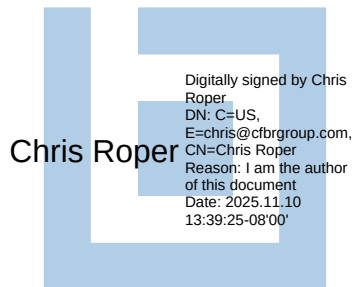
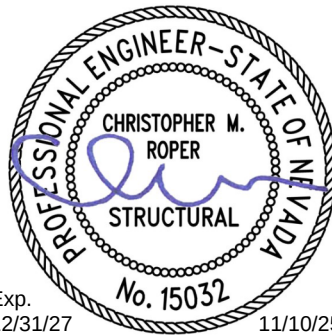


CFBR STRUCTURAL GROUP, LLC

STRUCTURAL CALCULATIONS

DCSD CC Meneley ES RTU's
1446 Muir Drive
Gardnerville, NV 89460

CFBR #25_113



DESIGN CRITERIA

CODE

2024 IBC / ASCE 7-22

RISK CATEGORY

III

SNOW LOAD

Roof Snow Load, S **30** psf

WIND LOADS

Basic Wind Speed, V **130** mph
Exposure **C**

SEISMIC LOADS

Ss **2.22**
Site Class **CD**
Sds **1.53**
S1 **0.69**
Ip **1**
Seismic Design Category **D**

Note:

Per Original 1978 As-Built Drawings Depicts Original Framing Designed for 7500# Mech Unit for AC-1

New Unit Weight: **6200** lbs

Per Original 1978 As-Built Drawings Depicts Original Framing Designed for 7300# Mech Unit for AC-3

New Unit Weight: **6600** lbs

Per Original 1978 As-Built Drawings Depicts Original Framing Designed for 6300# Mech Unit for AC-5

New Unit Weight: **4950** lbs

Per Original 1978 As-Built Drawings Depicts Original Framing Designed for 7130# Mech Unit for AC-6

New Unit Weight: **5000** lbs

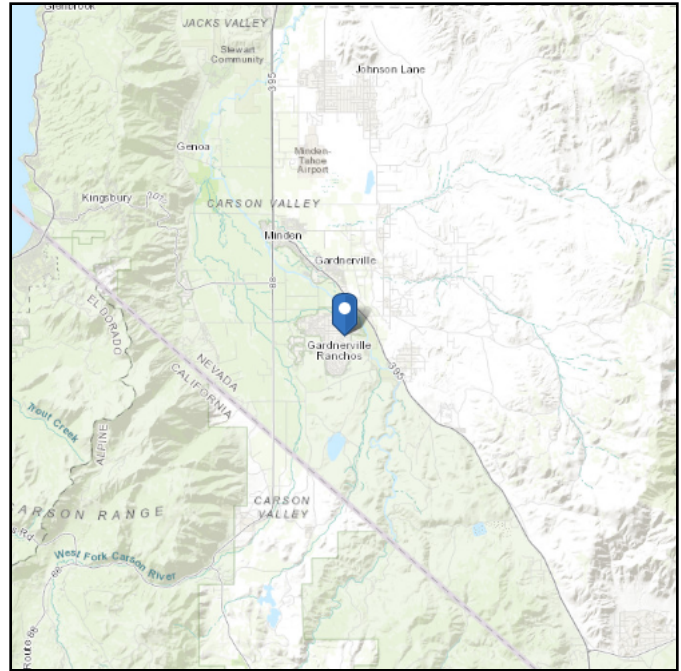
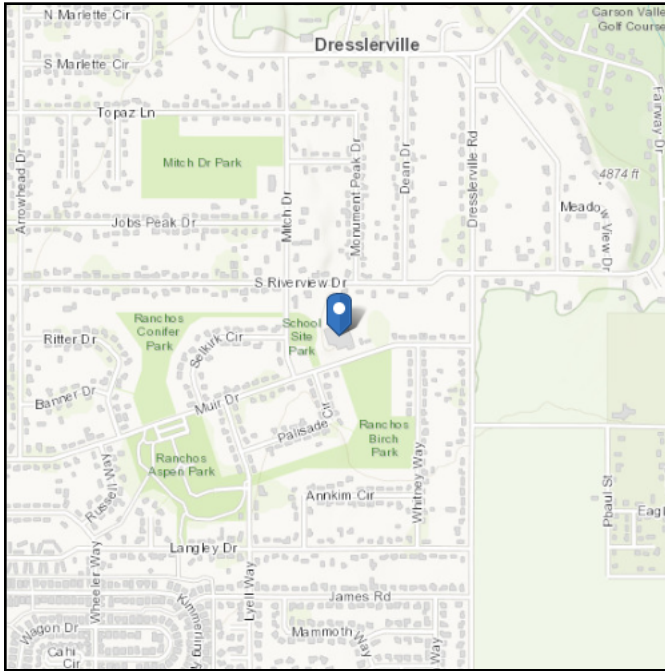


