	0	0	25.395	1.598	25.395	9.99+	9.99+
63	148*	S1	0	2.161	12.713	0.001	12.713	5.882	9.99+

Slab Stability - Sliding (Continued)

	LC	Slab	Angle[deg]	Va-xx[k]	Vr-xx[k]	Va-zz[k]	Vr-zz[k]	SR-xx	SR-zz
64	149*	S1	0	2.161	12.713	0.167	12.713	5.882	9.99+
65	150*	S1	0	2.161	12.713	0.165	12.713	5.883	9.99+
66	151*	S1	0	0	12.683	2.221	12.683	9.99+	5.71
67	152*	S1	0	0	12.683	2.312	12.683	9.99+	5.486
68	153*	S1	0	0	12.683	2.131	12.683	9.99+	5.953
69	154*	S1	0	2.161	12.652	0.001	12.652	5.855	9.99+
70	155*	S1	0	2.161	12.652	0.167	12.652	5.854	9.99+
71	156*	S1	0	2.161	12.652	0.165	12.652	5.855	9.99+
72	157*	S1	0	0	12.683	2.221	12.683	9.99+	5.71
73	158*	S1	0	0	12.683	2.312	12.683	9.99+	5.486
74	159*	S1	0	0	12.683	2.131	12.683	9.99+	5.953
75	160*	S1	0	2.161	12.713	0.001	12.713	5.882	9.99+
76	161*	S1	0	2.161	12.713	0.167	12.713	5.882	9.99+
77	162*	S1	0	2.161	12.713	0.165	12.713	5.883	9.99+
78	163*	S1	0	0	12.683	2.221	12.683	9.99+	5.71
79	164*	S1	0	0	12.683	2.312	12.683	9.99+	5.486
80	165*	S1	0	0	12.683	2.131	12.683	9.99+	5.953
81	166*	S1	0	2.161	12.652	0.001	12.652	5.855	9.99+
82	167*	S1	0	2.161	12.652	0.167	12.652	5.854	9.99+
83	168*	S1	0	2.161	12.652	0.165	12.652	5.855	9.99+
84	169*	S1	0	0	12.683	2.221	12.683	9.99+	5.71
85	170*	S1	0	0	12.683	2.312	12.683	9.99+	5.486
86	171*	S1	0	0	12.683	2.131	12.683	9.99+	5.953

Slab Stability - Overturning by Category

	LC	Slab	Category	Mo-xx[k-ft]	Ms-xx[k-ft]	Mo-zz[k-ft]	Ms-zz[k-ft]
1	86	S1	DL	0	1266.038	0	148.932
2	87	S1	DL	0	1266.038	0	148.932
3	88	S1	DL	0	1266.038	0	148.932
4	88	S1	RLL	0	92.096	0	10.829
5	89	S1	DL	0	1266.038	0	148.932
6	89	S1	SL	0	189.717	0	22.308
7	90	S1	DL	0	1266.038	0	148.932
8	91	S1	DL	0	1266.038	0	148.932
9	91	S1	RLL	0	69.072	0	8.122
10	92	S1	DL	0	1266.038	0	148.932
11	92	S1	SL	0	142.288	0	16.731
12	92	S1	SLN	0	124.5	0	14.631
13	93	S1	DL	0	1266.038	0	148.932
14	94	S1	DL	0	1266.038	0	-148.959
15	94	S1	WL	3.278	0	31.62	0
16	94	S1	WL+X	0	77.389	2.993	0
17	95	S1	DL	0	1266.038	0	-148.959
18	95	S1	WL	3.278	0	31.62	0
19	95	S1	WL+Y	66.901	0	19.974	0
20	96	S1	DL	0	-1266.04	0	-148.959
21	96	S1	WL+Z	74.802	0	7.16	0
22	97	S1	DL	0	-1266.04	0	148.932
23	97	S1	WL	1.753	0	31.441	0
24	97	S1	WL-X	0	-51.926	5.998	0
25	98	S1	DL	0	-1266.04	0	148.932
26	98	S1	WL	1.753	0	31.441	0
27	98	S1	WL-Y	36.42	0	16.38	0
28	99	S1	DL	0	1266.038	0	148.932
29	99	S1	WL-Z	0	61.019	0	6.679

Slab Stability - Overturning by Category (Continued)

	LC	Slab	Category	Mo-xx[k-ft]	Ms-xx[k-ft]	Mo-zz[k-ft]	Ms-zz[k-ft]
30	100	S1	DL	0	1266.038	0	-148.959
31	100	S1	WL	2.458	0	23.715	0
32	100	S1	RLL	0	69.072	0	-8.13
33	100	S1	WL+X	0	58.042	2.245	0
34	101	S1	DL	0	1266.038	0	-148.959
35	101	S1	WL	2.458	0	23.715	0
36	101	S1	RLL	0	69.072	0	-8.13
37	101	S1	WL+Y	50.176	0	14.98	0
38	102	S1	DL	0	-1266.04	0	-148.959
39	102	S1	RLL	0	-69.073	0	-8.13
40	102	S1	WL+Z	56.101	0	5.37	0
41	103	S1	DL	0	-1266.04	0	148.932
42	103	S1	WL	1.314	0	23.581	0
43	103	S1	RLL	0	-69.073	0	8.122
44	103	S1	WL-X	0	-38.945	4.498	0
45	104	S1	DL	0	-1266.04	0	148.932
46	104	S1	WL	1.314	0	23.581	0
47	104	S1	RLL	0	-69.073	0	8.122
48	104	S1	WL-Y	27.315	0	12.285	0
49	105	S1	DL	0	1266.038	0	148.932
50	105	S1	RLL	0	69.072	0	8.122
51	105	S1	WL-Z	0	45.765	0	5.009
52	106	S1	DL	0	1266.038	0	-148.959
53	106	S1	WL	2.458	0	23.715	0
54	106	S1	SL	0	142.288	0	-16.749
55	106	S1	WL+X	0	58.042	2.245	0
56	107	S1	DL	0	1266.038	0	-148.959
57	107	S1	WL	2.458	0	23.715	0
58	107	S1	SL	0	142.288	0	-16.749
59	107	S1	WL+Y	50.176	0	14.98	0
60	108	S1	DL	0	-1266.04	0	-148.959
61	108	S1	SL	0	-142.291	0	-16.749
62	108	S1	WL+Z	56.101	0	5.37	0
63	109	S1	DL	0	-1266.04	0	148.932
64	109	S1	WL	1.314	0	23.581	0
65	109	S1	SL	0	-142.291	0	16.731
66	109	S1	WL-X	0	-38.945	4.498	0
67	110	S1	DL	0	-1266.04	0	148.932
68	110	S1	WL	1.314	0	23.581	0
69	110	S1	SL	0	-142.291	0	16.731
70	110	S1	WL-Y	27.315	0	12.285	0
71	111	S1	DL	0	1266.038	0	148.932
72	111	S1	SL	0	142.288	0	16.731
73	111	S1	WL-Z	0	45.765	0	5.009
74	112	S1	DL	0	759.623	0	-89.375
75	112	S1	WL	3.278	0	31.62	0
76	112	S1	WL+X	0	77.389	2.993	0
77	113	S1	DL	0	759.623	0	-89.375
78	113	S1	WL	3.278	0	31.62	0
79	113	S1	WL+Y	0	66.901	0	-19.974
80	114	S1	DL	0	759.623	0	89.359
81	114	S1	WL+Z	0	46.853	0	7.152
82	115	S1	DL	0	-759.624	0	89.359
83	115	S1	WL	1.753	0	31.441	0
84	115	S1	WL-X	0	-51.926	5.998	0

Slab Stability - Overturning by Category (Continued)

	LC	Slab	Category	Mo-xx[k-ft]	Ms-xx[k-ft]	Mo-zz[k-ft]	Ms-zz[k-ft]
85	116	S1	DL	0	-759.624	0	89.359
86	116	S1	WL	1.753	0	31.441	0
87	116	S1	WL-Y	36.42	0	16.38	0
88	117	S1	DL	0	759.623	0	89.359
89	117	S1	WL-Z	0	61.019	0	6.679
90	118	S1	DL	0	759.623	0	-89.375
91	118	S1	WL	3.278	0	31.62	0
92	118	S1	WL+X	0	77.389	2.993	0
93	119	S1	DL	0	759.623	0	-89.375
94	119	S1	WL	3.278	0	31.62	0
95	119	S1	WL+Y	66.901	0	19.974	0
96	120	S1	DL	0	-759.624	0	-89.375
97	120	S1	WL+Z	74.802	0	7.16	0
98	121	S1	DL	0	-759.624	0	89.359
99	121	S1	WL	1.753	0	31.441	0
100	121	S1	WL-X	0	-51.926	5.998	0
101	122	S1	DL	0	-759.624	0	89.359
102	122	S1	WL	1.753	0	31.441	0
103	122	S1	WL-Y	36.42	0	16.38	0
104	123	S1	DL	0	759.623	0	89.359
105	123	S1	WL-Z	0	61.019	0	6.679
106	124*	S1	DL	0	1306.982	0	153.749
107	124*	S1	ELX	0	1.686	41.21	0
108	125*	S1	DL	0	1306.982	0	153.749
109	125*	S1	ELX+Z	1.455	0	41.212	0
110	126*	S1	DL	0	-1306.984	0	153.749
111	126*	S1	ELX-Z	1.414	0	41.209	0
112	127*	S1	DL	0	-1306.984	0	153.749
113	127*	S1	ELZ	43.059	0	0.001	0
114	128*	S1	DL	0	-1306.984	0	153.749
115	128*	S1	ELZ+X	44.777	0	0	0
116	129*	S1	DL	0	-1306.984	0	153.749
117	129*	S1	ELZ-X	41.34	0	0.002	0
118	130*	S1	DL	0	-1306.984	0	-153.776
119	130*	S1	ELX	1.728	0	41.612	0
120	131*	S1	DL	0	-1306.984	0	-153.776
121	131*	S1	ELX+Z	4.867	0	41.613	0
122	132*	S1	DL	0	1306.982	0	-153.776
123	132*	S1	ELX-Z	4.826	0	41.611	0
124	133*	S1	DL	0	1306.982	0	-153.776
125	133*	S1	ELZ	43.059	0	0.001	0
126	134*	S1	DL	0	1306.982	0	-153.776
127	134*	S1	ELZ+X	44.777	0	0	0
128	135*	S1	DL	0	1306.982	0	-153.776
129	135*	S1	ELZ-X	41.34	0	0.002	0
130	136*	S1	DL	0	1296.746	0	152.545
131	136*	S1	SL	0	142.288	0	16.731
132	136*	S1	ELX	0	1.264	30.908	0
133	137*	S1	DL	0	1296.746	0	152.545
134	137*	S1	SL	0	142.288	0	16.731
135	137*	S1	ELX+Z	1.091	0	30.909	0
136	138*	S1	DL	0	-1296.748	0	152.545
137	138*	S1	SL	0	-142.291	0	16.731
138	138*	S1	ELX-Z	1.06	0	30.907	0
139	139*	S1	DL	0	-1296.748	0	152.545

Slab Stability - Overturning by Category (Continued)

	LC	Slab	Category	Mo-xx[k-ft]	Ms-xx[k-ft]	Mo-zz[k-ft]	Ms-zz[k-ft]
140	139*	S1	SL	0	-142.291	0	16.731
141	139*	S1	ELZ	32.294	0	0.001	0
142	140*	S1	DL	0	-1296.748	0	152.545
143	140*	S1	SL	0	-142.291	0	16.731
144	140*	S1	ELZ+X	33.583	0	0	0
145	141*	S1	DL	0	-1296.748	0	152.545
146	141*	S1	SL	0	-142.291	0	16.731
147	141*	S1	ELZ-X	31.005	0	0.001	0
148	142*	S1	DL	0	-1296.748	0	-152.572
149	142*	S1	SL	0	-142.291	0	-16.749
150	142*	S1	ELX	1.296	0	31.209	0
151	143*	S1	DL	0	-1296.748	0	-152.572
152	143*	S1	SL	0	-142.291	0	-16.749
153	143*	S1	ELX+Z	3.651	0	31.21	0
154	144*	S1	DL	0	1296.746	0	-152.572
155	144*	S1	SL	0	142.288	0	-16.749
156	144*	S1	ELX-Z	3.619	0	31.208	0
157	145*	S1	DL	0	1296.746	0	-152.572
158	145*	S1	SL	0	142.288	0	-16.749
159	145*	S1	ELZ	32.294	0	0.001	0
160	146*	S1	DL	0	1296.746	0	-152.572
161	146*	S1	SL	0	142.288	0	-16.749
162	146*	S1	ELZ+X	33.583	0	0	0
163	147*	S1	DL	0	1296.746	0	-152.572
164	147*	S1	SL	0	142.288	0	-16.749
165	147*	S1	ELZ-X	31.005	0	0.001	0
166	148*	S1	DL	0	718.679	0	84.543
167	148*	S1	ELX	0	1.686	41.21	0
168	149*	S1	DL	0	718.679	0	84.543
169	149*	S1	ELX+Z	1.455	0	41.212	0
170	150*	S1	DL	0	-718.68	0	84.543
171	150*	S1	ELX-Z	1.414	0	41.209	0
172	151*	S1	DL	0	-718.68	0	84.543
173	151*	S1	ELZ	43.059	0	0.001	0
174	152*	S1	DL	0	-718.68	0	84.543
175	152*	S1	ELZ+X	44.777	0	0	0
176	153*	S1	DL	0	-718.68	0	84.543
177	153*	S1	ELZ-X	41.34	0	0.002	0
178	154*	S1	DL	0	-718.68	0	-84.558
179	154*	S1	ELX	1.728	0	41.612	0
180	155*	S1	DL	0	-718.68	0	-84.558
181	155*	S1	ELX+Z	4.867	0	41.613	0
182	156*	S1	DL	0	718.679	0	-84.558
183	156*	S1	ELX-Z	4.826	0	41.611	0
184	157*	S1	DL	0	718.679	0	-84.558
185	157*	S1	ELZ	43.059	0	0.001	0
186	158*	S1	DL	0	718.679	0	-84.558
187	158*	S1	ELZ+X	44.777	0	0	0
188	159*	S1	DL	0	718.679	0	-84.558
189	159*	S1	ELZ-X	41.34	0	0.002	0
190	160*	S1	DL	0	718.679	0	84.543
191	160*	S1	ELX	0	1.686	41.21	0
192	161*	S1	DL	0	718.679	0	84.543
193	161*	S1	ELX+Z	1.455	0	41.212	0
194	162*	S1	DL	0	-718.68	0	84.543

Slab Stability - Overturning by Category (Continued)

	LC	Slab	Category	Mo-xx[k-ft]	Ms-xx[k-ft]	Mo-zz[k-ft]	Ms-zz[k-ft]
195	162*	S1	ELX-Z	1.414	0	41.209	0
196	163*	S1	DL	0	-718.68	0	84.543
197	163*	S1	ELZ	43.059	0	0.001	0
198	164*	S1	DL	0	-718.68	0	84.543
199	164*	S1	ELZ+X	44.777	0	0	0
200	165*	S1	DL	0	-718.68	0	84.543
201	165*	S1	ELZ-X	41.34	0	0.002	0
202	166*	S1	DL	0	-718.68	0	-84.558
203	166*	S1	ELX	1.728	0	41.612	0
204	167*	S1	DL	0	-718.68	0	-84.558
205	167*	S1	ELX+Z	4.867	0	41.613	0
206	168*	S1	DL	0	718.679	0	-84.558
207	168*	S1	ELX-Z	4.826	0	41.611	0
208	169*	S1	DL	0	718.679	0	-84.558
209	169*	S1	ELZ	43.059	0	0.001	0
210	170*	S1	DL	0	718.679	0	-84.558
211	170*	S1	ELZ+X	44.777	0	0	0
212	171*	S1	DL	0	718.679	0	-84.558
213	171*	S1	ELZ-X	41.34	0	0.002	0

Slab Stability - Sliding by Category

	LC	Slab	Category	Va-xx[k]	Vr-xx[k]	Va-zz[k]	Vr-zz[k]
1	86	S1	DL	0	22.342	0	22.342
2	87	S1	DL	0	22.342	0	22.342
3	88	S1	DL	0	22.342	0	22.342
4	88	S1	RLL	0	1.625	0	1.625
5	89	S1	DL	0	22.342	0	22.342
6	89	S1	SL	0	3.348	0	3.348
7	90	S1	DL	0	22.342	0	22.342
8	91	S1	DL	0	22.342	0	22.342
9	91	S1	RLL	0	1.219	0	1.219
10	92	S1	DL	0	22.342	0	22.342
11	92	S1	SL	0	2.511	0	2.511
12	92	S1	SLN	0	2.197	0	2.197
13	93	S1	DL	0	22.342	0	22.342
14	94	S1	DL	0	22.342	0	22.342
15	94	S1	WL	-5.682	0	-0.145	0
16	94	S1	WL+X	-0.631	1.366	0	1.366
17	95	S1	DL	0	22.342	0	22.342
18	95	S1	WL	-5.682	0	-0.145	0
19	95	S1	WL+Y	-1.812	0	-1.18	0
20	96	S1	DL	0	22.342	0	22.342
21	96	S1	WL+Z	-1.074	0	-0.551	0
22	97	S1	DL	0	22.342	0	22.342
23	97	S1	WL	5.668	0.013	0.132	0.013
24	97	S1	WL-X	0.632	0.916	0	0.916
25	98	S1	DL	0	22.342	0	22.342
26	98	S1	WL	5.668	0.013	0.132	0.013
27	98	S1	WL-Y	-0.012	0	-0.643	0
28	99	S1	DL	0	22.342	0	22.342
29	99	S1	WL-Z	0	1.003	0.524	1.003
30	100	S1	DL	0	22.342	0	22.342
31	100	S1	WL	-4.261	0	-0.109	0
32	100	S1	RLL	0	1.219	0	1.219
33	100	S1	WL+X	-0.473	1.024	0	1.024

Slab Stability - Sliding by Category (Continued)

