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

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

RE: **TS-DISH-015-220121** – Dish Wireless LLC request for an order to approve tower sharing at an existing telecommunications facility located at 220 Evergreen Street, Bridgeport, Connecticut.

Dear Ms. Ranciato-Viele:

The Connecticut Siting Council (Council) is in receipt of your correspondence of February 7, 2022 submitted in response to the Council's January 31, 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

From: Ray Lemley <rlemley@csofb.com>
Sent: Monday, February 7, 2022 10:37 AM
To: CSC-DL Siting Council <Siting.Council@ct.gov>
Cc: Ranciato, Theresa <TRanciato@tectonicengineering.com>; Bartley, Danielle <DBartley@tectonicengineering.com>
Subject: TS-Dish-015-220121- Mount Analysis: 220 Evergreen St., Bridgeport

Good morning:

Per your letter of January 31, 2022, attached please find a passing Mount Analysis stamped by a Connecticut Engineer for the above referenced location. A hard copy is being mailed to you today. Please let us know if there is anything else you may need.

Regards,
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: **February 4, 2022**

Mount Analysis Report

Project Information:

Carrier:	Dish Wireless
Site Number:	NJJER01163A
Site Address:	220 Evergreen Street, Bridgeport, Fairfield County, CT 06606
Site Type:	Platform w/ Railing Mount on Monopole

Tectonic Project Number: 10710.NJJER01163A

Tectonic Engineering Consultants, Geologists & Land Surveyors, D.P.C. 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 – 29%**

This analysis has been performed in accordance with the 2018 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 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 II 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: Connor Golden-Weathers / Ian Marinaccio

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

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

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.

2) ANALYSIS CRITERIA

TIA-222 Revision:	**TIA-222-G**
Risk Category:	**II**
Wind Speed:	**93 mph**
Exposure Category:	**B**
Topographic Factor:	**1.0**
Ice Thickness:	**1.0 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
99.0	Dish Wireless	3	JMA	MX08FRO665-21	CommScope MC-PK8-DSH	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	05/17/2021
RFDS	Dish Wireless	06/09/2021
Preliminary Construction Drawings	Tectonic	11/16/2021

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	99.0	29	Pass
	Grating Support Angle		10	Pass
	Face Horizontal		18	Pass
	Mount Pipe		21	Pass
	Standoff Channel		29	Pass
	Standoff		24	Pass
	Rail Connector		15	Pass
	Railing		15	Pass
2	Collar Connection		29	Pass
Structure Rating (max from all components) =				**29 %**

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. The monopole is to be analyzed under a separate structural analysis by others.

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

Revison:

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

(APPENDIX N) MUNICIPALITY - SPECIFIC STRUCTURAL DESIGN PARAMETERS

				Wind Design Parameters					
Municipality	**Ground Snow Load**	**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
Andover	30	0.176	0.063	120	130	140	93	101	108
Ansonia	30	0.195	0.064	115	125	135	89	97	105
Ashford	35	0.173	0.063	120	130	140	93	101	108
Avon	35	0.181	0.064	110	120	130	85	93	101
Barkhamsted	40	0.177	0.065	110	120	125	85	93	97
Beacon Falls	30	0.192	0.064	115	125	135	89	97	105
Berlin	30	0.183	0.063	115	125	135	89	97	105
Bethany	30	0.189	0.063	115	125	135	89	97	105
Bethel	30	0.215	0.066	110	120	125	85	93	97
Bethlehem	35	0.190	0.065	110	120	125	85	93	97
Bloomfield	35	0.180	0.064	115	125	130	89	97	101
Bolton	30	0.177	0.063	115	125	135	89	97	105
Bozrah	30	0.170	0.061	120	135	145	93	105	112
Branford	30	0.180	0.061	120	130	140	93	101	108
Bridgeport	30	0.209	0.064	115	125	135	89	97	105
Bridgewater	35	0.201	0.066	110	120	125	85	93	97
Bristol	35	0.185	0.064	110	120	130	85	93	101
Brookfield	35	0.208	0.066	110	120	125	85	93	97
Brooklyn	35	0.171	0.062	120	130	140	93	101	108
Burlington	35	0.182	0.064	110	120	130	85	93	101
Canaan	40	0.173	0.065	105	115	120	81	89	93
Canterbury	35	0.171	0.061	120	130	140	93	101	108
Canton	35	0.180	0.064	110	120	130	85	93	101
Chaplin	35	0.173	0.062	120	130	140	93	101	108
Cheshire	30	0.186	0.063	115	125	135	89	97	105
Chester	30	0.172	0.060	120	130	140	93	101	108
Clinton	30	0.169	0.059	120	135	140	93	105	108
Colchester	30	0.174	0.061	120	130	140	93	101	108
Colebrook	40	0.174	0.065	105	115	125	81	89	97
Columbia	30	0.175	0.062	120	130	140	93	101	108
Cornwall	40	0.180	0.065	105	115	120	81	89	93
Coventry	30	0.176	0.063	120	130	140	93	101	108
Cromwell	30	0.181	0.063	115	125	135	89	97	105
Danbury	30	0.217	0.067	110	120	125	85	93	97
Darien	30	0.242	0.068	110	120	130	85	93	101
Deep River	30	0.170	0.060	120	130	140	93	101	108
Derby	30	0.195	0.064	115	125	135	89	97	105
Durham	30	0.179	0.062	115	130	140	89	101	108
Eastford	40	0.172	0.063	120	130	140	93	101	108
East Granby	35	0.177	0.065	110	120	130	85	93	101
East Haddam	30	0.172	0.061	120	130	140	93	101	108
East Hampton	30	0.177	0.062	120	130	140	93	101	108

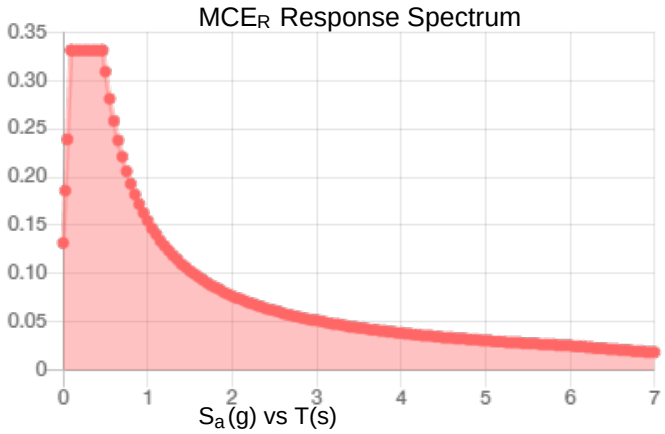
Seismic

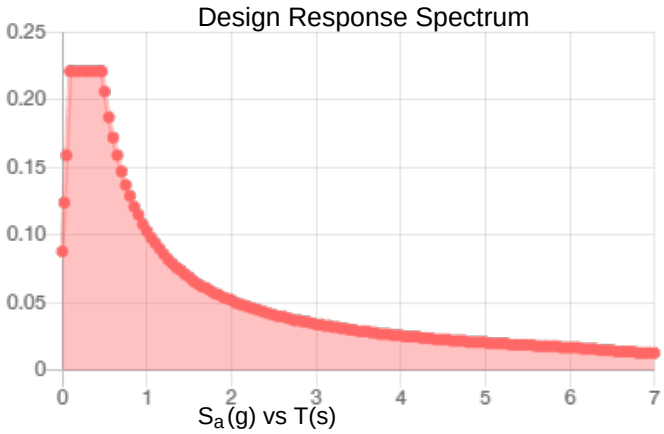
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.207	S_{DS} :	0.221
S_1 :	0.064	S_{D1} :	0.103
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.112
S_{MS} :	0.331	PGA_M :	0.177
S_{M1} :	0.155	F_{PGA} :	1.576
		I_e :	1

Seismic Design Category B





Data Accessed: **Wed Feb 02 2022**

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:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Wed Feb 02 2022

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 PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.	Job No.	10710.NJJER01163A		
	Sheet No.	1	of	3
	Calculated By	CGW	Date :	02/03/22
	Checked By	IM	Date :	02/03/22

WIND AND ICE LOADS PER TIA-222-G

W.O.	10710.NJJER01163A
Project Name	NJJER01163A
Location	220 Evergreen Street, Bridgeport, CT 06606
County	Fairfield

Tower Type	MP	Monopole
Structure Class	2	Substantial hazard
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	93	mph*
With ice	50	mph
Service	60	mph
Ice thickness	1.00	in

Importance Factor	
Wind only	1.00
Wind with ice	1.00
Ice thickness	1.00
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)	99
	Kh	N/A
	Kzt	1.00
	Kz	0.99
	Kiz	1.12
Wind Pressure, qz (psf)	No Ice	20.73
	With Ice	5.99
	Service	8.63
(tiz)	Ice Thk	2.23
Appurtenances (qzGh)	No Ice	20.73
	With Ice	5.99
	Service	8.63

*Ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second wind gust speed of 93 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.NJJER01163A		
Sheet No.	2	of	3
Calculated By	CGW	Date :	02/03/22
Checked By	IM	Date :	02/03/22

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	99	6.00	20.00	8.00	Flat	1.47	1.25	4.00	15.84	10.00	33.72	233	109	83	248
TA08025-B604 RRH	P	3	99	1.24	15.70	7.80	Flat	1.20	1.20	0.81	2.61	1.62	5.26	36	18	64	192
TA08025-B605 RRH	P	3	99	1.24	15.70	9.00	Flat	1.20	1.20	0.93	3.02	1.62	5.26	36	21	75	225
RDIDC-9181-PF-48	P	1	99	1.58	14.39	8.15	Flat	1.20	1.20	1.07	1.16	1.90	2.05	42	24	22	22
										$\sum(CaAA)_T$	22.63	$\sum(CaAa)_N$	46.30				686