ASCE Hazards Report

Address:
1446 Muir Dr
Gardnerville, Nevada
89460

Standard: ASCE/SEI 7-22
Risk Category: III
Soil Class: CD

Latitude: 38.902694
Longitude: -119.728605
Elevation: 4868.857872440585 ft
(NAVD 88)

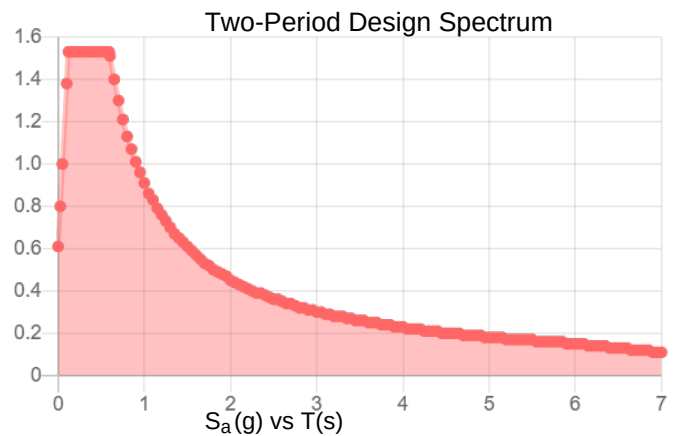
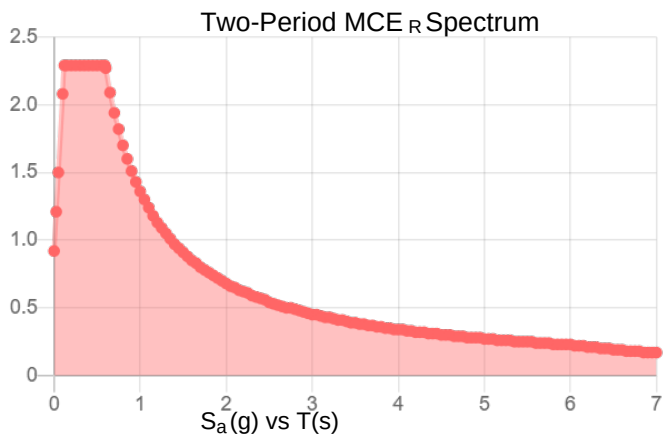
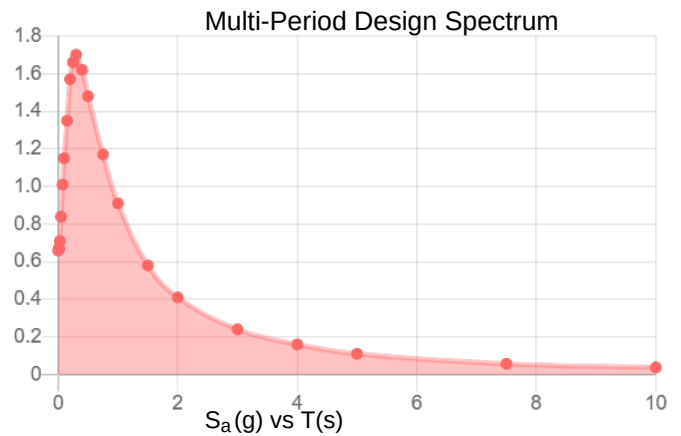
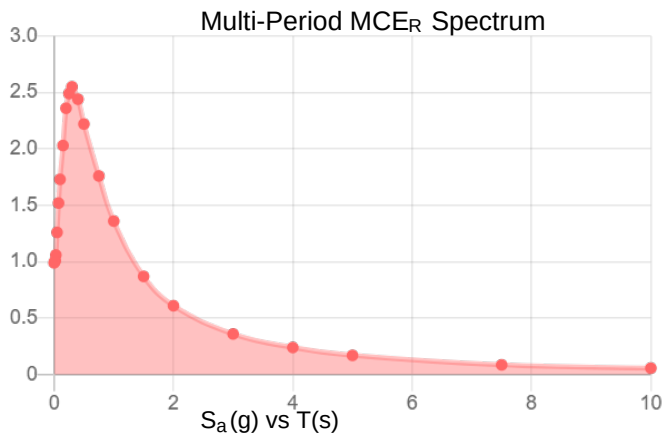