	LC	Slab	Category	Va-xx[k]	Vr-xx[k]	Va-zz[k]	Vr-zz[k]
34	101	S1	DL	0	22.342	0	22.342
35	101	S1	WL	-4.261	0	-0.109	0
36	101	S1	RLL	0	1.219	0	1.219
37	101	S1	WL+Y	-1.359	0	-0.885	0
38	102	S1	DL	0	22.342	0	22.342
39	102	S1	RLL	0	1.219	0	1.219
40	102	S1	WL+Z	-0.805	0	-0.414	0
41	103	S1	DL	0	22.342	0	22.342
42	103	S1	WL	4.251	0.01	0.099	0.01
43	103	S1	RLL	0	1.219	0	1.219
44	103	S1	WL-X	0.474	0.687	0	0.687
45	104	S1	DL	0	22.342	0	22.342
46	104	S1	WL	4.251	0.01	0.099	0.01
47	104	S1	RLL	0	1.219	0	1.219
48	104	S1	WL-Y	-0.009	0	-0.482	0
49	105	S1	DL	0	22.342	0	22.342
50	105	S1	RLL	0	1.219	0	1.219
51	105	S1	WL-Z	0	0.752	0.393	0.752
52	106	S1	DL	0	22.342	0	22.342
53	106	S1	WL	-4.261	0	-0.109	0
54	106	S1	SL	0	2.511	0	2.511
55	106	S1	WL+X	-0.473	1.024	0	1.024
56	107	S1	DL	0	22.342	0	22.342
57	107	S1	WL	-4.261	0	-0.109	0
58	107	S1	SL	0	2.511	0	2.511
59	107	S1	WL+Y	-1.359	0	-0.885	0
60	108	S1	DL	0	22.342	0	22.342
61	108	S1	SL	0	2.511	0	2.511
62	108	S1	WL+Z	-0.805	0	-0.414	0
63	109	S1	DL	0	22.342	0	22.342
64	109	S1	WL	4.251	0.01	0.099	0.01
65	109	S1	SL	0	2.511	0	2.511
66	109	S1	WL-X	0.474	0.687	0	0.687
67	110	S1	DL	0	22.342	0	22.342
68	110	S1	WL	4.251	0.01	0.099	0.01
69	110	S1	SL	0	2.511	0	2.511
70	110	S1	WL-Y	-0.009	0	-0.482	0
71	111	S1	DL	0	22.342	0	22.342
72	111	S1	SL	0	2.511	0	2.511
73	111	S1	WL-Z	0	0.752	0.393	0.752
74	112	S1	DL	0	13.405	0	13.405
75	112	S1	WL	-5.682	0	-0.145	0
76	112	S1	WL+X	-0.631	1.366	0	1.366
77	113	S1	DL	0	13.405	0	13.405
78	113	S1	WL	-5.682	0	-0.145	0
79	113	S1	WL+Y	0.632	1.181	0	1.181
80	114	S1	DL	0	13.405	0	13.405
81	114	S1	WL+Z	0	1.073	-0.522	1.073
82	115	S1	DL	0	13.405	0	13.405
83	115	S1	WL	5.668	0.013	0.132	0.013
84	115	S1	WL-X	0.632	0.916	0	0.916
85	116	S1	DL	0	13.405	0	13.405
86	116	S1	WL	5.668	0.013	0.132	0.013
87	116	S1	WL-Y	-0.012	0	-0.643	0
88	117	S1	DL	0	13.405	0	13.405

Slab Stability - Sliding by Category (Continued)

	LC	Slab	Category	Va-xx[k]	Vr-xx[k]	Va-zz[k]	Vr-zz[k]
89	117	S1	WL-Z	0	1.003	0.524	1.003
90	118	S1	DL	0	13.405	0	13.405
91	118	S1	WL	-5.682	0	-0.145	0
92	118	S1	WL+X	-0.631	1.366	0	1.366
93	119	S1	DL	0	13.405	0	13.405
94	119	S1	WL	-5.682	0	-0.145	0
95	119	S1	WL+Y	-1.812	0	-1.18	0
96	120	S1	DL	0	13.405	0	13.405
97	120	S1	WL+Z	-1.074	0	-0.551	0
98	121	S1	DL	0	13.405	0	13.405
99	121	S1	WL	5.668	0.013	0.132	0.013
100	121	S1	WL-X	0.632	0.916	0	0.916
101	122	S1	DL	0	13.405	0	13.405
102	122	S1	WL	5.668	0.013	0.132	0.013
103	122	S1	WL-Y	-0.012	0	-0.643	0
104	123	S1	DL	0	13.405	0	13.405
105	123	S1	WL-Z	0	1.003	0.524	1.003
106	124*	S1	DL	0	23.064	0	23.064
107	124*	S1	ELX	2.161	0.03	-0.001	0.03
108	125*	S1	DL	0	23.064	0	23.064
109	125*	S1	ELX+Z	2.161	0.03	-0.167	0.03
110	126*	S1	DL	0	23.064	0	23.064
111	126*	S1	ELX-Z	2.161	0.03	0.165	0.03
112	127*	S1	DL	0	23.064	0	23.064
113	127*	S1	ELZ	0	0	2.221	0
114	128*	S1	DL	0	23.064	0	23.064
115	128*	S1	ELZ+X	0	0	2.312	0
116	129*	S1	DL	0	23.064	0	23.064
117	129*	S1	ELZ-X	0	0	2.131	0
118	130*	S1	DL	0	23.064	0	23.064
119	130*	S1	ELX	-2.191	0	-0.029	0
120	131*	S1	DL	0	23.064	0	23.064
121	131*	S1	ELX+Z	-2.191	0	0.137	0
122	132*	S1	DL	0	23.064	0	23.064
123	132*	S1	ELX-Z	-2.191	0	-0.195	0
124	133*	S1	DL	0	23.064	0	23.064
125	133*	S1	ELZ	0	0	-2.221	0
126	134*	S1	DL	0	23.064	0	23.064
127	134*	S1	ELZ+X	0	0	-2.312	0
128	135*	S1	DL	0	23.064	0	23.064
129	135*	S1	ELZ-X	0	0	-2.131	0
130	136*	S1	DL	0	22.884	0	22.884
131	136*	S1	SL	0	2.511	0	2.511
132	136*	S1	ELX	1.621	0.023	-0.001	0.023
133	137*	S1	DL	0	22.884	0	22.884
134	137*	S1	SL	0	2.511	0	2.511
135	137*	S1	ELX+Z	1.621	0.023	-0.125	0.023
136	138*	S1	DL	0	22.884	0	22.884
137	138*	S1	SL	0	2.511	0	2.511
138	138*	S1	ELX-Z	1.621	0.023	0.123	0.023
139	139*	S1	DL	0	22.884	0	22.884
140	139*	S1	SL	0	2.511	0	2.511
141	139*	S1	ELZ	0	0	1.666	0
142	140*	S1	DL	0	22.884	0	22.884
143	140*	S1	SL	0	2.511	0	2.511

Slab Stability - Sliding by Category (Continued)

	LC	Slab	Category	Va-xx[k]	Vr-xx[k]	Va-zz[k]	Vr-zz[k]
144	140*	S1	ELZ+X	0	0	1.734	0
145	141*	S1	DL	0	22.884	0	22.884
146	141*	S1	SL	0	2.511	0	2.511
147	141*	S1	ELZ-X	0	0	1.598	0
148	142*	S1	DL	0	22.884	0	22.884
149	142*	S1	SL	0	2.511	0	2.511
150	142*	S1	ELX	-1.643	0	-0.022	0
151	143*	S1	DL	0	22.884	0	22.884
152	143*	S1	SL	0	2.511	0	2.511
153	143*	S1	ELX+Z	-1.643	0	0.102	0
154	144*	S1	DL	0	22.884	0	22.884
155	144*	S1	SL	0	2.511	0	2.511
156	144*	S1	ELX-Z	-1.643	0	-0.146	0
157	145*	S1	DL	0	22.884	0	22.884
158	145*	S1	SL	0	2.511	0	2.511
159	145*	S1	ELZ	0	0	-1.666	0
160	146*	S1	DL	0	22.884	0	22.884
161	146*	S1	SL	0	2.511	0	2.511
162	146*	S1	ELZ+X	0	0	-1.734	0
163	147*	S1	DL	0	22.884	0	22.884
164	147*	S1	SL	0	2.511	0	2.511
165	147*	S1	ELZ-X	0	0	-1.598	0
166	148*	S1	DL	0	12.683	0	12.683
167	148*	S1	ELX	2.161	0.03	-0.001	0.03
168	149*	S1	DL	0	12.683	0	12.683
169	149*	S1	ELX+Z	2.161	0.03	-0.167	0.03
170	150*	S1	DL	0	12.683	0	12.683
171	150*	S1	ELX-Z	2.161	0.03	0.165	0.03
172	151*	S1	DL	0	12.683	0	12.683
173	151*	S1	ELZ	0	0	2.221	0
174	152*	S1	DL	0	12.683	0	12.683
175	152*	S1	ELZ+X	0	0	2.312	0
176	153*	S1	DL	0	12.683	0	12.683
177	153*	S1	ELZ-X	0	0	2.131	0
178	154*	S1	DL	0	12.683	0	12.683
179	154*	S1	ELX	-2.191	0	-0.029	0
180	155*	S1	DL	0	12.683	0	12.683
181	155*	S1	ELX+Z	-2.191	0	0.137	0
182	156*	S1	DL	0	12.683	0	12.683
183	156*	S1	ELX-Z	-2.191	0	-0.195	0
184	157*	S1	DL	0	12.683	0	12.683
185	157*	S1	ELZ	0	0	-2.221	0
186	158*	S1	DL	0	12.683	0	12.683
187	158*	S1	ELZ+X	0	0	-2.312	0
188	159*	S1	DL	0	12.683	0	12.683
189	159*	S1	ELZ-X	0	0	-2.131	0
190	160*	S1	DL	0	12.683	0	12.683
191	160*	S1	ELX	2.161	0.03	-0.001	0.03
192	161*	S1	DL	0	12.683	0	12.683
193	161*	S1	ELX+Z	2.161	0.03	-0.167	0.03
194	162*	S1	DL	0	12.683	0	12.683
195	162*	S1	ELX-Z	2.161	0.03	0.165	0.03
196	163*	S1	DL	0	12.683	0	12.683
197	163*	S1	ELZ	0	0	2.221	0
198	164*	S1	DL	0	12.683	0	12.683

Slab Stability - Sliding by Category (Continued)

	LC	Slab	Category	Va-xx[k]	Vr-xx[k]	Va-zz[k]	Vr-zz[k]
199	164*	S1	ELZ+X	0	0	2.312	0
200	165*	S1	DL	0	12.683	0	12.683
201	165*	S1	ELZ-X	0	0	2.131	0
202	166*	S1	DL	0	12.683	0	12.683
203	166*	S1	ELX	-2.191	0	-0.029	0
204	167*	S1	DL	0	12.683	0	12.683
205	167*	S1	ELX+Z	-2.191	0	0.137	0
206	168*	S1	DL	0	12.683	0	12.683
207	168*	S1	ELX-Z	-2.191	0	-0.195	0
208	169*	S1	DL	0	12.683	0	12.683
209	169*	S1	ELZ	0	0	-2.221	0
210	170*	S1	DL	0	12.683	0	12.683
211	170*	S1	ELZ+X	0	0	-2.312	0
212	171*	S1	DL	0	12.683	0	12.683
213	171*	S1	ELZ-X	0	0	-2.131	0

RAM Connection

Current Date: 2/27/2025 1:28 PM
Units system: English
File name: S:\Sdg\Projects\2024\2024-051\Engineering\24-051_Sloans Lake_RAMConnection.rcnx

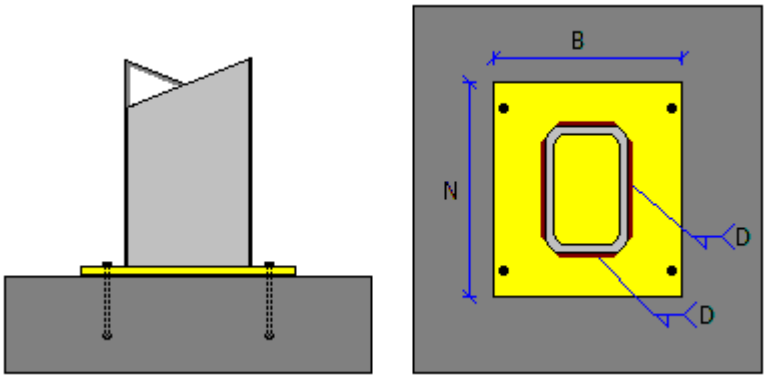
Steel Connections
Detailed report

Connection: 1 - Fixed biaxial BP

Family:	Column - Base (CB)
Type:	Base plate
Description:	Column base

General information

Connector



Members

Column

Column type	:	Prismatic member
Section	:	HSS_SQR 8x8X3_8
Material	:	A500 GrC rectangular
Longitudinal offset	:	0 in
Transversal offset	:	0 in

Base plate

Base plate

Plate shape	:	Rectangular
Connection type	:	Unstiffened
Position on the support	:	Center
N: Longitudinal dimension	:	16 in
B: Transversal dimension	:	16 in
Thickness	:	1.25 in
Material	:	A36
Column weld type	:	Fillet
Column weld	:	E70XX
D: Column weld size (1/16 in)	:	5
Override A2/A1 ratio	:	No
Include shear lug	:	No

Support

With pedestal	:	No
Longitudinal dimension	:	48 in
Transversal dimension	:	48 in
Thickness	:	18 in
Material	:	C 4-60
Include grouting	:	Yes
Grout thickness	:	2 in

Anchor

Anchor position	:	Longitudinal position
Rows number per side	:	1
Anchors per row	:	2
Longitudinal edge distance on the plate	:	2.25 in
Transverse edge distance on the plate	:	2.25 in
Anchor type	:	Headed
Head type	:	Hexagonal
Include lock nut	:	No
Anchor	:	1"
Effective embedment depth	:	15 in
Total length	:	19.57 in
Material	:	F1554 Gr36
Fy	:	36 kip/in2
Fu	:	58 kip/in2
Cracked concrete	:	Yes
Brittle steel	:	No
Anchors welded to base plate	:	No
Include bearing plates	:	No
Tension seismic requirements	:	D.3.3.4.3 (d)
Shear seismic requirements	:	D.3.3.5.3 (c)

Anchor reinforcement

Type of reinforcement	:	Supplementary
Tension reinforcement	:	No
Shear reinforcement	:	No

Design code: AISC 360-22 LRFD, ACI 318-19

Demands

Description	Pu [kip]	Mu22 [kip*ft]	Mu33 [kip*ft]	Vu2 [kip]	Vu3 [kip]	Load type
EQ	-0.05	0.00	21.25	-1.26	0.00	Design
D1	-6.27	0.00	0.01	0.00	0.00	Design
D2	-7.79	0.00	0.02	0.00	-0.01	Design
D3	-13.09	0.00	0.03	0.00	-0.02	Design
D4	-6.97	-0.49	-14.11	1.04	0.06	Design
D5	-14.68	-0.49	-14.10	1.04	0.04	Design
D6	-8.56	-0.98	-28.24	2.07	0.11	Design
D7	-10.97	-0.98	-28.23	2.07	0.11	Design
D8	-7.21	-0.98	-28.24	2.07	0.11	Design
D9	-6.34	0.00	0.01	0.00	0.00	Design
D10	-7.84	0.00	21.27	-1.26	-0.01	Design
D11	-7.74	0.00	-21.23	1.26	-0.01	Design
D12	-4.08	0.00	21.26	-1.26	0.00	Design
D13	-3.98	0.00	-21.24	1.26	0.00	Design
id13	-3.79	0.49	14.14	-1.04	-0.06	Design
id14	-11.50	0.49	14.15	-1.04	-0.07	Design
id15	-2.20	0.98	28.26	-2.07	-0.11	Design
id16	-4.61	0.98	28.27	-2.07	-0.12	Design
id17	-0.85	0.98	28.26	-2.07	-0.11	Design
D10a	-7.85	0.00	26.58	-1.58	-0.01	Seismic
D11a	-7.72	0.00	-26.55	1.58	-0.01	Seismic
D12a	-4.09	0.00	26.57	-1.58	0.00	Seismic
D13a	-3.97	0.00	-26.55	1.58	0.00	Seismic

Design calculations

Design for major axis
Base plate (AISC 360-22 LRFD)

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Base plate						
Distance from anchor to edge	[in]	1.75	0.25	--	✔	
Weld size	[1/16in]	5	3	--	✔	table J2.4

Design Check

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Concrete base						
Axial bearing	[Kip/in2]	4.42	0.62	D7	**0.14**	DG1 3.1.1
Base plate						
Flexural yielding (bearing interface)	[Kip*ft/ft]	12.66	5.25	D7	**0.41**	DG1 Sec 3.1.2
Flexural yielding (tension interface)	[Kip*ft/ft]	12.66	6.90	id17	**0.55**	DG1 Eq. 3.3.13
Column						
Weld capacity	[Kip/ft]	125.29	33.14	id17	**0.26**	HSS Manual p. 7-10
Elastic method weld shear and axial capacity	[Kip/ft]	83.53	58.10	id17	**0.70**	Sec. J2.4
Ratio	**0.70**					

Anchors

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Anchors						
Anchor spacing	[in]	11.50	4.00	--	✔	Sec. 17.9.2
Concrete cover	[in]	17.75	3.00	--	✔	Sec. 20.5.1.3.1
Effective length	[in]	15.65	--	17.35	✔	

Design Check

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Anchor tension	[Kip]	26.35	13.81	id17	**0.52**	Eq. 17.6.1.2
Breakout of anchor in tension	[Kip]	37.49	13.81	id17	**0.37**	Sec. 17.10.5.4
Breakout of group of anchors in tension	[Kip]	44.67	27.05	id17	**0.61**	Sec. 17.10.5.4
Pullout of anchor in tension	[Kip]	19.55	13.81	id17	**0.71**	Sec. 17.10.5.4
Anchor shear	[Kip]	10.96	0.52	id16	**0.05**	Eq. 17.7.1.2b, Sec. 17.7.1.2.1
Breakout of anchor in shear	[Kip]	18.89	0.52	D6	**0.03**	Sec. 17.5.2
Breakout of anchor in shear parallel to edge	[Kip]	41.98	0.52	D6	**0.01**	Sec. 17.5.2
Breakout of group of anchors in shear	[Kip]	22.08	2.07	D6	**0.09**	Sec. 17.5.2
Breakout of group of anchors in shear parallel to edge	[Kip]	44.17	2.07	D6	**0.05**	Sec. 17.5.2
Pryout of anchor in shear	[Kip]	99.98	0.52	D6	**0.01**	Sec. 17.5.2
Pryout of group of anchors in shear	[Kip]	157.69	2.07	D6	**0.01**	Sec. 17.5.2
Interaction of tensile and shear forces	[Kip]	1.20	0.00	EQ	**0.00**	Sec. 17.8.1
Ratio	**0.71**					

Design for minor axis
Base plate (AISC 360-22 LRFD)

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Base plate						
Distance from anchor to edge	[in]	1.75	0.25	--	✔	
Weld size	[1/16in]	5	3	--	✔	table J2.4

