

Design Calculations

for

Del Pado Blvd - Iceland Remodel



Homeowner: Rob Kerth (Iceland
Skaterink)
Address: 1430 Del Paso Blvd,
Sacramento, CA 95815

Client: C & L Drafting Services

Project Number: CR070722
Purpose: Structural Design for
Remodel

Date: 3/9/2023
Engineer: T. Hamel

The design calculations contained herein have
been prepared by or under the direction of the
following Registered Civil Engineer:



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	Project Title:	Del Pado Blvd - Iceland Remodel			
	Discipline: Structural				
Project No.:	CR070722	Originator:	T. Hamel	Date:	3/9/2023
Component:	Table of Contents	Checked:	W. Cullumber	Date:	3/9/2023

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		Project Title:	Del Pado Blvd - Iceland Remodel		
		Discipline:	Structural		
Project No.:	CR070722	Originator:	T. Hamel	Date:	3/9/2023
Component:	General Project Information	Checked:	W. Cullumber	Date:	3/9/2023

Del Pado Blvd - Iceland Remodel

Design Firm WCD & Associates
 Owner Rob Kerth (Iceland Skaterink)
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Project Approach


Typical design approach for gravity and lateral analysis. Seismic and Wind loading applied for lateral analysis. Gravity loading applied as specified in the calculations. Diaphragms are treated as flexible and simple span theory is utilized.

References

ASCE 7-16 Minimum Design Loads for Buildings and Other Structures
 ACI 318-19 Building Code Requirements for Structural Concrete and Commentary
 CBC 2022 California Building Code 2022
 AISC Steel Construction Manual 14th Edition
 AISC 341-16 Seismic Provisions for Structural Steel Buildings
 NDS 2018 National Design Standard for Wood Construction

Design Values

See Building Design by CBC Steel Buildings, Project No. C22B0182A, Dated 09/19/2022
 See Foundation Design for Loading Used

	Project Title:	Del Pado Blvd - Iceland Remodel			
	Discipline: Structural				
Project No.:	CR070722	Originator:	T. Hamel	Date:	3/9/2023
Component:	Buidling Loads Summary	Checked:	W. Cullumber	Date:	3/9/2023

VERTICAL BUILDING LOADS FOR FOOTING DESIGN

FRAME NO.	COL NO. AT FRAME	DEAD LOAD, KIPS (CASE 1 + CASE2)	LIVE LOAD, KIPS (CASE 3)	SEISMIC LOAD, KIPS (CASE 12 & CASE 13)
1 & 7	Col1	10	9	1
	Col2	10	9	-1
2 - 6	Col1	13	17	2
	Col2	13	17	-2

FRAME NO.	COL NO. AT FRAME	FRONT TO BACK WIND LOAD				RIGHT TO LEFT WIND LOAD			
		FRONT WIND LOADS, KIPS		BACK WIND LOADS, KIPS		LEFT WIND LOADS, KIPS		RIGHT WIND LOADS, KIPS	
		CASE 9	CASE 11	CASE 8	CASE 10	CASE 5	CASE 7	CASE 4	CASE 6
1 & 7	Col1	-9	-15	-13	-19	-9	-14	-14	-19
	Col2	-13	-19	-9	-14	-13	-19	-8	-14
2 - 6	Col1	-9	-21	-15	-26	-8	-20	-16	-27
	Col2	-14	-26	-9	-21	-16	-27	-8	-20

HORIZONTAL BUILDING LOADS FOR FOOTING DESIGN

FRAME NO.	COL NO. AT FRAME	DEAD LOAD, KIPS (CASE 1 + CASE2)	LIVE LOAD, KIPS (CASE 3)	SEISMIC LOAD, KIPS (CASE 12 & CASE 13)
1 & 7	Col1	8	5	2
	Col2	-8	-5	2
2 - 6	Col1	12	15	3
	Col2	-12	-15	3

FRAME NO.	COL NO. AT FRAME	FRONT TO BACK WIND LOAD				RIGHT TO LEFT WIND LOAD			
		FRONT WIND LOADS, KIPS		BACK WIND LOADS, KIPS		LEFT WIND LOADS, KIPS		RIGHT WIND LOADS, KIPS	
		CASE 9	CASE 11	CASE 8	CASE 10	CASE 5	CASE 7	CASE 4	CASE 6
1 & 7	Col1	-9	-14	-9	-13	-8	-12	-11	-16
	Col2	8	13	9	13	-12	16	7	12
2 - 6	Col1	-10	-20	-10	-19	-8	-17	-15	-24
	Col2	9	18	10	19	16	24	8	17

BUILDING LOADS FOR ANCHORAGE DESIGN

FRAME No.	VERTICAL LOADS		HORIZONTAL LOADS	
	DEAD LOAD, KIPS (CASE 1)	WIND LOAD, KIPS	DEAD LOAD, KIPS (CASE 1)	WIND LOAD, KIPS
1 & 7	10	-19	8	-16
2 - 6	13	-27	12	-24

*Worst Case load for Anchorage occurs at 0.9D + 1.0W

**Wind Loads govern over Seismic

NUCOR BUILDINGS GROUP

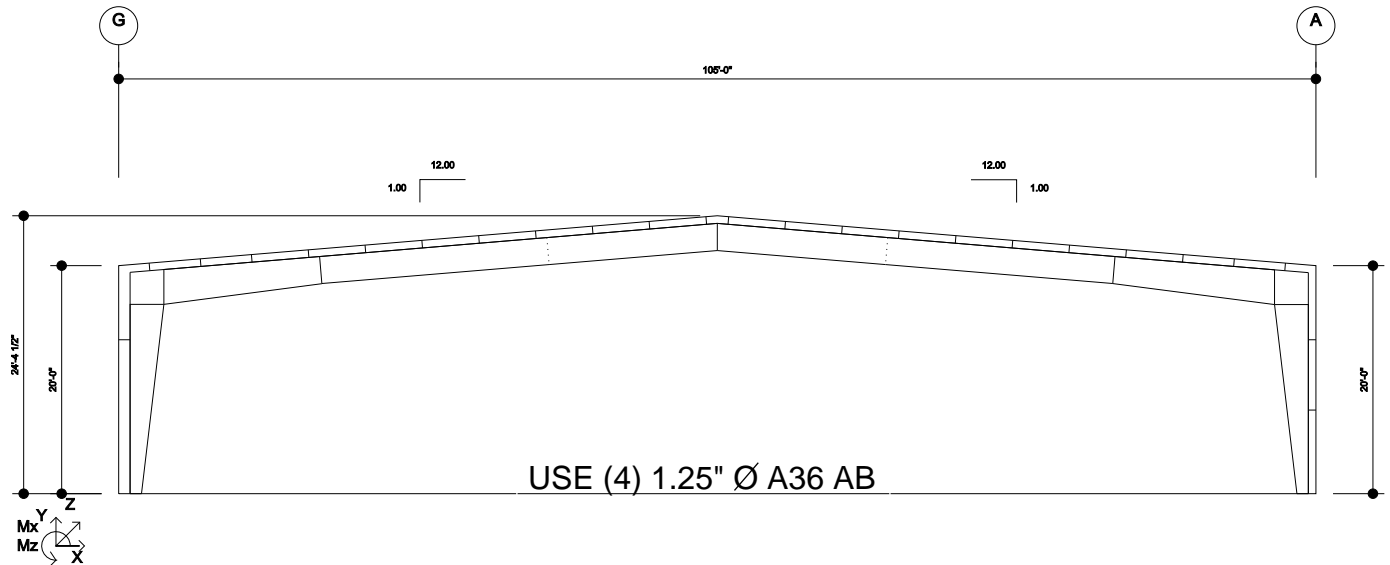
Job # : C22B0182A
File : E01.nfr
App Version : 1.6.127.0

Job Name : Nucor Buildings Group
Designer : BG\Viviana.Perez
Date : 8/23/2022

Frame : A-2

DESIGN SUMMARY - REACTIONS BY LOAD CASE REPORT

FRAME LINE 1,7



Member	X (kips)	Y (kips)	Z (kips)	Mx (kip-ft)	Mz (kip-ft)	Member	X (kips)	Y (kips)	Z (kips)	Mx (kip-ft)	Mz (kip-ft)
LOAD CASE 1 - DEAD						LOAD CASE 2 - COLLATERAL					
COL01	5	6	0	0	0	COL01	3	4	0	0	0
COL02	-5	6	0	0	0	COL02	-3	4	0	0	0
LOAD CASE 3 - ROOF LIVE						LOAD CASE 4 - WIND CASE 1 TO RIGHT					
COL01	8	9	0	0	0	COL01	-11	-14	0	0	0
COL02	-8	9	0	0	0	COL02	7	-8	0	0	0
LOAD CASE 5 - WIND CASE 1 TO LEFT						LOAD CASE 6 - WIND CASE 2 TO RIGHT					
COL01	-8	-8	0	0	0	COL01	-16	-19	0	0	0
COL02	12	-13	0	0	0	COL02	12	-14	0	0	0
LOAD CASE 7 - WIND CASE 2 TO LEFT						LOAD CASE 8 - LONG. WIND 1 TO BACK					
COL01	-12	-14	0	0	0	COL01	-9	-13	0	0	0
COL02	16	-19	0	0	0	COL02	9	-9	0	0	0
LOAD CASE 9 - LONG. WIND 1 TO FRONT						LOAD CASE 10 - LONG. WIND 2 TO BACK					
COL01	-9	-9	0	0	0	COL01	-13	-19	0	0	0
COL02	8	-13	0	0	0	COL02	13	-14	0	0	0
LOAD CASE 11 - LONG. WIND 2 TO FRONT						LOAD CASE 12 - SEISMIC TO RIGHT					
COL01	-14	-15	0	0	0	COL01	-2	-1	0	0	0
COL02	13	-19	0	0	0	COL02	-2	1	0	0	0
LOAD CASE 13 - SEISMIC TO LEFT											
COL01	2	1	0	0	0						
COL02	2	-1	0	0	0						

NOTES:

- ALL WIND REACTIONS SHOWN IN THE TABLE ABOVE ARE BASED ON ULTIMATE DESIGN WIND SPEED AND ARE UNFACTORED.
- SEISMIC REACTIONS ARE DUE TO BASE SHEAR. THE REDUNDANCY FACTOR AND THE OVERSTRENGTH FACTOR HAVE NOT BEEN INCLUDED IN THE REACTIONS SHOWN.

NUCOR BUILDINGS GROUP

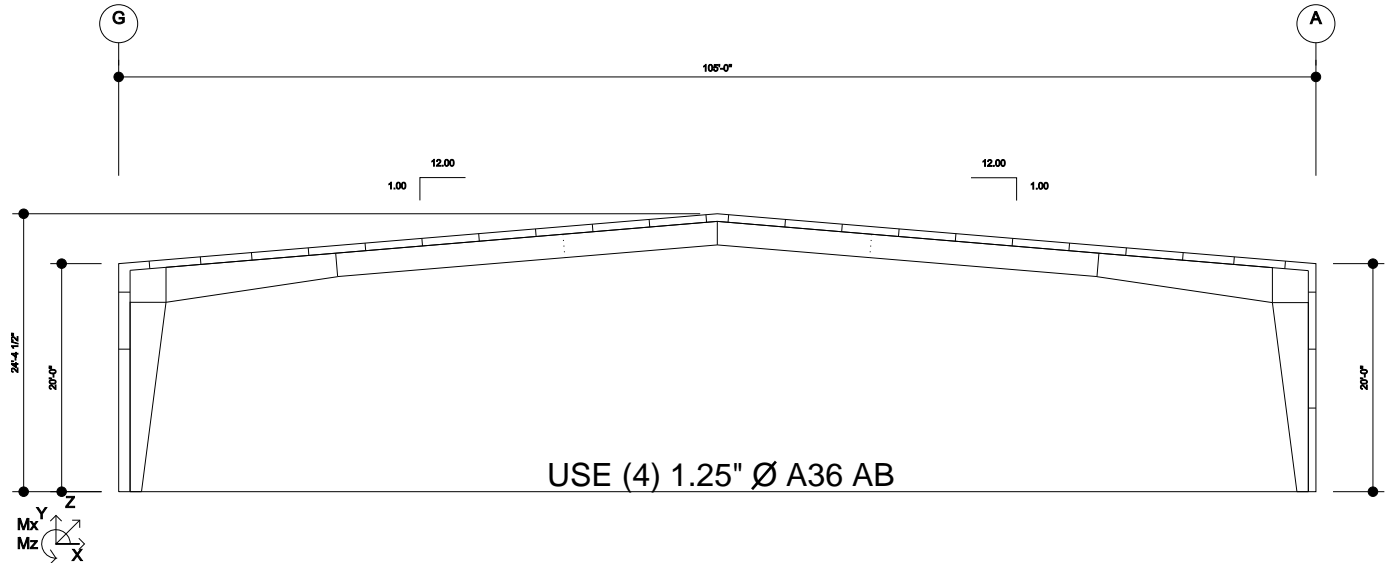
Job # : C22B0182A
File : F01a.nfr
App Version : 1.6.127.0

Job Name : Rob Kerth Iceland
Designer : BG\Viviana.Perez
Date : 8/23/2022

Frame : A-3

DESIGN SUMMARY - REACTIONS BY LOAD CASE REPORT

FRAME LINE 2-6



Member	X (kips)	Y (kips)	Z (kips)	Mx (kip-ft)	Mz (kip-ft)	Member	X (kips)	Y (kips)	Z (kips)	Mx (kip-ft)	Mz (kip-ft)
LOAD CASE 1 - DEAD						LOAD CASE 2 - COLLATERAL					
COL01	5	6	0	0	0	COL01	7	7	0	0	0
COL02	-5	6	0	0	0	COL02	-7	7	0	0	0
LOAD CASE 3 - ROOF LIVE						LOAD CASE 4 - WIND CASE 1 TO RIGHT					
COL01	15	17	0	0	0	COL01	-15	-16	0	0	0
COL02	-15	17	0	0	0	COL02	8	-8	0	0	0
LOAD CASE 5 - WIND CASE 1 TO LEFT						LOAD CASE 6 - WIND CASE 2 TO RIGHT					
COL01	-8	-8	0	0	0	COL01	(GOVERNS ANCHORAGE UPLIFT) -24	-27	0	0	0
COL02	16	-16	0	0	0	COL02	17	-20	0	0	0
LOAD CASE 7 - WIND CASE 2 TO LEFT						LOAD CASE 8 - LONG. WIND 1 TO BACK					
COL01	-17	-20	0	0	0	COL01	-10	-15	0	0	0
COL02	24	-27	0	0	0	COL02	10	-9	0	0	0
LOAD CASE 9 - LONG. WIND 1 TO FRONT						LOAD CASE 10 - LONG. WIND 2 TO BACK					
COL01	-10	-9	0	0	0	COL01	-19	-26	0	0	0
COL02	9	-14	0	0	0	COL02	19	-21	0	0	0
LOAD CASE 11 - LONG. WIND 2 TO FRONT						LOAD CASE 12 - SEISMIC TO RIGHT					
COL01	-20	-21	0	0	0	COL01	-3	-2	0	0	0
COL02	18	-26	0	0	0	COL02	-3	2	0	0	0
LOAD CASE 13 - SEISMIC TO LEFT											
COL01	3	2	0	0	0						
COL02	3	-2	0	0	0						

NOTES:

- ALL WIND REACTIONS SHOWN IN THE TABLE ABOVE ARE BASED ON ULTIMATE DESIGN WIND SPEED AND ARE UNFACTORED.
- SEISMIC REACTIONS ARE DUE TO BASE SHEAR. THE REDUNDANCY FACTOR AND THE OVERSTRENGTH FACTOR HAVE NOT BEEN INCLUDED IN THE REACTIONS SHOWN.

General Footing

Project File: FOOTING CALCS.ec6

LIC# : KW-06014798, Build:20.22.12.28

WCD & ASSOCIATES

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DESCRIPTION: FRAME 1 AND 7 FOOTING DESIGN (AT CORNERS) - GRAVITY CHECK

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16

Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	2.50 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	2,850.0 ksi
Concrete Density	=	150.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1

Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	2,000.0 ksf
Soil Density	=	120.0 pcf
Increase Bearing By Footing Weight	=	Yes
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

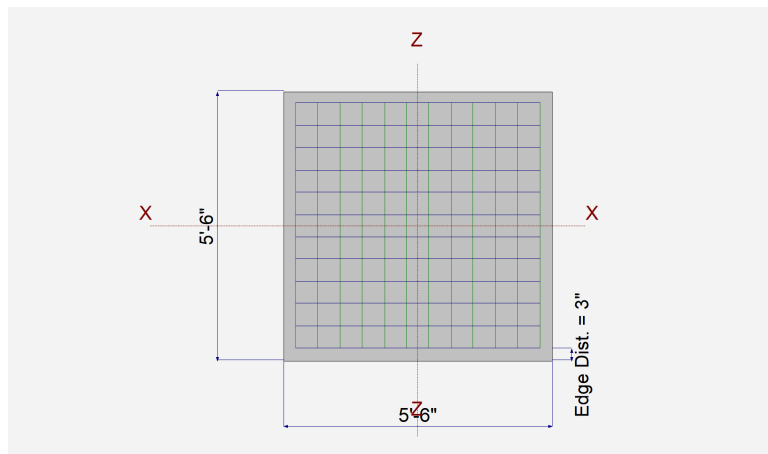
Footing base depth below soil surface	=	3.50 ft
Allow press. increase per foot of depth when footing base is below	=	ksf

Increases based on footing plan dimension

Allowable pressure increase per foot of depth when max. length or width is greater than	=	ksf
	=	ft

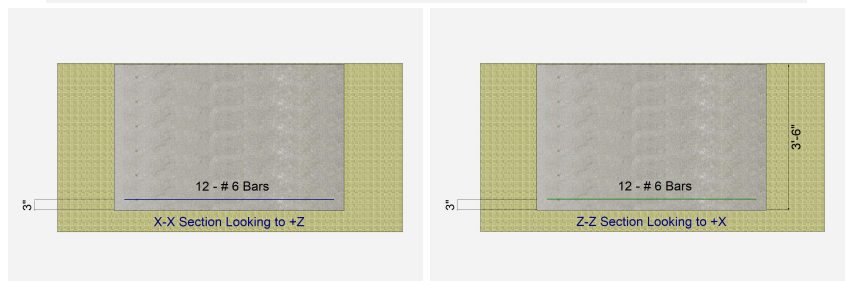
Dimensions

Width parallel to X-X Axis	=	5.50 ft
Length parallel to Z-Z Axis	=	5.50 ft
Footing Thickness	=	42.0 in
Load location offset from footing center...		
ex : Prll to X-X Axis	=	24.5 in
	=	in
Pedestal dimensions...		
px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in
Rebar Centerline to Edge of Concrete...		
at Bottom of footing	=	3.0 in



Reinforcing

Bars parallel to X-X Axis		
Number of Bars	=	12
Reinforcing Bar Size	=	# 6
Bars parallel to Z-Z Axis		
Number of Bars	=	12
Reinforcing Bar Size	=	# 6
Bandwidth Distribution Check (ACI 15.4.4.2)		
Direction Requiring Closer Separation		n/a
# Bars required within zone		n/a
# Bars required on each side of zone		n/a



Applied Loads

		D	Lr	L	S	W	E	H
P : Column Load	=	10.0	9.0			-19.0	1.0	k
OB : Overburden	=							ksf
M-xx	=							k-ft
M-zz	=							k-ft
V-x	=							k
V-z	=							k

General Footing

Project File: FOOTING CALCS.ec6

LIC# : KW-06014798, Build:20.22.12.28

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DESCRIPTION: FRAME 1 AND 7 FOOTING DESIGN (AT CORNERS) - GRAVITY CHECK

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.5557	Soil Bearing	5.557 ksf	10.0 ksf	+0.60D+0.60W about Z-Z axis
PASS	n/a	Overturing - X-X	0.0 k-ft	0.0 k-ft	No Overturing
PASS	1.006	Overturing - Z-Z	54.625 k-ft	54.954 k-ft	+0.60D+0.60W
PASS	1.362	Uplift	-11.40 k	15.529 k	+0.60D+0.60W
PASS	0.004162	Z Flexure (+X)	0.6810 k-ft/ft	163.601 k-ft/ft	+1.20D+1.60Lr
PASS	0.03316	Z Flexure (-X)	5.424 k-ft/ft	163.601 k-ft/ft	+0.90D+W
PASS	0.02017	X Flexure (+Z)	3.30 k-ft/ft	163.601 k-ft/ft	+1.20D+1.60Lr
PASS	0.02017	X Flexure (-Z)	3.30 k-ft/ft	163.601 k-ft/ft	+1.20D+1.60Lr
PASS	n/a	1-way Shear (+X)	0.0 psi	75.0 psi	n/a
PASS	n/a	1-way Shear (-X)	1.643 psi	75.0 psi	+1.20D+1.60Lr
PASS	n/a	1-way Shear (+Z)	0.0 psi	75.0 psi	n/a
PASS	n/a	1-way Shear (-Z)	0.0 psi	75.0 psi	n/a
PASS	0.0	2-way Punching	0.0 psi	0.0 psi	n/a



Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc (in)	Actual Soil Bearing Stress @ Location				Actual / Allow Ratio
				Bottom, -Z	Top, +Z	Left, -X	Right, +X	
X-X, D Only	10.0	n/a	0.0	0.8556	0.8556	n/a	n/a	0.086
X-X, +D+Lr	10.0	n/a	0.0	1.153	1.153	n/a	n/a	0.115
X-X, +D+0.750Lr	10.0	n/a	0.0	1.079	1.079	n/a	n/a	0.108
X-X, +D+0.60W	10.0	n/a	0.0	0.4787	0.4787	n/a	n/a	0.048
X-X, +D+0.750Lr+0.450W	10.0	n/a	0.0	0.7961	0.7961	n/a	n/a	0.080
X-X, +D+0.450W	10.0	n/a	0.0	0.5729	0.5729	n/a	n/a	0.057
X-X, +0.60D+0.60W	10.0	n/a	0.0	0.1365	0.1365	n/a	n/a	0.014
X-X, +D+0.70E	10.0	n/a	0.0	0.8787	0.8787	n/a	n/a	0.088
X-X, +D+0.5250E	10.0	n/a	0.0	0.8729	0.8729	n/a	n/a	0.087
X-X, +0.60D+0.70E	10.0	n/a	0.0	0.5365	0.5365	n/a	n/a	0.054
Z-Z, D Only	10.0	9.466	n/a	n/a	n/a	0.1267	1.585	0.159
Z-Z, +D+Lr	10.0	13.345	n/a	n/a	n/a	0.0	2.567	0.257
Z-Z, +D+0.750Lr	10.0	12.576	n/a	n/a	n/a	0.0	2.311	0.231
Z-Z, +D+0.60W	10.0	-2.369	n/a	n/a	n/a	0.5808	0.3767	0.058
Z-Z, +D+0.750Lr+0.450W	10.0	8.343	n/a	n/a	n/a	0.1984	1.394	0.139
Z-Z, +D+0.450W	10.0	2.050	n/a	n/a	n/a	0.4672	0.6786	0.068
Z-Z, +0.60D+0.60W	10.0	-32.044	n/a	n/a	n/a	5.557	0.0	0.556
Z-Z, +D+0.70E	10.0	9.862	n/a	n/a	n/a	0.09877	1.659	0.166
Z-Z, +D+0.5250E	10.0	9.765	n/a	n/a	n/a	0.1057	1.640	0.164
Z-Z, +0.60D+0.70E	10.0	10.115	n/a	n/a	n/a	0.04811	1.025	0.103

Overturing Stability

Rotation Axis & Load Combination...	Overturing Moment	Resisting Moment	Stability Ratio	Status
X-X, D Only	None	0.0 k-ft	Infinity	OK
X-X, +D+Lr	None	0.0 k-ft	Infinity	OK
X-X, +D+0.750Lr	None	0.0 k-ft	Infinity	OK
X-X, +D+0.60W	None	0.0 k-ft	Infinity	OK
X-X, +D+0.750Lr+0.450W	None	0.0 k-ft	Infinity	OK
X-X, +D+0.450W	None	0.0 k-ft	Infinity	OK
X-X, +0.60D+0.60W	None	0.0 k-ft	Infinity	OK
X-X, +D+0.70E	None	0.0 k-ft	Infinity	OK
X-X, +D+0.5250E	None	0.0 k-ft	Infinity	OK
X-X, +0.60D+0.70E	None	0.0 k-ft	Infinity	OK
Z-Z, D Only	None	91.590 k-ft	Infinity	OK
Z-Z, +D+Lr	None	134.715 k-ft	Infinity	OK

General Footing

Project File: FOOTING CALCS.ec6

LIC#: KW-06014798, Build:20.22.12.28

WCD & ASSOCIATES

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DESCRIPTION: FRAME 1 AND 7 FOOTING DESIGN (AT CORNERS) - GRAVITY CHECK

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Z-Z, +D+0.750Lr	None	123.934 k-ft	Infinity	OK
Z-Z, +D+0.60W	54.625 k-ft	91.590 k-ft	1.677	OK
Z-Z, +D+0.750Lr+0.450W	40.969 k-ft	123.934 k-ft	3.025	OK
Z-Z, +D+0.450W	40.969 k-ft	91.590 k-ft	2.236	OK
Z-Z, +0.60D+0.60W	54.625 k-ft	54.954 k-ft	1.006	OK
Z-Z, +D+0.70E	None	94.106 k-ft	Infinity	OK
Z-Z, +D+0.5250E	None	93.477 k-ft	Infinity	OK
Z-Z, +0.60D+0.70E	None	57.470 k-ft	Infinity	OK

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	1.750	+Z	Bottom	0.9072	AsMin	0.960	163.601	OK
X-X, +1.40D	1.750	-Z	Bottom	0.9072	AsMin	0.960	163.601	OK
X-X, +1.20D+0.50Lr	2.063	+Z	Bottom	0.9072	AsMin	0.960	163.601	OK
X-X, +1.20D+0.50Lr	2.063	-Z	Bottom	0.9072	AsMin	0.960	163.601	OK
X-X, +1.20D	1.50	+Z	Bottom	0.9072	AsMin	0.960	163.601	OK
X-X, +1.20D	1.50	-Z	Bottom	0.9072	AsMin	0.960	163.601	OK
X-X, +1.20D+1.60Lr	3.30	+Z	Bottom	0.9072	AsMin	0.960	163.601	OK
X-X, +1.20D+1.60Lr	3.30	-Z	Bottom	0.9072	AsMin	0.960	163.601	OK
X-X, +1.20D+1.60Lr+0.50W	2.113	+Z	Bottom	0.9072	AsMin	0.960	163.601	OK
X-X, +1.20D+1.60Lr+0.50W	2.113	-Z	Bottom	0.9072	AsMin	0.960	163.601	OK
X-X, +1.20D+0.50W	0.3125	+Z	Bottom	0.9072	AsMin	0.960	163.601	OK
X-X, +1.20D+0.50W	0.3125	-Z	Bottom	0.9072	AsMin	0.960	163.601	OK
X-X, +1.20D+0.50Lr+W	0.3125	+Z	Top	0.9072	AsMin	0.960	163.601	OK
X-X, +1.20D+0.50Lr+W	0.3125	-Z	Top	0.9072	AsMin	0.960	163.601	OK
X-X, +1.20D+W	0.8750	+Z	Top	0.9072	AsMin	0.960	163.601	OK
X-X, +1.20D+W	0.8750	-Z	Top	0.9072	AsMin	0.960	163.601	OK
X-X, +0.90D+W	1.250	+Z	Top	0.9072	AsMin	0.960	163.601	OK
X-X, +0.90D+W	1.250	-Z	Top	0.9072	AsMin	0.960	163.601	OK
X-X, +1.20D+E	1.625	+Z	Bottom	0.9072	AsMin	0.960	163.601	OK
X-X, +1.20D+E	1.625	-Z	Bottom	0.9072	AsMin	0.960	163.601	OK
X-X, +0.90D+E	1.250	+Z	Bottom	0.9072	AsMin	0.960	163.601	OK
X-X, +0.90D+E	1.250	-Z	Bottom	0.9072	AsMin	0.960	163.601	OK
Z-Z, +1.40D	0.3529	-X	Bottom	0.9072	AsMin	0.960	163.601	OK
Z-Z, +1.40D	0.3524	+X	Bottom	0.9072	AsMin	0.960	163.601	OK
Z-Z, +1.20D+0.50Lr	0.4158	-X	Bottom	0.9072	AsMin	0.960	163.601	OK
Z-Z, +1.20D+0.50Lr	0.4155	+X	Bottom	0.9072	AsMin	0.960	163.601	OK
Z-Z, +1.20D	0.3025	-X	Bottom	0.9072	AsMin	0.960	163.601	OK
Z-Z, +1.20D	0.3021	+X	Bottom	0.9072	AsMin	0.960	163.601	OK
Z-Z, +1.20D+1.60Lr	0.6814	-X	Bottom	0.9072	AsMin	0.960	163.601	OK
Z-Z, +1.20D+1.60Lr	0.6810	+X	Bottom	0.9072	AsMin	0.960	163.601	OK
Z-Z, +1.20D+1.60Lr+0.50W	0.4259	-X	Bottom	0.9072	AsMin	0.960	163.601	OK
Z-Z, +1.20D+1.60Lr+0.50W	0.4257	+X	Bottom	0.9072	AsMin	0.960	163.601	OK
Z-Z, +1.20D+0.50W	0.06302	-X	Bottom	0.9072	AsMin	0.960	163.601	OK
Z-Z, +1.20D+0.50W	0.06293	+X	Bottom	0.9072	AsMin	0.960	163.601	OK
Z-Z, +1.20D+0.50Lr+W	0.06302	-X	Top	0.9072	AsMin	0.960	163.601	OK
Z-Z, +1.20D+0.50Lr+W	0.06293	+X	Top	0.9072	AsMin	0.960	163.601	OK
Z-Z, +1.20D+W	0.1583	-X	Top	0.9072	AsMin	0.960	163.601	OK
Z-Z, +1.20D+W	0.1580	+X	Top	0.9072	AsMin	0.960	163.601	OK
Z-Z, +0.90D+W	5.424	-X	Top	0.9072	AsMin	0.960	163.601	OK
Z-Z, +0.90D+W	0.1185	+X	Top	0.9072	AsMin	0.960	163.601	OK
Z-Z, +1.20D+E	0.3277	-X	Bottom	0.9072	AsMin	0.960	163.601	OK
Z-Z, +1.20D+E	0.3272	+X	Bottom	0.9072	AsMin	0.960	163.601	OK
Z-Z, +0.90D+E	0.2521	-X	Bottom	0.9072	AsMin	0.960	163.601	OK
Z-Z, +0.90D+E	0.2517	+X	Bottom	0.9072	AsMin	0.960	163.601	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	0.92 psi	0.00 psi	0.00 psi	0.00 psi	0.92 psi	75.00 psi	0.01	OK
+1.20D+0.50Lr	1.08 psi	0.00 psi	0.00 psi	0.00 psi	1.08 psi	75.00 psi	0.01	OK
+1.20D	0.79 psi	0.00 psi	0.00 psi	0.00 psi	0.79 psi	75.00 psi	0.01	OK
+1.20D+1.60Lr	1.64 psi	0.00 psi	0.00 psi	0.00 psi	1.64 psi	75.00 psi	0.02	OK

General Footing

Project File: FOOTING CALCS.ec6

LIC# : KW-06014798, Build:20.22.12.28

WCD & ASSOCIATES

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DESCRIPTION: FRAME 1 AND 7 FOOTING DESIGN (AT CORNERS) - GRAVITY CHECK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.20D+1.60Lr+0.50W	1.11 psi	0.00 psi	0.00 psi	0.00 psi	1.11 psi	75.00 psi	0.01	OK
+1.20D+0.50W	0.16 psi	0.00 psi	0.00 psi	0.00 psi	0.16 psi	75.00 psi	0.00	OK
+1.20D+0.50Lr+W	0.16 psi	0.00 psi	0.00 psi	0.00 psi	0.16 psi	75.00 psi	0.00	OK
+1.20D+W	0.50 psi	0.00 psi	0.00 psi	0.00 psi	0.50 psi	75.00 psi	0.01	OK
+0.90D+W	1.56 psi	0.00 psi	0.00 psi	0.00 psi	1.56 psi	75.00 psi	0.02	OK
+1.20D+E	0.85 psi	0.00 psi	0.00 psi	0.00 psi	0.85 psi	75.00 psi	0.01	OK
+0.90D+E	0.66 psi	0.00 psi	0.00 psi	0.00 psi	0.66 psi	75.00 psi	0.01	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	0.00 psi	150.00psi	0	OK
+1.20D+0.50Lr	0.00 psi	150.00psi	0	OK
+1.20D	0.00 psi	150.00psi	0	OK
+1.20D+1.60Lr	0.00 psi	150.00psi	0	OK
+1.20D+1.60Lr+0.50W	0.00 psi	150.00psi	0	OK
+1.20D+0.50W	0.00 psi	150.00psi	0	OK
+1.20D+0.50Lr+W	0.00 psi	150.00psi	0	OK
+1.20D+W	0.00 psi	150.00psi	0	OK
+0.90D+W	0.00 psi	150.00psi	0	OK
+1.20D+E	0.00 psi	150.00psi	0	OK
+0.90D+E	0.00 psi	150.00psi	0	OK

Pole Footing Embedded in Soil

Project File: FOOTING CALCS.ec6

LIC# : KW-06014798, Build:20.22.12.28

WCD & ASSOCIATES

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DESCRIPTION: FRAME 1 AND 7 FOOTING DESIGN (AT CORNERS) - LATERAL CHECK

Code References

Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Load Combinations Used : ASCE 7-16

General Information

Pole Footing Shape Rectangular
Pole Footing Width 66.0 in
Calculate Min. Depth for Allowable Pressures
Lateral Restraint at Ground Surface
Allow Passive 250.0 pcf
Max Passive 1,500.0 pcf

Controlling Values

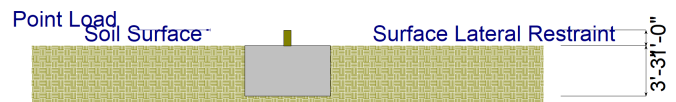
Governing Load Combination $D+0.750Lr-0.450W$
Lateral Load 15.350 k
Moment 15.350 k-ft

Restraint @ Ground Surface

Pressure at Depth
Actual 796.43 psf
Allowable 812.50 psf
Surface Retraint Force 25,386.5 lbs

Minimum Required Depth 3.250 ft

Footing Base Area 30.250 ft²
Maximum Soil Pressure 0.6876 ksf



Applied Loads

Lateral Concentrated Load (k)		Lateral Distributed Loads (k)		Applied Moment (kft)	Vertical Load (k)
D : Dead Load	8.0 k		k/ft	k-ft	10.0 k
Lr : Roof Live	5.0 k		k/ft	k-ft	9.0 k
L : Live	k		k/ft	k-ft	k
S : Snow	k		k/ft	k-ft	k
W : Wind	-8.0 k		k/ft	k-ft	-9.0 k
E : Earthquake	2.0 k		k/ft	k-ft	1.0 k
H : Lateral Earth	k		k/ft	k-ft	k
Load distance above ground surface	1.0 ft	TOP of Load above ground surface	ft		
		BOTTOM of Load above ground surface	ft		

Load Combination Results

Load Combination	Forces @ Ground Surface		Required Depth - (ft)	Pressure at Depth		Soil Increase Factor
	Loads - (k)	Moments - (ft-k)		Actual - (psf)	Allow - (psf)	
D Only	8.000	8.000	2.63	636.3	656.3	1.000
+D+Lr	13.000	13.000	3.13	729.5	781.3	1.000
+D+0.750Lr	11.750	11.750	3.00	715.5	750.0	1.000
+D+0.60W	3.200	3.200	2.00	438.4	500.0	1.000
+D-0.60W	12.800	12.800	3.13	718.3	781.3	1.000
+D+0.750Lr+0.450W	8.150	8.150	2.63	648.2	656.3	1.000
+D+0.750Lr-0.450W	15.350	15.350	3.25	796.4	812.5	1.000
+D+0.450W	4.400	4.400	2.25	476.3	562.5	1.000
+D-0.450W	11.600	11.600	3.00	706.4	750.0	1.000



Pole Footing Embedded in Soil

Project File: FOOTING CALCS.ec6

LIC# : KW-06014798, Build:20.22.12.28

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DESCRIPTION: FRAME 1 AND 7 FOOTING DESIGN (AT CORNERS) - LATERAL CHECK

+0.60D+0.60W	0.000	0.000	0.13	0.0	31.3	1.000
+0.60D-0.60W	9.600	9.600	2.88	636.5	718.8	1.000
+1.069D+1.750E	12.051	12.051	3.00	733.8	750.0	1.000
+1.069D-1.750E	5.051	5.051	2.25	546.8	562.5	1.000
+1.052D+1.313E	11.038	11.038	3.00	672.1	750.0	1.000
+1.052D-1.313E	5.788	5.788	2.38	562.4	593.8	1.000
+0.5311D+1.750E	7.749	7.749	2.63	616.3	656.3	1.000
+0.5311D-1.750E	0.749	0.749	1.25	262.7	312.5	1.000

General Footing

Project File: FOOTING CALCS.ec6

LIC# : KW-06014798, Build:20.22.12.28

WCD & ASSOCIATES

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DESCRIPTION: FRAME 2 - 6 FOOTING DESIGN (AT SLAB EGDE) - GRAVITY CHECK

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16

Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	2.50 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	2,850.0 ksi
Concrete Density	=	150.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1

Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	2,000.0 ksf
Soil Density	=	120.0 pcf
Increase Bearing By Footing Weight	=	Yes
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

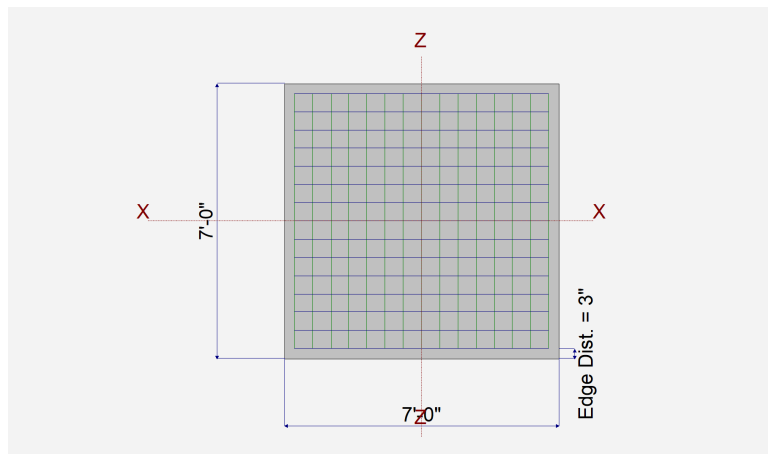
Footing base depth below soil surface	=	3.50 ft
Allow press. increase per foot of depth when footing base is below	=	ksf

Increases based on footing plan dimension

Allowable pressure increase per foot of depth when max. length or width is greater than	=	ksf
	=	ft

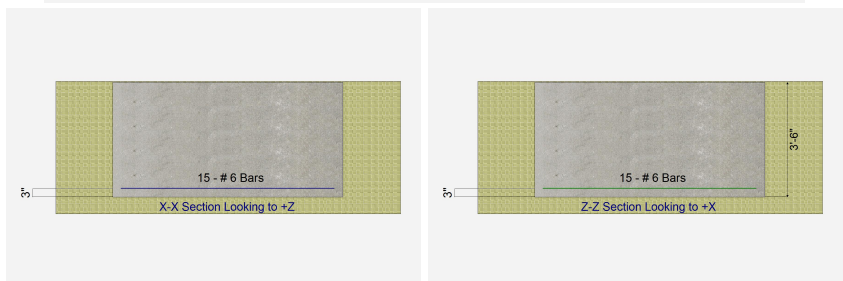
Dimensions

Width parallel to X-X Axis	=	7.0 ft
Length parallel to Z-Z Axis	=	7.0 ft
Footing Thickness	=	42.0 in
Load location offset from footing center...		
ez : Prll to Z-Z Axis	=	33.5 in
	=	in
Pedestal dimensions...		
px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in
Rebar Centerline to Edge of Concrete...		
at Bottom of footing	=	3.0 in



Reinforcing

Bars parallel to X-X Axis		
Number of Bars	=	15
Reinforcing Bar Size	=	# 6
Bars parallel to Z-Z Axis		
Number of Bars	=	15
Reinforcing Bar Size	=	# 6
Bandwidth Distribution Check (ACI 15.4.4.2)		
Direction Requiring Closer Separation		n/a
# Bars required within zone		n/a
# Bars required on each side of zone		n/a



Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	13.0	17.0			-27.0	2.0		k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

Project File: FOOTING CALCS.ec6

LIC# : KW-06014798, Build:20.22.12.28

WCD & ASSOCIATES

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DESCRIPTION: FRAME 2 - 6 FOOTING DESIGN (AT SLAB EGDE) - GRAVITY CHECK

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.3739	Soil Bearing	3.739 ksf	10.0 ksf	+0.60D+0.60W about X-X axis
PASS	1.012	Overturing - X-X	101.925 k-ft	103.098 k-ft	+0.60D+0.60W
PASS	n/a	Overturing - Z-Z	0.0 k-ft	0.0 k-ft	No Overturing
PASS	1.434	Uplift	-16.20 k	23.235 k	+0.60D+0.60W
PASS	0.03328	Z Flexure (+X)	5.350 k-ft/ft	160.765 k-ft/ft	+1.20D+1.60Lr
PASS	0.03328	Z Flexure (-X)	5.350 k-ft/ft	160.765 k-ft/ft	+1.20D+1.60Lr
PASS	0.00460	X Flexure (+Z)	0.7396 k-ft/ft	160.765 k-ft/ft	+1.20D+1.60Lr
PASS	0.05817	X Flexure (-Z)	9.352 k-ft/ft	160.765 k-ft/ft	+0.90D+W
PASS	0.006968	1-way Shear (+X)	0.5226 psi	75.0 psi	+1.20D+1.60Lr
PASS	n/a	1-way Shear (-X)	0.5226 psi	75.0 psi	+1.20D+1.60Lr
PASS	n/a	1-way Shear (+Z)	0.0 psi	75.0 psi	n/a
PASS	0.04052	1-way Shear (-Z)	3.039 psi	75.0 psi	+0.90D+W
PASS	0.0	2-way Punching	0.0 psi	0.0 psi	n/a



Top reinforcing mat required (see 'Bending' tab).