Site Soil Class: CD

Results:

PGA _M :	0.84	T _L :	6
S _{MS} :	2.29	S _S :	2.22
S _{M1} :	1.36	S ₁ :	0.69
S _{DS} :	1.53	V _{S30} :	365
S _{D1} :	0.91		

Seismic Design Category: D



MCE_R Vertical Response Spectrum
Vertical ground motion data has not yet been made available by USGS.

Design Vertical Response Spectrum
Vertical ground motion data has not yet been made available by USGS.

Data Accessed: Mon Sep 29 2025

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-22 and ASCE/SEI 7-22 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-22 Ch. 21 are available from USGS.

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EQUIPMENT

AC-1
W = 6200 lb
H unit = 6.4 ft
H base = 1.5 ft
H tot = 7.90 ft

Note: Center of seismic mass is assumed at mid-point of H unit
Assume base solid for wind? y y or n
H center of wind = 3.95 ft

Projected Width B1 (for wind) = 19.33 ft, long side 1 Af1 = 153 sf, long side 1 wind area
Base Anchor Spacing in B1 direction = 19.33 ft, short side to short side
Projected Width B2 (for wind) = 7.5 ft, short side 2 Af2 = 59 sf, short side 2 wind area
Base Anchor Spacing in B2 direction = 7.5 ft, long side to long side

WIND

Basic Wind Speed, V = 130 mph, per local requirements
Exposure = C per local requirements
Kz = 0.85 exposure coefficient
Kzt = 1 topographic factor
Kd = 0.85 directionality factor
Ke = 1 elevation factor
 $qz = 0.00256(Kz)(Kzt)(Ke)(V^2) = 36.8$ psf - LRFD
0.6 qz = 22.1 psf - ASD
G = 1 gust factor
h/D = 1.1 max
Cf (or Cr) = 1.9 force coefficient

ASD Loading Normal to Long Side 1

F1=0.6(qz)(Kd)(GCr)(Af1) = 5442 lb
OTM1 = 21494 ft-lb
0.6MR1 = 13950 ft-lb
Max. Uplift @ B1 = -1006 lb

ASD Loading Normal to Short Side 2

F2=0.6(qz)(Kd)(GCr)(Af2) = 2111 lb
OTM2 = 8340 ft-lb
0.6MR2 = 35954 ft-lb
Max. Uplift @ B2 = 0 lb

LRFD Loading Normal to Long Side 1

F1=(qz)(Kd)(GCr)(Af1) = 9069 lb
OTM1 = 35824 ft-lb
0.9MR1 = 20925 ft-lb
Max. Uplift @ B1 = -1987 lb

LRFD Loading Normal to Short Side 2

F2=(qz)(Kd)(GCr)(Af2) = 3519 lb
OTM2 = 13900 ft-lb
0.9MR2 = 53931 ft-lb
Max. Uplift @ B2 = 0 lb