Design Check

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Concrete base						
Axial bearing	[Kip/in2]	4.42	0.62	D7	**0.14**	DG1 3.1.1
Base plate						
Flexural yielding (bearing interface)	[Kip*ft/ft]	12.66	5.25	D7	**0.41**	DG1 Sec 3.1.2
Flexural yielding (tension interface)	[Kip*ft/ft]	12.66	6.90	id17	**0.55**	DG1 Eq. 3.3.13
Column						
Weld capacity	[Kip/ft]	125.29	33.14	id17	**0.26**	HSS Manual p. 7-10
Elastic method weld shear and axial capacity	[Kip/ft]	83.53	1.66	id17	**0.02**	Sec. J2.4
Ratio	**0.55**					

Anchors

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Anchors						
Anchor spacing	[in]	11.50	4.00	--	✔	Sec. 17.9.2
Concrete cover	[in]	17.75	3.00	--	✔	Sec. 20.5.1.3.1
Effective length	[in]	15.65	--	17.35	✔	

Design Check

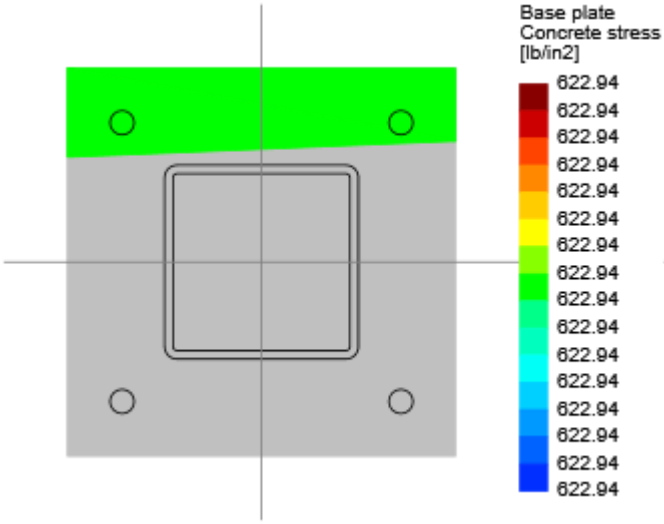
Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Anchor tension	[Kip]	26.35	13.81	id17	**0.52**	Eq. 17.6.1.2
Breakout of anchor in tension	[Kip]	37.49	13.81	id17	**0.37**	Sec. 17.10.5.4
Breakout of group of anchors in tension	[Kip]	44.67	27.05	id17	**0.61**	Sec. 17.10.5.4
Pullout of anchor in tension	[Kip]	19.55	13.81	id17	**0.71**	Sec. 17.10.5.4
Anchor shear	[Kip]	10.96	0.52	id16	**0.05**	Eq. 17.7.1.2b, Sec. 17.7.1.2.1
Breakout of anchor in shear	[Kip]	18.89	0.03	id16	**0.00**	Sec. 17.5.2
Breakout of anchor in shear parallel to edge	[Kip]	41.98	0.03	id16	**0.00**	Sec. 17.5.2
Breakout of group of anchors in shear	[Kip]	22.08	0.12	id16	**0.01**	Sec. 17.5.2
Breakout of group of anchors in shear parallel to edge	[Kip]	44.17	0.12	id16	**0.00**	Sec. 17.5.2
Pryout of anchor in shear	[Kip]	99.98	0.03	id16	**0.00**	Sec. 17.5.2
Pryout of group of anchors in shear	[Kip]	157.69	0.12	id16	**0.00**	Sec. 17.5.2
Interaction of tensile and shear forces	[Kip]	1.20	0.00	D4	**0.00**	Sec. 17.8.1

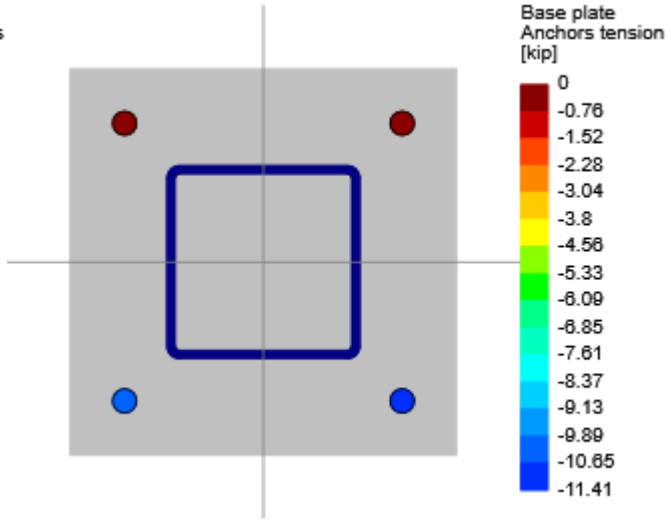
Ratio	**0.71**

Global critical strength ratio	**0.71**

Biaxial

Maximum compression (D7)



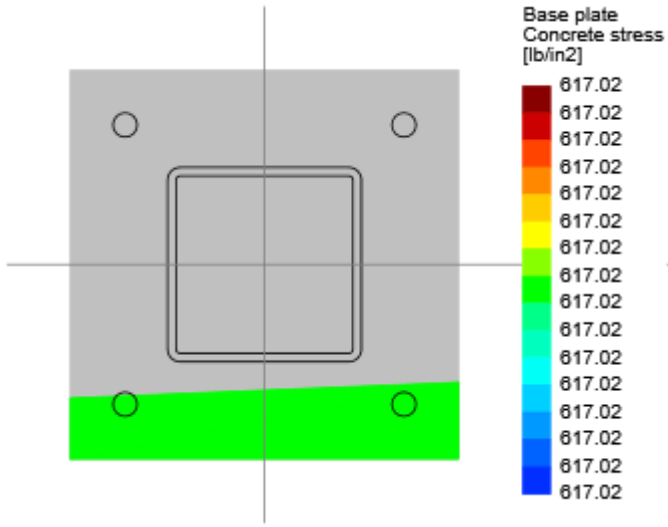


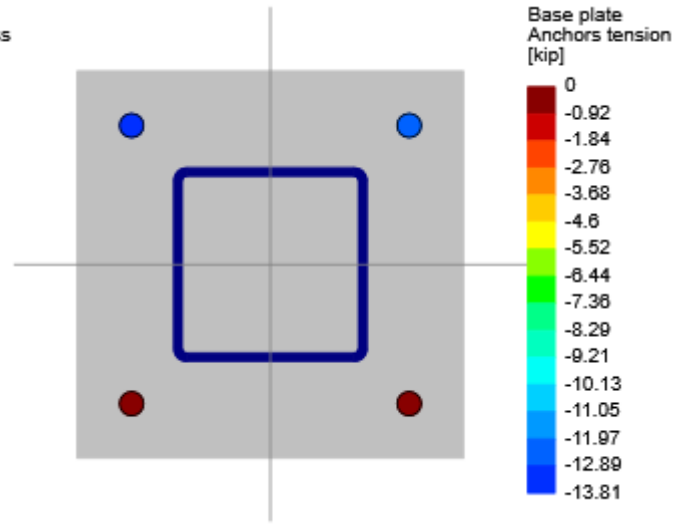
Maximum bearing pressure	622.94	[lb/in2]
Minimum bearing pressure	622.94	[lb/in2]
Maximum anchor tension	11.41	[kip]
Minimum anchor tension	0.00	[kip]
Neutral axis angle	2.38	[deg]
Neutral axis location	3.67	[in]
Bearing length	3.67	[in]

Anchors tensions

Anchor	Transverse [in]	Longitudinal [in]	Shear [kip]	Tension [kip]
1	-5.75	-5.75	0.52	10.90
2	-5.75	5.75	0.52	0.00
3	5.75	5.75	0.52	0.00
4	5.75	-5.75	0.52	11.41

Maximum tension (id17)





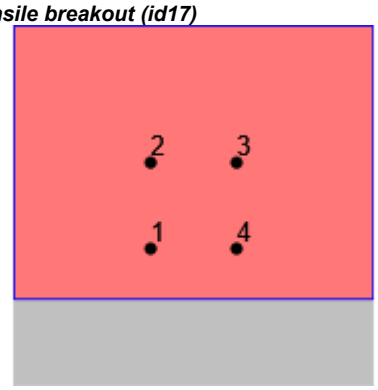
Maximum bearing pressure	617.02	[lb/in2]
Minimum bearing pressure	617.02	[lb/in2]
Maximum anchor tension	13.81	[kip]
Minimum anchor tension	0.00	[kip]
Neutral axis angle	-177.70	[deg]
Neutral axis location	3.15	[in]
Bearing length	3.15	[in]

Anchors tensions

Anchor	Transverse [in]	Longitudinal [in]	Shear [kip]	Tension [kip]
1	-5.75	-5.75	-0.52	0.00
2	-5.75	5.75	-0.52	13.81
3	5.75	5.75	-0.52	13.24
4	5.75	-5.75	-0.52	0.00

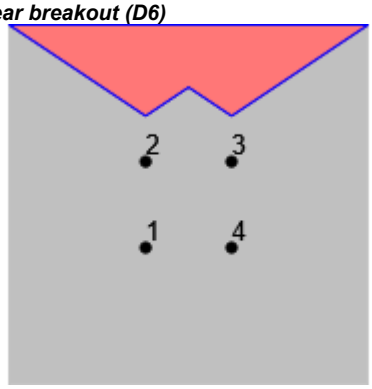
Major axis

Results for tensile breakout (id17)



Group	Area [in2]	Tension [kip]	Anchors
1	1752.00	27.05	2, 3

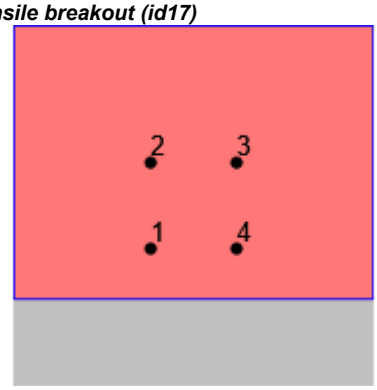
Results for shear breakout (D6)



Group	Area [in2]	Shear [kip]	Anchors
1	864.00	2.07	1, 2, 3, 4
2	864.00	1.04	2, 3

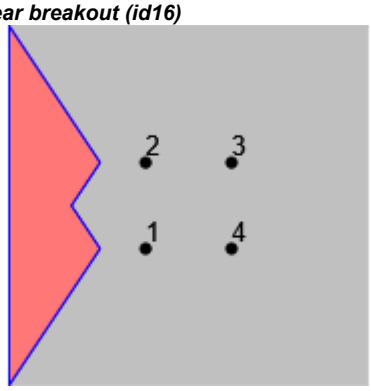
Minor axis

Results for tensile breakout (id17)



Group	Area [in2]	Tension [kip]	Anchors
1	1752.00	27.05	2, 3

Results for shear breakout (id16)



Group	Area [in2]	Shear [kip]	Anchors
1	864.00	0.06	1, 2
2	864.00	0.12	1, 2, 3, 4

APPENDIX

Geotechnical Evaluation

Sloans Lake FSER
1690 Meade Street
Denver, Colorado

HCA-HealthONE L.L.C. d/b/a Rose Medical Center

4567 East 9th Avenue | Denver, Colorado 80220

November 4, 2024 | Project No. 503056001

Geotechnical | Environmental | Construction Inspection & Testing | Forensic Engineering & Expert Witness

Geophysics | Engineering Geology | Laboratory Testing | Industrial Hygiene | Occupational Safety | Air Quality | GIS

Ninyo & Moore

Geotechnical & Environmental Sciences Consultants

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

35+ YEARS

Geotechnical Evaluation

Sloans Lake FSER
1690 Meade Street
Denver, Colorado

Mr. Zach Wideman
HCA-HealthONE L.L.C. d/b/a Rose Medical Center
4567 East 9th Avenue | Denver, Colorado 80220

November 4, 2024 | Project No. 503056001

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1 – Site Location
2 – Boring Location

APPENDICES

A – Boring Logs
B – Laboratory Testing

1 INTRODUCTION

In accordance with your authorization and our proposal dated September 26, 2024, we have performed a geotechnical evaluation for the proposed canopy structure replacement for the Sloans Lake FSER building located at 1690 Meade Street in Denver, Colorado. The approximate location of the site is depicted on Figure 1.

The purpose of our study was to evaluate the subsurface conditions and to provide design and construction recommendations regarding the development of the referenced site. This report presents the findings of our subsurface exploration program, results of our laboratory testing, conclusions regarding the subsurface conditions at the site, and geotechnical recommendations for design and construction of this project.

2 SCOPE OF SERVICES

The scope of our services for the project generally included:

- Review of referenced background information, including aerial imagery, published geologic maps, in-house geotechnical data, and available topographical information pertaining to the project site and vicinity.
- Performed site reconnaissance and marked-out the boring locations at the project site.
- Notification of Utility Notification Center of Colorado of the boring locations prior to drilling.
- Drilling, logging, and sampling of one small-diameter exploratory boring within the footprint of the proposed canopy to a depth of approximately 39.5 feet below ground surface (bgs). The boring log is presented in Appendix A. The boring location is presented on Figure 2.
- Performance of laboratory tests on selected samples obtained from the boring to evaluate engineering properties including in-situ moisture content and dry density, Atterberg limits, percent materials finer than the No. 200 sieve, swell/consolidation potential, and soil corrosivity characteristics (including pH, resistivity, water-soluble sulfates, and chlorides). The results of the laboratory testing are presented on the boring logs and in Appendix B.
- Compilation and analysis of the data obtained.
- Preparation of this report presenting our findings, and conclusions and geotechnical recommendations regarding design and construction of the project.

3 SITE DESCRIPTION AND BACKGROUND REVIEW

The proposed canopy structure is located on the northeast corner of the existing Sloans Lake FSER building at 1690 Meade Street in Denver, Colorado. The project site is bounded by West 17th Avenue to the north, Lowell Boulevard to the east, the Sloans Lake FSER medical office building followed by West 16th Avenue to the south, and by a parking lot followed by Newton Street to the west. The approximate location of the site is presented on Figure 1.

Based on our review of historic aerial photography, the Sloans Lake FSER building was construction prior to June of 1993 and has remained in similar condition since.

4 PROPOSED CONSTRUCTION

Based on the information provided, we understand that the project may involve the demolition of the existing vehicle pull through and canopy structure and design and construction of a new canopy structure. We understand the canopy structure will be structurally independent of the existing Sloans Lake FSER building.

5 FIELD EXPLORATION AND LABORATORY TESTING

On October 11, 2024, Ninyo & Moore conducted subsurface exploration services at the project site to evaluate the existing subsurface conditions and to collect soil samples for visual observation and laboratory testing. The evaluation consisted of the drilling, logging, and sampling of one exploratory boring using a truck-mounted drill rig equipped with 4-inch diameter continuous flight solid-stem augers. The boring was advanced to a depth of approximately 39.5 feet bgs. The approximate location of the boring is presented on Figure 2. Relatively undisturbed and disturbed soil samples were collected at selected intervals. The boring coordinates and ground elevation were measured in the field using a Trimble Model DA2-BT survey unit with a global navigation satellite system (GNSS) output of NAD83 (2011) and referencing Geoid model GEOID18. The boring coordinates and elevations are presented in Table 1.

Table 1 – Boring Coordinates

Boring No.	Approximate Elevation (feet)	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)
B-1	5,315.9	39.74384152	-105.03499165

Note: Coordinates and elevations collected with Trimble DA2-BT survey unit with GNSS output of NAD83 (2011) and GEOID 18. Vertical precision of +/-1.5 inches and horizontal precision of +/- 1-inch using the above GNSS output and geoid model at this site.

The soil samples collected from our drilling activities were transported to the Ninyo & Moore laboratory for geotechnical laboratory analysis. Selected samples were analyzed to evaluate engineering properties including in-situ moisture content and dry density, Atterberg limits, percent material passing the No. 200 sieve, swell/consolidation potential, and soil corrosivity characteristics (pH, resistivity, water-soluble sulfates, and chlorides). The results of the in-situ moisture content and dry density tests are presented on the boring logs in Appendix A. A description of each laboratory test method and the remainder of the laboratory test results are presented in Appendix B.

6 GEOLOGY AND SUBSURFACE CONDITIONS

The geology and subsurface conditions at the site are described in the following sections.

6.1 Geologic Setting

The site is located in Denver, Colorado, approximately 11 miles east of the Rocky Mountain Front Range, within the Colorado Piedmont section of the Great Plains Physiographic Province. The Laramide Orogeny uplifted the Rocky Mountains during the late Cretaceous and early Tertiary Periods. Subsequent erosion deposited sediments east of the Rocky Mountains, including the Denver Formation in the area. As a result of regional uplift approximately 5 to 10 million years ago, streams such as the South Platte River down-cut and excavated into the Great Plains forming the Colorado Piedmont section (Trimble, 1980).

The surficial geology of the site vicinity is mapped by Lindvall (1978) as Upper Holocene-age Piney Creek Alluvium consisting of clay, sand, silt, and gravel. The Denver Formation is mapped underlying the project area at depth.

6.2 Subsurface Conditions

Our understanding of the subsurface conditions at the project site is based on our field exploration, laboratory testing, review of published geologic maps, historic aerial imagery, and our experience with the general geology of the area. The following sections provide a generalized description of the subsurface materials encountered. More detailed descriptions are presented on the boring logs in Appendix A.

6.2.1 Fill Materials

Fill materials were encountered beneath approximately 5.75 inches of asphalt and 4 inches of roadbase in the boring and extended to a depth of approximately 4 feet bgs. The fill materials encountered generally consisted of dark gray, moist, fat clay with sand. The fill materials are considered undocumented.

Based on the results of the laboratory testing, a selected sample of the fill materials had an in-place moisture content of 23.8 percent and a dry density of 102 pounds per cubic foot (pcf).

6.2.2 Alluvium

Alluvium was encountered beneath the fill materials and extended to a depth of approximately 9 feet bgs. The alluvium generally consisted of brown and dark brown, moist, very stiff, lean clay with sand and medium dense, fine to coarse sand with clay and sand.

Based on the results of the laboratory testing, a selected sample of the alluvium had an in-place moisture content of 20.7 percent and a dry density of 106.1 pcf.

6.2.3 Denver Formation Bedrock

Denver Formation bedrock was encountered below the alluvium and extended to the boring's termination depth of approximately 39.5 feet bgs. The Denver Formation encountered generally consisted of various shades of gray, olive, brown, and yellow, dry to moist, very soft to hard claystone. The top approximately 8 feet of the claystone encountered was weathered.

Based on the results of the laboratory testing, selected samples of the Denver Formation had in-place moisture contents of 13 to 22.9 percent and dry densities of 99.4 to 112.5 pcf.

6.3 Groundwater

Groundwater was not encountered at the time of drilling. However, based on our experience in the area, groundwater may be present at depths between 12 and 15 feet bgs. Groundwater levels can fluctuate due to seasonal variations in precipitation, irrigation, groundwater withdrawal or injection, and other factors. The possibility of groundwater level fluctuations and perched groundwater should be considered when developing the design and construction plans for the project. However, based on our understanding of the proposed construction, groundwater is not anticipated to be a constraint, but may be encountered during drilled pier excavations.