Hand check required for anchor pullout.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc (in)	Actual Soil Bearing Stress @ Location				Actual / Allow Ratio
				Bottom, -Z	Top, +Z	Left, -X	Right, +X	
X-X, D Only	10.0	n/a	11.246	0.1618	1.419	n/a	n/a	0.142
X-X, +D+Lr	10.0	n/a	18.035	0.0	2.642	n/a	n/a	0.264
X-X, +D+0.750Lr	10.0	n/a	16.758	0.0	2.318	n/a	n/a	0.232
X-X, +D+0.60W	10.0	n/a	-4.759	0.6144	0.3050	n/a	n/a	0.061
X-X, +D+0.750Lr+0.450W	10.0	n/a	11.586	0.1451	1.460	n/a	n/a	0.146
X-X, +D+0.450W	10.0	n/a	1.072	0.5013	0.5834	n/a	n/a	0.058
X-X, +0.60D+0.60W	10.0	n/a	-40.0	3.739	0.0	n/a	n/a	0.374
X-X, +D+0.70E	10.0	n/a	12.022	0.1227	1.515	n/a	n/a	0.152
X-X, +D+0.5250E	10.0	n/a	11.833	0.1325	1.491	n/a	n/a	0.149
X-X, +0.60D+0.70E	10.0	n/a	12.511	0.05798	0.9475	n/a	n/a	0.095
Z-Z, D Only	10.0	0.0	n/a	n/a	n/a	0.7903	0.7903	0.079
Z-Z, +D+Lr	10.0	0.0	n/a	n/a	n/a	1.137	1.137	0.114
Z-Z, +D+0.750Lr	10.0	0.0	n/a	n/a	n/a	1.051	1.051	0.105
Z-Z, +D+0.60W	10.0	0.0	n/a	n/a	n/a	0.4597	0.4597	0.046
Z-Z, +D+0.750Lr+0.450W	10.0	0.0	n/a	n/a	n/a	0.8026	0.8026	0.080
Z-Z, +D+0.450W	10.0	0.0	n/a	n/a	n/a	0.5423	0.5423	0.054
Z-Z, +0.60D+0.60W	10.0	0.0	n/a	n/a	n/a	0.1436	0.1436	0.014
Z-Z, +D+0.70E	10.0	0.0	n/a	n/a	n/a	0.8189	0.8189	0.082
Z-Z, +D+0.5250E	10.0	0.0	n/a	n/a	n/a	0.8117	0.8117	0.081
Z-Z, +0.60D+0.70E	10.0	0.0	n/a	n/a	n/a	0.5028	0.5028	0.050

Overturing Stability

Rotation Axis & Load Combination...	Overturing Moment	Resisting Moment	Stability Ratio	Status
X-X, D Only	None	171.829 k-ft	Infinity	OK
X-X, +D+Lr	None	278.788 k-ft	Infinity	OK
X-X, +D+0.750Lr	None	252.048 k-ft	Infinity	OK
X-X, +D+0.60W	101.925 k-ft	171.829 k-ft	1.686	OK
X-X, +D+0.750Lr+0.450W	76.444 k-ft	252.048 k-ft	3.297	OK
X-X, +D+0.450W	76.444 k-ft	171.829 k-ft	2.248	OK
X-X, +0.60D+0.60W	101.925 k-ft	103.098 k-ft	1.012	OK
X-X, +D+0.70E	None	178.435 k-ft	Infinity	OK
X-X, +D+0.5250E	None	176.784 k-ft	Infinity	OK
X-X, +0.60D+0.70E	None	109.704 k-ft	Infinity	OK
Z-Z, D Only	None	0.0 k-ft	Infinity	OK
Z-Z, +D+Lr	None	0.0 k-ft	Infinity	OK

General Footing

Project File: FOOTING CALCS.ec6

LIC# : KW-06014798, Build:20.22.12.28

WCD & ASSOCIATES

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DESCRIPTION: FRAME 2 - 6 FOOTING DESIGN (AT SLAB EGDE) - GRAVITY CHECK

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Z-Z, +D+0.750Lr	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.60W	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.750Lr+0.450W	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.450W	None	0.0 k-ft	Infinity	OK
Z-Z, +0.60D+0.60W	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.70E	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.5250E	None	0.0 k-ft	Infinity	OK
Z-Z, +0.60D+0.70E	None	0.0 k-ft	Infinity	OK

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	0.3010	+Z	Bottom	0.9072	AsMin	0.9429	160.765	OK
X-X, +1.40D	0.3017	-Z	Bottom	0.9072	AsMin	0.9429	160.765	OK
X-X, +1.20D+0.50Lr	0.3989	+Z	Bottom	0.9072	AsMin	0.9429	160.765	OK
X-X, +1.20D+0.50Lr	0.3988	-Z	Bottom	0.9072	AsMin	0.9429	160.765	OK
X-X, +1.20D	0.2580	+Z	Bottom	0.9072	AsMin	0.9429	160.765	OK
X-X, +1.20D	0.2586	-Z	Bottom	0.9072	AsMin	0.9429	160.765	OK
X-X, +1.20D+1.60Lr	0.7396	+Z	Bottom	0.9072	AsMin	0.9429	160.765	OK
X-X, +1.20D+1.60Lr	0.7392	-Z	Bottom	0.9072	AsMin	0.9429	160.765	OK
X-X, +1.20D+1.60Lr+0.50W	0.4887	+Z	Bottom	0.9072	AsMin	0.9429	160.765	OK
X-X, +1.20D+1.60Lr+0.50W	0.4894	-Z	Bottom	0.9072	AsMin	0.9429	160.765	OK
X-X, +1.20D+0.50W	0.03473	+Z	Bottom	0.9072	AsMin	0.9429	160.765	OK
X-X, +1.20D+0.50W	0.03481	-Z	Bottom	0.9072	AsMin	0.9429	160.765	OK
X-X, +1.20D+0.50Lr+W	0.04796	+Z	Top	0.9072	AsMin	0.9429	160.765	OK
X-X, +1.20D+0.50Lr+W	0.04808	-Z	Top	0.9072	AsMin	0.9429	160.765	OK
X-X, +1.20D+W	0.1580	+Z	Top	0.9072	AsMin	0.9429	160.765	OK
X-X, +1.20D+W	0.1584	-Z	Top	0.9072	AsMin	0.9429	160.765	OK
X-X, +0.90D+W	0.1185	+Z	Top	0.9072	AsMin	0.9429	160.765	OK
X-X, +0.90D+W	9.352	-Z	Top	0.9072	AsMin	0.9429	160.765	OK
X-X, +1.20D+E	0.2911	+Z	Bottom	0.9072	AsMin	0.9429	160.765	OK
X-X, +1.20D+E	0.2918	-Z	Bottom	0.9072	AsMin	0.9429	160.765	OK
X-X, +0.90D+E	0.2266	+Z	Bottom	0.9072	AsMin	0.9429	160.765	OK
X-X, +0.90D+E	0.2271	-Z	Bottom	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +1.40D	2.275	-X	Bottom	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +1.40D	2.275	+X	Bottom	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +1.20D+0.50Lr	3.013	-X	Bottom	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +1.20D+0.50Lr	3.013	+X	Bottom	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +1.20D	1.950	-X	Bottom	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +1.20D	1.950	+X	Bottom	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +1.20D+1.60Lr	5.350	-X	Bottom	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +1.20D+1.60Lr	5.350	+X	Bottom	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +1.20D+1.60Lr+0.50W	3.663	-X	Bottom	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +1.20D+1.60Lr+0.50W	3.663	+X	Bottom	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +1.20D+0.50W	0.2625	-X	Bottom	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +1.20D+0.50W	0.2625	+X	Bottom	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +1.20D+0.50Lr+W	0.3625	-X	Top	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +1.20D+0.50Lr+W	0.3625	+X	Top	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +1.20D+W	1.425	-X	Top	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +1.20D+W	1.425	+X	Top	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +0.90D+W	1.913	-X	Top	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +0.90D+W	1.913	+X	Top	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +1.20D+E	2.20	-X	Bottom	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +1.20D+E	2.20	+X	Bottom	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +0.90D+E	1.713	-X	Bottom	0.9072	AsMin	0.9429	160.765	OK
Z-Z, +0.90D+E	1.713	+X	Bottom	0.9072	AsMin	0.9429	160.765	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	0.22 psi	0.22 psi	0.87 psi	0.00 psi	0.87 psi	75.00 psi	0.01	OK
+1.20D+0.50Lr	0.29 psi	0.29 psi	1.15 psi	0.00 psi	1.15 psi	75.00 psi	0.02	OK
+1.20D	0.19 psi	0.19 psi	0.75 psi	0.00 psi	0.75 psi	75.00 psi	0.01	OK
+1.20D+1.60Lr	0.52 psi	0.52 psi	2.14 psi	0.00 psi	2.14 psi	75.00 psi	0.03	OK

General Footing

Project File: FOOTING CALCS.ec6

LIC# : KW-06014798, Build:20.22.12.28

WCD & ASSOCIATES

(c) ENERCALC INC 1983-2022

DESCRIPTION: FRAME 2 - 6 FOOTING DESIGN (AT SLAB EGDE) - GRAVITY CHECK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.20D+1.60Lr+0.50W	0.36 psi	0.36 psi	1.42 psi	0.00 psi	1.42 psi	75.00 psi	0.02	OK
+1.20D+0.50W	0.03 psi	0.03 psi	0.10 psi	0.00 psi	0.10 psi	75.00 psi	0.00	OK
+1.20D+0.50Lr+W	0.04 psi	0.04 psi	0.14 psi	0.00 psi	0.14 psi	75.00 psi	0.00	OK
+1.20D+W	0.14 psi	0.14 psi	0.62 psi	0.00 psi	0.62 psi	75.00 psi	0.01	OK
+0.90D+W	0.19 psi	0.19 psi	3.04 psi	0.00 psi	3.04 psi	75.00 psi	0.04	OK
+1.20D+E	0.21 psi	0.21 psi	0.84 psi	0.00 psi	0.84 psi	75.00 psi	0.01	OK
+0.90D+E	0.17 psi	0.17 psi	0.65 psi	0.00 psi	0.65 psi	75.00 psi	0.01	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	0.00 psi	150.00psi	0	OK
+1.20D+0.50Lr	0.00 psi	150.00psi	0	OK
+1.20D	0.00 psi	150.00psi	0	OK
+1.20D+1.60Lr	0.00 psi	150.00psi	0	OK
+1.20D+1.60Lr+0.50W	0.00 psi	150.00psi	0	OK
+1.20D+0.50W	0.00 psi	150.00psi	0	OK
+1.20D+0.50Lr+W	0.00 psi	150.00psi	0	OK
+1.20D+W	0.00 psi	150.00psi	0	OK
+0.90D+W	0.00 psi	150.00psi	0	OK
+1.20D+E	0.00 psi	150.00psi	0	OK
+0.90D+E	0.00 psi	150.00psi	0	OK

Pole Footing Embedded in Soil

Project File: FOOTING CALCS.ec6

LIC# : KW-06014798, Build:20.22.12.28

WCD & ASSOCIATES

(c) ENERCALC INC 1983-2022

DESCRIPTION: FRAME 2 - 6 FOOTING DESIGN (AT SLAB EGDE) - LATERAL CHECK

Code References

Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Load Combinations Used : ASCE 7-16

General Information

Pole Footing Shape Rectangular
Pole Footing Width 84.0 in
Calculate Min. Depth for Allowable Pressures
Lateral Restraint at Ground Surface
Allow Passive 250.0 pcf
Max Passive 1,500.0 pcf

Controlling Values

Governing Load Combination $D+0.750Lr-0.450W$
Lateral Load 15.350 k
Moment 15.350 k-ft

Restraint @ Ground Surface

Pressure at Depth
Actual 734.41 psf
Allowable 750.0 psf
Surface Retraint Force 26,222.9 lbs

Minimum Required Depth 3.0 ft

Footing Base Area 49.0 ft²
Maximum Soil Pressure 0.4245 ksf



Applied Loads

Lateral Concentrated Load (k)		Lateral Distributed Loads (k)		Applied Moment (kft)	Vertical Load (k)
D : Dead Load	8.0 k		k/ft	k-ft	10.0 k
Lr : Roof Live	5.0 k		k/ft	k-ft	9.0 k
L : Live	k		k/ft	k-ft	k
S : Snow	k		k/ft	k-ft	k
W : Wind	-8.0 k		k/ft	k-ft	-9.0 k
E : Earthquake	2.0 k		k/ft	k-ft	1.0 k
H : Lateral Earth	k		k/ft	k-ft	k
Load distance above ground surface	1.0 ft	TOP of Load above ground surface	ft		
		BOTTOM of Load above ground surface	ft		

Load Combination Results

Load Combination	Forces @ Ground Surface		Required Depth - (ft)	Pressure at Depth		Soil Increase Factor
	Loads - (k)	Moments - (ft-k)		Actual - (psf)	Allow - (psf)	
D Only	8.000	8.000	2.50	551.2	625.0	1.000
+D+Lr	13.000	13.000	2.88	677.2	718.8	1.000
+D+0.750Lr	11.750	11.750	2.75	669.0	687.5	1.000
+D+0.60W	3.200	3.200	1.88	391.9	468.8	1.000
+D-0.60W	12.800	12.800	2.88	666.8	718.8	1.000
+D+0.750Lr+0.450W	8.150	8.150	2.50	561.5	625.0	1.000
+D+0.750Lr-0.450W	15.350	15.350	3.00	734.4	750.0	1.000
+D+0.450W	4.400	4.400	2.00	473.7	500.0	1.000
+D-0.450W	11.600	11.600	2.75	660.5	687.5	1.000



Pole Footing Embedded in Soil

Project File: FOOTING CALCS.ec6

LIC# : KW-06014798, Build:20.22.12.28

WCD & ASSOCIATES

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DESCRIPTION: FRAME 2 - 6 FOOTING DESIGN (AT SLAB EGDE) - LATERAL CHECK

+0.60D+0.60W	0.000	0.000	0.13	0.0	31.3	1.000
+0.60D-0.60W	9.600	9.600	2.63	599.9	656.3	1.000
+1.069D+1.750E	12.051	12.051	2.75	686.2	687.5	1.000
+1.069D-1.750E	5.051	5.051	2.13	481.7	531.3	1.000
+1.052D+1.313E	11.038	11.038	2.75	628.5	687.5	1.000
+1.052D-1.313E	5.788	5.788	2.25	492.3	562.5	1.000
+0.5311D+1.750E	7.749	7.749	2.38	591.5	593.8	1.000
+0.5311D-1.750E	0.749	0.749	1.13	254.8	281.3	1.000

FT2 ANCHORAGE CALC

1. Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General

Design method: ACI 318-14
Units: Imperial units

Anchor Information:

Anchor type: Cast-in-place
Material: AB
Diameter (inch): 0.750
Effective Embedment depth, h_{ef} (inch): 10.000
Anchor category: -
Anchor ductility: Yes
 h_{min} (inch): 12.25
 C_{min} (inch): 4.50
 S_{min} (inch): 4.50

Base Material

Concrete: Normal-weight
Concrete thickness, h (inch): 42.00
State: Cracked
Compressive strength, f'_c (psi): 2500
 $\Psi_{c,v}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Ignore 6do requirement: No
Build-up grout pad: No

Base Plate

Length x Width x Thickness (inch): 13.00 x 10.00 x 0.25

Recommended Anchor

Anchor Name: PAB Pre-Assembled Anchor Bolt - PAB6 (3/4"Ø)



FT2 ANCHORAGE CALC

Load and Geometry

Load factor source: ACI 318 Section 5.3

Load combination: not set

Seismic design: No

Anchors subjected to sustained tension: Not applicable

Apply entire shear load at front row: No

Anchors only resisting wind and/or seismic loads: No

Strength level loads:

N_{ua} [lb]: 10000

V_{uax} [lb]: 8800

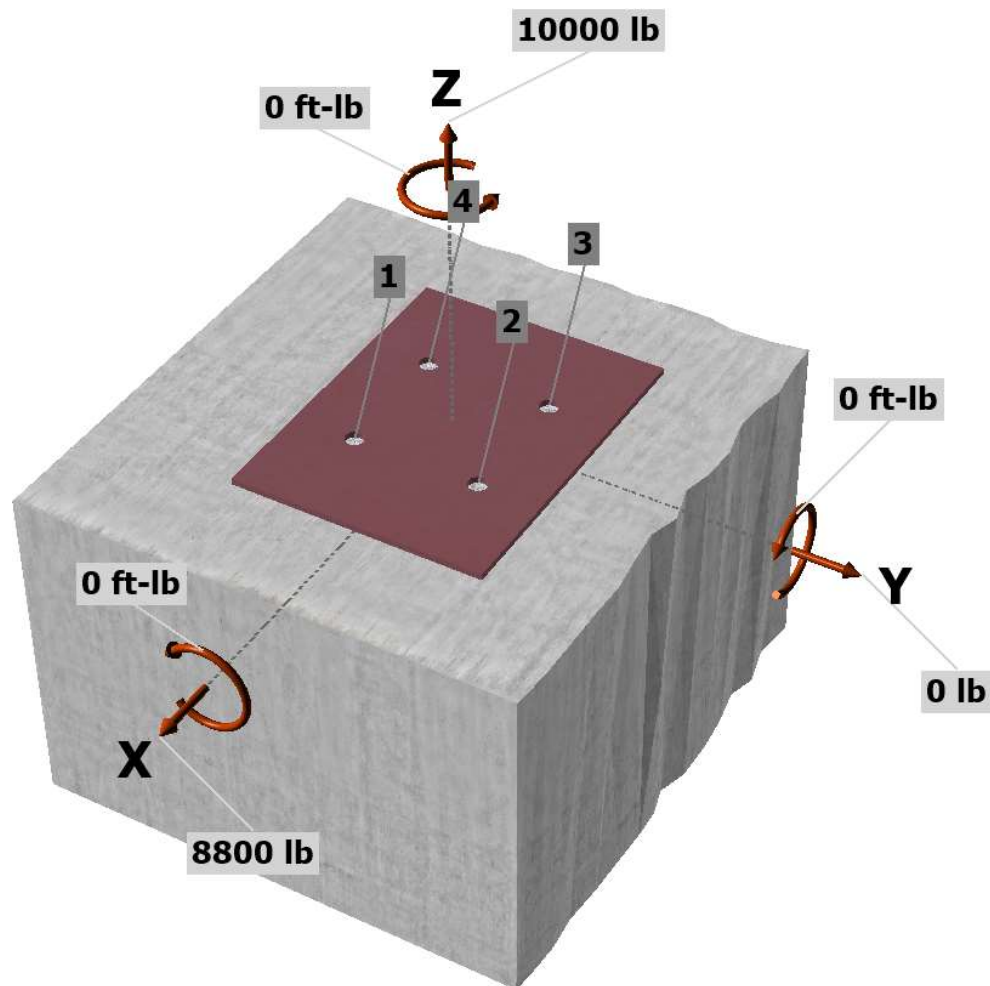
V_{uay} [lb]: 0

M_{ux} [ft-lb]: 0

M_{uy} [ft-lb]: 0

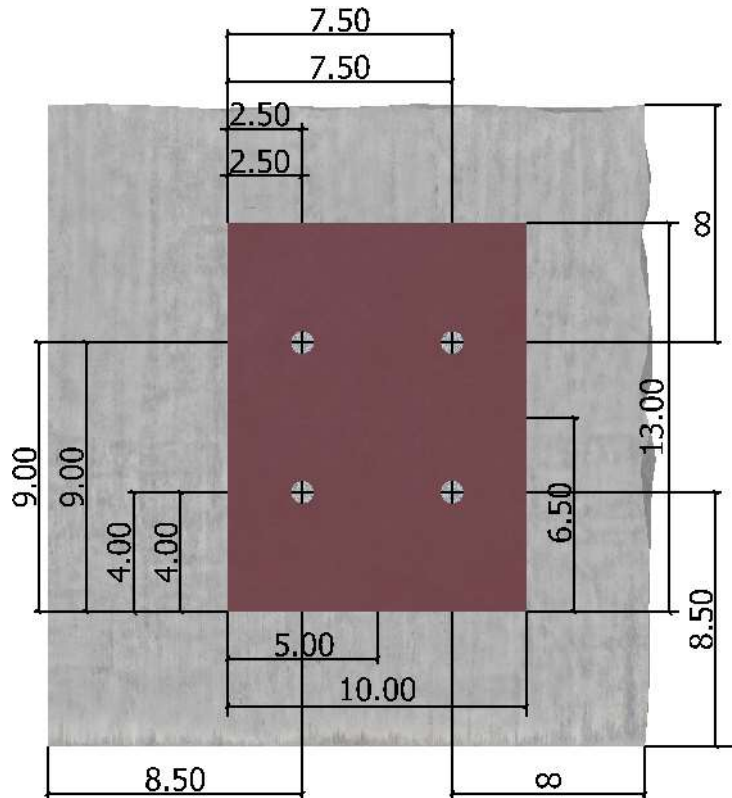
M_{uz} [ft-lb]: 0

<Figure 1>



FT2 ANCHORAGE CALC

<Figure 2>



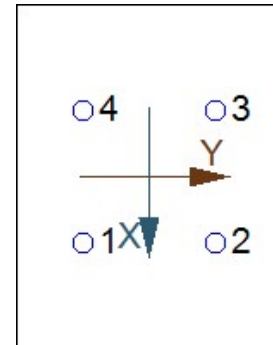
FT2 ANCHORAGE CALC

3. Resulting Anchor Forces

Anchor	Tension load, N _{ua} (lb)	Shear load x, V _{uax} (lb)	Shear load y, V _{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2 + (V_{uay})^2}$ (lb)
1	2500.0	2200.0	0.0	2200.0
2	2500.0	2200.0	0.0	2200.0
3	2500.0	2200.0	0.0	2200.0
4	2500.0	2200.0	0.0	2200.0
Sum	10000.0	8800.0	0.0	8800.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 10000
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



4. Steel Strength of Anchor in Tension (Sec. 17.4.1)

N _{sa} (lb)	φ	φN _{sa} (lb)
19370	0.75	14528

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.4.2)

$$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5} \text{ (Eq. 17.4.2.2a)}$$

k _c	λ _a	f' _c (psi)	h _{ef} (in)	N _b (lb)
24.0	1.00	2500	10.000	37947

$$\phi N_{cbg} = \phi (A_{Nc} / A_{Nco}) \psi_{ec,N} \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b \text{ (Sec. 17.3.1 \& Eq. 17.4.2.1b)}$$

A _{Nc} (in ²)	A _{Nco} (in ²)	C _{a,min} (in)	ψ _{ec,N}	ψ _{ed,N}	ψ _{c,N}	ψ _{cp,N}	N _b (lb)	φ	φN _{cbg} (lb)
877.64	900.00	8.50	1.000	0.870	1.00	1.000	37947	0.70	22536

6. Pullout Strength of Anchor in Tension (Sec. 17.4.3)

$$\phi N_{pn} = \phi \psi_{c,P} N_p = \phi \psi_{c,P} 8 A_{brg} f'_c \text{ (Sec. 17.3.1, Eq. 17.4.3.1 \& 17.4.3.4)}$$

ψ _{c,P}	A _{brg} (in ²)	f' _c (psi)	φ	φN _{pn} (lb)
1.0	3.53	2500	0.70	49476

FT2 ANCHORAGE CALC

8. Steel Strength of Anchor in Shear (Sec. 17.5.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\phi_{grout}\phi V_{sa}$ (lb)
11625	1.0	0.65	7556

9. Concrete Breakout Strength of Anchor in Shear (Sec. 17.5.2)

Shear perpendicular to edge in x-direction:

$$V_{bx} = \min[7(l_e/d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{at}^{1.5}; 9\lambda_a\sqrt{f'_c}c_{at}^{1.5}] \text{ (Eq. 17.5.2.2a \& Eq. 17.5.2.2b)}$$

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{at} (in)	V_{bx} (lb)
6.00	0.750	1.00	2500	13.50	22321

$$\phi V_{cbgx} = \phi (A_{Vc}/A_{Vco})\psi_{ec,V}\psi_{ed,V}\psi_{c,V}\psi_{h,V}V_{bx} \text{ (Sec. 17.3.1 \& Eq. 17.5.2.1b)}$$

A_{Vc} (in ²)	A_{Vco} (in ²)	$\psi_{ec,V}$	$\psi_{ed,V}$	$\psi_{c,V}$	$\psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbgx} (lb)
683.44	820.13	1.000	0.826	1.000	1.000	22321	0.70	10754

Shear parallel to edge in y-direction:

$$V_{bx} = \min[7(l_e/d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{at}^{1.5}; 9\lambda_a\sqrt{f'_c}c_{at}^{1.5}] \text{ (Eq. 17.5.2.2a \& Eq. 17.5.2.2b)}$$

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{at} (in)	V_{bx} (lb)
6.00	0.750	1.00	2500	8.50	11152

$$\phi V_{cbgy} = \phi (2)(A_{Vc}/A_{Vco})\psi_{ec,V}\psi_{ed,V}\psi_{c,V}\psi_{h,V}V_{bx} \text{ (Sec. 17.3.1, 17.5.2.1(c) \& Eq. 17.5.2.1b)}$$

A_{Vc} (in ²)	A_{Vco} (in ²)	$\psi_{ec,V}$	$\psi_{ed,V}$	$\psi_{c,V}$	$\psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbgy} (lb)
334.69	325.13	1.000	1.000	1.000	1.000	11152	0.70	16072

10. Concrete Pryout Strength of Anchor in Shear (Sec. 17.5.3)

$$\phi V_{cp} = \phi k_{cp}N_{cbg} = \phi k_{cp}(A_{Nc}/A_{Nco})\psi_{ec,N}\psi_{ed,N}\psi_{c,N}\psi_{cp,N}N_b \text{ (Sec. 17.3.1 \& Eq. 17.5.3.1b)}$$

k_{cp}	A_{Nc} (in ²)	A_{Nco} (in ²)	$\psi_{ec,N}$	$\psi_{ed,N}$	$\psi_{c,N}$	$\psi_{cp,N}$	N_b (lb)	ϕ	ϕV_{cp} (lb)
2.0	877.64	900.00	1.000	0.870	1.000	1.000	37947	0.70	45072

11. Results

Interaction of Tensile and Shear Forces (Sec. R17.6)

Tension	Factored Load, N _{ua} (lb)	Design Strength, ϕN _n (lb)	Ratio	Status	
Steel	2500	14528	0.17	Pass	
Concrete breakout	10000	22536	0.44	Pass (Governs)	
Pullout	2500	49476	0.05	Pass	
Shear	Factored Load, V _{ua} (lb)	Design Strength, ϕV _n (lb)	Ratio	Status	
Steel	2200	7556	0.29	Pass	
T Concrete breakout x+	8800	10754	0.82	Pass (Governs)	
 Concrete breakout y-	4400	16072	0.27	Pass (Governs)	
Pryout	8800	45072	0.20	Pass	
Interaction check	(N _{ua} /ϕN _{ua}) ^{5/3}	(V _{ua} /ϕV _{ua}) ^{5/3}	Combined Ratio	Permissible	Status
Sec. R17.6	0.26	0.72	97.4%	1.0	Pass

PAB6 (3/4"Ø) with hef = 10.000 inch meets the selected design criteria.

FT2 ANCHORAGE CALC

12. Warnings

- Designer must exercise own judgement to determine if this design is suitable.



FT3 ANCHORAGE CALC

1. Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General

Design method: ACI 318-14
Units: Imperial units

Anchor Information:

Anchor type: Cast-in-place
Material: AB
Diameter (inch): 0.750
Effective Embedment depth, h_{ef} (inch): 10.000
Anchor category: -
Anchor ductility: Yes
 h_{min} (inch): 12.25
 C_{min} (inch): 4.50
 S_{min} (inch): 4.50

Base Material

Concrete: Normal-weight
Concrete thickness, h (inch): 42.00
State: Cracked
Compressive strength, f'_c (psi): 2500
 $\Psi_{c,v}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Ignore 6do requirement: No
Build-up grout pad: No

Base Plate

Length x Width x Thickness (inch): 13.00 x 10.00 x 0.25

Recommended Anchor

Anchor Name: PAB Pre-Assembled Anchor Bolt - PAB6 (3/4"Ø)



FT3 ANCHORAGE CALC

Load and Geometry

Load factor source: ACI 318 Section 5.3

Load combination: not set

Seismic design: No

Anchors subjected to sustained tension: Not applicable

Apply entire shear load at front row: No

Anchors only resisting wind and/or seismic loads: No

Strength level loads:

N_{ua} [lb]: 15300

V_{uax} [lb]: 13200

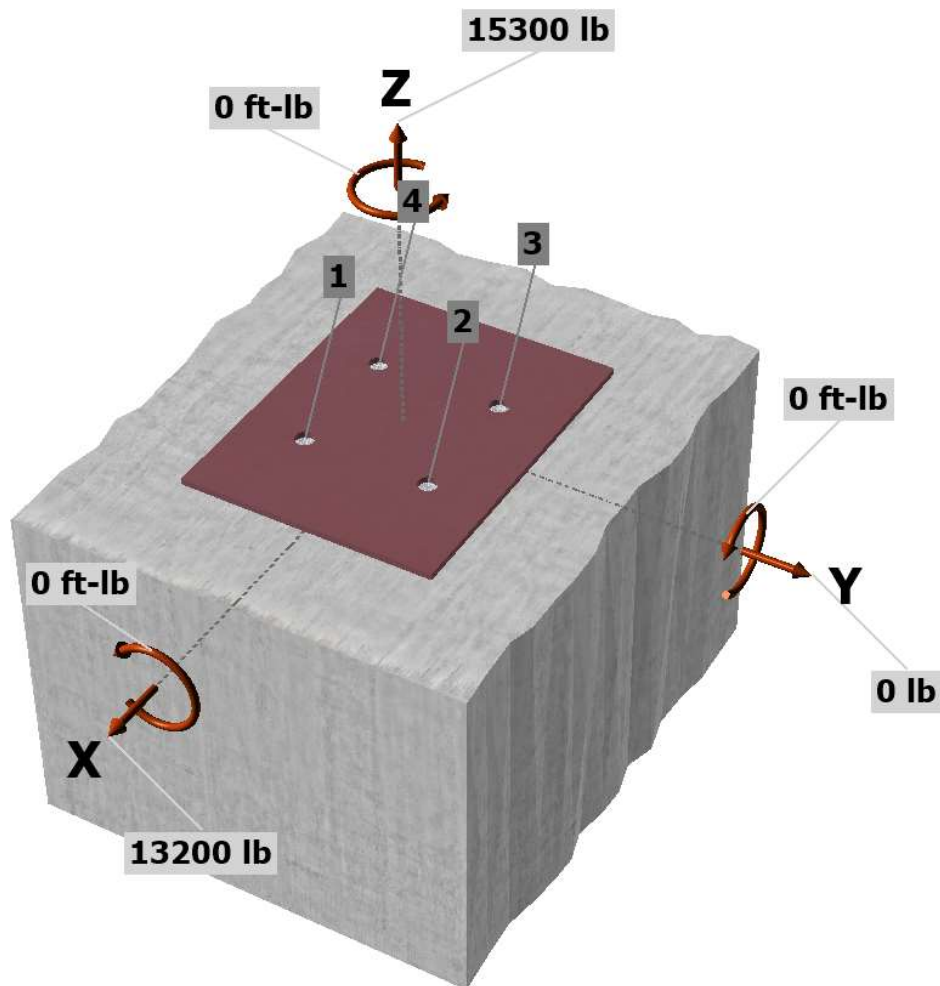
V_{uay} [lb]: 0

M_{ux} [ft-lb]: 0

M_{uy} [ft-lb]: 0

M_{uz} [ft-lb]: 0

<Figure 1>

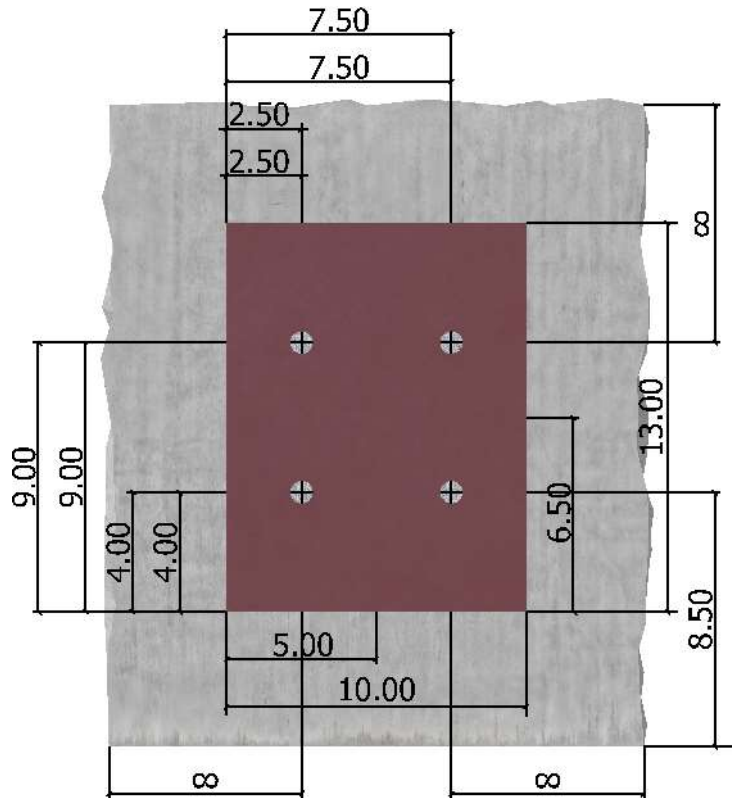


Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.

Simpson Strong-Tie Company Inc. 5956 W. Las Positas Boulevard Pleasanton, CA 94588 Phone: 925.560.9000 Fax: 925.847.3871 www.strongtie.com

FT3 ANCHORAGE CALC

<Figure 2>



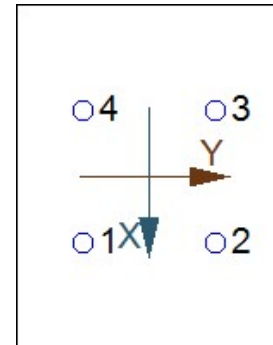
FT3 ANCHORAGE CALC

3. Resulting Anchor Forces

Anchor	Tension load, N _{ua} (lb)	Shear load x, V _{uax} (lb)	Shear load y, V _{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2 + (V_{uay})^2}$ (lb)
1	3825.0	3300.0	0.0	3300.0
2	3825.0	3300.0	0.0	3300.0
3	3825.0	3300.0	0.0	3300.0
4	3825.0	3300.0	0.0	3300.0
Sum	15300.0	13200.0	0.0	13200.0

Maximum concrete compression strain (%): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 15300
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



4. Steel Strength of Anchor in Tension (Sec. 17.4.1)

N _{sa} (lb)	φ	φN _{sa} (lb)
19370	0.75	14528

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.4.2)

$$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5} \text{ (Eq. 17.4.2.2a)}$$

k _c	λ _a	f' _c (psi)	h _{ef} (in)	N _b (lb)
24.0	1.00	2500	10.000	37947

$$\phi N_{cbg} = \phi (A_{Nc} / A_{Nco}) \psi_{ec,N} \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b \text{ (Sec. 17.3.1 \& Eq. 17.4.2.1b)}$$

A _{Nc} (in ²)	A _{Nco} (in ²)	C _{a,min} (in)	ψ _{ec,N}	ψ _{ed,N}	ψ _{c,N}	ψ _{cp,N}	N _b (lb)	φ	φN _{cbg} (lb)
1103.53	900.00	8.50	1.000	0.870	1.00	1.000	37947	0.70	28336

6. Pullout Strength of Anchor in Tension (Sec. 17.4.3)

$$\phi N_{pn} = \phi \psi_{c,P} N_p = \phi \psi_{c,P} 8 A_{brg} f'_c \text{ (Sec. 17.3.1, Eq. 17.4.3.1 \& 17.4.3.4)}$$

ψ _{c,P}	A _{brg} (in ²)	f' _c (psi)	φ	φN _{pn} (lb)
1.0	3.53	2500	0.70	49476

FT3 ANCHORAGE CALC

8. Steel Strength of Anchor in Shear (Sec. 17.5.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\phi_{grout}\phi V_{sa}$ (lb)
11625	1.0	0.65	7556

9. Concrete Breakout Strength of Anchor in Shear (Sec. 17.5.2)

Shear perpendicular to edge in x-direction:

$$V_{bx} = \min[7(l_e/d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{at}^{1.5}; 9\lambda_a\sqrt{f'_c}c_{at}^{1.5}] \text{ (Eq. 17.5.2.2a \& Eq. 17.5.2.2b)}$$

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{at} (in)	V_{bx} (lb)
6.00	0.750	1.00	2500	13.50	22321

$$\phi V_{cbgx} = \phi (A_{Vc} / A_{Vco}) \psi_{ec,V} \psi_{ed,V} \psi_{c,V} \psi_{h,V} V_{bx} \text{ (Sec. 17.3.1 \& Eq. 17.5.2.1b)}$$

A_{Vc} (in ²)	A_{Vco} (in ²)	$\psi_{ec,V}$	$\psi_{ed,V}$	$\psi_{c,V}$	$\psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbgx} (lb)
921.38	820.13	1.000	1.000	1.000	1.000	22321	0.70	17554

10. Concrete Pryout Strength of Anchor in Shear (Sec. 17.5.3)

$$\phi V_{cp} = \phi k_{cp} N_{cbg} = \phi k_{cp} (A_{Nc} / A_{Nco}) \psi_{ec,N} \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b \text{ (Sec. 17.3.1 \& Eq. 17.5.3.1b)}$$

k_{cp}	A_{Nc} (in ²)	A_{Nco} (in ²)	$\psi_{ec,N}$	$\psi_{ed,N}$	$\psi_{c,N}$	$\psi_{cp,N}$	N_b (lb)	ϕ	ϕV_{cp} (lb)
2.0	1103.53	900.00	1.000	0.870	1.000	1.000	37947	0.70	56672

11. Results

Interaction of Tensile and Shear Forces (Sec. R17.6)

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status	
Steel	3825	14528	0.26	Pass	
Concrete breakout	15300	28336	0.54	Pass (Governs)	
Pullout	3825	49476	0.08	Pass	
Shear	Factored Load, V_{ua} (lb)	Design Strength, ϕV_n (lb)	Ratio	Status	
Steel	3300	7556	0.44	Pass	
T Concrete breakout x+	13200	17554	0.75	Pass (Governs)	
Pryout	13200	56672	0.23	Pass	
Interaction check	$(N_{ua}/\phi N_{ua})^{5/3}$	$(V_{ua}/\phi V_{ua})^{5/3}$	Combined Ratio	Permissible	Status
Sec. R17.6	0.36	0.62	98.0%	1.0	Pass

PAB6 (3/4"Ø) with hef = 10.000 inch meets the selected design criteria.

12. Warnings

- Designer must exercise own judgement to determine if this design is suitable.



STEEL BUILDINGS
A **NUCOR** Company

STRUCTURAL CALCULATIONS

Project Name: Rob Kerth Ice Land

NBG Project #: C22B0182A

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1700 E. Louise Avenue
Lathrop, CA 95330

Phone: 209-983-0910

Tuesday, August 23, 2022

R.C. Patterson, Inc.
2505 Delmar Avenue
Penryn, CA 95663

Attn.: BOB PATTERSON

Project Location: Sacramento, CA 95815

Project Number: C22B0182A

Project Name: Rob Kerth Ice Land

Buildings: A->105'-0"x147'-6"x20'-0"(RCG, 1:12);

This Letter of Design Certification ensures that the materials furnished by the metal building supplier are designed in accordance with the information specified to the metal building supplier on the order documents and summarized by the loading information listed below. The Project Engineer of Record (not the metal building supplier) is responsible for verifying that the building code and design loads meet any and all applicable local requirements.

The Professional Engineer whose seal appears on this Letter of Certification is employed by the metal building manufacturer, a Member of MBMA, and does not serve as or represent the Engineer of Record for this project and shall not be construed as such.

DESIGN LOAD CRITERIA:

Structural Loads Applied in General Accordance with: California (CBC 2019)

Risk Category: III - Substantial Hazards

PROJECT-WIDE LOADING INFORMATION:

Ground Snow Load: 0.00 psf Snow Exposure Factor, Ce: 1.00 Snow Imp. Factor, Is: 1.10
Roof Live Load: 20.00 psf Reducible as per code Rainfall Intensity: 4 in/hr
Design Wind Velocity: 110 mph Nominal Design Wind Velocity: 85 mph ***C&C Wind: 26psf / -35psf
Is Roof to meet UL 90 Requirements?: No Wind Exposure: C

Seismic Criteria: Ss: 0.539 S1: 0.246 *No ground snow included in seismic calculation
Design Sds / Sd1: 0.492 / 0.346 Analysis Procedure: Equivalent Lateral Force Procedure
Seis. Imp. Factor, Ie: 1.25 Long. SFRS: Ord. Concentrically Braced Frame
Seis. Design Category: D Site Class: D Lat. SFRS: Ord. Moment Frame

BUILDING-SPECIFIC LOADING INFORMATION:

Bldg	Roof Dead (psf)*	Collateral Dead		Snow Coefficient		Snow Load (psf)		Wind		Seismic		
		Pri (psf)	Sec (psf)	Ct	Cs	Ps (psf)	**Pm (psf)	Enclosure	GCpi	R	Cs	V (kips)
A	2.50	5.00	5.00	1.20	1.00	0.00	0.00	Enclosed	±0.18	3.25	0.189	37.72

*Primary Structural Not Included

**Pm is based on the minimum roof snow load calculated per building code or the contract-specified roof snow load, whichever is greater. This value, Pm, is only applied in combination with Dead and Collateral Loads. Roof Snow in other loading conditions is determined per the specified Building Code.

***Design wind pressures to be used for wall exterior component and cladding materials not provided by Metal Building Supplier

Mezzanine Information:

Floor Dead Load: N/A

Floor Collateral Load: N/A

Floor Live Load: N/A

Crane Information:

No cranes on building.

Roof-Top Unit Information:

No roof-top units on building.

The design of structural members supporting roof gravity loads is controlled by the more critical effect of roof live load or roof snow applied in accordance with the governing building code.

DESIGN STANDARDS REFERENCED:

- AISC Specification for Structural Steel Buildings - Steel Construction Manual, 15th Edition, ©2017.
- AISI North-American Spec. for the Design of Cold-Formed Steel Structures, ©2016 Edition.
- IBC codes are designed in accordance with ASCE7-16 Edition.
- MBMA Metal Building Systems Manual, Latest Edition.
- AWS Latest Edition of Structural Welding Code.
- No buyout structural components provided on this project.



9/19/22



Professional Seal



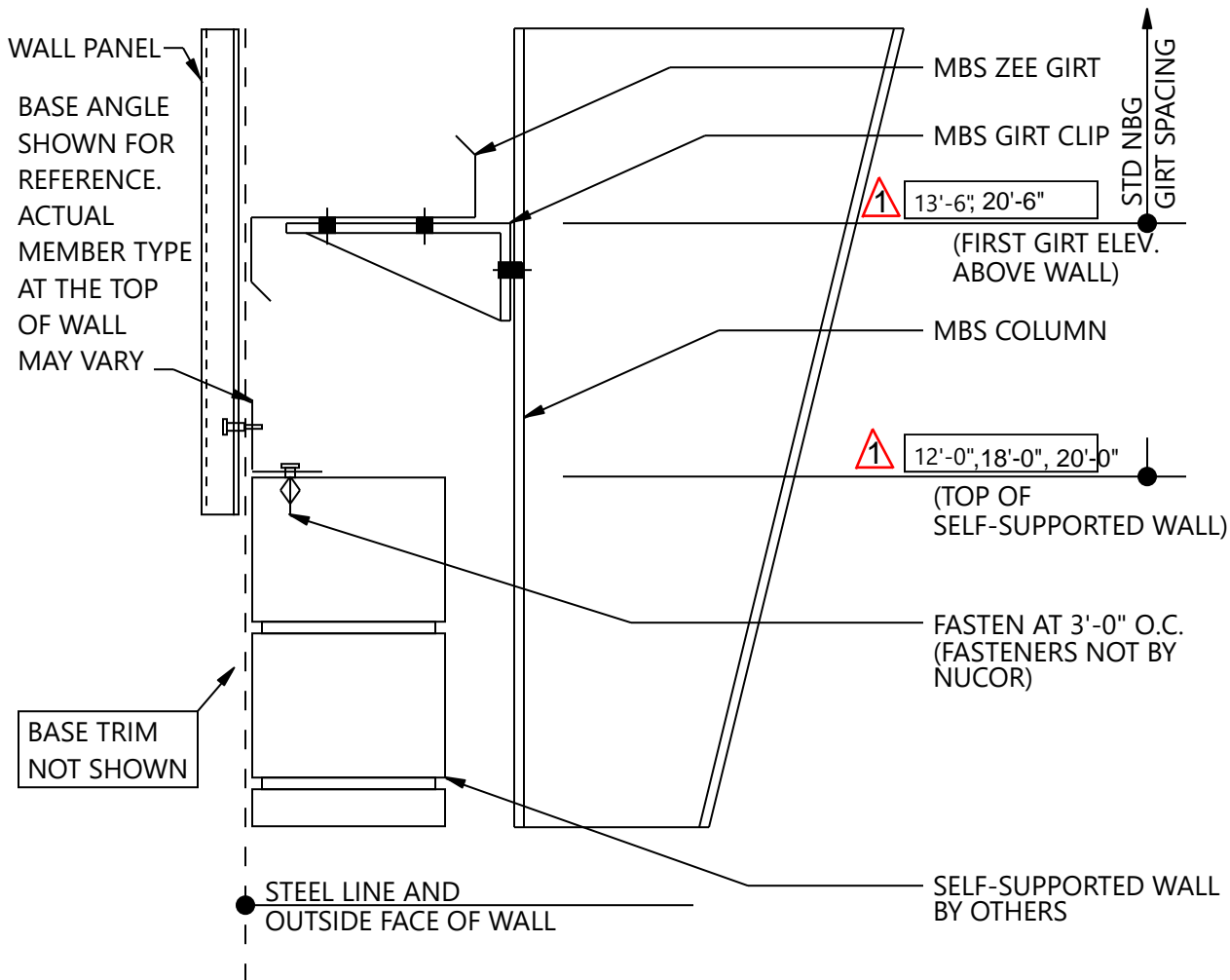
Special notes to be placed on Erection Drawing Cover Sheet:

WO7 - Wall by Others Designed to Accommodate Story Drift:

The concrete/masonry wall designer is responsible for designing and detailing the wall system by others to accommodate the lateral and longitudinal drifts as indicated.

WO10 - Wall Panel Loads Self-Supported Masonry:

The metal building manufacturer's wall panels above the top of the masonry/concrete walls must be attached to the walls with a spacing as shown. The masonry/concrete walls, as well as the fasteners attaching the metal building manufacturer's wall panels to the masonry/concrete walls are designed and provided by others (not by the metal building manufacturer). The masonry/concrete wall is self-supporting, and must be designed to support the loads as shown



MBS WALL PANEL LOADS

SELF-SUPPORTED WALL BY OTHERS

1 Top of Self-Supporting Wall & First Girt Height Updated

WO10



DESIGN PARAMETERS

Job No. : C22B0182A Sheet : A - 1
Customer : Rob Kerth Ice Land Location: Sacramento, Ca
Designed by : VP Builder: R.C. Patterson, Inc.
Checked by : **RA 8/30/22**
Date : 24-Aug-2022 Revision : 01

STRUCTURE DESCRIPTION

Frame Type : Clear Span
Building Width : 105.00 ft.
Building Length : 147.50 ft.
Eave Height : 20.00 ft.
Max. Bay Spacing : 25.00 ft.
Roof Slope : 1.000 in. / ft.

BASIC LOADS

Building Code : CBC 2019 Risk Category : III
Roof Live Load : 20 psf Tributary Reduction : Yes
Frame Live Load : 12 psf
Wind Load
Wind Speed, V : 110 mph Enclosure Condition : Enclosed
V_{asd} : 85 mph Exposure : C
Seismic Load
Design Category : D S_S : 53.90% S_I : 24.60%
Importance : 1.25 S_{DS} : 0.49 S_{DI} : 0.35
Site Class : D R_{Trans} : 3.50 / Ω_o : 2.50 C_{S-Trans} : 0.18
R_{Long} : 3.25 / Ω_o : 2.00 C_{S-Long} : 0.19
Snow Load
Roof Snow : 0 psf Ce : 1.0 Ct : 1.2
Ground Snow : 0 psf
Importance : 1.10
Collateral Load : 5.0 psf
Dead Load : 5.0 psf (Total) Frame Wt: 2.5 psf
Purlins: 1.0 psf
Panels: 1.0 psf
Misc.: 0.5 psf

OTHER LOADS

REVISIONS

1 VP 11/4/22 per CO#2 **CK: RA 11/4/22**
A/0.a,4, B/1, D/5,8,11,13,16,20-23, E/1-2, F/9, H/1,2,4,5

*** This structure is designed in compliance with CBC Steel Buildings specifications and standards utilizing the pertinent provisions and recommendations of the American Institute of Steel Construction (AISC), International Code Council (ICC), American Iron and Steel Institute (AISI), the Metal Building Manufacturer's Association (MBMA) and their publications. ***

NUCOR BUILDINGS GROUP

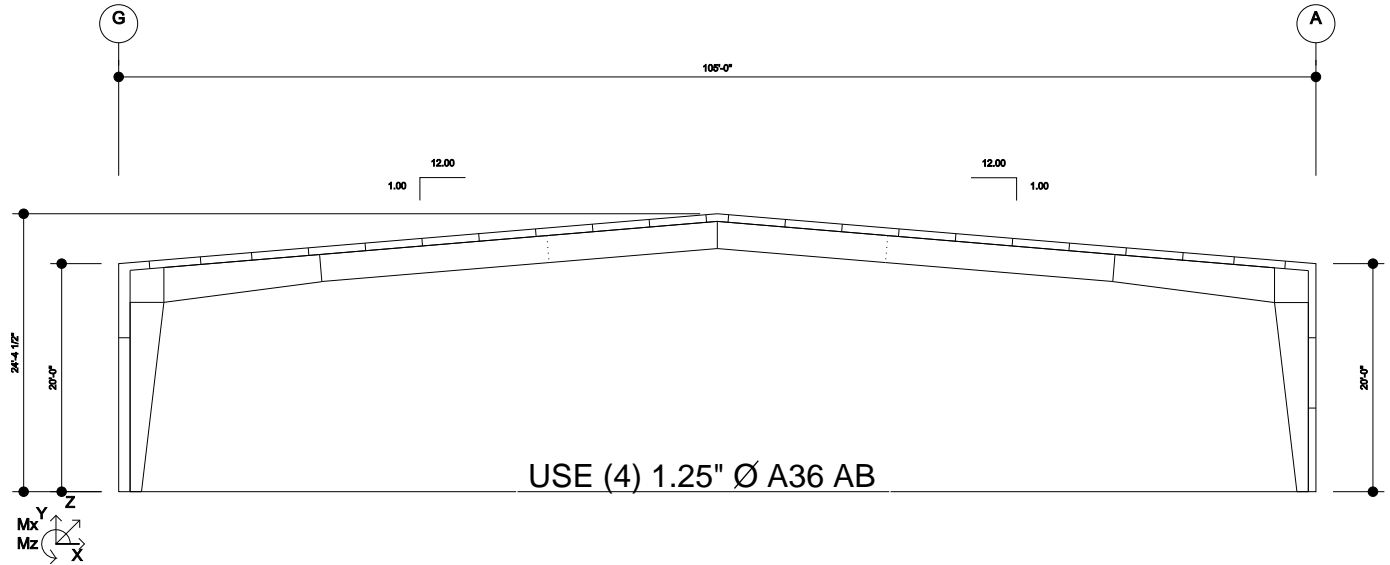
Job # : C22B0182A
File : E01.nfr
App Version : 1.6.127.0

Job Name : Nucor Buildings Group
Designer : BG\Viviana.Perez
Date : 8/23/2022

Frame : A-2

DESIGN SUMMARY - REACTIONS BY LOAD CASE REPORT

FRAME LINE 1,7



Member	X (kips)	Y (kips)	Z (kips)	Mx (kip-ft)	Mz (kip-ft)	Member	X (kips)	Y (kips)	Z (kips)	Mx (kip-ft)	Mz (kip-ft)
LOAD CASE 1 - DEAD						LOAD CASE 2 - COLLATERAL					
COL01	5	6	0	0	0	COL01	3	4	0	0	0
COL02	-5	6	0	0	0	COL02	-3	4	0	0	0
LOAD CASE 3 - ROOF LIVE						LOAD CASE 4 - WIND CASE 1 TO RIGHT					
COL01	8	9	0	0	0	COL01	-11	-14	0	0	0
COL02	-8	9	0	0	0	COL02	7	-8	0	0	0
LOAD CASE 5 - WIND CASE 1 TO LEFT						LOAD CASE 6 - WIND CASE 2 TO RIGHT					
COL01	-8	-8	0	0	0	COL01	-16	-19	0	0	0
COL02	12	-13	0	0	0	COL02	12	-14	0	0	0
LOAD CASE 7 - WIND CASE 2 TO LEFT						LOAD CASE 8 - LONG. WIND 1 TO BACK					
COL01	-12	-14	0	0	0	COL01	-9	-13	0	0	0
COL02	16	-19	0	0	0	COL02	9	-9	0	0	0
LOAD CASE 9 - LONG. WIND 1 TO FRONT						LOAD CASE 10 - LONG. WIND 2 TO BACK					
COL01	-9	-9	0	0	0	COL01	-13	-19	0	0	0
COL02	8	-13	0	0	0	COL02	13	-14	0	0	0
LOAD CASE 11 - LONG. WIND 2 TO FRONT						LOAD CASE 12 - SEISMIC TO RIGHT					
COL01	-14	-15	0	0	0	COL01	-2	-1	0	0	0
COL02	13	-19	0	0	0	COL02	-2	1	0	0	0
LOAD CASE 13 - SEISMIC TO LEFT											
COL01	2	1	0	0	0						
COL02	2	-1	0	0	0						

NOTES:

- ALL WIND REACTIONS SHOWN IN THE TABLE ABOVE ARE BASED ON ULTIMATE DESIGN WIND SPEED AND ARE UNFACTORED.
- SEISMIC REACTIONS ARE DUE TO BASE SHEAR. THE REDUNDANCY FACTOR AND THE OVERSTRENGTH FACTOR HAVE NOT BEEN INCLUDED IN THE REACTIONS SHOWN.