Wind with Ice Load Combinations **Ice Thk=** 2.23 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	99.00	6.37	20.37	8.37	Flat	1.47	1.26	4.45	17.66	10.82	36.68	73	35	28	292
TA08025-B604 RRH	P	3	99.00	1.61	16.07	8.17	Flat	1.20	1.20	1.10	3.56	2.16	7.00	14	7	5	51
TA08025-B605 RRH	P	3	99.00	1.61	16.07	9.37	Flat	1.20	1.20	1.26	4.08	2.16	7.00	14	8	5	53
RDIDC-9181-PF-48	P	1	99.00	1.95	14.76	8.52	Flat	1.21	1.20	1.39	1.51	2.40	2.60	16	9	6	62
										$\sum(CaAA)_T$	26.81	$\sum(CaAa)_N$	53.28				457

Tectonic

PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Job No.	10710.NJJER01163A		
Sheet No.	3	of	3
Calculated By	CGW	Date :	02/03/22
Checked By	IM	Date :	02/03/22

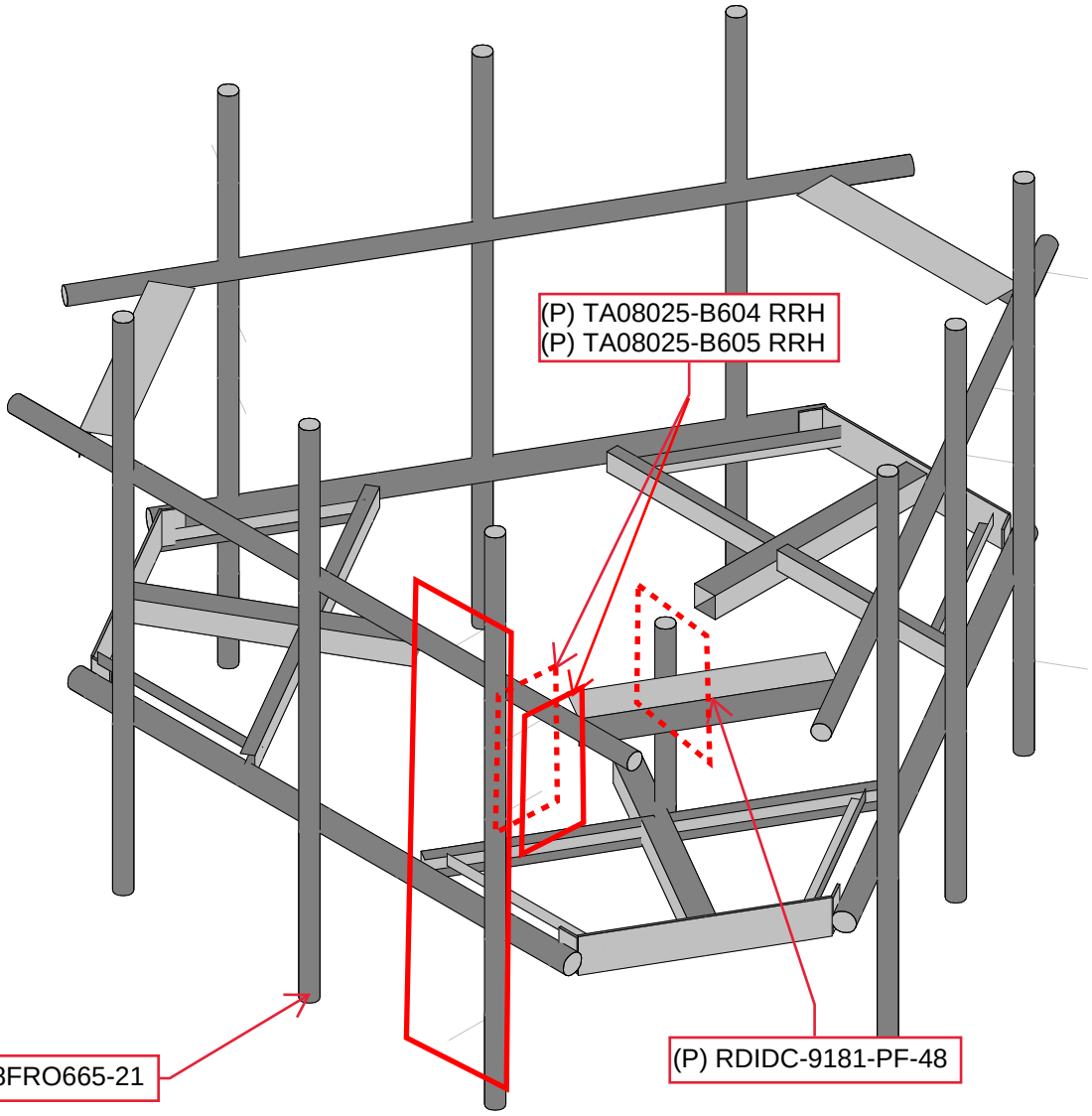
Mounting System Information

						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)**
Standoff End Plate 6.5"	6.50	0.38	Flat	2	1.08	20	1.15	11.9	1.83	9.9
Standoff End Plate 6"	6.00	0.38	Flat	2	1.00	19	1.06	11.1	1.74	9.4
Grating Support Angle	2.00	2.00	Flat	2	0.33	6	0.67	6.9	1.08	5.8
Face Horizontal	3.50	3.50	Cylindrical	1.2	0.35	7	0.92	9.5	0.80	4.3
Mount Pipe	2.88	2.88	Cylindrical	1.2	0.29	5	0.75	7.8	0.73	4.0
Standoff Channel	3.38	2.06	Flat	2	0.56	11	0.91	9.4	1.31	7.0
Standoff	4.00	4.00	Flat	2	0.67	12	1.33	13.9	1.41	7.6
Rail Connector	6.60	4.45	Flat	2	1.10	21	1.84	19.2	1.84	9.9
Railing	2.88	2.88	Cylindrical	1.2	0.29	5	0.75	7.8	0.73	4.0

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

APPENDIX B

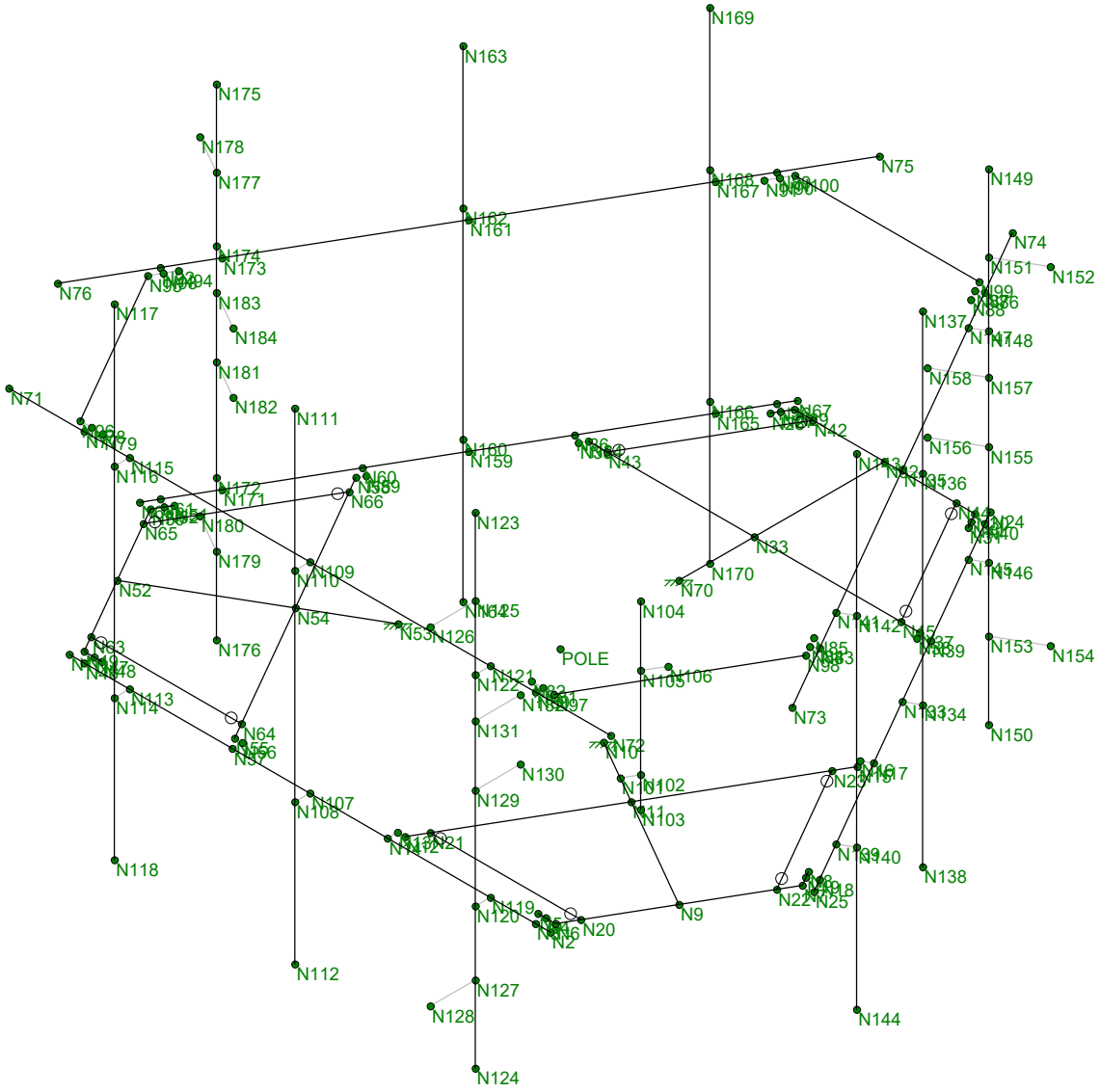
WIRE FRAME AND RENDERED MODELS



NOTES:
1) PROPOSED ANTENNAS AND MOUNTING PIPES HAVE BEEN VERTICALLY CENTERED ALONG THE PROPOSED MOUNT (NO OFFSET)

2) LISTED PROPOSED APPURTENANCES ABOVE ARE TYPICAL FOR ALL SECTORS

Tectonic Engineering	PROPOSED ANTENNA MOUNT	
CGW		Feb 3, 2022 at 11:08 AM
10710.NJJER0163A		10710.NJJER01120B - MountAnal...



