STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
Web Site: portal.ct.gov/csc

VIA ELECTRONIC MAIL

August 31, 2022

Theresa Ranciato-Viele
Consultant
Tectonic Engineering
63-3 N. Branford Road
Branford, CT 06405
tranciato@tectonicengineering.com

RE: **TS-DISH-091-220715** – Dish Wireless, LLC request for an order to approve tower sharing at an existing telecommunications facility located at 302 Ball Pond Road, New Fairfield, Connecticut.

Dear Ms. Ranciato-Viele:

The Connecticut Siting Council (Council) is in receipt of your correspondence of August 22, 2022 submitted in response to the Council's August 17, 2022 notification of an incomplete request for tower sharing with regard to the above-referenced matter.

The submission renders the request for tower sharing complete and the Council will process the request in accordance with the Federal Communications Commission 60-day timeframe.

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman
Executive Director

MAB/IN/emr

c: Ray Lemley, Construction Services of Branford (rlemley@csofb.com)

From: Ray Lemley <rlemley@csofb.com>
Sent: Monday, August 22, 2022 6:54 AM
To: CSC-DL Siting Council <Siting.Council@ct.gov>
Cc: Nwankwo, Ifeanyi <Ifeanyi.Nwankwo@ct.gov>; Ranciato, Theresa <TRanciato@tectonicengineering.com>; Bartley, Danielle <DBartley@tectonicengineering.com>
Subject: TS-Dish-091-220715/302 Ball Pond Rd., New Fairfield

Good morning:

Per the Incomplete Letter for the above location, attached please find a Mount Analysis. A hard copy is being mailed.

Thank you,
Ray Lemley

RAY LEMLEY

Construction Services of Branford

63-3 N. Branford Road, Branford CT 06405

Main: (203) 488-0712 **Direct:** (203) 433-7533

Fax: (203) 481-1135 **Mobile:** (203) 499-8631

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Date: **August 19, 2022**

Proposed Mount Analysis Report

Project Information:

Carrier:	Dish Wireless
Site Number:	NJJER01134A
Site Address:	302 Ball Pond Rd, New Fairfield, Fairfield County, CT 06812
Site Type:	Platform w/ Railing Mount on Monopole

Tectonic Project Number: 10710.NJJER01134A

Tectonic Engineering Consultants, Geologists & Land Surveyors, D.P.C., Inc. is pleased to submit this **"Mount Analysis Report"** to determine the structural integrity of the above-mentioned proposed mount.

The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

Mount: **Sufficient – 48%**

This analysis has been performed in accordance with the 2018 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 115 mph converted to a nominal 3-second gust wind speed of 89 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B with a maximum topographic factor, Kzt, of 1.0 and Risk Category III was used in this analysis.

We at Tectonic appreciate the opportunity of providing our continuing professional services to you and Dish Wireless. If you have any questions or need further assistance on this or any other projects, please give us a call.

Structural analysis prepared by: John-Fritz Julien / Ian Marinaccio

Respectfully submitted by:
Tectonic Engineering Consultants, Geologists & Land Surveyors D.P.C., Inc.

Edward N. Iamiceli, P.E.
Managing Director - Structural

STATE OF CONNECTICUT
EDWARD N. IAMICELI
PEN.0028473
LICENSED
PROFESSIONAL ENGINEER

Project Contact Info

1279 Route 300 | Newburgh, NY 12550
845.567.6656 Tel | 845.567.8703 Fax

tectonicengineering.com
Equal Opportunity Employer

TABLE OF CONTENTS

1) INTRODUCTION

Analysis of the proposed antenna mounts due to the loading of the proposed antennas, equipment, and related appurtenances. The proposed mount is a platform mount manufactured by CommScope, P/N: MC-PK8-DSH with a handrail.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-G
Risk Category:	III
Wind Speed:	89 mph
Exposure Category:	B
Topographic Factor:	1.0
Ice Thickness:	0.75 in
Wind Speed with Ice:	50 mph
Service Load:	60 mph

Table 1 - Proposed Equipment Loading Information

Mounting Level (ft)	Carrier Designation	Number of Antennas	Antenna Manufacturer	Antenna Model	Proposed Mount Type	Note
165.0	Dish Wireless	3	JMA	MX08FR0665-21	CommScope MC-PK8-DSH w/ HR	1
		3	Fujitsu	TA08025-B604 RRH		
		3	Fujitsu	TA08025-B605 RRH		
		1	Raycap	RDIDC-9181-PF-48		

Note:
1) Proposed equipment to be installed on the proposed mounts.

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Dated
Mount Assembly Drawings	CommScope, P/N: MC-PK8- DSH	03/17/2021
Field Notes & Photos	Tectonic	03/31/2021
RFDS	Dish Wireless	08/06/2021
Construction Drawings	Tectonic	06/30/2022

3.1) Analysis Method

A tool internally developed, using Microsoft Excel, was used to calculate wind loading on all appurtenances and mount members. This information was then used in conjunction with another program, RISA-3D, which is a commercially available analysis software package, used to check the antenna mounting system and calculate member stresses for various loading cases. The selected output from the analysis is included in Appendices B and C.

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed, and maintained in good condition in accordance with its original design, TIA Standards, and/or manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Tables 1 and 2.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
4) Member length and sizes are based solely on the assembly drawing by CommScope, referenced above.

5) Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM 500 (GR B-46)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325

This analysis may be affected if any assumptions are not valid or have been made in error. Tectonic should be notified to determine the effect on the structural integrity of the mount.

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform Mount)

Notes	Component	Mount Centerline (ft)	% Capacity	Pass / Fail
1	Standoff End Plate	165.0	26	Pass
	Grating Support Angle		12	Pass
	Face Horizontal		19	Pass
	Mount Pipe		23	Pass
	Standoff Channel		35	Pass
	Standoff		29	Pass
	Rail Connector		20	Pass
	Railing		18	Pass
2	Collar Connection		48	Pass
Structure Rating (max from all components) =				**48 %**

Notes:
1) See additional documentation in "Appendix C - Analysis Output" for calculations supporting the % capacity consumed.
2) See additional documentation in "Appendix D – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Result / Conclusions

The proposed platform mount has adequate capacity to support the proposed antenna and equipment installation as detailed in the following report.

This structural analysis only includes evaluation of the antenna mounts and not the monopole.

Contractor shall field verify existing conditions and recommendations as noted on the construction drawings and notify the design engineer of any discrepancies prior to construction. Any further changes to the antenna and/or appurtenance configuration should be reviewed with respect to their effect on structural loads prior to implementation.

APPENDIX A

SOFTWARE INPUT CALCULATIONS

CONNECTICUT DESIGN CRITERIA - STATE

CT is NOT a Home Rule State; Tab added only for Design Criteria

(APPENDIX N) MUNICIPALITY - SPECIFIC STRUCTURAL DESIGN PARAMETERS

Municipality	Ground Snow Load	*Wind Design Parameters*							
		MCE Spectral Accelerations (%g)		Ultimate Design Wind Speeds, V_{ult} (mph)			Nominal Design Wind Speeds, V_{asd} (mph)		
		S_s	S_1	Risk Cat.I	Risk Cat.II	Risk Cat III-IV	Risk Cat. I	Risk Cat. II	Risk Cat. III-IV
Montville	30	0.165	0.059	125	135	145	97	105	112
Morris	35	0.187	0.065	110	120	125	85	93	97
Naugatuck	30	0.190	0.064	110	125	135	85	97	105
New Britain	30	0.183	0.064	115	125	135	89	97	105
New Canaan	30	0.240	0.068	110	120	130	85	93	101
New Fairfield	35	0.212	0.067	105	115	125	81	89	97
New Hartford	40	0.180	0.065	110	120	130	85	93	101
New Haven	30	0.186	0.062	115	125	135	89	97	105
Newington	30	0.182	0.064	115	125	135	89	97	105
New London	30	0.161	0.058	125	135	145	97	105	112
New Milford	35	0.198	0.066	105	115	125	81	89	97
Newtown	30	0.208	0.066	110	120	130	85	93	101
Norfolk	40	0.175	0.065	105	115	125	81	89	97
North Branford	30	0.179	0.061	120	130	140	93	101	108
North Canaan	40	0.173	0.065	105	115	120	81	89	93
North Haven	30	0.184	0.062	115	125	135	89	97	105
North Stonington	30	0.163	0.059	125	135	145	97	105	112
Norwalk	30	0.232	0.067	110	120	130	85	93	101
Norwich	30	0.168	0.060	125	135	145	97	105	112
Old Lyme	30	0.164	0.059	125	135	145	97	105	112
Old Saybrook	30	0.164	0.059	125	135	145	97	105	112
Orange	30	0.192	0.063	115	125	135	89	97	105
Oxford	30	0.196	0.064	110	125	130	85	97	101
Plainfield	35	0.170	0.061	125	135	145	97	105	112
Plainville	35	0.184	0.064	115	125	135	89	97	105
Plymouth	35	0.186	0.064	110	120	130	85	93	101
Pomfret	40	0.172	0.063	120	130	140	93	101	108
Portland	30	0.180	0.063	115	130	135	89	101	105
Preston	30	0.167	0.060	125	135	145	97	105	112
Prospect	30	0.188	0.064	115	125	135	89	97	105
Putnam	40	0.172	0.063	120	130	140	93	101	108
Redding	30	0.220	0.067	110	120	130	85	93	101
Ridgefield	30	0.230	0.068	110	120	125	85	93	97
Rocky Hill	30	0.181	0.063	115	125	135	89	97	105
Roxbury	35	0.197	0.065	110	120	125	85	93	97
Salem	30	0.170	0.060	120	135	140	93	105	108
Salisbury	40	0.173	0.065	105	115	120	81	89	93
Scotland	30	0.172	0.061	120	130	140	93	101	108
Seymour	30	0.194	0.064	115	125	135	89	97	105
Sharon	40	0.179	0.065	105	115	120	81	89	93
Shelton	30	0.199	0.064	115	125	135	89	97	105
Sherman	35	0.202	0.066	105	115	120	81	89	93