NUCOR BUILDINGS GROUP

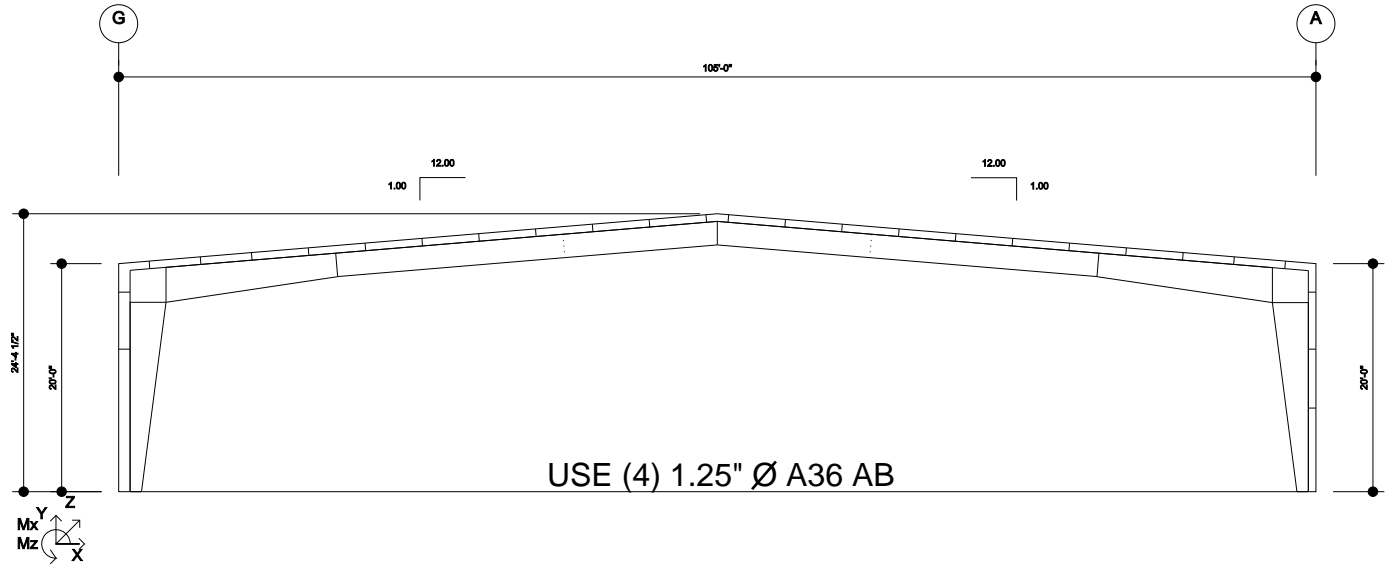
Job # : C22B0182A
File : F01a.nfr
App Version : 1.6.127.0

Job Name : Rob Kerth Iceland
Designer : BG\Viviana.Perez
Date : 8/23/2022

Frame : A-3

DESIGN SUMMARY - REACTIONS BY LOAD CASE REPORT

FRAME LINE 2-6



Member	X (kips)	Y (kips)	Z (kips)	Mx (kip-ft)	Mz (kip-ft)	Member	X (kips)	Y (kips)	Z (kips)	Mx (kip-ft)	Mz (kip-ft)
LOAD CASE 1 - DEAD						LOAD CASE 2 - COLLATERAL					
COL01	5	6	0	0	0	COL01	7	7	0	0	0
COL02	-5	6	0	0	0	COL02	-7	7	0	0	0
LOAD CASE 3 - ROOF LIVE						LOAD CASE 4 - WIND CASE 1 TO RIGHT					
COL01	15	17	0	0	0	COL01	-15	-16	0	0	0
COL02	-15	17	0	0	0	COL02	8	-8	0	0	0
LOAD CASE 5 - WIND CASE 1 TO LEFT						LOAD CASE 6 - WIND CASE 2 TO RIGHT					
COL01	-8	-8	0	0	0	COL01	-24	-27	0	0	0
COL02	16	-16	0	0	0	COL02	17	-20	0	0	0
LOAD CASE 7 - WIND CASE 2 TO LEFT						LOAD CASE 8 - LONG. WIND 1 TO BACK					
COL01	-17	-20	0	0	0	COL01	-10	-15	0	0	0
COL02	24	-27	0	0	0	COL02	10	-9	0	0	0
LOAD CASE 9 - LONG. WIND 1 TO FRONT						LOAD CASE 10 - LONG. WIND 2 TO BACK					
COL01	-10	-9	0	0	0	COL01	-19	-26	0	0	0
COL02	9	-14	0	0	0	COL02	19	-21	0	0	0
LOAD CASE 11 - LONG. WIND 2 TO FRONT						LOAD CASE 12 - SEISMIC TO RIGHT					
COL01	-20	-21	0	0	0	COL01	-3	-2	0	0	0
COL02	18	-26	0	0	0	COL02	-3	2	0	0	0
LOAD CASE 13 - SEISMIC TO LEFT											
COL01	3	2	0	0	0						
COL02	3	-2	0	0	0						

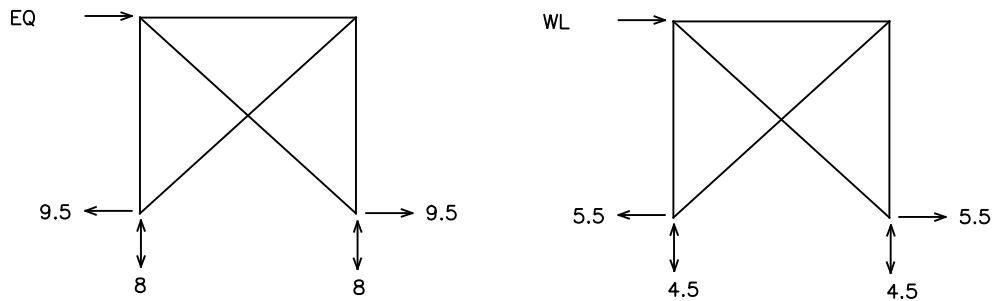
NOTES:

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- SEISMIC REACTIONS ARE DUE TO BASE SHEAR. THE REDUNDANCY FACTOR AND THE OVERSTRENGTH FACTOR HAVE NOT BEEN INCLUDED IN THE REACTIONS SHOWN.

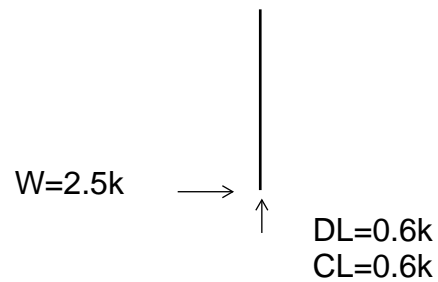
REACTION SCHEMATICS

(All reactions are in kips)

1 End post added @ 1/A.8 & 7/A.9



BRACING REACTION SIDEWALL A,G (2-3), (5-6)



1 END POST REACTIONS @ 1/A.8 & 7/A.9

USE (2) 3/4" Ø A36 AB

NOTES:

1. ALL WIND REACTIONS ARE BASED ON ULTIMATE DESIGN WIND SPEED AND ARE UNFACTORED.
2. SEISMIC REACTIONS ARE DUE TO BASE SHEAR. THE REDUNDANCY FACTOR AND THE OVERSTRENGTH FACTOR HAVE NOT BEEN INCLUDED IN THE REACTIONS SHOWN.
3. BRACING REACTIONS MUST BE COMBINED WITH MAIN FRAME REACTIONS AS REQUIRED BY CODE.

Wind Loading per ASCE 7-16

with AISI 2016 Specification and 2012 MBMA Manual

Version: 2020.07.27 (Date: 07/27/20) By NBG-GS

Project No. :	C22B0182A
Description :	Rob Kerth Ice Land
Engineer :	VP
Date :	8/22/2022

Geometry

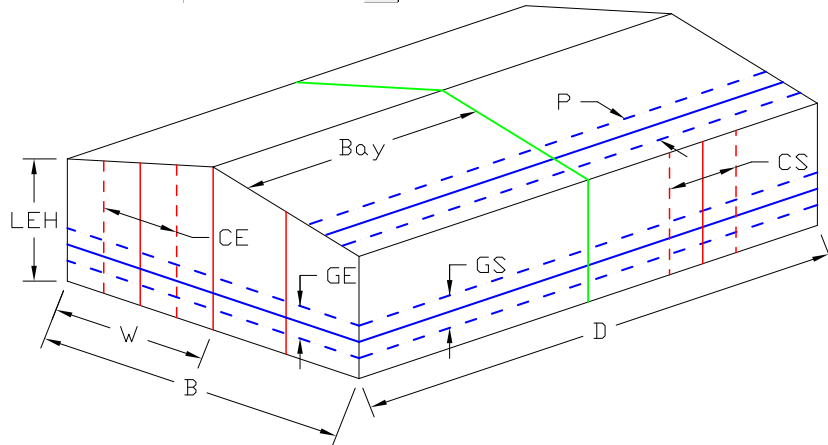
Building Name: Building A **Building Type:** Gable **Roof:** Std. R Panel

Bldg. Width [B]:	105.0000'
Dist. To Ridge [W]:	52.5000'
Bldg. Length [D]:	147.5000'

NBG Brand: CBC

Left Eave Ht. [LEH]:	20.0000'
Right Eave Ht. [REH]:	20.0000'
Left Roof Slope:	1.00:12
Right Roof Slope:	1.00:12

Bay Width [Bay]:	23.7500'
Purlin Trib. Width [P]:	5.0000'
EW Girt Trib Ht. [GE]:	6.0000'
SW Girt Trib. Ht. [GS]:	6.0000'
EW Girt Length:	21.0000'
SW Girt Length:	23.7500'



EW Col. Trib. Width [CE]:	21.0000'	Left SW Top-of-Parapet:		Right SW Top-of-Parapet:	
SW Col. Trib. Width [CS]:	24.3750'	Opening Area:		EW Top-of-Parapet:	

Loading Information

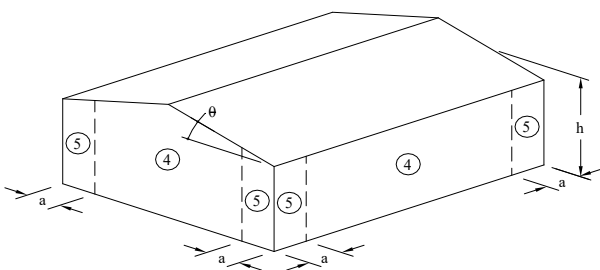
Building Code:	IBC 2018
Wind Speed:	110 mph
Wind Exposure:	C
Ground Elevation:	0 ft.

Building Porosity: Enclosed
Interior Partitions Exist: No

General Loading Calculations

h: 20.0000'	K_d: 0.85	K_{zt}: 1.00	R_i: 1.00	q_h: 23.75 psf
	K_z or K_h: 0.90	K_c: 1.00	G: 0.85	GC_{pi}: ± 0.18

Components and Cladding, Walls

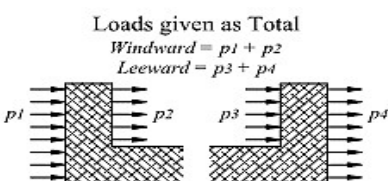


a = 8.00 ft.

	Tributary Area (ft ²)	Pressure Zones 4,5 (psf)	Suction Zone 4 (psf)	Suction Zone 5 (psf)
Sidewall Wind Column	488	19.28	-21.41	-21.45
Endwall Wind Column	420	19.52	-21.66	-21.94
Sidewall Girt	188	20.84	-22.97	-24.58
Endwall Girt	147	21.24	-23.38	-25.38
Wall Panel	12	25.35	-27.48	-33.60

Note: The value of GCp in results above has been reduced by 10% per Note 5 of Figure 30.3-1, since the slope angle is $\leq 10^\circ$.

Parapets

Tributary Area used for Parapet C&C = --- ft²

Item	Maximum Projection (ft)	K _{h_par}	q _p (psf)	MWFRS		C & C	
				Windward (psf)	Leeward (psf)	Windward (psf)	Leeward (psf)
Left Parapet	---	---	---	---	---	---	---
Right Parapet	---	---	---	---	---	---	---
EW Parapet	---	---	---	---	---	---	---

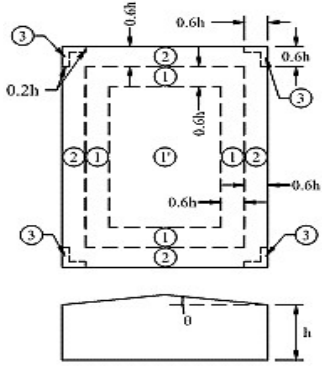
Wind Loading Continued...

Components and Cladding, Roofs

Applicable Roof Slope Angle = 4.76 deg

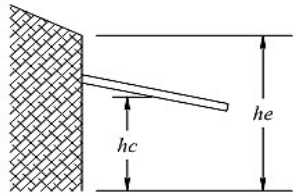
0.6h = 12.00 ft.

0.2h = 4.00 ft.



Item	Tributary Area (ft ²)	Pressure All (psf)	Suction in Zones					
			1' (psf)	1 (psf)	2 (psf)	3 (psf)	---	---
Purlin/Joist	188	16.00	-22.39	-32.18	-42.86	-48.21	---	---
Panel	5	16.00	-25.65	-44.64	-58.89	-80.26	---	---
Fastener	5	16.00	-25.65	-44.64	-58.89	-80.26	---	---
Values Below are for the Overhang Portion of the Roof								
Purlin/Joist	188	---	-36.68	-36.68	-37.52	-42.86	---	---
Panel	5	---	-44.64	-44.64	-58.89	-80.26	---	---
Fastener	5	---	-44.64	-44.64	-58.89	-80.26	---	---

Components and Cladding, Below-Eave Canopy



he: Average Eave Height

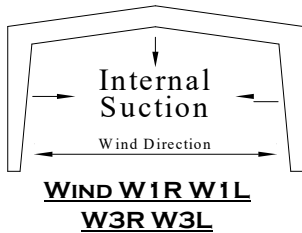
hc: Average Canopy Elevation

Item	Tributary Area (ft ²)	Pressure Total (psf)	Uplift Total (psf)		
			For Various Canopy Elevations		
			hc ≤ 10 ft	Otherwise	hc ≥ 18 ft
Purlin / Joist	188	16.00	-16.00	-16.00	-27.31
Panel	5	21.37	-16.00	-21.37	-33.24
Fastener	5	21.37	-16.00	-21.37	-33.24

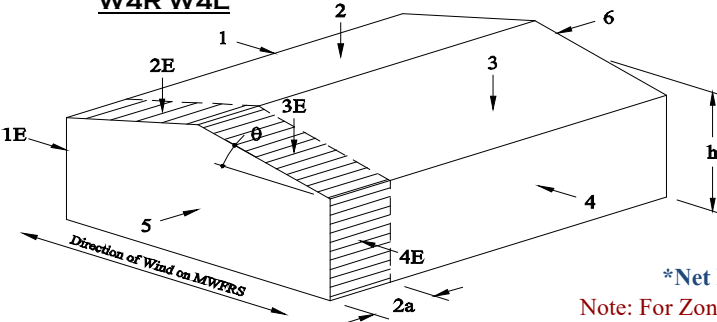
Main Wind Force Resisting Systems (Transverse Wind Direction)

Applicable Roof Slope Angle = 4.76 deg

a = 8.00 ft.



Item	Transverse Wind Direction							
	W1R	W1L	W2R	W2L	W3R	W3L	W4R	W4L
C1:	0.58	-0.11	0.22	-0.47	---	---	---	---
Load, (psf)	13.77	-2.61	5.22	-11.16	---	---	---	---
C2:	-0.51	-0.19	-0.87	-0.55	---	---	---	---
Load, (psf)	-12.11	-4.51	-20.66	-13.06	---	---	---	---
C3:	-0.19	-0.51	-0.55	-0.87	---	---	---	---
Load, (psf)	-4.51	-12.11	-13.06	-20.66	---	---	---	---
C4:	-0.11	0.58	-0.47	0.22	---	---	---	---
Load, (psf)	-2.61	13.77	-11.16	5.22	---	---	---	---
C5:	-0.27	-0.27	-0.63	-0.63	---	---	---	---
Load, (psf)	-6.41	-6.41	-14.96	-14.96	---	---	---	---
C6:	-0.27	-0.27	-0.63	-0.63	---	---	---	---
Load, (psf)	-6.41	-6.41	-14.96	-14.96	---	---	---	---
Net* (psf)	2.94	2.94	2.94	2.94				



Edge Zone Pressure Coefficients

Item	Edge Zone Pressure Coefficients			
	W1R & W3R	W1L & W3L	W2R & W4R	W2L & W4L
C1E:	0.79	-0.25	0.43	-0.61
Load, (psf)	18.76	-5.94	10.21	-14.49
C2E:	-0.89	-0.35	-1.25	-0.71
Load, (psf)	-21.13	-8.31	-29.68	-16.86
C3E:	-0.35	-0.89	-0.71	-1.25
Load, (psf)	-8.31	-21.13	-16.86	-29.68
C4E:	-0.25	0.79	-0.61	0.43
Load, (psf)	-5.94	18.76	-14.49	10.21

*Net Lat < 16 psf. Add additional pressure to windward wall.

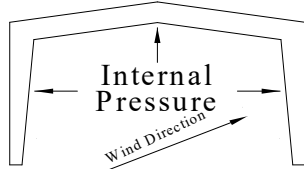
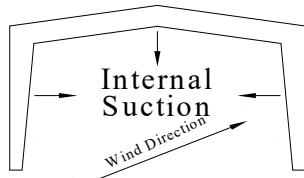
Note: For Zone 2/2E or 3/3E; the windward zone width shall be 50.00 ft., while the leeward zone width shall be 55.00 ft. per Figure 28.3-1 note 8.

Wind Loading Continued...

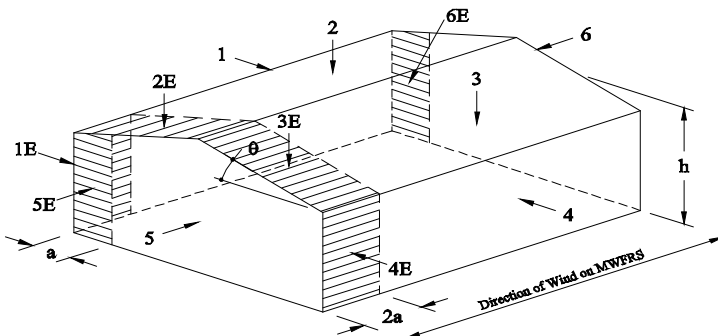
Main Wind Force Resisting Systems (Longitudinal Wind Direction)

Applicable Roof Slope Angle = 4.76 deg

a = 8.00 ft.



Longitudinal Wind Direction								
Item	W5B	W5F	W6B	W6F	W7B	W7F	W8B	W8F
C1:	-0.27	-0.27	-0.63	-0.63	---	---	---	---
Load, (psf)	-6.41	-6.41	-14.96	-14.96	---	---	---	---
C2:	-0.51	-0.19	-0.87	-0.55	---	---	---	---
Load, (psf)	-12.11	-4.51	-20.66	-13.06	---	---	---	---
C3:	-0.19	-0.51	-0.55	-0.87	---	---	---	---
Load, (psf)	-4.51	-12.11	-13.06	-20.66	---	---	---	---
C4:	-0.27	-0.27	-0.63	-0.63	---	---	---	---
Load, (psf)	-6.41	-6.41	-14.96	-14.96	---	---	---	---
C1E:	-0.30	-0.30	-0.66	-0.66	---	---	---	---
Load, (psf)	-7.12	-7.12	-15.67	-15.67	---	---	---	---
C2E:	-0.89	-0.35	-1.25	-0.71	---	---	---	---
Load, (psf)	-21.13	-8.31	-29.68	-16.86	---	---	---	---
C3E:	-0.35	-0.89	-0.71	-1.25	---	---	---	---
Load, (psf)	-8.31	-21.13	-16.86	-29.68	---	---	---	---
C4E:	-0.30	-0.30	-0.66	-0.66	---	---	---	---
Load, (psf)	-7.12	-7.12	-15.67	-15.67	---	---	---	---



End-Wall Pressure Coefficients				
Item	W5B & W7B	W5F & W7F	W6B & W8B	W6F & W8F
C5:	0.58	-0.11	0.22	-0.47
Load, (psf)	13.77	-2.61	5.22	-11.16
C6:	-0.11	0.58	-0.47	0.22
Load, (psf)	-2.61	13.77	-11.16	5.22
C5E:	0.79	-0.25	0.43	-0.61
Load, (psf)	18.76	-5.94	10.21	-14.49
C6E:	-0.25	0.79	-0.61	0.43
Load, (psf)	-5.94	18.76	-14.49	10.21

Longitudinal Force Resisted by Bracing: 20.44 kips

Total Longitudinal Net Pressure Applied to Building: 17.55 psf

Total Longitudinal Force Applied to Building: 40.88 kips

IBC 2018 Seismic Considerations:

Equivalent Lateral Force Procedure (per ASCE 7, Section 12.8)

Input Data

Spreadsheet Revision Number : 2021.01.20
Latest Revision Date : 1/20/2021**Building Data Input:**

	Building A
Nature of Occupancy	Substantial Hazard
Gable/Single Slope	Gable
Building Width	105.00 feet
Building Length	147.50 feet
Distance to Ridge (from BSW)	52.50 feet
Roof Slope, s:12 (slope to BSW)	1.00 : 12
Low Eave Height (Front SW)	20.00 feet
High Eave Height (Back SW)	20.00 feet
Mean Roof Height	22.19 feet

Roof Level Diaphragm	Flexible *
Mezzanine Level Diaphragm	None *

Vertical Distribution Required ☐

Seismic Irregularities Exist ☐

Project No.:	C22B0182A
Description:	Rob Kerth Ice Land
Engineer :	VP
Date :	8/24/2022

*Note: ASCE 7 states "Where diaphragms are not flexible, the design shall include the torsion moment plus the accidental torsional moments caused by an assumed 5% displacement in either direction of the building masses." Due to the configuration of rigid frame metal buildings, accidental torsion is NOT required in the lateral seismic calculations. Thus accidental torsion due to diaphragm rigidity shall only be applied to the longitudinal seismic calcs.

Seismic Data Input:

Short period response acceleration, S_s	$S_s = 0.539$
1-second period response acceleration, S_1	$S_1 = 0.246$
Site Classification	D **

**Note: ASCE 7 Section 11.4.2, states "Where the soil properties are not known in sufficient detail to determine the site class, Site Class D shall be used unless the authority having jurisdiction or geotechnical data determines Site Class E or F soils are present at the site." As a result, Site Class D will be used on nearly all buildings.

Roof Loading:

Lateral Frame Self weight (SW)	2.50 psf
Roof Dead Load (RDL)	2.00 psf
Roof Collateral Load (CDL)	5.00 psf
Roof Self Weight (Bracing, Beams etc.)	0.50 psf
Roof Snow (Pf)	0.00 psf ***

***Note: 20% of flat roof snow load is used in seismic dead load calculations when the flat roof snow load is greater than 30 psf. DO NOT include any snow drift loads in seismic dead load.

****Note: Full Height Hardwall is applied at mean roof height (mrh) at Endwalls. Enter the height required to account for the full dead load of the wall. For Parapets below the Ridge Height on Endwalls the actual Top Elevation must be adjusted.

Exterior Wall #1 (Left EW) Loads:

<input type="radio"/> Full Height Wall	<input type="radio"/> Full Height Wall w/ Parapet
<input checked="" type="radio"/> Partial Height Hardwall	<input type="radio"/> Partial Height Hardwall w/ Parapet
<input checked="" type="checkbox"/> Exclude Wall in Lateral Seismic Calculations. (Shear Wall Supports Self Weight)	
Wall Length	105.00 feet
Top Elevation	22.19 feet ****
Upper Wall Weight	2.50 psf
Top of Masonry Elevation	12.00 feet
Lower Wall Weight	55.00 psf

Exterior Wall #3 (Right EW) Loads:

<input type="radio"/> Full Height Wall	<input type="radio"/> Full Height Wall w/ Parapet
<input checked="" type="radio"/> Partial Height Hardwall	<input type="radio"/> Partial Height Hardwall w/ Parapet
<input checked="" type="checkbox"/> Exclude Wall in Lateral Seismic Calculations. (Shear Wall Supports Self Weight)	
Wall Length	105.00 feet
Top Elevation	22.19 feet ****
Upper Wall Weight	2.50 psf
Top of Masonry Elevation	12.00 feet
Lower Wall Weight	55.00 psf

Exterior Wall #2 (Front SW) Loads:

<input type="radio"/> Full Height Wall	<input type="radio"/> Full Height Wall w/ Parapet
<input checked="" type="radio"/> Partial Height Hardwall	<input type="radio"/> Partial Height Hardwall w/ Parapet
<input checked="" type="checkbox"/> Exclude Wall in Longitudinal Seismic Calculations. (Shear Wall Supports Self Weight)	
Top Elevation	20.00 feet
Upper Wall Weight	2.50 psf
Top of Masonry Elevation	12.00 feet
Lower Wall Weight	55.00 psf

Exterior Wall #4 (Back SW) Loads:

<input checked="" type="radio"/> Full Height Wall	<input type="radio"/> Full Height Wall w/ Parapet
<input type="radio"/> Partial Height Hardwall	<input type="radio"/> Partial Height Hardwall w/ Parapet
<input checked="" type="checkbox"/> Exclude Wall in Longitudinal Seismic Calculations. (Shear Wall Supports Self Weight)	
Top Elevation	20.00 feet
Wall Weight	2.50 psf

Interior Wall #5 (Partition) Loads:

<input checked="" type="radio"/> Full Height Wall	<input type="radio"/> Full Height Wall w/ Parapet
<input type="radio"/> Partial Height Hardwall	<input type="radio"/> Partial Height Hardwall w/ Parapet
<input checked="" type="checkbox"/> Exclude Wall in Lateral Seismic Calculations. (Shear Wall Supports Self Weight)	
Top Elevation	22.19 feet ****
Wall Weight	0.00 psf

Note: The weight of a concrete or masonry wall may be excluded from the seismic load calculations for lateral / longitudinal seismic force resisting systems, provided that details permit unrestrained movement of the seismic force resisting system relative to the wall. (This exclusion does not apply to metal panel walls, wood, EIFS, or other flexible wall systems that are attached to the building framing at several points.) Per MBMA "Seismic Design Guide for Metal Building Systems.

IBC 2018 Lateral Seismic Calculations:

Lateral Calcs. (1)

Equivalent Lateral Force Procedure (per ASCE 7, Section 12.8)

Spreadsheet Revision Number : 2021.01.20

Latest Revision Date : 1/20/2021

Frame Description / Location:

FL/1,7

Building Data Input Echo:

Occupancy Category

III

Seismic Force Resisting System

Rigid Frame

Ordinary Steel Moment Frames

Gable/Single Slope

Gable

Width

105.00 feet

Length

147.50 feet

Distance to Ridge

52.50 feet

Roof Slope, s:12

1.00 : 12

Low Eave Height

20.00 feet

High Eave Height

20.00 feet

Mean Roof Height

22.19 feet

Bay Width

12.60 feet

Frame Located at Bay:

☒

Left Endwall

☐

Interior Frame

☐

Right Endwall

☐

Int. Frame w/ Partition

Hardwall (SW) Information:**Roof Concentrated Load Information:**

Roof concentrated loads:

Wall Length Exterior Wall #2 (Front SW):

12.60 feet

Wall Length Exterior Wall #4 (Back SW):

12.60 feet

Mezzanine Information:

Is Mez #1 or #2 Considered a Story?

Loading Area - Mezzanine #1:

Concentrated Loads - Mezzanine #1:

Loading Area - Mezzanine #2:

Concentrated Loads - Mezzanine #2:

Crane Information:

Quantity of Cranes / Bay - Aisle #1:

Length of Runway - Aisle #1:

Quantity of Cranes / Bay - Aisle #2:

Length of Runway - Aisle #2:

Quantity of Cranes / Bay - Aisle #3:

Length of Runway - Aisle #3:

Seismic Data Input Echo:Short period response acceleration, S_sS_s = 0.5391-second period response acceleration, S₁S₁ = 0.246

*Note: Enter quantity of cranes for one aisle only, DO NOT increase the crane quantities when crane information is used for more than one aisle.

Seismic Data Output:Occupancy Importance Factor, I_e

1.25

Site Coefficient F_a:F_a = 1.37Site Coefficient F_v:F_v = 2.11

Max spectral response for short periods (Eq 11.4-1):

S_{ms} = 0.738

Max spectral response for 1-second period (Eq 11.4-2):

S_{m1} = 0.519

Design spectral response for short periods (Eq 11.4-3):

S_{ds} = 0.492

Design spectral response for 1-second periods (Eq 11.4-4):

S_{d1} = 0.346

Seismic Design Category:

D

Response Modification Coefficient, R:

3.5

System Overstrength Factor, Ω_o:

2.5

Deflection Modification Factor, C_d:

3

Building Period Coefficient, C_t:

0.028

Approximate Fundamental Period, T_a (Eq 12.8-7):

0.334

**Note: Enter runway length, DO NOT double runway length as other seismic sheets have asked you to do previously.

***Note: ASCE 7 - Sections 12.2.3, 12.2.3.1 through 12.2.3.3 states, "Where different seismic force-resisting systems are used in combination to resist seismic forces in the same direction of structural response, other than those combinations considered as dual systems, the more stringent system limitation contained in Table 12.2-1 shall apply." The value of the response modification coefficient, R, used for design in the direction under consideration shall not be greater than the least value of R for any of the systems utilized in that direction. The deflection amplification factor, C_d, and the over-strength factor, Ω_o, shall be consistent with R required in that direction; excluding buildings with a risk category of I or II, and flexible diaphragms. In which case, resisting elements are permitted to be designed for the least value of R for each independent line of reference.

Please refer to ASCE 7 12.8.2 and table 12.8-1 for Fundamental Periods for strength design, for seismic story drift checks ONLY there is no upper limit stated

Seismic Load Output:

Seismic Base Shear, V (Eq 12.8-1)

3.26 kips

Seismic Response Coefficient, C_s (Eq 12.8-1 to 12.8-6)

0.176

Redundancy Factor, ρ

1.30

Distribution Exponent, k

0.00

Multistory Distribution

Seismic Considerations	Eff. Seismic Weight W _x	Elevation h _x	Vertical Dist. Factor, C _{vx}	Seismic Force F _x	Seismic Base Moment M	Alt. Roof Weight:	Alt. Panel Load:
						13.65 psf	0.030 kips/ft
Roof Loads	13276 lbs	22.19 feet	13276	2.33 kips	51.74 ft-kips	Frame Uniform Loads	
Exterior Wall #1 (Left EW) Loads	2674 lbs	17.17 feet	2674	0.47 kips	8.07 ft-kips	Roof Weight:	Panel Load:
		6.00 feet				11.60 psf	0.026 kips/ft
Exterior Wall #2 (Front SW) Loads	252 lbs	16.00 feet	252	0.04 kips	0.71 ft-kips	Frame Concentrated Loads	
	8316 lbs	6.00 feet	8316	1.46 kips	8.76 ft-kips	Load	Elevation
						0.507 kips	18.67 feet
Exterior Wall #4 (Back SW) Loads	630 lbs	10.00 feet	630	0.11 kips	1.11 ft-kips	0.059 kips	18.67 feet
Crane Aisle #1	0 lbs	--	--	--	--	--	--
Crane Aisle #2	0 lbs	--	--	--	--	--	--
Crane Aisle #3	0 lbs	--	--	--	--	--	--
Mezzanine #1	0 lbs	--	--	--	--	--	--
Mezzanine #2	0 lbs	--	--	--	--	--	--
Totals	25148 lbs	--	25148	4.42 kips	70.39 ft-kips	Frame Base Shear:	3.262 kips

IBC 2018 Lateral Seismic Calculations:

Lateral Calcs. (2)

Equivalent Lateral Force Procedure (per ASCE 7, Section 12.8)

Spreadsheet Revision Number : 2021.01.20

Latest Revision Date : 1/20/2021

Frame Description / Location:

FL/2-6

Building Data Input Echo:

Occupancy Category

III

Seismic Force Resisting System

Rigid Frame

Ordinary Steel Moment Frames

Gable/Single Slope

Gable

Width

105.00 feet

Length

147.50 feet

Distance to Ridge

52.50 feet

Roof Slope, s:12

1.00 : 12

Low Eave Height

20.00 feet

High Eave Height

20.00 feet

Mean Roof Height

22.19 feet

Bay Width

25.00 feet

Frame Located at Bay:

- ☐ Left Endwall ☒ Interior Frame
☐ Right Endwall ☐ Int. Frame w/ Partition

Project No.: C22B0182A

Description: Rob Kerth Ice Land

Engineer : VP

Date : 8/24/2022

Roof Concentrated Load Information:

Roof concentrated loads:

Wall Length Exterior Wall #2 (Front SW):

25.00 feet

Wall Length Exterior Wall #4 (Back SW):

25.00 feet

Mezzanine Information:

Is Mez #1 or #2 Considered a Story?

Loading Area - Mezzanine #1:

Concentrated Loads - Mezzanine #1:

Loading Area - Mezzanine #2:

Concentrated Loads - Mezzanine #2:

Crane Information:

Quantity of Cranes / Bay - Aisle #1:

Length of Runway - Aisle #1:

Quantity of Cranes / Bay - Aisle #2:

Length of Runway - Aisle #2:

Quantity of Cranes / Bay - Aisle #3:

Length of Runway - Aisle #3:

Seismic Data Input Echo:Short period response acceleration, S_sS_s = 0.5391-second period response acceleration, S₁S₁ = 0.246

*Note: Enter quantity of cranes for one aisle only, DO NOT increase the crane quantities when crane information is used for more than one aisle.

Seismic Data Output:Occupancy Importance Factor, I_e

1.25

Site Coefficient F_a:F_a = 1.37Site Coefficient F_v:F_v = 2.11

Max spectral response for short periods (Eq 11.4-1):

S_{ms} = 0.738

Max spectral response for 1-second period (Eq 11.4-2):

S_{m1} = 0.519

Design spectral response for short periods (Eq 11.4-3):

S_{ds} = 0.492

Design spectral response for 1-second periods (Eq 11.4-4):

S_{d1} = 0.346

Seismic Design Category:

D

Response Modification Coefficient, R:

3.5

System Overstrength Factor, Ω_o:

2.5

Deflection Modification Factor, C_d:

3

Building Period Coefficient, C_t:

0.028

Approximate Fundamental Period, T_a (Eq 12.8-7):

0.334

**Note: Enter runway length, DO NOT double runway length as other seismic sheets have asked you to do previously.

***Note: ASCE 7 - Sections 12.2.3, 12.2.3.1 through 12.2.3.3 states, "Where different seismic force-resisting systems are used in combination to resist seismic forces in the same direction of structural response, other than those combinations considered as dual systems, the more stringent system limitation contained in Table 12.2-1 shall apply." The value of the response modification coefficient, R, used for design in the direction under consideration shall not be greater than the least value of R for any of the systems utilized in that direction. The deflection amplification factor, C_d, and the over-strength factor, Ω_o, shall be consistent with R required in that direction; excluding buildings with a risk category of I or II, and flexible diaphragms. In which case, resisting elements are permitted to be designed for the least value of R for each independent line of reference.

Please refer to ASCE 7 12.8.2 and table 12.8-1 for Fundamental Periods for strength design, for seismic story drift checks ONLY there is no upper limit stated

Seismic Load Output:

Seismic Base Shear, V (Eq 12.8-1)

5.75 kips

Seismic Response Coefficient, C_s (Eq 12.8-1 to 12.8-6)

0.176

Redundancy Factor, ρ

1.30

Distribution Exponent, k

0.00

Multistory Distribution

Seismic Considerations	Eff. Seismic Weight W _x	Elevation h _x	Vertical Dist. Factor, C _{vx}	Seismic Force F _x	Seismic Base Moment M	Alt. Roof Weight:	Alt. Panel Load:
						12.09 psf	0.053 kips/ft
Roof Loads	26341 lbs	22.19 feet	26341	4.63 kips	102.66 ft-kips	Frame Uniform Loads	
Interior Wall #5 (Partition) Loads	0 lbs	--	--	--	--	Roof Weight:	Panel Load:
Exterior Wall #2 (Front SW) Loads	500 lbs	16.00 feet	500	0.09 kips	1.41 ft-kips	10.03 psf	0.044 kips/ft
Exterior Wall #4 (Back SW) Loads	1250 lbs	10.00 feet	1250	0.22 kips	2.20 ft-kips	Frame Concentrated Loads	
Crane Aisle #1	0 lbs	--	--	--	--	Load	Elevation
Crane Aisle #2	0 lbs	--	--	--	--	1.007 kips	18.67 feet
Crane Aisle #3	0 lbs	--	--	--	--	0.118 kips	18.67 feet
Mezzanine #1	0 lbs	--	--	--	--	--	--
Mezzanine #2	0 lbs	--	--	--	--	--	--
Totals	44591 lbs	--	44591	7.83 kips	123.66 ft-kips	Frame Base Shear:	5.752 kips

IBC 2018 Longitudinal Seismic Calculations:

Equivalent Lateral Force Procedure (per ASCE 7, Section 12.8)

Longitudinal Cales.

Spreadsheet Revision Number : 2021.01.20

Latest Revision Date : 1/20/2021

Building Data Input Echo:

Building A

Occupancy Category III
 Low SW Force Resisting System X-Bracing
 High SW Force Resisting System X-Bracing
 Gable/Single Slope Gable
 Width 105.00 feet
 Length 147.50 feet
 Distance to Ridge 52.50 feet
 Roof Slope, s:12 1.00 : 12
 Low Eave Height 20.00 feet
 High Eave Height 20.00 feet
 Mean Roof Height 22.19 feet

Ordinary Steel Concentrically Braced Frames

Project No.: C22B0182A

Description: Rob Kerth Ice Land

Engineer : VP

Date : 8/24/2022

Roof Concentrated Load Information:

Roof concentrated loads:

Mezzanine Information:

Is Mez #1 or #2 Considered a Story?

Loading Area - Mezzanine #1:

Concentrated Loads - Mezzanine #1:

Loading Area - Mezzanine #2:

Concentrated Loads - Mezzanine #2:

Seismic Data Input Echo:

Short period response acceleration, S_s
 1-second period response acceleration, S_1

 $S_s = 0.539$ $S_1 = 0.246$ **Seismic Data Output:**

Occupancy Importance Factor, I_e 1.25
 Site Coefficient F_a $F_a = 1.37$
 Site Coefficient F_v $F_v = 2.11$
 Max spectral response for short periods (Eq 11.4-1): $S_{ms} = 0.738$
 Max spectral response for 1-second period (Eq 11.4-2): $S_{m1} = 0.519$
 Design spectral response for short periods (Eq 11.4-3): $S_{ds} = 0.492$
 Design spectral response for 1-second periods (Eq 11.4-4): $S_{d1} = 0.346$
 Seismic Design Category: D
 Response Modification Coefficient, R : 3.25 **
 System Overstrength Factor, Ω_o : 2 **
 Deflection Modification Factor, C_d : 3.25 **
 Building Period Coefficient, C_t : 0.02
 Approximate Fundamental Period, T_a (Eq 12.8-7): 0.204

Hardwall Information:

Wall Length Exterior Wall #2 (Front SW):

147.50 feet

Wall Length Exterior Wall #4 (Back SW):

147.50 feet

Wall Length Interior Wall #5 (Partition):

105.00 feet

Quantity of Partition Walls (Wall #5):

Crane Information:

Quantity of Cranes - Aisle #1:

Length of Runway - Aisle #1:

Quantity of Ind. Crane Columns - Aisle #1:

Quantity of Cranes - Aisle #2:

Length of Runway - Aisle #2:

Quantity of Ind. Crane Columns - Aisle #2:

Quantity of Cranes - Aisle #3:

Length of Runway - Aisle #3:

Quantity of Ind. Crane Columns - Aisle #3:

*Note: Enter quantity of cranes for one aisle only, DO NOT increase the crane quantities when crane information is used for more than one aisle.

**Note: ASCE 7 - Sections 12.2.3, 12.2.3.1 through 12.2.3.3 states, "Where different seismic force-resisting systems are used in combination to resist seismic forces in the same direction of structural response, other than those combinations considered as dual systems, the more stringent system limitation contained in Table 12.2-1 shall apply." The value of the response modification coefficient, R , used for design in the direction under consideration shall not be greater than the least value of R for any of the systems utilized in that direction. The deflection amplification factor, C_d , and the over-strength factor, Ω_o , shall be consistent with R required in that direction; excluding buildings with a risk category of I or II, and flexible diaphragms. In which case, resisting elements are permitted to be designed for the least value of R for each independent line of resistance. Please refer to ASCE 7 12.8.2 and table 12.8-1 for Fundamental Periods for strength design, for seismic story drift checks ONLY there is no upper limit stated

Seismic Load Output:Seismic Base Shear, V (Eq 12.8-1)

37.72 kips

Seismic Response Coefficient, C_s (Eq 12.8-1 to 12.8-6)

0.189

Redundancy Factor, ρ

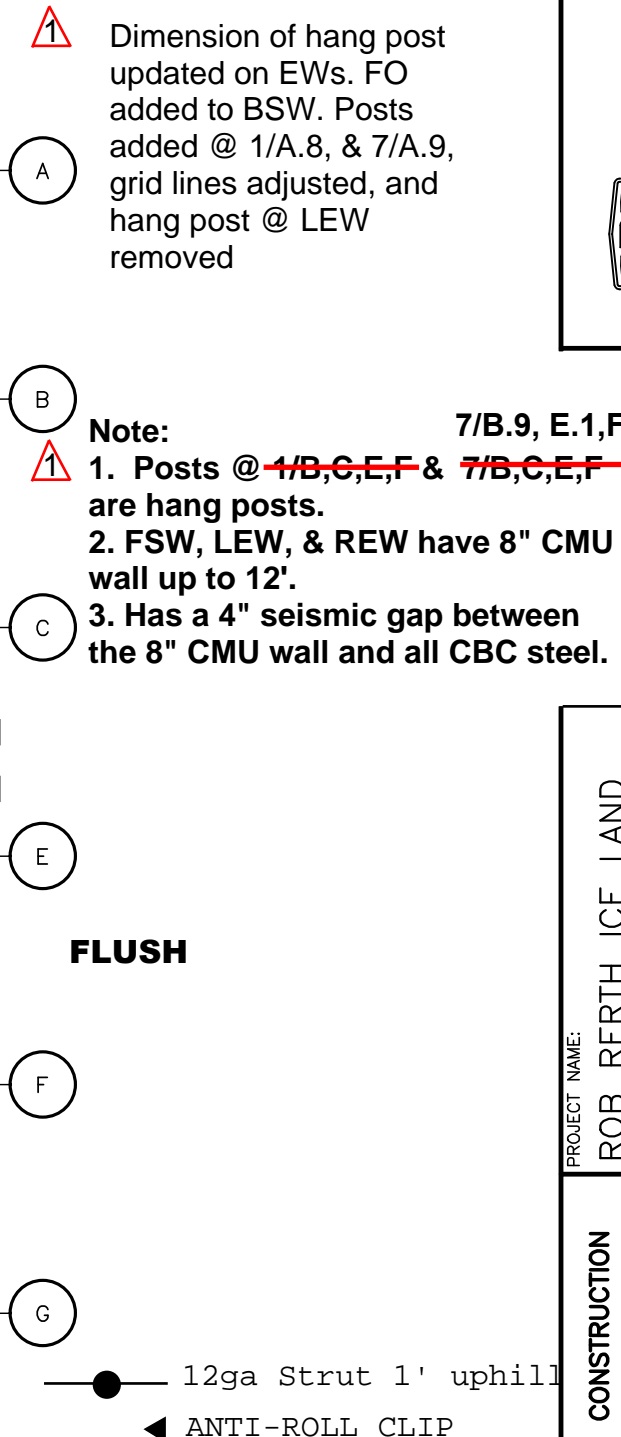
1.30

Distribution Exponent, k

0.00

Multistory Distribution

Seismic Considerations	Eff. Seismic Weight W_x	Elevation h_x	Vertical Dist. Factor, C_{vx}	Seismic Force F_x	Seismic Base Moment M	Bracing Uniform Loads	
Roof Loads	155412 lbs	22.19 feet	155412	29.40 kips	652.31 ft-kips	Roof Snow:	--
Exterior Wall #1 (Left EW) Loads	2674 lbs 69300 lbs	17.17 feet 6.00 feet	2674 69300	0.51 kips 13.11 kips	8.69 ft-kips 78.66 ft-kips	Seismic Dead W:	12.72 psf
Exterior Wall #3 (Right EW) Loads	2674 lbs 69300 lbs	17.17 feet 6.00 feet	2674 69300	0.51 kips 13.11 kips	8.69 ft-kips 78.66 ft-kips	Total Seismic W:	12.72 psf
Interior Wall #5 (Partition) Loads	0 lbs	11.13 feet	--	--	--	Seismic Factor:	0.189
						Bracing Concentrated Loads	
						Load	Elevation
Exterior Wall #2 (Front SW) Loads	2950 lbs	16.00 feet 6.00 feet	2950	0.56 kips	8.93 ft-kips	0.446 kips	20.00 feet
Exterior Wall #4 (Back SW) Loads	0 lbs	10.00 feet	--	--	--	--	--
Crane Aisle #1	0 lbs	--	--	--	--	--	--
Crane Aisle #2	0 lbs	--	--	--	--	--	--
Crane Aisle #3	0 lbs	--	--	--	--	--	--
Mezzanine #1	0 lbs	--	--	--	--	--	--
Mezzanine #2	0 lbs	--	--	--	--	--	--
Totals	302310 lbs	--	302310	57.19 kips	835.94 ft-kips	Bracing Base Shear:	37.720 kips



Wind Loading per ASCE 7-16

with AISI 2016 Specification and 2012 MBMA Manual

Project No. : C22B0182A
 Description : Rob Kerth Ice Land
 Engineer : VP
 Date : 8/22/2022

Version: 2020.07.27 (Date: 07/27/20) By NGB-GS

Wall Sheeting Spans

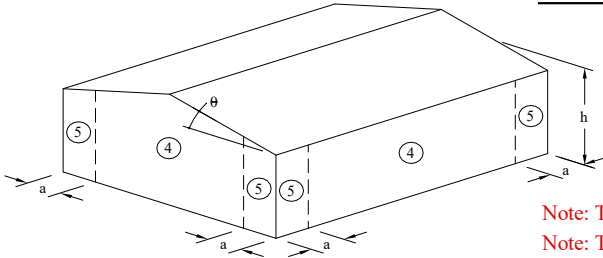
Building Name: Building A

Wall Panel Selection: Std. R Panel 26 Ga. Grade 80, with $F_y = 80\text{ksi}$ $F_u = 82\text{ksi}$

Deflection Limit: L/60

Min. Girt Thickness for Fastener Checks:

0.060



a = 8.00 ft.