7 GEOLOGIC HAZARDS

The following sections describe potential geologic hazards at the site including faulting and seismicity, expansive soils, and compressible/collapsible soils.

7.1 Faulting and Seismicity

Historically, several minor earthquakes have been recorded around the Front Range area. Based on our field observations and our review of readily available published geological maps and literature there are no known active faults underlying or adjacent to the subject site. Faults closest to the project site include the Rocky Mountain Arsenal Fault and the Golden Fault.

The Rocky Mountain Arsenal Fault lies approximately 12.5 miles northeast of the site (Kirkham and Rogers, 1981). The most recent significant seismic movements associated with the Rocky Mountain Arsenal Fault occurred in the 1960's, with recorded earthquake magnitudes up to 5.5. United States Geological Survey (USGS) investigators concluded that a strong correlation existed between the seismic activity of this fault and pressure injection of liquid waste into a disposal well located at the nearby Rocky Mountain Arsenal. Pressure injection in the disposal well was discontinued in 1966 and only minor seismic movements along the fault have been recorded since. The risk of this fault giving rise to damaging, earthquake-induced ground motions at the site during the design life of the proposed structure is considered to be relatively low, based on the previously recorded low seismic magnitudes.

The Golden Fault lies approximately 10 miles west of the site. The fault is considered to be late Quaternary in age and has not shown displacement in Holocene time, as Pleistocene deposits overlie the fault (approximately 75 to 125 thousand years before the present [Kirkham, 1977]). Therefore, the probability of damage at the site from seismically induced ground surface rupture from this fault is considered to be low.

Design of the proposed improvements should be performed in accordance with the requirements of the governing jurisdictions and applicable building codes. Table 1 presents the seismic design parameters in accordance with the 2021 International Building Code guidelines and adjusted maximum considered earthquake spectral response acceleration parameters evaluated using a web-based ground motion calculator (OSHPD, 2024).

Table 2 – 2021 International Building Code Seismic Design Criteria

Seismic Design Factors	Value
Risk Category	III
Site Class	D
Site Coefficient, F_a	1.6
Site Coefficient, F_v	2.4
Mapped Spectral Acceleration at 0.2-second Period, S_s	0.218 g
Mapped Spectral Acceleration at 1.0-second Period, S_1	0.059 g
Spectral Acceleration at 0.2-second Period Adjusted for Site Class, S_{MS}	0.348 g
Spectral Acceleration at 1.0-second Period Adjusted for Site Class, S_{M1}	0.141 g
Design Spectral Response Acceleration at 0.2-second Period, S_{DS}	0.232 g
Design Spectral Response Acceleration at 1.0-second Period, S_{D1}	0.094 g

7.2 Expansive Soils

One of the more significant geologic hazards in Colorado is the presence of swelling clays in bedrock or surficial deposits. Moisture changes to bedrock or surficial deposits containing swelling clays can result in volumetric expansion and collapse of those units. Changes in soil moisture content can result from rainfall, irrigation, pipeline leakage, surface drainage, perched groundwater, drought, or other factors. Volumetric change of expansive soil may cause excessive cracking and heaving of structures with shallow foundations, concrete slabs-on-grade, or pavements supported on these materials. Construction on soils known to be potentially expansive could have a significant impact on the project.

A review of a Colorado Geological Survey map delineating areas based on their relative potential for swelling in the Front Range area by Hart (1973-1974) indicates soil and bedrock materials in the project vicinity typically exhibit moderate swell potential.

Based on the results of our laboratory testing, a selected sample of site soils exhibited a swell percentage of approximately 1.5 percent when wetted against a surcharge pressure of approximately 200 pounds per square foot (psf). Based on the results of our laboratory testing, the pavements and flatwork on the site would have a performance risk category of “MODERATE” based on the criteria presented in Table 2 which is based on the Colorado Department of Transportation (CDOT) Pavement Design Manual criteria.

Table 3 – Pavement Performance Risk Categories

Pavement Performance Risk Category	Representative Percent Swell(200 psf Surcharge)
NONE	0
LOW	0 to <1
MODERATE	1 to <5
HIGH	5 to 20
VERY HIGH	> 20

NOTE: The information provided in this table is based on Colorado Department of Transportation (CDOT) Pavement Design Manual (2021), Chapter 4.

Based on the results of our laboratory testing, a selected sample of site soils exhibited swell percentages of up to approximately 0.9 percent when wetted against surcharge pressures between approximately 500 and 2,500 psf. Based on the results of our subsurface exploration and laboratory testing, the soil expected to be encountered at slab-on-grade levels would have a slab performance risk category of “LOW”, based on the criteria presented in Table 4.

Table 4 – Slab Performance Risk Categories		
Slab Performance Risk Category	**Representative Percent Swell (500 psf Surcharge)**	**Representative Percent Swell (1,000 psf Surcharge)**
LOW	0 to <3	0 to <2
MODERATE	3 to <5	2 to <4
HIGH	5 to <8	4 to <6
VERY HIGH	> 8	> 6

Note: Based on Colorado Association of Geotechnical Engineers, Guidelines for Slab Performance Risk Evaluation and Residential Basement Floor System Recommendations (Denver Metropolitan Area, 1996).

7.3 Compressible/Collapsible Soils

Compressible soils are generally comprised of soils that undergo consolidation when exposed to new loadings, such as fill or foundation loads. Soil collapse (or hydro-collapse) is a phenomenon where soils undergo a significant decrease in volume upon an increase in moisture content, with or without an increase in external loads. Buildings, structures, and other improvements may be subject to excessive settlement-related distress when compressible soils or collapsible soils are present.

Based on our subsurface exploration and the results of the laboratory testing, the on-site soils generally exhibit low collapse potential. However, compression of the undocumented fill materials under the weight of additional loads could occur. Therefore, if shallow foundations are used for support of the canopy, undocumented fill materials encountered below the foundations should be removed and recompacted.

8 CONCLUSIONS

Based on the results of the subsurface evaluation, laboratory testing, and data analyses, it is our opinion that development of the site is feasible from a geotechnical standpoint, provided the recommendations presented herein are implemented and appropriate construction practices are followed. Geotechnical design and construction considerations for the proposed project include the following:

- Fill materials were encountered beneath approximately 5.75 inches of asphalt and 4 inches of roadbase in the boring and extended to a depth of approximately 4 feet bgs. The fill materials encountered generally consisted of dark gray, moist, fat clay with sand. The fill materials are considered undocumented and should be removed from beneath the building foundations.

- It should be noted that undocumented fill materials that contain organic material and/or inert construction debris (regardless of particle size) may not be approved by City and County of

Denver (CCOD) Public Works Department for trench backfill associated with publicly-owned utilities.

- Although not encountered during our subsurface exploration, considering the in-fill nature of the site and its historic past-uses, there may be buried concrete remnants, areas of deeper fills, tanks, or other features present below the ground surface. The man-made fill materials that contain debris and organic material such as coal will not be suitable for re-use as engineered fill without sorting of unsuitable materials.

- Alluvium was encountered beneath the fill materials and extended to a depth of approximately 9 feet bgs. The alluvium generally consisted of brown and dark brown, moist, very stiff, lean clay with sand and medium dense, fine to coarse sand with clay and sand.

- Denver Formation bedrock was encountered below the alluvium and extended to the boring termination depth of approximately 39.5 feet bgs. The Denver Formation encountered generally consisted of various shades of gray, olive, brown, and yellow, dry to moist, very soft to hard claystone. The top approximately 8 feet of the claystone encountered was weathered.

- Based on our subsurface exploration, a shallow foundation system may be feasible for the canopy structure, as long as the canopy is structurally independent of the existing building. As an alternative, the canopy may be supported on a deep foundation system consisting of drilled piers.

- The on-site material should generally be excavated with medium- to heavy-duty earthmoving or excavation equipment in good operating condition.

- Groundwater was not encountered at the time of drilling. However, based on our experience in the area, groundwater may be present at depths between 12 and 15 feet bgs. Groundwater levels can fluctuate due to seasonal variations in precipitation, irrigation, groundwater withdrawal or injection, and other factors. Based on our understanding of the proposed construction, groundwater is not anticipated to be a constraint but will be encountered during drilled pier excavations (if utilized).

- Based on our laboratory data, the sulfate content of the tested soils presents a negligible risk of sulfate attack to concrete. We recommend the use of Type I/II cement for construction of concrete structures at this site.

- Based on our laboratory data, the subgrade soils at the site are very severely corrosive to ferrous metals. Therefore, special consideration should be given to the use of heavy gauge, corrosion-protected, underground steel pipe or culverts, if any are planned. As an alternative, plastic pipe or reinforced concrete pipe could be considered. A corrosion specialist should be consulted for further recommendations.

9 RECOMMENDATIONS

The following sections present our geotechnical recommendations for the development.

9.1 Demolition

The subject project will include demolition of the existing site pavements. Although not encountered during our subsurface exploration, considering the historic past-uses of the site, there may be buried concrete remnants, areas of deeper fills, tanks, or other features present

below the ground surface. Remnants from the demolition activities should be removed from the site.

Demolition of the existing improvements should include rerouting, removal, or in-place abandonment of underground utilities. Utilities should be adequately capped or rerouted at the project perimeter in accordance with the requirements of the governing authorities and the recommendations of the geotechnical consultant at the time of demolition. Abandoned underground utility pipes under proposed building limits should be removed from the site, or, if the pipes are left in place, they should be filled with flowable fill, such as grout or controlled low strength material (CLSM). The contractor should take adequate precautions when grading the site to reduce the potential for damage to existing utilities that are to remain in service.

9.2 Earthwork

The following sections provide our earthwork recommendations for this project. In general, the CCOD and/or project specific earthwork specifications are expected to apply, unless noted.

9.2.1 Excavations

Our evaluation of the excavation characteristics of the on-site materials is based on the results of the subsurface exploration, our site observations, and our experience with similar materials. The on-site surface and near-surface soils (fill materials and alluvium) may generally be excavated with moderate- to heavy-duty earthmoving or excavation equipment in good operating condition.

Equipment and procedures that do not cause significant disturbance to the excavation bottoms should be used. Excavators and backhoes with buckets having large claws to loosen the soil should be avoided when excavating the bottom approximately 6 to 12 inches of excavations as such equipment may disturb the excavation bases.

The fill materials and alluvium are susceptible to variations in moisture content. As a result, and depending on the time of year construction occurs, wet or saturated soils may be encountered after periods of heavy or prolonged precipitation. These soils may soften under the action of light equipment and foot traffic. Where encountered, drying or overexcavation of these materials is recommended. If the subgrade becomes disturbed, it should be compacted or removed and replaced before placing additional backfill material.

Groundwater is not anticipated to be a constraint to the building construction but will be encountered during drilled pier excavations.

9.2.2 Temporary Excavations and Shoring

The near-surface earth materials encountered in the exploratory borings are fill materials and alluvial deposits. In our opinion, temporary slopes in the near-surface fill and alluvial soils should be stable at a slope ratio of approximately 1.5:1 (horizontal[H]:vertical[V]), corresponding to should Type C soils as evaluated by OSHA. Temporary slopes should be evaluated in the field by a competent person in accordance with OSHA guidelines.

The contractor should provide safely sloped excavations or an adequately constructed and braced shoring system, in compliance with OSHA regulations, for employees working in excavations that may expose them to the danger of moving ground. Reducing the inclination of the sidewalls of the excavations, where feasible, may increase the stability of the excavations. If construction or earth material is stored, or equipment is operated near an excavation, flatter slope geometry or shoring should be used during construction.

9.2.3 Site Grading

Prior to grading, the ground surface within improvement areas should be cleared of any surface obstructions, debris, topsoil, organics (including vegetation), and other deleterious material.

Considering the nature of the site and its historic past-uses, there may be buried concrete remnants, areas of deeper fills, tanks, or other features present below the ground surface. If encountered, these materials should be removed and replaced with properly compacted engineered fill.

Materials generated from clearing operations should be removed from the project site for disposal (e.g. at a legal landfill site). Obstructions that extend below finish grade, if present, should be removed and resulting voids filled with compacted, engineered fill or CLSM.

Based on our subsurface evaluation findings and our understanding of the proposed construction, undocumented fill materials will be present. The undocumented fill material should be removed from beneath the spread-footing foundations and replaced as engineered fill. Considering the nature of the site and its historic past-uses, there may be buried concrete remnants, areas of deeper fills, tanks, or other features present below the ground surface. As previously mentioned, undocumented fill materials that contain debris and organic material will not be suitable for re-use as engineered fill without sorting of the unsuitable materials.

Following the removal and recompaction of the undocumented fill material, the proposed canopy structure could be supported on conventional spread footings.

Placement of pavement and exterior flatwork on undocumented fill materials may result in additional loading to the undocumented fill materials which could result in additional compression of the subgrade materials. Therefore, the undocumented fill materials in their current state would provide a risk to the owner of pavement and exterior flatwork settlement and resultant distress if those elements were supported on the undocumented fill materials. This risk cannot be eliminated without removal and replacement of the undocumented fill materials.

If the owner is willing to accept this risk, we recommend the pavements and exterior flatwork should be placed on a zone of moisture-conditioned and compacted engineered fill extending 12 or more inches below the bottom of the pavement section.

The exposed subgrade materials should be dense or firm and unyielding prior to fill placement. Proofrolling of subgrade should be performed following the remedial grading and prior to fill placement. The extent of and depths of removal should be evaluated by our representative during the excavation work based on observation of the soils exposed. Additional excavations may be recommended at the time of construction to remove debris (if encountered) within the fill. In addition, previous developments have occurred at this site. As a result, remnants of existing foundations may be encountered. Additional recommendations specific to the site conditions encountered may be provided at the time of construction. The project budget should include additional cost associated with the removal and replacement of additional fill material.

The geotechnical consultant should be retained to observe the remedial excavations, and the elevations of the excavation bottoms should be surveyed by the project civil engineer.

9.2.4 Re-Use of Site Soils

Site soils generated from on-site excavation activities of fill and alluvium that are free of deleterious materials and organic matter, and do not contain particles larger than 3 inches in diameter, can generally be used as engineered fill.

Fragments of rock, cobbles, and inert construction debris (e.g., concrete or asphalt) larger than 3 inches in diameter may be incorporated into the project fills in non-structural areas and below the anticipated utility installation depths. A Geotechnical Engineer should be consulted regarding appropriate recommendations for usage of such materials on a case-

by-case basis when such materials have been observed during earthwork. Care should be taken to avoid nesting of oversized materials during placement. Recommendations provided in Section 203 of the current the CDOT Standard Specifications for Road and Bridge Construction should be followed during the placement of oversized material.

Undocumented fill materials that contain organic material and/or inert construction debris (regardless of particle size) may not be approved by CCOD Public Works Department for trench backfill associated with publicly-owned utilities.

Additional evaluation and laboratory testing should be performed during earthwork activities to better evaluate the suitability of the on-site soils for re-use as engineered fill at this site. An evaluation of the potential for contamination by hazardous materials was beyond the scope of this study and the possibility of restrictions on re-use due to environmental factors was not studied.

9.2.5 Fill Placement and Compaction

Granular soils (on-site soils that classify as SP-SC or import soils) used as engineered fill should be moisture-conditioned to moisture contents within 2 percent of optimum moisture content. Fine-grained soils (on-site soils that classify as CL or CH) used as engineered fill should be moisture-conditioned to moisture contents between optimum and 3 percent over optimum moisture content. Engineered fill should be compacted to a relative compaction of 95 percent or more as evaluated by The American Society for Testing and Materialts (ASTM) D698.

The engineered fill should be compacted by appropriate mechanical methods. Lift thickness for fill will be dependent upon the type of compaction equipment utilized. Backfill should be placed in lifts not exceeding 8 inches in loose thickness in areas compacted by other-than hand operated machines. Backfill should be placed in lifts not exceeding 6 inches in loose thickness in areas compacted by hand operated machines.

Fill materials should not be placed, worked, rolled while they are frozen, thawing, or during poor/inclement weather conditions.

Compaction areas should be kept separate, and no lift should be covered by another until relative compaction and moisture content within the recommended ranges are obtained.

Use of CLSM should be considered in lieu of compacted fill for areas with low tolerances for surface settlements, for excavations that extend below the groundwater table and in areas

with difficult access for compaction equipment. CLSM should be placed in lifts of 5 feet or less with a 24-hour or more curing period between each lift.

9.2.6 Imported Soil

Imported soil for use as engineered fill should have less than 50 percent passing the No. 200 sieve, a very low swell potential (approximately 1 percent or less when wetted against a surcharge pressure of 200 psf), and a low plasticity index (less than 20). Imported soil should not contain organic matter, clay lumps, bedrock (claystone, sandstone, etc.) fragments, debris, other deleterious matter, or rocks or hard chunks larger than approximately 3 inches' nominal diameter.

Import soil in contact with ferrous metals should have low corrosion potential. Import material in contact with concrete should have a soluble sulfate content of less than 0.1 percent.

We further recommend that proposed import soils be evaluated by the project's geotechnical consultant at the borrow source for its suitability prior to importation to the project site. Import soil should be moisture-conditioned and placed and compacted in accordance with the recommendations set forth in Section 9.2.5.

9.3 Spread Footing Foundations

Perimeter footings should extend to 36 inches or more below the lowest exterior finished grade (for frost protection), and bear on a zone of adequately placed and compacted engineered fill as described in Section 9.2.3 of this report. Continuous wall footings should have a width of 18 inches or more and column footings should have a width of 24 inches or more. Footings should be reinforced in accordance with the recommendations of the structural engineer.

Footings may be designed using an allowable bearing pressure of 3,000 psf for static conditions. The bearing capacity may be increased by one-third when considering loads of short duration such as wind or seismic forces. The foundations should preferably be proportioned such that the resultant force from design loads, including lateral loads, falls within the kern (i.e., middle one-third of the footing base).

Uplift resistance can be developed from the weight of the footings, the effective weight of any overlying soil, and the weight of the supported structure itself. The effective unit weight of the soil can be assumed to be 120 pcf above the groundwater level and 60 pcf below. Soil uplift resistance may be calculated as the weight of the soil prism defined by a diagonal line extending from the perimeter of the foundation to the ground surface at an angle of 20 degrees from the vertical.

Under large moment and/or shear loading, the effective size of the uplift soil prism may be reduced. An appropriate safety factor should be applied.

The base of foundation excavations should be free of water and loose soil prior to placing concrete. Concrete should be placed soon after subgrade compaction to reduce bearing soil disturbance. Should the soils at bearing level become excessively dry, disturbed, or saturated, the affected soil should be moisture conditioned and recompacted. It is recommended that Ninyo & Moore be retained to observe, test, and evaluate the soil foundation bearing materials.