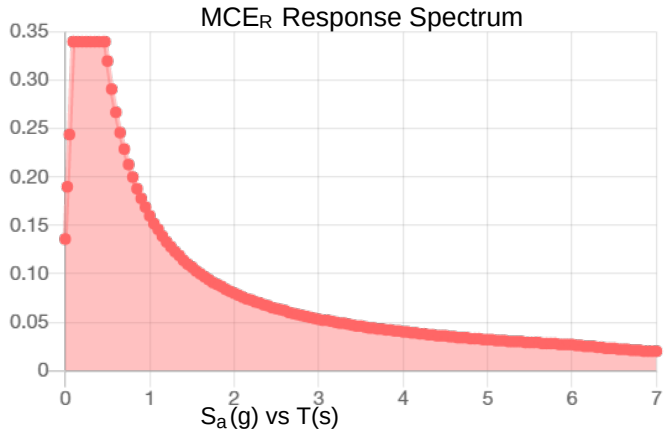
Seismic

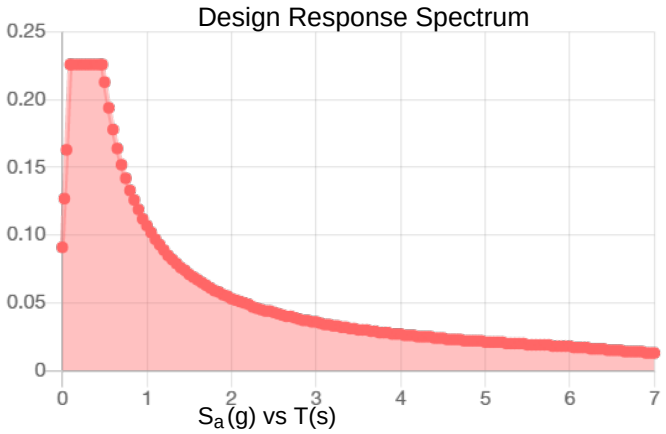
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.212	S_{DS} :	0.226
S_1 :	0.067	S_{D1} :	0.107
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.115
S_{MS} :	0.34	PGA_M :	0.18
S_{M1} :	0.16	F_{PGA} :	1.57
		I_e :	1

Seismic Design Category B





Data Accessed: Mon Aug 16 2021

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Mon Aug 16 2021

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Tectonic	Job No.	10710.NJJER01134A		
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.	Sheet No.	1	of	3
	Calculated By	JJ	Date :	08/19/22
	Checked By	IM	Date :	08/19/22

WIND AND ICE LOADS PER TIA-222-G

W.O.	10710.NJJER01134A
Project Name	NJJER01134A
Location	302 Ball Pond Rd, New Fairfield, CT 06812
County	Fairfield

Tower Type	MP	Monopole
Risk Category	III	High hazard or Essential facility
Exposure Category	B	Suburban/wooded/obstructed
Topo Category	1	Flat or rolling terrain
Height of crest	0	ft

Basic Wind Speed (3-sec gust):		
Without ice	89	mph*
With ice	50	mph
Service	60	mph
Ice thickness	0.75	in

Importance Factor	
Wind only	1.15
Wind with ice	1.00
Ice thickness	1.25
Supporting Data:	
K_e	0.90
K_t	N/A
f	N/A
z_g	1200
α	7
$K_{z,min}$	0.7
K_d	0.95
G_h	1.00

Height	z (ft)	165
	Kh	N/A
	Kzt	1.00
	Kz	1.14
	Kiz	1.17
Wind Pressure, qz (psf)	No Ice	25.26
	With Ice	6.93
	Service	11.48
(tiz)	Ice Thk	2.20
Appurtenances (qzGh)	No Ice	25.26
	With Ice	6.93
	Service	11.48

*Ultimate 3-second gust wind speed of 115 mph converted to a nominal 3-second wind gust speed of 89 mph per Section 1609.3 and Appendix N, as required for use in the TIA-222-G Standard.

Tectonic

PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Job No.	10710.NJJER01134A		
Sheet No.	2	of	3
Calculated By	JJ	Date :	08/19/22
Checked By	IM	Date :	08/19/22

Appurtenance Information

Effective Projected Area for Appurtenance $(EPA)_A=Max((EPA)_N,(EPA)_T)$

$(EPA)_T=\sum(C_aA_A)_T$ | $(EPA)_N=\sum(C_aA_A)_N$

Reduction Factor = 0.9

Wind Only Load Combinations

Antenna Configuration	(E) or (P)	Qty	z (ft)	Length or Diameter (ft)	Width (in)	Depth (in)	Flat or Cylindrical?	Antenna $(Ca)_T$	Antenna $(Ca)_N$	Side Face $(Aa)_T$ (ft^2)	Wind ward Side Face (CaAa)T (ft^2)	Face Normal $(A_a)_N$ (ft^2)	Windward face Normal $(C_aA_a)_N$ (ft^2)	Normal Antenna Wind Load Each (lb)	Transverse Antenna Wind Load Each (lb)	Antenna Weight (lb)	Total Weight (lb)
MX08FRO665-21	P	3	165	6.00	20.00	8.00	Flat	1.47	1.25	4.00	15.84	10.00	33.72	293	138	82.5	247.5
TA08025-B604 RRH	P	3	165	1.24	15.70	7.80	Flat	1.20	1.20	0.81	2.61	1.62	5.26	46	23	63.9	191.7
TA08025-B605 RRH	P	3	165	1.24	15.70	9.00	Flat	1.20	1.20	0.93	3.02	1.62	5.26	46	26	74.9	224.7
RDIDC-9181-PF-48	P	1	165	1.58	14.39	8.15	Flat	1.20	1.20	1.07	1.16	1.90	2.05	53	30	21.8	21.8
										$\sum(CaAA)_T$	22.63	$\sum(CaAa)_N$	46.30				686

Wind with Ice Load Combinations **Ice Thk=** 2.20 in

Antenna Configuration	(E) or (P)	Qty	z (ft)	Length or Diameter (ft)	Width (in)	Depth (in)	Flat or Cylindrical?	Antenna $(Ca)_T$	Antenna $(Ca)_N$	Side Face $(A_a)_T$ (ft^2)	Windward Side Face (CaAa)T (ft^2)	Face Normal $(A_a)_N$ (ft^2)	Windward Face Normal $(C_aA_a)_N$ (ft^2)	Normal Antenna Wind Load Each (lb)	Transverse Antenna Wind Load Each (lb)	Ice Area for Weight (ft^2)	Ice Weight Alone (lbs)
MX08FRO665-21	P	3	165.00	6.37	20.37	8.37	Flat	1.47	1.26	4.44	17.63	10.81	36.64	85	41	28.0	287.8
TA08025-B604 RRH	P	3	165.00	1.61	16.07	8.17	Flat	1.20	1.20	1.09	3.55	2.15	6.98	16	8	4.9	50.0
TA08025-B605 RRH	P	3	165.00	1.61	16.07	9.37	Flat	1.20	1.20	1.26	4.07	2.15	6.98	16	9	5.1	52.5
RDIDC-9181-PF-48	P	1	165.00	1.95	14.76	8.52	Flat	1.21	1.20	1.38	1.51	2.40	2.59	18	10	5.9	61.1
										$\sum(CaAA)_T$	26.76	$\sum(CaAa)_N$	53.18				451

Tectonic

PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Job No.	10710.NJJER01134A		
Sheet No.	3	of	3
Calculated By	JJ	Date :	08/19/22
Checked By	IM	Date :	08/19/22