SEISMIC (NON-STRUCTURAL COMPONENT)

Sds = 1.53
Ip = 1.00
Car = 1
Rpo = 1.5
z = 20 ft, point of attachment ht.
h = 20 ft, roof ht.
Rμ = 1.3

Fp = 0.4(Sds)(Ip)(Wp)(Hf/Rμ)(Car/Rpo) = 6810 lb
Fp min = 0.3(Sds)(Ip)(Wp) = 2846 lb
Fp max = 1.6(Sds)(Ip)(Wp) = 15178 lb
Fp final = 6810 lb

ASD Loading Normal to Long Side 1

F1 = 0.7Fp = 4767 lb
OTM1 = 22406 ft-lb
0.6MR1 = 13950 ft-lb
Max. Uplift @ B1 = -1128 lb

ASD Loading Normal to Short Side 2

F2 = 0.7Fp = 4767 lb
OTM2 = 22406 ft-lb
0.6MR2 = 35954 ft-lb
Max. Uplift @ B2 = 0 lb

LRFD Loading Normal to Long Side 1

F1 = Fp = 6810 lb
OTM1 = 32009 ft-lb
0.9MR1 = 20925 ft-lb
Max. Uplift @ B1 = -1478 lb

LRFD Loading Normal to Short Side 2

F2 = Fp = 6810 lb
OTM2 = 32009 ft-lb
0.9MR2 = 53931 ft-lb
Max. Uplift @ B2 = 0 lb

CONTROLLING LOADSASD Loading Normal to Long Side 1

F1 = 5442 lb, Wind
OTM1 = 22406 ft-lb, Seismic
Max. Uplift @ B1 = -1128 lb, Seismic

ASD Loading Normal to Short Side 2

F2 = 4767 lb, Seismic
OTM2 = 22406 ft-lb, Seismic
Max. Uplift @ B2 = 0 lb, Seismic

LRFD Loading Normal to Long Side 1

F1 = 9069 lb, Wind
OTM1 = 35824 ft-lb, Wind
Max. Uplift @ B1 = -1987 lb, Wind

LRFD Loading Normal to Short Side 2

F2 = 6810 lb, Seismic
OTM2 = 32009 ft-lb, Seismic
Max. Uplift @ B2 = 0 lb, Seismic

Use 1/4" Tekes @12" O.C. Max Around Perimeter, (6) Min. per Side

EQUIPMENT

AC-3
W = 6600 lb
H unit = 6.4 ft
H base = 1.5 ft
H tot = 7.90 ft

Note: Center of seismic mass is assumed at mid-point of H unit
Assume base solid for wind? y y or n
H center of wind = 3.95 ft

Projected Width B1 (for wind) = 19.33 ft, long side 1 Af1 = 153 sf, long side 1 wind area
Base Anchor Spacing in B1 direction = 19.33 ft, short side to short side
Projected Width B2 (for wind) = 7.5 ft, short side 2 Af2 = 59 sf, short side 2 wind area
Base Anchor Spacing in B2 direction = 7.5 ft, long side to long side

WIND

Basic Wind Speed, V = 130 mph, per local requirements
Exposure = C per local requirements
Kz = 0.85 exposure coefficient
Kzt = 1 topographic factor
Kd = 0.85 directionality factor
Ke = 1 elevation factor
 $qz = 0.00256(Kz)(Kzt)(Ke)(V^2) = 36.8$ psf - LRFD
 $0.6 qz = 22.1$ psf - ASD
G = 1 gust factor
h/D = 1.1 max
Cf (or Cr) = 1.9 force coefficient

ASD Loading Normal to Long Side 1

F1=0.6(qz)(Kd)(GCr)(Af1) = 5442 lb
OTM1 = 21494 ft-lb
0.6MR1 = 14850 ft-lb
Max. Uplift @ B1 = -886 lb

ASD Loading Normal to Short Side 2

F2=0.6(qz)(Kd)(GCr)(Af2) = 2111 lb
OTM2 = 8340 ft-lb
0.6MR2 = 38273 ft-lb
Max. Uplift @ B2 = 0 lb