Tectonic Engineering	PROPOSED ANTENNA MOUNT	
CGW		Feb 3, 2022 at 11:17 AM
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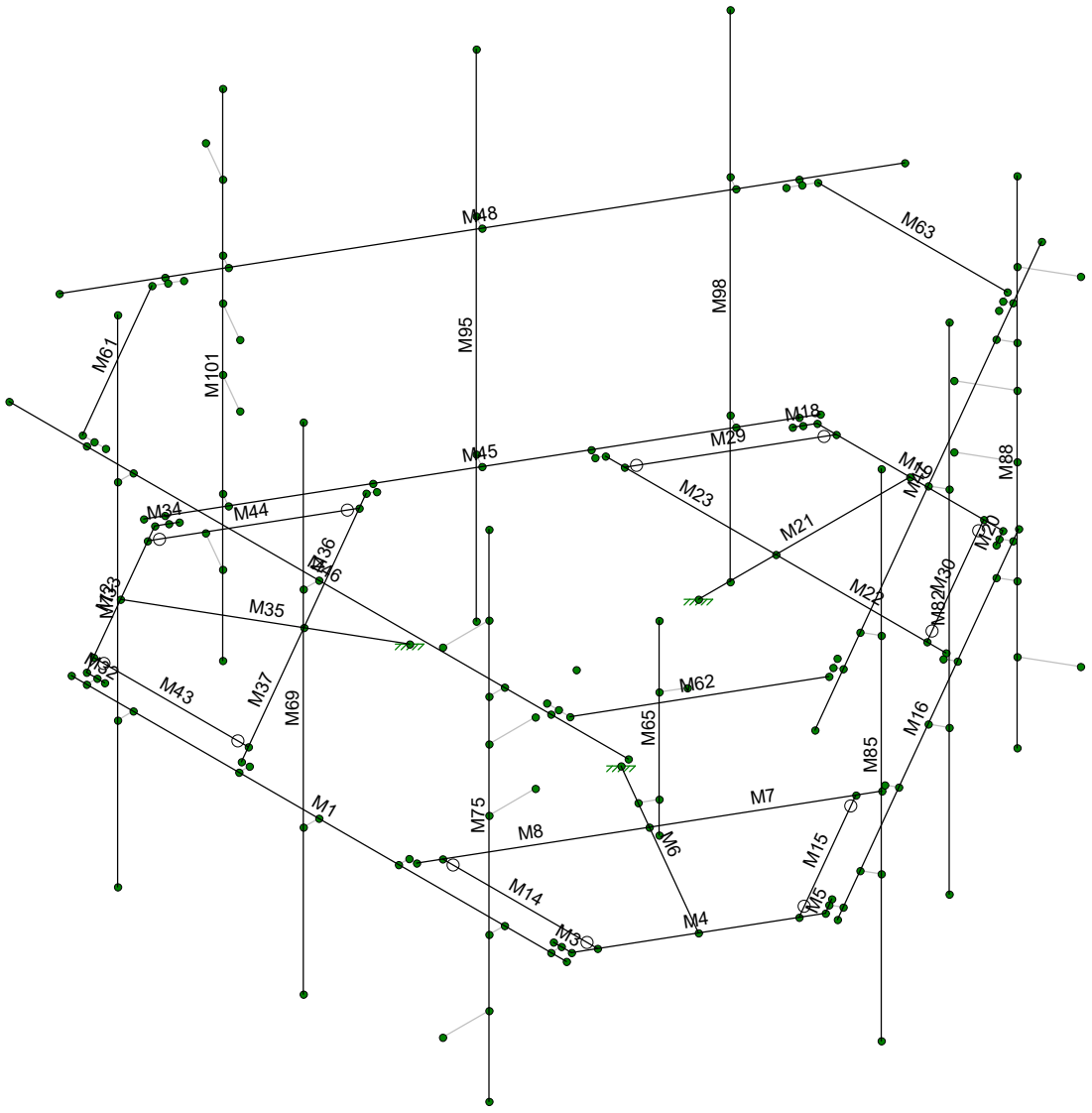
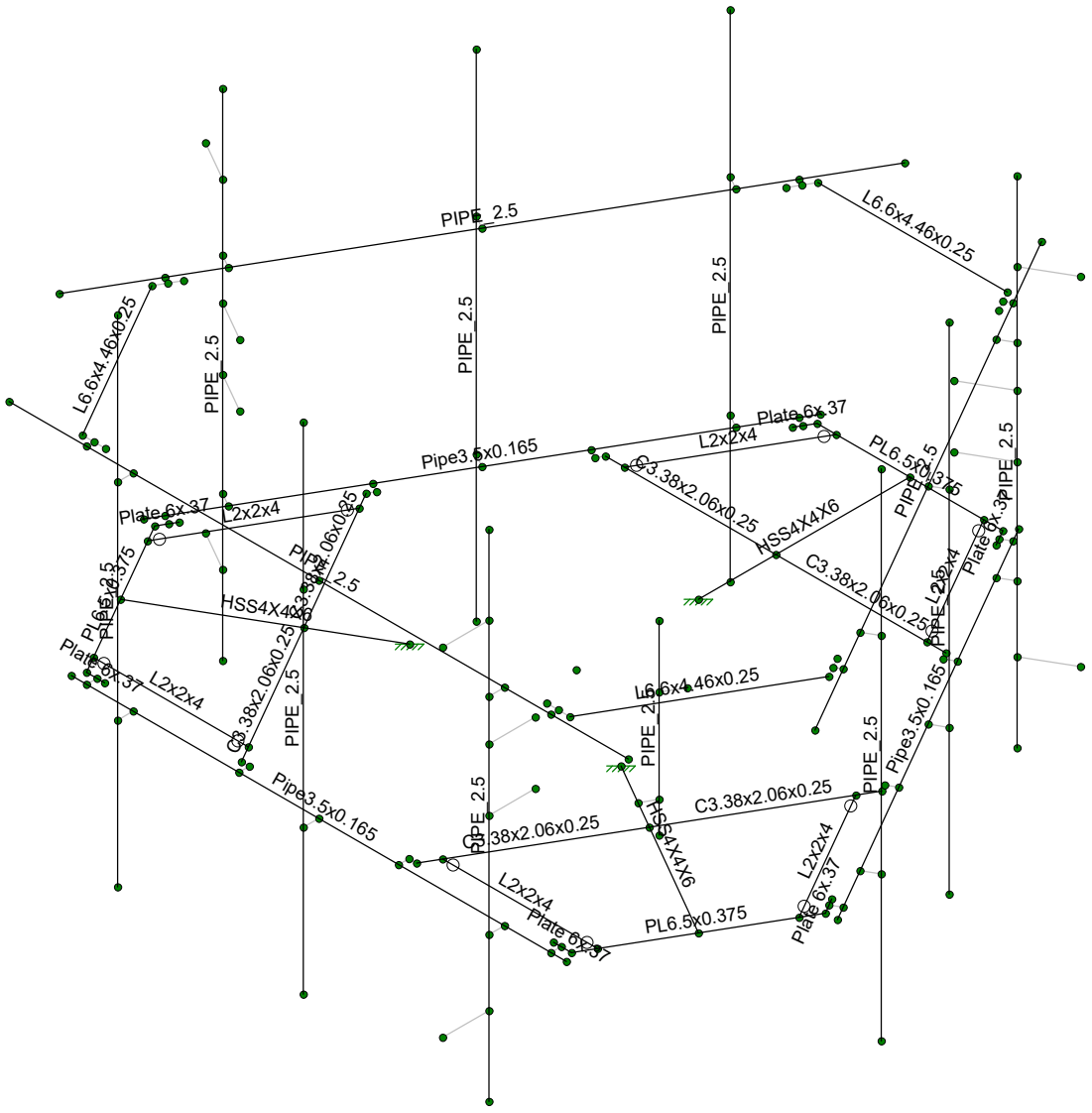


Tectonic Engineering	PROPOSED ANTENNA MOUNT	
CGW		Feb 3, 2022 at 11:18 AM
10710.NJJER0163A		10710.NJJER01120B - MountAnal...