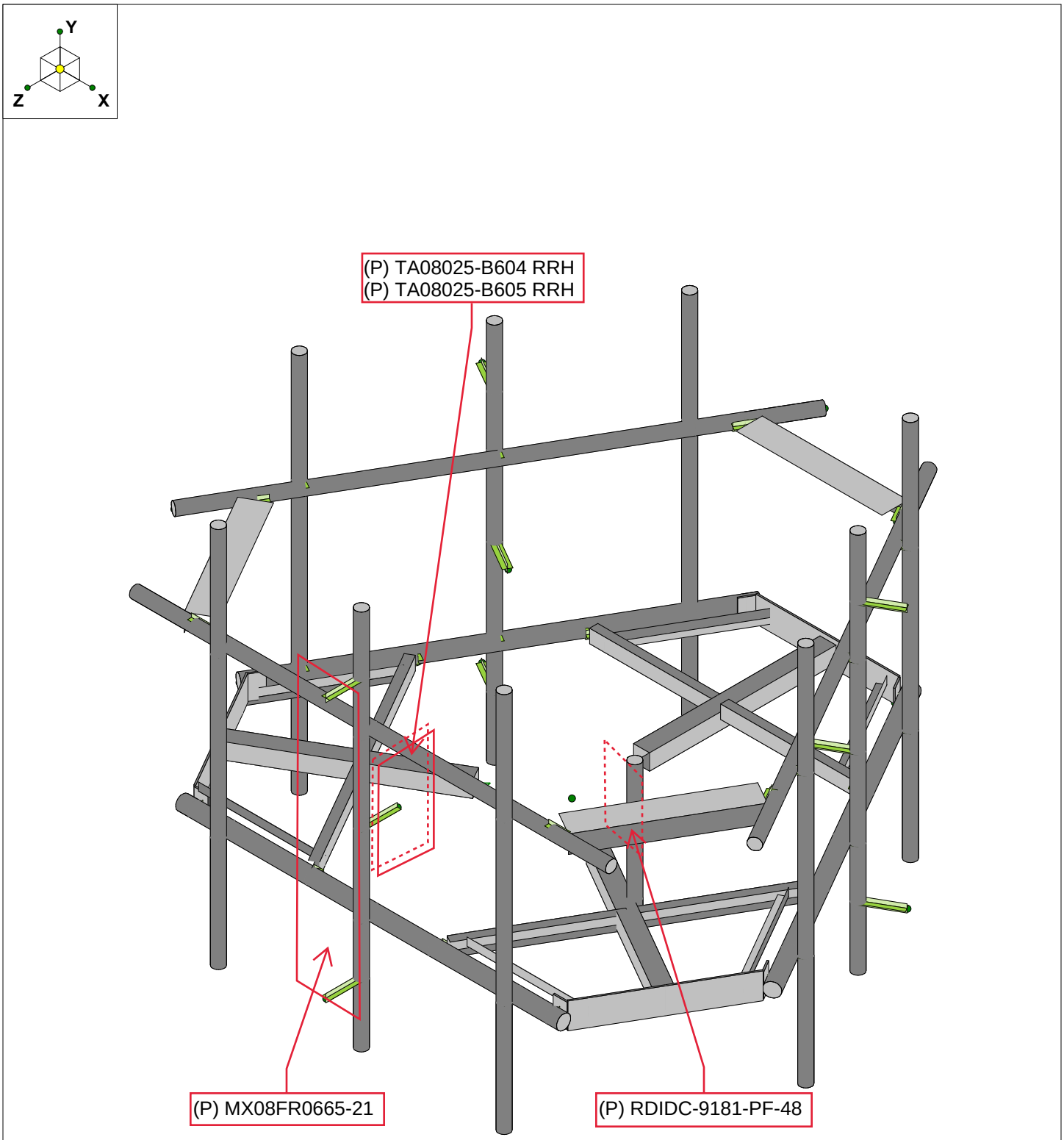
Mounting System Information

						Reduction Factor =		0.9		
Mount Part	**Projected Width (in)**	**Depth (in)**	**Flat or Cylindrical ?**	**Drag Factor**	**Projected Area (ft^2)**	**Wind Force (lbs/ft)**	**Ice Weight Area (ft^2)**	**Ice Weight (lbs/ft)**	**Projected Area with Ice (ft^2)**	**Wind Force Ice (lbs/ft)**
6.5"x3/8" Plate	6.50	0.38	Flat	2	1.08	25.4	1.15	11.8	1.82	11.3
6"x3/8" Plate	6.00	0.38	Flat	2	1.00	23.5	1.06	10.9	1.73	10.8
L2x2x1/4	2.00	2.00	Flat	2	0.33	7.8	0.67	6.9	1.07	6.7
Horizonal Pipe 3.5 dia x.16	3.50	3.50	Cylindrical	1.2	0.35	8.2	0.92	9.4	0.79	4.9
2.5 Std Mount Pipe	2.88	2.88	Cylindrical	1.2	0.29	6.8	0.75	7.7	0.73	4.5
Channel(3.38x2.06)	3.38	2.06	Flat	2	0.56	13.2	0.91	9.3	1.30	8.1
HSS 4x4x3/8	4.00	4.00	Flat	2	0.67	15.7	1.33	13.7	1.40	8.7
Rail Connector L6.6x4.45x1/4	6.60	4.45	Flat	2	1.10	25.8	1.84	18.9	1.83	11.4
2.5 Std Pipe Rail	2.88	2.88	Cylindrical	1.2	0.29	6.8	0.75	7.7	0.73	4.5

Note: The member sizes are based on the assembly drawings by Commscope, date 03/17/21

APPENDIX B

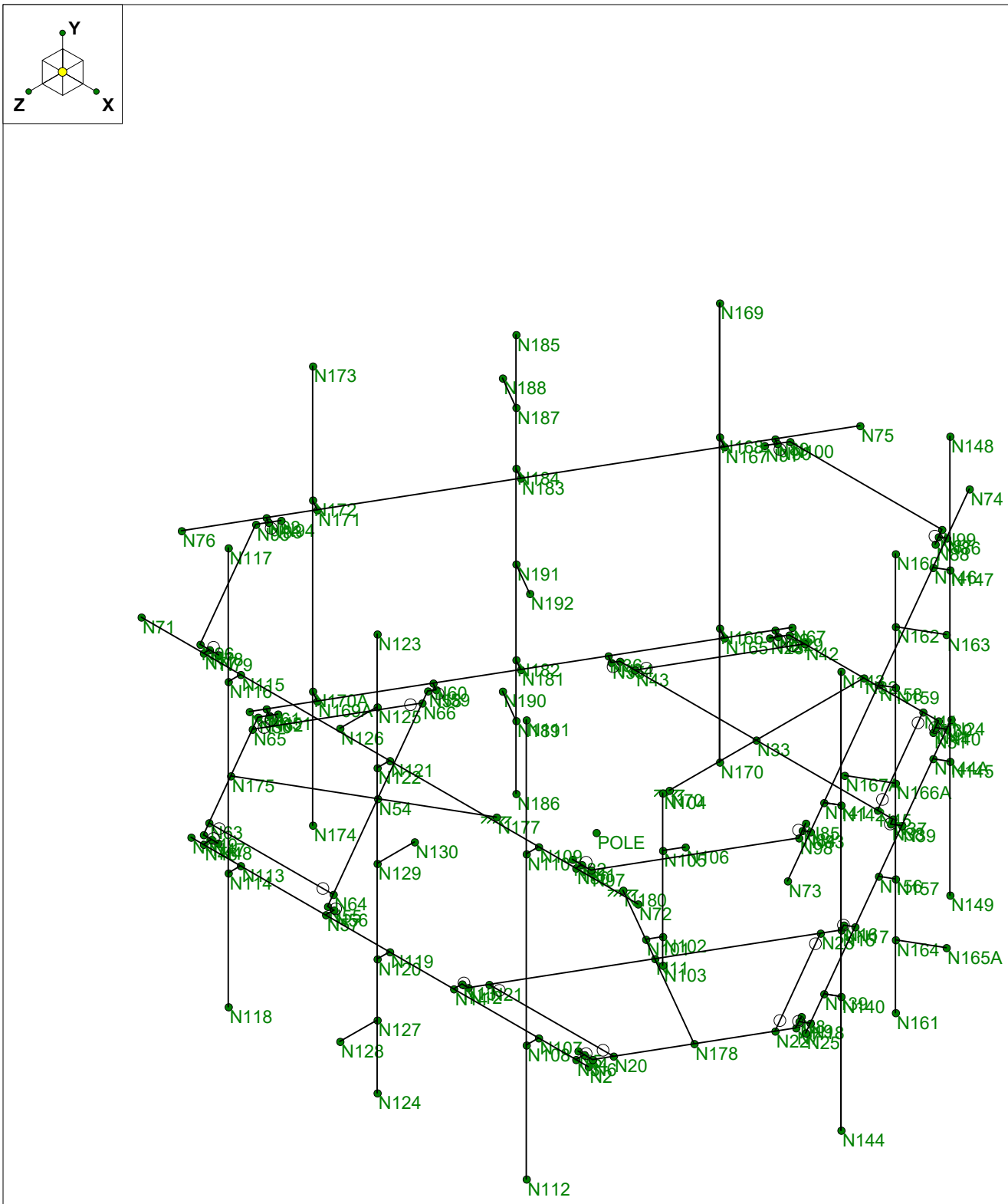
WIRE FRAME AND RENDERED MODELS

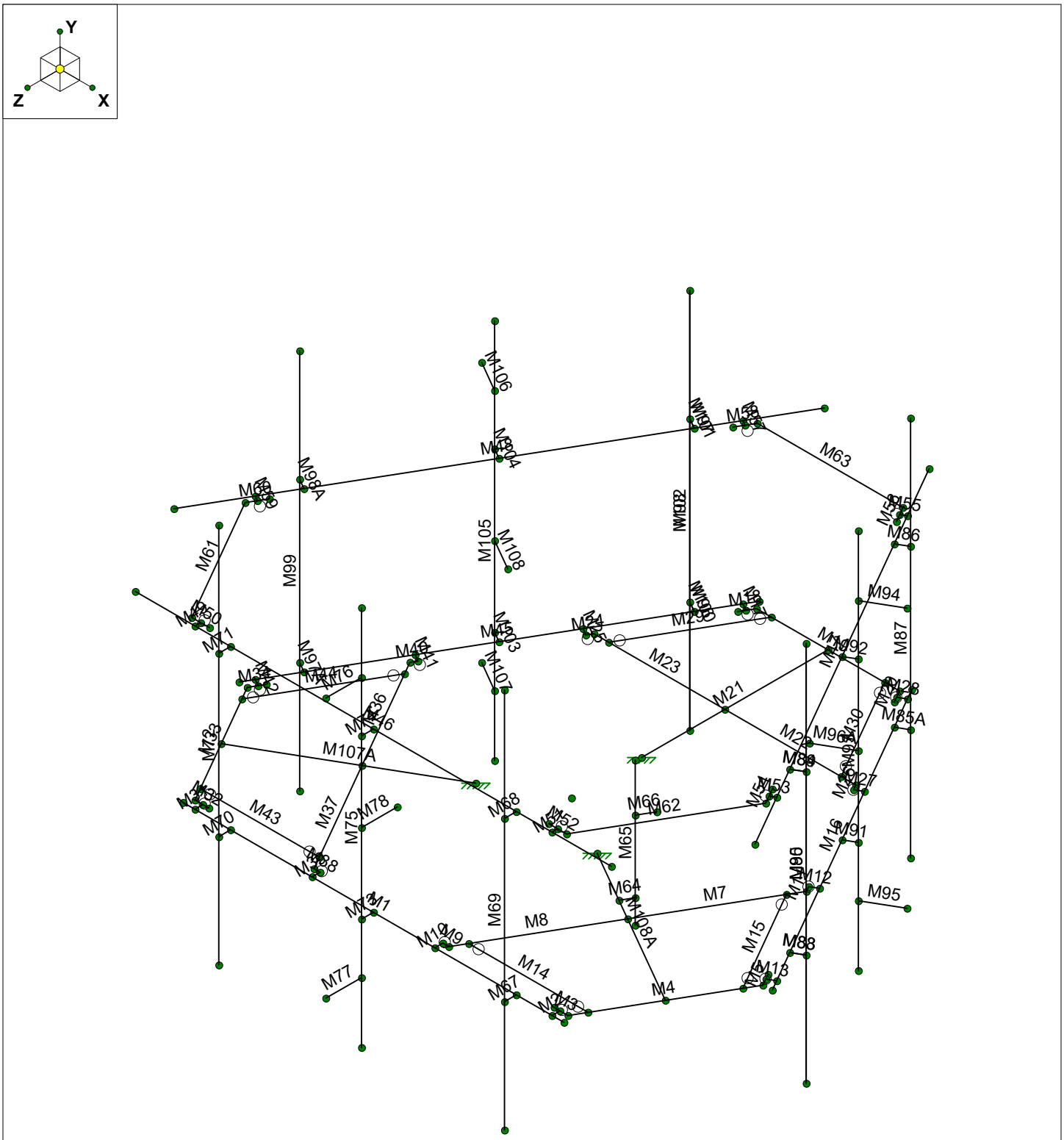


NOTES:
1) PROPOSED ANTENNAS AND MOUNTING PIPES HAVE BEEN VERTICALLY CENTERED ALONG THE EXISTING MOUNT (NO OFFSET).
2) LISTED PROPOSED APPURTENANCES ABOVE ARE TYPICAL FOR ALL SECTORS.