Item	Tributary Area (ft ²)	Pressure Zones 4,5 (psf)	Suction Zone 4 (psf)	Suction Zone 5 (psf)
Wall Panel	12	15.21	-16.49	-20.16
Simple Span	(ft) →	7.95	8.00	7.47
2 Equal Spans	(ft) →	8.00	7.63	6.86
3 Equal Spans	(ft) →	8.00	8.00	7.47
Fasteners	(ft) →	---	7.50	7.50

Note: These panel spans are based on values found in the EDM per brand

Note: The wind loads determined in this sheet are multiplied by 0.6

Note: 50 Year-Wind deflection check

Roof Sheeting Spans

Self Weight (psf): 0.97 Collateral Load (psf): 0.00 Max Live/Snow Load (psf): 20.00

Roof Panel Selection: Std. R Panel 26 Ga. Grade 80, with $F_y = 80\text{ksi}$ $F_u = 82\text{ksi}$

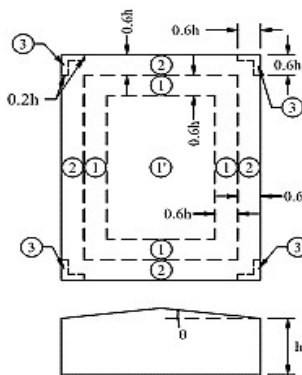
Deflection Limit: L/60

Minimum Purlin Thickness for Fastener: 0.060

Seaming Option for Interior Zone, (Zone 1): N/A

Seaming Option for Edge Zone, (Zone 2): N/A

Seaming Option for Corner Zone, (Zone 3): N/A



0.6h = 12.00 ft.

0.2h = 4.00 ft.

Item	Pressure All (ft.)	Suction in Zones				
		1' (ft.)	1 (ft.)	2 (ft.)	3 (ft.)	
Roof Panel, (psf) →	23.17	-14.81	-26.20	-34.75	-47.58	---
Simple Span	5.50	5.50	5.50	5.50	4.84	---
2 Equal Spans	5.50	5.50	5.50	5.27	4.48	---
3 Equal Spans	5.50	5.50	5.50	5.50	4.84	---
Seaming / Fasteners		6.00	6.00	6.00	4.58	---

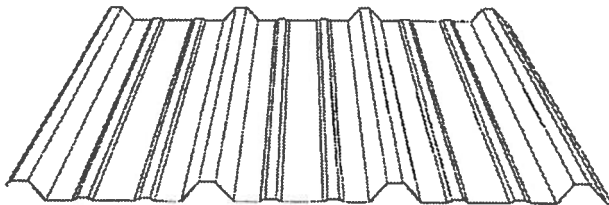
Note: These Panel Spans are Based on Values Found In the EDM for each brand

Note: The wind loads determined in this sheet are multiplied by 0.6

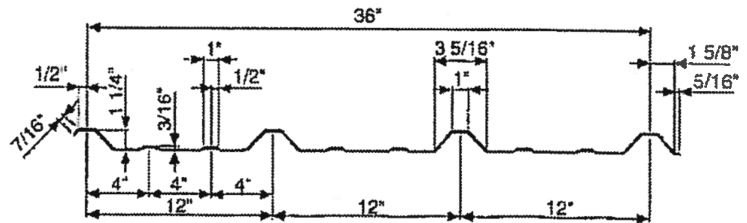
Note: 50 Year-Wind deflection check



CHART – 'C'
(R'-Panel)



R-Panel Profile



R-Panel Cross Section

Standard R-Panel Engineering Properties

Gauge	Design Thickness	Total Thickness	Panel Weight	Top in Compression		Bottom in Compression	
	IN	IN		Ix	Sx	Ix	Sx
26	0.0177	0.0199	0.97	0.0397	0.0398	0.0317	0.0471
24	0.0225	0.0244	1.19	0.0543	0.0551	0.0423	0.0607

R Panel SAFE UNIFORM LOAD (PSF)
GRAVITY (PRESSURE)

TYPE OF SPAN	GAUGE	SPAN (FT)											
		2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.3333
SIMPLE SPAN	26	238	152	106	78	60	47	38	32	26	23	19	18
	80 ksi	430	220	127	80	54	38	28	21	16	13	10	9
	26	211	135	94	69	53	42	34	28	23	20	17	16
	50 ksi	433	222	128	81	54	38	28	21	16	13	10	9
	24	294	188	131	96	73	58	47	39	33	28	24	22
TWO SPAN	50 ksi	619	317	183	116	77	54	40	30	23	18	14	13
	26	277	177	123	90	69	55	44	37	31	26	23	21
	80 ksi	1035	530	307	193	129	91	66	50	38	30	24	21
	26	233	149	104	76	58	46	37	31	26	22	19	17
	50 ksi	1044	535	309	195	130	92	67	50	39	30	24	21
THREE OR MORE SPANS	24	299	192	133	98	75	59	48	40	33	28	24	22
	50 ksi	1491	764	442	278	186	131	95	72	55	43	35	30
	26	323	207	144	106	81	64	52	43	36	31	26	24
	80 ksi	861	441	255	161	108	76	55	41	32	25	20	17
	26	272	174	121	89	68	54	44	36	30	26	22	20

UPLIFT (SUCTION)

TYPE OF SPAN	GAUGE	SPAN (FT)											
		2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.3333
SIMPLE SPAN	26	277	177	123	90	69	55	44	37	31	26	23	21
	80 ksi	350	179	104	65	44	31	22	17	13	10	8	7
	26	233	149	104	76	58	46	37	31	26	22	19	17
	50 ksi	361	185	107	67	45	32	23	17	13	11	8	7
	24	299	192	133	98	75	59	48	40	33	28	24	22
TWO SPAN	50 ksi	481	246	142	90	60	42	31	23	18	14	11	10
	26	238	152	106	78	60	47	38	32	26	23	19	18
	80 ksi	842	431	250	157	105	74	54	40	31	25	20	17
	26	211	135	94	69	53	42	34	28	23	20	17	16
	50 ksi	869	445	257	162	109	76	56	42	32	25	20	18
THREE OR MORE SPANS	24	294	188	131	96	73	58	47	39	33	28	24	22
	50 ksi	1158	593	343	216	145	102	74	56	43	34	27	23
	26	278	178	124	91	70	55	44	37	31	26	23	21
	80 ksi	700	359	208	131	88	61	45	34	26	20	16	14
	26	246	158	109	80	62	49	39	33	27	23	20	18

- Notes:
1. E = 29500
 2. Top value is based on stress and bottom value is based on deflection.
 3. Weight of panel is not included in the above allowables.
 4. Deflection allowables are based on L/180. To adjust for other limits use the following:
For L/90 multiply the above allowables by 2.0
For L/240 multiply the above allowables by 0.75
 5. Stress allowables may be increased by 4/3 for wind loading if allowed by the building code.
 6. The panel properties are calculated in accordance with the 2012 North American Specification for the Design of Cold Formed Steel Structural Members.

NBG LIGHT GAGE ANALYSIS SHORT REPORT | 08/24/2022

Software: NBG Light Gage Analysis [version: 2018.12.04.1 date: 12/04/2018]
 Analysis Config: CBC [version: 2016.07.12.001]

Input File: C:\Users\viviana.perez\OneDrive - Nucor\Desktop\Vivi's Projects\Current\182 Rob Kerth Ice Land\Light Gage\Purlin\Rob Kerth Ice land purlins

Project Name: Rob Kerth Ice land purlins

AISI Spec Year: 2016
 Building Code: IBC 2018
 Inventory: CBCCA-RP

See D-19

Purlin spacing: 5.00 o.c.
 Insulation Thickness: 0.00

SPAN PARAMETERS

Span	Length	Section	Design Group	Design	Brace Type	Left Support	Right Support	Left Lap	Right Lap
	(ft)							(in)	(in)
1	1.33	08Z089	1	No	Top	1	2	Cant.	0.00
2	22.42	08Z089	1	No	Top	2	3	0.00	46.50
3	25.00	08Z067	2	No	Top	3	4	46.50	30.50
4	25.00	08Z067	3	No	Top	4	5	30.50	30.50
5	25.00	08Z067	4	No	Top	5	6	30.50	30.50
6	25.00	08Z067	5	No	Top	6	7	30.50	46.50
7	22.42	08Z089	6	No	Top	7	8	46.50	0.00
8	1.33	08Z089	6	No	Top	8	9	0.00	Cant.

MAXIMUM COMPUTED DISPLACEMENTS, FORCES & LOAD RATIOS

Span Properties			Maximum Computed Displacements & Forces						Maximum Computed Load Ratios					
No	Length	Section	Displacement	Axial	Shear	Moment(+)	Moment(-)	Ten.(T)	Comp.(P)	Shear(V)	Mom.(M)	T&M	P&M	V&M
1	1.33	08Z089	0.215	0.00	0.20	0.11	-0.13	0.00	0.00	0.02	0.02	0.02	0.02	0.03
		x	0.00	0.00	16.00	16.00	16.00	0.00	0.00	16.00	16.00	16.00	16.00	16.00
		comb	12	0	12	4	12	0	0	2	12	12	12	2
2	22.42	08Z089	-0.942	1.66	2.09	6.30	-9.73	0.00	0.15	0.18	0.73	0.73	0.91	0.75
		x	117.11	245.75	269.00	269.00	269.00	0.00	0.00	222.50	269.00	269.00	93.68	269.00
		comb	12	4	12	4	12	0	4	12	12	12	4	12
3	25.00	08Z067	-0.513	3.58	1.92	6.30	-9.73	0.00	0.45	0.39	0.84	0.84	0.88	0.81
		x	150.00	269.50	0.00	0.00	0.00	0.00	46.50	269.50	269.50	269.50	46.50	269.50
		comb	12	10	12	4	12	0	10	12	12	12	4	12
4	25.00	08Z067	-0.764	0.67	1.88	5.24	-8.57	0.00	0.09	0.41	0.93	0.93	0.93	0.89
		x	150.00	289.83	300.00	300.00	300.00	0.00	30.50	269.50	269.50	269.50	269.50	269.50
		comb	12	4	12	4	12	0	4	12	12	12	12	12
5	25.00	08Z067	-0.764	0.67	1.88	5.24	-8.57	0.00	0.09	0.41	0.93	0.93	0.93	0.89
		x	150.00	269.50	0.00	0.00	0.00	0.00	30.50	30.50	30.50	30.50	30.50	30.50
		comb	12	4	12	4	12	0	4	12	12	12	12	12
6	25.00	08Z067	-0.514	3.58	1.92	6.29	-9.73	0.00	0.45	0.39	0.84	0.84	0.88	0.81
		x	138.50	265.12	300.00	300.00	300.00	0.00	30.50	30.50	30.50	30.50	253.50	30.50
		comb	12	10	12	4	12	0	10	12	12	12	4	12
7	22.42	08Z089	-0.942	1.66	2.09	6.29	-9.73	0.00	0.15	0.18	0.73	0.73	0.90	0.75
		x	151.89	58.21	0.00	0.00	0.00	0.00	46.50	46.50	0.00	0.00	163.61	0.00
		comb	12	4	12	4	12	0	4	12	12	12	4	12
8	1.33	08Z089	0.215	0.00	0.20	0.11	-0.13	0.00	0.00	0.02	0.02	0.02	0.02	0.03
		x	16.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		comb	12	0	12	4	12	0	0	2	12	12	12	2
			Displacement	Axial	Shear	Moment(+)	Moment(-)	Ten.(T)	Comp.(P)	Shear(V)	Mom.(M)	T&M	P&M	V&M
Max of All Spans			-0.942	3.58	2.09	6.30	-9.73	0.00	0.45	0.41	0.93	0.93	0.93	0.89
Distance from Left			117.11	269.50	269.00	269.00	269.00	0.00	46.50	269.50	269.50	269.50	269.50	269.50
Span			2	3	2	2	2	0	3	4	4	4	4	4
Load Combination			12	10	12	4	12	0	10	12	12	12	12	12

SUPPORT CONNECTIONS

Support No.	2	3	4	5	6	7	8
Connection Code	NC	NC	NC	NC	NC	NC	NC

* Roofing is screwed down

VERTICAL REACTIONS [kips]

Comb	Support No
------	------------

	1	2	3	4	5	6	7	8	9
1	0.00	-0.96	-2.69	-2.41	-2.52	-2.41	-2.69	-0.96	0.00
2	0.00	-1.32	-3.70	-3.32	-3.47	-3.32	-3.70	-1.32	0.00
3	0.00	-0.36	-1.01	-0.91	-0.95	-0.91	-1.01	-0.36	0.00
4	0.00	1.14	2.54	2.13	2.28	2.13	2.53	1.14	0.00
5	0.00	0.78	1.71	1.44	1.54	1.44	1.71	0.78	0.00
6	0.00	0.86	1.73	1.41	1.52	1.41	1.72	0.85	0.00
7	0.00	0.55	1.04	0.83	0.90	0.83	1.04	0.55	0.00
8	0.00	-0.17	-0.98	-0.98	-0.99	-0.98	-0.98	-0.17	0.00
9	0.00	-0.71	-1.99	-1.79	-1.86	-1.79	-1.99	-0.71	0.00
10	0.00	-0.06	-0.18	-0.16	-0.17	-0.16	-0.18	-0.06	0.00
11	0.00	-0.39	-1.08	-0.97	-1.02	-0.97	-1.08	-0.39	0.00
12	0.00	-1.43	-4.01	-3.60	-3.75	-3.60	-4.01	-1.43	0.00

* Negative reaction for gravity loads

SUPPORT RATIOS

Support	Support Type*	Crippling	Crip & Bend	Bolt Shear	Bearing*
2	3	Max Ratios Combo	0.36 12	0.27 12	0.27 12
3	3	Max Ratios Combo	0.66 12	0.81 12	0.76 12
4	3	Max Ratios Combo	0.84 12	0.90 12	0.68 12
5	3	Max Ratios Combo	0.88 12	0.96 12	0.71 12
6	3	Max Ratios Combo	0.84 12	0.90 12	0.68 12
7	3	Max Ratios Combo	0.66 12	0.81 12	0.76 12
8	3	Max Ratios Combo	0.36 12	0.27 12	0.27 12
Maximum Ratios of All Supports		0.88	0.96	0.76	0.33
Support		5	5	3	5
Combo		12	12	12	12
Support Type		3	3	3	3

* Bolt type between purlin & clip: A307

* Support types: 1 = No Clip | 2 = Crippling Clip | 3 = Bolted or Welded Clip w/ A307 | 4 = Bolted or Welded Clip w/ A325

* Bearing ratio is check of bearing of clip bolts on purlins

GENERAL LOADS

Load Case	Uniform Load (psf)	Load Case Name
1	2.5	Dead Load
2	5.0	Collateral Load
3	0.0	Snow Load
4	20.0	Live Load
5	-32.2	Wind Load
6	-42.9	Edge Zone Wind Load
7	0.0	Alternate Snow Load
8	16.0	Wind Pressure Load
9	1.0	Seismic Load

LINEAR LOADS

Load Case	Span	Load Type	Start Load (lb/ft)	Start X (ft)	End Load (lb/ft)	End X (ft)
1	1	Shear	12.50	0.00	12.50	1.33
1	2	Shear	12.50	0.00	12.50	22.42
1	3	Shear	12.50	0.00	12.50	25.00
1	4	Shear	12.50	0.00	12.50	25.00
1	5	Shear	12.50	0.00	12.50	25.00
1	6	Shear	12.50	0.00	12.50	25.00
1	7	Shear	12.50	0.00	12.50	22.42
1	8	Shear	12.50	0.00	12.50	1.33
2	1	Shear	24.90	0.00	24.90	1.33
2	2	Shear	24.90	0.00	24.90	22.42
2	3	Shear	24.90	0.00	24.90	25.00
2	4	Shear	24.90	0.00	24.90	25.00
2	5	Shear	24.90	0.00	24.90	25.00
2	6	Shear	24.90	0.00	24.90	25.00
2	7	Shear	24.90	0.00	24.90	22.42
2	8	Shear	24.90	0.00	24.90	1.33
4	1	Shear	99.30	0.00	99.30	1.33
4	2	Shear	99.30	0.00	99.30	22.42
4	3	Shear	99.30	0.00	99.30	25.00
4	4	Shear	99.30	0.00	99.30	25.00
4	5	Shear	99.30	0.00	99.30	25.00
4	6	Shear	99.30	0.00	99.30	25.00
4	7	Shear	99.30	0.00	99.30	22.42
4	8	Shear	99.30	0.00	99.30	1.33
5	1	Shear	-214.30	0.00	-214.30	1.33
5	2	Shear	-214.30	0.00	-214.30	10.67
5	2	Shear	-160.90	10.67	-160.90	22.42
5	3	Shear	-160.90	0.00	-160.90	25.00

5	4	Shear	-160.90	0.00	-160.90	25.00
5	5	Shear	-160.90	0.00	-160.90	25.00
5	6	Shear	-160.90	0.00	-160.90	25.00
5	7	Shear	-160.90	0.00	-160.90	11.75
5	7	Shear	-214.30	11.75	-214.30	22.42
5	8	Shear	-214.30	0.00	-214.30	1.33
8	1	Shear	80.00	0.00	80.00	1.33
8	2	Shear	80.00	0.00	80.00	22.42
8	3	Shear	80.00	0.00	80.00	25.00
8	4	Shear	80.00	0.00	80.00	25.00
8	5	Shear	80.00	0.00	80.00	25.00
8	6	Shear	80.00	0.00	80.00	25.00
8	7	Shear	80.00	0.00	80.00	22.42
8	8	Shear	80.00	0.00	80.00	1.33

CONCENTRATED LOADS

Load Case	Span	P (k)	V (k)	M (k-ft)	X (ft)
5	2	2.76	0.00	0.00	0.00
5	2	-2.76	0.00	0.00	22.42
5	3	4.57	0.00	0.00	0.00
5	3	-4.57	0.00	0.00	25.00
5	4	1.12	0.00	0.00	0.00
5	4	-1.12	0.00	0.00	25.00
5	5	1.12	0.00	0.00	0.00
5	5	-1.12	0.00	0.00	25.00
5	6	4.57	0.00	0.00	0.00
5	6	-4.57	0.00	0.00	25.00
5	7	2.76	0.00	0.00	0.00
5	7	-2.76	0.00	0.00	22.42
9	2	0.39	0.00	0.00	0.00
9	2	-0.39	0.00	0.00	22.42
9	3	3.93	0.00	0.00	0.00
9	3	-3.93	0.00	0.00	25.00
9	4	0.44	0.00	0.00	0.00
9	4	-0.44	0.00	0.00	25.00
9	5	0.44	0.00	0.00	0.00
9	5	-0.44	0.00	0.00	25.00
9	6	3.93	0.00	0.00	0.00
9	6	-3.93	0.00	0.00	25.00
9	7	0.39	0.00	0.00	0.00
9	7	-0.39	0.00	0.00	22.42

LOAD COMBINATIONS

Comb	Active	Load Combination Name	Allowable	Load Case No.								
#	(Y/N)		Factor	1	2	3	4	5	6	7	8	9
1	Y	Live Load Only	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
2	Y	DL + COL + LL	1.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
3	Y	DL + COL + SL	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Y	0.6 DL + 0.6 WL	1.00	0.60	0.00	0.00	0.00	0.60	0.00	0.00	0.00	0.00
5	Y	0.6 DL + 0.42 WL	1.00	0.60	0.00	0.00	0.00	0.42	0.00	0.00	0.00	0.00
6	Y	DL + COL + 0.6 WL	1.00	1.00	1.00	0.00	0.00	0.60	0.00	0.00	0.00	0.00
7	Y	DL + COL + 0.75 SL + 0.45 WL	1.00	1.00	1.00	0.75	0.00	0.45	0.00	0.00	0.00	0.00
8	Y	DL + COL + 0.75 LL + 0.45 WL	1.00	1.00	1.00	0.00	0.75	0.45	0.00	0.00	0.00	0.00
9	Y	DL + COL + 0.75 SL + 0.45 WP	1.00	1.00	1.00	0.75	0.00	0.00	0.00	0.00	0.45	0.00
10	Y	0.53DL+0.91E	1.00	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91
11	Y	1.07DL+1.07COL+0.91E	1.00	1.07	1.07	0.00	0.00	0.00	0.00	0.00	0.00	0.91
12	Y	DL+COL+0.75LL+0.45WPL	1.00	1.00	1.00	0.00	0.75	0.00	0.00	0.00	0.45	0.00

DEFLECTION LIMITATIONS

The deflection limit with DEAD LOAD = $L / 120.0$
 The maximum deflection with DEAD LOAD = 2.50"
 The deflection limit without DEAD LOAD = $L / 150.0$
 The maximum deflection without DEAD LOAD = 2.00"

* Deflection limitations were applied to combinations 1-3,5

GENERAL NOTES

* '* Ends of laps are considered as brace points.'
 * '* Inflection points are considered brace points except for spans with discrete bracing.'
 * All calculations are in accordance with the 2016 North American Specification.

SYSTEM WEIGHT & COST

Total system weight = 630.20 lbs
 Total system cost = 1109.95 dollars

PURLIN PRODUCTION LIST

Purlin	Section	Length
1	08Z089	27.62
2	08Z067	31.42
3	08Z067	30.08
4	08Z067	30.08
5	08Z067	31.42
6	08Z089	27.62

MATERIAL SUMMARY

Section	Weight	Cost	Fy
08Z067	394.83	705.55	55.0
08Z089	235.37	404.41	55.0

NBG LIGHT GAGE ANALYSIS SHORT REPORT | 11/03/2022

Software: NBG Light Gage Analysis [version: 2018.12.04.1 date: 12/04/2018]
 Analysis Config: CBC [version: 2016.07.12.001]

1 Girt gages, laps, and heights updated.

Input File: C:\Users\viviana.perez\OneDrive - Nucor\Desktop\Vivi's Projects\Completed\2022\182 Rob Kerth Ice Land\Light Gage\SW\Ice land SW C02

Project Name: Ice land SW

AISI Spec Year: 2016
 Building Code: IBC 2018
 Inventory: CBCCA-RP

See D-20,21

1 Girts @ 7'-6", 13'-8"

Purlin spacing: 6.84 o.c.
 Insulation Thickness: 0.00

16ga 13'-8" girt only on FSW

SPAN PARAMETERS

Span	Length	Section	Design Group	Design	Brace Type	Left Support	Right Support	Left Lap	Right Lap	
	(ft)							(in)	(in)	
1	1.33	08Z060	1	Yes	Top	1	2	Cant.	0.00	
2	22.42	08Z060	1	Yes	Top	2	3	0.00	22.50	34.5
3	25.00	08Z060	2	Yes	Top	3	4	22.50	22.50	
4	25.00	08Z060	3	Yes	Top	4	5	22.50	22.50	
5	25.00	08Z060	4	Yes	Top	5	6	22.50	22.50	
6	25.00	08Z060	5	Yes	Top	6	7	22.50	22.50	
7	22.42	08Z060	6	Yes	Top	7	8	22.50	0.00	34.5
8	1.33	08Z060	6	Yes	Top	8	9	0.00	Cant.	

MAXIMUM COMPUTED DISPLACEMENTS, FORCES & LOAD RATIOS

Span Properties			Maximum Computed Displacements & Forces						Maximum Computed Load Ratios					
No	Length	Section	Displacement	Axial	Shear	Moment(+)	Moment(-)	Ten.(T)	Comp.(P)	Shear(V)	Mom.(M)	T&M	P&M	V&M
1	1.33	08Z060	-0.216	0.00	-0.13	0.09	-0.08	0.00	0.00	0.05	0.02	0.02	0.02	0.05
		x	0.00	0.00	16.00	16.00	16.00	0.00	0.00	16.00	16.00	16.00	16.00	16.00
		comb	2	0	2	2	1	0	0	2	1	1	1	2
2	22.42	08Z060	0.952	0.00	-1.32	5.93	-5.35	0.00	0.00	0.44	1.00	1.00	1.00	0.87
		x	117.11	0.00	269.00	269.00	269.00	0.00	0.00	246.50	93.68	93.68	93.68	246.50
		comb	2	0	2	2	1	0	0	2	2	2	2	2
3	25.00	08Z060	0.407	0.00	-1.22	5.93	-5.35	0.00	0.00	0.40	0.89	0.89	0.89	0.89
		x	150.00	0.00	0.00	0.00	0.00	0.00	0.00	22.50	22.50	22.50	22.50	22.50
		comb	2	0	2	2	1	0	0	2	1	1	1	2
4	25.00	08Z060	0.570	0.00	-1.19	5.35	-4.85	0.00	0.00	0.39	0.76	0.76	0.76	0.79
		x	150.00	0.00	300.00	300.00	300.00	0.00	0.00	277.50	277.50	277.50	277.50	277.50
		comb	2	0	2	2	1	0	0	2	1	1	1	2
5	25.00	08Z060	0.570	0.00	-1.19	5.35	-4.85	0.00	0.00	0.39	0.76	0.76	0.76	0.79
		x	150.00	0.00	0.00	0.00	0.00	0.00	0.00	22.50	22.50	22.50	22.50	22.50
		comb	2	0	2	2	1	0	0	2	1	1	1	2
6	25.00	08Z060	0.407	0.00	-1.22	5.93	-5.35	0.00	0.00	0.40	0.89	0.89	0.89	0.89
		x	138.50	0.00	300.00	300.00	300.00	0.00	0.00	277.50	277.50	277.50	277.50	277.50
		comb	2	0	2	2	1	0	0	2	1	1	1	2
7	22.42	08Z060	0.952	0.00	-1.32	5.93	-5.35	0.00	0.00	0.44	1.00	1.00	1.00	0.87
		x	151.89	0.00	0.00	0.00	0.00	0.00	0.00	22.50	163.61	163.61	163.61	22.50
		comb	2	0	2	2	1	0	0	2	2	2	2	2
8	1.33	08Z060	-0.216	0.00	-0.13	0.09	-0.08	0.00	0.00	0.05	0.02	0.02	0.02	0.05
		x	16.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		comb	2	0	2	2	1	0	0	2	1	1	1	2
			Displacement	Axial	Shear	Moment(+)	Moment(-)	Ten.(T)	Comp.(P)	Shear(V)	Mom.(M)	T&M	P&M	V&M
Max of All Spans			0.952	0.00	-1.32	5.93	-5.35	0.00	0.00	0.44	1.00	1.00	1.00	0.89
Distance from Left			117.11	0.00	269.00	269.00	269.00	0.00	0.00	246.50	93.68	93.68	93.68	22.50
Span			2	0	2	2	2	0	0	2	2	2	2	3
Load Combination			2	0	2	2	1	0	0	2	2	2	2	2

SUPPORT CONNECTIONS

Support No.	2	3	4	5	6	7	8
Connection Code	NC	NC	NC	NC	NC	NC	NC

VERTICAL REACTIONS [kips]

Comb	Support No
	1 2 3 4 5 6 7 8 9

1	0.00	-0.84	-2.29	-2.09	-2.16	-2.09	-2.29	-0.84	0.00
2	0.00	0.97	2.54	2.30	2.39	2.30	2.54	0.97	0.00
3	0.00	-0.59	-1.61	-1.47	-1.51	-1.47	-1.61	-0.59	0.00
4	0.00	0.68	1.78	1.61	1.67	1.61	1.78	0.68	0.00

* Negative reaction for gravity loads

SUPPORT RATIOS

Support	Support Type*		Crippling	Crip & Bend	Bolt Shear	Bearing*
2	1	Max Ratios Combo	0.50 1	0.36 1	0.18 2	0.10 2
3	1	Max Ratios Combo	0.68 1	0.71 1	0.48 2	0.25 2
4	1	Max Ratios Combo	0.62 1	0.63 1	0.43 2	0.23 2
5	1	Max Ratios Combo	0.64 1	0.66 1	0.45 2	0.24 2
6	1	Max Ratios Combo	0.62 1	0.63 1	0.43 2	0.23 2
7	1	Max Ratios Combo	0.68 1	0.71 1	0.48 2	0.25 2
8	1	Max Ratios Combo	0.50 1	0.36 1	0.18 2	0.19 2
Maximum Ratios of All Supports			0.68	0.71	0.48	0.25
Support			3	3	3	3
Combo			1	1	2	2
Support Type			1	1	1	1

* Bolt type between purlin & clip: A307

* Support types: 1 = No Clip | 2 = Crippling Clip | 3 = Bolted or Welded Clip w/ A307 | 4 = Bolted or Welded Clip w/ A325

* Bearing ratio is check of bearing of clip bolts on purlins

GENERAL LOADS

Load Case	Uniform Load (psf)	Load Case Name
1	20.8	Pressure Wind Load
2	-23.0	Suction Wind Load
3	-24.6	Edge Suction Wind Load

LINEAR LOADS

Load Case	Span	Load Type	Start Load	Start X	End Load	End X
			(lb/ft)	(ft)	(lb/ft)	(ft)
1	1	Shear	142.50	0.00	142.50	1.33
1	2	Shear	142.50	0.00	142.50	22.42
1	3	Shear	142.50	0.00	142.50	25.00
1	4	Shear	142.50	0.00	142.50	25.00
1	5	Shear	142.50	0.00	142.50	25.00
1	6	Shear	142.50	0.00	142.50	25.00
1	7	Shear	142.50	0.00	142.50	22.42
1	8	Shear	142.50	0.00	142.50	1.33
2	1	Shear	-168.10	0.00	-168.10	1.33
2	2	Shear	-168.10	0.00	-168.10	6.67
2	2	Shear	-157.10	6.67	-157.10	22.42
2	3	Shear	-157.10	0.00	-157.10	25.00
2	4	Shear	-157.10	0.00	-157.10	25.00
2	5	Shear	-157.10	0.00	-157.10	25.00
2	6	Shear	-157.10	0.00	-157.10	25.00
2	7	Shear	-157.10	0.00	-157.10	15.75
2	7	Shear	-168.10	15.75	-168.10	22.42
2	8	Shear	-168.10	0.00	-168.10	1.33

LOAD COMBINATIONS

Comb	Active	Load Combination Name	Allowable	Load Case No.	
#	(Y/N)		Factor	1	2
1	Y	Wind Pressure	1.00	0.60	0.00
2	Y	Wind Suction	1.00	0.00	0.60
3	Y	Wind Pressure Deflection	1.00	0.42	0.00
4	Y	Wind Suction Deflection	1.00	0.00	0.42

DEFLECTION LIMITATIONS

The 50 year deflection limit	=	L / 90.0
The 50 year maximum deflection	=	3.33"

* Deflection limitations were applied to combinations 3-4

GENERAL NOTES

* '*' Ends of laps are considered as brace points.'
 * '*' Inflection points are considered brace points except for spans with discrete bracing.'
 * All calculations are in accordance with the 2016 North American Specification.

SYSTEM WEIGHT & COST

```
=====
Total system weight = 477.14 lbs
Total system cost   = 760.00 dollars
```

PURLIN PRODUCTION LIST


```
=====
Purlin      Section      Length
-----
1           08Z060         25.62
2           08Z060         28.75
3           08Z060         28.75
4           08Z060         28.75
5           08Z060         28.75
6           08Z060         25.62
```

MATERIAL SUMMARY

```
=====
Section      Weight      Cost      Fy
-----
08Z060       477.14       760.00    55.0
```

NBG LIGHT GAGE ANALYSIS SHORT REPORT | 11/03/2022

Software: NBG Light Gage Analysis [version: 2018.12.04.1 date: 12/04/2018]
 Analysis Config: CBC [version: 2016.07.12.001]

 Girt gages, laps, and heights updated.

Input File: C:\Users\viviana.perez\OneDrive - Nucor\Desktop\Vivi's Projects\Completed\2022\182 Rob Kerth Ice Land\Light Gage\SW\Ice land SW CO2 loaded

Project Name: Ice land SW loaded

AISI Spec Year: 2016
 Building Code: IBC 2018
 Inventory: CBCCA-RP

See D-20

 @BSW Girts @ 13'-8"

Purlin spacing: 6.25 o.c.
 Insulation Thickness: 0.00

SPAN PARAMETERS

Span	Length	Section	Design Group	Design	Brace Type	Left Support	Right Support	Left Lap	Right Lap
	(ft)							(in)	(in)
1	1.33	08Z099	1	No	Top	1	2	Cant.	0.00
2	22.42	08Z099	1	No	Top	2	3	0.00	34.50
3	25.00	08Z067	2	No	Top	3	4	34.50	22.50
4	25.00	08Z060	3	No	Top	4	5	22.50	22.50
5	25.00	08Z060	4	No	Top	5	6	22.50	22.50
6	25.00	08Z067	5	No	Top	6	7	22.50	34.50
7	22.42	08Z099	6	No	Top	7	8	34.50	0.00
8	1.33	08Z099	6	No	Top	8	9	0.00	Cant.

MAXIMUM COMPUTED DISPLACEMENTS, FORCES & LOAD RATIOS

Span Properties			Maximum Computed Displacements & Forces						Maximum Computed Load Ratios					
No	Length	Section	Displacement	Axial	Shear	Moment(+)	Moment(-)	Ten.(T)	Comp.(P)	Shear(V)	Mom.(M)	T&M	P&M	V&M
1	1.33	08Z099	-0.259	0.00	-0.12	0.08	-0.07	0.00	0.00	0.01	0.01	0.01	0.01	0.01
		x	0.00	0.00	16.00	16.00	16.00	0.00	0.00	16.00	16.00	16.00	16.00	16.00
		comb	2	0	2	2	1	0	0	1	1	1	1	1
2	22.42	08Z099	1.232	0.00	-1.91	7.74	-6.98	0.00	0.00	0.15	0.97	0.97	0.97	0.68
		x	128.04	0.00	269.00	269.00	269.00	0.00	0.00	234.50	128.04	128.04	128.04	128.04
		comb	2	0	2	2	1	0	0	2	2	2	2	2
3	25.00	08Z067	-0.247	0.00	-1.23	7.74	-6.98	0.00	0.00	0.27	0.92	0.92	0.92	0.88
		x	58.00	0.00	0.00	0.00	0.00	0.00	0.00	34.50	34.50	34.50	34.50	34.50
		comb	2	0	2	2	1	0	0	2	1	1	1	2
4	25.00	08Z060	0.609	0.00	-1.13	5.27	-4.77	0.00	0.00	0.37	0.77	0.77	0.77	0.78
		x	138.50	0.00	300.00	300.00	300.00	0.00	0.00	277.50	277.50	277.50	277.50	277.50
		comb	2	0	2	2	1	0	0	2	1	1	1	2
5	25.00	08Z060	0.613	0.00	-1.13	5.27	-4.77	0.00	0.00	0.37	0.77	0.77	0.77	0.78
		x	161.50	0.00	0.00	0.00	0.00	0.00	0.00	22.50	22.50	22.50	22.50	22.50
		comb	2	0	2	2	1	0	0	2	1	1	1	2
6	25.00	08Z067	-0.255	0.00	-1.23	7.79	-7.03	0.00	0.00	0.27	0.93	0.93	0.93	0.89
		x	242.00	0.00	300.00	300.00	300.00	0.00	0.00	265.50	265.50	265.50	265.50	265.50
		comb	2	0	2	2	1	0	0	2	1	1	1	2
7	22.42	08Z099	1.224	0.00	-2.04	7.79	-7.03	0.00	0.00	0.17	0.95	0.95	0.95	0.67
		x	142.56	0.00	0.00	0.00	0.00	0.00	0.00	34.50	166.56	166.56	166.56	166.56
		comb	2	0	2	2	1	0	0	2	2	2	2	2
8	1.33	08Z099	-0.269	0.00	-0.12	0.08	-0.07	0.00	0.00	0.01	0.01	0.01	0.01	0.01
		x	16.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		comb	2	0	2	2	1	0	0	1	1	1	1	1
			Displacement	Axial	Shear	Moment(+)	Moment(-)	Ten.(T)	Comp.(P)	Shear(V)	Mom.(M)	T&M	P&M	V&M
Max of All Spans			1.232	0.00	-2.04	7.79	-7.03	0.00	0.00	0.37	0.97	0.97	0.97	0.89
Distance from Left			128.04	0.00	0.00	300.00	300.00	0.00	0.00	277.50	128.04	128.04	128.04	265.50
Span			2	0	7	6	6	0	0	4	2	2	2	6
Load Combination			2	0	2	2	1	0	0	2	2	2	2	2

SUPPORT CONNECTIONS

Support No.	2	3	4	5	6	7	8
Connection Code	NC	NC	NC	NC	NC	NC	NC

VERTICAL REACTIONS [kips]

Comb	Support No
	1 2 3 4 5 6 7 8 9

1	0.00	-1.49	-2.84	-1.77	-2.05	-1.76	-2.96	-1.38	0.00
2	0.00	1.69	3.15	1.94	2.27	1.94	3.28	1.56	0.00
3	0.00	-1.04	-1.99	-1.24	-1.44	-1.24	-2.07	-0.96	0.00
4	0.00	1.18	2.20	1.36	1.59	1.36	2.29	1.09	0.00

* Negative reaction for gravity loads

SUPPORT RATIOS

Support	Support Type*		Crippling	Crip & Bend	Bolt Shear	Bearing*
2	1	Max Ratios Combo	0.30 1	0.22 1	0.32 2	0.10 2
3	1	Max Ratios Combo	0.40 1	0.52 1	0.59 2	0.23 2
4	1	Max Ratios Combo	0.46 1	0.46 1	0.37 2	0.18 2
5	1	Max Ratios Combo	0.61 1	0.64 1	0.43 2	0.22 2
6	1	Max Ratios Combo	0.46 1	0.46 1	0.37 2	0.18 2
7	1	Max Ratios Combo	0.42 1	0.53 1	0.62 2	0.23 2
8	1	Max Ratios Combo	0.28 1	0.20 1	0.30 2	0.19 2
Maximum Ratios of All Supports			0.61	0.64	0.62	0.23
Support			5	5	7	7
Combo			1	1	2	2
Support Type			1	1	1	1

* Bolt type between purlin & clip: A307

* Support types: 1 = No Clip | 2 = Crippling Clip | 3 = Bolted or Welded Clip w/ A307 | 4 = Bolted or Welded Clip w/ A325

* Bearing ratio is check of bearing of clip bolts on purlins

GENERAL LOADS

Load Case	Uniform Load (psf)	Load Case Name
1	20.8	Pressure Wind Load
2	-23.0	Suction Wind Load
3	-24.6	Edge Suction Wind Load

LINEAR LOADS

Load Case	Span	Load Type	Start Load	Start X	End Load	End X
			(lb/ft)	(ft)	(lb/ft)	(ft)
1	1	Shear	130.30	0.00	130.30	1.33
1	2	Shear	130.30	0.00	130.30	22.42
1	3	Shear	130.30	0.00	130.30	25.00
1	4	Shear	130.30	0.00	130.30	25.00
1	5	Shear	130.30	0.00	130.30	25.00
1	6	Shear	130.30	0.00	130.30	25.00
1	7	Shear	130.30	0.00	130.30	22.42
1	8	Shear	130.30	0.00	130.30	1.33
2	1	Shear	-153.60	0.00	-153.60	1.33
2	2	Shear	-153.60	0.00	-153.60	6.67
2	2	Shear	-143.60	6.67	-143.60	22.42
2	3	Shear	-143.60	0.00	-143.60	25.00
2	4	Shear	-143.60	0.00	-143.60	25.00
2	5	Shear	-143.60	0.00	-143.60	25.00
2	6	Shear	-143.60	0.00	-143.60	25.00
2	7	Shear	-143.60	0.00	-143.60	15.75
2	7	Shear	-153.60	15.75	-153.60	22.42
2	8	Shear	-153.60	0.00	-153.60	1.33

CONCENTRATED LOADS

Load Case	Span	P (k)	V (k)	M (k-ft)	X (ft)
1	2	0.00	0.90	0.00	1.67
1	2	0.00	1.37	0.00	13.67
1	7	0.00	1.18	0.00	5.88
1	7	0.00	1.09	0.00	17.88
2	2	0.00	-1.00	0.00	1.67
2	2	0.00	-1.52	0.00	13.67
2	7	0.00	-1.31	0.00	5.88
2	7	0.00	-1.21	0.00	17.88

LOAD COMBINATIONS

Comb Active	Load Combination Name	Allowable	Load Case No.	
# (Y/N)		Factor	1	2
1	Y Wind Pressure	1.00	0.60	0.00
2	Y Wind Suction	1.00	0.00	0.60
3	Y Wind Pressure Deflection	1.00	0.42	0.00
4	Y Wind Suction Deflection	1.00	0.00	0.42

DEFLECTION LIMITATIONS

```

=====
The 50 year deflection limit      = L / 90.0
The 50 year maximum deflection   = 3.33"
=====

```

* Deflection limitations were applied to combinations 3-4

GENERAL NOTES

```

=====
* '* Ends of laps are considered as brace points.'
* '* Inflection points are considered brace points except for spans with discrete bracing.'
* All calculations are in accordance with the 2016 North American Specification.
=====

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SYSTEM WEIGHT & COST

```

=====
Total system weight = 608.96 lbs
Total system cost   = 940.48 dollars
=====

```

PURLIN PRODUCTION LIST

```

=====
Purlin      Section      Length
=====
1           08Z099         26.62
2           08Z067         29.75
3           08Z060         28.75
4           08Z060         28.75
5           08Z067         29.75
6           08Z099         26.62
=====

```

MATERIAL SUMMARY