Tectonic Engineering	PROPOSED ANTENNA MOUNT	
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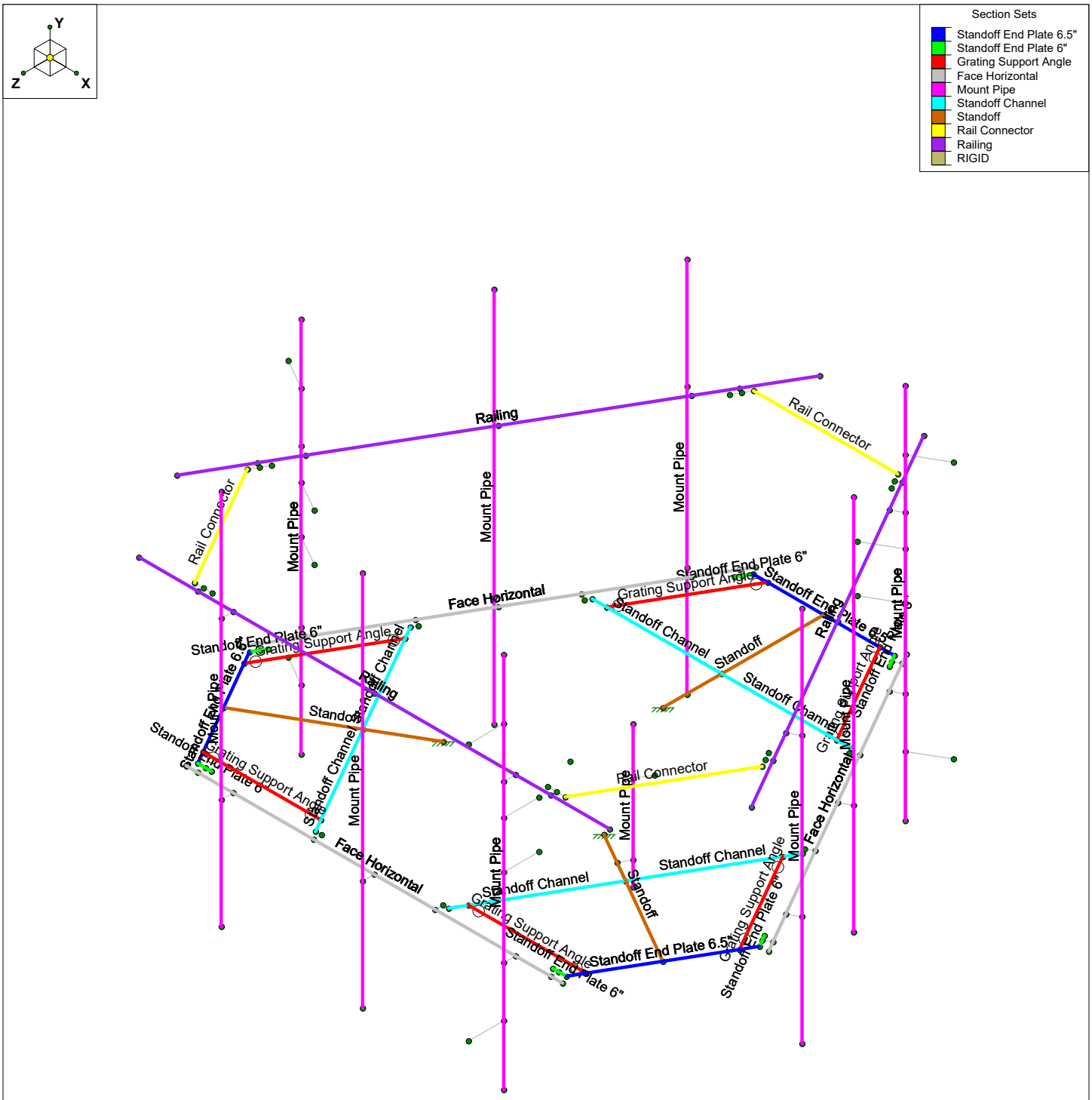

Tectonic Engineering	PROPOSED ANTENNA MOUNT	
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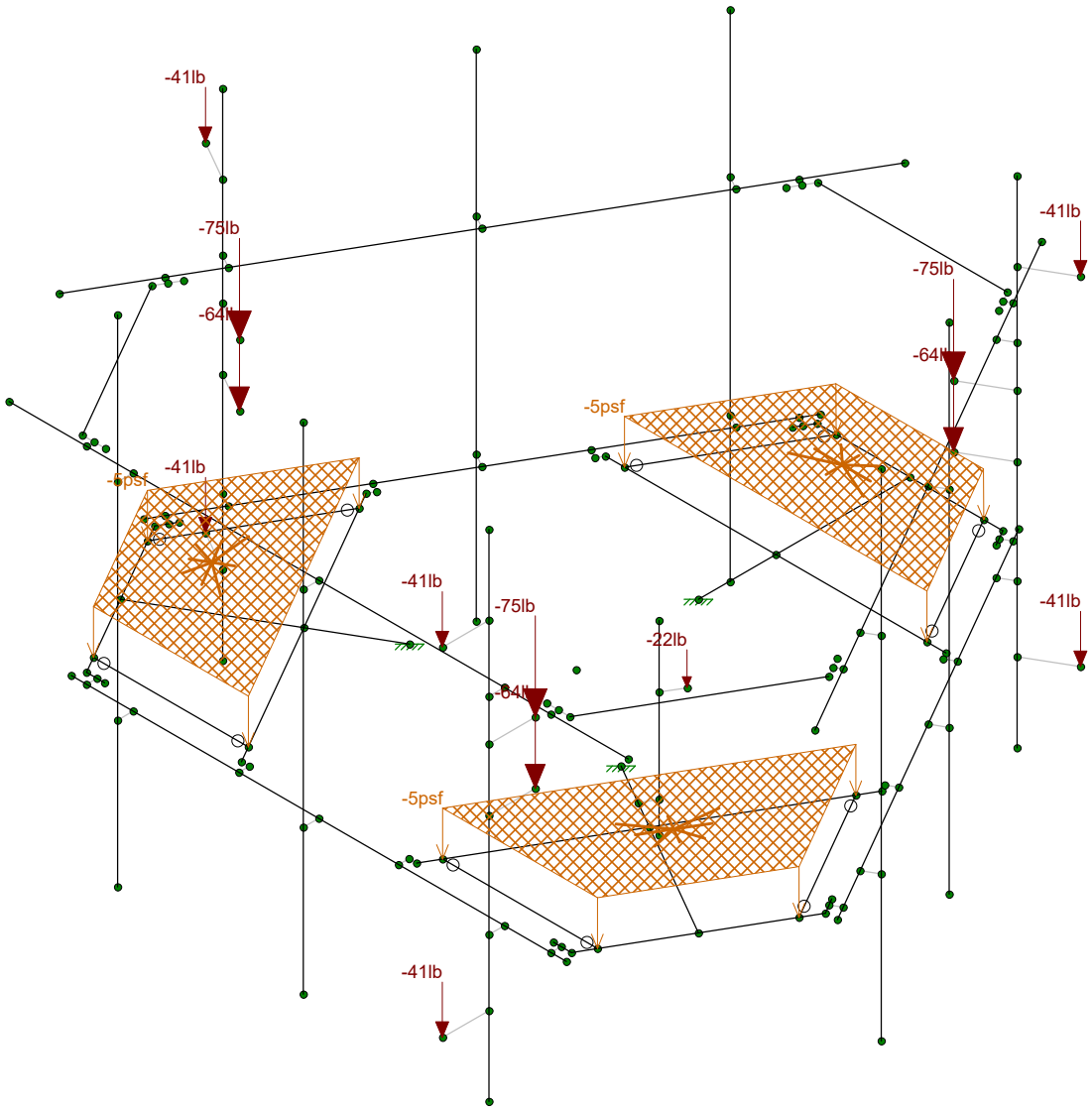
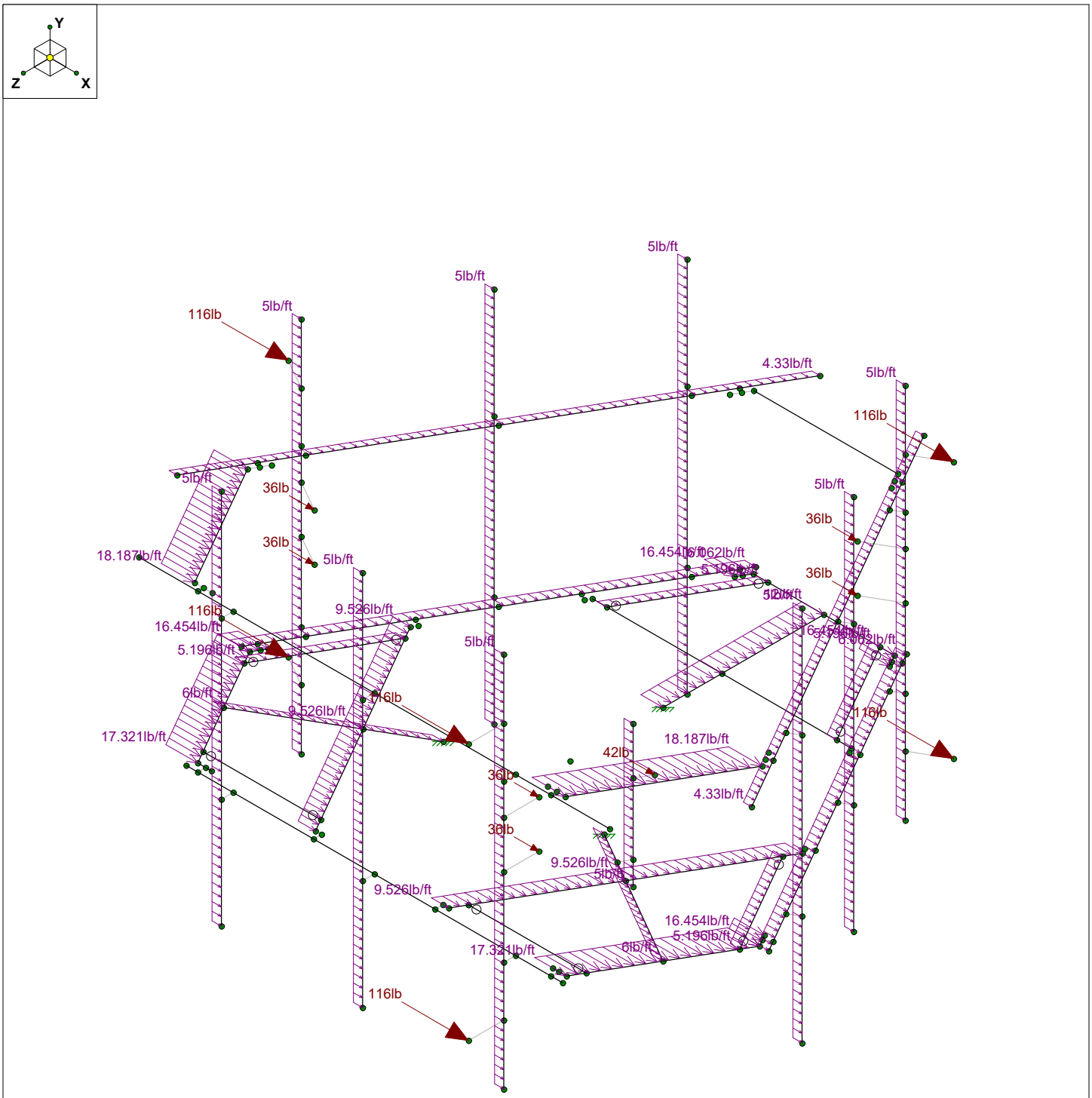