Based on the limited information provided and the results of our subsurface exploration and laboratory testing, we estimate total and differential settlement of up to about 1 inch and ½-inch, respectively, may occur.

9.4 Drilled Pier Foundations

As an alternative to spread-footing foundations, the canopy structure could be supported on deep foundations. The commonly used deep foundation system in Denver is the straight-shaft drilled-pier foundation. Due to the assumed presence of groundwater and alluvial deposits that are prone to sloughing, placement of casing through the alluvial deposits, and/or utilizing a slurry method, may be needed to advance drilled pier foundations into the Denver Formation bedrock.

The design considerations presented below should be considered during drill pier foundation system design. The construction details and other considerations presented in this report should also be considered when preparing project documents. If the measures outlined in this report are implemented effectively, the total vertical foundation movement will be about ½-inch for structures supported on drilled pier foundation systems constructed on bedrock of this nature, provided that the drilled shaft bearing materials are not significantly disturbed during construction. Differential movements are estimated to be of similar magnitude. This estimate is based on the subsurface conditions encountered in the borings, anticipated loading conditions, and our experience with similar soils and bedrock.

9.4.1 Drilled Pier Design Considerations

A pier diameter of 18 or more inches or 5 percent of the expected total pier length, whichever is greater, is recommended to facilitate cleaning and observation of the pier hole. The Structural Engineer should design the actual length to diameter ratio.

Piers should be proportioned by the Structural Engineer, but should penetrate 10 or more feet into competent Denver Formation bedrock and have an overall length of 20 or more feet.

If the pier excavation is cased and the casing is set into the bedrock, penetration depth of the piers should be measured from the bottom of the casing. The drilled pier excavations should be observed by a qualified geotechnical professional to ensure that the piers are not bottomed in weathered bedrock.

Actual pier lengths may be greater than the recommended minimum pier length. If the pier excavation is cased and the casing is set into the bedrock, penetration depths of the piers should be measured from the bottom of the casing.

Piers may be designed using the allowable skin friction and end bearing pressures provided in Table 5.

Table 5 – Recommended Drilled Pier Design Parameters

Bedrock Penetration (feet)	Allowable Skin Friction (psf)	Allowable End Bearing (psf)
Up to 10	3,000	---
10 to 20	4,000	40,000
More Than 20	5,000	50,000

The allowable skin friction values are applicable to provide bearing support and resist uplift. The allowable end bearing pressure and allowable skin friction values provided may be increased by one-third when considering loads of short duration such as wind and seismic.

Bedrock penetration in pier holes should be roughened artificially to assist the development of peripheral shear between the pier and bedrock. Artificially roughening of pier holes should consist of installing 3-inch high and 2-inch deep shear rings placed on 18 inches on center within the bedrock penetration zone of each pier.

We understand lateral load analysis of shafts will be performed by others. The parameters tabulated below may be used for lateral analysis of drilled piers for resistance to lateral loads. The parameters were developed based on the field and laboratory data obtained for the subject site and our experience with similar sites and conditions.

A simplified soil / bedrock profile, unit wet weights (γ, γ_{sub}), angles of internal friction (ϕ), undrained shear strength (c_u), for the earth materials, as well as values for strain at 50 percent of failure stress (ε_{50}) and modulus of horizontal subgrade reaction (k_h). The estimated values are tabulated in Table 6. Resistance to lateral loads should be neglected in the upper 3 feet

of the existing ground surface and within fill materials. Cased zones should not be included in load calculations and the lengths of individual piers should be increased correspondingly.

Table 6 – Recommended Lateral Load Pressures

Material Type	γ (pcf)	$\gamma_{sub.}$ (pcf)	ϕ (deg)	c_u (psf)	k_h (pci)	ε_{50}
Alluvium	120	-	30	0	90	-
Denver Formation Bedrock	125	-	-	6,000	2,000	0.004

For lateral loading, piles in a group may be considered to act individually when the center-to-center spacing is greater than 4D (where, D is the diameter of the pile) in the direction normal to loading and greater than 8D in the direction parallel to loading. The following table presents the lateral load group reduction factors (also known as P-multipliers or P_m) to be applied for various pile spacing for in-line loading.

Table 7 – Lateral Load Group Reduction Factors

Center-to-Center Pile Spacing for In-Line Loading	P_m *		
	Row 1	Row 2	Row 3 and higher
2D	0.60	0.35	0.25
3D	0.75	0.55	0.40
5D	1.00	0.85	0.70
7D	1.00	1.00	0.90

Note:
* P_m (Lateral Load Reduction Factor) values provided are based on AASHTO LRFD Bridge Design Specifications, 4th Edition, November 2011

If the loading direction for a single row of piles is perpendicular to the row, a P_m of less than 1.00 should only be used if the pile spacing is 4D or less. A P_m of 0.80, 0.90, and 1.00 should be used for pile spacing of 2.5D, 3D and 4D, respectively.

For axial loading, a reduction in skin friction is not needed for a minimum center-to-center pier spacing of 3D. At a center-to-center spacing of 1D, when piers touch, the skin friction reduction factor for both piers should be 0.5. Linear interpolation should be utilized to evaluate a skin friction reduction factor for a center-to-center pier spacing between 1D and 3D. Since drilled piers are bearing in hard to very hard bedrock, a reduction in end bearing at pier spacing less than 3D is not needed.

9.4.2 Drilled Pier Construction Considerations

Our evaluation of the excavation characteristics of the on-site materials is based on the results of our exploratory borings, site observations, and experience with similar materials. Resistant bedrock was encountered in our borings. Difficult drilling conditions may be encountered during pier hole drilling. The pier-drilling contractor should be prepared to core lenses and beds of highly cemented materials. Pier penetration should be adjusted in the field until adequate bearing material is encountered.

The pier-drilling contractor should mobilize equipment of sufficient size and operating capability to achieve the recommended penetration into the bedrock. The excavation technique chosen by the contractor should not adversely affect the quality or strength of the shaft side or end bearing materials. If refusal is encountered in these materials either during the test program or during actual installation, the Geotechnical Engineer should be retained to evaluate the conditions to establish that true refusal has been met with adequate drilling equipment.

Groundwater was not encountered at the time of drilling. However, based on our experience in the area, groundwater may be present at depths between 12 and 15 feet bgs. The groundwater conditions will fluctuate and perched groundwater may be encountered between the overburden deposits and formational materials. The contractor should be prepared to advance the piers in the presence of groundwater.

The alluvial soils are vulnerable to sloughing during the drilling process and casing will be needed to advance the pier holes. A slightly oversized casing can be used to facilitate excavation and to reduce the chance from snagging or lifting the casing during cleanout operations.

In addition to the alluvial soils, Denver Formation bedrock below the water table will yield significant volumes of water when penetrated by the pier excavations. Seating of the casing in the upper layers of the bedrock may not create positive cutoff of water infiltration. In the event that casing is seated into the bedrock, the bedrock penetration should be measured from the bottom of the casing.

The concrete may be placed by the free-fall method into piers that exhibit “dry” conditions (i.e. less than 3 inches of water). This method consists of using a vertical section of concrete chute to divert the concrete flow out of the truck in a vertical stream of concrete with a relatively small diameter. The stream should be diverted to avoid hitting the sides of the drilled

pier or the reinforcing cage, which could cause concrete segregation. In no case, should concrete be placed in more than 3 inches of water, unless placed using a tremie-method.

Where water or slurry is present in the drilled pier hole, including outside of a casing that will be withdrawn from the hole, the concrete placed for the pier should have sufficient slump and be placed with sufficient head maintained above groundwater levels so that the concrete is not displaced in the body of the pier by water, soil, slurry, etc., leading to effective voids in the pier. Concrete utilized in the piers should be a fluid mix with sufficient slump so that it will fill the void between reinforcing steel and the pier hole wall. We recommend the concrete have a slump in the range of 6 inches +/– 1-inch.

The contractor should take care to reduce enlargement of the excavation at the tops of piers, which could result in mushrooming of the pier top. Pier holes should be cleaned prior to placement of concrete. Care should be taken to check that the soils at the pier bottom have not been disturbed. The movement associated with mobilizing the end-bearing component should not be beyond tolerable structural limits. The successful advancement of drilled excavations for the construction of drilled piers will depend largely on the suitability of the drilling equipment and skill of the operator. The drilled foundation contractor should try to reduce the time during which the excavation remains open. The contractor should schedule the sequence of operations so that each excavation can be finished, reinforcing steel placed, and the concrete poured in a rapid and timely manner. The contractor should not place drilled piers adjacent to each other until the first one is set. The installation of piers should be scheduled to allow the concrete in adjacent piers to set for 24 or more hours before drilling the next pier. Drilled piers spaced closer than about four pier diameters (clear spacing) should be placed on alternate days and drilled pier excavations should not be left open overnight.

The drilled pier excavations should be evaluated to check that adequate bearing material has been reached and that the bearing surface has been suitably cleaned. This evaluation can typically be done at the surface. Installation should be observed by the Geotechnical Engineer or qualified representative to check that, among other things: 1) subsurface conditions are as anticipated from the borings, 2) the drilled piers are constructed to the specified size and penetration, 3) drilled piers are within allowable tolerances for plumbness, and 4) reinforcements are placed per project specifications. These items are fundamental to the installation and behavior of the drilled piers in accordance with our recommendations. Furthermore, we recommend the following for the installation of drilled piers.

- The clear spacing between rebar or behind the rebar cage should be more than three times the maximum size of the coarse aggregate used in the concrete.

- Centralizers on the rebar cage should be installed to keep the cage positioned per project specifications.

- Cross bracing of a reinforcing cage may be used when fabricating, transporting, and lifting. However, experience has shown that cross bracing can contribute to the development of voids in a concrete pier. Therefore, we recommend removing the cross bracing prior to lowering the reinforcing cage into the open excavation.

- If casing is used, a sufficient head of concrete that fills the casing should be used before pulling the casing.

- Concrete tremied into a pier excavation with slurry (if utilized) should maintain a hydrostatic pressure in excess of either the surrounding water table or slurry in the excavation.

- The slurry (if utilized) should have a marsh funnel viscosity of more than 45 to 60 seconds. The slurry should have a specific gravity between 1.02 (8.5 lb./gal.) and 1.15 (9.6 lb./gal.) at the time of concrete placement. In addition, the sand content in the slurry should be less than 15 percent.

- We recommend performing sonic integrity testing on an appropriate percentage (i.e., 10 percent or more) of the drilled piers installed at the site to assess the effectiveness of the pier construction methods. Additional information on sonic integrity testing (i.e. sonic-echo or cross-hole sonic) can be provided upon request.

We should be given an opportunity to review the proposed specifications and the contractor's installation procedures prior to construction.

9.5 Pavement Design

We assumed the project pavements will be privately maintained. Pavement section alternatives for the paved surfaces were developed in general accordance with the guidelines and procedures of the American Association of State Highway and Transportation Officials (AASHTO), CDOT, and CCOD.

The subgrade materials underlying the project pavements should be improved to a depth of 12 inches or more in accordance with the recommendations provided in Section 9.2.3.

Specific traffic loadings for these areas were not available at the time of this report preparation. The design of rigid pavements was based on an equivalent 18-kip single axel application of 250,000 for a 20-year design life was assumed for the pavement areas. The following parameters were also utilized:

Initial Serviceability:	4.5
Terminal Serviceability:	2.5
28-Day Mean PCC Modulus Rupture:	650 psi

28-Day Mean Elastic Modulus of Slab:	3.6×10^6 psi
Mean Effective k value:	150 psi/in
Reliability:	80%
Overall Standard Deviation:	0.35
Load Transfer Coefficient:	4.2
Overall Drainage Coefficient:	1

Based on the above-mentioned design traffic and input parameters, and following the AASHTO method of pavement design, we recommend utilizing 6 or more inches of Portland cement concrete pavement (PCCP) for the proposed paved areas. We also recommend that a qualified structural or civil engineer be consulted for appropriate reinforcement of concrete pavement.

Consideration should be given to the placement of 4 inches or more inches of aggregate base course (ABC) below PCCP. Although the use of ABC is not integral for structural support in PCCP pavements, their use will develop a more stable subgrade for concrete truck traffic associated with the pavement construction and help reduce potential slab curl, shrinkage cracking, and subgrade “pumping” through joints. Adequate joint spacing is recommended to prevent loss of load transfer across saw-cut crack control joints. Joints should be sealed to reduce water infiltration.

Adequate surface drainage should be provided to reduce ponding and infiltration of water into the pavement and subgrade materials. We suggest that the paved areas have a surface gradient of 2 percent or more. In addition, surface runoff from surrounding areas should be intercepted, collected, and not permitted to flow onto the pavement or infiltrate the subgrade. We recommend that perimeter swales, edge drains, curbs and gutters, or combination of these drainage devices, be constructed to reduce the adverse effects of surface water runoff.

PCCP should consist of a plant mix composed of a mixture of aggregate, Portland cement and appropriate admixtures meeting the requirements of CCOD. Concrete should have a modulus of rupture of third point loading of 650 psi or more. The concrete should be air-entrained with approximately 6 percent air and should have a cement content of six or more sacks per cubic yard. Allowable slump should be approximately 4 inches. The ABC material placed beneath pavements should meet the criteria of CDOT Class 6 aggregate base. Requirements for CDOT Class 6 aggregate base can be found in Section 703 of the current CDOT Standards and Specifications for Road and Bridge Construction (CDOT, 2021).

The geotechnical engineer should be retained to review the proposed pavement mix designs, grading, and lift thicknesses prior to construction.

The contractor should be prepared either to dry the subgrade materials or moisten them, as needed, prior to compaction. Some site soils may pump or deflect during compaction if moisture levels are not carefully monitored. The contractor should be prepared to process and compact such soils to establish a stable platform for paving, including use of chemical stabilization or geotextiles, where needed.

The prepared subgrade should be protected from the elements prior to pavement placement. Subgrades that are exposed to the elements may need additional moisture conditioning and compaction, prior to pavement placements.

Immediately prior to paving, the subgrade should be proofrolled with a heavily loaded, pneumatic tired vehicle and checked for moisture. Areas that show excessive deflection during proof rolling should be excavated and replaced and/or stabilized. Areas allowed to pond prior to paving may need to be re-worked prior to proof rolling.

The collection and diversion of surface drainage away from paved areas is vital to satisfactory performance of the pavements. The subsurface and surface drainage systems should be carefully designed to facilitate removal of the water from paved areas and subgrade soils. Allowing surface waters to pond on pavements will cause premature pavement deterioration. Where topography, site constraints or other factors limit or preclude adequate surface drainage, pavements should be provided with edge drains to reduce loss of subgrade support. The long-term performance of the pavement also can be improved greatly by backfilling and compaction behind curbs, gutters, and sidewalks so that ponding is not permitted and water infiltration is reduced.

9.6 Concrete Flatwork

Ground-supported flatwork, such as walkways, will be subject to soil-related movements resulting from heave/settlement, frost, etc. Thus, where these types of elements abut rigid building foundations or isolated/suspended structures, differential movements should be anticipated. We recommend that flexible joints be provided where such elements abut the main structures to allow for differential movement at these locations.

We recommend that exterior concrete flatwork be supported on improved subgrade as described in Section 9.2.3 of this report. Positive drainage should be established and maintained adjacent to flatwork. Water should not be allowed to pond on flatwork.

In no case should exterior flatwork extend under any portion of the building where there is less than 2 inches of clearance between the flatwork and any element of the building. Exterior flatwork

in contact with brick, rock facades, or any other element of the building can cause damage to the structure if the flatwork experiences movements.

The ground-supported flatwork should be provided with crack-control and expansion joints in accordance with CCOD Standards and Specifications.

9.7 Corrosion Considerations

The corrosion potential of on-site soils to concrete and buried metal was evaluated in the laboratory using representative samples obtained from the exploratory borings. Laboratory testing was performed to assess the effects of sulfate on concrete and the effects of soil resistivity on buried metal. Results of these tests are presented in Appendix B. Recommendations regarding concrete to be utilized in construction of proposed improvements and for buried metal pipes are provided in the following sections.

9.7.1 Concrete

The test for water-soluble sulfate content of the soils was performed using CDOT Test Method CP-L 2104. The laboratory test results are presented in Appendix B. The percentage of water-soluble sulfates in water measured was 0.001 percent. Based on Table 601-2 of the CDOT 2020 Standard Specifications for Road and Bridge Construction, the on-site soils represent a Class 1 severity of sulfate exposure to concrete on a scale that ranges between Class 0 and Class 3. Therefore, we recommend that the concrete used for this project should have a maximum water to cementitious material ratio of 0.45 and the cementitious materials should meet one of the below outlined requirements.

- ASTM C150 Type I, II, III or V
- ASTM C595 Type IL, IP, IP(MS), IP(HS) or IT

The Structural Engineer should ultimately select the concrete design strength based on the project specific loading conditions. However, higher strength concrete may be selected for increased durability, resistance to slab curling and shrinkage cracking. We recommend the use of concrete with a design 28-day compressive strength of 4,000 psi or more, for concrete slabs at this site. Concrete exposed to the elements should be air-entrained.

9.7.2 Buried Metal Pipes

The corrosion potential of on-site materials was analyzed to evaluate potential effects on foundations and structures. Corrosion potential was evaluated using the results of laboratory

testing of samples obtained during the subsurface evaluation that were considered representative of soils at the subject site.

Resistivity was measured to be approximately 294 ohm-cm for our selected sample. The results of the laboratory testing indicate the on-site materials could be very severely corrosive to ferrous metals based on the criteria in Table 8. Therefore, special consideration should be given to the use of heavy gauge, corrosion protected, underground steel pipe or culverts, if any are planned. As an alternative, plastic pipe or reinforced concrete pipe could be considered. A corrosion specialist should be consulted for further recommendations. The laboratory test results are presented in Appendix B.

Table 8 – Corrosion Potential to Steel

Resistivity (Ohm-cm)	Corrosivity Potential to Steel
0 - 500	Very Severe
500 – 2,000	Severe
2,000 – 10,000	Moderate
10,000 – 30,000	Mild
>30,000	Low

9.8 Scaling

Climatic conditions in the project area including relatively low humidity, large temperature changes and repeated freeze-thaw cycles, may cause surficial scaling and spalling of exterior concrete. Occurrence of surficial scaling and spalling can be aggravated by poor workmanship during construction, such as “over-finishing” concrete surfaces and the use of de-icing salts on exterior concrete flatwork, particularly during the first winter after construction. The use of de-icing salts on nearby roadways, which can be transferred by vehicle traffic onto newly placed concrete, can be sufficient to induce scaling.

The measures below can be beneficial for reducing the concrete scaling. However, because of the other factors involved, including workmanship, surface damage to concrete can develop even though the measures provided below were followed. The mix design criteria should be coordinated with other project requirements including the criteria for soluble sulfate resistance.