```

=====
Section      Weight      Cost      Fy
=====
08Z060       165.02       262.86    55.0
08Z067       190.99       300.39    55.0
08Z099       252.94       377.23    55.0
=====

```

NBG LIGHT GAGE ANALYSIS SHORT REPORT | 11/03/2022

Software: NBG Light Gage Analysis [version: 2018.12.04.1 date: 12/04/2018]
 Analysis Config: CBC [version: 2016.07.12.001]

 Spans, girt gages, and heights updated.

Input File: C:\Users\viviana.perez\OneDrive - Nucor\Desktop\Vivi's Projects\Completed\2022\182 Rob Kerth Ice Land\Light Gage\EW\Ice land LEW C02

Project Name: Ice land single bay

AISI Spec Year: 2016
 Building Code: IBC 2018
 Inventory: CBCCA-RP

See D-22,23

@1,7 (A-B) 7'-6", 13'-8", 20'-6"

Purlin spacing: 6.84 o.c.
 Insulation Thickness: 0.00

 
 SPAN PARAMETERS

Span	Length	Section	Design Group	Design	Brace Type	Left Support	Right Support	Left Lap	Right Lap
	(ft)							(in)	(in)
1	16.00	08Z067	1	No	Top	1	2	----	----

MAXIMUM COMPUTED DISPLACEMENTS, FORCES & LOAD RATIOS

Span Properties			Maximum Computed Displacements & Forces						Maximum Computed Load Ratios					
No	Length	Section	Displacement	Axial	Shear	Moment(+)	Moment(-)	Ten.(T)	Comp.(P)	Shear(V)	Mom.(M)	T&M	P&M	V&M
1	16.00	08Z067	0.577	0.00	-0.83	2.79	-3.33	0.00	0.00	0.23	0.95	0.95	0.95	0.62
		x	96.00	0.00	0.00	96.00	96.00	0.00	0.00	0.00	96.00	96.00	96.00	96.00
		comb	2	0	2	1	2	0	0	2	2	2	2	2
			Displacement	Axial	Shear	Moment(+)	Moment(-)	Ten.(T)	Comp.(P)	Shear(V)	Mom.(M)	T&M	P&M	V&M
Max of All Spans			0.577	0.00	-0.83	2.79	-3.33	0.00	0.00	0.23	0.95	0.95	0.95	0.62
Distance from Left			96.00	0.00	0.00	96.00	96.00	0.00	0.00	0.00	96.00	96.00	96.00	96.00
Span			1	0	1	1	1	0	0	1	1	1	1	1
Load Combination			2	0	2	1	2	0	0	2	2	2	2	2

SUPPORT CONNECTIONS

Support No.	1	2
Connection Code	NC	NC

VERTICAL REACTIONS [kips]

Comb	Support No	
	1	2
1	-0.70	-0.70
2	0.83	0.83
3	-0.49	-0.49
4	0.58	0.58

* Negative reaction for gravity loads

SUPPORT RATIOS

Support	Support Type*	Crippling	Crip & Bend	Bolt Shear	Bearing*
1	1	Max Ratios Combo	0.53 1	0.35 1	0.16 2
2	1	Max Ratios Combo	0.53 1	0.35 1	0.16 2
Maximum Ratios of All Supports		0.53	0.35	0.16	0.15
Support		1	1	1	1
Combo		1	1	2	2
Support Type		1	1	1	1

* Bolt type between purlin & clip: A307

* Support types: 1 = No Clip | 2 = Crippling Clip | 3 = Bolted or Welded Clip w/ A307 | 4 = Bolted or Welded Clip w/ A325

* Bearing ratio is check of bearing of clip bolts on purlins

GENERAL LOADS

Load Case	Uniform Load (psf)	Load Case Name
1	21.2	Pressure Wind Load
2	-23.4	Suction Wind Load

LINEAR LOADS

Load Case	Span	Load Type	Start Load	Start X	End Load	End X
			(lb/ft)	(ft)	(lb/ft)	(ft)
1	1	Shear	145.30	0.00	145.30	16.00
2	1	Shear	-173.60	0.00	-173.60	16.00

LOAD COMBINATIONS

Comb	Active	Load Combination Name	Allowable	Load Case No.		
#	(Y/N)		Factor	1	2	
1	Y	Wind Pressure	1.00	0.60	0.00	
2	Y	Wind Suction	1.00	0.00	0.60	
3	Y	Wind Pressure Deflection	1.00	0.42	0.00	
4	Y	Wind Suction Deflection	1.00	0.00	0.42	

DEFLECTION LIMITATIONS

The 50 year deflection limit	=	L / 90.0
The 50 year maximum deflection	=	2.13"

* Deflection limitations were applied to combinations 3-4

GENERAL NOTES

- * '* Ends of laps are considered as brace points.'
- * '* Inflection points are considered brace points except for spans with discrete bracing.'
- * All calculations are in accordance with the 2016 North American Specification.

SYSTEM WEIGHT & COST

Total system weight = 51.36 lbs
Total system cost = 80.78 dollars

PURLIN PRODUCTION LIST

Purlin	Section	Length
1	08Z067	16.00

MATERIAL SUMMARY

Section	Weight	Cost	Fy
08Z067	51.36	80.78	55.0

NBG LIGHT GAGE ANALYSIS SHORT REPORT | 11/03/2022

Software: NBG Light Gage Analysis [version: 2018.12.04.1 date: 12/04/2018]
 Analysis Config: CBC [version: 2016.07.12.001]
 Input File: C:\Users\viviana.perez\OneDrive - Nucor\Desktop\Vivi's Projects\Completed\2022\182 Rob Kerth Ice Land\Light Gage\EW\Ice land LEW C02 3.1875
 Project Name: Ice land EW 2.1875
 AISI Spec Year: 2016
 Building Code: IBC 2018
 Inventory: CBCCA-RP

See D-22

@LEW

1 Spans, girt gages, and heights updated.

1 Girts @ 7'-6", 13'-8", 20'-6"

Purlin spacing: 3.19 o.c.
 Insulation Thickness: 0.00

SPAN PARAMETERS

Span	Length	Section	Design Group	Design	Brace Type	Left Support	Right Support	Left Lap	Right Lap
	(ft)							(in)	(in)
1	16.00	08Z060	1	Yes	Top	1	2	----	0.00
2	26.00	08Z075	2	Yes	Top	2	3	0.00	0.00
3	21.00	08Z060	3	Yes	Top	3	4	0.00	0.00
4	21.00	08Z060	4	Yes	Top	4	5	0.00	0.00
5	21.00	08Z060	5	Yes	Top	5	6	0.00	----

MAXIMUM COMPUTED DISPLACEMENTS, FORCES & LOAD RATIOS

Span Properties			Maximum Computed Displacements & Forces						Maximum Computed Load Ratios					
No	Length	Section	Displacement	Axial	Shear	Moment(+)	Moment(-)	Ten.(T)	Comp.(P)	Shear(V)	Mom.(M)	T&M	P&M	V&M
1	16.00	08Z060	0.288	0.00	-0.38	1.30	-1.49	0.00	0.00	0.15	0.48	0.48	0.48	0.31
		x	96.00	0.00	0.00	96.00	96.00	0.00	0.00	0.00	96.00	96.00	96.00	84.00
		comb	2	0	2	1	2	0	0	2	2	2	2	2
2	26.00	08Z075	1.546	0.00	-0.58	3.43	-3.78	0.00	0.00	0.11	0.93	0.93	0.93	0.60
		x	156.00	0.00	0.00	156.00	156.00	0.00	0.00	0.00	156.00	156.00	156.00	144.00
		comb	2	0	2	1	2	0	0	2	2	2	2	2
3	21.00	08Z060	0.817	0.00	-0.47	2.23	-2.46	0.00	0.00	0.18	0.79	0.79	0.79	0.51
		x	120.00	0.00	0.00	120.00	132.00	0.00	0.00	0.00	120.00	120.00	120.00	120.00
		comb	2	0	2	1	2	0	0	2	2	2	2	2
4	21.00	08Z060	0.817	0.00	-0.47	2.23	-2.46	0.00	0.00	0.18	0.79	0.79	0.79	0.51
		x	120.00	0.00	0.00	120.00	132.00	0.00	0.00	0.00	120.00	120.00	120.00	120.00
		comb	2	0	2	1	2	0	0	2	2	2	2	2
5	21.00	08Z060	0.839	0.00	-0.49	2.23	-2.52	0.00	0.00	0.19	0.81	0.81	0.81	0.53
		x	132.00	0.00	252.00	120.00	132.00	0.00	0.00	252.00	120.00	120.00	120.00	120.00
		comb	2	0	2	1	2	0	0	2	2	2	2	2
			Displacement	Axial	Shear	Moment(+)	Moment(-)	Ten.(T)	Comp.(P)	Shear(V)	Mom.(M)	T&M	P&M	V&M
Max of All Spans			1.546	0.00	-0.58	3.43	-3.78	0.00	0.00	0.19	0.93	0.93	0.93	0.60
Distance from Left Span			156.00	0.00	0.00	156.00	156.00	0.00	0.00	252.00	156.00	156.00	156.00	144.00
Load Combination			2	0	2	2	2	0	0	5	2	2	2	2

SUPPORT CONNECTIONS

Support No.	1	2	3	4	5	6
Connection Code	NC	NC	NC	NC	NC	NC

VERTICAL REACTIONS [kips]

Comb	Support No					
	1	2	3	4	5	6
1	-0.32	-0.85	-0.95	-0.85	-0.85	-0.43
2	0.38	0.95	1.05	0.94	0.94	0.49
3	-0.23	-0.60	-0.67	-0.60	-0.60	-0.30
4	0.27	0.66	0.74	0.66	0.66	0.35

* Negative reaction for gravity loads

SUPPORT RATIOS

Support	Support Type*	Crippling	Crip & Bend	Bolt Shear	Bearing*
1	1	Max Ratios Combo	0.31 1	0.20 1	0.07 2
					0.08 2

2	1	Max Ratios Combo	0.81 1	0.54 1	0.18 2	0.15 2
3	1	Max Ratios Combo	0.90 1	0.60 1	0.20 2	0.21 2
4	1	Max Ratios Combo	0.81 1	0.54 1	0.18 2	0.19 2
5	1	Max Ratios Combo	0.81 1	0.54 1	0.18 2	0.19 2
6	1	Max Ratios Combo	0.40 1	0.27 1	0.09 2	0.10 2
Maximum Ratios of All Supports			0.90	0.60	0.20	0.21
Support			3	3	3	3
Combo			1	1	2	2
Support Type			1	1	1	1

* Bolt type between purlin & clip: A307

* Support types: 1 = No Clip | 2 = Crippling Clip | 3 = Bolted or Welded Clip w/ A307 | 4 = Bolted or Welded Clip w/ A325

* Bearing ratio is check of bearing of clip bolts on purlins

GENERAL LOADS

Load Case	Uniform Load (psf)	Load Case Name
1	21.2	Pressure Wind Load
2	-23.4	Suction Wind Load
3	-25.4	Edge Suction Wind Load

LINEAR LOADS

Load Case	Span	Load Type	Start Load (lb/ft)	Start X (ft)	End Load (lb/ft)	End X (ft)
1	1	Shear	67.70	0.00	67.70	16.00
1	2	Shear	67.70	0.00	67.70	26.00
1	3	Shear	67.70	0.00	67.70	21.00
1	4	Shear	67.70	0.00	67.70	21.00
1	5	Shear	67.70	0.00	67.70	21.00
2	1	Shear	-80.90	0.00	-80.90	8.00
2	1	Shear	-74.50	8.00	-74.50	16.00
2	2	Shear	-74.50	0.00	-74.50	26.00
2	3	Shear	-74.50	0.00	-74.50	21.00
2	4	Shear	-74.50	0.00	-74.50	21.00
2	5	Shear	-74.50	0.00	-74.50	13.00
2	5	Shear	-80.90	13.00	-80.90	21.00

LOAD COMBINATIONS

Comb Active	Load Combination Name	Allowable	Load Case No.	
# (Y/N)		Factor	1	2
1	Y Wind Pressure	1.00	0.60	0.00
2	Y Wind Suction	1.00	0.00	0.60
3	Y Wind Pressure Deflection	1.00	0.42	0.00
4	Y Wind Suction Deflection	1.00	0.00	0.42

DEFLECTION LIMITATIONS

The 50 year deflection limit	= L / 90.0
The 50 year maximum deflection	= 3.47"

* Deflection limitations were applied to combinations 3-4

GENERAL NOTES

* '* Ends of laps are considered as brace points.'

* '* Inflection points are considered brace points except for spans with discrete bracing.'

* All calculations are in accordance with the 2016 North American Specification.

SYSTEM WEIGHT & COST

Total system weight =	320.07 lbs
Total system cost =	506.28 dollars

PURLIN PRODUCTION LIST

Purlin	Section	Length
1	08Z060	16.00
2	08Z075	26.00
3	08Z060	21.00
4	08Z060	21.00
5	08Z060	21.00

MATERIAL SUMMARY

Section	Weight	Cost	Fy
08Z060	226.73	361.14	55.0
08Z075	93.34	145.14	55.0

NBG LIGHT GAGE ANALYSIS SHORT REPORT | 11/03/2022

Software: NBG Light Gage Analysis [version: 2018.12.04.1 date: 12/04/2018]
 Analysis Config: CBC [version: 2016.07.12.001]

Input File: C:\Users\viviana.perez\OneDrive - Nucor\Desktop\Vivi's Projects\Completed\2022\182 Rob Kerth Ice Land\Light Gage\EW\Ice land EW C02

Project Name: Ice land EW

⚠ Spans, girt gages, laps, and heights updated.

AISI Spec Year: 2016
 Building Code: IBC 2018
 Inventory: CBCCA-RP

See D-23

@REW

⚠ Girts @ 7'-6", 13'-8", 20'-6"

Purlin spacing: 5.35 o.c.
 Insulation Thickness: 0.00

SPAN PARAMETERS

Span	Length	Section	Design Group	Design	Brace Type	Left Support	Right Support	Left Lap	Right Lap
	(ft)							(in)	(in)
1	21.00	08Z089	1	No	Top	1	2	----	0.00
2	18.42	08Z067	2	No	Top	2	3	0.00	0.00
3	26.58	08Z099	3	No	Top	3	4	0.00	0.00
4	22.33	08Z089	4	No	Top	4	5	0.00	0.00
5	16.67	08Z060	5	No	Top	5	6	0.00	----

16ga w/
2.1875'
trib

MAXIMUM COMPUTED DISPLACEMENTS, FORCES & LOAD RATIOS

Span Properties			Maximum Computed Displacements & Forces						Maximum Computed Load Ratios					
No	Length	Section	Displacement	Axial	Shear	Moment(+)	Moment(-)	Ten.(T)	Comp.(P)	Shear(V)	Mom.(M)	T&M	P&M	V&M
1	21.00	08Z089	0.957	0.00	-0.83	3.75	-4.24	0.00	0.00	0.10	0.83	0.83	0.83	0.54
		x	120.00	0.00	0.00	132.00	120.00	0.00	0.00	0.00	120.00	120.00	120.00	120.00
		comb	2	0	2	1	2	0	0	2	2	2	2	2
2	18.42	08Z067	0.728	0.00	-0.69	2.88	-3.17	0.00	0.00	0.19	0.90	0.90	0.90	0.59
		x	104.68	0.00	221.00	116.32	104.68	0.00	0.00	0.00	104.68	104.68	104.68	104.68
		comb	2	0	2	1	2	0	0	2	2	2	2	2
3	26.58	08Z099	2.160	0.00	-1.00	6.01	-6.62	0.00	0.00	0.00	0.9	0.9	0.9	0.6
		x	153.59	0.00	0.00	165.41	153.59	0.00	0.00	0.00	153.59	153.59	153.59	153.59
		comb	2	0	2	1	2	0	0	2	2	2	2	2
4	22.33	08Z089	1.193	0.00	-0.84	4.24	-4.67	0.00	0.00	0.10	0.92	0.92	0.92	0.60
		x	128.17	0.00	268.00	139.83	139.83	0.00	0.00	0.00	128.17	128.17	128.17	128.17
		comb	2	0	2	1	2	0	0	2	2	2	2	2
5	16.67	08Z060	0.565	0.00	-0.66	2.36	-2.71	0.00	0.00	0.26	0.86	0.86	0.86	0.56
		x	105.88	0.00	200.00	94.12	105.88	0.00	0.00	200.00	94.12	94.12	94.12	94.12
		comb	2	0	2	1	2	0	0	2	2	2	2	2
			Displacement	Axial	Shear	Moment(+)	Moment(-)	Ten.(T)	Comp.(P)	Shear(V)	Mom.(M)	T&M	P&M	V&M
Max of All Spans			2.160	0.00	-1.00	6.01	-6.62	0.00	0.00	0.26	1.14	1.14	1.14	0.74
Distance from Left Span			153.59	0.00	0.00	165.41	153.59	0.00	0.00	200.00	153.59	153.59	153.59	153.59
Span			3	0	3	3	3	0	0	5	3	3	3	3
Load Combination			2	0	2	1	2	0	0	2	2	2	2	2

SUPPORT CONNECTIONS

Support No.	1	2	3	4	5	6
Connection Code	NC	NC	NC	NC	NC	NC

VERTICAL REACTIONS [kips]

Comb	Support No	1	2	3	4	5	6
1		-0.72	-1.34	-1.53	-1.67	-1.33	-0.57
2		0.83	1.49	1.69	1.84	1.48	0.66
3		-0.50	-0.94	-1.07	-1.17	-0.93	-0.40
4		0.58	1.04	1.18	1.29	1.03	0.47

* Negative reaction for gravity loads

SUPPORT RATIOS

Support	Support Type*	Crippling	Crip & Bend	Bolt Shear	Bearing*
1	1	Max Ratios Combo	0.32 1	0.21 1	0.16 2
					0.11 2

2	1	Max Ratios Combo	1.03 1	0.68 1	0.28 2	0.26 2
3	1	Max Ratios Combo	1.17 1	0.78 1	0.32 2	0.20 2
4	1	Max Ratios Combo	0.74 1	0.49 1	0.35 2	0.25 2
5	1	Max Ratios Combo	1.26 1	0.84 1	0.28 2	0.29 2
6	1	Max Ratios Combo	0.54 1	0.36 1	0.13 2	0.13 2
Maximum Ratios of All Supports			1.26	0.84	0.35	0.29
Support			5	5	4	5
Combo			1	1	2	2
Support Type			1	1	1	1

* Bolt type between purlin & clip: A307

* Support types: 1 = No Clip | 2 = Crippling Clip | 3 = Bolted or Welded Clip w/ A307 | 4 = Bolted or Welded Clip w/ A325

* Bearing ratio is check of bearing of clip bolts on purlins

GENERAL LOADS

Load Case	Uniform Load (psf)	Load Case Name
1	21.2	Pressure Wind Load
2	-23.4	Suction Wind Load
3	-25.4	Edge Suction Wind Load

LINEAR LOADS

Load Case	Span	Load Type	Start Load (lb/ft)	Start X (ft)	End Load (lb/ft)	End X (ft)
1	1	Shear	113.60	0.00	113.60	21.00
1	2	Shear	113.60	0.00	113.60	18.42
1	3	Shear	113.60	0.00	113.60	26.58
1	4	Shear	113.60	0.00	113.60	22.33
1	5	Shear	113.60	0.00	113.60	16.67
2	1	Shear	-135.80	0.00	-135.80	8.00
2	1	Shear	-125.10	8.00	-125.10	21.00
2	2	Shear	-125.10	0.00	-125.10	18.42
2	3	Shear	-125.10	0.00	-125.10	26.58
2	4	Shear	-125.10	0.00	-125.10	22.33
2	5	Shear	-125.10	0.00	-125.10	8.67
2	5	Shear	-135.80	8.67	-135.80	16.67

LOAD COMBINATIONS

Comb Active	Load Combination Name	Allowable	Load Case No.	
#	(Y/N)	Factor	1	2
1	Y	Wind Pressure	1.00	0.60 0.00
2	Y	Wind Suction	1.00	0.00 0.60
3	Y	Wind Pressure Deflection	1.00	0.42 0.00
4	Y	Wind Suction Deflection	1.00	0.00 0.42

DEFLECTION LIMITATIONS

The 50 year deflection limit	= L / 90.0
The 50 year maximum deflection	= 3.54"

* Deflection limitations were applied to combinations 3-4

ERROR MESSAGES

* Warning! Overstressed in Moment (M)
 * Warning! Overstressed in Tension & Bending (T&M)
 * Warning! Overstressed in Compression & Bending (P&M)

GENERAL NOTES

* '* Ends of laps are considered as brace points.'
 * '* Inflection points are considered brace points except for spans with discrete bracing.'
 * All calculations are in accordance with the 2016 North American Specification.

SYSTEM WEIGHT & COST

Total system weight =	417.82 lbs
Total system cost =	635.13 dollars

PURLIN PRODUCTION LIST

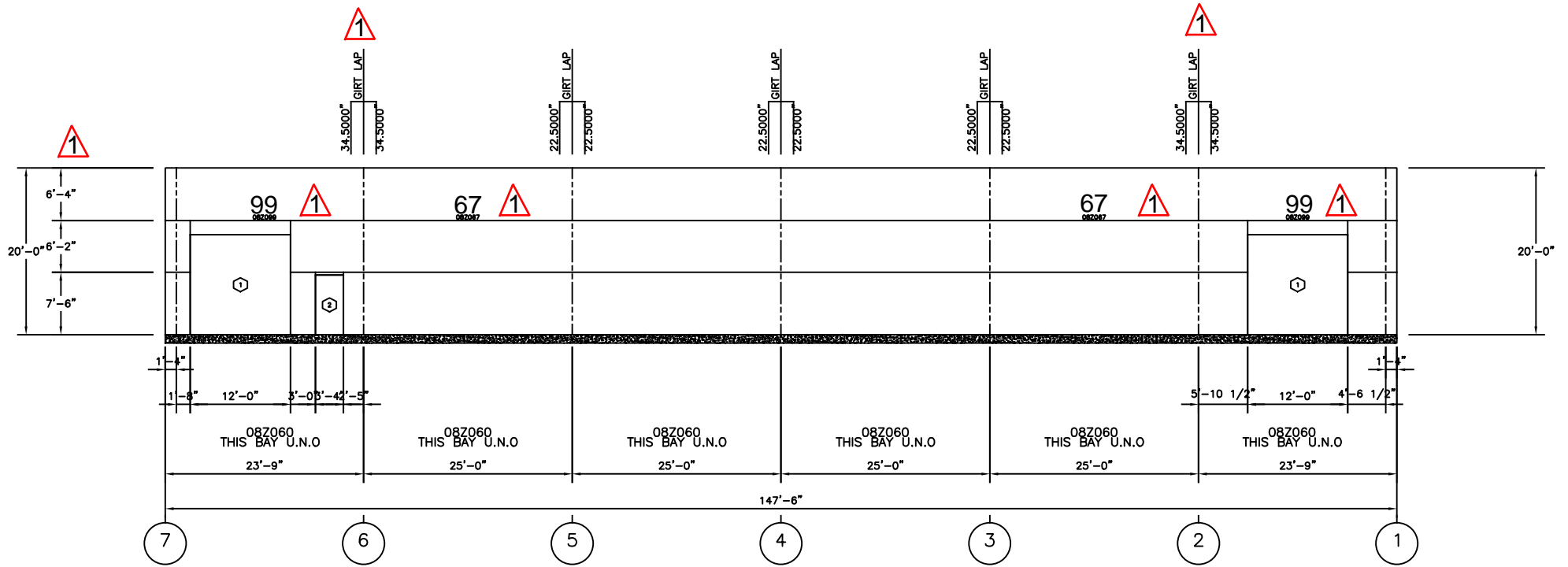
Purlin	Section	Length
1	08Z089	21.00
2	08Z067	18.42

3	08Z099	26.58
4	08Z089	22.33
5	08Z060	16.67

MATERIAL SUMMARY

Section	Weight	Cost	Fy
08Z060	47.83	76.19	55.0
08Z067	59.12	92.98	55.0
08Z089	184.60	277.64	55.0
08Z099	126.27	188.32	55.0



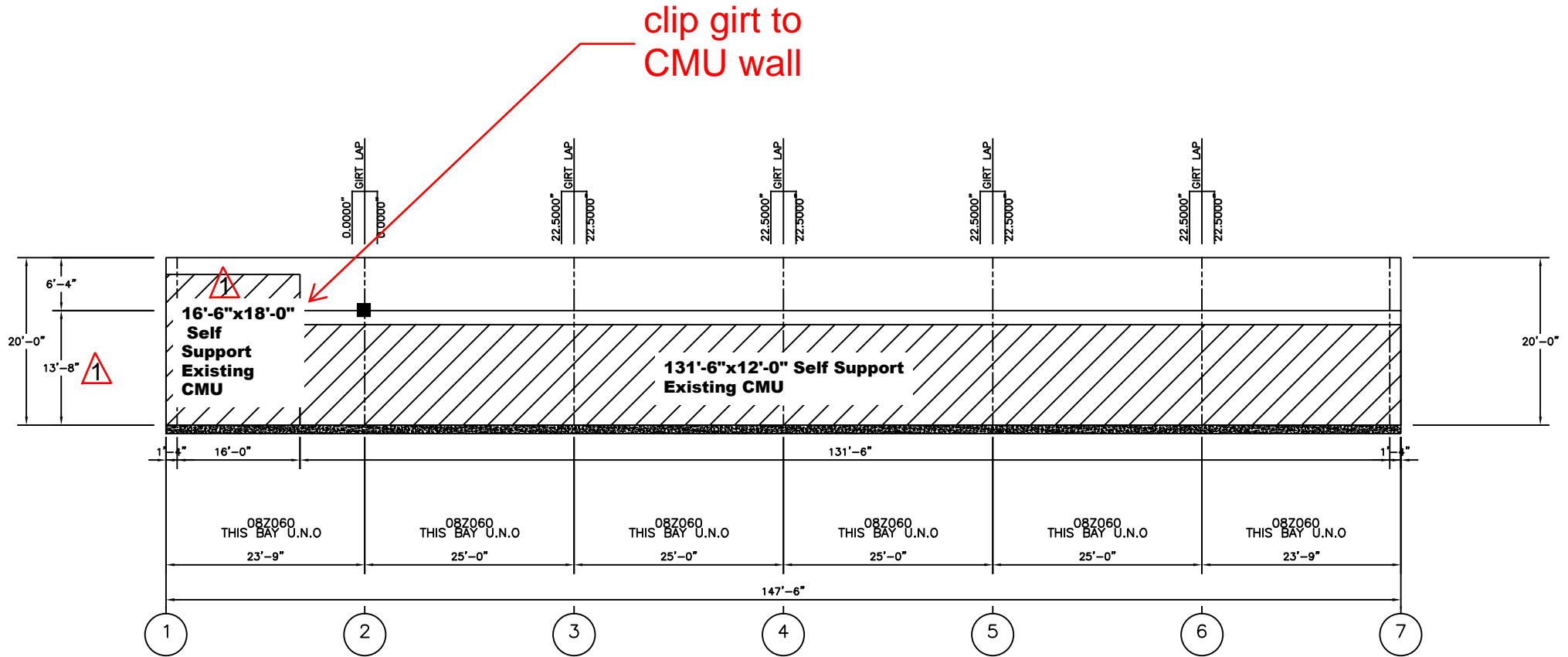


WALL ELEVATION, BSW - 1

Framed Opening Schedule									
ID	Qty	Width	Height	Header	Sill	Sill Height	Jambe Left	Jambe Right	Field / Factory
1	2	12'-0"	12'-0"	08C060			08C060	08C060	Factory
2	1	3'-4"	7'-2"	08C060			08C060	08C060	Factory

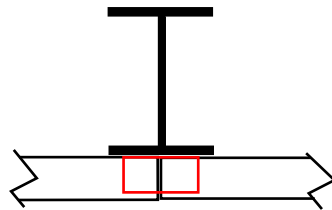


FO added & girt heights/gages



clip girt to
CMU wall

WALL ELEVATION, FSW - 1
 1 Girt heights and wall deletions updated

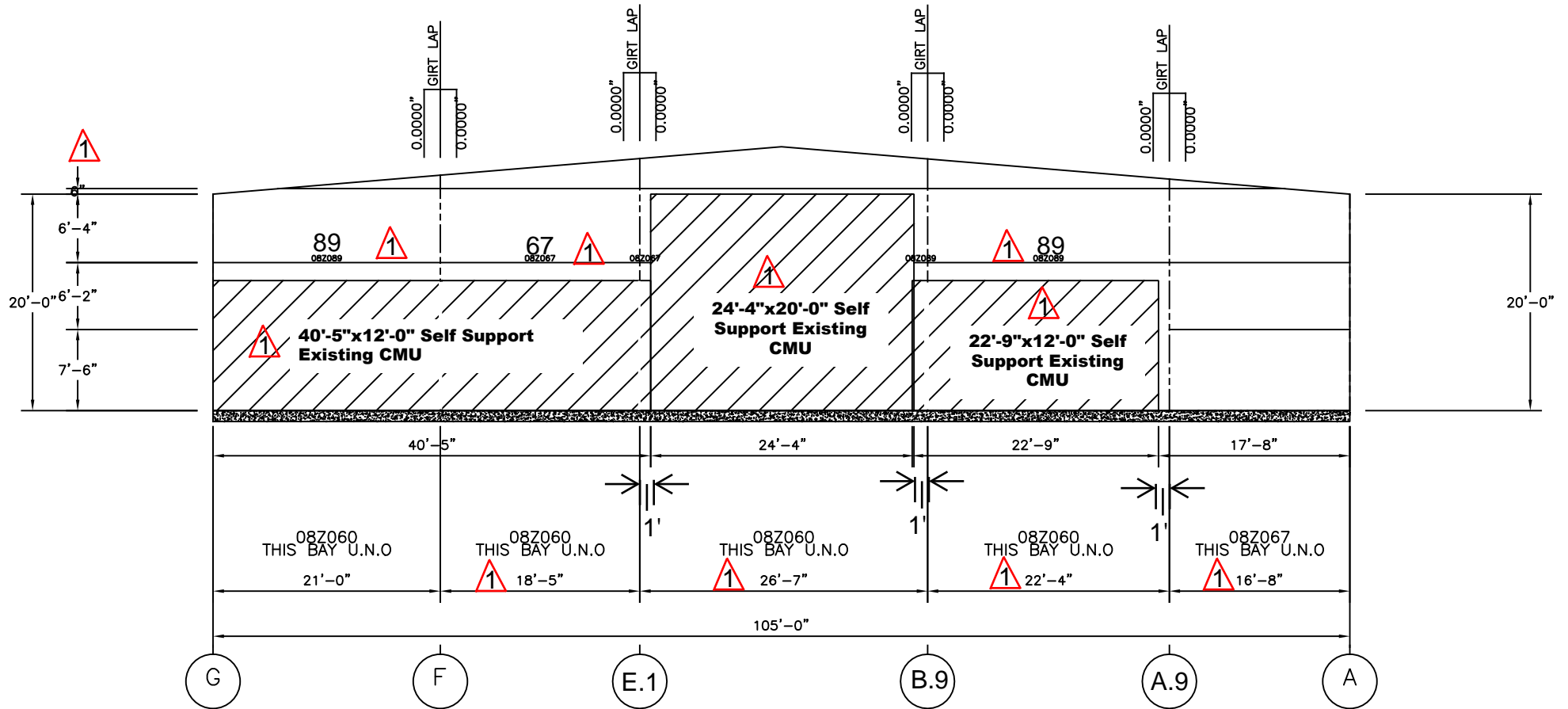


1 ■ Do not lap, pin connection,



1 Girt heights/gages, wall deletions, & post locations updated

Note: No girts or posts above wall deletion. Only panel.



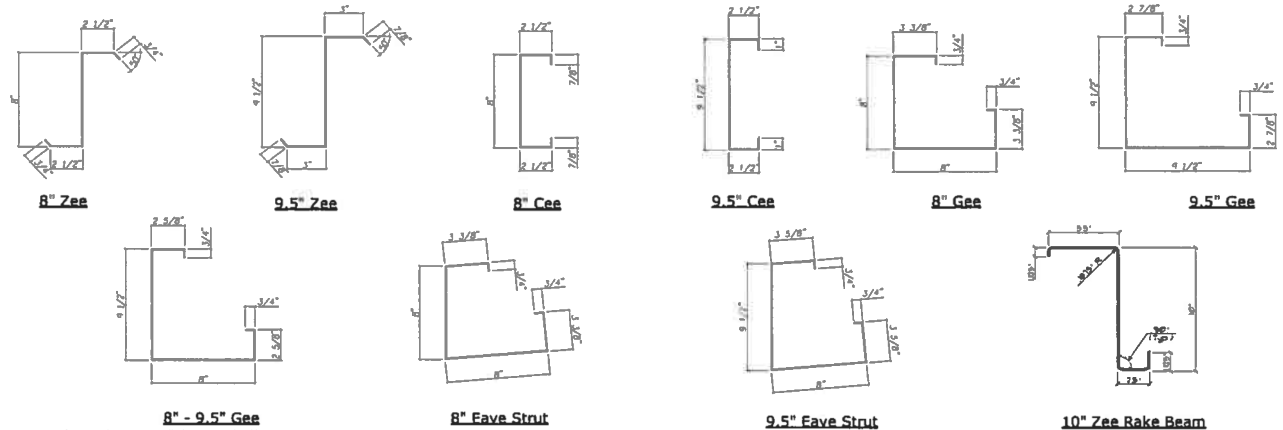
WALL ELEVATION, REW - 1

1 Girt heights/gages, wall deletions, & post locations updated

Note: Hang post @ C-F



8" & 9.5" COLD-FORMED MEMBER SECTION PROPERTIES



Note: Inside Radius 0.25" (Typical all Members).

SECTION PROPERTIES

Size	T In	W lb/ft	A _g In ²	A _n In ²	I _{xx} In ⁴	I _{xx-Defn} In ⁴	S _{xx} In ³	M _a k-in	M _a k-ft	V _a k
ZEE										
8 Z 16	0.060	2.87	0.84	0.45	7.36	8.09	1.74	57.25	4.77	2.60
8 Z 15	0.067	3.20	0.94	0.53	8.27	8.99	1.97	64.74	5.39	3.63
8 Z 14	0.075	3.59	1.05	0.64	9.42	10.02	2.27	74.69	6.22	5.11
8 Z 13	0.089	4.26	1.25	0.84	11.45	11.80	2.81	92.45	7.70	8.57
8 Z 12	0.099	4.73	1.39	0.98	12.79	13.05	3.15	103.87	8.66	10.82
9.5 Z 15	0.067	3.82	1.12	0.57	13.44	15.28	2.61	85.96	7.16	3.02
9.5 Z 14	0.075	4.27	1.26	0.67	15.49	17.04	3.08	101.54	8.46	4.24
9.5 Z 13	0.089	5.07	1.49	0.87	18.65	20.78	3.75	123.60	10.30	7.11
9.5 Z 12	0.099	5.64	1.66	1.05	21.17	22.24	4.32	142.28	11.86	9.81
CEE										
8 C 16	0.060	2.87	0.84	0.48	7.47	7.94	1.80	59.27	4.94	2.60
8 C 15	0.067	3.20	0.94	0.56	8.42	8.82	2.05	67.38	5.62	3.63
8 C 14	0.075	3.59	1.05	0.71	9.75	9.81	2.37	78.12	6.51	5.11
8 C 13	0.089	4.26	1.25	0.89	11.52	11.53	2.88	94.85	7.90	8.57
8 C 12	0.099	4.73	1.39	1.02	12.73	12.73	3.18	104.83	8.74	10.82
9.5 C 15	0.067	3.59	1.05	0.62	13.28	13.53	2.76	91.10	7.59	3.02
9.5 C 14	0.075	4.26	1.25	0.71	15.06	15.68	3.06	100.75	8.40	4.24
9.5 C 13	0.089	5.03	1.48	0.93	18.21	18.81	3.76	123.80	10.32	7.11
9.5 C 12	0.099	5.25	1.54	1.06	19.59	19.59	4.13	135.81	11.32	9.81
GEE										
GP 8X8X16 (Gravity, +ve)	0.060	4.76	1.41	0.64	9.82	11.14	4.13	57.54	4.80	3.58
(Uplift, -ve)	-	-	-	-	9.75	10.48	2.34	77.02	6.42	-
GP 9.5X9.5X14 (Gravity, +ve)	0.075	6.44	1.89	0.90	19.17	22.17	7.43	91.90	7.66	5.30
(Uplift, -ve)	-	-	-	-	18.66	19.96	3.82	114.28	9.52	-
GPX 8X9.5X16 (Gravity, +ve)	0.060	4.76	1.41	0.63	13.64	15.75	5.20	65.29	5.44	2.65
(Uplift, -ve)	-	-	-	-	13.74	14.71	2.62	86.46	7.21	-
EAVE STRUT										
GE 8X8X16 1:12 (Gravity, +ve)	0.060	4.76	1.41	0.64	9.36	10.65	1.68	55.56	4.63	3.59
(Uplift, -ve)	-	-	-	-	9.29	9.93	2.20	72.06	6.01	-
GE 8X8X16 4:12 (Gravity, +ve)	0.060	4.75	1.40	0.64	8.79	9.56	1.63	53.74	4.48	3.86
(Uplift, -ve)	-	-	-	-	8.25	8.98	1.81	59.72	4.98	-
GE 9.5X8X14 1:12 (Gravity, +ve)	0.075	6.44	1.89	0.92	18.28	20.87	2.81	92.54	7.71	5.69
(Uplift, -ve)	-	-	-	-	18.98	20.24	3.65	120.20	10.02	-
GE 9.5X8X14 4:12 (Gravity, +ve)	0.075	6.42	1.89	0.92	17.01	18.57	2.65	87.35	7.28	6.05
(Uplift, -ve)	-	-	-	-	17.38	18.40	3.20	105.46	8.79	-
ZEE RAKE BEAM										
ER 10X14 (Gravity, +ve)	0.075	4.96	1.46	0.76	18.04	19.59	3.68	116.64	9.72	4.02
(Uplift, -ve)	-	-	-	-	20.65	22.03	3.43	112.83	9.40	-
EH 10X12 (Gravity, +ve)	0.102	6.70	1.97	1.18	25.30	27.36	5.30	159.23	13.27	10.16
(Uplift, -ve)	-	-	-	-	29.53	29.53	4.83	168.60	14.05	-

Notes -

1. Section properties are calculated in accordance with the 2012 North American Specification for the Design of Cold-Formed Steel Members. $F_y = 55$ ksi.
2. Bending allowables shown may be utilized for members having the compression flange continuously fastened to sheathing.
3. Effective section properties are calculated at yield stress of $F_y = 55$ ksi. Deflection Moment of Inertia, $I_{xx-Defn}$ is calculated at working stress level of $0.6 F_y$.



STEEL BUILDINGS
A **NUCOR** Company

Sheet :	E - 1
Job # :	C22B0182A
Date :	3-Nov-22
By :	VP

1 @ 1/ A.8 & 7/A.9

ENDWALL POST DESIGN - LINE ~~1&7~~

Column/End Post Design

1 End posts added

Horizontal Loads

Column Length = 21.40 ft
Trib. Width = 8.80 ft

Effective Wind Area Horizontal = 188.32 ft²

GC_p = -0.79

GC_{pi} = -0.18

Wind, WL:

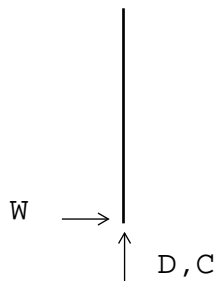
q_h = 23.75 psf

WL = -22.97 psf


w_{0.6WL} = (0.6WL) x Trib. Width
= 0.6(-23.0) x 8.8ft
= -121 plf

Max. Shear, V = (w x L) / 2
= (-121.3 x 21.4 ft) / 2
= **1.30 k**

Max. Moment, M = (w x L²) / 8
= (-121.3 x 21.4 ft²) / 8
= **6.94 k-ft**



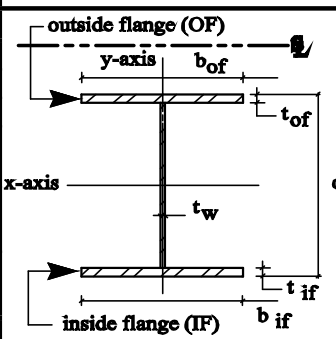
D=5.0psf(8.8ft)(12.6ft)=0.55k~0.6k
C=5.0psf(8.8ft)(12.6ft)=0.55k~0.6k
W_n=23.75psf(8.8ft)(21.4ft/2)=2.24k~2.5k

 End posts added

Project No. : C22B0182A
Description : Rob Kerth Ice Land- WP
Engineer : VP
Date : 11/3/2022
BEAM-COLUMN S.S. (AISC 15th Edition)**MAIN REPORT: DESIGN SUMMARY**

Version: 2018.09.12 (Date: 09/12/18) By NBG-GS


**Use 3/8" BP w/ (2)
 3/4" AB w/ AC-21 @
 top**

GENERAL INFORMATION (<i>ENTER DATA IN GRAY SHADED CELLS!</i>)			Span and Loading Conditions				Remarks
			WP				
Member Length	L _{bx}	ft.	21.40				Assumes L _{bx} = L
Unbraced Length - Minor	L _{by}	ft.	7.50				
Consideration of <i>Tension Field Action</i> for Shear			FALSE	FALSE	FALSE	FALSE	<= See cell comment & Chapter G.
Clear Distance between Transverse Stiffeners	a	in.					<= See cell comment & Section G2.
Lateral-torsional buckling factor	C _b		1.000	1.000	1.000	1.000	<= See cell comment
K _x Factor	K _x		1.000	1.000	1.000	1.000	<= See cell comment
K _y Factor	K _y		1.000	1.000	1.000	1.000	
K _z Factor	K _z		1.000	1.000	1.000	1.000	
SECTION GEOMETRY							
Select Wide-flange or Built-up Section:			WF	None	None	None	
Section Description:			W8X10	--	--	--	
Enter WF-Section:			W8X10				
Total Depth	d	in.	7.890	--	--	--	
Web Thickness	t _w	in.	0.170	--	--	--	
Outside Flange Width	b _{of}	in.	3.940	--	--	--	
Outside Flange Thickness	t _{of}	in.	0.205	--	--	--	
Inside Flange Width	b _{if}	in.	3.940	--	--	--	
Inside Flange Thickness	t _{if}	in.	0.205	--	--	--	
MATERIAL INFORMATION							
Material Strength	F _y	ksi	50	50	50	55	
Elastic Modulus	E	ksi	29,000	29,000	29,000	29,000	Standard for steel shown
Shear Modulus	G	ksi	11,200	11,200	11,200	11,200	Standard for steel shown
Flange Yield Strength	F _{yf}	ksi	50	50	50	55	
Web Yield Strength	F _{yw}	ksi	50	50	50	55	
Ultimate Strength	F _u	ksi	65	65	65	70	
APPLIED LOADS				<input type="checkbox"/> Applied Loading includes second order effects.			
Factor of Safety (Allowable Stress Factor)	S _f		1.000	1.000	1.000	1.000	
Axial (compression => + pos., tension => - neg.)	P _a	kips	0.000				
Shear (absolute value)	V _x	kips	1.300				Major Axis (x-axis)
Moment (outside flange in compression => + pos.)	M _x	ft-kip	6.940				
Shear (absolute value)	V _y	kips					Minor Axis (y-axis)
Moment (absolute value)	M _y	ft-kip					

Design Results:	ASD	OK	--	--	--	Remarks
ASD Combined Strength Ratio	CSR	0.464	--	--	--	Eq. H1-1a or H1-1b
ASD Shear Strength Ratio (x-axis)	V_{rx}/V_{cx}	0.056	--	--	--	Major Axis (x-axis)
ASD Shear Strength Ratio (y-axis)	V_{ry}/V_{cy}	0.000	--	--	--	Minor Axis (y-axis)

Deflection Results (Major-axis)	OK	--	--	--	Remarks
Deflection Limits (about x-axis)	L / 180	L / 180	L / 180	L / 180	Limits as numerals (i.e. 360 = L/360)
Maximum Deflection (about x-axis)	Δ_{max}	1.427 in.	0.000 in.	0.000 in.	0.000 in.
Member Deflection (about x-axis)	Δ_{x-axis}	0.640 in.	--	--	--

Deflection Results (Minor-axis)	OK	--	--	--	Remarks
Deflection Limits (about y-axis)	L / 180	L / 180	L / 180	L / 180	Limits as numerals (i.e. 360 = L/360)
Maximum Deflection (about y-axis)	Δ_{max}	1.427 in.	0.000 in.	0.000 in.	0.000 in.
Member Deflection (about y-axis)	Δ_{y-axis}	0.000 in.	--	--	--

NUCOR BUILDINGS GROUP

Job # : C22B0182A
 Job Name : Nucor Buildings Group
 Frame : E01
 Date : 8/23/2022
 Designer : BG\Viviana.Perez
 File : E01.nfr
 App Version : 1.6.127.0

 F R A M E D E S C R I P T I O N

Frame type : RCG
 Frame width : 105.00 Ft.
 Bay width : 12.60 Ft.

	LEFT	RIGHT		
Dim to ridge :	52.50 Ft.	52.50 Ft.		
Roof slope :	1.00/12	-1.00/12		
Eave height :	20.00 Ft.	20.00 Ft.		
Girt offset :	12.00 In.	8.00 In.	Typ. Girt spacing :	5.00 Ft.
Purlin offset :	8.00 In.	8.00 In.	Typ. Purlin spacing:	5.00 Ft.

Col. spacing : 105.0000

Supports / Spring Constants

COL01 - Bottom V H
 COL02 - Bottom V H

Column Bracing:

WP1 Girt Brace : Y
 Flange Brace : 1
 Location (ft): 13.5

 WP2 Girt Brace : Y Y
 Flange Brace : 1 1
 Location (ft): 7.3 13.5

Other Braces:

Column :
 Left Brace :
 Right Brace :
 Location (ft):

 L O A D I N G C O N D I T I O N S

Building Code & Year : IBC2018
 Risk Category : III-Substantial Hazard
 AISC Specification : 2016 ASD

L O A D S (Psf)

Roof Dead load : 2.50
 Roof Coll load : 5.00
 Roof Live load : 12.00
 Roof Snow load : 0.00
 Floor dead load : 0.00
 Floor live load : 0.00
 Ground Snow load: 0.00 Ce = 1.00
 Ss = 0.539 S1 = 0.246 Seismic Design Category = D Site Class = D
 R = 3.50 Cd = 3.00 Sds = 0.492 Sd1 = 0.346 rho = 1.30 omega = 2.500

Is Building Irregular = False

Roof Seismic Factor : 0.176 PSF
 Floor Seismic Factor : 0.176 PSF

Wind speed : 110.00 Mph Exp. : C
 Wind pressure : 23.75 Psf

Building is Enclosed

FRAME LINE 1,7

F-2

Wind pressure coefficients Is End Bay? True

	C1	C2E	C2	C3	C3E	C4
W1R	0.790	0.000	-0.890	-0.350	0.000	-0.250
W1L	-0.250	0.000	-0.350	-0.890	0.000	0.790
W2R	0.430	0.000	-1.250	-0.710	0.000	-0.610
W2L	-0.610	0.000	-0.710	-1.250	0.000	0.430
W5B	-0.300	0.000	-0.890	-0.350	0.000	-0.300
W5F	-0.300	0.000	-0.350	-0.890	0.000	-0.300
W6B	-0.660	0.000	-1.250	-0.710	0.000	-0.660
W6F	-0.660	0.000	-0.710	-1.250	0.000	-0.660

Tributary Widths

Panel Trib. Width (ft)

WP1	12.60
WP2	12.60
RP1	12.60
RP2	12.60

P R O G R A M - A P P L I E D L O A D S

Panel Loads

Load Case	On Panel	Start Load Klf	End Load Klf	Start Loc Ft.	End Loc
RDL	RP1	-0.032	-0.032	0.000	52.500
RDL	RP2	-0.032	-0.032	52.500	105.000
COL	RP1	-0.063	-0.063	0.000	52.500
COL	RP2	-0.063	-0.063	52.500	105.000
RLL	RP1	-0.151	-0.151	0.000	52.500
RLR	RP2	-0.151	-0.151	52.500	105.000
W1R	WP1	0.236	0.236	0.000	20.000
W1R	WP2	0.075	0.075	0.000	20.000
W1R	RP1	-0.266	-0.266	0.000	52.500
W1R	RP2	-0.105	-0.105	52.500	105.000
W1L	WP1	-0.075	-0.075	0.000	20.000
W1L	WP2	-0.236	-0.236	0.000	20.000
W1L	RP1	-0.105	-0.105	0.000	52.500
W1L	RP2	-0.266	-0.266	52.500	105.000
W2R	WP1	0.129	0.129	0.000	20.000