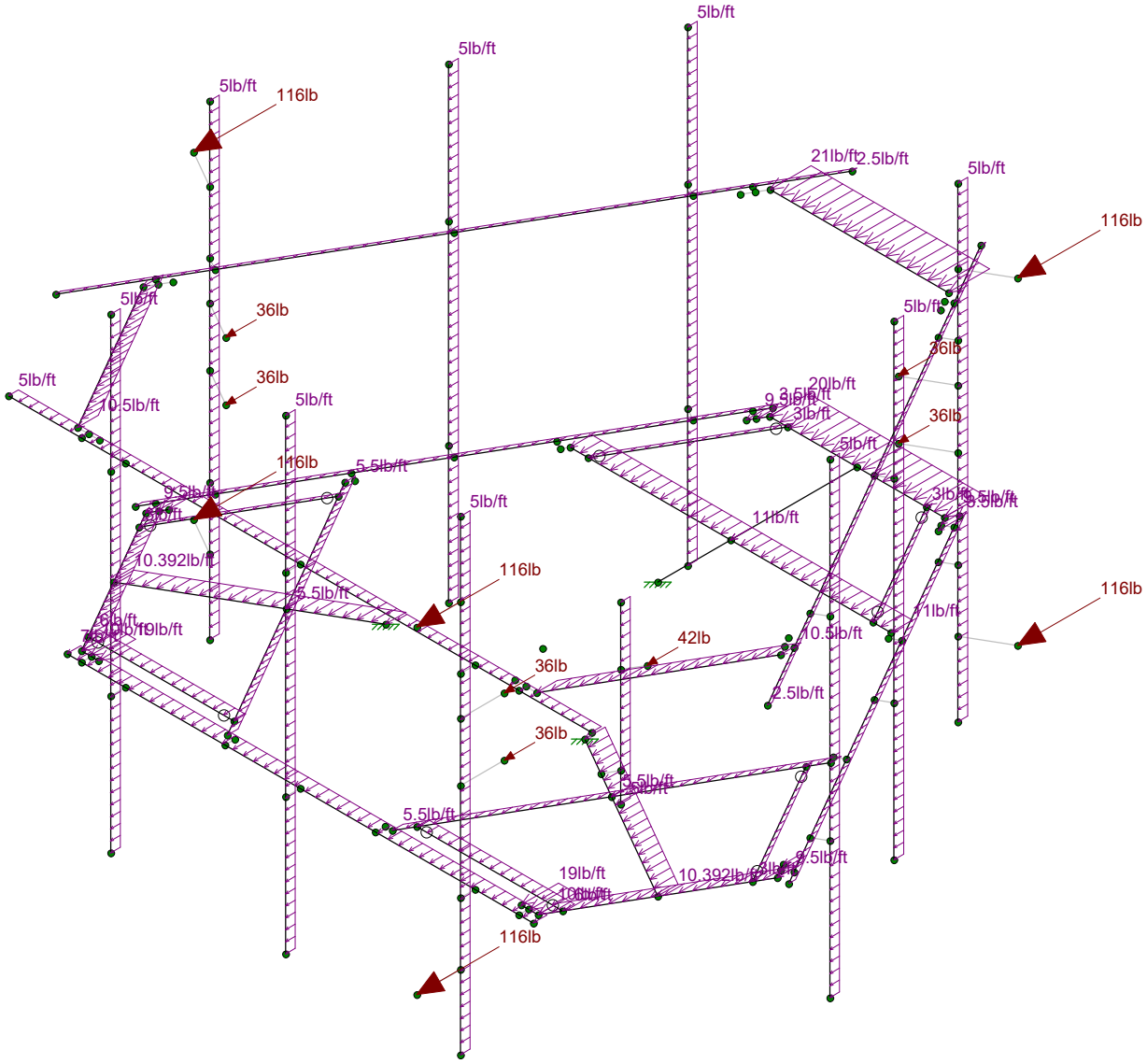
Loads: BLC 1, DL

Tectonic Engineering	PROPOSED ANTENNA MOUNT	
CGW		Feb 3, 2022 at 11:19 AM
10710.NJJER0163A		10710.NJJER01120B - MountAnal...



Loads: BLC 2, WLX

Tectonic Engineering	PROPOSED ANTENNA MOUNT	
CGW		Feb 3, 2022 at 11:19 AM
10710.NJJER0163A		10710.NJJER01120B - MountAnal...



Loads: BLC 3, WLZ

Tectonic Engineering	PROPOSED ANTENNA MOUNT	
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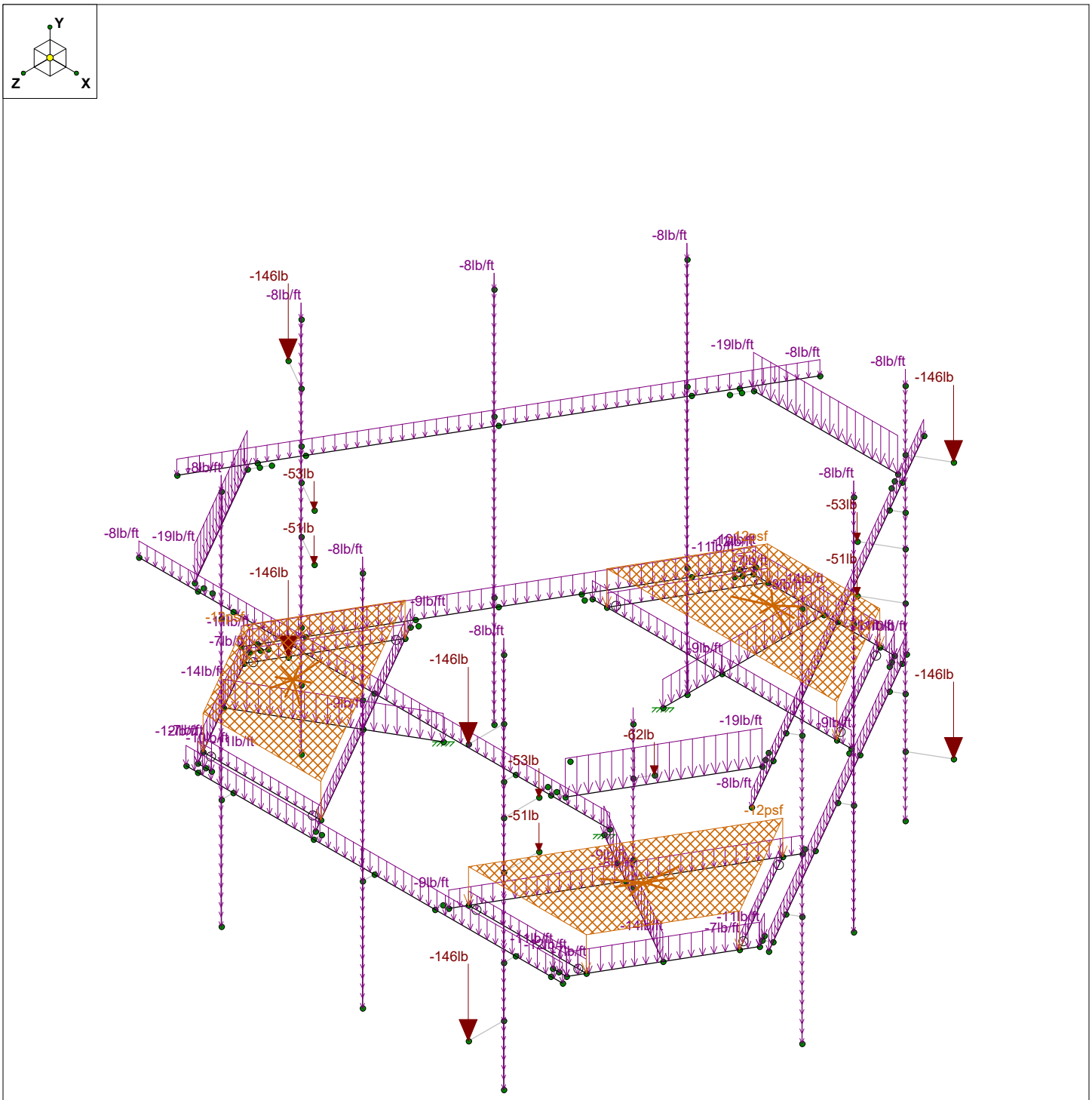
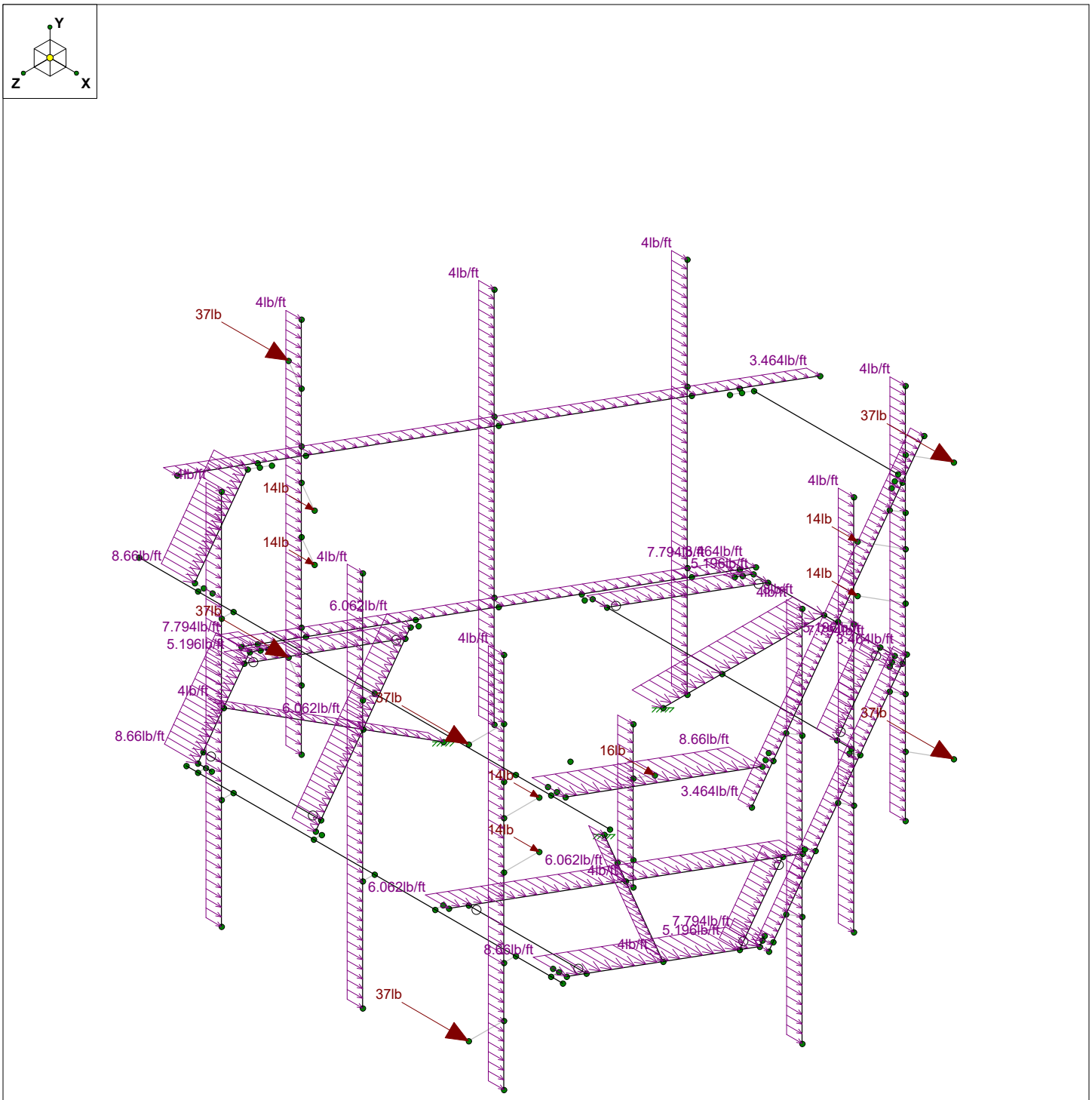
10710.NJJER0163A		10710.NJJER01120B - MountAnal...