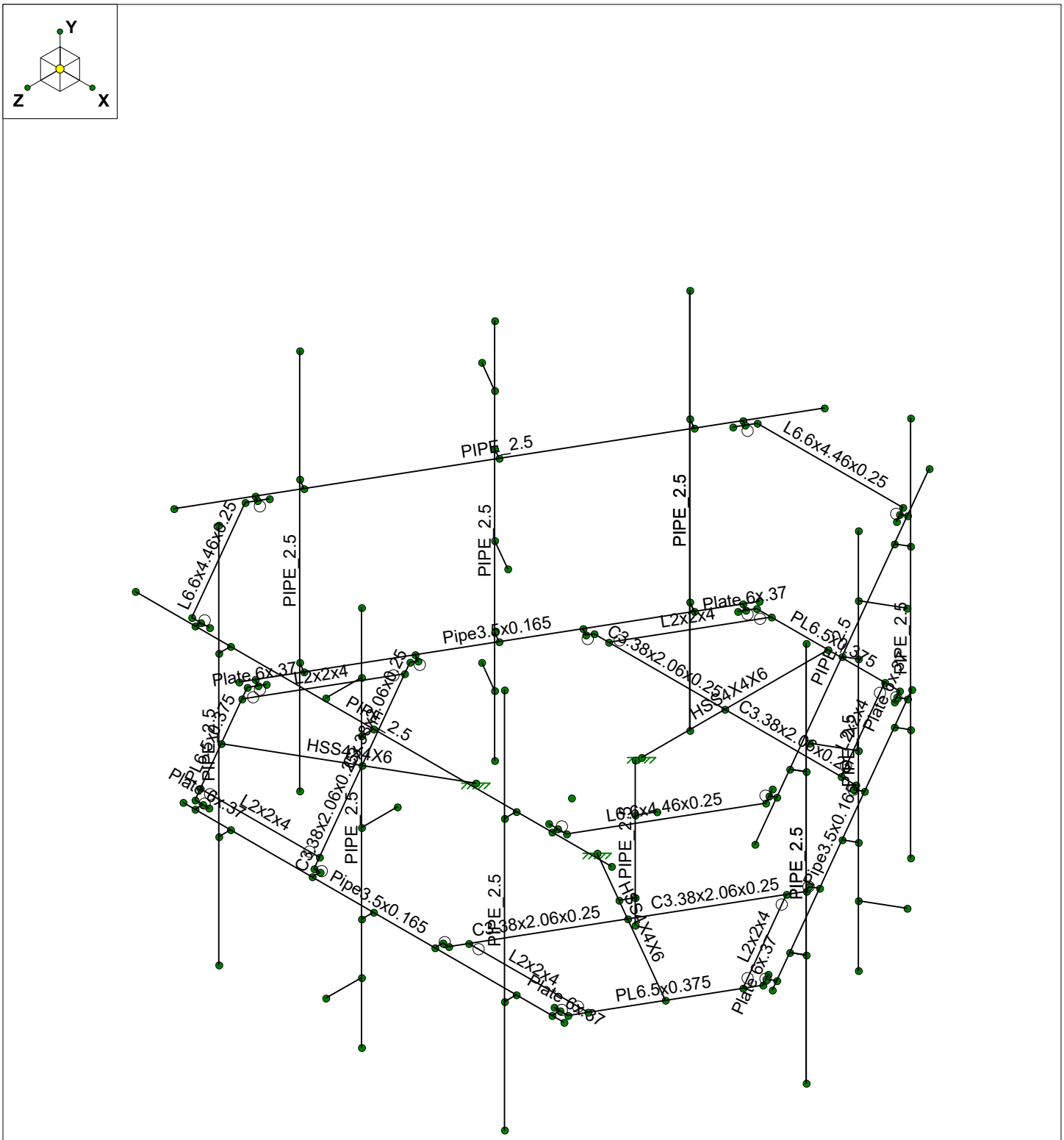
(P) PROPOSED

Envelope Only Solution

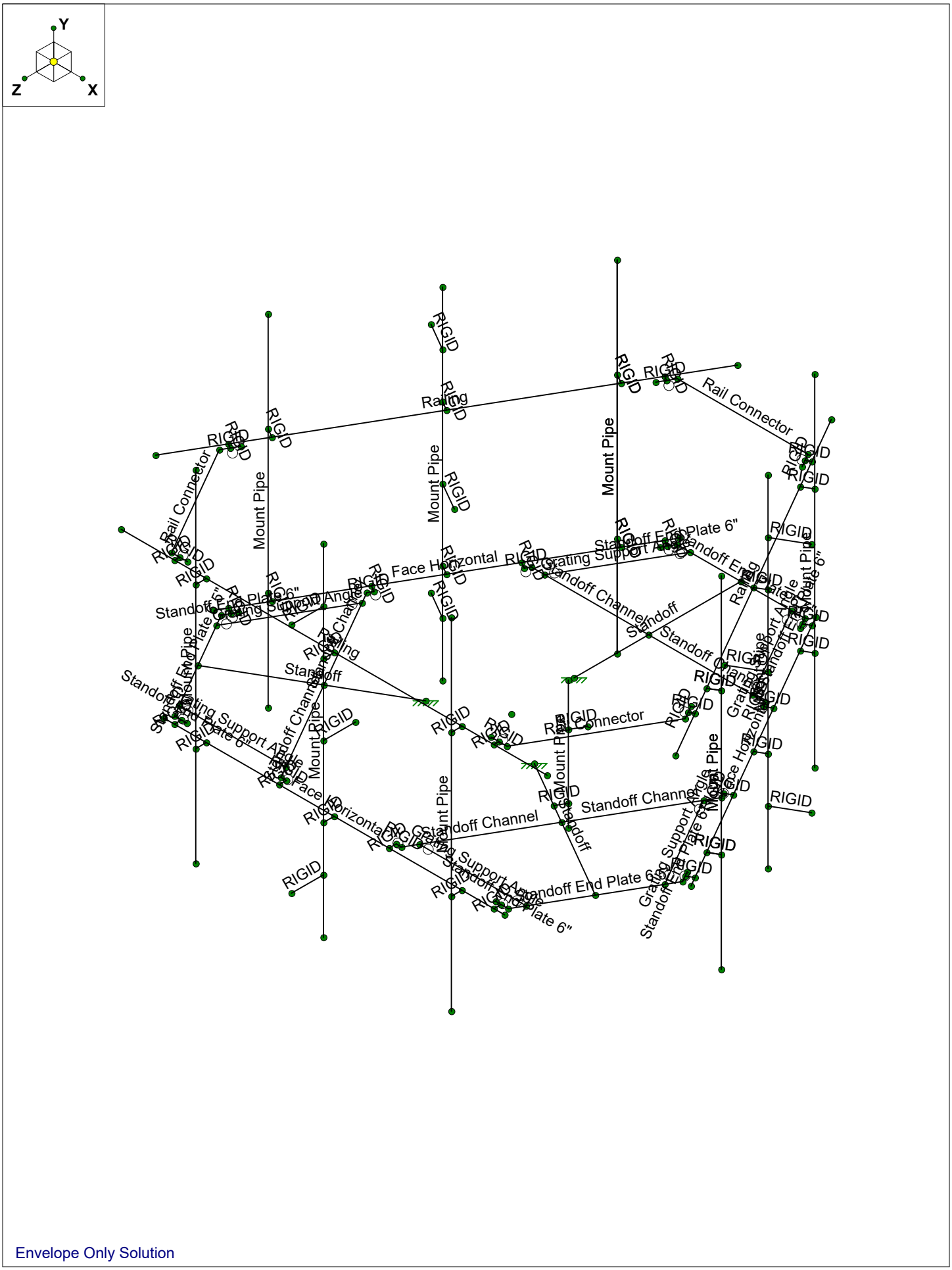

Y
Z
X
N169
N185
N173
N188
N187
N75
N148
N74
N183
N172
N171
N76
N117
N191
N192
N71
N123
N182
N181
N43
N42
N162
N163
N115
N118
N170A
N169A
N190
N125
N66
N65
N126
N33
N170
N121
N122
N175
N54
N186
N177
N174
POLE
N130
N129
N106
N73
N113
N114
N64
N72
N149
N119
N120
N103
N165A
N118
N127
N128
N178
N20
N2
N124
N144
N112
Envelope Only Solution