W2R	WP2	0.183	0.183	0.000	20.000
W2R	RP1	-0.374	-0.374	0.000	52.500
W2R	RP2	-0.212	-0.212	52.500	105.000
W2L	WP1	-0.183	-0.183	0.000	20.000
W2L	WP2	-0.129	-0.129	0.000	20.000
W2L	RP1	-0.212	-0.212	0.000	52.500
W2L	RP2	-0.374	-0.374	52.500	105.000
W5B	WP1	-0.090	-0.090	0.000	20.000
W5B	WP2	0.090	0.090	0.000	20.000
W5B	RP1	-0.266	-0.266	0.000	52.500
W5B	RP2	-0.105	-0.105	52.500	105.000
W5F	WP1	-0.090	-0.090	0.000	20.000
W5F	WP2	0.090	0.090	0.000	20.000
W5F	RP1	-0.105	-0.105	0.000	52.500
W5F	RP2	-0.266	-0.266	52.500	105.000
W6B	WP1	-0.197	-0.197	0.000	20.000
W6B	WP2	0.197	0.197	0.000	20.000
W6B	RP1	-0.374	-0.374	0.000	52.500
W6B	RP2	-0.212	-0.212	52.500	105.000
W6F	WP1	-0.197	-0.197	0.000	20.000
W6F	WP2	0.197	0.197	0.000	20.000
W6F	RP1	-0.212	-0.212	0.000	52.500
W6F	RP2	-0.374	-0.374	52.500	105.000
EQR	RP1	0.030	0.030	0.000	52.500
EQR	RP2	0.030	0.030	52.500	105.000
EQL	RP1	-0.030	-0.030	0.000	52.500
EQL	RP2	-0.030	-0.030	52.500	105.000

U S E R - A P P L I E D L O A D S

Shear loads that are applied perpendicular to the web have been considered in the baseplate design only. The locations listed below for each longitudinal bracing load apply only to the column axial load (tension on base of column and compression when at top of column).

Load Case	On Mem	Hor. Kips	Vert. Kips	Perp Shear Kips	Moment K-Ft.	Loc Ft.	Special Load #	Description
RDL	SPAN1	0.000	-0.600	0.000	0.000	21.000	C-1	Hang Post
RDL	SPAN1	0.000	-0.750	0.000	0.000	42.000	C-3	Hang Post
RDL	SPAN2	0.000	-0.750	0.000	0.000	63.000	C-4	Hang Post
RDL	SPAN2	0.000	-0.600	0.000	0.000	84.000	C-2	Hang Post

L O A D C O M B I N A T I O N S

ASR Cases

- 1) 1.00 SW+RDL+COL+NLL
- 2) 1.00 SW+RDL+COL+NLR
- 3) 1.00 SW+RDL+COL+RLL+RLR+NLL
- 4) 1.00 SW+RDL+COL+RLL+RLR+NLR
- 5) 1.00 SW+RDL+COL+0.60W1L
- 6) 1.00 SW+RDL+COL+0.60W2L
- 7) 1.00 SW+RDL+COL+0.60W1R
- 8) 1.00 SW+RDL+COL+0.60W2R
- 9) 1.00 0.60SW+0.60RDL+0.60W1L
- 10) 1.00 0.60SW+0.60RDL+0.60W2L
- 11) 1.00 0.60SW+0.60RDL+0.60W1R
- 12) 1.00 0.60SW+0.60RDL+0.60W2R
- 13) 1.00 SW+RDL+COL+0.75RLL+0.75RLR+0.45W1L
- 14) 1.00 SW+RDL+COL+0.75RLL+0.75RLR+0.45W2L
- 15) 1.00 SW+RDL+COL+0.75RLL+0.75RLR+0.45W1R
- 16) 1.00 SW+RDL+COL+0.75RLL+0.75RLR+0.45W2R
- 17) 1.00 SW+RDL+COL+0.60W5B
- 18) 1.00 SW+RDL+COL+0.60W6B
- 19) 1.00 SW+RDL+COL+0.60W5F
- 20) 1.00 SW+RDL+COL+0.60W6F
- 21) 1.00 0.60SW+0.60RDL+0.60W5B
- 22) 1.00 0.60SW+0.60RDL+0.60W6B
- 23) 1.00 0.60SW+0.60RDL+0.60W5F
- 24) 1.00 0.60SW+0.60RDL+0.60W6F
- 25) 1.00 SW+RDL+COL+0.75RLL+0.75RLR+0.45W5B
- 26) 1.00 SW+RDL+COL+0.75RLL+0.75RLR+0.45W6B
- 27) 1.00 SW+RDL+COL+0.75RLL+0.75RLR+0.45W5F
- 28) 1.00 SW+RDL+COL+0.75RLL+0.75RLR+0.45W6F
- 29) 1.00 1.07SW+1.07RDL+1.07COL+0.91EQL
- 30) 1.00 1.07SW+1.07RDL+1.07COL+0.91EQR
- 31) 1.00 1.05SW+1.05RDL+1.05COL+0.68EQL
- 32) 1.00 1.05SW+1.05RDL+1.05COL+0.68EQR
- 33) 1.00 0.53SW+0.53RDL+0.91EQL
- 34) 1.00 0.53SW+0.53RDL+0.91EQR

FRAME LINE 1,7

F-4

Job : C22B0182A Nucor Buildings Group
Frame: E01

NUCOR BUILDINGS GROUP

Date: 08-29-22
By : BG\Viviana.Perez

Page: 1
File: E01

*** DESIGN SUMMARY REPORT ***

Built Up Rafter - RAF01

Section	T/L Mat'l	B/R Flange	Web Mat'l	Load Comb	Loc	Axial Kips	Axial Ratio	Moment Ft-kip	T/L Bend Ratio	B/R Bend Ratio	Max Unity Check	Load Comb	Loc	Force Kips	SHEAR Shear Ratio	Flow T/L (k/in)	B/R
1	F6.31	F6.38	W188	3	1	-15.4	0.13	-216.1	0.71	0.83	0.89	3	1	12.81	0.32	0.23	0.26

Chkpt 1 5
Depth 36.69 28.69
Section | 1 |

| width thick Fy |

T/L Flg | 6.0 0.3125 55.00 |
Web | 0.1875 55.00 |
B/R Flg | 6.0 0.3750 55.00 |

Built Up Rafter - RAF02

Section	T/L Mat'l	B/R Flange	Web Mat'l	Load Comb	Loc	Axial Kips	Axial Ratio	Moment Ft-kip	T/L Bend Ratio	B/R Bend Ratio	Max Unity Check	Load Comb	Loc	Force Kips	SHEAR Shear Ratio	Flow T/L (k/in)	B/R
1	F5.25	F5.25	W135	4	12	-14.2	0.41	74.0	0.66	0.52	1.00	3	6	9.23	0.44	0.22	0.22
2	F5.25	F5.25	W188	4	16	-14.0	0.36	94.1	0.68	0.58	0.97	3	13	3.34	0.08	0.07	0.07

Chkpt 6 12 13 18
Depth 28.50 28.50 28.50
Section | 1 | 2 |

| width thick Fy | width thick Fy |

T/L Flg | 5.0 0.2500 55.00 | 5.0 0.2500 55.00 |
Web | 0.1345 55.00 | 0.1875 55.00 |
B/R Flg | 5.0 0.2500 55.00 | 5.0 0.2500 55.00 |

Built Up Rafter - RAF03

Section	T/L Mat'l	B/R Flange	Web Mat'l	Load Comb	Loc	Axial Kips	Axial Ratio	Moment Ft-kip	T/L Bend Ratio	B/R Bend Ratio	Max Unity Check	Load Comb	Loc	Force Kips	SHEAR Shear Ratio	Flow T/L (k/in)	B/R
1	F5.25	F5.25	W188	3	21	-14.0	0.36	94.6	0.68	0.58	0.97	4	24	-3.25	0.08	0.07	0.07
2	F5.25	F5.25	W135	3	25	-14.2	0.41	75.3	0.67	0.52	1.01	4	31	-9.14	0.44	0.22	0.22

Chkpt 19 24 25 31
Depth 28.50 28.50 28.50
Section | 1 | 2 |

| width thick Fy | width thick Fy |

T/L Flg | 5.0 0.2500 55.00 | 5.0 0.2500 55.00 |
Web | 0.1875 55.00 | 0.1345 55.00 |
B/R Flg | 5.0 0.2500 55.00 | 5.0 0.2500 55.00 |

Built Up Rafter - RAF04

Section	T/L Mat'l	B/R Flange	Web Mat'l	Load Comb	Loc	Axial Kips	Axial Ratio	Moment Ft-kip	T/L Bend Ratio	B/R Bend Ratio	Max Unity Check	Load Comb	Loc	Force Kips	SHEAR Shear Ratio	Flow T/L (k/in)	B/R
1	F6.25	F6.31	W188	4	36	-15.3	0.16	-215.9	0.81	0.95	1.03	4	36	-12.71	0.31	0.21	0.24

Chkpt 32 36
Depth 28.56 36.56
Section | 1 |

| width thick Fy |

T/L Flg | 6.0 0.2500 55.00 |
Web | 0.1875 55.00 |
B/R Flg | 6.0 0.3125 55.00 |

Built Up Column - COL01

Section	T/L Mat'l	B/R Flange	Web Mat'l	Load Comb	Loc	Axial Kips	Axial Ratio	Moment Ft-kip	T/L Bend Ratio	B/R Bend Ratio	Max Unity Check	Load Comb	Loc	Force Kips	SHEAR Shear Ratio	Flow T/L (k/in)	B/R
1	F8.25	F8.31	W188	3	42	-16.5	0.11	-215.4	0.71	0.84	0.90	3	42	-12.93	0.32	0.92	0.99

Chkpt 37 42
Depth 12.00 35.56
Section | 1 |

| width thick Fy |

T/L Flg | 8.0 0.2500 55.00 |
Web | 0.1875 55.00 |
B/R Flg | 8.0 0.3125 55.00 |

FRAME LINE 1,7

F-5

Built Up Column - COL02

Section	T/L Flange	B/R Flange	Web	Load Comb	Loc	Axial Kips	Axial Ratio	Moment Ft-kip	T/L Bend Ratio	B/R Bend Ratio	Max Unity Check	-----		SHEAR		-----	
	Mat'l	Mat'l	Mat'l									Load Comb	Loc	Force Kips	Shear Ratio	Flow T/L	(k/in) B/R
1	F8.31	F8.25	W188	4	49	-16.4	0.11	215.6	0.84	0.71	0.90	4	49	12.94	0.32	0.99	0.92

Chkpt 43 49
Depth 12.00 35.56
Section | 1 |

| width thick Fy |

T/L Flg | 8.0 0.3125 55.00 |
Web | 0.1875 55.00 |
B/R Flg | 8.0 0.2500 55.00 |

Frame Weight (lbs) = 3569

Deflections (in):

10 yr Wind dx = -0.47 = H/ 422 LONG. WIND 2 TO BACK
Seismic dx = 0.59 = H/ 337 SEISMIC TO RIGHT
Story Drift = 1.42 = 0.007H SEISMIC TO RIGHT
Stability Coefficient = 0.01 1.07SW+1.07RDL+1.07COL+0.91EQR
Stability Ratio = 0.04 1.07SW+1.07RDL+1.07COL+0.91EQR
Fundamental Period = 0.5575 Single Story Period
Maximum dx = 0.77 = H/ 256 1.07SW+1.07RDL+1.07COL+0.91EQR
Maximum dy = -4.44 = L/ 270 @ MOD 1, SW+RDL+COL+RLL+RLR
Max. Live dy = -2.20 = L/ 545 @ MOD 1, LIVE ON LEFT AND RIGHT

Job # : C22B0182A

File : E01.nfr

App Version : 1.6.127.0

Job Name : Nucor Buildings Group

Designer : BG\Viviana.Perez

Date : 8/23/2022

Frame : E01

BOLTED END-PLATES (BEP) SUMMARY

Bolt Pre Tension Method : TurnOfNut

PLATE SIZE: (in)

Splice ID	Left Type	Right Type	Members Joined	Loc	Web Depth	Left Plate				Right Plate			
						Width	Thick	Length	Fy(ksi)	Width	Thick	Length	Fy(ksi)
1	6E	6E	COL01 To RAF01	Top	36.00	8.00	0.50	42.00	55.0	6.00	0.50	42.00	55.0
1	6E	6E	COL01 To RAF01	Bot	36.00	8.00	0.50	42.00	55.0	6.00	0.50	42.00	55.0
2	4E	4E	RAF01 To RAF02	Top	28.00	6.00	0.38	34.00	55.0	6.00	0.38	34.00	55.0
2	4E	4E	RAF01 To RAF02	Bot	28.00	6.00	0.38	34.00	55.0	6.00	0.38	34.00	55.0
3	4E	4E	RAF02 To RAF03	Top	28.00	6.00	0.38	33.85	55.0	6.00	0.38	33.85	55.0
3	4E	4E	RAF02 To RAF03	Bot	28.00	6.00	0.38	33.85	55.0	6.00	0.38	33.85	55.0
4	4E	4E	RAF03 To RAF04	Top	28.00	6.00	0.38	33.75	55.0	6.00	0.38	33.75	55.0
4	4E	4E	RAF03 To RAF04	Bot	28.00	6.00	0.38	33.75	55.0	6.00	0.38	33.75	55.0
5	6E	6E	RAF04 To COL02	Top	36.00	6.00	0.50	42.00	55.0	8.00	0.50	42.00	55.0
5	6E	6E	RAF04 To COL02	Bot	36.00	6.00	0.50	42.00	55.0	8.00	0.50	42.00	55.0

PLATE DESIGN

Splice ID	Left Type	Right Type	Tension Location	Load Comb	Max Moment			Load Comb	Max Shear			Left Plate Ratio	Right Plate Ratio
					Axial (kip)	Shear (kip)	Moment (ft-kip)		Axial (kip)	Shear (kip)	Moment (ft-kip)		
1	6E	6E	Top	2	-13.87	14.41	-216.09	10	5.47	-7.25	94.58	0.74	0.88
1	6E	6E	Bot	10	5.47	-7.25	94.58	2	-13.87	14.41	-216.09	0.38	0.46
2	4E	4E	Top	2	-14.69	9.25	-59.63	10	6.10	-4.13	18.52	0.50	0.51
2	4E	4E	Bot	22	7.30	-3.06	37.30	2	-14.69	9.25	-59.63	0.54	0.56
3	4E	4E	Top	8	6.37	-0.98	-34.15	15	-0.88	1.33	13.76	0.49	0.49
3	4E	4E	Bot	2	-13.87	0.03	92.34	22	7.38	-1.34	-31.59	0.89	0.89
4	4E	4E	Top	2	-14.68	-9.16	-56.55	8	6.11	4.08	16.58	0.46	0.46
4	4E	4E	Bot	20	7.27	3.02	35.40	2	-14.68	-9.16	-56.55	0.52	0.51
5	6E	6E	Top	2	-13.87	-14.30	-215.92	8	5.48	7.22	94.39	0.89	0.74
5	6E	6E	Bot	8	5.48	7.22	94.39	2	-13.87	-14.30	-215.92	0.47	0.38

BOLT RUPTURE DESIGN

Splice ID	Left Type	Right Type	Loc	Bolt Type	Pre-Tension	Dia	Gage	Gage 2	Pfi	Pfo	Pf	Pb	de	Load Comb	Axial (kip)	Moment (ft-kip)	Left Bolt Ratio	Right Bolt Ratio
1	6E	6E	Top	A325	Yes	0.75	3.50	--	1.31	1.48	3.00	2.25	1.25	2	-13.87	-216.09	0.56	0.56
1	6E	6E	Bot	A325	Yes	0.75	3.50	--	1.31	1.31	3.00	2.25	1.25	10	5.47	94.58	0.29	0.29
2	4E	4E	Top	A325	Yes	0.75	3.50	--	1.25	1.44	3.00	--	1.25	2	-14.69	-59.63	0.22	0.23
2	4E	4E	Bot	A325	Yes	0.75	3.50	--	1.25	1.36	3.00	--	1.25	22	7.30	37.30	0.24	0.24
3	4E	4E	Top	A325	Yes	0.75	3.50	--	1.25	1.41	2.88	--	1.25	8	6.37	-34.15	0.22	0.22
3	4E	4E	Bot	A325	Yes	0.75	3.50	--	1.25	1.34	2.88	--	1.25	2	-13.87	92.34	0.40	0.40
4	4E	4E	Top	A325	Yes	0.75	3.50	--	1.25	1.38	2.88	--	1.25	2	-14.68	-56.55	0.21	0.21
4	4E	4E	Bot	A325	Yes	0.75	3.50	--	1.25	1.38	2.88	--	1.25	20	7.27	35.40	0.23	0.23
5	6E	6E	Top	A325	Yes	0.75	3.50	--	1.31	1.39	3.00	2.25	1.25	2	-13.87	-215.92	0.56	0.56
5	6E	6E	Bot	A325	Yes	0.75	3.50	--	1.31	1.44	3.00	2.25	1.25	8	5.48	94.39	0.29	0.29

COMBINED BOLT BEARING SHEAR DESIGN

Splice ID	Left Type	Right Type	Loc	Bolt Type	Pre-Tension	Dia	Gage	Gage 2	Pfi	Pfo	Pf	Pb	de	Load Comb	Shear (kip)	Left Bolt	Right Bolt
																Ratio	Ratio
1	6E	6E	Top	A325	Yes	0.75	3.50	--	1.31	1.48	3.00	2.25	1.25	10	-7.25	0.10	0.10
1	6E	6E	Bot	A325	Yes	0.75	3.50	--	1.31	1.31	3.00	2.25	1.25	2	14.41	0.20	0.20
2	4E	4E	Top	A325	Yes	0.75	3.50	--	1.25	1.44	3.00	--	1.25	10	-4.13	0.09	0.09

Splice ID	Left Type	Right Type	Bolt Loc	Bolt Type	Pre-Tension	Dia	Gage	Gage 2	Pfi	Pfo	Pf	Pb	de	Load Comb	Shear (kip)	Left Bolt Ratio	Right Bolt Ratio
2	4E	4E	Bot	A325	Yes	0.75	3.50	--	1.25	1.36	3.00	--	1.25	2	9.25	0.19	0.19
3	4E	4E	Top	A325	Yes	0.75	3.50	--	1.25	1.41	2.88	--	1.25	15	1.33	0.03	0.03
3	4E	4E	Bot	A325	Yes	0.75	3.50	--	1.25	1.34	2.88	--	1.25	22	-1.34	0.03	0.03
4	4E	4E	Top	A325	Yes	0.75	3.50	--	1.25	1.38	2.88	--	1.25	8	4.08	0.09	0.09
4	4E	4E	Bot	A325	Yes	0.75	3.50	--	1.25	1.38	2.88	--	1.25	2	-9.16	0.19	0.19
5	6E	6E	Top	A325	Yes	0.75	3.50	--	1.31	1.39	3.00	2.25	1.25	8	7.22	0.10	0.10
5	6E	6E	Bot	A325	Yes	0.75	3.50	--	1.31	1.44	3.00	2.25	1.25	2	-14.30	0.20	0.20

WELD DESIGN

Splice ID	Loc	Left								Right							
		Welds			Checks					Welds			Checks				
		Flg	Web	Stf	Load Comb	Tensile Rupture	Load Comb	Shear Rupture		Flg	Web	Stf	Load Comb	Tensile Rupture	Load Comb	Shear Rupture	
1	Top	FWD3	WP13		2	0.57	10	0.11		FWD3	WP13		2	0.78	10	0.11	
1	Bot	FWD3	WP13		10	0.30	2	0.21		FWD3	WP13		10	0.41	2	0.22	
2	Top	FWD3	WP13		2	0.26	10	0.08		FWD3	WP13		2	0.32	10	0.10	
2	Bot	FWD3	WP13		22	0.28	2	0.19		FWD3	WP13		22	0.35	2	0.23	
3	Top	FWD3	WP13		8	0.29	15	0.03		FWD3	WP13		8	0.29	15	0.03	
3	Bot	FWD3	WP13		2	0.52	22	0.03		FWD3	WP13		2	0.52	22	0.03	
4	Top	FWD3	WP13		2	0.30	8	0.10		FWD3	WP13		2	0.24	8	0.08	
4	Bot	FWD3	WP13		20	0.33	2	0.23		FWD3	WP13		20	0.27	2	0.19	
5	Top	FWD3	WP13		2	0.78	8	0.11		FWD3	WP13		2	0.57	8	0.11	
5	Bot	FWD3	WP13		8	0.41	2	0.22		FWD3	WP13		8	0.30	2	0.21	

BASEPLATE AND ANCHOR ROD DESIGN RESULTS

BASEPLATE AND ANCHOR ROD INFORMATION: (in)

Column ID	Column Type	Column Pattern	Column Depth	Base Plate					Anchor Rods					
				Width	Thickness	Length	Fy(ksi)		Qty	Dia.	Grade	Pfi	Pb	Gage
COL01	WF/BU	Left	12	10	0.625	12.0000	55		4	1.25	Grade36	4	5	5
COL02	WF/BU	Right	12	10	0.625	12.0000	55		4	1.25	Grade36	4	5	5

BASEPLATE DESIGN CHECKS

Column ID	Concrete Bearing (Compression)					Base Plate Yielding (Tension)				
	Load Comb	Axial (kip)	Shear (kip)	Bracing Shear (kip)	Design Ratio	Load Comb	Axial (kip)	Shear (kip)	Bracing Shear (kip)	Design Ratio
COL01	2	-16.22	-13.90	0.00	0.09	10	7.90	6.40	0.00	0.55
COL02	2	-16.08	13.84	0.00	0.09	8	7.87	-6.65	0.00	0.55

ANCHOR ROD SHEAR AND TENSION DESIGN CHECKS

Anchor Rod Tension Design						Anchor Rod Shear Design					Combined Tension-Shear Design					Combined Shear-Tension Design				
Column ID	Load Comb	Axial (kip)	Shear (kips)	Bracing Shear(kip)	Rod Ratio	Load Comb	Axial (kip)	Shear (kip)	Bracing Shear(kip)	Rod Ratio	Load Comb	Axial (kip)	Shear (kip)	Bracing Shear(kip)	Rod Ratio	Load Comb	Axial (kip)	Shear (kip)	Bracing Shear(kip)	Rod Ratio
COL01	10	7.90	6.40	0.00	0.07	2	-16.22	-13.90	0.00	0.22	10	7.90	6.40	0.00	0.07	2	-16.22	-13.90	0.00	0.22
COL02	8	7.87	-6.65	0.00	0.07	2	-16.08	13.84	0.00	0.22	8	7.87	-6.65	0.00	0.07	2	-16.08	13.84	0.00	0.22

BASEPLATE LEFT FLANGE WELD DESIGN CHECKS

Column ID	Left Flange Weld (Pipe Weld)						Web Weld						Right Flange Weld					
	Weld Size	Load Comb	Axial (kip)	Shear (kip)	Bracing Shear (kip)	Weld Ratio	Weld Size	Load Comb	Axial (kip)	Shear (kip)	Bracing Shear (kip)	Weld Ratio	Weld Size	Load Comb	Axial (kip)	Shear (kip)	Bracing Shear (kip)	Weld Ratio
COL01	FWS3	10	7.90	6.40	0.00	0.05	FWR3	2	-16.22	-13.90	0.00	0.31	FWS3	10	7.90	6.40	0.00	0.07
COL02	FWS3	8	7.87	-6.65	0.00	0.07	FWR3	2	-16.08	13.84	0.00	0.31	FWS3	8	7.87	-6.65	0.00	0.05

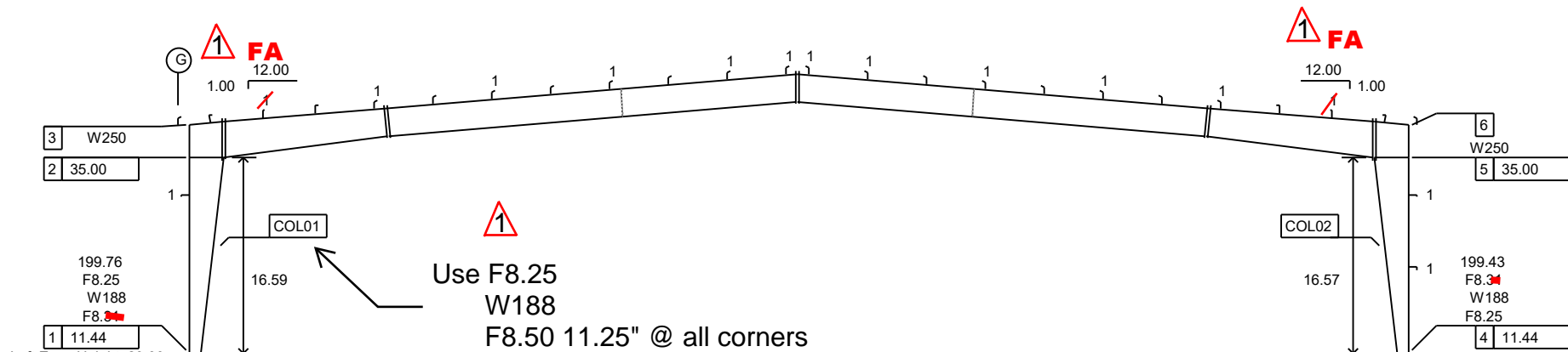
No	ASR	Combination
1	1.00	1.00SW+1.00RDL+1.00COL
2	1.00	1.00SW+1.00RDL+1.00COL+1.00RLL+1.00RLR
3	1.00	1.00SW+1.00RDL+1.00COL+0.60W1L
4	1.00	1.00SW+1.00RDL+1.00COL+0.60W2L
5	1.00	1.00SW+1.00RDL+1.00COL+0.60W1R
6	1.00	1.00SW+1.00RDL+1.00COL+0.60W2R
7	1.00	0.60SW+0.60RDL+0.60W1L
8	1.00	0.60SW+0.60RDL+0.60W2L
9	1.00	0.60SW+0.60RDL+0.60W1R
10	1.00	0.60SW+0.60RDL+0.60W2R
11	1.00	1.00SW+1.00RDL+1.00COL+0.75RLL+0.75RLR+0.45W1L
12	1.00	1.00SW+1.00RDL+1.00COL+0.75RLL+0.75RLR+0.45W2L
13	1.00	1.00SW+1.00RDL+1.00COL+0.75RLL+0.75RLR+0.45W1R
14	1.00	1.00SW+1.00RDL+1.00COL+0.75RLL+0.75RLR+0.45W2R
15	1.00	1.00SW+1.00RDL+1.00COL+0.60W5B
16	1.00	1.00SW+1.00RDL+1.00COL+0.60W6B
17	1.00	1.00SW+1.00RDL+1.00COL+0.60W5F
18	1.00	1.00SW+1.00RDL+1.00COL+0.60W6F
19	1.00	0.60SW+0.60RDL+0.60W5B
20	1.00	0.60SW+0.60RDL+0.60W6B
21	1.00	0.60SW+0.60RDL+0.60W5F
22	1.00	0.60SW+0.60RDL+0.60W6F
23	1.00	1.00SW+1.00RDL+1.00COL+0.75RLL+0.75RLR+0.45W5B
24	1.00	1.00SW+1.00RDL+1.00COL+0.75RLL+0.75RLR+0.45W6B
25	1.00	1.00SW+1.00RDL+1.00COL+0.75RLL+0.75RLR+0.45W5F
26	1.00	1.00SW+1.00RDL+1.00COL+0.75RLL+0.75RLR+0.45W6F
27	1.00	1.069SW+1.069RDL+1.069COL+0.91EQL
28	1.00	1.069SW+1.069RDL+1.069COL+0.91EQR
29	1.00	1.052SW+1.052RDL+1.052COL+0.682EQL
30	1.00	1.052SW+1.052RDL+1.052COL+0.682EQR
31	1.00	0.53SW+0.53RDL+0.91EQL
32	1.00	0.53SW+0.53RDL+0.91EQR
33*	1.20	1.069SW+1.069RDL+1.069COL+1.75EQL
34*	1.20	1.052SW+1.052RDL+1.052COL+1.313EQL
35*	1.20	0.531SW+0.531RDL+0.531COL+1.75EQL
36*	1.20	1.069SW+1.069RDL+1.069COL+1.75EQR
37*	1.20	1.052SW+1.052RDL+1.052COL+1.313EQR
38*	1.20	0.531SW+0.531RDL+0.531COL+1.75EQR

*Indicates a Special Seismic Load Combination

FRAME LINE 1,7

F-9

Web Depth	7	36.00	8	28.00	9	28.00	CT	10	28.00	11	28.00	CT	12	28.00	13	36.00
Length on Slope		165.02		240.00		180.00		180.00		240.00		169.03				
Left/Top Flange		F6.31		F5.25		F5.25		F5.25		F5.25		F6.25				
Web		W188		W135		W188		W188		W135		W188				
Right/Bottom Flange		F6.38		F5.25		F5.25		F5.25		F5.25		F6.31				
Horizontal Tail Dim.		17.6208				52.5000				87.3792						
Purlin Offset: 8.0		RAF01		RAF02				RAF03				RAF04				
Projected Area: 325																



Left Eave Height: 20.00

Left Girt Offset: 12.0

Right Eave Height: 20.00

Right Girt Offset: 8.0

Total Width: 105.00

Location Code	1 P	2	3	4 P	5	6	7 M	8 M	9	10 M	11	12 M	13 M
Left Plate	NA	4x0.375	8x0.250	NA	4x0.375	8x0.250	8x0.500	6x0.375	-	6x0.375	-	6x0.375	6x0.500
Right Plate	10x0.625	-	-	10x0.625	-	-	6x0.500	6x0.375	-	6x0.375	-	6x0.375	8x0.500
Bolt Quantity-Diameter	4-1.250	-	-	4-1.250	-	-	12-0.75-S	8-0.75-S	-	8-0.75-S	-	8-0.75-S	12-0.75-S
Pfi/Pf	4.000/NA	-	-	4.000/NA	-	-	1.313/3.000	1.250/3.000	-	1.250/2.875	-	1.250/2.875	1.313/3.000
Top Welds (L/R)	FWS3	-	W1-FWS3	FWS3	-	W1-FWS3	FWD3/FWD3	FWD3/FWD3	-	FWD3/FWD3	-	FWD3/FWD3	FWD3/FWD3
Bottom Welds (L/R)	FWS3	-	W3-FWS3	FWS3	-	W3-FWS3	FWD3/FWD3	FWD3/FWD3	-	FWD3/FWD3	-	FWD3/FWD3	FWD3/FWD3
Web Welds (L/R)	FWR3	-	W4-FWS3	FWR3	-	W4-FWS3	WP13/WP13	WP13/WP13	-	WP13/WP13	-	WP13/WP13	WP13/WP13
Connection Code	BHFCNA	-	-	BHFCNA	-	-	KVEUEU	SPEUEU	-	SVEUEU	-	SPEUEU	KVEUEU
Pb/Gage	5.000/5.000	-	-	5.000/5.000	-	-	2.250/3.500	NA/3.500	-	NA/3.500	-	NA/3.500	2.250/3.500

Job #: C22B0182A

File: E01.frame

Title: E01

Designer: BG/Viviana.Perez

Date: 8/29/2022 - 1:27 PM

Frame Ver: 1.6.127

Page: ____

NUCOR BUILDINGS GROUP

Job # : C22B0182A
 Job Name : Rob Kerth Iceland
 Frame : F01
 Date : 8/23/2022
 Designer : BG\Viviana.Perez
 File : F01a.nfr
 App Version : 1.6.127.0

 F R A M E D E S C R I P T I O N

Frame type : RCG
 Frame width : 105.00 Ft.
 Bay width : 25.00 Ft.

	LEFT	RIGHT	
Dim to ridge :	52.50 Ft.	52.50 Ft.	
Roof slope :	1.00/12	-1.00/12	
Eave height :	20.00 Ft.	20.00 Ft.	
Girt offset :	12.00 In.	8.00 In.	Typ. Girt spacing : 5.00 Ft.
Purlin offset :	8.00 In.	8.00 In.	Typ. Purlin spacing: 5.00 Ft.

Col. spacing : 105.0000

Supports / Spring Constants

COL01 - Bottom V H
 COL02 - Bottom V H

Column Bracing:

WP1 Girt Brace : Y
 Flange Brace : 2
 Location (ft): 13.5

 WP2 Girt Brace : Y Y
 Flange Brace : 2 2
 Location (ft): 7.3 13.5

Other Braces:

Column :
 Left Brace :
 Right Brace :
 Location (ft):

 L O A D I N G C O N D I T I O N S

Building Code & Year : IBC2018
 Risk Category : III-Substantial Hazard
 AISC Specification : 2016 ASD

L O A D S (Psf)

Roof Dead load : 2.50
 Roof Coll load : 5.00
 Roof Live load : 12.00
 Roof Snow load : 0.00
 Floor dead load : 0.00
 Floor live load : 0.00
 Ground Snow load: 0.00 Ce = 1.00
 Ss = 0.539 S1 = 0.246 Seismic Design Category = D Site Class = D
 R = 3.50 Cd = 3.00 Sds = 0.492 Sd1 = 0.346 rho = 1.30 omega = 2.500

Is Building Irregular = False

Roof Seismic Factor : 0.176 PSF
 Floor Seismic Factor : 0.176 PSF

Wind speed : 110.00 Mph Exp. : C
 Wind pressure : 23.75 Psf

Building is Enclosed

Wind pressure coefficients Is End Bay? False

	C1	C2E	C2	C3	C3E	C4
W1R	0.580	0.000	-0.510	-0.190	0.000	-0.110
W1L	-0.110	0.000	-0.190	-0.510	0.000	0.580
W2R	0.220	0.000	-0.870	-0.550	0.000	-0.470
W2L	-0.470	0.000	-0.550	-0.870	0.000	0.220
W5B	-0.270	0.000	-0.510	-0.190	0.000	-0.270
W5F	-0.270	0.000	-0.190	-0.510	0.000	-0.270
W6B	-0.630	0.000	-0.870	-0.550	0.000	-0.630
W6F	-0.630	0.000	-0.550	-0.870	0.000	-0.630

Tributary Widths

Panel Trib. Width (ft)

WP1	25.00
WP2	25.00
RP1	25.00
RP2	25.00

P R O G R A M - A P P L I E D L O A D S
-----Panel Loads

Load Case	On Panel	Start Load Klf	End Load Klf	Start Loc Ft.	End Loc Ft.
RDL	RP1	-0.063	-0.063	0.000	52.500
RDL	RP2	-0.063	-0.063	52.500	105.000
COL	RP1	-0.125	-0.125	0.000	52.500
COL	RP2	-0.125	-0.125	52.500	105.000
RLL	RP1	-0.300	-0.300	0.000	52.500
RLR	RP2	-0.300	-0.300	52.500	105.000
W1R	WP1	0.344	0.344	0.000	20.000
W1R	WP2	0.065	0.065	0.000	20.000
W1R	RP1	-0.303	-0.303	0.000	52.500
W1R	RP2	-0.113	-0.113	52.500	105.000
W1L	WP1	-0.065	-0.065	0.000	20.000
W1L	WP2	-0.344	-0.344	0.000	20.000
W1L	RP1	-0.113	-0.113	0.000	52.500
W1L	RP2	-0.303	-0.303	52.500	105.000
W2R	WP1	0.131	0.131	0.000	20.000
W2R	WP2	0.279	0.279	0.000	20.000
W2R	RP1	-0.516	-0.516	0.000	52.500
W2R	RP2	-0.327	-0.327	52.500	105.000
W2L	WP1	-0.279	-0.279	0.000	20.000
W2L	WP2	-0.131	-0.131	0.000	20.000
W2L	RP1	-0.327	-0.327	0.000	52.500
W2L	RP2	-0.516	-0.516	52.500	105.000
W5B	WP1	-0.160	-0.160	0.000	20.000
W5B	WP2	0.160	0.160	0.000	20.000
W5B	RP1	-0.303	-0.303	0.000	52.500
W5B	RP2	-0.113	-0.113	52.500	105.000
W5F	WP1	-0.160	-0.160	0.000	20.000
W5F	WP2	0.160	0.160	0.000	20.000
W5F	RP1	-0.113	-0.113	0.000	52.500
W5F	RP2	-0.303	-0.303	52.500	105.000
W6B	WP1	-0.374	-0.374	0.000	20.000
W6B	WP2	0.374	0.374	0.000	20.000
W6B	RP1	-0.516	-0.516	0.000	52.500
W6B	RP2	-0.327	-0.327	52.500	105.000
W6F	WP1	-0.374	-0.374	0.000	20.000
W6F	WP2	0.374	0.374	0.000	20.000
W6F	RP1	-0.327	-0.327	0.000	52.500
W6F	RP2	-0.516	-0.516	52.500	105.000
EQR	RP1	0.051	0.051	0.000	52.500
EQR	RP2	0.051	0.051	52.500	105.000
EQL	RP1	-0.051	-0.051	0.000	52.500
EQL	RP2	-0.051	-0.051	52.500	105.000

Concentrated Loads

Load Case	On Mem	Hor. Kips	Vert. Kips	Moment K-Ft.	Loc Ft.
W1R	COL01	0.757	0.000	0.000	20.000
W1R	COL02	0.757	0.000	0.000	20.000
W1L	COL01	-0.757	0.000	0.000	20.000
W1L	COL02	-0.757	0.000	0.000	20.000
W2R	COL01	0.757	0.000	0.000	20.000
W2R	COL02	0.757	0.000	0.000	20.000
W2L	COL01	-0.757	0.000	0.000	20.000
W2L	COL02	-0.757	0.000	0.000	20.000

Endwall Bracing Loads

 Shear loads that are applied perpendicular to the web have been considered in the baseplate design only.

Load Case	On Mem	Hor. Kips	Vert. Kips	Perp Shear Kips	Moment K-Ft.	Loc Ft.
-----------	--------	-----------	------------	-----------------	--------------	---------

----- U S E R - A P P L I E D L O A D S -----

Shear loads that are applied perpendicular to the web have been considered in the baseplate design only. The locations listed below for each longitudinal bracing load apply only to the column axial load (tension on base of column and compression when at top of column).

Load Case	On Mem	Hor. Kips	Vert. Kips	Perp Shear Kips	Moment K-Ft.	Loc Ft.	Special Load #	Description
BWF	COL01	0.000	4.500	-5.500	0.000	0.500	Long. Bracing-1	COL01
BWF	COL02	0.000	4.500	-5.500	0.000	0.500	Long. Bracing-2	COL02
BWB	COL01	0.000	-4.500	5.500	0.000	18.500	Long. Bracing-1	COL01
BWB	COL02	0.000	-4.500	5.500	0.000	18.500	Long. Bracing-2	COL02
EQB	COL01	0.000	-7.750	9.500	0.000	18.500	Long. Bracing-1	COL01
EQB	COL02	0.000	-7.750	9.500	0.000	18.500	Long. Bracing-2	COL02
EQF	COL01	0.000	7.750	-9.500	0.000	0.500	Long. Bracing-1	COL01
EQF	COL02	0.000	7.750	-9.500	0.000	0.500	Long. Bracing-2	COL02

----- L O A D C O M B I N A T I O N S -----

ASR Cases

- 1) 1.00 SW+RDL+COL+NLL
- 2) 1.00 SW+RDL+COL+NLR
- 3) 1.00 SW+RDL+COL+RLL+RLR+NLL
- 4) 1.00 SW+RDL+COL+RLL+RLR+NLR
- 5) 1.00 SW+RDL+COL+0.60W1L
- 6) 1.00 SW+RDL+COL+0.60W2L
- 7) 1.00 SW+RDL+COL+0.60W1R
- 8) 1.00 SW+RDL+COL+0.60W2R
- 9) 1.00 0.60SW+0.60RDL+0.60W1L
- 10) 1.00 0.60SW+0.60RDL+0.60W2L
- 11) 1.00 0.60SW+0.60RDL+0.60W1R
- 12) 1.00 0.60SW+0.60RDL+0.60W2R
- 13) 1.00 SW+RDL+COL+0.75RLL+0.75RLR+0.45W1L
- 14) 1.00 SW+RDL+COL+0.75RLL+0.75RLR+0.45W2L
- 15) 1.00 SW+RDL+COL+0.75RLL+0.75RLR+0.45W1R
- 16) 1.00 SW+RDL+COL+0.75RLL+0.75RLR+0.45W2R
- 17) 1.00 SW+RDL+COL+0.60W5B+0.60BWB
- 18) 1.00 SW+RDL+COL+0.60W6B+0.60BWB
- 19) 1.00 SW+RDL+COL+0.60W5F+0.60BWF
- 20) 1.00 SW+RDL+COL+0.60W6F+0.60BWF
- 21) 1.00 0.60SW+0.60RDL+0.60W5B+0.60BWB
- 22) 1.00 0.60SW+0.60RDL+0.60W6B+0.60BWB
- 23) 1.00 0.60SW+0.60RDL+0.60W5F+0.60BWF
- 24) 1.00 0.60SW+0.60RDL+0.60W6F+0.60BWF
- 25) 1.00 SW+RDL+COL+0.75RLL+0.75RLR+0.45W5B+0.45BWB
- 26) 1.00 SW+RDL+COL+0.75RLL+0.75RLR+0.45W6B+0.45BWB
- 27) 1.00 SW+RDL+COL+0.75RLL+0.75RLR+0.45W5F+0.45BWF
- 28) 1.00 SW+RDL+COL+0.75RLL+0.75RLR+0.45W6F+0.45BWF
- 29) 1.00 1.07SW+1.07RDL+1.07COL+0.91EQL
- 30) 1.00 1.07SW+1.07RDL+1.07COL+0.91EQR
- 31) 1.00 1.07SW+1.07RDL+1.07COL+0.91EQB+NLL

32) 1.00 1.07SW+1.07RDL+1.07COL+0.91EQB+NLR
33) 1.00 1.07SW+1.07RDL+1.07COL+0.91EQF+NLL
34) 1.00 1.07SW+1.07RDL+1.07COL+0.91EQF+NLR
35) 1.00 1.05SW+1.05RDL+1.05COL+0.68EQL
36) 1.00 1.05SW+1.05RDL+1.05COL+0.68EQR
37) 1.00 1.05SW+1.05RDL+1.05COL+0.68EQB+NLL
38) 1.00 1.05SW+1.05RDL+1.05COL+0.68EQB+NLR
39) 1.00 1.05SW+1.05RDL+1.05COL+0.68EQF+NLL
40) 1.00 1.05SW+1.05RDL+1.05COL+0.68EQF+NLR
41) 1.00 0.53SW+0.53RDL+0.91EQL
42) 1.00 0.53SW+0.53RDL+0.91EQR
43) 1.00 0.53SW+0.53RDL+0.91EQB+NLL
44) 1.00 0.53SW+0.53RDL+0.91EQB+NLR
45) 1.00 0.53SW+0.53RDL+0.91EQF

Job : C22B0182A Rob Kerth Iceland
 Frame: F01

NUCOR BUILDINGS GROUP

Date: 08-24-22
 By : BG\Viviana.Perez

Page: 1
 File: F01A

*** DESIGN SUMMARY REPORT ***

Built Up Rafter - RAF01

Section	T/L Mat'l	B/R Flange Mat'l	Web Mat'l	Load Comb	Loc	Axial Kips	Axial Ratio	Moment Ft-kip	T/L Bend Ratio	B/R Bend Ratio	Max Unity Check	Load Comb	Loc	Force Kips	SHEAR Shear Ratio	Flow T/L (k/in)	B/R
1	F8.31	F8.50	W188	3	1	-27.5	0.13	-382.4	1.00	0.87	0.94	3	1	21.69	0.53	0.45	0.56

Chkpt 1 5
 Depth 36.81 24.81
 Section | 1 |

| width thick Fy |

T/L Flg | 8.0 0.3125 55.00 |
 Web | 0.1875 55.00 |
 B/R Flg | 8.0 0.5000 55.00 |