LRFD Loading Normal to Long Side 1

F1=(qz)(Kd)(GCr)(Af1) = 9069 lb
OTM1 = 35824 ft-lb
0.9MR1 = 22275 ft-lb
Max. Uplift @ B1 = -1807 lb

LRFD Loading Normal to Short Side 2

F2=(qz)(Kd)(GCr)(Af2) = 3519 lb
OTM2 = 13900 ft-lb
0.9MR2 = 57410 ft-lb
Max. Uplift @ B2 = 0 lb

SEISMIC (NON-STRUCTURAL COMPONENT)

Sds = 1.53
Ip = 1.00
Car = 1
Rpo = 1.5
z = 20 ft, point of attachment ht.
h = 20 ft, roof ht.
Rμ = 1.3

Fp = 0.4(Sds)(Ip)(Wp)(Hf/Rμ)(Car/Rpo) = 7250 lb
Fp min = 0.3(Sds)(Ip)(Wp) = 3029 lb
Fp max = 1.6(Sds)(Ip)(Wp) = 16157 lb
Fp final = 7250 lb

ASD Loading Normal to Long Side 1

F1 = 0.7Fp = 5075 lb
OTM1 = 23852 ft-lb
0.6MR1 = 14850 ft-lb
Max. Uplift @ B1 = -1200 lb

ASD Loading Normal to Short Side 2

F2 = 0.7Fp = 5075 lb
OTM2 = 23852 ft-lb
0.6MR2 = 38273 ft-lb
Max. Uplift @ B2 = 0 lb

LRFD Loading Normal to Long Side 1

F1 = Fp = 7250 lb
OTM1 = 34074 ft-lb
0.9MR1 = 22275 ft-lb
Max. Uplift @ B1 = -1573 lb

LRFD Loading Normal to Short Side 2

F2 = Fp = 7250 lb
OTM2 = 34074 ft-lb
0.9MR2 = 57410 ft-lb
Max. Uplift @ B2 = 0 lb

CONTROLLING LOADSASD Loading Normal to Long Side 1

F1 = 5442 lb, Wind
OTM1 = 23852 ft-lb, Seismic
Max. Uplift @ B1 = -1200 lb, Seismic

ASD Loading Normal to Short Side 2

F2 = 5075 lb, Seismic
OTM2 = 23852 ft-lb, Seismic
Max. Uplift @ B2 = 0 lb, Seismic

LRFD Loading Normal to Long Side 1

F1 = 9069 lb, Wind
OTM1 = 35824 ft-lb, Wind
Max. Uplift @ B1 = -1807 lb, Wind

LRFD Loading Normal to Short Side 2

F2 = 7250 lb, Seismic
OTM2 = 34074 ft-lb, Seismic
Max. Uplift @ B2 = 0 lb, Seismic

Use 1/4" Tekes @12" O.C. Max Around Perimeter, (6) Min. per Side

EQUIPMENT

AC-5
W = 4950 lb
H unit = 5.83 ft
H base = 1.5 ft
H tot = 7.33 ft

Note: Center of seismic mass is assumed at mid-point of H unit
Assume base solid for wind? y y or n
H center of wind = 3.67 ft

Projected Width B1 (for wind) = 14.92 ft, long side 1 Af1 = 109 sf, long side 1 wind area
Base Anchor Spacing in B1 direction = 14.92 ft, short side to short side
Projected Width B2 (for wind) = 7.5 ft, short side 2 Af2 = 55 sf, short side 2 wind area
Base Anchor Spacing in B2 direction = 7.5 ft, long side to long side

WIND

Basic Wind Speed, V = 130 mph, per local requirements
Exposure = C per local requirements
Kz = 0.85 exposure coefficient
Kzt = 1 topographic factor
Kd = 0.85 directionality factor
Ke = 1 elevation factor
 $qz = 0.00256(Kz)(Kzt)(Ke)(V^2) = 36.8$ psf - LRFD
0.6 qz = 22.1 psf - ASD
G = 1 gust factor
h/D = 1.0 max
Cf (or Cr) = 1.9 force coefficient