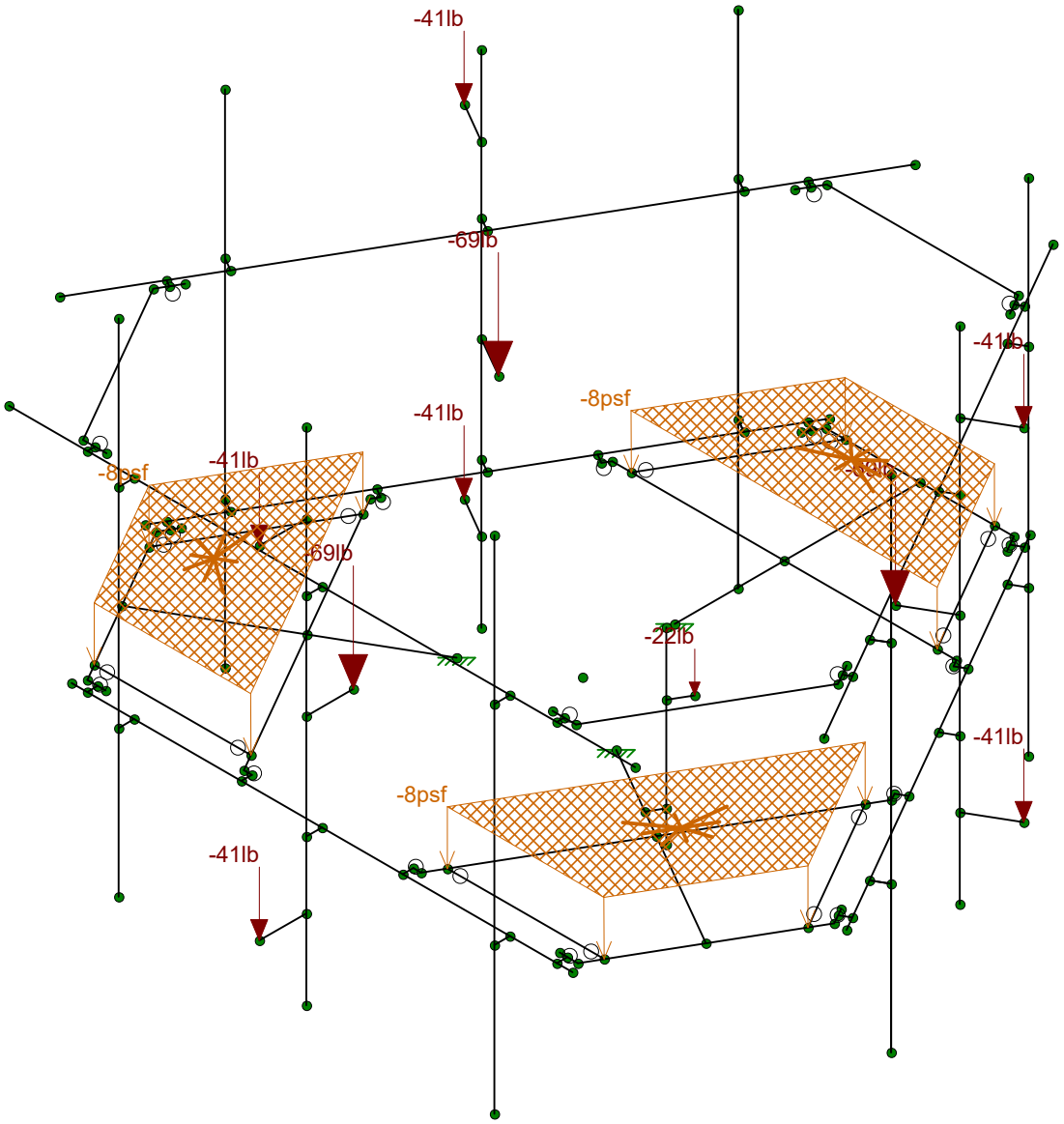
Envelope Only Solution



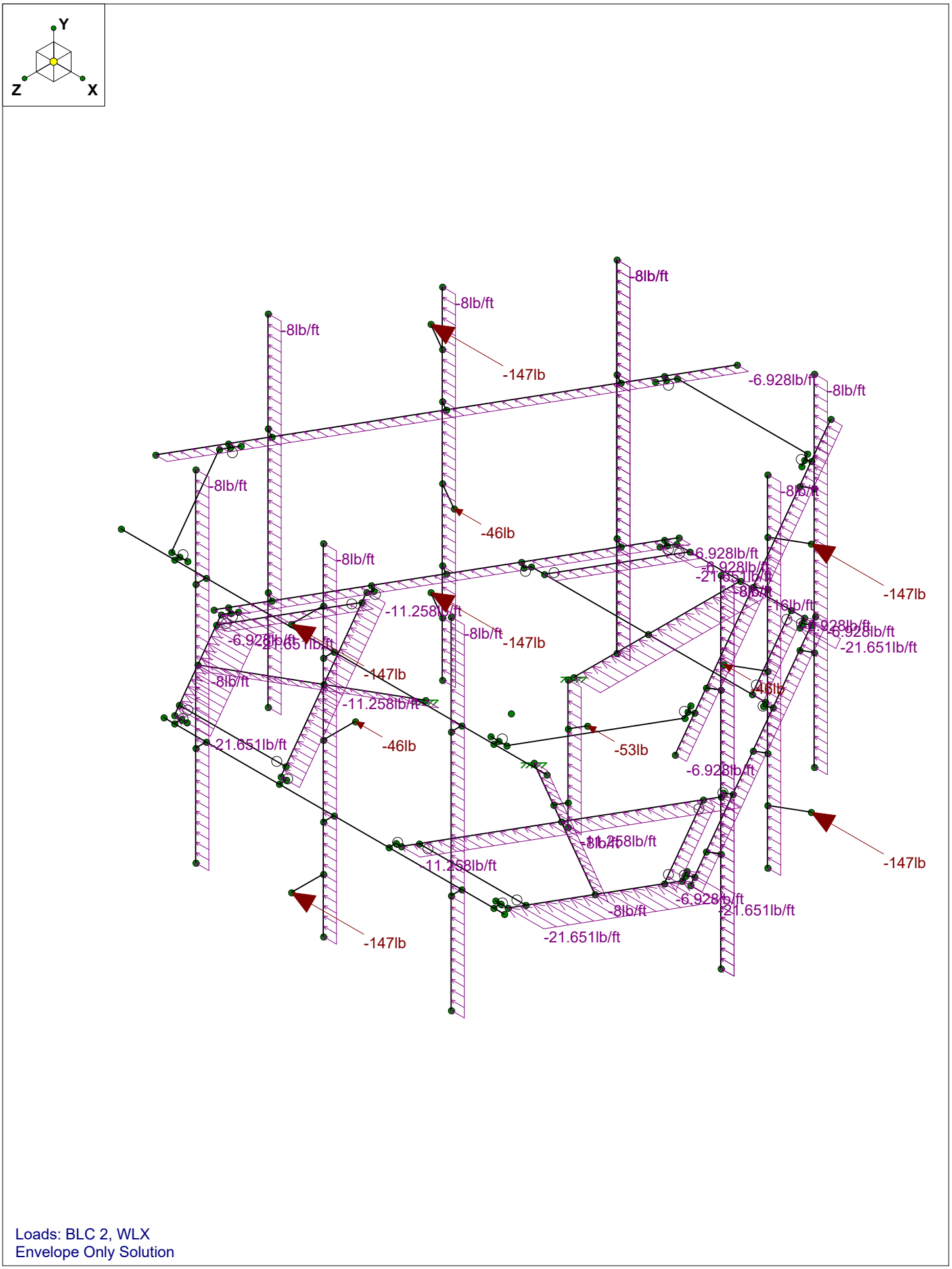
Envelope Only Solution



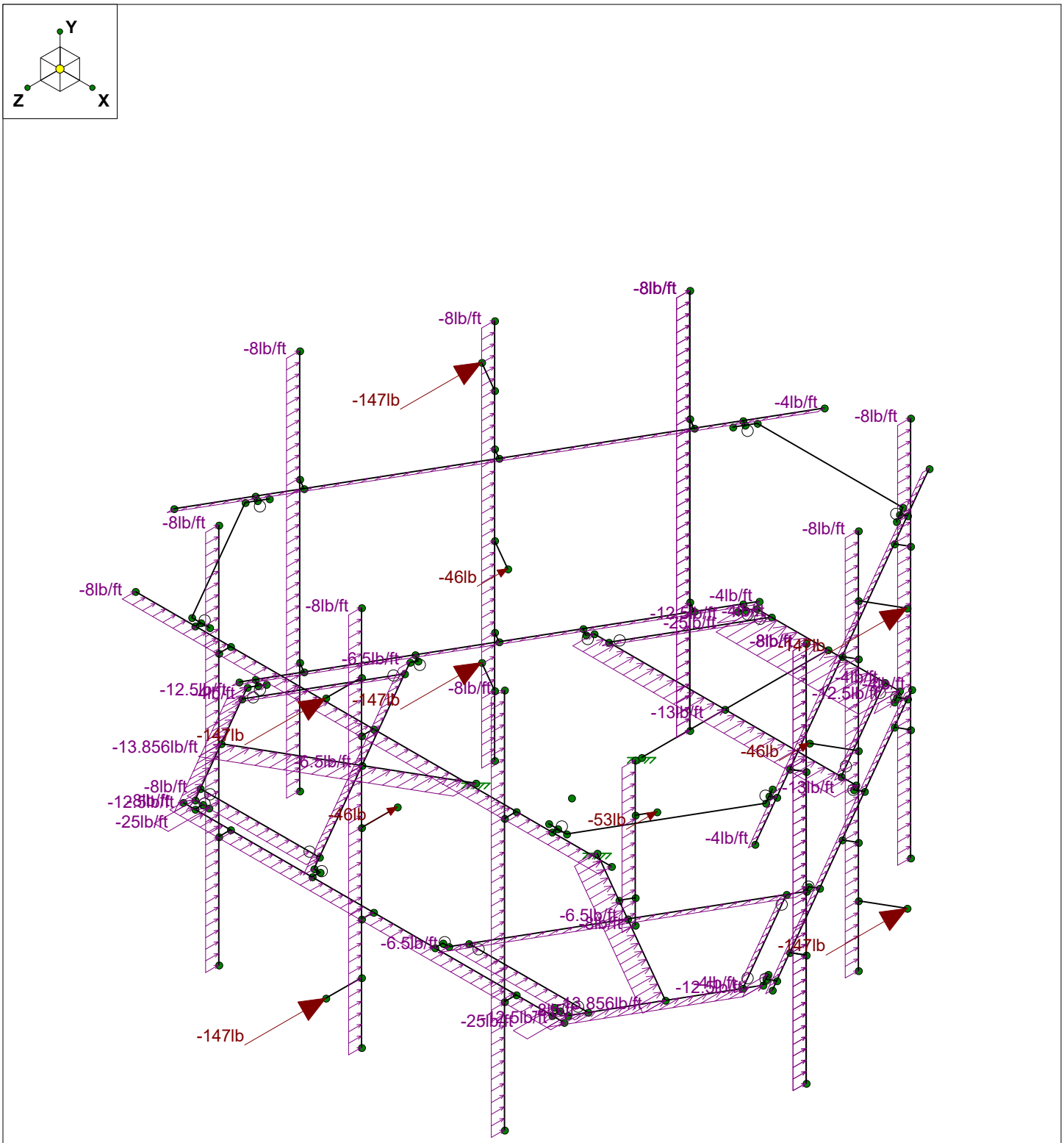
Envelope Only Solution



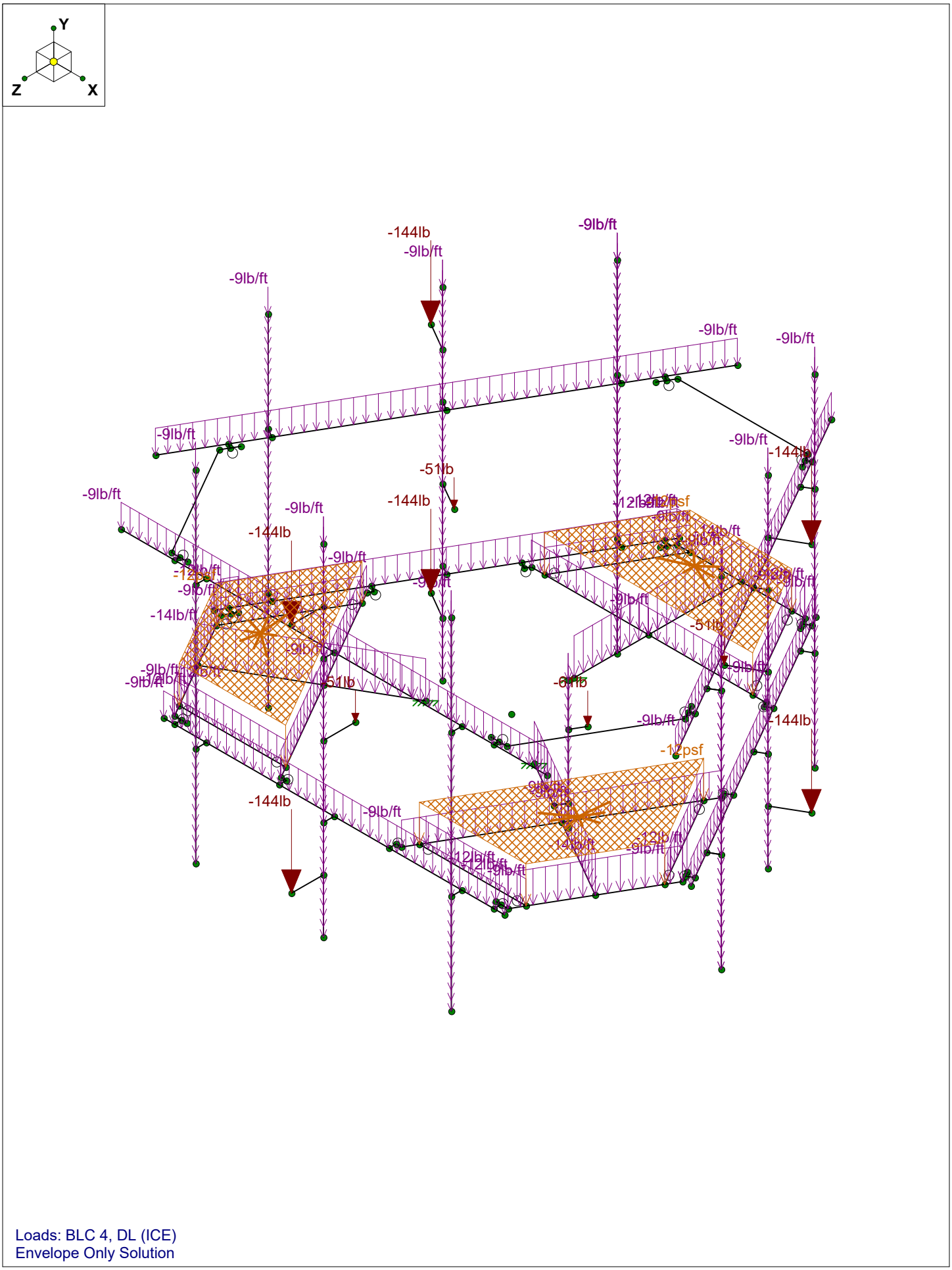