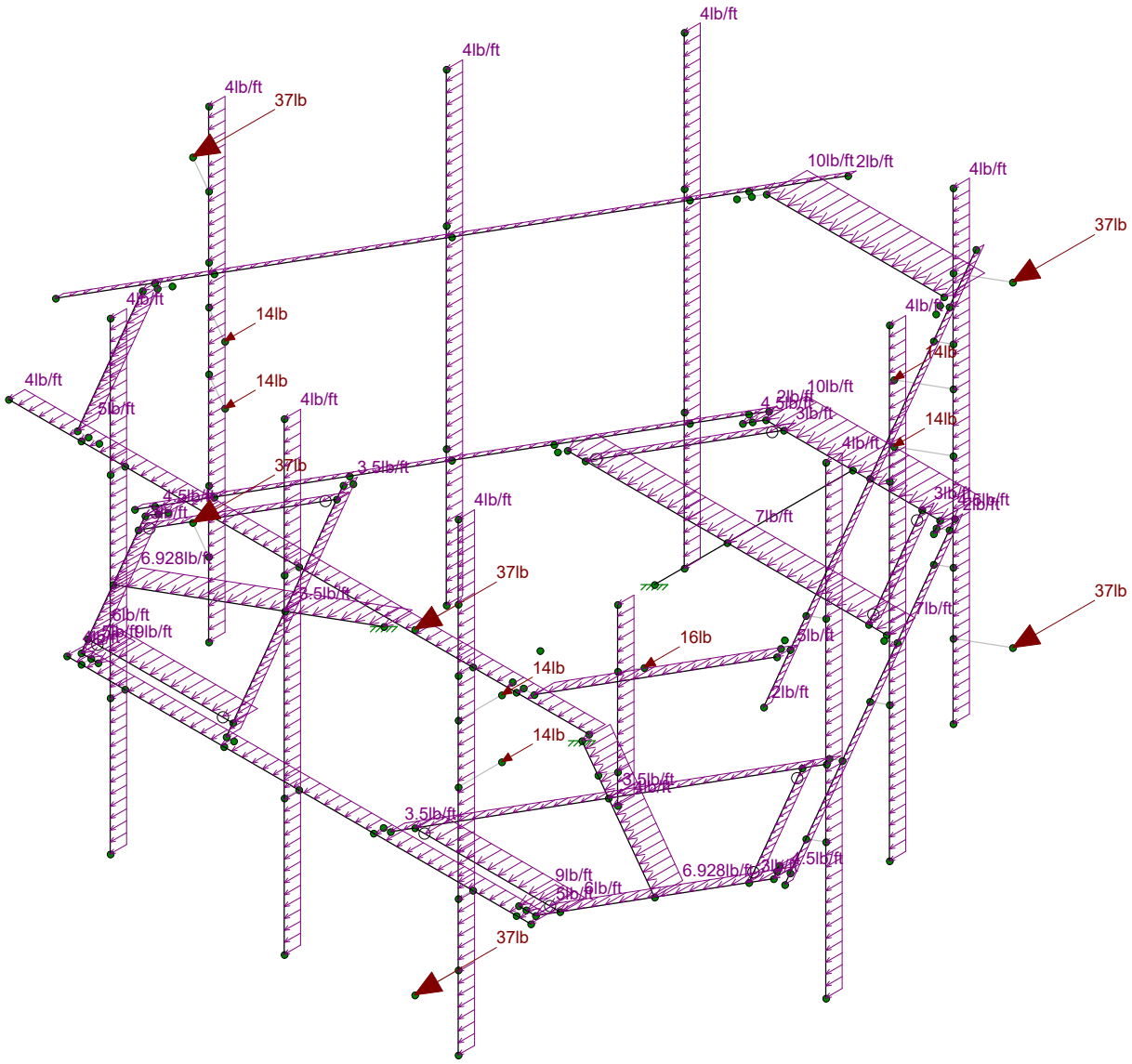
Loads: BLC 4, DL (ICE)

Tectonic Engineering	PROPOSED ANTENNA MOUNT	
CGW		Feb 3, 2022 at 11:19 AM
10710.NJJER0163A		10710.NJJER01120B - MountAnal...



Loads: BLC 5, WLX (ICE)

Tectonic Engineering	PROPOSED ANTENNA MOUNT	
CGW		Feb 3, 2022 at 11:19 AM
10710.NJJER0163A		10710.NJJER01120B - MountAnal...