ASD Loading Normal to Long Side 1

F1=0.6(qz)(Kd)(GCr)(Af1) = 3897 lb
OTM1 = 14283 ft-lb
0.6MR1 = 11138 ft-lb
Max. Uplift @ B1 = -419 lb

ASD Loading Normal to Short Side 2

F2=0.6(qz)(Kd)(GCr)(Af2) = 1959 lb
OTM2 = 7180 ft-lb
0.6MR2 = 22156 ft-lb
Max. Uplift @ B2 = 0 lb

LRFD Loading Normal to Long Side 1

F1=(qz)(Kd)(GCr)(Af1) = 6495 lb
OTM1 = 23805 ft-lb
0.9MR1 = 16706 ft-lb
Max. Uplift @ B1 = -946 lb

LRFD Loading Normal to Short Side 2

F2=(qz)(Kd)(GCr)(Af2) = 3265 lb
OTM2 = 11966 ft-lb
0.9MR2 = 33234 ft-lb
Max. Uplift @ B2 = 0 lb

SEISMIC (NON-STRUCTURAL COMPONENT)

Sds = 1.53
Ip = 1.00
Car = 1
Rpo = 1.5
z = 20 ft, point of attachment ht.
h = 20 ft, roof ht.
Rμ = 1.3

Fp = 0.4(Sds)(Ip)(Wp)(Hf/Rμ)(Car/Rpo) = 5437 lb
Fp min = 0.3(Sds)(Ip)(Wp) = 2272 lb
Fp max = 1.6(Sds)(Ip)(Wp) = 12118 lb
Fp final = 5437 lb

ASD Loading Normal to Long Side 1

F1 = 0.7Fp = 3806 lb
OTM1 = 16804 ft-lb
0.6MR1 = 11138 ft-lb
Max. Uplift @ B1 = -756 lb

ASD Loading Normal to Short Side 2

F2 = 0.7Fp = 3806 lb
OTM2 = 16804 ft-lb
0.6MR2 = 22156 ft-lb
Max. Uplift @ B2 = 0 lb

LRFD Loading Normal to Long Side 1

F1 = Fp = 5437 lb
OTM1 = 24006 ft-lb
0.9MR1 = 16706 ft-lb
Max. Uplift @ B1 = -973 lb

LRFD Loading Normal to Short Side 2

F2 = Fp = 5437 lb
OTM2 = 24006 ft-lb
0.9MR2 = 33234 ft-lb
Max. Uplift @ B2 = 0 lb

CONTROLLING LOADSASD Loading Normal to Long Side 1

F1 = 3897 lb, Wind
OTM1 = 16804 ft-lb, Seismic
Max. Uplift @ B1 = -756 lb, Seismic

ASD Loading Normal to Short Side 2

F2 = 3806 lb, Seismic
OTM2 = 16804 ft-lb, Seismic
Max. Uplift @ B2 = 0 lb, Seismic

LRFD Loading Normal to Long Side 1

F1 = 6495 lb, Wind
OTM1 = 24006 ft-lb, Seismic
Max. Uplift @ B1 = -973 lb, Seismic

LRFD Loading Normal to Short Side 2

F2 = 5437 lb, Seismic
OTM2 = 24006 ft-lb, Seismic
Max. Uplift @ B2 = 0 lb, Seismic

Use 1/4" Tekes @12" O.C. Max Around Perimeter, (6) Min. per Side

EQUIPMENT

AC-6

W = **5000** lb
H unit = **5.83** ft
H base = **1.5** ft
H tot = **7.33** ft

Note: Center of seismic mass is assumed at mid-point of H unit
Assume base solid for wind? **y** y or n
H center of wind = **3.67** ft

Projected Width B1 (for wind) = **14.92** ft, long side 1 Af1 = 109 sf, long side 1 wind area
Base Anchor Spacing in B1 direction = **14.92** ft, short side to short side
Projected Width B2 (for wind) = **7.5** ft, short side 2 Af2 = 55 sf, short side 2 wind area
Base Anchor Spacing in B2 direction = **7.5** ft, long side to long side