Built Up Rafter - RAF02

Section	T/L Mat'l	B/R Flange Mat'l	Web Mat'l	Load Comb	Loc	Axial Kips	Axial Ratio	Moment Ft-kip	T/L Bend Ratio	B/R Bend Ratio	Max Unity Check	Load Comb	Loc	Force Kips	SHEAR Shear Ratio	Flow T/L (k/in)	B/R
1	F6.31	F6.38	W135	3	6	-26.1	0.31	-103.3	0.64	0.77	0.99	3	6	15.13	0.73	0.48	0.52
2	F6.31	F6.38	W188	4	14	-24.8	0.27	136.7	0.84	0.71	1.02	3	12	4.99	0.12	0.14	0.16

Chkpt 6 11 12 16
 Depth 24.69 24.69 24.69
 Section | 1 | 2 |

| width thick Fy | width thick Fy |

T/L Flg | 6.0 0.3125 55.00 | 6.0 0.3125 55.00 |
 Web | 0.1345 55.00 | 0.1875 55.00 |
 B/R Flg | 6.0 0.3750 55.00 | 6.0 0.3750 55.00 |

Built Up Rafter - RAF03

Section	T/L Mat'l	B/R Flange Mat'l	Web Mat'l	Load Comb	Loc	Axial Kips	Axial Ratio	Moment Ft-kip	T/L Bend Ratio	B/R Bend Ratio	Max Unity Check	Load Comb	Loc	Force Kips	SHEAR Shear Ratio	Flow T/L (k/in)	B/R
1	F6.31	F6.38	W188	3	19	-24.8	0.27	137.9	0.85	0.72	1.02	4	21	-4.81	0.12	0.14	0.15
2	F6.31	F6.38	W135	3	22	-25.2	0.29	112.8	0.80	0.63	1.00	4	27	-14.95	0.72	0.47	0.51

Chkpt 17 21 22 27
 Depth 24.69 24.69 24.69
 Section | 1 | 2 |

| width thick Fy | width thick Fy |

T/L Flg | 6.0 0.3125 55.00 | 6.0 0.3125 55.00 |
 Web | 0.1875 55.00 | 0.1345 55.00 |
 B/R Flg | 6.0 0.3750 55.00 | 6.0 0.3750 55.00 |

Built Up Rafter - RAF04

Section	T/L Mat'l	B/R Flange Mat'l	Web Mat'l	Load Comb	Loc	Axial Kips	Axial Ratio	Moment Ft-kip	T/L Bend Ratio	B/R Bend Ratio	Max Unity Check	Load Comb	Loc	Force Kips	SHEAR Shear Ratio	Flow T/L (k/in)	B/R
1	F8.31	F8.50	W188	4	32	-27.5	0.13	-380.7	1.00	0.86	0.93	4	32	-21.55	0.53	0.45	0.55

Chkpt 28 32
 Depth 24.81 36.81
 Section | 1 |

| width thick Fy |

T/L Flg | 8.0 0.3125 55.00 |
 Web | 0.1875 55.00 |
 B/R Flg | 8.0 0.5000 55.00 |

Built Up Column - COL01

Section	T/L Mat'l	B/R Flange Mat'l	Web Mat'l	Load Comb	Loc	Axial Kips	Axial Ratio	Moment Ft-kip	T/L Bend Ratio	B/R Bend Ratio	Max Unity Check	Load Comb	Loc	Force Kips	SHEAR Shear Ratio	Flow T/L (k/in)	B/R
1	F8.31	F8.50	W188	3	39	-29.0	0.13	-381.8	0.97	0.82	0.89	3	39	-22.86	0.56	1.67	1.88

Chkpt 33 39
 Depth 12.00 37.81
 Section | 1 |

| width thick Fy |

T/L Flg | 8.0 0.3125 55.00 |
 Web | 0.1875 55.00 |
 B/R Flg | 8.0 0.5000 55.00 |

Built Up Column - COL02

										T/L	B/R	Max	-----		SHEAR		-----				
Flange			Flange			Web	Load		Axial	Axial	Moment	T/L	B/R	Unity	Load	Force	Shear	Flow	(k/in)		
Section	Mat'l	Mat'l	Mat'l	Comb	Loc	Kips	Ratio	Ft-kip	Ratio	Ratio	Check	Comb	Loc	Kips	Ratio	T/L	B/R				
1	F8.50	F8.31	W188	4	47	-28.9	0.13	380.7	0.82	0.96	0.89	4	47	22.85	0.56	1.88	1.67				
Chkpt	40			47																	
Depth	12.00			37.81																	
Section		1																			

width thick Fy																					

T/L Flg		8.0	0.5000	55.00																	
Web		0.1875		55.00																	
B/R Flg		8.0	0.3125	55.00																	

Frame Weight (lbs) = 4299

Deflections (in):

10 yr Wind dx =	0.49 = H/	402	LONG. WIND 2 TO FRONT
Seismic dx =	1.00 = H/	198	SEISMIC TO RIGHT
Story Drift =	2.41 =	0.012H	SEISMIC TO RIGHT
Stability Coefficient =	0.01		1.07SW+1.07RDL+1.07COL+0.91EQB
Stability Ratio =	0.07		1.07SW+1.07RDL+1.07COL+0.91EQB
Fundamental Period =	0.7633		Single Story Period
Maximum dx =	-1.15 = H/	172	1.07SW+1.07RDL+1.07COL+0.91EQL
Maximum dy =	-5.89 = L/	203 @ MOD 1,	SW+RDL+COL+RLL+RLR
Max. Live dy =	-3.42 = L/	350 @ MOD 1,	LIVE ON LEFT AND RIGHT

FRAME LINE 2-6

F-16

NUCOR BUILDINGS GROUP

Job # : C22B0182A
File : F01a.nfr
App Version : 1.6.127.0

Job Name : Rob Kerth Iceland
Designer : BG\Viviana.Perez
Date : 8/23/2022

Frame : F01

BOLTED END-PLATES (BEP) SUMMARY

Bolt Pre Tension Method : TurnOfNut

PLATE SIZE: (in)

Splice ID	Left Type	Right Type	Members Joined	Loc	Web Depth	Left Plate				Right Plate			
						Width	Thick	Length	Fy(ksi)	Width	Thick	Length	Fy(ksi)
1	6E	6E	COL01 To RAF01	Top	36.00	8.00	0.63	42.37	55.0	8.00	0.63	42.37	55.0
1	6E	6E	COL01 To RAF01	Bot	36.00	8.00	0.63	42.37	55.0	8.00	0.63	42.37	55.0
2	6E	6E	RAF01 To RAF02	Top	24.00	8.00	0.50	30.25	55.0	6.00	0.38	30.25	55.0
2	6E	6E	RAF01 To RAF02	Bot	24.00	8.00	0.50	30.25	55.0	6.00	0.38	30.25	55.0
3	4E	4E	RAF02 To RAF03	Top	24.00	6.00	0.50	30.08	55.0	6.00	0.50	30.08	55.0
3	4E	4E	RAF02 To RAF03	Bot	24.00	6.00	0.50	30.08	55.0	6.00	0.50	30.08	55.0
4	4E	4E	RAF03 To RAF04	Top	24.00	6.00	0.38	30.25	55.0	8.00	0.50	30.25	55.0
4	4E	4E	RAF03 To RAF04	Bot	24.00	6.00	0.38	30.25	55.0	8.00	0.50	30.25	55.0
5	6E	6E	RAF04 To COL02	Top	36.00	8.00	0.63	42.37	55.0	8.00	0.63	42.37	55.0
5	6E	6E	RAF04 To COL02	Bot	36.00	8.00	0.63	42.37	55.0	8.00	0.63	42.37	55.0

PLATE DESIGN

Splice ID	Left Type	Right Type	Tension Location	Load Comb	Max Moment			Load Comb	Max Shear			Left Plate Ratio	Right Plate Ratio
					Axial (kip)	Shear (kip)	Moment (ft-kip)		Axial (kip)	Shear (kip)	Moment (ft-kip)		
1	6E	6E	Top	2	-24.72	24.86	-382.37	10	9.39	-11.18	161.79	0.86	0.86
1	6E	6E	Bot	10	9.39	-11.18	161.79	2	-24.72	24.86	-382.37	0.44	0.43
2	6E	6E	Top	2	-26.07	15.19	-103.27	10	10.37	-6.85	37.68	0.44	0.96
2	6E	6E	Bot	22	12.31	-5.32	52.90	2	-26.07	15.19	-103.27	0.37	0.81
3	4E	4E	Top	8	10.64	-0.93	-45.66	15	-3.07	1.58	24.96	0.44	0.44
3	4E	4E	Bot	2	-24.72	0.07	134.42	22	12.38	-1.58	-41.86	0.84	0.84
4	4E	4E	Top	2	-26.06	-15.01	-96.56	8	10.38	6.78	35.25	1.00	0.45
4	4E	4E	Bot	20	12.14	5.27	50.93	2	-26.06	-15.01	-96.56	0.89	0.39
5	6E	6E	Top	2	-24.72	-24.69	-380.68	8	9.42	11.10	161.73	0.86	0.86
5	6E	6E	Bot	8	9.42	11.10	161.73	2	-24.72	-24.69	-380.68	0.43	0.44

BOLT RUPTURE DESIGN

Splice ID	Left Type	Right Type	Loc	Bolt Type	Pre-Tension	Dia	Gage	Gage 2	Pfi	Pfo	Pf	Pb	de	Load Comb	Axial (kip)	Moment (ft-kip)	Left Bolt Ratio	Right Bolt Ratio
1	6E	6E	Top	A325	Yes	0.75	3.50	--	1.38	1.61	3.25	2.25	1.25	2	-24.72	-382.37	0.98	0.98
1	6E	6E	Bot	A325	Yes	0.75	3.50	--	1.38	1.50	3.25	2.25	1.25	10	9.39	161.79	0.50	0.50
2	6E	6E	Top	A325	Yes	0.75	3.50	--	1.25	1.56	3.13	2.25	1.25	2	-26.07	-103.27	0.33	0.46
2	6E	6E	Bot	A325	Yes	0.75	3.50	--	1.25	1.34	3.13	2.25	1.25	22	12.31	52.90	0.28	0.28
3	4E	4E	Top	A325	Yes	0.75	3.50	--	1.25	1.48	3.00	--	1.25	8	10.64	-45.66	0.35	0.35
3	4E	4E	Bot	A325	Yes	0.75	3.50	--	1.25	1.33	3.00	--	1.25	2	-24.72	134.42	0.67	0.67
4	4E	4E	Top	A325	Yes	0.75	3.50	--	1.25	1.56	3.13	--	1.25	2	-26.06	-96.56	0.59	0.43
4	4E	4E	Bot	A325	Yes	0.75	3.50	--	1.25	1.50	3.13	--	1.25	20	12.14	50.93	0.39	0.39
5	6E	6E	Top	A325	Yes	0.75	3.50	--	1.38	1.51	3.25	2.25	1.25	2	-24.72	-380.68	0.98	0.98
5	6E	6E	Bot	A325	Yes	0.75	3.50	--	1.38	1.46	3.25	2.25	1.25	8	9.42	161.73	0.50	0.50

COMBINED BOLT BEARING SHEAR DESIGN

Splice ID	Left Type	Right Type	Loc	Bolt Type	Pre-Tension	Dia	Gage	Gage 2	Pfi	Pfo	Pf	Pb	de	Load Comb	Shear (kip)	Left Bolt Ratio	Right Bolt Ratio
1	6E	6E	Top	A325	Yes	0.75	3.50	--	1.38	1.61	3.25	2.25	1.25	10	-11.18	0.16	0.16
1	6E	6E	Bot	A325	Yes	0.75	3.50	--	1.38	1.50	3.25	2.25	1.25	2	24.86	0.35	0.35
2	6E	6E	Top	A325	Yes	0.75	3.50	--	1.25	1.56	3.13	2.25	1.25	10	-6.85	0.10	0.10

Splice ID	Left Type	Right Type	Bolt Loc	Bolt Type	Pre-Tension	Dia	Gage	Gage 2	Pfi	Pfo	Pf	Pb	de	Load Comb	Shear (kip)	Left Bolt Ratio	Right Bolt Ratio
2	6E	6E	Bot	A325	Yes	0.75	3.50	--	1.25	1.34	3.13	2.25	1.25	2	15.19	0.21	0.21
3	4E	4E	Top	A325	Yes	0.75	3.50	--	1.25	1.48	3.00	--	1.25	15	1.58	0.03	0.03
3	4E	4E	Bot	A325	Yes	0.75	3.50	--	1.25	1.33	3.00	--	1.25	22	-1.58	0.03	0.03
4	4E	4E	Top	A325	Yes	0.75	3.50	--	1.25	1.56	3.13	--	1.25	8	6.78	0.14	0.14
4	4E	4E	Bot	A325	Yes	0.75	3.50	--	1.25	1.50	3.13	--	1.25	2	-15.01	0.31	0.31
5	6E	6E	Top	A325	Yes	0.75	3.50	--	1.38	1.51	3.25	2.25	1.25	8	11.10	0.16	0.16
5	6E	6E	Bot	A325	Yes	0.75	3.50	--	1.38	1.46	3.25	2.25	1.25	2	-24.69	0.35	0.35

WELD DESIGN

Splice ID	Loc	Left								Right							
		Welds			Checks					Welds			Checks				
		Flg	Web	Stf	Load Comb	Tensile Rupture	Load Comb	Shear Rupture		Flg	Web	Stf	Load Comb	Tensile Rupture	Load Comb	Shear Rupture	
1	Top	FWD4	WP13		2	0.87	10	0.17		FWD4	WP13		2	0.96	10	0.16	
1	Bot	FWD3	WP13		10	0.51	2	0.37		FWD3	WP13		10	0.57	2	0.37	
2	Top	FWD3	WP13		2	0.38	10	0.14		FWD3	WP13		2	0.53	10	0.20	
2	Bot	FWD3	WP13		22	0.32	2	0.32		FWD3	WP13		22	0.45	2	0.45	
3	Top	FWD3	WP13		8	0.40	15	0.04		FWD3	WP13		8	0.40	15	0.04	
3	Bot	FWD3	WP13		2	0.77	22	0.04		FWD3	WP13		2	0.77	22	0.04	
4	Top	FWD3	WP13		2	0.54	8	0.20		FWD3	WP13		2	0.39	8	0.15	
4	Bot	FWD3	WP13		20	0.49	2	0.44		FWD3	WP13		20	0.35	2	0.34	
5	Top	FWD4	WP13		2	0.95	8	0.16		FWD4	WP13		2	0.87	8	0.16	
5	Bot	FWD3	WP13		8	0.57	2	0.37		FWD3	WP13		8	0.51	2	0.36	

BASEPLATE AND ANCHOR ROD DESIGN RESULTS

BASEPLATE AND ANCHOR ROD INFORMATION: (in)

Column ID	Column Type	Column Pattern	Column Depth	Base Plate					Anchor Rods					
				Width	Thickness	Length	Fy(ksi)		Qty	Dia.	Grade	Pfi	Pb	Gage
COL01	WF/BU	Left	12	10	0.625	12.0000	55		4	1.25	Grade36	4	5	5
COL02	WF/BU	Right	12	10	0.625	12.0000	55		4	1.25	Grade36	4	5	5

BASEPLATE DESIGN CHECKS

Column ID	Concrete Bearing (Compression)					Base Plate Yielding (Tension)				
	Load Comb	Axial (kip)	Shear (kip)	Bracing Shear (kip)	Design Ratio	Load Comb	Axial (kip)	Shear (kip)	Bracing Shear (kip)	Design Ratio
COL01	2	-28.00	-24.80	0.00	0.15	10	12.07	10.76	0.00	0.68
COL02	2	-27.84	24.78	0.00	0.15	22	14.05	-7.36	-3.30	0.73

ANCHOR ROD SHEAR AND TENSION DESIGN CHECKS

Column ID	Anchor Rod Tension Design					Anchor Rod Shear Design					Combined Tension-Shear Design					Combined Shear-Tension Design				
	Load Comb	Axial (kip)	Shear (kips)	Bracing Shear(kip)	Rod Ratio	Load Comb	Axial (kip)	Shear (kip)	Bracing Shear(kip)	Rod Ratio	Load Comb	Axial (kip)	Shear (kip)	Bracing Shear(kip)	Rod Ratio	Load Comb	Axial (kip)	Shear (kip)	Bracing Shear(kip)	Rod Ratio
COL01	10	12.07	10.76	0.00	0.11	2	-28.00	-24.80	0.00	0.39	10	12.07	10.76	0.00	0.11	2	-28.00	-24.80	0.00	0.39
COL02	22	14.05	-7.36	-3.30	0.13	2	-27.84	24.78	0.00	0.39	22	14.05	-7.36	-3.30	0.13	2	-27.84	24.78	0.00	0.39

BASEPLATE LEFT FLANGE WELD DESIGN CHECKS

Column ID	Left Flange Weld (Pipe Weld)						Web Weld						Right Flange Weld					
	Weld Size	Load Comb	Axial (kip)	Shear (kip)	Bracing Shear (kip)	Weld Ratio	Weld Size	Load Comb	Axial (kip)	Shear (kip)	Bracing Shear (kip)	Weld Ratio	Weld Size	Load Comb	Axial (kip)	Shear (kip)	Bracing Shear (kip)	Weld Ratio
COL01	FWS3	-74	7.68	-3.91	-16.63	0.57	FWR3	2	-28.00	-24.80	0.00	0.56	FWS3	-74	7.68	-3.91	-16.63	0.32
COL02	FWS3	-71	7.72	3.90	-16.63	0.32	FWR3	2	-27.84	24.78	0.00	0.56	FWS3	-71	7.72	3.90	-16.63	0.57

No	ASR	Combination
1	1.00	1.00SW+1.00RDL+1.00COL
2	1.00	1.00SW+1.00RDL+1.00COL+1.00RLL+1.00RLR
3	1.00	1.00SW+1.00RDL+1.00COL+0.60W1L
4	1.00	1.00SW+1.00RDL+1.00COL+0.60W2L
5	1.00	1.00SW+1.00RDL+1.00COL+0.60W1R
6	1.00	1.00SW+1.00RDL+1.00COL+0.60W2R
7	1.00	0.60SW+0.60RDL+0.60W1L
8	1.00	0.60SW+0.60RDL+0.60W2L
9	1.00	0.60SW+0.60RDL+0.60W1R
10	1.00	0.60SW+0.60RDL+0.60W2R
11	1.00	1.00SW+1.00RDL+1.00COL+0.75RLL+0.75RLR+0.45W1L
12	1.00	1.00SW+1.00RDL+1.00COL+0.75RLL+0.75RLR+0.45W2L
13	1.00	1.00SW+1.00RDL+1.00COL+0.75RLL+0.75RLR+0.45W1R
14	1.00	1.00SW+1.00RDL+1.00COL+0.75RLL+0.75RLR+0.45W2R
15	1.00	1.00SW+1.00RDL+1.00COL+0.60W5B+0.60BWB
16	1.00	1.00SW+1.00RDL+1.00COL+0.60W6B+0.60BWB
17	1.00	1.00SW+1.00RDL+1.00COL+0.60W5F+0.60BWF
18	1.00	1.00SW+1.00RDL+1.00COL+0.60W6F+0.60BWF
19	1.00	0.60SW+0.60RDL+0.60W5B+0.60BWB
20	1.00	0.60SW+0.60RDL+0.60W6B+0.60BWB
21	1.00	0.60SW+0.60RDL+0.60W5F+0.60BWF
22	1.00	0.60SW+0.60RDL+0.60W6F+0.60BWF
23	1.00	1.00SW+1.00RDL+1.00COL+0.75RLL+0.75RLR+0.45W5B+0.45BWB
24	1.00	1.00SW+1.00RDL+1.00COL+0.75RLL+0.75RLR+0.45W6B+0.45BWB
25	1.00	1.00SW+1.00RDL+1.00COL+0.75RLL+0.75RLR+0.45W5F+0.45BWF
26	1.00	1.00SW+1.00RDL+1.00COL+0.75RLL+0.75RLR+0.45W6F+0.45BWF
27	1.00	1.069SW+1.069RDL+1.069COL+0.91EQL
28	1.00	1.069SW+1.069RDL+1.069COL+0.91EQR
29	1.00	1.069SW+1.069RDL+1.069COL+0.91EQB
30	1.00	1.069SW+1.069RDL+1.069COL+0.91EQF
31	1.00	1.052SW+1.052RDL+1.052COL+0.682EQL
32	1.00	1.052SW+1.052RDL+1.052COL+0.682EQR
33	1.00	1.052SW+1.052RDL+1.052COL+0.682EQB
34	1.00	1.052SW+1.052RDL+1.052COL+0.682EQF
35	1.00	0.53SW+0.53RDL+0.91EQL
36	1.00	0.53SW+0.53RDL+0.91EQR
37	1.00	0.53SW+0.53RDL+0.91EQB
38	1.00	0.53SW+0.53RDL+0.91EQF
39*	1.20	1.069SW+1.069RDL+1.069COL+1.75EQL
40*	1.20	1.052SW+1.052RDL+1.052COL+1.313EQL
41*	1.20	0.531SW+0.531RDL+0.531COL+1.75EQL
42*	1.20	1.069SW+1.069RDL+1.069COL+1.75EQL+0.525EQB
43*	1.20	1.052SW+1.052RDL+1.052COL+1.313EQL+0.394EQB
44*	1.20	0.531SW+0.531RDL+0.531COL+1.75EQL+0.525EQB
45*	1.20	1.069SW+1.069RDL+1.069COL+1.75EQL+0.525EQF
46*	1.20	1.052SW+1.052RDL+1.052COL+1.313EQL+0.394EQF
47*	1.20	0.531SW+0.531RDL+0.531COL+1.75EQL+0.525EQF
48*	1.20	1.069SW+1.069RDL+1.069COL+1.75EQR
49*	1.20	1.052SW+1.052RDL+1.052COL+1.313EQR
50*	1.20	0.531SW+0.531RDL+0.531COL+1.75EQR

*Indicates a Special Seismic Load Combination

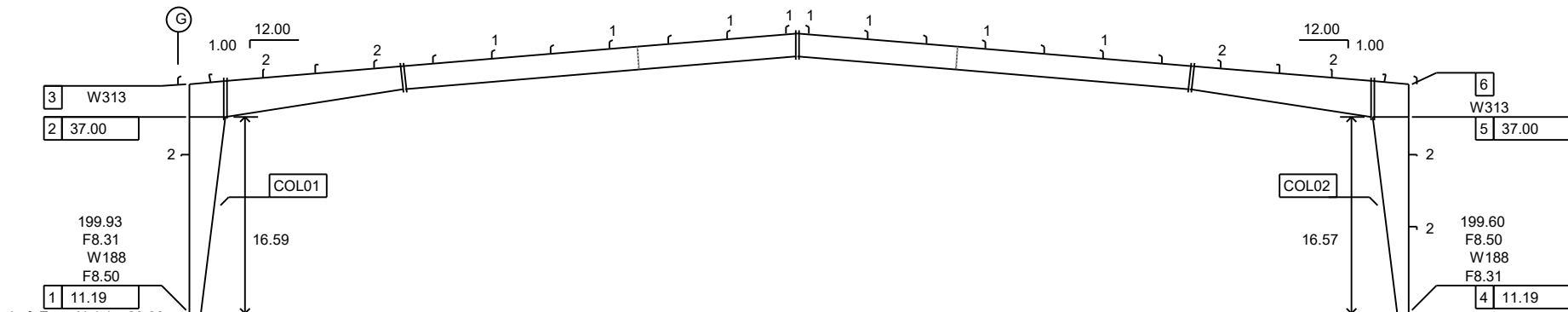
No	ASR	Combination
51*	1.20	1.069SW+1.069RDL+1.069COL+1.75EQR+0.525EQB
52*	1.20	1.052SW+1.052RDL+1.052COL+1.313EQR+0.394EQB
53*	1.20	0.531SW+0.531RDL+0.531COL+1.75EQR+0.525EQB
54*	1.20	1.069SW+1.069RDL+1.069COL+1.75EQR+0.525EQF
55*	1.20	1.052SW+1.052RDL+1.052COL+1.313EQR+0.394EQF
56*	1.20	0.531SW+0.531RDL+0.531COL+1.75EQR+0.525EQF
57*	1.20	1.069SW+1.069RDL+1.069COL+1.40EQB
58*	1.20	1.052SW+1.052RDL+1.052COL+1.05EQB
59*	1.20	0.531SW+0.531RDL+0.531COL+1.40EQB
60*	1.20	1.069SW+1.069RDL+1.069COL+0.525EQL+1.75EQB
61*	1.20	1.052SW+1.052RDL+1.052COL+0.394EQL+1.313EQB
62*	1.20	0.531SW+0.531RDL+0.531COL+0.525EQL+1.75EQB
63*	1.20	1.069SW+1.069RDL+1.069COL+0.525EQR+1.75EQB
64*	1.20	1.052SW+1.052RDL+1.052COL+0.394EQR+1.313EQB
65*	1.20	0.531SW+0.531RDL+0.531COL+0.525EQR+1.75EQB
66*	1.20	1.069SW+1.069RDL+1.069COL+1.40EQF
67*	1.20	1.052SW+1.052RDL+1.052COL+1.05EQF
68*	1.20	0.531SW+0.531RDL+0.531COL+1.40EQF
69*	1.20	1.069SW+1.069RDL+1.069COL+0.525EQL+1.75EQF
70*	1.20	1.052SW+1.052RDL+1.052COL+0.394EQL+1.313EQF
71*	1.20	0.531SW+0.531RDL+0.531COL+0.525EQL+1.75EQF
72*	1.20	1.069SW+1.069RDL+1.069COL+0.525EQR+1.75EQF
73*	1.20	1.052SW+1.052RDL+1.052COL+0.394EQR+1.313EQF
74*	1.20	0.531SW+0.531RDL+0.531COL+0.525EQR+1.75EQF

*Indicates a Special Seismic Load Combination

FRAME LINE 2-6

F-20

Web Depth	7	36.00	8	24.00	9	24.00	CT	10	24.00	11	24.00	CT	12	24.00	13	36.00
Length on Slope		180.00		240.00		163.01		163.01		240.00		184.01				
Left/Top Flange		F8.31		F6.31		F6.31		F6.31		F6.31		F8.31				
Web		W188		W135		W188		W188		W135		W188				
Right/Bottom Flange		F8.50		F6.38		F6.38		F6.38		F6.38		F8.50				
Horizontal Tail Dim.		19.0315				52.5000				85.9685						
Purlin Offset: 8.0		RAF01		RAF02						RAF03		RAF04				
Projected Area: 304																



Left Eave Height: 20.00

Left Girt Offset: 12.0

Right Eave Height: 20.00

Right Girt Offset: 8.0

Total Width: 105.00

Location Code	1 P	2	3	4 P	5	6	7 M	8 M	9	10 M	11	12 M	13 M
Left Plate	NA	4x0.375	8x0.313	NA	4x0.375	8x0.313	8x0.625	8x0.500	-	6x0.500	-	6x0.375	8x0.625
Right Plate	10x0.625	-	-	10x0.625	-	-	8x0.625	6x0.375	-	6x0.500	-	8x0.500	8x0.625
Bolt Quantity-Diameter	4-1.250	-	-	4-1.250	-	-	12-0.75-S	12-0.75-S	-	8-0.75-S	-	8-0.75-S	12-0.75-S
Pfi/Pf	4.000/NA	-	-	4.000/NA	-	-	1.375/3.250	1.250/3.125	-	1.250/3.000	-	1.250/3.125	1.375/3.250
Top Welds (L/R)	FWS3	-	W1-FWS3	FWS3	-	W1-FWS3	FWD4/FWD4	FWD3/FWD3	-	FWD3/FWD3	-	FWD3/FWD3	FWD4/FWD4
Bottom Welds (L/R)	FWS3	-	W3-FWS4	FWS3	-	W3-FWS4	FWD3/FWD3	FWD3/FWD3	-	FWD3/FWD3	-	FWD3/FWD3	FWD3/FWD3
Web Welds (L/R)	FWR3	-	W4-FWS3	FWR3	-	W4-FWS3	WP13/WP13	WP13/WP13	-	WP13/WP13	-	WP13/WP13	WP13/WP13
Connection Code	BHFCNA	-	-	BHFCNA	-	-	KVEUEU	SPEUEU	-	SVEUEU	-	SPEUEU	KVEUEU
Pb/Gage	5.000/5.000	-	-	5.000/5.000	-	-	2.250/3.500	2.250/3.500	-	NA/3.500	-	NA/3.500	2.250/3.500

Job #: C22B0182A

File: F01a.frame

Title: F01

Designer: BG/Viviana.Perez

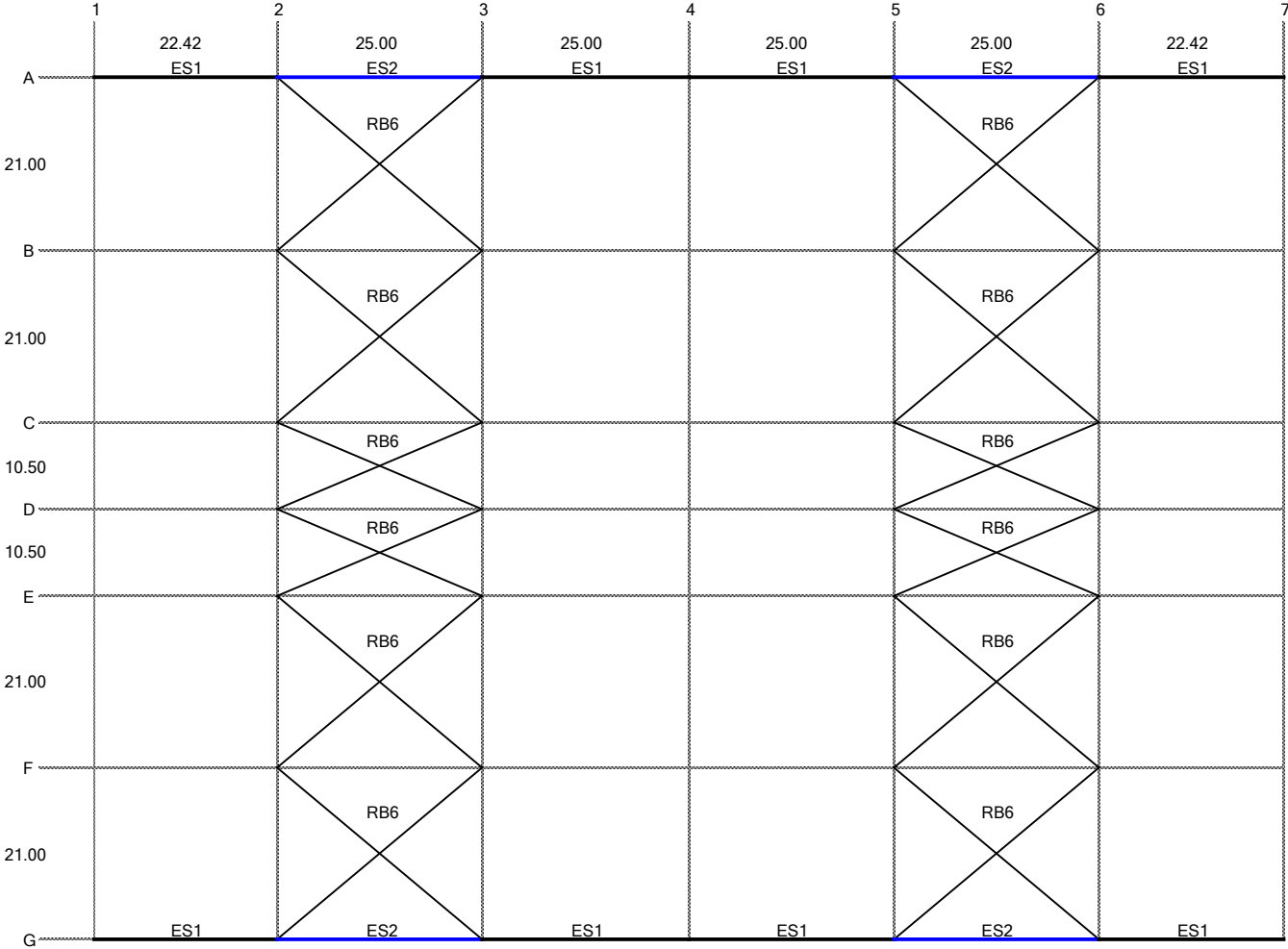
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B01
C22B0182a
Roof Plan

Viviana.Perez
8/22/2022



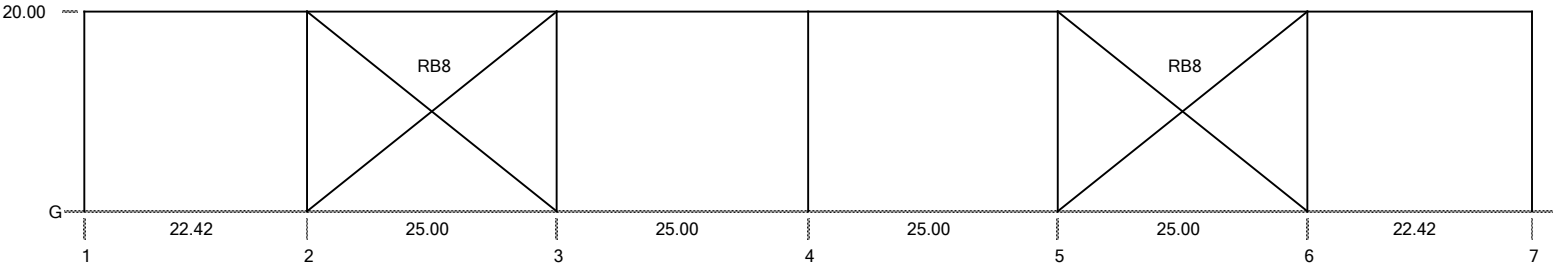
RB6 - 3/4 ROD
~~ES2 - PG-188 PipeStrut - 8E060 w/ std. (2) bolt connx.~~
AC-13 clip w/ 12ga strut purlin 1' uphill

ES1 - 8E060B2 - EaveStrut w/ std. (2)-bolt connx.

B01
C22B0182a
Sidewall Elevations - Bldg. A

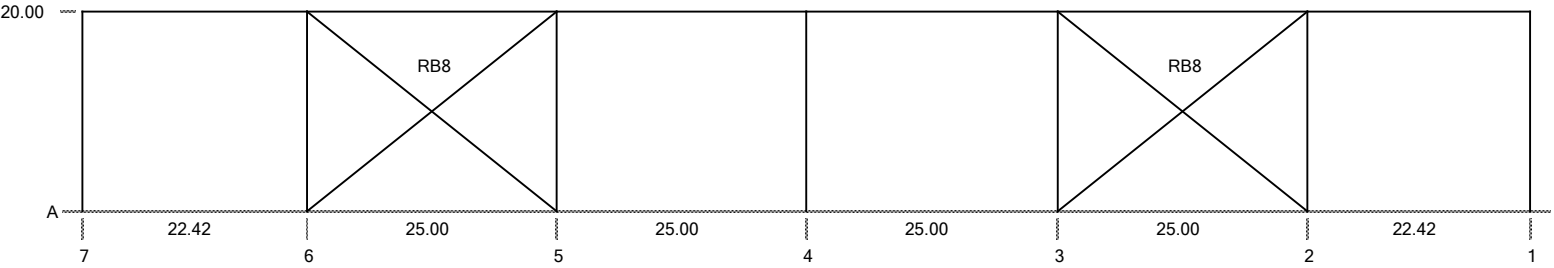
Viviana.Perez
8/22/2022

Front Sidewall



RB8 - 1 ROD

Back Sidewall



RB8 - 1 ROD

INPUT REPORT

NUCOR BUILDINGS GROUP
 Job Name: Ice Land
 Designer: Viviana.Perez
 File : B01.nbr

BRACING PROGRAM
 Job Number : C22B0182a
 Date : 8/22/2022
 App Version: 1.5.98.0

STRUCTURAL GEOMETRY

Building Width :	105.00 Ft.	Building Length :	144.84 Ft.
BSW Eave Ht :	20.00 Ft.	Left Roof Slope :	1.00/12
FSW Eave Ht :	20.00 Ft.	Right Roof Slope :	1.00/12
Girt Offset :	8.00 In.	Purlin Offset :	8.00 In.
Ridge Location :	52.50 Ft.		

Main Frame Spans: 105.0000'
 Bay Spacing : 22.4200', 4@25.0000', 22.4200'

Endwall Spacing -> Left : 2@21.0000', 2@10.5000', 2@21.0000'
 Right: 2@21.0000', 2@10.5000', 2@21.0000'

Girt Spacings -> BSW : 7.5000', 6.0000', 3.2500'
 FSW : 7.5000', 6.0000', 3.2500'

Purlin Spacing -> RP1 : 1.0000', 10@5.0000', 1.6820'
 RP2 : 1.0000', 10@5.0000', 1.6820'

Roof Connection Type: Bolted

LOADING CONDITIONS

Building Code & Year : IBC 2018
 Risk Category : III-Substantial Hazard

GRAVITY LOADING (DEAD, LIVE AND SNOW)

Roof Dead Load = 2.50 PSF	Roof Col. Load = 5.00 PSF	Roof Live Load = 12.00 PSF
Ground Snow = 0.00 PSF	Roof Snow Load = 0.00 PSF	Is Slippery = False
Roof Exp.(Ce) = 1.0	Thermal Con.(Ct) = 1.0	Slope Factor(Cs) = 1.00

SEISMIC

Site Class: D Longitudinal Framing System: Braced Bays

Seismic Data:

Ss = 0.539	S1 = 0.246	Seismic Dead Wt = 13.15 PSF
Sds = 0.492	Sd1 = 0.346	Total Seismic Wt = 13.15 PSF

rho = 1.30 omega = 2.00 R = 3.25

Roof Seismic Factor = 0.189 Design Category = D Roof Diaphragm = Flexible
 Irregular Building = False

WIND

Wind Speed : 110 MPH Wind Exposure: C Wind Enclosure: Enclosed
 MRH Pressure: 23.75 PSF

WIND PRESSURE COEFFICIENTS

	C5	C6	C5E	C6E	Net Pressure On Building
W5B	0.580	-0.110	0.790	-0.250	W5B (PSF) 17.88
W5F	-0.110	0.580	-0.250	0.790	W5F (PSF) -17.88

Wind Pressures

	Interior Zone	Exterior Zone	To	Parapet Wind Pressure						
	W5B	W5F	W5B	W5F						
	(PSF)	(PSF)	(PSF)	(PSF)						
	(PSF)	(PSF)	(PSF)	(PSF)						
	(Ft.)	(Ft.)	(Ft.)	(Ft.)						
Windward	13.77	13.77	18.76	18.76	24.38	Windward	---	(PSF)	---	(PSF)
Leeward	-2.61	-2.61	-5.94	-5.94	---	Leeward	---	(PSF)	---	(PSF)

USER-APPLIED LOADS

Load	Roof/	Load	Load	Frame	Roof	Wall	
Case	Wall	Dir.	Magnitude	Line	Grid	Elevation	Description
(ID)	(ID)	(X,Z)	(Kips)	(ID)	(ID)	(Ft.)	

LOAD COMBINATIONS

ID	ASR	Name
1)	1.00	SW+RDL+COL+0.60W5B
2)	1.00	SW+RDL+COL+0.60W5F
3)	1.00	0.60SW+0.60RDL+0.60W5B
4)	1.00	0.60SW+0.60RDL+0.60W5F
5)	1.00	SW+RDL+COL+0.75RLL+0.45W5B

6)	1.00	SW+RDL+COL+0.75RLL+0.45W5F
7)	1.00	1.07SW+1.07RDL+1.07COL+0.91EQB
8)	1.00	1.07SW+1.07RDL+1.07COL+0.91EQF
9)	1.00	1.05SW+1.05RDL+1.05COL+0.68EQB
10)	1.00	1.05SW+1.05RDL+1.05COL+0.68EQF
11)	1.00	0.53SW+0.53RDL+0.91EQB
12)	1.00	0.53SW+0.53RDL+0.91EQF
13)	1.00	SW+RDL+COL+RLL+0.39NLB
14)	1.00	SW+RDL+COL+RLL-0.39NLB
15)	1.00	SW+RDL+COL+0.15NLB
16)	1.00	SW+RDL+COL-0.15NLB

^^^ REACTION REPORT -- BY LOAD CASE ^^^

NUCOR BUILDINGS GROUP
 Job Name: Ice Land
 Designer: Viviana.Perez
 File : B01.nbr

BRACING PROGRAM
 Job Number : C22B0182a
 Date : 8/22/2022
 App Version: 1.5.98.0

REACTIONS -- LOAD CASE W5B

Frame Line	Grid Line	Horizontal + = right	Vertical + = up	Moment + = counterclockwise
1	A	0.00	0.00	0.00
1	G	0.00	0.00	0.00
2	A	-5.21	-4.16	0.00
2	G	-5.21	-4.16	0.00
3	A	0.00	4.16	0.00
3	G	0.00	4.16	0.00
4	A	0.00	0.00	0.00
4	G	0.00	0.00	0.00
5	A	-5.20	-4.16	0.00
5	G	-5.20	-4.16	0.00
6	A	0.00	4.16	0.00
6	G	0.00	4.16	0.00
7	A	0.00	0.00	0.00
7	G	0.00	0.00	0.00
Summation		-20.82	0.00	

REACTIONS -- LOAD CASE W5F

Frame Line	Grid Line	Horizontal + = right	Vertical + = up	Moment + = counterclockwise
1	A	0.00	0.00	0.00
1	G	0.00	0.00	0.00
2	A	0.00	4.16	0.00
2	G	0.00	4.16	0.00
3	A	5.20	-4.16	0.00
3	G	5.20	-4.16	0.00
4	A	0.00	0.00	0.00
4	G	0.00	0.00	0.00
5	A	0.00	4.16	0.00
5	G	0.00	4.16	0.00
6	A	5.21	-4.16	0.00
6	G	5.21	-4.16	0.00
7	A	0.00	0.00	0.00
7	G	0.00	0.00	0.00
Summation		20.82	0.00	

REACTIONS -- LOAD CASE EQB

Frame Line	Grid Line	Horizontal + = right	Vertical + = up	Moment + = counterclockwise
1	A	0.00	0.00	0.00
1	G	0.00	0.00	0.00
2	A	-9.44	-7.56	0.00
2	G	-9.44	-7.56	0.00
3	A	0.00	7.56	0.00
3	G	0.00	7.56	0.00
4	A	0.00	0.00	0.00
4	G	0.00	0.00	0.00
5	A	-9.44	-7.55	0.00
5	G	-9.44	-7.55	0.00
6	A	0.00	7.55	0.00
6	G	0.00	7.55	0.00
7	A	0.00	0.00	0.00
7	G	0.00	0.00	0.00
Summation		-37.77	0.00	

REACTIONS -- LOAD CASE EQF

Frame Line	Grid Line	Horizontal + = right	Vertical + = up	Moment + = counterclockwise
1	A	0.00	0.00	0.00
1	G	0.00	0.00	0.00
2	A	0.00	7.55	0.00
2	G	0.00	7.55	0.00
3	A	9.44	-7.55	0.00
3	G	9.44	-7.55	0.00
4	A	0.00	0.00	0.00
4	G	0.00	0.00	0.00

5	A	0.00	7.56	0.00
5	G	0.00	7.56	0.00
6	A	9.44	-7.56	0.00
6	G	9.44	-7.56	0.00
7	A	0.00	0.00	0.00
7	G	0.00	0.00	0.00
Summation		37.77	0.00	

^^^ BRACING DESIGN SUMMARY REPORT -- BY CONTROLLING LOAD COMBINATION ^^^

NUCOR BUILDINGS GROUP

Job Name: Ice Land
 Designer: Viviana.Perez
 File : B01.nbr

BRACING PROGRAM

Job Number : C22B0182a
 Date : 8/22/2022
 App Version: 1.5.98.0

BRACES

Memb. ID	Frame Lines	Grid/ Top Elev.	Orient.	Mat. code	Member desc.	Load comb.	Axial (k)	Axial Allowed	Min tw	Omega Applied
B1	2-3	A-B	/	RB6	3/4_ROD	8	9.10	10.89	0.115	TW ONLY
B2	2-3	A-B	\	RB6	3/4_ROD	7	9.10	10.89	0.115	TW ONLY
B3	2-3	B-C	/	RB6	3/4_ROD	8	4.55	10.89	0.056	TW ONLY
B4	2-3	B-C	\	RB6	3/4_ROD	7	4.55	10.89	0.056	TW ONLY
B5	2-3	C-D	/	RB6	3/4_ROD	8	0.94	10.89	0.007	TW ONLY
B6	2-3	C-D	\	RB6	3/4_ROD	7	0.94	10.89	0.007	TW ONLY
B7	2-3	D-E	/	RB6	3/4_ROD	7	0.94	10.89	0.007	TW ONLY
B8	2-3	D-E	\	RB6	3/4_ROD	8	0.94	10.89	0.007	TW ONLY
B9	2-3	E-F	/	RB6	3/4_ROD	7	4.55	10.89	0.056	TW ONLY
B10	2-3	E-F	\	RB6	3/4_ROD	8	4.55	10.89	0.056	TW ONLY
B11	2-3	F-G	/	RB6	3/4_ROD	7	9.10	10.89	0.115	TW ONLY
B12	2-3	F-G	\	RB6	3/4_ROD	8	9.10	10.89	0.115	TW ONLY
B13	5-6	A-B	/	RB6	3/4_ROD	8	9.10	10.89	0.115	TW ONLY
B14	5-6	A-B	\	RB6	3/4_ROD	7	9.10	10.89	0.115	TW ONLY
B15	5-6	B-C	/	RB6	3/4_ROD	8	4.55	10.89	0.056	TW ONLY
B16	5-6	B-C	\	RB6	3/4_ROD	7	4.55	10.89	0.056	TW ONLY
B17	5-6	C-D	/	RB6	3/4_ROD	8	0.94	10.89	0.007	TW ONLY
B18	5-6	C-D	\	RB6	3/4_ROD	7	0.94	10.89	0.007	TW ONLY
B19	5-6	D-E	/	RB6	3/4_ROD	7	0.94	10.89	0.007	TW ONLY
B20	5-6	D-E	\	RB6	3/4_ROD	8	0.94	10.89	0.007	TW ONLY
B21	5-6	E-F	/	RB6	3/4_ROD	7	4.55	10.89	0.056	TW ONLY
B22	5-6	E-F	\	RB6	3/4_ROD	8	4.55	10.89	0.056	TW ONLY
B23	5-6	F-G	/	RB6	3/4_ROD	7	9.10	10.89	0.115	TW ONLY
B24	5-6	F-G	\	RB6	3/4_ROD	8	9.10	10.89	0.115	TW ONLY
B25	2-3	A 20.00	/	RB8	1_ROD	7	17.18	22.92	0.150	Y
B26	2-3	A 20.00	\	RB8	1_ROD	8	17.17	22.92	0.150	Y
B27	5-6	A 20.00	/	RB8	1_ROD	7	17.17	22.92	0.150	Y
B28	5-6	A 20.00	\	RB8	1_ROD	8	17.18	22.92	0.150	Y
B29	2-3	G 20.00	/	RB8	1_ROD	7	17.18	22.92	0.150	Y
B30	2-3	G 20.00	\	RB8	1_ROD	8	17.17	22.92	0.150	Y
B31	5-6	G 20.00	/	RB8	1_ROD	7	17.17	22.92	0.150	Y
B32	5-6	G 20.00	\	RB8	1_ROD	8	17.18	22.92	0.150	Y

The minimum web thickness (Min tw) provided for Single/DoubleX-Bracing clevis connections are based on the Standard Brace Clevis plate.

STRUTS

Memb. ID	Frame Lines	Grid/ Elev.	Mat. code	Member desc.	Load comb.	Axial (k)	Axial Allowed	Omega Applied
S1L	1-2	B	-4.38	PUR	1	-0.23		N
S1R	1-2	B	0.61	PUR	1	-1.66		N
S2L	1-2	C	-0.46	PUR	3	-1.39		N
S2R	1-2	C	4.52	PUR	3	-0.14		N
S3L	1-2	D	-1.00	PUR	1	-0.53		N
S3R	1-2	D	1.00	PUR	1	-0.53		N
S4L	1-2	E	-4.52	PUR	3	-0.14		N
S4R	1-2	E	0.46	PUR	3	-1.39		N
S5L	1-2	F	-0.61	PUR	1	-1.66		N
S5R	1-2	F	4.38	PUR	1	-0.23		N
S6L	2-3	B	-4.38	PUR	8	-0.64		N
S6R	2-3	B	0.61	PUR	8	-4.65		N
S7L	2-3	C	-0.46	PUR	8	-2.02		N
S7R	2-3	C	4.52	PUR	8	-0.21		N
S8L	2-3	D	-1.00	PUR	1	-0.53		N
S8R	2-3	D	1.00	PUR	1	-0.53		N
S9L	2-3	E	-4.52	PUR	8	-0.21		N
S9R	2-3	E	0.46	PUR	8	-2.02		N
S10L	2-3	F	-0.61	PUR	8	-4.65		N
S10R	2-3	F	4.38	PUR	8	-0.64		N
S11L	3-4	B	-4.38	PUR	1	-0.09		N
S11R	3-4	B	0.61	PUR	1	-0.67		N
S12L	3-4	C	-0.46	PUR	2	-0.56		N
S12R	3-4	C	4.52	PUR	2	-0.06		N
S13L	3-4	D	-1.00	PUR	1	-0.21		N
S13R	3-4	D	1.00	PUR	1	-0.21		N
S14L	3-4	E	-4.52	PUR	2	-0.06		N
S14R	3-4	E	0.46	PUR	2	-0.56		N
S15L	3-4	F	-0.61	PUR	1	-0.67		N
S15R	3-4	F	4.38	PUR	1	-0.09		N
S16L	4-5	B	-4.38	PUR	2	-0.09		N
S16R	4-5	B	0.61	PUR	2	-0.67		N
S17L	4-5	C	-0.46	PUR	1	-0.56		N
S17R	4-5	C	4.52	PUR	1	-0.06		N
S18L	4-5	D	-1.00	PUR	2	-0.21		N
S18R	4-5	D	1.00	PUR	2	-0.21		N
S19L	4-5	E	-4.52	PUR	1	-0.06		N
S19R	4-5	E	0.46	PUR	1	-0.56		N

S20L	4-5	F	-0.61	PUR	2	-0.67		N
S20R	4-5	F	4.38	PUR	2	-0.09		N
S21L	5-6	B	-4.38	PUR	7	-0.64		N
S21R	5-6	B	0.61	PUR	7	-4.65		N
S22L	5-6	C	-0.46	PUR	7	-2.02		N
S22R	5-6	C	4.52	PUR	7	-0.21		N
S23L	5-6	D	-1.00	PUR	2	-0.53		N
S23R	5-6	D	1.00	PUR	2	-0.53		N
S24L	5-6	E	-4.52	PUR	7	-0.21		N
S24R	5-6	E	0.46	PUR	7	-2.02		N
S25L	5-6	F	-0.61	PUR	7	-4.65		N
S25R	5-6	F	4.38	PUR	7	-0.64		N