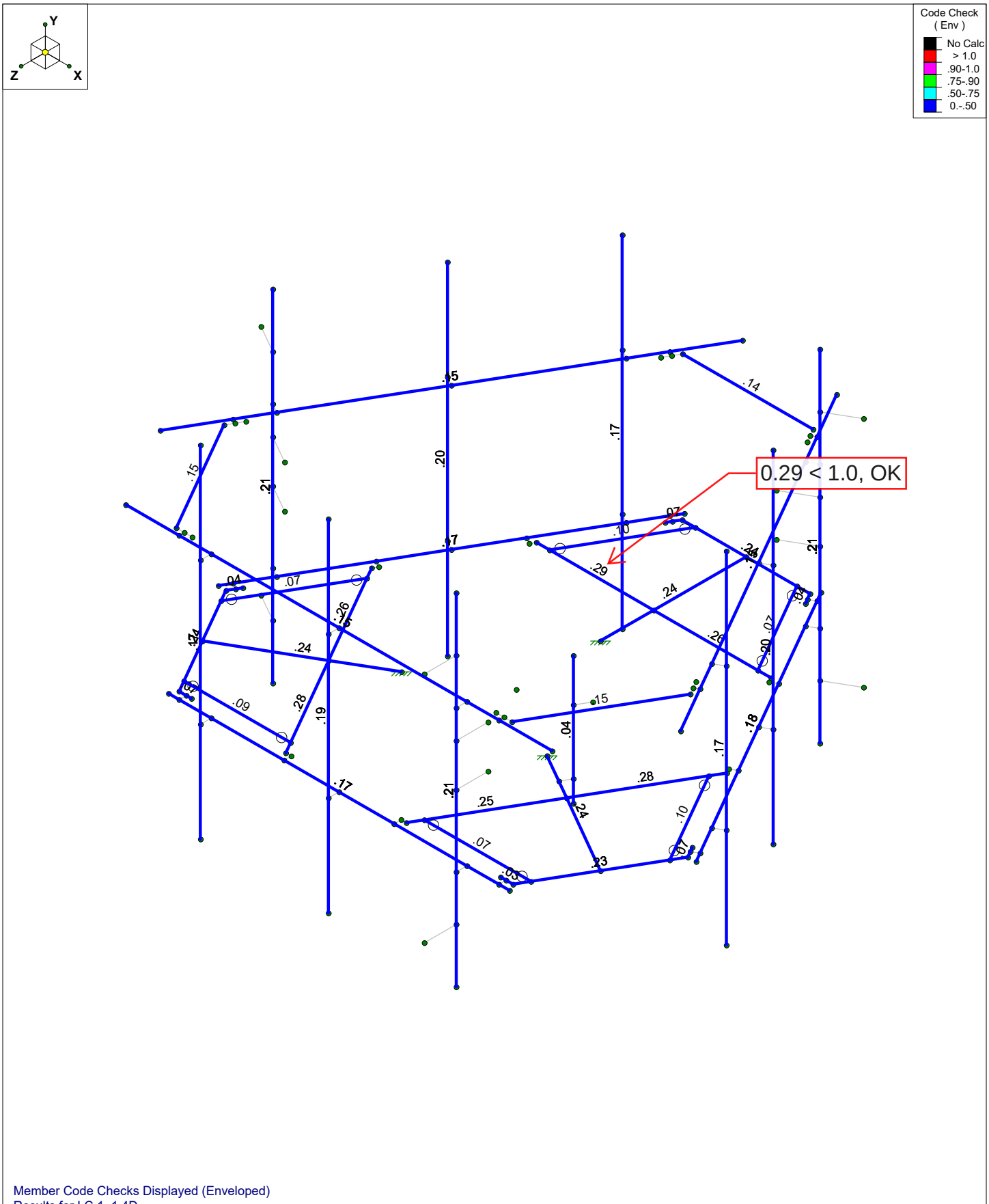


Loads: BLC 6, WLZ (ICE)

Tectonic Engineering	PROPOSED ANTENNA MOUNT	
CGW		Feb 3, 2022 at 11:19 AM
10710.NJJER0163A		10710.NJJER01120B - MountAnal...

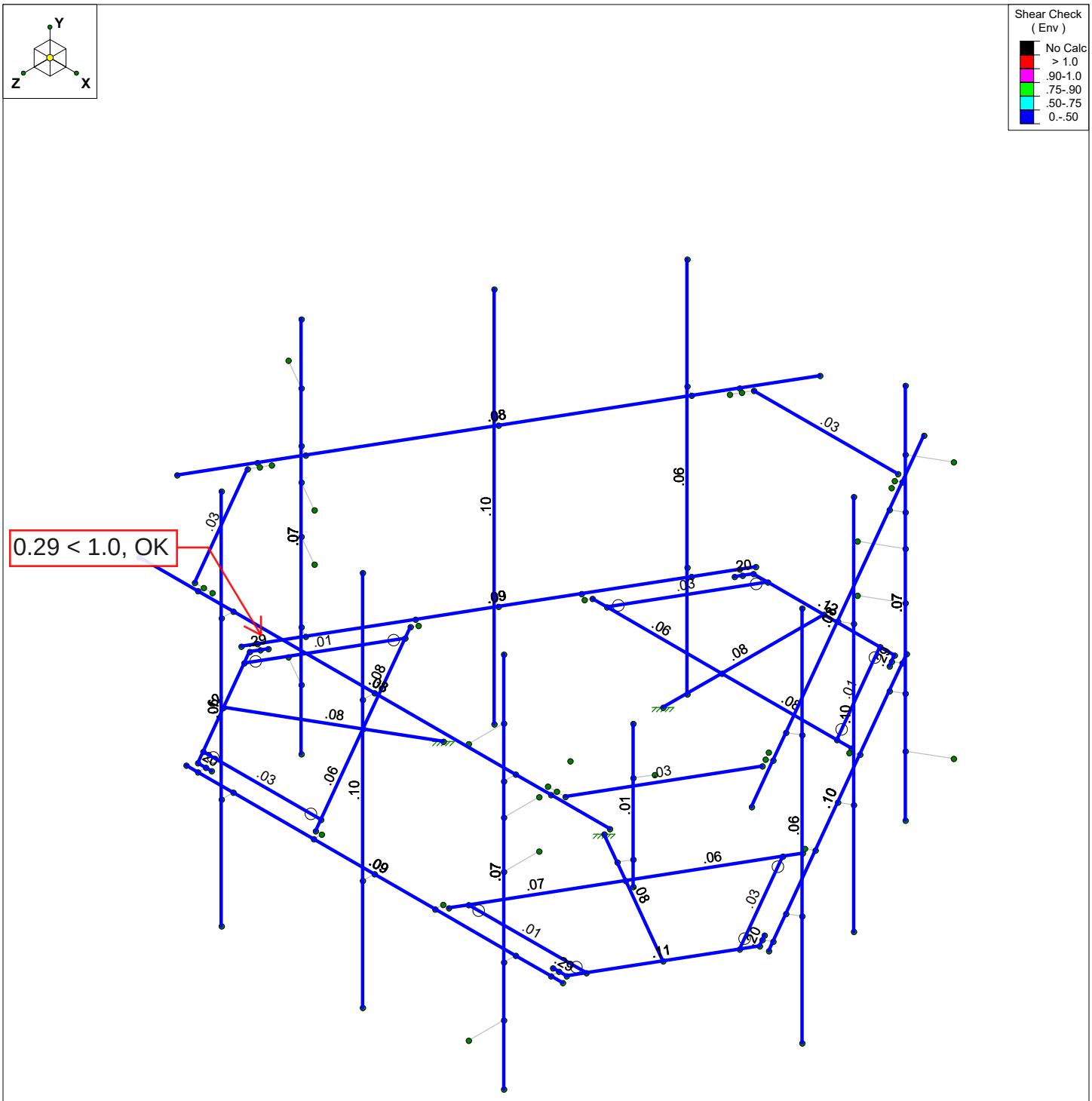
APPENDIX C

SOFTWARE ANALYSIS OUTPUT



Member Code Checks Displayed (Enveloped)
Results for LC 1, 1.4D

Tectonic Engineering	PROPOSED ANTENNA MOUNT	
CGW		Feb 3, 2022 at 11:20 AM
10710.NJJER0163A		10710.NJJER01120B - MountAnal...



Member Shear Checks Displayed (Enveloped)
Results for LC 1, 1.4D

Tectonic Engineering	PROPOSED ANTENNA MOUNT	
CGW		Feb 3, 2022 at 11:20 AM
10710.NJJER0163A		10710.NJJER01120B - MountAnal...

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 Rul...	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 Angle	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....	Beam	Channel	A36 Gr.36	Typical	1.75	.715	3.026	.034
7	Standoff	HSS4X4X6	Beam	SquareTube	A500 Gr.B ...	Typical	4.78	10.3	10.3	17.5
8	Rail Connector	L6.6x4.46x0.25	Beam	Single Angle	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

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	DL	DL		-1.05		13			3	
2	WLX	WLX				13		43		
3	WLZ	WLZ				13		43		
4	DL (ICE)	None				13		43	3	
5	WLX (ICE)	None				13		43		
6	WLZ (ICE)	None				13		43		
7	BLC 1 Transient Area...	None						18		
8	BLC 4 Transient Area...	None						18		

Load Combinations

	Description	So..	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..
1	1.4D	Yes	Y		1	1.4																		
2	1.2D+1.6WLX	Yes	Y		1	1.2	2	1.6																
3	1.2D+1.6WLZ	Yes	Y		1	1.2	3	1.6																
4	1.2D+1.6(WLX+WL...	Yes	Y		1	1.2	2	1.6																
5	1.2D+1.6(WLX+WL...	Yes	Y		1	1.2	2	1.3...	3	.8														
6	1.2D+1.6(WLX+WL...	Yes	Y		1	1.2	2	.8	3	1.3...														
7	1.2D+1.6(WLX+WL...	Yes	Y		1	1.2	2		3	1.6														
8	1.2D+1.6(WLX+WL...	Yes	Y		1	1.2	2	-.8	3	1.3...														
9	1.2D+1.6(WLX+WL...	Yes	Y		1	1.2	2	-1.3...	3	.8														
10	1.2D+1.6(WLX+WL...	Yes	Y		1	1.2	2	-1.6	3															
11	1.2D+1.6(WLX+WL...	Yes	Y		1	1.2	2	-1.3...	3	-.8														
12	1.2D+1.6(WLX+WL...	Yes	Y		1	1.2	2	-.8	3	-1.3...														
13	1.2D+1.6(WLX+WL...	Yes	Y		1	1.2	2		3	-1.6														
14	1.2D+1.6(WLX+WL...	Yes	Y		1	1.2	2	.8	3	-1.3...														
15	1.2D+1.6(WLX+WL...	Yes	Y		1	1.2	2	1.3...	3	-.8														
16	**Wind Load with Ic...																							
17	1.2D+1.0Di+1.0WLXi	Yes	Y		1	1.2	4	1	5	1														
18	1.2D+1.0Di+1.0WLZi	Yes	Y		1	1.2	4	1			6	1												

Load Combinations (Continued)