WIND

Basic Wind Speed, V = **130** mph, per local requirements
Exposure = **C** per local requirements
Kz = **0.85** exposure coefficient
Kzt = **1** topographic factor
Kd = **0.85** directionality factor
Ke = **1** elevation factor
 $qz = 0.00256(Kz)(Kzt)(Ke)(V^2) = 36.8$ psf - LRFD
 $0.6 qz = 22.1$ psf - ASD
G = **1** gust factor
h/D = **1.0** max
Cf (or Cr) = **1.9** force coefficient

ASD Loading Normal to Long Side 1

F1=0.6(qz)(Kd)(GCr)(Af1) = 3897 lb
OTM1 = 14283 ft-lb
0.6MR1 = 11250 ft-lb
Max. Uplift @ B1 = -404 lb

ASD Loading Normal to Short Side 2

F2=0.6(qz)(Kd)(GCr)(Af2) = 1959 lb
OTM2 = 7180 ft-lb
0.6MR2 = 22380 ft-lb
Max. Uplift @ B2 = 0 lb

LRFD Loading Normal to Long Side 1

F1=(qz)(Kd)(GCr)(Af1) = 6495 lb
OTM1 = 23805 ft-lb
0.9MR1 = 16875 ft-lb
Max. Uplift @ B1 = -924 lb

LRFD Loading Normal to Short Side 2

F2=(qz)(Kd)(GCr)(Af2) = 3265 lb
OTM2 = 11966 ft-lb
0.9MR2 = 33570 ft-lb
Max. Uplift @ B2 = 0 lb

SEISMIC (NON-STRUCTURAL COMPONENT)

Sds = **1.53**
Ip = **1.00**
Car = **1**
Rpo = **1.5**
z = **20** ft, point of attachment ht.
h = **20** ft, roof ht.
Rμ = **1.3**
 $Fp = 0.4(Sds)(Ip)(Wp)(Hf/Rμ)(Car/Rpo) = 5492$ lb
 $Fp \text{ min} = 0.3(Sds)(Ip)(Wp) = 2295$ lb
 $Fp \text{ max} = 1.6(Sds)(Ip)(Wp) = 12240$ lb
 $Fp \text{ final} = 5492$ lb

ASD Loading Normal to Long Side 1

F1 = 0.7Fp = 3845 lb
OTM1 = 16974 ft-lb
0.6MR1 = 11250 ft-lb
Max. Uplift @ B1 = -763 lb

ASD Loading Normal to Short Side 2

F2 = 0.7Fp = 3845 lb
OTM2 = 16974 ft-lb
0.6MR2 = 22380 ft-lb
Max. Uplift @ B2 = 0 lb

LRFD Loading Normal to Long Side 1

F1 = Fp = 5492 lb
OTM1 = 24249 ft-lb
0.9MR1 = 16875 ft-lb
Max. Uplift @ B1 = -983 lb

LRFD Loading Normal to Short Side 2

F2 = Fp = 5492 lb
OTM2 = 24249 ft-lb
0.9MR2 = 33570 ft-lb
Max. Uplift @ B2 = 0 lb

CONTROLLING LOADSASD Loading Normal to Long Side 1

F1 = **3897** lb, Wind
OTM1 = **16974** ft-lb, Seismic
Max. Uplift @ B1 = **-763** lb, Seismic

ASD Loading Normal to Short Side 2

F2 = **3845** lb, Seismic
OTM2 = **16974** ft-lb, Seismic
Max. Uplift @ B2 = **0** lb, Seismic

LRFD Loading Normal to Long Side 1

F1 = **6495** lb, Wind
OTM1 = **24249** ft-lb, Seismic
Max. Uplift @ B1 = **-983** lb, Seismic

LRFD Loading Normal to Short Side 2

F2 = **5492** lb, Seismic
OTM2 = **24249** ft-lb, Seismic
Max. Uplift @ B2 = **0** lb, Seismic