- Curing concrete in accordance with applicable codes and guidelines.
- Maintaining a water/cement ratio of 0.45 by weight for exterior concrete mixes.
- Including Type F fly ash in exterior concrete mixes as 20 percent of the cementitious material.

- Specifying a 28-day, compressive strength of 4,000 or more psi for exterior concrete that may be exposed to de-icing salts.
- Avoiding the use of de-icing salts through the first winter after construction.
- If colored concrete is being proposed for use at this site, Ninyo & Moore should be consulted for additional recommendations.

9.9 Frost Heave

Site soils are susceptible to frost heave if allowed to become saturated and exposed to freezing temperatures and repeated freeze/thaw cycling. The formation of ice in the underlying soils can result in two or more inches of heave of pavements, flatwork and other hardscaping in sustained cold weather. A portion of this movement may be recovered when the soils thaw, but due to loss of soil density some degree of displacement will remain. Frost heave of hardscaping could also result in areas where the subgrade soils were placed on engineered fill.

In areas where hardscape movements are a design concern (i.e. exterior flatwork located adjacent to the building within the doorway swing zone), replacement of the subgrade soils with 2 or more feet of clean, coarse sand or gravel, or supporting the element on foundations similar to the building, or spanning over a void should be considered. Recommendations in this regard can be provided upon request.

9.10 Construction in Cold or Wet Weather

During construction, the site should be graded such that surface water can drain readily away from the building areas. Given the soil conditions, it is important to avoid ponding of water in or near excavations. Water that accumulates in excavations should be promptly pumped out or otherwise removed and these areas should be allowed to dry out before resuming construction. Berms, ditches, and similar means should be used to decrease stormwater entering the work area and to efficiently convey it off site.

Earthwork activities undertaken during the cold weather season may be difficult and should be done by an experienced contractor. Fill should not be placed on top of frozen soils. The frozen soils should be removed prior to the placement of fill or other construction material. Frozen soil should not be used as engineered fill or backfill. The frozen soil may be reused (provided it meets the selection criteria) once it has thawed completely. In addition, compaction of the soils may be more difficult due to the viscosity change in water at lower temperatures.

If construction proceeds during cold weather, foundations, slabs, or other concrete elements should not be placed on frozen subgrade soil. Frozen soil should either be removed from beneath

concrete elements, or thawed and recompacted. To limit the potential for soil freezing, the time passing between excavation and construction should be minimized. Blankets, straw, soil cover, or heating may be used to discourage the soil from freezing.

9.11 Site Drainage

Infiltration of water into subsurface soils can lead to soil movement and associated distress, and chemically and physically related deterioration of concrete and masonry structures. To reduce the potential for infiltration of moisture into subsurface soils at the site, we recommend the following:

- Positive drainage should be established and maintained away from the proposed structure. Positive drainage may be established by providing a surface gradient for paved areas of 2 to 5 percent or more for a distance of 10 feet or more away from structures. Where concrete flatwork is placed adjacent to structures and other considerations are required by law, such as ADA requirements, slopes of 1 percent or more are considered acceptable. For unpaved areas, positive drainage may be established by a slope of 5 to 10 percent for 10 feet or more away from structures, where possible.

- Adequate surface drainage should be provided to channel surface water away from on-site structures and off paved surfaces to a suitable outlet such as a storm drain. Adequate surface drainage may be enhanced by utilization of graded swales, area drains, and other drainage devices. Surface run-off should not be allowed to pond near structures.

- Canopy roof drains should have downspouts tightlined to an appropriate outlet, such as a storm drain or the street, away from structures, pavements, and flatwork. If tightlining of the downspouts is not practicable, they should discharge 5 feet or more away from structures and onto surfaces that slope away from the structure. Downspouts should not be allowed to discharge onto the ground surface adjacent to building foundations or on exterior walkways.

- Irrigated landscaping, consisting of sprinklers to water plants with high demands for water, should not be placed within 10 feet of the building(s). Drip irrigation is considered acceptable within this zone.

9.12 Construction Observation and Testing

A qualified geotechnical consultant should perform appropriate observation and testing services during grading and construction operations. These services should include observation of any soft, loose, or otherwise unsuitable soils, evaluation of subgrade conditions where soil removals are performed, evaluation of the suitability of proposed borrow materials for use as fill, evaluation of the stability of open temporary excavations, evaluation of the results of any subgrade stabilization or dewatering activities, and performance of observation and testing services during placement and compaction of engineered fill and backfill soils.

The geotechnical consultant should also perform observation and testing services during placement of concrete, mortar, grout, asphalt concrete, and steel reinforcement. If another geotechnical consultant is selected to perform observation and testing services for the project, we

request that the selected consultant provide a letter to the owner, with a copy to Ninyo & Moore, indicating that they fully understand our recommendations and that they are in full agreement with the recommendations contained in this report. Qualified subcontractors utilizing appropriate techniques and construction materials should perform construction of the proposed improvements.

9.13 Plan Review

The recommendations presented in this report are based on preliminary design information for the proposed project and on the findings of our geotechnical evaluation. When finished, project plans and specifications should be reviewed by the geotechnical consultant prior to submitting the plans and specifications for bid. Additional field exploration and laboratory testing may be needed upon review of the project design plans.

9.14 Pre-Construction Meeting

We recommend a pre-construction meeting be held. The owner or the owner's representative, the architect, the contractor, and the geotechnical consultant should be in attendance to discuss the plans and the project.

10 LIMITATIONS

The field evaluation, laboratory testing, and geotechnical analyses presented in this geotechnical report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be encountered during construction. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation will be performed upon request. Please also note that our evaluation was limited to assessment of the geotechnical aspects of the project, and did not include evaluation of structural issues, environmental concerns, or the presence of hazardous materials.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

This report is intended for design purposes only. It does not provide sufficient data to prepare an accurate bid by contractors. It is suggested that the bidders and their geotechnical consultant perform an independent evaluation of the subsurface conditions in the project areas. The independent evaluations may include, but not be limited to, review of other geotechnical reports prepared for the adjacent areas, site reconnaissance, and additional exploration and laboratory testing.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions. If geotechnical conditions different from those described in this report are encountered, our office should be notified and additional recommendations, if warranted, will be provided upon request. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of man at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

11 REFERENCES

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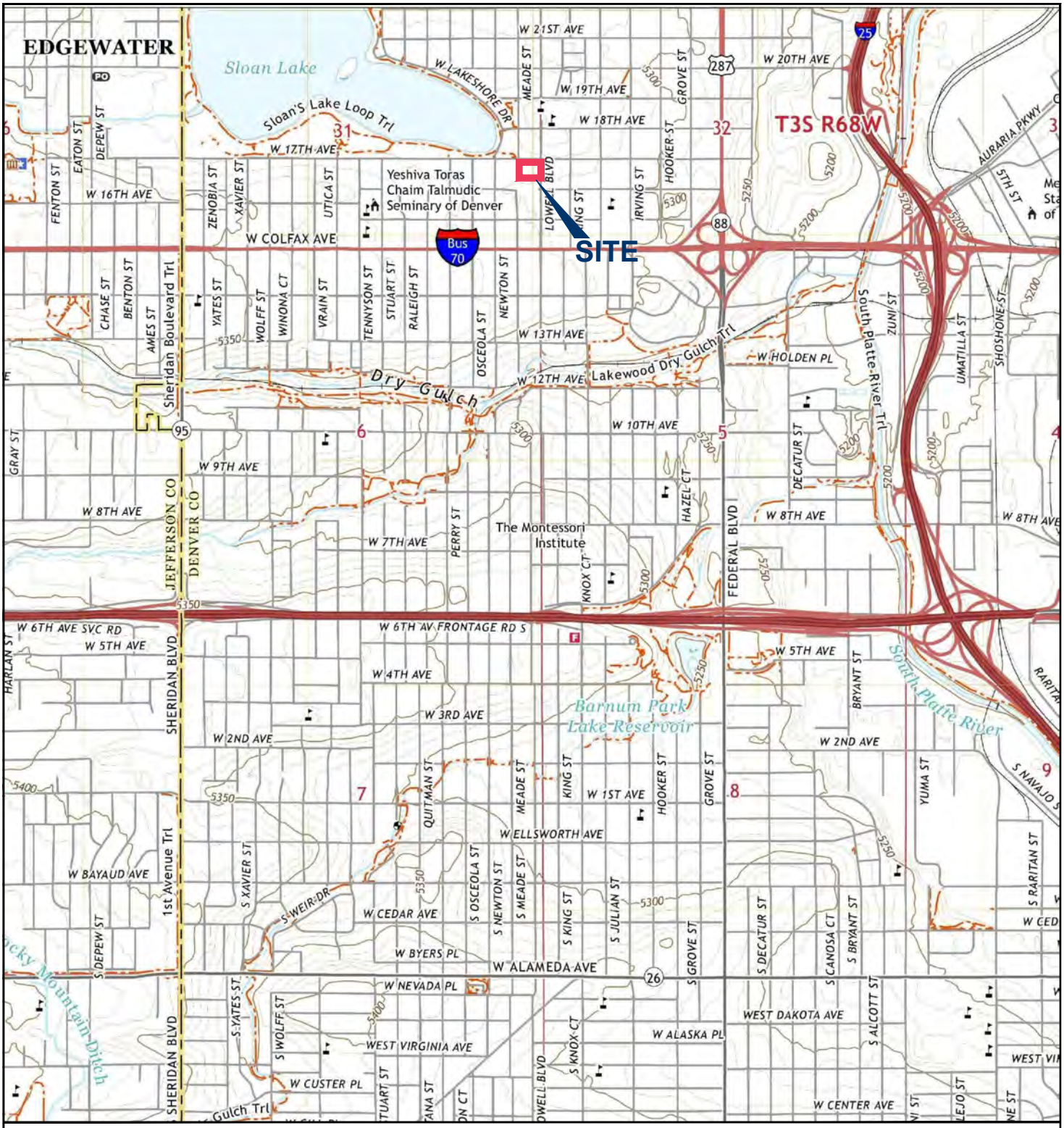
FIGURES



NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: USGS, 2018.

N

FEET
0 2,000 4,000

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FIGURE 1

SITE LOCATION

SLOANS LAKE FSER
DENVER, COLORADO

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

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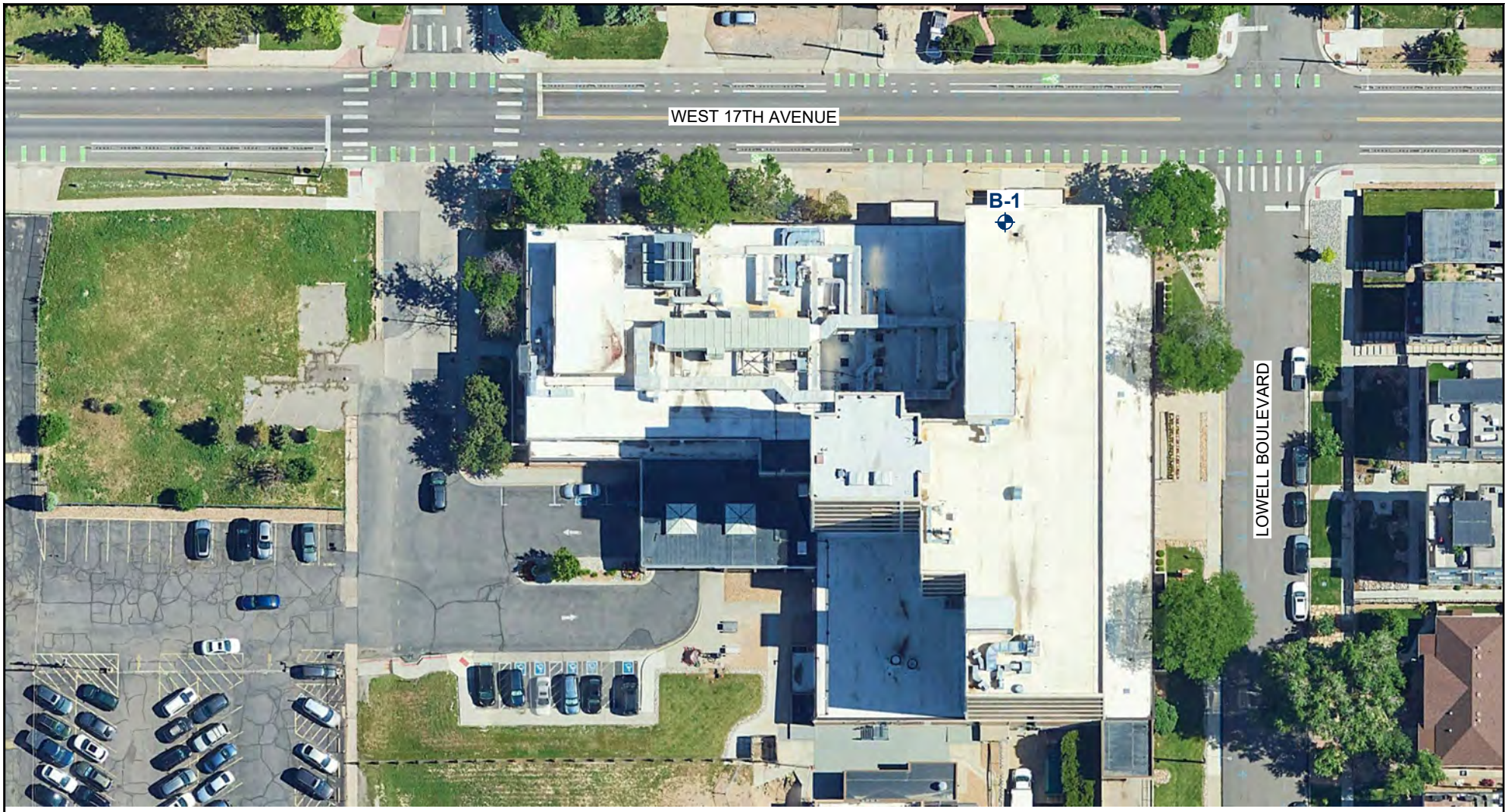

LEGEND

B-1 BORING

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: GOOGLE EARTH 2022.

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FEET

0 60 120

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FIGURE 2

BORING LOCATION

SLOANS LAKE FSER
DENVER, COLORADO

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Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

APPENDIX A

Boring Logs

APPENDIX A

BORING LOGS

Field Procedure for the Collection of Disturbed Samples
Disturbed soil samples were obtained in the field using the following methods.

Bulk Samples
Bulk samples of representative earth materials were obtained from the exploratory boring. The samples were bagged and transported to the laboratory for testing.

Field Procedure for the Collection of Ring-lined Samples
Ring-lined soil samples were obtained in the field using the following methods.

The California Drive Sampler
The sampler, with an external diameter of 2.4 inches, was lined with four 4-inch long, thin brass rings with inside diameters of approximately 1.9 inches. The sample barrel was driven into the ground with the weight of a hammer in general accordance with ASTM D 3550. The driving weight was permitted to fall freely. The approximate length of the fall, the weight of the hammer, and the number of blows per foot of driving are presented on the boring logs as an index to the relative resistance of the materials sampled. The samples were removed from the sample barrel in the brass liners, sealed, and transported to the laboratory for testing.

BORING LOG EXPLANATION SHEET

DEPTH (feet)	BULK DRIVEN	BLOWS/FOOT	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SYMBOL	USCS	
							Bulk sample.
							Modified Split-Barrel Drive Sampler
							2-inch inner diameter split-barrel drive sampler.
							No recovery with modified split-barrel drive sampler, or 2-inch inner diameter split-barrel drive sampler.
							Sample retained by others.
5							Standard Penetration Test (SPT).
							No recovery with an SPT.
							Shelby tube sample. Distance pushed in inches/length of sample recovered in inches.
							No recovery with Shelby tube sampler.
							Continuous Push Sample.
10							Groundwater encountered during drilling.
							Groundwater measured after drilling.
						SM	**MAJOR MATERIAL TYPE (SOIL)**: Solid line denotes unit change.
						CL	Dashed line denotes material change
15							Attitudes: Strike/Dip b: Bedding c: Contact j: Joint f: Fracture F: Fault cs: Clay Seam s: Shear bss: Basal Slide Surface sf: Shear Fracture sz: Shear Zone sbs: Shear Bedding Surface
20							The total depth line is a solid line that is drawn at the bottom of the boring.