	Description	So..	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..
19	1.2D+1.0Di+1.0(WL...	Yes	Y		1	1.2	4	1	5	1	6															
20	1.2D+1.0Di+1.0(WL...	Yes	Y		1	1.2	4	1	5	.87	6	.5														
21	1.2D+1.0Di+1.0(WL...	Yes	Y		1	1.2	4	1	5	.5	6	.87														
22	1.2D+1.0Di+1.0(WL...	Yes	Y		1	1.2	4	1	5		6	1														
23	1.2D+1.0Di+1.0(WL...	Yes	Y		1	1.2	4	1	5	-.5	6	.87														
24	1.2D+1.0Di+1.0(WL...	Yes	Y		1	1.2	4	1	5	-.87	6	.5														
25	1.2D+1.0Di+1.0(WL...	Yes	Y		1	1.2	4	1	5	-1	6															
26	1.2D+1.0Di+1.0(WL...	Yes	Y		1	1.2	4	1	5	-.87	6	-.5														
27	1.2D+1.0Di+1.0(WL...	Yes	Y		1	1.2	4	1	5	-.5	6	-.87														
28	1.2D+1.0Di+1.0(WL...	Yes	Y		1	1.2	4	1	5		6	-1														
29	1.2D+1.0Di+1.0(WL...	Yes	Y		1	1.2	4	1	5	.5	6	-.87														
30	1.2D+1.0Di+1.0(WL...	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	N10	max	958.547	9	2261.171	20	1504.757	14	.181	10	1.955	8	4.059	20
2		min	-947.859	15	108.506	11	-1515.55	8	-3.092	17	-1.977	14	-.675	11
3	N53	max	959.415	11	2126.271	24	1394.466	12	.677	4	1.893	12	.331	15
4		min	-955.919	5	58.909	15	-1381.59	6	-1.971	10	-1.916	6	-4.592	24
5	N70	max	1532.155	10	2136.439	28	498.011	13	4.938	28	1.751	4	.962	10
6		min	-1545.945	2	40.041	3	-505.436	3	-.611	3	-1.773	10	-.394	2
7	Totals:	max	3177.247	10	5806.272	21	3302.219	13						
8		min	-3177.239	2	2494.023	12	-3302.215	3						

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

	Member	Shape	Code Check	Loc[in]	LC	Shear C...	Loc[in]	Dir	LC	phi*...	phi*...	phi*M...	phi*...	Cb	Eqn
1	M23	C3.38x2.06x0.25	.286	0	29	.063	29.563	z	14	477...	567...	2.203	5.752	1.6...	H1-1b
2	M7	C3.38x2.06x0.25	.284	0	20	.062	29.563	z	6	477...	567...	2.203	5.752	1.6...	H1-1b
3	M37	C3.38x2.06x0.25	.280	0	24	.057	29.563	z	10	477...	567...	2.203	5.752	1.6...	H1-1b
4	M22	C3.38x2.06x0.25	.261	33	13	.078	3.438	z	7	477...	567...	2.203	5.752	1.6	H1-1b
5	M36	C3.38x2.06x0.25	.258	33	9	.079	3.438	z	15	477...	567...	2.203	5.752	1.5...	H1-1b
6	M8	C3.38x2.06x0.25	.249	33	5	.074	3.438	z	11	477...	567...	2.203	5.752	1.6...	H1-1b
7	M6	HSS4X4X6	.240	41	19	.085	31.604	z	14	187...	197...	22.046	22.046	2.0...	H1-1b
8	M19	PL6.5x0.375	.239	18	13	.116	36	y	6	497...	789...	.617	8.83	1.3...	H1-1b
9	M33	PL6.5x0.375	.237	18	9	.116	36	y	14	497...	789...	.617	8.826	1.3...	H1-1b
10	M35	HSS4X4X6	.236	41	23	.085	41	y	22	187...	197...	22.046	22.046	1.9...	H1-1b
11	M21	HSS4X4X6	.235	41	27	.085	41	y	26	187...	197...	22.046	22.046	1.97	H1-1b
12	M4	PL6.5x0.375	.226	18	5	.106	0	y	10	497...	789...	.617	8.843	1.3...	H1-1b
13	M101	PIPE_2.5	.213	68	8	.067	68		14	300...	507...	3.596	3.596	1.5...	H1-1b
14	M88	PIPE_2.5	.211	68	12	.067	68		6	300...	507...	3.596	3.596	2.8...	H1-1b
15	M75	PIPE_2.5	.210	68	4	.067	68		10	300...	507...	3.596	3.596	2.7...	H1-1b
16	M82	PIPE_2.5	.195	68	6	.104	68		12	300...	507...	3.596	3.596	4.1...	H1-1b
17	M95	PIPE_2.5	.195	68	14	.104	68		8	300...	507...	3.596	3.596	4.3...	H1-1b
18	M69	PIPE_2.5	.194	68	10	.103	68		4	300...	507...	3.596	3.596	4.7...	H1-1b
19	M16	Pipe3.5x0.165	.177	64	13	.096	48		7	388...	544...	4.822	4.822	2.4	H1-1b
20	M45	Pipe3.5x0.165	.174	32	9	.094	48		15	388...	544...	4.822	4.822	2.4...	H1-1b
21	M1	Pipe3.5x0.165	.168	32	5	.093	48		11	388...	544...	4.822	4.822	2.3...	H1-1b
22	M72	PIPE_2.5	.167	68	4	.060	68		12	300...	507...	3.596	3.596	3.9...	H1-1b
23	M98	PIPE_2.5	.166	68	8	.058	68		4	300...	507...	3.596	3.596	3.87	H1-1b
24	M85	PIPE_2.5	.166	68	12	.060	68		8	300...	507...	3.596	3.596	4.2...	H1-1b
25	M61	L6.6x4.46x0.25	.152	0	4	.034	0	y	6	516...	875...	2.465	7.125	1.6...	H2-1
26	M46	PIPE_2.5	.151	15	10	.082	95		4	223...	507...	3.596	3.596	1.2...	H1-1b
27	M48	PIPE_2.5	.149	95	14	.082	95		8	223...	507...	3.596	3.596	1.2...	H1-1b
28	M47	PIPE_2.5	.148	95	6	.082	95		12	223...	507...	3.596	3.596	1.2...	H1-1b

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

	Member	Shape	Code Check	Loc[in]	LC	Shear C...	Loc[in]	Dir	LC	phi*...	phi*...	phi*M...	phi*...	Cb	Eqn
29	M62	L6.6x4.46x0.25	.148	0	12	.034	36.724	y	14	516...	875...	2.465	7.125	1.5...	H2-1
30	M63	L6.6x4.46x0.25	.143	0	8	.032	.765	y	10	516...	875...	2.465	7.125	1.5...	H2-1
31	M29	L2x2x4	.101	0	14	.026	30.022	z	27	222...	305...	.691	1.577	1.1...	H2-1
32	M15	L2x2x4	.099	0	6	.026	30.022	z	19	222...	305...	.691	1.577	1.1...	H2-1
33	M43	L2x2x4	.090	0	10	.026	30.022	z	23	222...	305...	.691	1.577	1.1...	H2-1
34	M44	L2x2x4	.072	0	15	.015	30.022	y	28	222...	305...	.691	1.577	2.1...	H2-1
35	M30	L2x2x4	.072	0	7	.015	30.022	y	20	222...	305...	.691	1.577	2.1...	H2-1
36	M5	Plate 6x.37	.070	1.969	7	.197	0	y	6	679...	719...	.554	8.991	2.5...	H1-1b
37	M18	Plate 6x.37	.069	1.531	15	.197	3.5	y	14	679...	719...	.554	8.991	2.4...	H1-1b
38	M14	L2x2x4	.067	0	11	.015	30.022	y	24	222...	305...	.691	1.577	2.11	H2-1
39	M32	Plate 6x.37	.065	1.531	11	.197	3.5	y	10	679...	719...	.554	8.991	2.6...	H1-1b
40	M34	Plate 6x.37	.039	1.969	15	.292	0	y	23	679...	719...	.554	8.991	1.3...	H1-1b
41	M65	PIPE 2.5	.038	6	14	.013	6		5	471...	507...	3.596	3.596	1.8...	H1-1b
42	M20	Plate 6x.37	.037	1.969	7	.292	0	y	27	679...	719...	.554	8.991	1.3...	H1-1b
43	M3	Plate 6x.37	.034	1.531	11	.290	3.5	y	19	679...	719...	.554	8.991	1.3...	H1-1b

MAXIMUM MEMBER STRESSES DO NOT EXCEED 29% OF THEIR DESIGN STRENGTH. THEREFORE, THE PROPOSED MOUNT IS ADEQUATE TO SUPPORT THE PROPOSED INSTALLATION.

APPENDIX D

ADDITIONAL CALCULATIONS

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Job No. 10710.NJJER01163A
Calculated By: CGW Date : 2/3/22
Checked By: IM Date : 2/3/22

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 N10, LC19		
Shear, X =	0.231	k
Shear, Y =	2.227	k
Tension, Z =	0.163	k
Mx =	4.935	k-ft
My =	0.34	k-ft
Torsion, Mz =	0.721	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} =	4.56	k

AISC [Table J3.2]

ΦRnt > Tmax

22.0% **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} =	1.00	k

AISC [Table J3.2]

ΦRnv > Vmax

8.0% **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
$ΦR'_{nt}$ =	20.72	k
T_{max} =	4.56	k

ΦR'nt > Tmax

22.0% **OK**

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Job No. 10710.NJJER01163A
Calculated By: CGW Date : 2/3/22
Checked By: IM Date : 2/3/22

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
$f_{V,max}$ =	1.895	ksi
$f_{b,max}$ =	16.58	ksi

Min(ΦFnw,ΦFnbm) > √(fv,max+fm,max)

26.5% **OK**

5 - Plate Capacity

Φ =	0.9	
ΦF_{byy} =	45.00	ksi
f_b =	13.25	ksi

ΦFbyy > Fb

29.4% **OK**