Loads: BLC 1, DL
Envelope Only Solution



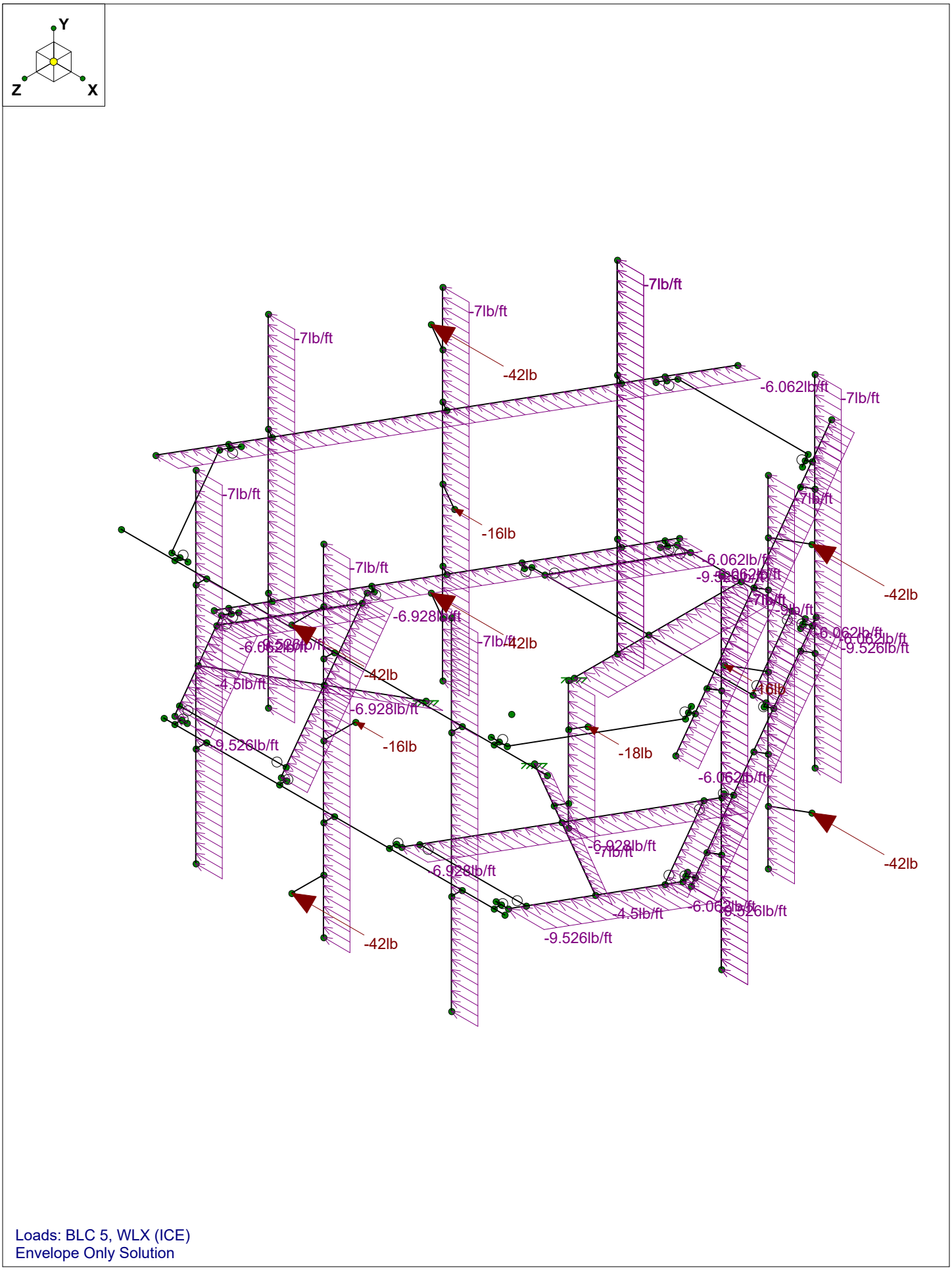
Loads: BLC 2, WLX
Envelope Only Solution



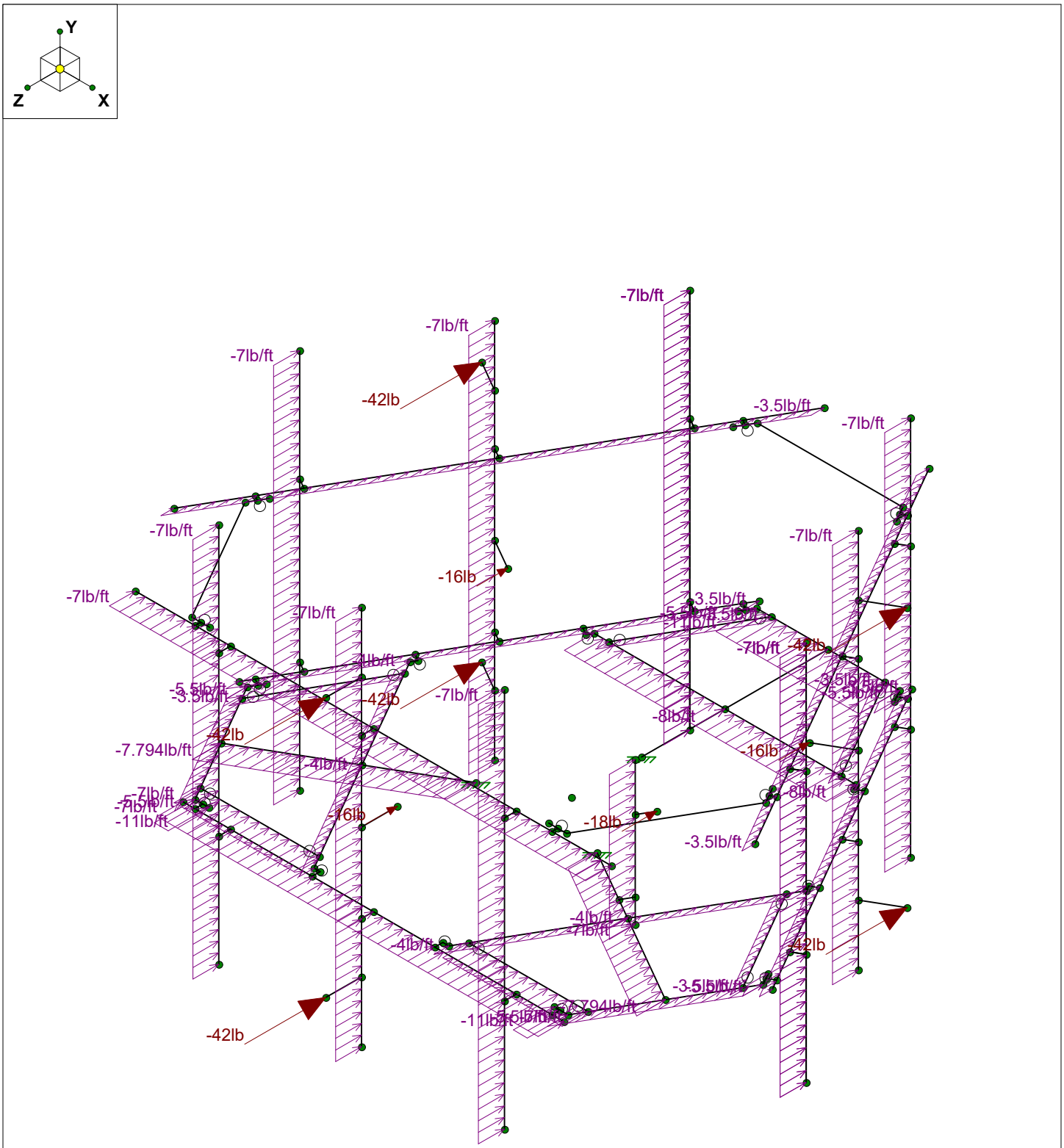
Loads: BLC 3, WLZ
Envelope Only Solution