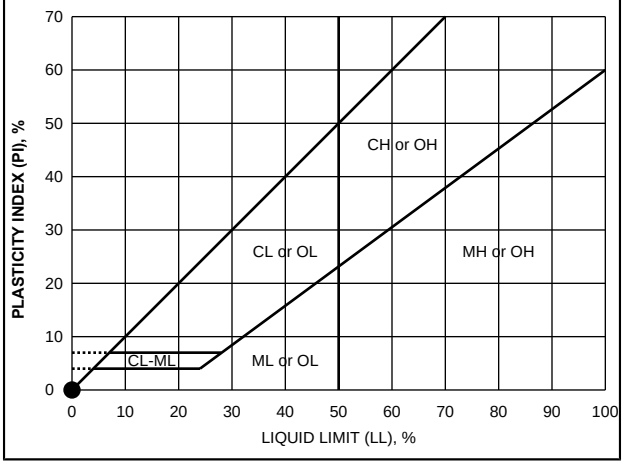
SOIL CLASSIFICATION CHART PER ASTM D 2488

PRIMARY DIVISIONS			SECONDARY DIVISIONS	
			GROUP SYMBOL	GROUP NAME
COARSE-GRAINED SOILS more than 50% retained on No. 200 sieve	GRAVEL more than 50% of coarse fraction retained on No. 4 sieve	CLEAN GRAVEL less than 5% fines	GW	well-graded GRAVEL
			GP	poorly-graded GRAVEL
		GRAVEL with DUAL CLASSIFICATIONS 5% to 12% fines	GW-GM	well-graded GRAVEL with silt
			GP-GM	poorly-graded GRAVEL with silt
			GW-GC	well-graded GRAVEL with clay
			GP-GC	poorly-graded GRAVEL with clay
		GRAVEL with FINES more than 12% fines	GM	silty GRAVEL
			GC	clayey GRAVEL
			GC-GM	silty, clayey GRAVEL
	SAND 50% or more of coarse fraction retained on No. 4 sieve	CLEAN SAND less than 5% fines	SW	well-graded SAND
			SP	poorly-graded SAND
		SAND with DUAL CLASSIFICATIONS 5% to 12% fines	SW-SM	well-graded SAND with silt
			SP-SM	poorly-graded SAND with silt
			SW-SC	well-graded SAND with clay
			SP-SC	poorly-graded SAND with clay
		SAND with FINES more than 12% fines	SM	silty SAND
			SC	clayey SAND
			SC-SM	silty, clayey SAND
FINE-GRAINED SOILS 50% or more passes No. 200 sieve	SILT and CLAY liquid limit less than 50%	INORGANIC	CL	lean CLAY
			ML	SILT
			CL-ML	silty CLAY
		ORGANIC	OL (PI > 4)	organic CLAY
			OL (PI < 4)	organic CLAY
	SILT and CLAY liquid limit 50% or more	INORGANIC	CH	fat CLAY
			MH	elastic SILT
		ORGANIC	OH (plots on or above 'A'-line)	organic CLAY
			OH (plots below 'A'-line)	organic SILT
	Highly Organic Soils		PT	Peat

GRAIN SIZE

DESCRIPTION		SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders		> 12"	> 12"	Larger than basketball-sized
Cobbles		3 - 12"	3 - 12"	Fist-sized to basketball-sized
Gravel	Coarse	3/4 - 3"	3/4 - 3"	Thumb-sized to fist-sized
	Fine	#4 - 3/4"	0.19 - 0.75"	Pea-sized to thumb-sized
Sand	Coarse	#10 - #4	0.079 - 0.19"	Rock-salt-sized to pea-sized
	Medium	#40 - #10	0.017 - 0.079"	Sugar-sized to rock-salt-sized
	Fine	#200 - #40	0.0029 - 0.017"	Flour-sized to sugar-sized
Fines		Passing #200	< 0.0029"	Flour-sized and smaller

PLASTICITY CHART



APPARENT DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPOOLING CABLE OR CATHEAD		AUTOMATIC TRIP HAMMER	
	SPT (blows/foot)	SPLIT BARREL (blows/foot)	SPT (blows/foot)	SPLIT BARREL (blows/foot)
Very Loose	≤ 4	≤ 8	≤ 3	≤ 5
Loose	5 - 10	9 - 21	4 - 7	6 - 14
Medium Dense	11 - 30	22 - 63	8 - 20	15 - 42
Dense	31 - 50	64 - 105	21 - 33	43 - 70
Very Dense	> 50	> 105	> 33	> 70

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	SPOOLING CABLE OR CATHEAD		AUTOMATIC TRIP HAMMER	
	SPT (blows/foot)	SPLIT BARREL (blows/foot)	SPT (blows/foot)	SPLIT BARREL (blows/foot)
Very Soft	< 2	< 3	< 1	< 2
Soft	2 - 4	3 - 5	1 - 3	2 - 3
Firm	5 - 8	6 - 10	4 - 5	4 - 6
Stiff	9 - 15	11 - 20	6 - 10	7 - 13
Very Stiff	16 - 30	21 - 39	11 - 20	14 - 26
Hard	> 30	> 39	> 20	> 26

DATE DRILLED	10/11/2024
BORING NO.	B-1
GROUND ELEVATION	~5315.9'
SHEET	1 OF 2
RIG TYPE	CME-55
TOOLING	4" Solid Stem Auger
DRILLING FIRM	Dakota
DRIVE WEIGHT	140 lbs.
TYPE	Spooling Cathead
DROP	30"
SAMPLED BY	MEO
LOGGED BY	MEO
REVIEWED BY	BFG

DEPTH (feet)	BULK	DRIVEN	BLOWS/FOOT	MOISTURE CONTENT	DRY DENSITY (PCF)	SYMBOL	USCS	
								CONCRETE: Approximately 5.75 inches thick.
								ROADBASE: Approximately 4 inches thick.
			13	23.8	102.0			**FILL**: Dark gray, moist, fat CLAY with sand.
5			23	20.7	106.1		CL	**ALLUVIUM**: Brown, moist, very stiff, lean CLAY with sand.
							SP-SC	Dark brown, moist, medium dense, fine to coarse SAND with clay and gravel.
10			34	13.0	112.5			**DENVER FORMATION**: Olive gray, moist, very soft, CLAYSTONE; weathered.
15			33	19.0	108.2			Gray to olive gray.
								Brown, dry to moist, moderately hard, CLAYSTONE.
20			50/10"	18.7	100.1			
25			50/8"	20.0	108.5			Gray and light brown; moist.
30			50/6"	22.9	101.3			Dry to moist; hard.
35			50/6"	21.5	99.4			Yellowish brown.
			50/6"	21.8	103.3			Gray.

FIGURE A-1

Ninyo & Moore

SLOANS LAKE FSER
DENVER, COLORADO
503056001 | 11/24

DEPTH (feet)	BULK	DRIVEN	BLOWS/FOOT	MOISTURE CONTENT	DRY DENSITY (PCF)	SYMBOL	USCS

DATE DRILLED	10/11/2024	BORING NO.	B-1				
GROUND ELEVATION	~5315.9'	SHEET	2	OF	2		
RIG TYPE	CME-55	TOOLING	4" Solid Stem Auger	DRILLING FIRM	Dakota		
DRIVE WEIGHT	140 lbs.	TYPE	Spooling Cathead	DROP	30"		
SAMPLED BY	MEO	LOGGED BY	MEO	REVIEWED BY	BFG		

Total Depth: 39.5 feet.
Groundwater was not encountered during drilling.
Backfilled with on-site soil after drilling on 10/11/2024.

Notes:
Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.

Ground elevations were measured using a Trimble Model DA2-BT survey unit with global navigation satellite system (GNSS) output of NAD83 (2011) and referencing geoid model GEOID18.

APPENDIX B

Laboratory Testing

APPENDIX B

LABORATORY TESTING

Classification

Soils were visually and texturally classified in accordance with the Unified Soil Classifications System (USCS) in general accordance with ASTM D 2488. Soil classifications are indicated on the logs of the exploratory excavations in Appendix A.

In-Place Moisture and Density Tests

The moisture content and dry density of ring-lined samples obtained from the exploratory boring were evaluated in general accordance with ASTM D 2837. These test results are presented on the logs of the exploratory boring in Appendix A.

Atterberg Limits

Tests were performed on selected representative fine-grained soil samples to evaluate the liquid limit, plastic limit, and plasticity index in general accordance with ASTM D 4318. These test results were utilized to evaluate the soil classification in accordance with the Unified Soil Classification System. The test results and classifications are shown on Figure B-1.

No. 200 Sieve Analysis

An evaluation of the percentage of particles finer than the No. 200 sieve in selected soil samples was performed in general accordance with ASTM D 1140. The results of the tests are presented on Figure B-2.

Consolidation/Swell Tests

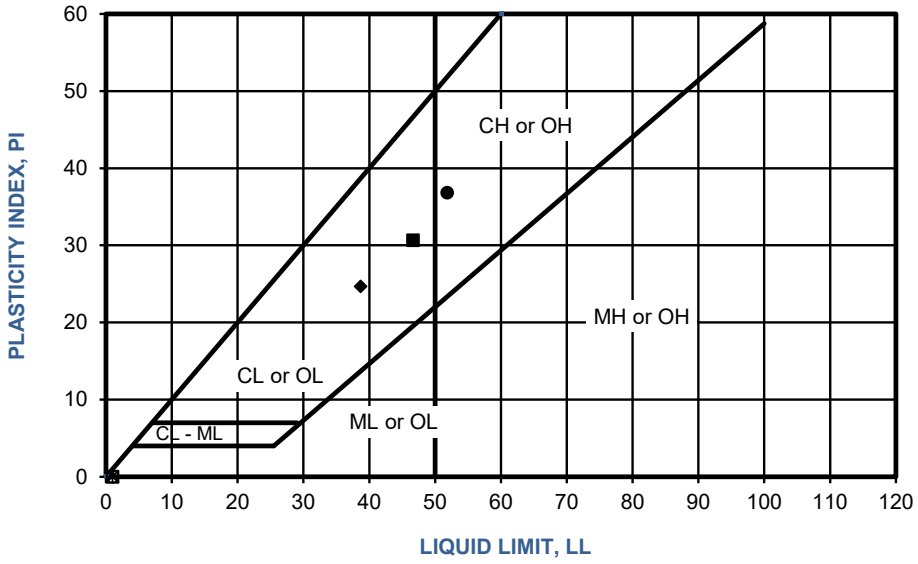
The swell potential of selected materials was evaluated in general accordance with ASTM D4546, Method B. Relatively undisturbed specimens were loaded with a specified surcharge before inundation with tap water. Readings of volumetric swell were recorded until completion of primary swell. The results of the tests are presented on Figures B-3 through B-8.

Soil Corrosivity Tests

A soil pH test was performed on a representative sample in general accordance with ASTM Test Method D 4972. A soil minimum resistivity test was performed on a representative sample in general accordance with AASHTO T288. The sulfate content of a selected sample was evaluated in general accordance with CDOT Test Method CP-L 2103. The chloride content of a selected sample was evaluated in general accordance with CDOT Test Method CP-L 2104. The test results are presented on Figure B-9.

SYMBOL	LOCATION	DEPTH (ft)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	USCS CLASSIFICATION (Fraction Finer Than No. 40 Sieve)	EQUIVALENT USCS
●	B-1	1.0-2.0	52	15	37	CH	CH
■	B-1	4.0-5.0	47	16	31	CL	CL
◆	B-1	14.0-15.0	39	14	25	CL	CL

NP - INDICATES NON-PLASTIC



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318

FIGURE B-1

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ATTERBERG LIMITS TEST RESULTS

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SAMPLE LOCATION	SAMPLE DEPTH (ft)	DESCRIPTION	PERCENT PASSING NO. 4	PERCENT PASSING NO. 200	EQUIVALENT USCS
B-1	1.0-2.0	Dark Gray Fat CLAY with Sand	98	73	CH
B-1	4.0-5.0	Brown Lean CLAY with Sand	100	75	CL
B-1	14.0-15.0	Gray to Olive Gray CLAYSTONE; DENVER FORMATION	100	72	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 1140

FIGURE B-2

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NO. 200 SIEVE ANALYSIS TEST RESULTS

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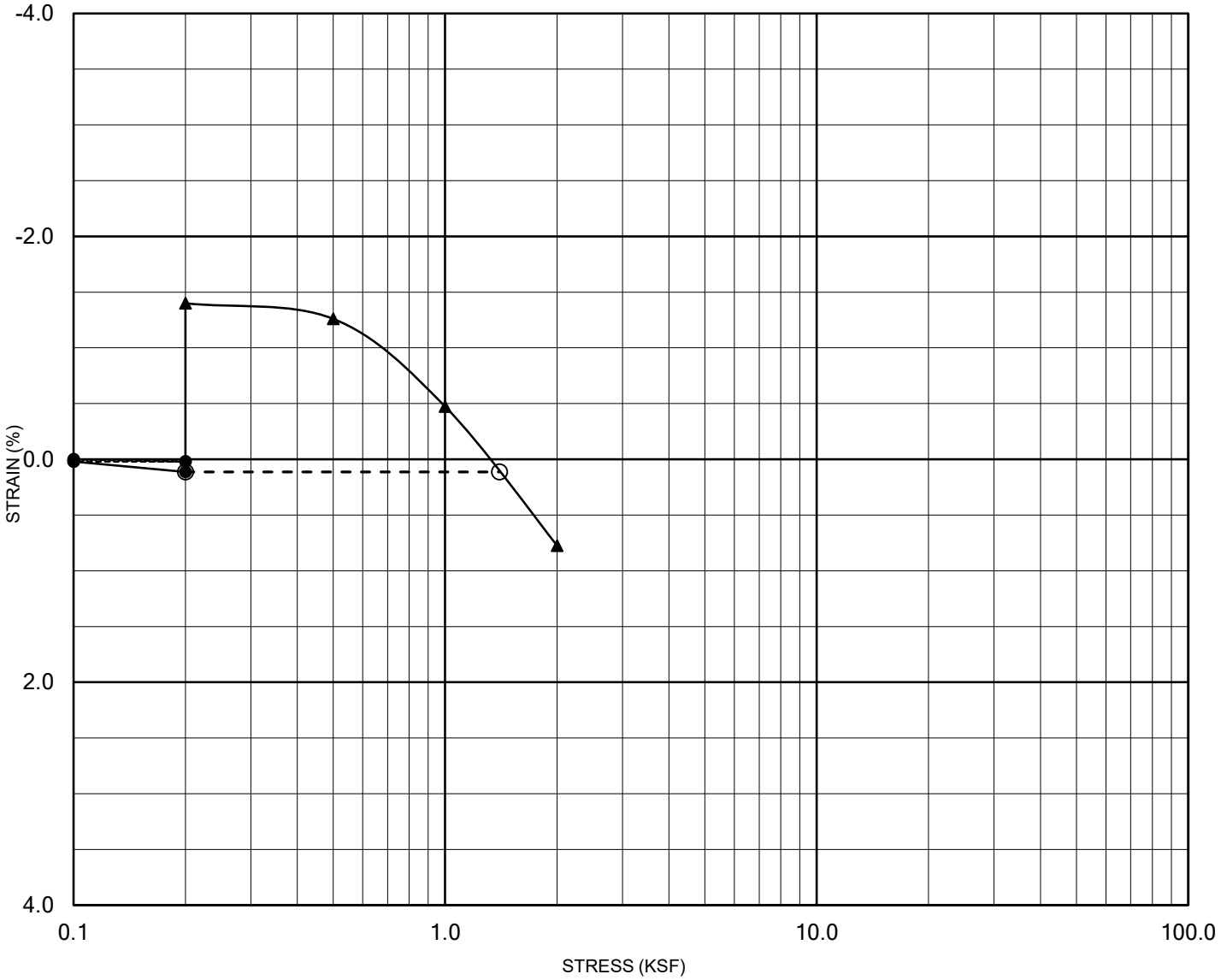

Seating Cycle
Load Prior to Inundation
Load After Inundation
Swell Pressure

Moisture Increase (%):	1.8
Swell Percentage (%):	1.5
Swell Pressure (psf):	1,200

Sample Location: B-1
Depth: 1.0-2.0
Soil Type: CH (Fill)

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546

FIGURE B-3

CONSOLIDATION TEST RESULTS

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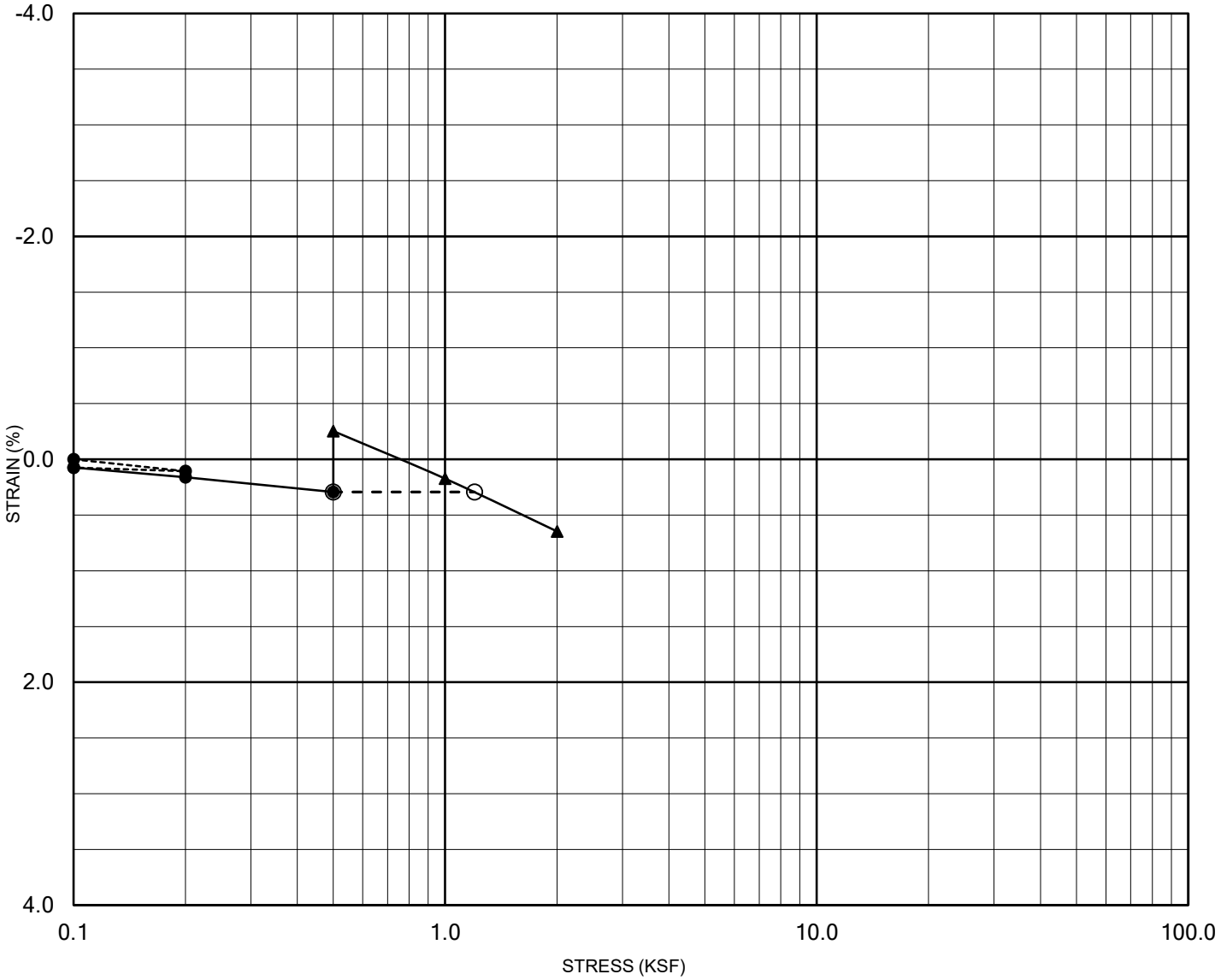

Seating Cycle
Load Prior to Inundation
Load After Inundation
Swell Pressure

Moisture Increase (%):	3.3
Swell Percentage (%):	0.5
Swell Pressure (psf):	700

Sample Location: B-1
Depth: 4.0-5.0
Soil Type: CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546