Use 1/4" Tekes @12" O.C. Max Around Perimeter, (6) Min. per Side

CFBR STRUCTURAL GROUP, LLC

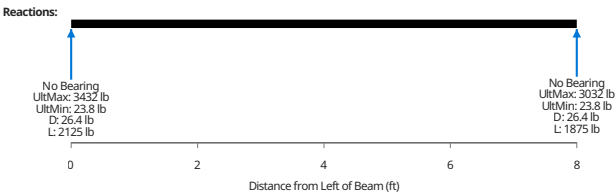
Client:	Author: Zack Grow	Date: Oct 20, 2025
Project: DCSD Meneley ES RTU's		Job #: 25_113
Address: 1446 Muir Drive, Gardnerville, NV, USA		Subject: Member Schedule

	Calculation	Member	Quantity	Comments
50%	Typ. Angle Brace	L4X4X1/4	8 ft	

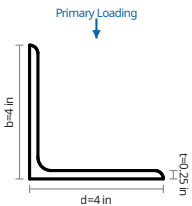
CFBR STRUCTURAL GROUP, LLC	Client:	Author: Zack Grow	Date: Oct 20, 2025
	Project: DCSD Meneley ES RTU's		Job #: 25_113
	Address: 1446 Muir Drive, Gardnerville, NV, USA		Subject: Typ. Angle Brace PASS
	References: AISC 360-16 (LRFD)		

Summary

50%	Moment Capacity	$\phi M_n = 3037 \text{ lb} \cdot \text{ft}$
16%	Shear Capacity	$\phi V_n = 19\,440 \text{ lb}$
30%	Critical Deflection	$\delta_{gov} = -0.0811 \text{ in}$
	Critical Deflection Ratio	$L/ = 1184$
	Dead Load Deflection	$\delta_D = -0.00699 \text{ in}$

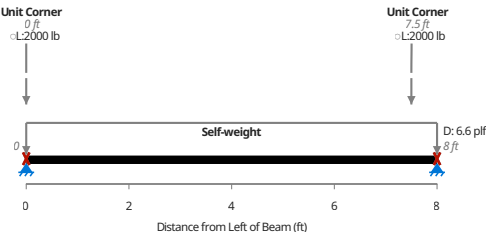


Key Properties



Designation	L4X4X1/4
Yield Strength	$F_y = 36\,000 \text{ psi}$
Beam Plan Length	$L_X = 8 \text{ ft}$
Continuous Bracing for Lateral Torsional Buckling	Top flange

Loads



Enable Automatic Live Load Patterning? (BETA)	No
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Design Criteria

Design Code for Load Combinations	International Building Code (IBC) 2024
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Member Properties

Gross Area	$A_g = 1.93 \text{ in}^2$
Moment of Inertia	$I = 3 \text{ in}^4$

Section Classification (AISC 360-16 B4)

Section Classification - Long Leg	Non-Compact
Section Classification - Short Leg	Non-Compact

Section Flexural Capacity (AISC 360-16, Chapter F)

Nominal Cross-Section Bending Resistance - Positive Bending	$M_{sxn}^+ = 3374 \text{ lb} \cdot \text{ft}$
Nominal Cross-Section Bending Resistance - Negative Bending	$M_{sxn}^- = 3374 \text{ lb} \cdot \text{ft}$

Flexural Capacity - Positive Bending (AISC 360-16, Chapter F)

Lateral-Torsional Buckling Governs? - Positive Bending	$LTB_{flag}^+ = \text{No}$
--	----------------------------

Flexural Capacity - Negative Bending (AISC 360-16, Chapter F)

Lateral-Torsional Buckling Governs? - Negative Bending	$LTB_{flag}^- = \text{No}$
--	----------------------------

Shear Capacity (AISC 360-16, Chapter G)

Shear Slenderness	$h/t_w = 16$
Shear Buckling Coefficient	$C_{v2} = 1$
Nominal Shear Capacity	$V_n = 21\,600 \text{ lb}$

Comments