Loads: BLC 4, DL (ICE)
Envelope Only Solution



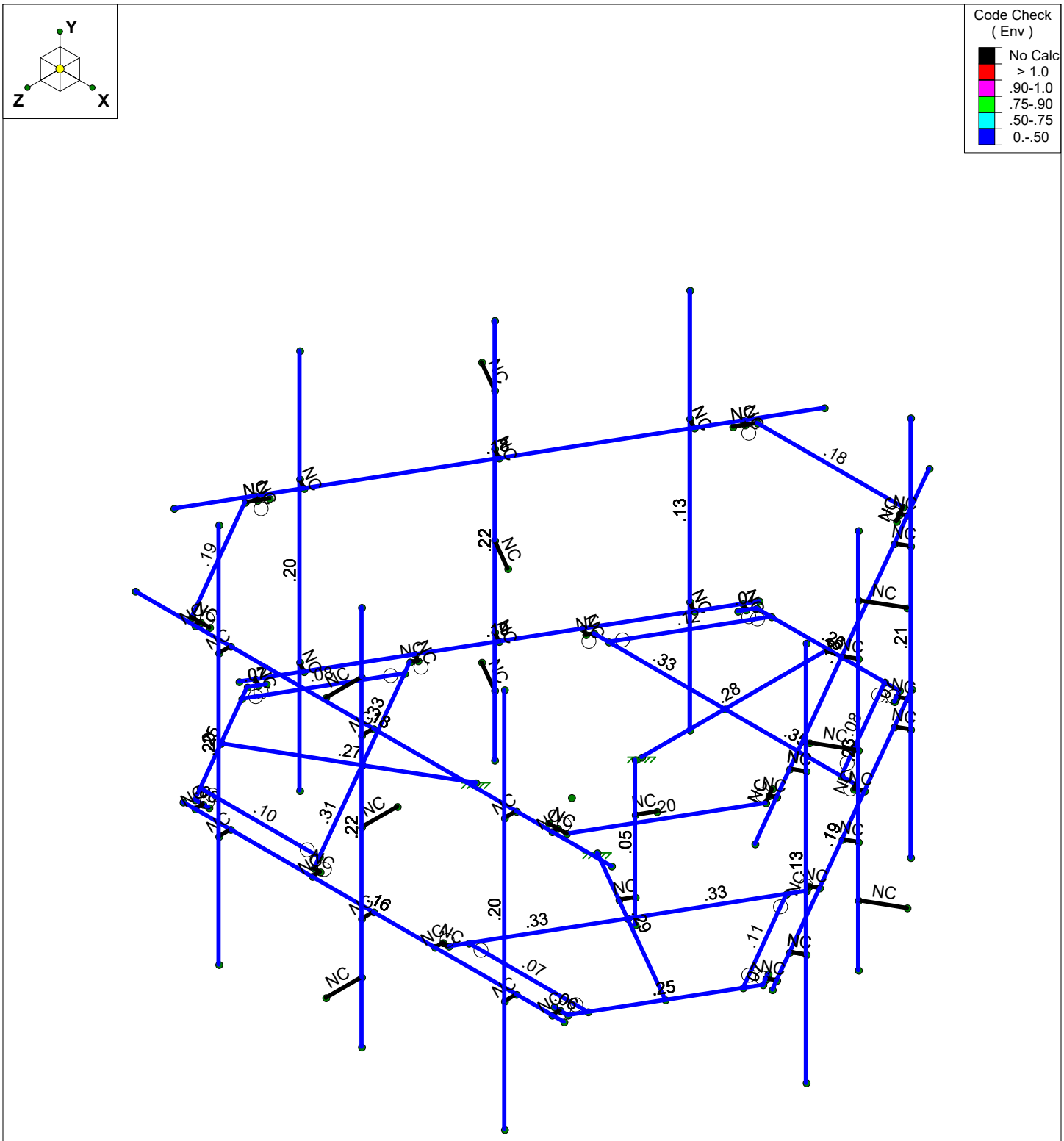
Loads: BLC 5, WLX (ICE)
Envelope Only Solution



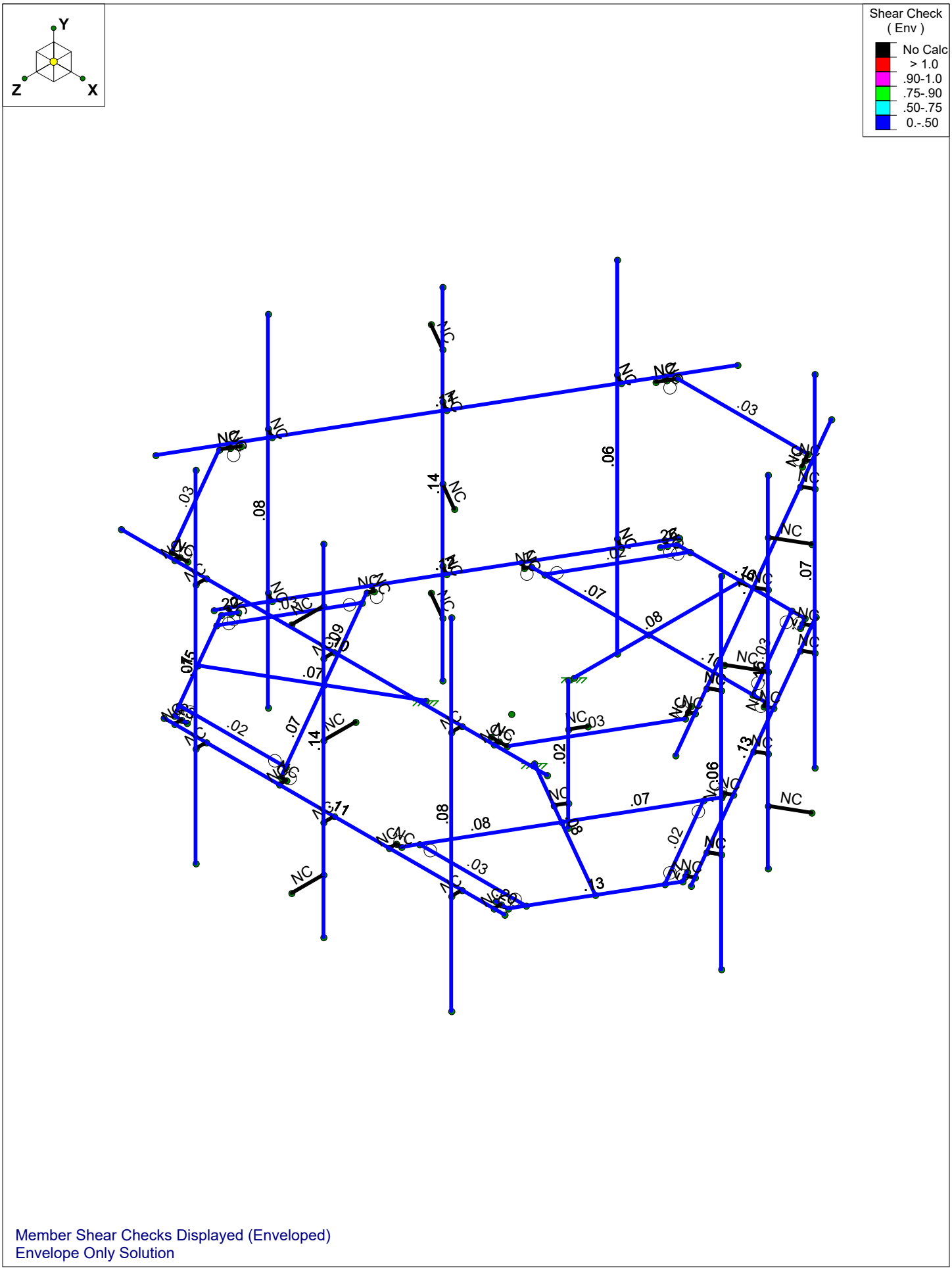
Loads: BLC 6, WLZ (ICE)
Envelope Only Solution

APPENDIX C

SOFTWARE ANALYSIS OUTPUT



Member Code Checks Displayed (Enveloped)
Envelope Only Solution



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Standoff End Plate 6.5"	PL6.5x0.375	Beam	RECT	A36 Gr.36	Typical	2.438	.029	8.582	.11
2	Standoff End Plate 6"	Plate 6x.37	Beam	RECT	A36 Gr.36	Typical	2.22	.025	6.66	.097
3	Grating Support Angle	L2x2x4	Beam	Single An...	A36 Gr.36	Typical	.944	.346	.346	.021
4	Face Horizontal	Pipe3.5x0.165	Beam	Pipe	A53 Gr.B	Typical	1.729	2.409	2.409	4.819
5	Mount Pipe	PIPE_2.5	Column	Pipe	A53 Gr.B	Typical	1.61	1.45	1.45	2.89
6	Standoff Channel	C3.38x2.06x0.25	Beam	Channel	A36 Gr.36	Typical	1.75	.715	3.026	.034
7	Standoff	HSS4X4X6	Beam	SquareT...	A500 Gr.B R...	Typical	4.78	10.3	10.3	17.5
8	Rail Connector	L6.6x4.46x0.25	Beam	Single An...	A36 Gr.36	Typical	2.703	4.759	12.473	.055
9	Railing	PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical	1.61	1.45	1.45	2.89
10	OVP Pipe	PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical	1.61	1.45	1.45	2.89

Load Combinations

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4D	Yes	Y		1	1.4																		
2	1.2D+1.6(WLX+WLZ) - 0 Deg	Yes	Y		1	1.2	2	1.6																
3	1.2D+1.6(WLX+WLZ) - 30 Deg	Yes	Y		1	1.2	2	1.3...	3	.8														
4	1.2D+1.6(WLX+WLZ) - 60 Deg	Yes	Y		1	1.2	2	.8	3	1.3...														
5	1.2D+1.6(WLX+WLZ) - 90 Deg	Yes	Y		1	1.2	2		3	1.6														
6	1.2D+1.6(WLX+WLZ) - 120 Deg	Yes	Y		1	1.2	2	-.8	3	1.3...														
7	1.2D+1.6(WLX+WLZ) - 150 Deg	Yes	Y		1	1.2	2	-1....	3	.8														
8	1.2D+1.6(WLX+WLZ) - 180 Deg	Yes	Y		1	1.2	2	-1.6	3															
9	1.2D+1.6(WLX+WLZ) - 210 Deg	Yes	Y		1	1.2	2	-1....	3	-.8														
10	1.2D+1.6(WLX+WLZ) - 240 Deg	Yes	Y		1	1.2	2	-.8	3	-1....														
11	1.2D+1.6(WLX+WLZ) - 270 Deg	Yes	Y		1	1.2	2		3	-1.6														
12	1.2D+1.6(WLX+WLZ) - 300 Deg	Yes	Y		1	1.2	2	.8	3	-1....														
13	1.2D+1.6(WLX+WLZ) - 330 Deg	Yes	Y		1	1.2	2	1.3...	3	-.8														
14	**Wind Load with Ice**																							
15	1.2D+1.0Di+1.0WLXi	Yes	Y		1	1.2	4	1	5	1														
16	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5	1	6													
17	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5	.87	6	.5												
18	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5	.5	6	.87												
19	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5		6	1												
20	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5	-.5	6	.87												
21	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5	-.87	6	.5												
22	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5	-1	6													
23	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5	-.87	6	-.5												
24	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5	-.5	6	-.87												
25	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5		6	-1												
26	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5	.5	6	-.87												
27	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5	.87	6	-.5												