FIGURE B-4

CONSOLIDATION TEST RESULTS

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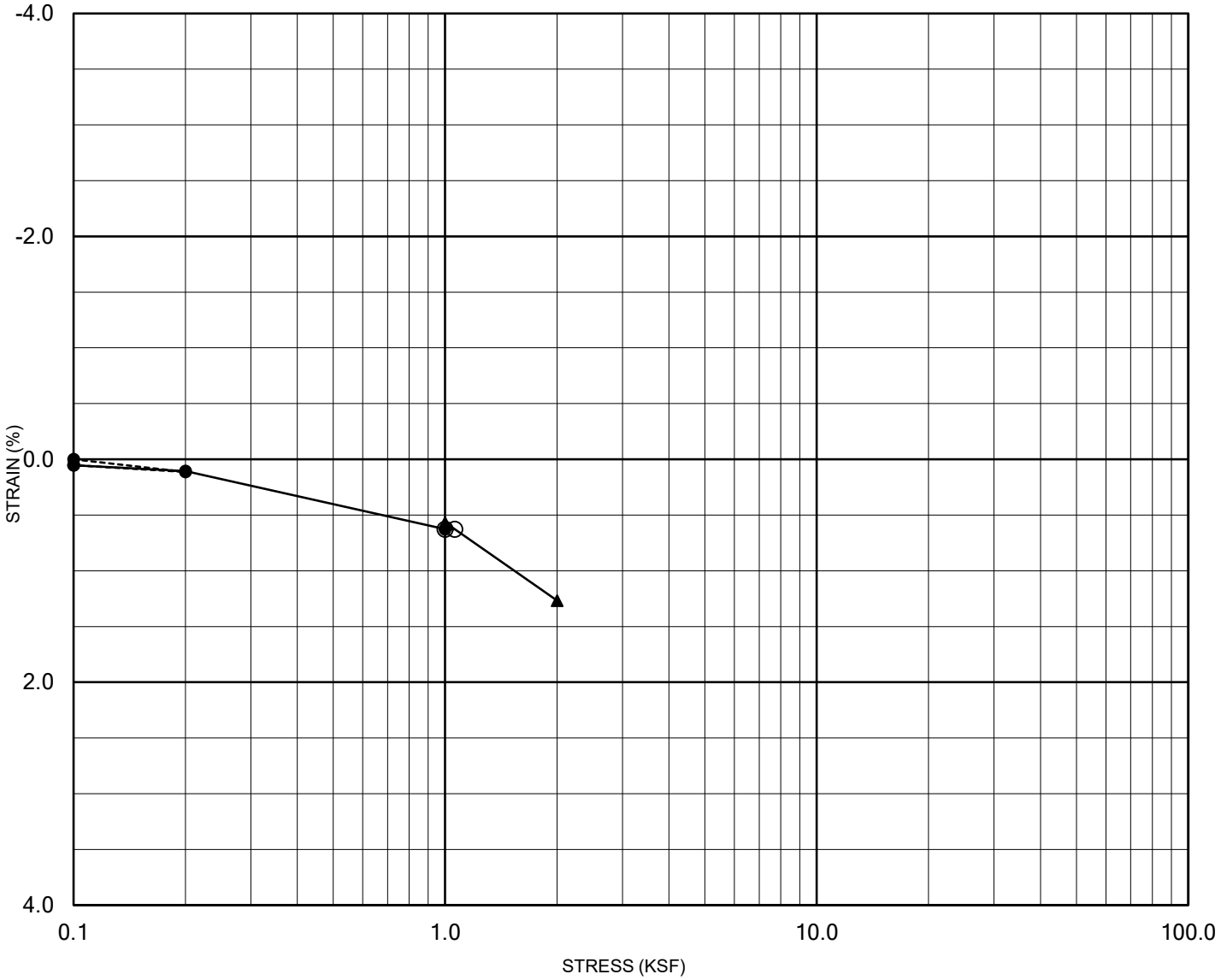

Seating Cycle
Load Prior to Inundation
Load After Inundation
Swell Pressure

Moisture Increase (%):	3.0
Swell Percentage (%):	0.1
Swell Pressure (psf):	60

Sample Location: B-1
Depth: 9.0-10.0
Soil Type: CLAYSTONE; DENVER FORMATION

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546

FIGURE B-5

CONSOLIDATION TEST RESULTS

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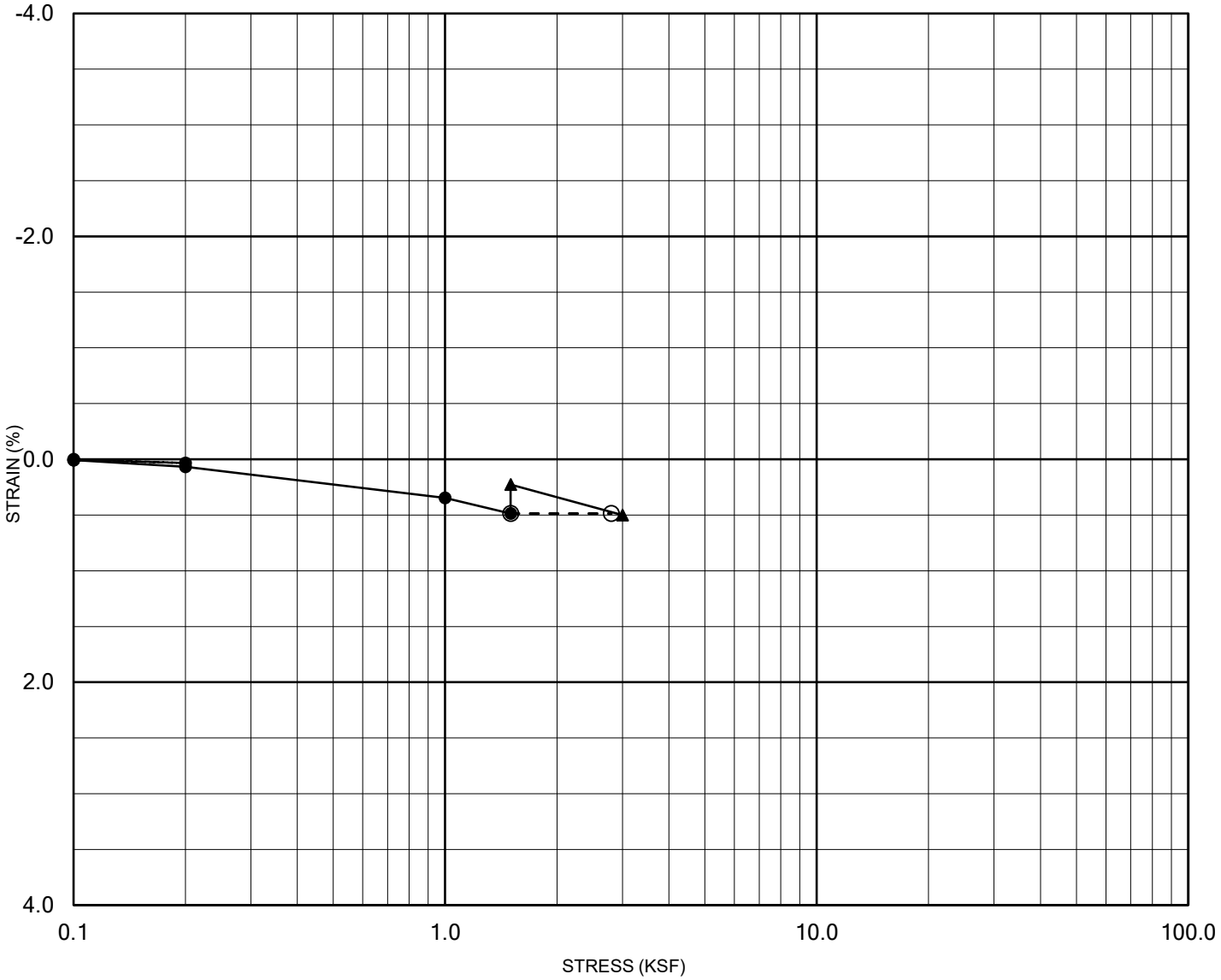

Seating Cycle
Load Prior to Inundation
Load After Inundation
Swell Pressure

Moisture Increase (%):	3.2
Swell Percentage (%):	0.3
Swell Pressure (psf):	1,300

Sample Location: B-1
Depth: 14.0-15.0
Soil Type: CLAYSTONE; DENVER FORMATION

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FIGURE B-6

CONSOLIDATION TEST RESULTS

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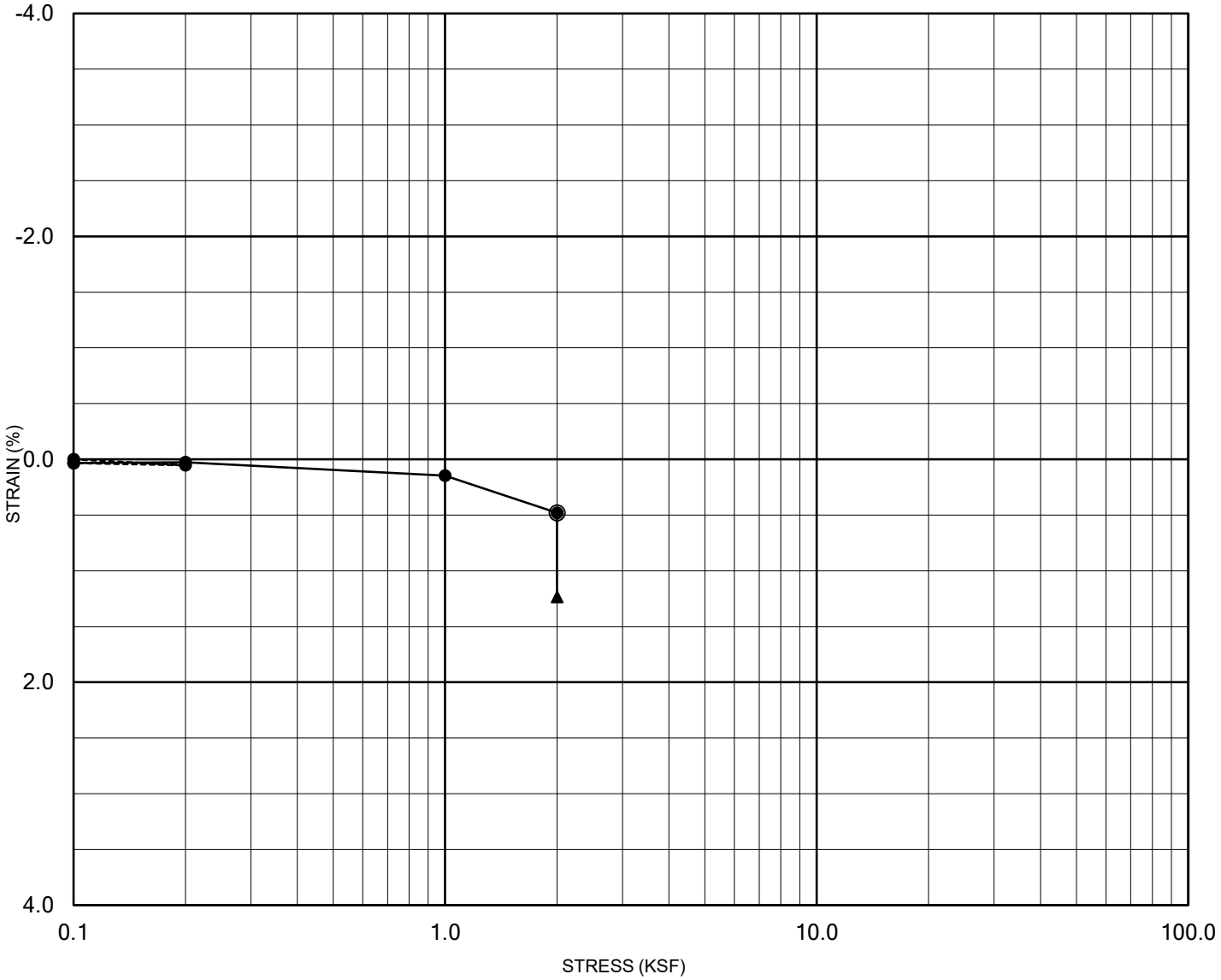

Seating Cycle
Load Prior to Inundation
Load After Inundation
Swell Pressure

Moisture Increase (%):	5.2
Swell Percentage (%):	-0.8
Swell Pressure (psf):	--

Sample Location: B-1
Depth: 19.0-19.8
Soil Type: CLAYSTONE; DENVER FORMATION

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546

FIGURE B-7

CONSOLIDATION TEST RESULTS

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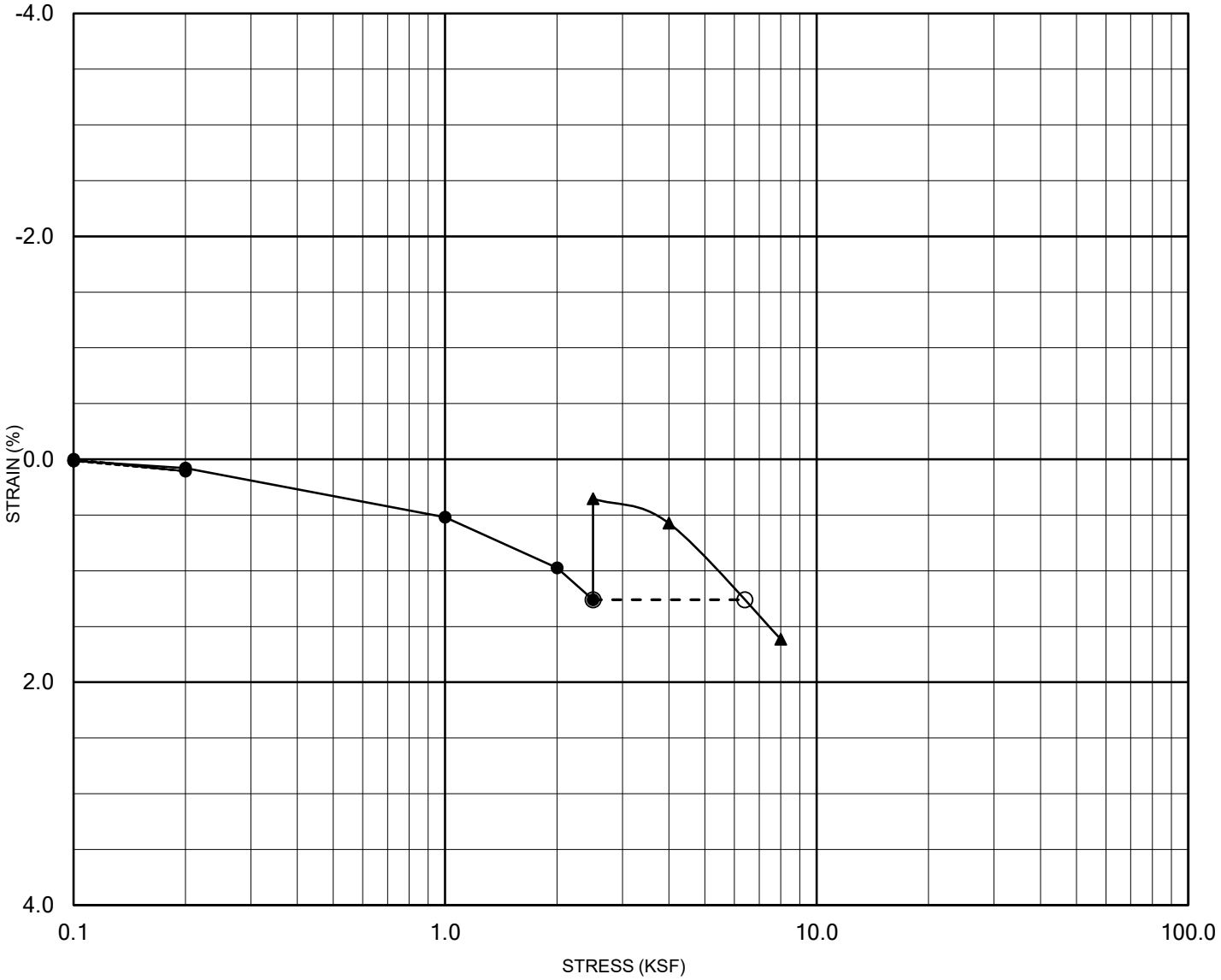

Seating Cycle
Load Prior to Inundation
Load After Inundation
Swell Pressure

Moisture Increase (%):	3.0
Swell Percentage (%):	0.9
Swell Pressure (psf):	3,900

Sample Location: B-1
Depth: 24.0-24.7
Soil Type: CLAYSTONE; DENVER FORMATION

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4546

FIGURE B-8

CONSOLIDATION TEST RESULTS

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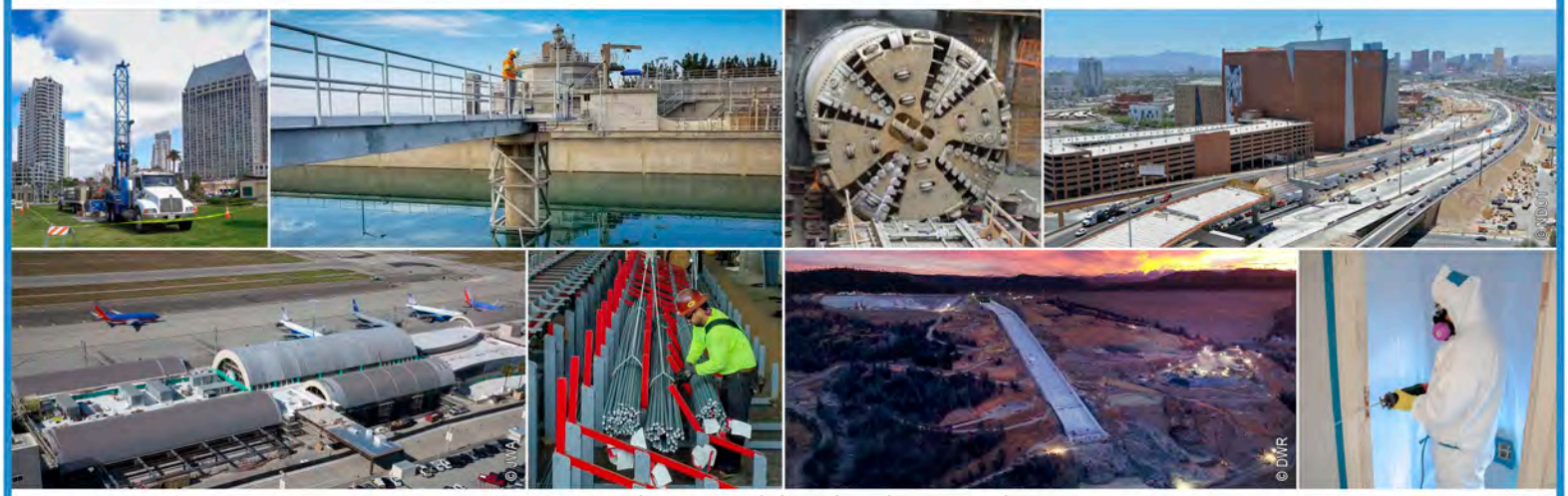
SAMPLE LOCATION	SAMPLE DEPTH (ft)	pH [1]	RESISTIVITY [2] (ohm-cm)	SULFATE CONTENT IN SOIL [3] (ppm)	(%)	CHLORIDE CONTENT [4] (ppm)
B-1	0.0-5.0	6.8	294	7	0.001	15000

[1] PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4972
[2] PERFORMED IN GENERAL ACCORDANCE WITH AASHTO T288
[3] PERFORMED IN GENERAL ACCORDANCE WITH CDOT TEST METHOD CP-L 2103 METHOD B
[4] PERFORMED IN GENERAL ACCORDANCE WITH CDOT TEST METHOD CP-L 2104



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