S26L	6-7	B	-4.38	PUR	2	-0.23		N
S26R	6-7	B	0.61	PUR	2	-1.66		N
S27L	6-7	C	-0.46	PUR	4	-1.39		N
S27R	6-7	C	4.52	PUR	4	-0.14		N
S28L	6-7	D	-1.00	PUR	2	-0.53		N
S28R	6-7	D	1.00	PUR	2	-0.53		N
S29L	6-7	E	-4.52	PUR	4	-0.14		N
S29R	6-7	E	0.46	PUR	4	-1.39		N
S30L	6-7	F	-0.61	PUR	2	-1.66		N
S30R	6-7	F	4.38	PUR	2	-0.23		N
S31	1-2	A	20.00	8E060B2 EaveStrut	1	-1.18	2.48	Y
S32	2-3	A	20.00	8E060B2 PipeStrut	* 8	-12.11	24.60	Y
S32	2-3	A	20.00	8E060B2 EaveStrut				Y
S33	3-4	A	20.00	8E060B2 EaveStrut	1	-0.40	2.48	Y
S34	4-5	A	20.00	8E060B2 EaveStrut	2	-0.40	2.48	Y
S35	5-6	A	20.00	8E060B2 PipeStrut	* 7	-12.11	24.60	Y
S35	5-6	A	20.00	8E060B2 EaveStrut				Y
S36	6-7	A	20.00	8E060B2 EaveStrut	2	-1.18	2.48	Y
S37	1-2	G	20.00	8E060B2 EaveStrut	1	-1.18	2.48	Y
S38	2-3	G	20.00	8E060B2 PipeStrut	* 8	-12.11	24.60	Y
S38	2-3	G	20.00	8E060B2 EaveStrut				Y
S39	3-4	G	20.00	8E060B2 EaveStrut	1	-0.40	2.48	Y
S40	4-5	G	20.00	8E060B2 EaveStrut	2	-0.40	2.48	Y
S41	5-6	G	20.00	8E060B2 PipeStrut	* 7	-12.11	24.60	Y
S41	5-6	G	20.00	8E060B2 EaveStrut				Y
S42	6-7	G	20.00	8E060B2 EaveStrut	2	-1.18	2.48	Y

*Use AC-13 clip
w/ 12ga strut
purlin 1' uphill

COST & WEIGHT SUMMARY
IN DOLLARS & LBS

	Cables	Rods	Angles	Ev/Bx/Pi Struts	Purlin Struts	Portals	Total

COST	0	1224	0	2670	0	0	3895
WEIGHT	0	1858	0	2675	0	0	4534

SECOND ORDER ANALYSIS

Automatically Select 2nd Order Method

Load Combination	Sum Yi	Sum H	Delta	B2

1 SW+RDL+COL+0.60W5B	-38.2	12.50	0.211	1.00
2 SW+RDL+COL+0.60W5F	-38.2	-12.50	0.211	1.00
3 0.60SW+0.60RDL+0.60W5B	53.0	12.50	0.211	1.00
4 0.60SW+0.60RDL+0.60W5F	53.0	-12.50	0.211	1.00
5 SW+RDL+COL+0.75RLL+0.45W5B	-194.1	9.37	0.158	1.02
6 SW+RDL+COL+0.75RLL+0.45W5F	-194.1	-9.37	0.158	1.02
7 1.07SW+1.07RDL+1.07COL+0.91EQB	-121.9	26.46	0.461	1.01
8 1.07SW+1.07RDL+1.07COL+0.91EQF	-121.9	-26.46	0.461	1.01
9 1.05SW+1.05RDL+1.05COL+0.68EQB	-120.0	19.84	0.346	1.01
10 1.05SW+1.05RDL+1.05COL+0.68EQF	-120.0	-19.84	0.346	1.01
11 0.53SW+0.53RDL+0.91EQB	-20.1	26.46	0.461	1.00
12 0.53SW+0.53RDL+0.91EQF	-20.1	-26.46	0.461	1.00
13 SW+RDL+COL+RLL+0.39NLB	-296.6	0.59	0.010	1.04
14 SW+RDL+COL+RLL-0.39NLB	-296.6	-0.59	0.010	1.04
15 SW+RDL+COL+0.15NLB	-114.1	0.23	0.004	1.01
16 SW+RDL+COL-0.15NLB	-114.1	-0.23	0.004	1.01



STEEL BUILDINGS

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Tel: (209) 983-0910

Job: C22B0182A Sheet No. H-1

Date: 11/4/22 By: VP

Hang Post Design

Wall deletion @ 12'

W8x10 Hang Post

FL-7 REW L=11.3ft trib=11.62ft

$$w = 0.6 * 23.75 \text{ psf} * 11.6 \text{ ft}$$

$$= 0.167 \text{ k/ft} \sim 0.2 \text{ k/ft}$$

$$V = 0.2 \text{ k/ft} * (11.3 \text{ ft} / 2) = 1.13 \text{ k}$$

$$M = 0.2 \text{ k/ft} * (11.3 \text{ ft})^2 / 8 = 3.2 \text{ k-ft}$$

FL-7 REW L=9.75ft trib=19.71ft

$$w = 0.6 * 23.75 \text{ psf} * 19.71 \text{ ft}$$

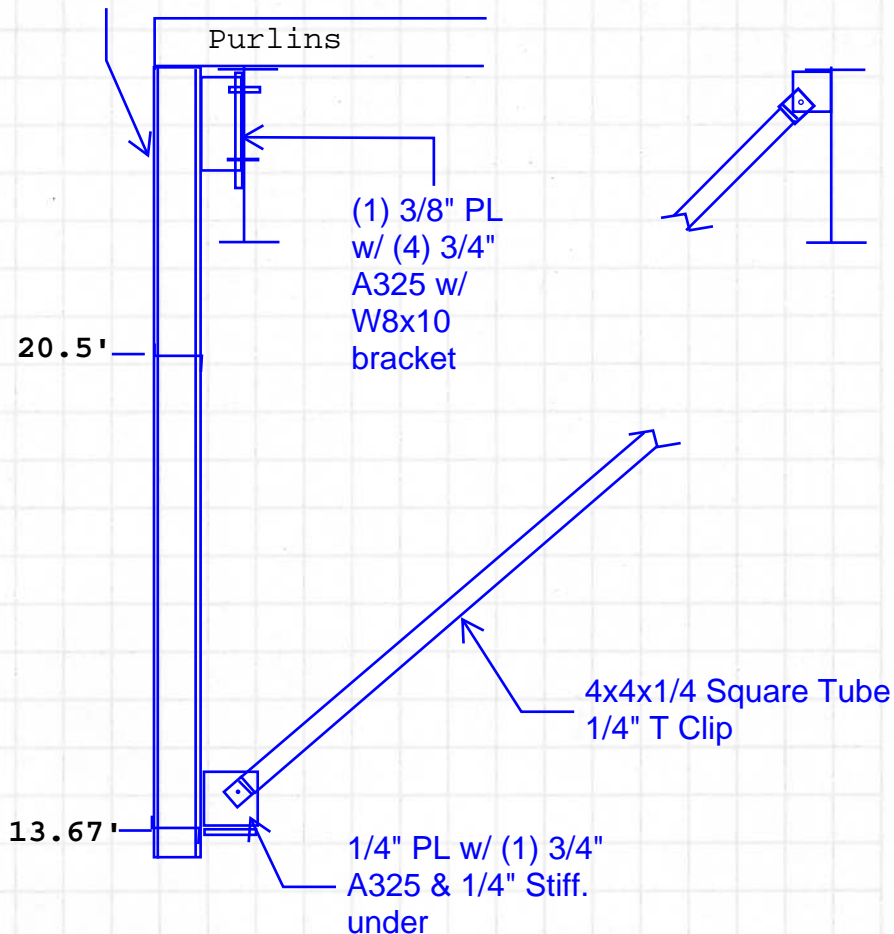
$$= 0.28 \text{ k/ft} \sim 0.3 \text{ k/ft}$$

$$V = 0.3 \text{ k/ft} * (9.75 \text{ ft} / 2) = 1.5 \text{ k}$$

$$M = 0.3 \text{ k/ft} * (9.75 \text{ ft})^2 / 8 = 3.6 \text{ k-ft}$$

$$A = 1.5 \text{ k} / \cos \theta = 4.4 \text{ k} \sim 5 \text{ k}$$

$$\theta = 70^\circ$$



Note: Align stiffener w/ girt height

BEAM-COLUMN S.S. (AISC 15th Edition)

⚠ Loads updated

MAIN REPORT: DESIGN SUMMARY

Version: 2018.09.12 (Date: 09/12/18) By NBG-GS

@7/B.9,E.1 @7/A.9,F

GENERAL INFORMATION (ENTER DATA IN GRAY SHADED CELLS!)			Span and Loading Conditions				Remarks
			Hang	Hang	Hang		
			Post REW	Post REW	Post LEW		
Member Length	L_{bx}	ft.	11.30	9.75			Assumes $L_{bx} = L$
Unbraced Length - Minor	L_{by}	ft.	6.83	6.83			
Consideration of <i>Tension Field Action</i> for Shear			FALSE	FALSE	FALSE	FALSE	<= See cell comment & Chapter G.
Clear Distance between Transverse Stiffeners	a	in.					<= See cell comment & Section G2.
Lateral-torsional buckling factor	C_b		1.000	1.000	1.000	1.000	<= See cell comment
Kx Factor	K_x		1.000	1.000	1.000	1.000	<= See cell comment
Ky Factor	K_y		1.000	1.000	1.000	1.000	
Kz Factor	K_z		1.000	1.000	1.000	1.000	
SECTION GEOMETRY							
Select Wide-flange or Built-up Section:			WF	WF	None	None	
Section Description:			W8X10	W8X10	--	--	
Enter WF-Section:			W8X10	W8X10			
Total Depth	d	in.	7.890	7.890	--	--	
Web Thickness	t_w	in.	0.170	0.170	--	--	
Outside Flange Width	b_{of}	in.	3.940	3.940	--	--	
Outside Flange Thickness	t_{of}	in.	0.205	0.205	--	--	
Inside Flange Width	b_{if}	in.	3.940	3.940	--	--	
Inside Flange Thickness	t_{if}	in.	0.205	0.205	--	--	
MATERIAL INFORMATION							
Material Strength	F_y	ksi	50	50	50	55	
Elastic Modulus	E	ksi	29,000	29,000	29,000	29,000	Standard for steel shown
Shear Modulus	G	ksi	11,200	11,200	11,200	11,200	Standard for steel shown
Flange Yield Strength	F_{yf}	ksi	50	50	50	55	
Web Yield Strength	F_{yw}	ksi	50	50	50	55	
Ultimate Strength	F_u	ksi	65	65	65	70	
APPLIED LOADS							<input type="checkbox"/> Applied Loading includes second order effects.
Factor of Safety (Allowable Stress Factor)	S_f		1.000	1.000	1.000	1.000	
Axial (compression => + pos., tension => - neg.)	P_a	kips	1.000	1.000			
Shear (absolute value)	V_x	kips	1.130	1.500			Major Axis (x-axis)
Moment (outside flange in compression => + pos.)	M_x	ft-kip	3.200	3.600			
Shear (absolute value)	V_y	kips					Minor Axis (y-axis)
Moment (absolute value)	M_y	ft-kip					

Design Results:	ASD	OK	OK	OK	--	Remarks
ASD Combined Strength Ratio	CSR	0.215	0.240	0.074	--	Eq. H1-1a or H1-1b
ASD Shear Strength Ratio (x-axis)	V_{rx}/V_{cx}	0.048	0.064	0.043	--	Major Axis (x-axis)
ASD Shear Strength Ratio (y-axis)	V_{ry}/V_{cy}	0.000	0.000	0.000	--	Minor Axis (y-axis)

Deflection Results (Major-axis)			OK	OK	OK	--	Remarks
Deflection Limits (about x-axis)			L / 180	L / 180	L / 180	L / 180	Limits as numerals (i.e. 360 = L/360)
Maximum Deflection (about x-axis)	Δ_{\max}	in.	0.753 in.	0.650 in.	0.367 in.	0.000 in.	
Member Deflection (about x-axis)	$\Delta_{x\text{-axis}}$	in.	0.082 in.	0.069 in.	0.008 in.	--	$\Delta_{x\text{-axis}} \leq \Delta_{\max}$

Deflection Results (Minor-axis)			OK	OK	OK	--	Remarks
Deflection Limits (about y-axis)			L / 180	L / 180	L / 180	L / 180	Limits as numerals (i.e. 360 = L/360)
Maximum Deflection (about y-axis)	Δ_{\max}	in.	0.753 in.	0.650 in.	0.367 in.	0.000 in.	
Member Deflection (about y-axis)	$\Delta_{y\text{-axis}}$	in.	0.000 in.	0.000 in.	0.000 in.	--	$\Delta_{y\text{-axis}} \leq \Delta_{\max}$



Project No.: C22B0182A
 Project Name: Rob Kerth Ice Land
 Engineer: VP
 Date: 8/29/2022

HSS Beam-Column (AISC 15th Ed.)

Version: 2020.05.18 (5/18/20) by NBG-GS

Span and Loading Information		Case 1	Case 2	Case 3	Case 4
Member Length	ft	24.9			
Unbraced Length - Major	in.	298.8	0	0	0
Unbraced Length - Minor	in.	298.8	0	0	0
Cbx	-	1	1	1	1
Cby	-	1	1	1	1
Cmx	-	1	1	1	1
Cmy	-	1	1	1	1
Kx	-	1	1	1	1
Ky	-	1	1	1	1
Shear Lag Factor 'U'	-	0.75	0.75	0.75	0.75
Applied Loads					
X-axis Uniform Load (+Dn)	kip/ft	0	0	0	0
Y-axis Uniform Load (+Dn)	kip/ft	0.01221	0	0	0
Axial Tension Load	kip	0	0	0	0
Axial Compression Load	kip	5	0	0	0
Mx End 1 (+Ten. On Bot.)	ft-kip	0	0	0	0
Mx End 2 (+Ten. On Bot.)	ft-kip	0	0	0	0
Mx Interior (+Ten. On Bot.)	ft-kip	0	0	0	0
My End 1 (+Ten. On Bot.)	ft-kip	0	0	0	0
My End 2 (+Ten. On Bot.)	ft-kip	0	0	0	0
My Interior (+Ten. On Bot.)	ft-kip	0	0	0	0
Vx Shear	kip	0	0	0	0
Vy Shear	kip	0	0	0	0
Torsion	ft-kip	0	0	0	0
Stress Factor	-	1	1	1	1
KL/r	-	197	---	---	---
	Result	OK	OK	OK	OK
	Max CSR	0.50	0.00	0.00	0.00
Section Information					
Section Type		Nucor Std. Tube ▼	Nucor Std. Pipe ▼	Nucor Std. Pipe ▼	Nucor Std. Pipe ▼
Section		T4.250 ▼	P6.134 ▼	P6.134 ▼	P6.134 ▼
Fy	ksi	46	42	42	42
Depth / Diameter	in.	4	6.625	6.625	6.625
Width / Diameter	in.	4	6.625	6.625	6.625
Design Thickness	in.	0.233	0.125	0.125	0.125
Design Loads					
Max Mx	ft-kip	0	0	0	0
Max My	ft-kip	0.946290263	0	0	0
Axial Tension	kip	0	0	0	0
Axial Compression	kip	5	0	0	0
Vx	kip	0	0	0	0
Vy	kip	0.1520145	0	0	0
Torsion	ft-kip	0	0	0	0
Stress Ratios					
Mx		0.000	0.000	0.000	0.000
My		0.089	0.000	0.000	0.000
Mx+My		0.089	0.000	0.000	0.000
Tension		0.000	0.000	0.000	0.000
P		0.381	0.000	0.000	0.000
M / P		0.498	0.000	0.000	0.000
Vx		0.000	0.000	0.000	0.000
Vy		0.006	0.000	0.000	0.000
M/V		0.089	0.000	0.000	0.000
Torsion		0.000	0.000	0.000	0.000
M/V/P/Torsion		0.470	0.000	0.000	0.000
M/V/Tension/Torsion		0.089	0.000	0.000	0.000
Deflection Results					
X-Axis Deflection	in.	0.000	0.000	0.000	0.000
L / X		N/A	N/A	N/A	N/A
Y-Axis Deflection	in.	0.467	0.000	0.000	0.000
L / Y		640	N/A	N/A	N/A

1 FO added



1 Framed Openings Calculation

(AISC 360-10 ASD & AISI S100-2012)

Job Number C22B0182A

Engineer VP

Module 1 ☐ FSW BAY ☒ RSW BAY ☐ LEW BAY ☐ REW BAY

DIMENSIONS

Span length (column to column)	22.42 ft
Door width (j)	12.00 ft
Door Height	12.00 ft
Distance from left column to 1 st jamb (i)	5.88 ft
Distance from header to jamb support	1.67 ft
Ht. of the girt/eave above jamb support	20.00 ft
Deflection (standard is L/90 for 50 yr. wind)	L / 90

Wall Girt Depth ☒ 8" ☐ 9.5" ☐ 12"

Nested (2) Girts ? ☒ Yes

Use Hot-Rolled Channels? ☐ Yes ☒ No

Distance Between Lateral Supports (in) N/A in

Channel Depth Selection ☐ C8 ☐ C9 ☐ C10

Use Hot Rolled Jambs? ☐ No

Use Different Depth Jambs? ☐ No

See D-20

MSA SECONDARY FRAME OUTPUT

		W
Wind pressure (50 yr. wind)	23.75 psf	0.6
Suction coefficient	-0.90	
Pressure coefficient	0.81	
Suction	-12.87 psf	
Pressure	11.57 psf	
Design spacing, jamb supp.	38.00 in	
Allowable Stress Ratio	1.03	

PANEL CONDITION

Jamb Support(s)	R =	0.65
See comment window for R values		
Header R =	0.65	Jambs R = N/A
See comment windows for R values		

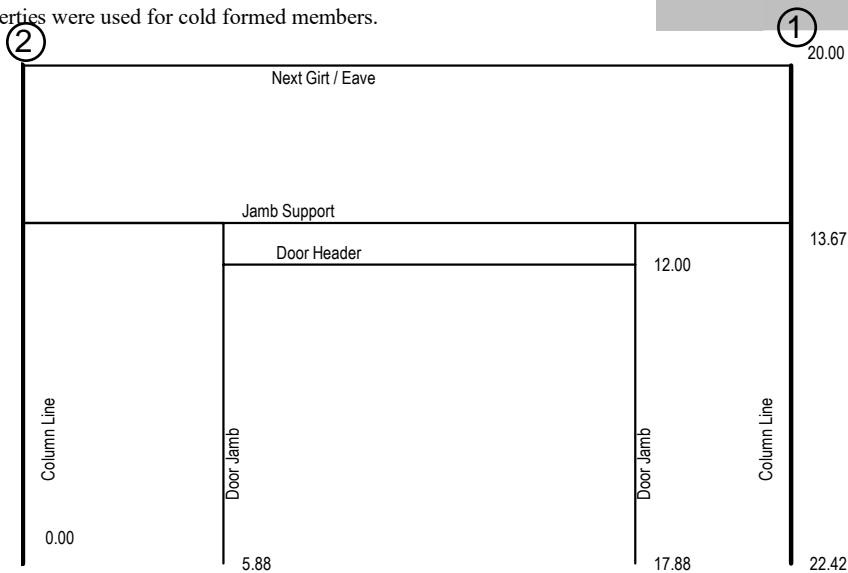
Use Different Depth Jamb Support? ☐ No

Maximum Girt Spacing = 6.167 ft

Recommended Member For Jamb Support(s)	Nested 8Z15 8Z099	Stress Ratio= 0.93	$\Delta_{max} = L / 324$
Recommended Minimum Member Size For Jambs	8C16	Stress Ratio= 0.66	$\Delta_{max} = L / 608$
Recommended Minimum Member Size For Header	8C16	Stress Ratio= 0.06	$\Delta_{max} = L / 9629$

All members are designed as simple span.

The reduced sectional properties were used for cold formed members.



 FO added



Framed Openings Calculation

(AISC 360-10 ASD & AISI S100-2012)

Job Number C22B0182A

Engineer VP

 Module 1 ☐ FSW BAY ☒ RSW BAY ☐ LEW BAY ☐ REW BAY

DIMENSIONS

Span length (column to column)	22.42 ft
Door width (j)	12.00 ft
Door Height	12.00 ft
Distance from left column to 1 st jamb (i)	1.67 ft
Distance from header to jamb support	1.67 ft
Ht. of the girt/eave above jamb support	20.00 ft
Deflection (standard is L/90 for 50 yr. wind)	L / 90

Door is 1.7 feet from column, check column weak axis bending

 Wall Girt Depth ☒ 8" ☐ 9.5" ☐ 12"

 Nested (2) Girts ? ☒ Yes

 Use Hot-Rolled Channels? ☐ Yes ☒ No

Distance Between Lateral Supports (in) N/A in

 Channel Depth Selection ☐ C8 ☐ C9 ☐ C10

 Use Hot Rolled Jambs? ☐ No

 Use Different Depth Jambs? ☐ No

MSA SECONDARY FRAME OUTPUT

		W
Wind pressure (50 yr. wind)	23.75 psf	0.6
Suction coefficient	-0.90	
Pressure coefficient	0.81	
Suction	-12.87 psf	
Pressure	11.57 psf	
Design spacing, jamb supp.	38.00 in	
Allowable Stress Ratio	1.03	

PANEL CONDITION

Jamb Support(s)	R =	0.65
See comment window for R values		
Header R =	0.65	Jambs R = N/A
See comment windows for R values		

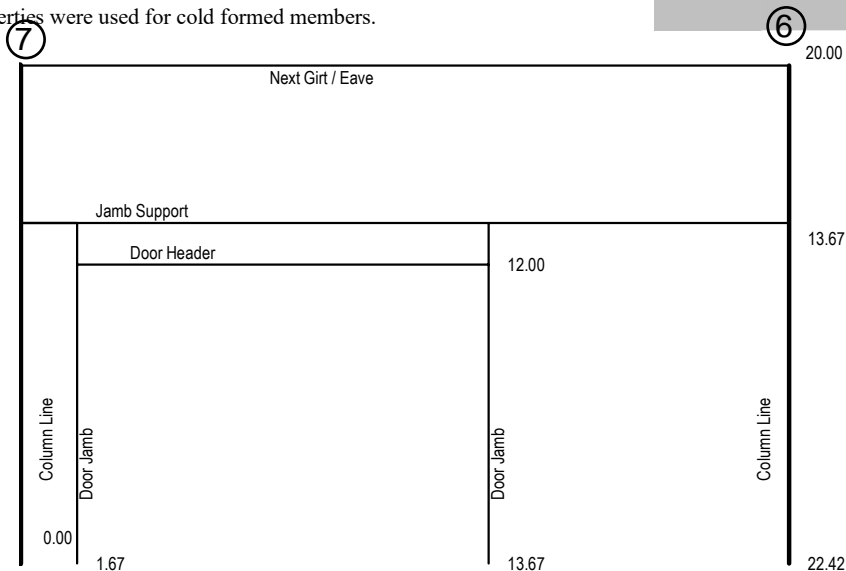
 Use Different Depth Jamb Support? ☐ No

Maximum Girt Spacing = 6.167 ft

Recommended Member For Jamb Support(s)	Nested 8Z14 8Z099	Stress Ratio= 0.95	$\Delta_{max} = L / 297$
Recommended Minimum Member Size For Jambs	8C16	Stress Ratio= 0.76	$\Delta_{max} = L / 524$
Recommended Minimum Member Size For Header	8C16	Stress Ratio= 0.06	$\Delta_{max} = L / 9629$

All members are designed as simple span.

The reduced sectional properties were used for cold formed members.





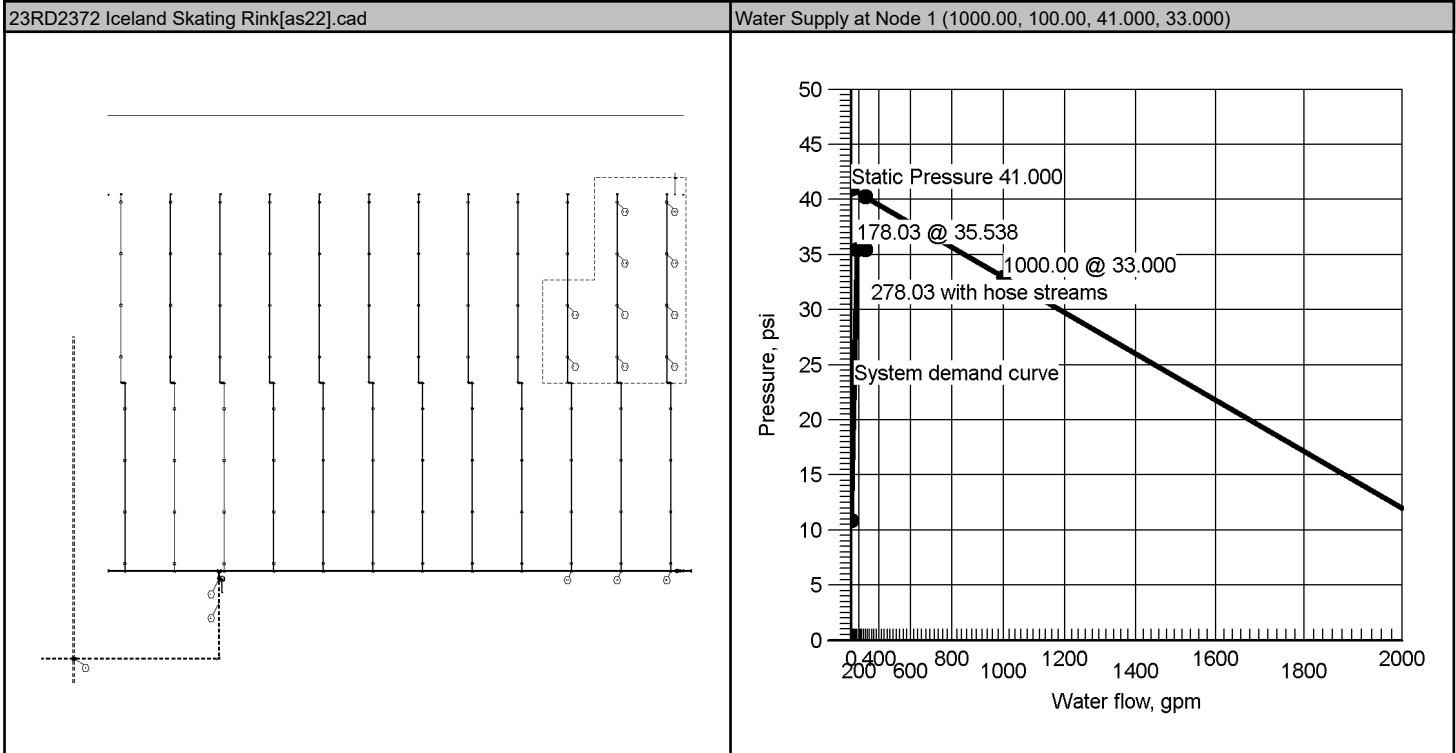
Hydraulic Overview

Job Number: 23RD2372
Report Description: Light Hazard (1)

Job		
Job Number 23RD2372	Design Engineer Byron Gonzales	
Job Name: Iceland Skating Rink	Phone 916-652-1306	FAX 916-652-1307
Address 1 1430 Del Paso Blvd.	State Certification/License Number 577921	
Address 2 Sacramento, CA 95815	AHJ City of Sacramento	
Address 3	Job Site/Building Dry Pipe System	

System	
Density 0.10 gpm/ft ²	Area of Application 1500 ft ² (Actual 1535 ft ²)
Most Demanding Sprinkler Data 5.6 K-Factor 16.30 at 8.474	Hose Streams 100.00
Coverage Per Sprinkler 163 ft ²	Number Of Sprinklers Calculated 10 0
System Pressure Demand 35.538	System Flow Demand 178.03
Total Demand 278.03 @ 35.538	Pressure Result +4.712 (11.7%)

Supplies					
Node	Name	Flow(gpm)	Hose Flow(gpm)	Static(psi)	Residual(psi)
1	Water Supply	1000.00	100.00	41.000	33.000





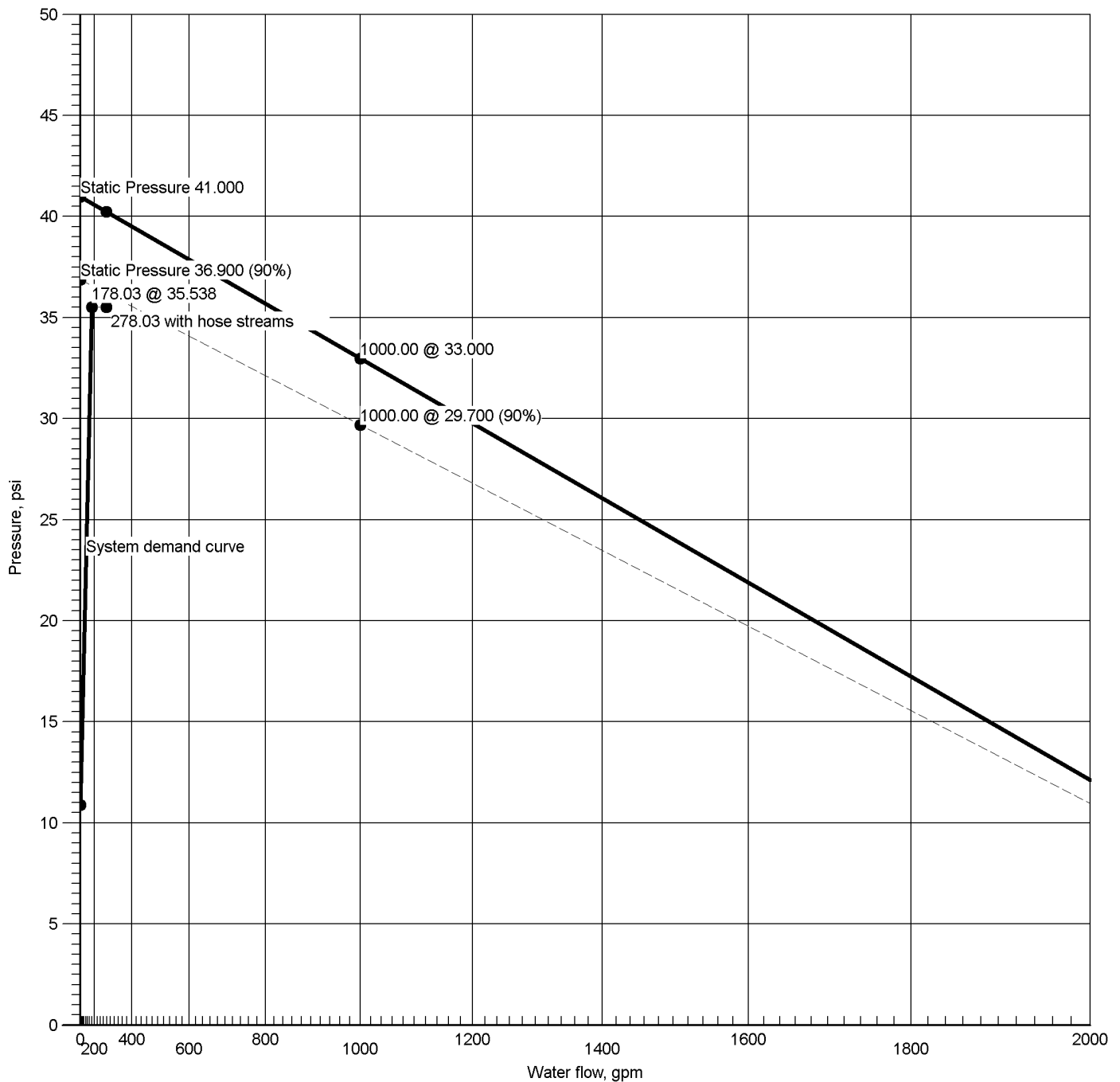
Hydraulic Summary

Job Number: 23RD2372
Report Description: Light Hazard (1)

Job											
Job Number 23RD2372				Design Engineer Byron Gonzales							
Job Name: Iceland Skating Rink				State Certification/License Number 577921							
Address 1 1430 Del Paso Blvd.				AHJ City of Sacramento							
Address 2 Sacramento, CA 95815				Job Site/Building Dry Pipe System							
Address 3				Drawing Name 23RD2372 Iceland Skating Rink[as22].cad							
System				Remote Area(s)							
Most Demanding Sprinkler Data 5.6 K-Factor 16.30 at 8.474				Occupancy Light Hazard			Job Suffix				
Hose Allowance At Source 100.00				Density 0.10 gpm/ft²			Area of Application 1500 ft² (Actual 1535 ft²)				
Additional Hose Supplies <u>Node</u> <u>Flow(gpm)</u>				Number Of Sprinklers Calculated 10		Number Of Nozzles Calculated 0		Coverage Per Sprinkler 163 ft²			
				AutoPeak Results: Pressure For Remote Area(s) Adjacent To Most Remote Area Right: 33.555							
Total Hose Streams 100.00											
System Flow Demand 178.03		Total Water Required (Including Hose Allowance) 278.03									
Maximum Pressure Unbalance In Loops 0.000											
Maximum Velocity Above Ground 9.61 between nodes 20 and 103											
Maximum Velocity Under Ground 4.20 between nodes 2 and 3											
Volume capacity of Wet Pipes 208.18 gal		Volume capacity of Dry Pipes 267.70 gal									
Supplies											
Node	Name	Hose Flow (gpm)	Static (psi)	Residual (psi)	@	Flow (gpm)	Available (psi)	@	Total Demand (gpm)	Required (psi)	Safety Margin (psi)
1	Water Supply	100.00	41.000	33.000		1000.00	40.251		278.03	35.538	4.712
Contractor											
Contractor Number 577621		Contact Name Byron Gonzales				Contact Title Designer					
Name of Contractor: Cosco Fire Protection		Phone 916-652-1306				Extension 11613					
Address 1 3850 Atherton Road		FAX 916-652-1307									
Address 2 Rocklin, CA 95765		E-mail bgonzales@coscofire.com									
Address 3		Web-Site www.coscofire.com									



Water Supply at Node 1



Hydraulic Graph

Water Supply at Node 1

Static: Pressure
41.000

Residual: Pressure
33.000 @ 1000.00

Available Pressure at System Demand
40.251 @ 278.03

Required Pressure at System Demand
35.538 @ 178.03

Required Pressure at System Demand (Including Hose Allowance at Source)
35.538 @ 278.03

Test Conducted By

City of Sacramento Community Development

Date of Test
2/29/2024

Hydrant Numbers
701

Test Witnessed By

Mario Robinson

Time of Test
10:30 AM

Location

1430 Del Paso Blvd. Sacramento, CA 9



Node Analysis

Job Number: 23RD2372
Report Description: Light Hazard (1)

Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)
1	-3-0	S, C(46-0½)	35.538	178.03
101	22-2	Spr(-16.075)	16.075	22.45
102	21-1	Spr(-16.245)	16.245	22.57
103	22-2	Spr(-9.412)	9.412	17.18
104	21-1	Spr(-8.613)	8.613	16.44
105	20-0	Spr(-8.483)	8.483	16.31
106	18-11	Spr(-8.783)	8.783	16.60
107	22-2	Spr(-9.402)	9.402	17.17
108	21-1	Spr(-8.604)	8.604	16.43
109	20-0	Spr(-8.474)	8.474	16.30
110	18-11	Spr(-8.775)	8.775	16.59
2	-3-0		34.985	
3	0-6		33.297	
10	16-0	PO(7-0½)	24.960	
20	16-0	PO(7-0½)	24.878	



Hydraulic Analysis

Job Number: 23RD2372
Report Description: Light Hazard (1)

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure	
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary	
Upstream							Total Length		
Route 1									
BL	1.6820	32.89	4.75	100		0.045915	13-0½	Pf	0.599
109	20-0	16.30	5.6	8.474		Sprinkler		Pe	-0.469
108	21-1			8.604				Pv	
BL	1.6820	49.32	7.12	100		0.097142	13-0½	Pf	1.267
108	21-1	16.43	5.6	8.604		Sprinkler		Pe	-0.469
107	22-2			9.402				Pv	
BL	1.6820	66.49	9.60	100		0.168827	58-0½ 17-8 75-8½	Pf	12.781
107	22-2	17.17	5.6	9.402		Sprinkler,		Pe	2.672
30	16-0			24.855		3E(3-6½), PO(7-0½)		Pv	
CM	4.2600	66.49	1.50	100		0.001828	12-6 12-6	Pf	0.023
30	16-0			24.855				Pe	
20	16-0			24.878				Pv	
CM	4.2600	133.01	2.99	100		0.006593	12-6 12-6	Pf	0.082
20	16-0	66.52		24.878		Flow (q) from Route 2		Pe	
10	16-0			24.960				Pv	
CM	4.2600	178.03	4.01	100		0.011307	104-8 39-5 144-1	Pf	1.621
10	16-0	45.02		24.960		Flow (q) from Route 5		Pe	6.715
3	0-6			33.297		T(18-9½), E(9-4½), DPV, BV(11-3)		Pv	
UG	4.1600	178.03	4.20	140		0.006812	9-6 15-7 25-1	Pf	0.171
3	0-6			33.297				Pe	1.517
2	-3-0			34.985		E(15-7)		Pv	
UG	4.3900	178.03	3.77	150		0.004613	50-9½ 69-0½ 119-10	Pf	0.553
2	-3-0			34.985				Pe	
1	-3-0			35.538		E(23-0), S, C(46-0½)		Pv	
		100.00				Hose Allowance At Source			
1		278.03							
Route 2									
BL	1.6820	32.91	4.75	100		0.045957	13-0½	Pf	0.600
105	20-0	16.31	5.6	8.483		Sprinkler		Pe	-0.469
104	21-1			8.613				Pv	
BL	1.6820	49.34	7.12	100		0.097235	13-0½ 13-0½	Pf	1.268
104	21-1	16.44	5.6	8.613		Sprinkler		Pe	-0.469
103	22-2			9.412				Pv	
BL	1.6820	66.52	9.61	100		0.168991	58-0½ 17-8 75-8½	Pf	12.793
103	22-2	17.18	5.6	9.412		Sprinkler,		Pe	2.672
20	16-0			24.878		3E(3-6½), PO(7-0½)		Pv	
Route 3									
BL	1.6820	16.59	2.40	100		0.012942	13-0½ 13-0½	Pf	0.169
110	18-11	16.59	5.6	8.775		Sprinkler		Pe	-0.469
109	20-0			8.474				Pv	
Route 4									
BL	1.6820	16.60	2.40	100		0.012954	13-0½ 13-0½	Pf	0.169
106	18-11	16.60	5.6	8.783		Sprinkler		Pe	-0.469
105	20-0			8.483				Pv	
Route 5									
BL	1.6820	45.02	6.50	100		0.082077	58-0½ 17-8 75-8½	Pf	6.214
101	22-2	22.57	5.6	16.075		Sprinkler,, Flow (q) from Route 6		Pe	2.672
10	16-0			24.960		3E(3-6½), PO(7-0½)		Pv	
Route 6									
BL	1.6820	22.57	3.26	100		0.022879	13-0½ 13-0½	Pf	0.298
102	21-1	22.57	5.6	16.245		Sprinkler		Pe	-0.469
101	22-2			16.075				Pv	

Equivalent Pipe Lengths of Valves and Fittings (C=120 only)

C Value Multiplier

$$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$$

Value Of C	100	130	140	150
Multiplying Factor	0.713	1.16	1.33	1.51



Hydraulic Analysis

Job Number: 23RD2372
Report Description: Light Hazard (1)

Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	

Pipe Type Legend	Units Legend		Fittings Legend	
AO Arm-Over	Diameter	Inch	ALV Alarm Valve	
BL Branch Line	Elevation	Foot	AngV Angle Valve	
CM Cross Main	Flow	gpm	b Bushing	
DN Drain	Discharge	gpm	BaV Ball Valve	
DR Drop	Velocity	fps	BFP Backflow Preventer	
DY Dynamic	Pressure	psi	BV Butterfly Valve	
FM Feed Main	Length	Foot	C Cross Flow Turn 90°	
FR Feed Riser	Friction Loss	psi/Foot	cplg Coupling	
MS Miscellaneous	HWC	Hazen-Williams Constant	Cr Cross Run	
OR Outrigger	Pt	Total pressure at a point in a pipe	CV Check Valve	
RN Riser Nipple	Pn	Normal pressure at a point in a pipe	DeV Deluge Valve	
SN Swing Nipple	Pf	Pressure loss due to friction between points	DPV Dry Pipe Valve	
SP Sprig	Pe	Pressure due to elevation difference between indicated points	E 90° Elbow	
ST Stand Pipe	Pv	Velocity pressure at a point in a pipe	EE 45° Elbow	
UG Underground			Ee1 11¼° Elbow	
			Ee2 22½° Elbow	
			f Flow Device	
			fd Flex Drop	
			FDC Fire Department Connection	
			fE 90° FireLock(TM) Elbow	
			fEE 45° FireLock(TM) Elbow	
			flg Flange	
			FN Floating Node	
			fT FireLock(TM) Tee	
			g Gauge	
			GloV Globe Valve	
			GV Gate Valve	
			Ho Hose	
			Hose Hose	
			HV Hose Valve	
			Hyd Hydrant	
			LtE Long Turn Elbow	
			mecT Mechanical Tee	
			Noz Nozzle	
			P1 Pump In	
			P2 Pump Out	
			PIV Post Indicating Valve	
			PO Pipe Outlet	
			PrV Pressure Relief Valve	
			PRV Pressure Reducing Valve	
			red Reducer/Adapter	
			S Supply	
			sCV Swing Check Valve	
			SFx Seismic Flex	
			Spr Sprinkler	
			St Strainer	
			T Tee Flow Turn 90°	
			Tr Tee Run	
			U Union	
			WirF Wirsbo	
			WMV Water Meter Valve	
			Z Cap	

WATER SUPPLY TEST - DEPARTMENT OF UTILITIES

City of Sacramento Community Development Dept. 300 Richards Blvd., 3rd Floor Sacramento, CA 95811	WORK ORDER #: 597935		WST NUMBER: 2403443	
	ANALYSIS FEE: \$519.00		DATE PAID: 2/16/2024	
	FIELD TEST FEE: \$1,092.00		DATE PAID: 2/16/2024	
	HYDRAULIC BOUNDARY CONDITION		DATE PAID:	
CONTACT: Rob Kerth	FEE: \$615.00; optional see item (3) below.		TEST NUMBER: 1 of 1	
COMPANY: American Iceland, LLC	PHONE NUMBER: (916) 799-3121		rob@kerth.us	
ADDRESS: 539 Southgate RD Sacramento, CA 95815	Site location		1430 Del Paso Boulevard, Sacramento, CA, 95815	
	ASSESSOR'S PARCEL NUMBER: 275-0125-007-0000			

The undersigned agrees to the following items and conditions:

- (1) The street address and/or parcel number shown above is correct
- (2) Water supply data is developed from several sources of information which may include water supply test data, computer models, and pressure recording stations. The water supply data given is to be used for design purposes.
- (3) Based on hydrant locations, test results may not provide accurate flow information at the point of connection, for a fee the City can provide the hydraulic analysis necessary to transfer the results to a single point of connection.
- (4) Although the water supply data reported herein is believed to be accurate, the City makes no warranty, guaranty, certification or other representation of any kind that such data is accurate or correct, or that the pressures and/or flow rates reported herein can or will be maintained. The undersigned agrees that the City, its officers and employees shall not be liable for any damages of any kind resulting from the use of or reliance upon the water supply data reported herein by the undersigned or by any third party.
- (5) When more than one water supply test has been performed, the decision is left to the Fire Plan Checker as to which water supply test is to be used.
- (6) If the undersigned desires to witness the water supply test performed by the City, please check the box below:
☐ I want to witness this water supply test, which will be scheduled at the convenience of the Department of Utilities.
- (7) If the undersigned elects to hire a licensed engineer, at the undersigned's sole expense, to witness and certify the water supply test performed by the City, please check the box below:
☐ At my expense, I will arrange for a licensed engineer to witness and certify this water supply test, which will be scheduled at the convenience of the Department of Utilities.

PRINT NAME: Rob Kerth

SIGNATURE: 

DATE: 2/15/2024

DATE OF TEST: 2/29/2024				TIME OF TEST: 10:30 AM						
WTR. MAIN SIZE: 6				TEST CONDUCTED BY: Mario Robinson						
	Hydrant Number	Map Page	Static Pres. (PSI)	Residual Pres. (PSI)	Pitot Pres. (PSI)	Outlet Dia. (Inches)	Coefficient		Calc. Flow @ Pres. (GPM)	Flow @ 20 PSI (G.P.M.)
							C ₁	C ₂		
Residual	**	X18	46	38						
Flowed	701	X18			36	2.5	0.90	1.00	1007	1695
Flowed										
Flowed										
Flowed										

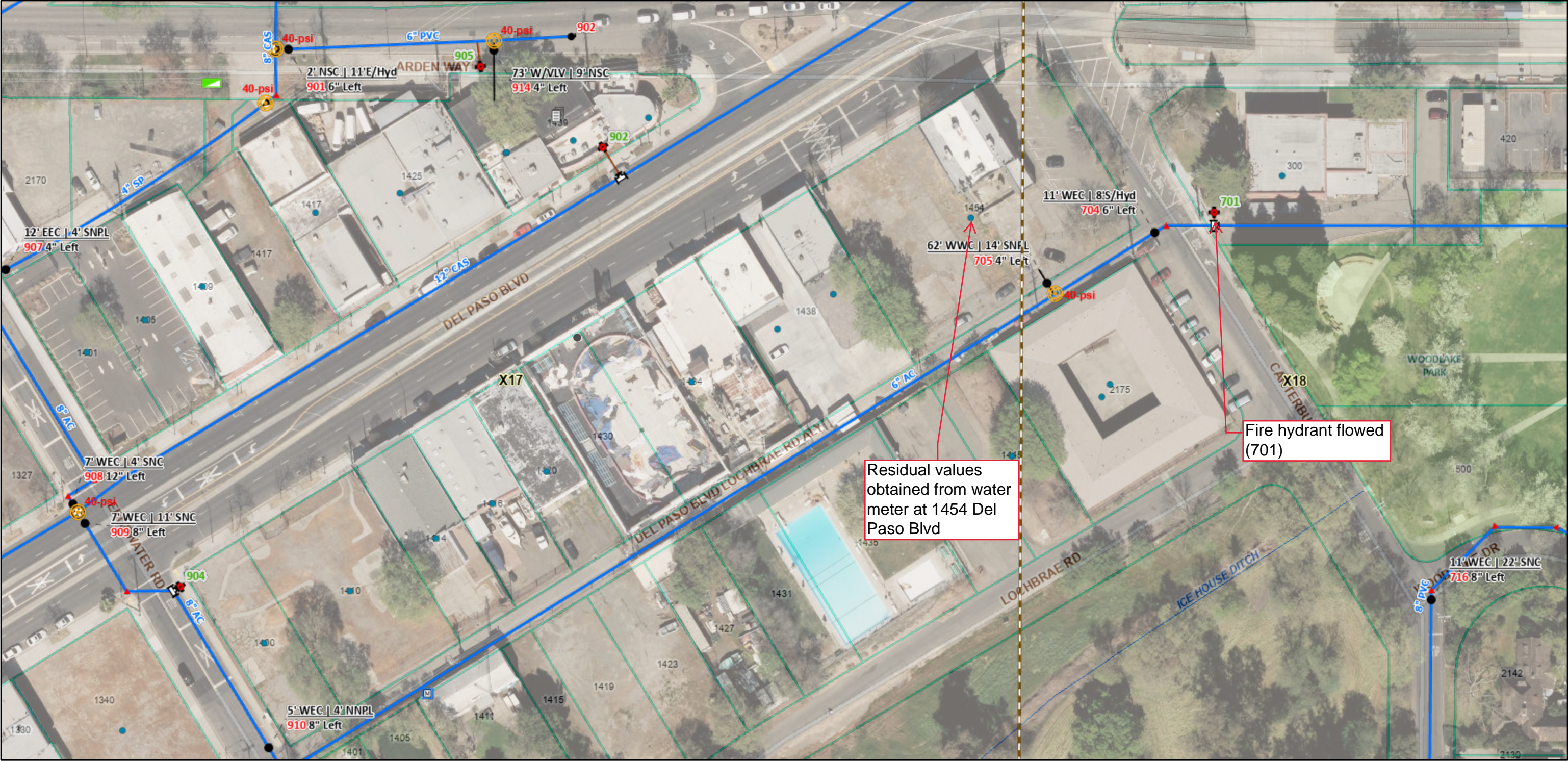
* THE WATER SUPPLY TEST DATA IS NOT TO BE USED FOR THE DESIGN OF DOMESTIC WATER SYSTEMS.
 * (STATIC PRES. - RESIDUAL PRES.) / (STATIC PRES. - 20 PSI) MUST NOT BE LESS THAN 25%. THEREFORE, THESE RESULTS ARE ONLY VALID FOR RESIDUAL PRESSURES LESS THAN 40 PSI

WATER SUPPLY DATA SUMMARY

	Design (1)
Static Pressure	41 PSI
Residual Pressure	33 PSI
Total Flow @ Residual	1000 G.P.M.
Total Flow @ 20 PSI	1700 G.P.M.

(1) The Design Water Supply Data reflects fluctuations and future demands on the water distribution system. It is to be used for design purposes. HA

UTILITY MAP



3/5/2024, 8:09:20 AM

DOU Map Book Grid

Water Pressure

38 - 41

DOU Documents

Hold Harmless

Water Lateral Lines (City Owned)

Hydrant

Unknown

Water Mains (City Owned)

Distribution

Water Service Connections (Centroids) (City Owned)

Water Service Connections (New) (City Owned)

Domestic

Water Hydrants (City Owned)

Standard

Water Control Valves (City Owned)

Blowoff

Water System Valves (City Owned)

Gate

Water Backflow Prevention Assemblies (City Owned)

Irrigation

Water Fittings (City Owned)

Cross

Elbow

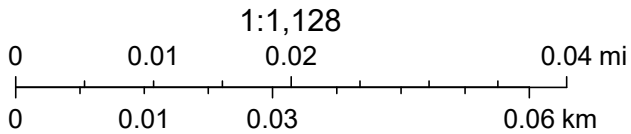
Reducer

Tee

Parcel Boundary

Parks

EXISTING



N. Jennings, Esri Community Maps Contributors, County of Sacramento, California State Parks, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/ NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, USFWS