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N70	max	2113.424	2	2230.359	19	600.121	5	5.808	19	2.779	8	.63	2
2		min	-2106.734	8	-10.858	11	-610.085	11	-1.06	11	-2.764	2	-.735	8
3	N177	max	1062.254	3	2082.694	27	1716.637	4	.666	8	2.624	4	1.017	7
4		min	-1070.833	9	-63.041	7	-1722.658	10	-2.633	15	-2.622	10	-4.658	27
5	N180	max	1234.928	13	2322.652	23	1880.593	6	.634	2	2.846	12	5.259	23
6		min	-1233.077	7	35.072	3	-1873.088	12	-2.78	22	-2.833	6	-.977	3
7	Totals:	max	4038.809	2	5714.141	27	4159.589	5						
8		min	-4038.815	8	2470.55	6	-4159.588	11						

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

	Member	Shape	Code ...	Loc[ft]	LC	Shear...	Loc[...	Dir	LC	phi*Pn...	phi*Pnt...	phi*Mn...	phi*Mn...	Cb	Eqn
1	M22	C3.38x2.06x0....	.350	2.75	19	.095	.286	z	10	47760....	56700	2.203	5.752	1...	H1-1b
2	M23	C3.38x2.06x0....	.332	0	19	.072	2.464	z	5	47760....	56700	2.203	5.752	1...	H1-1b
3	M36	C3.38x2.06x0....	.332	2.75	27	.091	.286	z	6	47760....	56700	2.203	5.752	1...	H1-1b
4	M8	C3.38x2.06x0....	.326	2.75	23	.081	.286	z	2	47760....	56700	2.203	5.752	1...	H1-1b
5	M7	C3.38x2.06x0....	.326	0	23	.072	2.464	z	9	47760....	56700	2.203	5.752	1...	H1-1b
6	M37	C3.38x2.06x0....	.313	0	27	.065	2.464	z	13	47760....	56700	2.203	5.752	1...	H1-1b
7	M108A	HSS4X4X6	.294	3.917	10	.079	2.652	z	12	184705...	197892	22.046	22.046	1...	H1-1b
8	M21	HSS4X4X6	.282	3.917	18	.079	3.917	z	8	184705...	197892	22.046	22.046	2...	H1-1b
9	M107A	HSS4X4X6	.269	3.917	12	.073	3.917	z	10	184705...	197892	22.046	22.046	1...	H1-1b
10	M19	PL6.5x0.375	.260	1.5	4	.158	3	y	10	4979.1...	78975	.617	9.041	1...	H1-1b
11	M4	PL6.5x0.375	.248	1.5	10	.135	0	y	2	4979.1...	78975	.617	9.266	1...	H1-1b
12	M33	PL6.5x0.375	.245	1.5	12	.149	3	y	6	4979.1...	78975	.617	9.147	1...	H1-1b
13	M93	PIPE_2.5	.225	5.667	4	.145	4		4	30038....	50715	3.596	3.596	2...	H1-1b
14	M75	PIPE_2.5	.221	5.667	8	.136	4		8	30038....	50715	3.596	3.596	3...	H1-1b
15	M105	PIPE_2.5	.218	5.667	12	.141	4		12	30038....	50715	3.596	3.596	2...	H1-1b
16	M87	PIPE_2.5	.209	5.667	4	.073	5.667		8	30038....	50715	3.596	3.596	3...	H1-1b
17	M99	PIPE_2.5	.203	5.667	12	.075	5.667		4	30038....	50715	3.596	3.596	2...	H1-1b
18	M72	PIPE_2.5	.200	5.667	2	.074	2.333		11	30038....	50715	3.596	3.596	3...	H1-1b
19	M69	PIPE_2.5	.197	5.667	8	.076	5.667		12	30038....	50715	3.596	3.596	3...	H1-1b
20	M62	L6.6x4.46x0.25	.196	3.06	2	.033	0	y	12	51620....	87561	2.465	7.125	1...	H2-1
21	M16	Pipe3.5x0.165	.194	5.333	4	.125	5.25		10	38821....	54463.5	4.822	4.822	1...	H1-1b
22	M45	Pipe3.5x0.165	.189	5.333	12	.123	2.75		6	38821....	54463.5	4.822	4.822	1...	H1-1b
23	M61	L6.6x4.46x0.25	.185	0	8	.030	0	y	4	51620....	87561	2.465	7.125	1...	H2-1
24	M46	PIPE_2.5	.182	8.75	8	.103	2.083		13	22373....	50715	3.596	3.596	1...	H1-1b
25	M63	L6.6x4.46x0.25	.179	3.06	10	.034	.032	y	8	51620....	87561	2.465	7.125	1...	H2-1
26	M47	PIPE_2.5	.177	2.083	10	.109	2.083		9	22373....	50715	3.596	3.596	1...	H1-1b
27	M48	PIPE_2.5	.175	2.083	6	.105	7.917		13	22373....	50715	3.596	3.596	1...	H1-1b
28	M1	Pipe3.5x0.165	.165	5.333	13	.105	2.75		2	38821....	54463.5	4.822	4.822	1...	H1-1b
29	M85	PIPE_2.5	.129	5.667	10	.064	2.333		7	30038....	50715	3.596	3.596	2...	H1-1b
30	M90	PIPE_2.5	.129	5.667	10	.064	2.333		7	30038....	50715	3.596	3.596	2...	H1-1b
31	M98	PIPE_2.5	.127	5.667	6	.059	2.333		3	30038....	50715	3.596	3.596	3...	H1-1b
32	M102	PIPE_2.5	.127	5.667	6	.059	2.333		3	30038....	50715	3.596	3.596	3...	H1-1b
33	M29	L2x2x4	.115	0	12	.025	0	z	16	22280....	30585.6	.691	1.577	1...	H2-1
34	M15	L2x2x4	.114	0	3	.025	0	z	19	22280....	30585.6	.691	1.577	1...	H2-1
35	M43	L2x2x4	.100	0	7	.025	2.502	z	25	22280....	30585.6	.691	1.577	1...	H2-1
36	M30	L2x2x4	.081	0	4	.029	2.502	y	23	22280....	30585.6	.691	1.577	2...	H2-1
37	M44	L2x2x4	.077	0	12	.026	2.502	y	19	22280....	30585.6	.691	1.577	2...	H2-1
38	M5	Plate 6x.37	.074	.164	5	.266	0	y	10	67974....	71928	.554	8.991	2...	H1-1b
39	M18	Plate 6x.37	.071	.128	13	.263	.292	y	6	67974....	71928	.554	8.991	2...	H1-1b
40	M20	Plate 6x.37	.071	.164	9	.209	0	y	4	67974....	71928	.554	8.991	1...	H1-1b
41	M34	Plate 6x.37	.071	.164	5	.204	0	y	12	67974....	71928	.554	8.991	1...	H1-1b
42	M14	L2x2x4	.069	0	9	.027	2.502	y	27	22280....	30585.6	.691	1.577	2...	H2-1
43	M3	Plate 6x.37	.061	.128	13	.201	.292	y	8	67974....	71928	.554	8.991	1...	H1-1b

Envelope AISC 15th(360-16): LRFD Steel Code Checks (Continued)

	Member	Shape	Code ...	Loc[ft]	LC	Shear...	Loc[...	Dir	LC	phi*Pn...	phi*Pnt...	phi*Mn...	phi*Mn...	Cb	Eqn
44	M32	Plate 6x.37	.061	.128	9	.228	.292	y	2	67974....	71928	.554	8.991	2..	H1-1b
45	M65	PIPE_2.5	.049	.5	6	.017	.5		9	47114....	50715	3.596	3.596	1..	H1-1b

APPENDIX D

ADDITIONAL CALCULATIONS

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Job No. 10710.NJJER01134A
Calculated By: JJ Date : 8/19/22
Checked By: IM Date : 8/19/22

Connection Details		
Bolt Details		
Bolt Quantity =	4	
Bolt Diameter =	0.625	in
Vertical Spacing =	7	in
Horizontal Spacing =	7	in
Bolt Grade =	A325	
Bolt F_u, if "Other" =	N/A	ksi

Loading Details		
Node N70, ENV		
Shear, X =	2.113	k
Shear, Y =	2.23	k
Tension, Z =	0.61	k
Mx =	5.808	k-ft
My =	2.779	k-ft
Torsion, Mz =	0.735	k-ft

1 - Tensile Capacity

$$R_{nt} = F_{nt}A_b$$ AISC [Eqn. J3-1]

Φ =	0.75	
F_{nt} =	90	ksi
A_b =	0.307	in^2
ΦR_{nt} =	20.72	k
T_{max} =	7.51	k

AISC [Table J3.2]

ΦRnt > Tmax

36% **OK**

2 - Shear Capacity

$$R_{nv} = F_{nv}A_b$$ AISC [Eqn. J3-1]

Φ =	0.75	
F_{nv} =	54	ksi
A_b =	0.307	in^2
ΦR_{nv} =	12.43	k
V_{max} =	1.21	k

AISC [Table J3.2]

ΦRnv > Vmax

10% **OK**

3 - Combined Tension and Shear Capacity

$$R'_{nt} = F'_{nt}A_b$$ AISC [Eqn. J3-2]

$$F'_{nt} = 1.3F_{nt} - \frac{F_{nt}}{\phi F_{nv}} f_{rv} \leq F_{nt}$$ AISC [Eqn. J3-3a]

Φ =	0.75	
F'_{nt} =	90	ksi
A_b =	0.307	in^2
$\Phi R'_{nt}$ =	20.72	k
T_{max} =	7.51	k

ΦR'nt > Tmax

36% **OK**

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Job No. 10710.NJJER01134A
Calculated By: JJ Date : 8/19/22
Checked By: IM Date : 8/19/22

Connection Details		
Weld Details		
Weld Type	Fillet	
# of Sides	2	
Electrodes	70	XX
Size of Weld =	0.25	in
HSS Height =	4.00	in
HSS Width =	4.00	in
HSS Thickness =	0.38	in
Plate Details		
Height/Width =	9.00	in
Thickness =	0.625	in
F_y =	50	ksi

4 - Weld Capacity

$$F_{nw} = 0.6F_{EXX}$$ AISC [Table J2.5]

Φ =	0.75	
ΦF_{nw} =	63.00	ksi
$f_{V,max}$ =	2.074	ksi
$f_{b,max}$ =	21.58	ksi

Min(ΦFnw,ΦFnbm) > √(fv,max+fm,max)

34% **OK**

5 - Plate Capacity

Φ =	0.9	
ΦF_{byy} =	45.00	ksi
f_b =	21.81	ksi

ΦFbyy > Fb

48% **OK**