January 27, 2022
March 15, 2022 (Rev.1)

Smartlink, LLC
1997 Annapolis Exchange Pkwy, Suite 200
Annapolis, MD 21401

RE:		
	Site Number:	CT2037
	FA Number:	10035247
	PACE Number:	MRCTB052200
	PT Number:	2051A101RB
	Site Name:	NEW HAVEN WHEELER ST
	Site Address:	69 Wheeler Street New Haven, CT 06512

To Whom It May Concern:

Hudson Design Group LLC (HDG) has been authorized by Smartlink to perform a mount analysis on the existing AT&T antenna/RRH mounts to determine their capability of supporting the following additional loading (based on RFDS V5.0 dated 3/8/2022):

- (1) OPA65R-BU4DA Antennas (48.0"x21.0"x7.8" – Wt. = 53 lbs. /each)
- (2) OPA65R-BU6DA Antennas (71.2"x21.0"x7.8" – Wt. = 64 lbs. /each)
- (3) B14 4478 RRH's (18.1"x13.4"x8.3" – Wt. = 60 lbs. /each)
- (3) 4426 B66 RRH's (14.9"x13.2"x5.8" – Wt. = 49 lbs. /each)
- (3) RRUS-E2 B29 RRH's (20.4"x18.5"x7.5" – Wt. = 53 lbs. /each)
- (3) RRUS-32 B30 RRH's (27.2"x12.1"x7.0" – Wt. = 60 lbs. /each)
- (4) DC6-48-60-18-8F Surge Arrestors (31.4"x10.2"Ø – Wt. = 29 lbs.)
- **(1) QD4616-7 Antenna (51.5"x22.0"x9.6" – Wt. = 109 lbs. /each)**
- **(2) QD6616-7 Antennas (72.0"x22.0"x9.6" – Wt. = 130 lbs. /each)**
- **(3) AIR6419 Antennas (31.1"x16.1"x7.3" – Wt. = 66 lbs. /each)**
- **(3) AIR6449 Antenna (30.4"x15.9"x8.1" – Wt. 82 lbs. /each)**
- **(3) 4415 B25 RRH's (16.5"x13.4"x5.9" – Wt. = 46 lbs. /each)**
- **(3) B5/B12 4449 RRH's (17.9"x13.2"x9.4" – Wt. = 73 lbs. /each)**

**Proposed equipment shown in bold*

No original structural design documents or fabrication drawings were available for the existing mounts. HDG's subconsultant, ProVertic LLC, conducted a survey climb and mapping of the existing AT&T antenna mounts on November 22, 2021.

Mount Analysis Methods:

- This analysis was conducted in accordance with EIA/TIA-222-H, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, the International Building Code 2015 with 2018 Connecticut State Building Code, and AT&T Mount Technical Directive – R16.
- HDG considers this mount to be asymmetrical and has applied wind loads in 30 degree increments all around the mount. Per TIA-222-H and Appendix N of the Connecticut State Building Code, the max basic wind speed for this site is equal to 125 mph with a max basic wind speed with ice of 50 mph and a max ice thickness of 1.0 in. An escalated ice thickness of 1.11 in was used for this analysis.
- HDG considers this site to be exposure category D; tower is located on flat, unobstructed, shorelines.
- HDG considers this site to be topographic category 1; tower is located on flat terrain or the bottom of a hill or ridge.
- HDG considers this site to have a spectral response acceleration parameter at short periods, S_S, of 0.186 and a spectral response acceleration parameter at a period of 1 second, S_1, of 0.062.
- The mount has been analyzed with load combinations consisting of 500 lbs live load using a service wind speed of 30 mph wind on the worst case antenna. Analysis performed on each antenna pipe to determine worst case location; worst case location was antenna position 4.
- The mount has been analyzed with load combinations consisting of a 250 lbs live load in a worst case location on the mount.
- The existing mounts are secured to the existing monopole with ring mounts and threaded rods. HDG considers the threaded rods to be the governing connection member.

Based on our evaluation, we have determined that the existing mounts **ARE CAPABLE** of supporting the proposed installation.

	Component	Controlling Load Case	Stress Ratio	Pass/Fail
Existing Mount Rating	8	LC77	78%	**PASS**

Reference Documents:

- Mount mapping report prepared by ProVertic LLC.

This determination was based on the following limitations and assumptions:

1. HDG is not responsible for any modifications completed prior to and hereafter which HDG was not directly involved.
2. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.
3. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer's requirements.
4. The existing mounts have been adequately secured to the tower structure per the mount manufacturer's specifications.
5. All components pertaining to AT&T's mounts must be tightened and re-plumbed prior to the installation of new appurtenances.
6. HDG performed a localized analysis on the mount itself and not on the supporting tower structure.

Please feel free to contact our office should you have any questions.

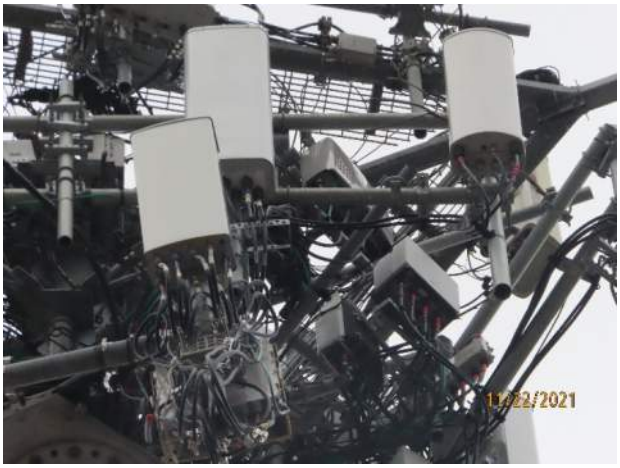
Respectfully Submitted,
Hudson Design Group LLC

STATE OF CONNECTICUT
DANIEL HAMM
LICENSED
PROFESSIONAL ENGINEER

Michael Cabral
Vice President

Daniel P. Hamm, PE
Principal

FIELD PHOTOS:



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Wind & Ice
Calculations

Date: 1/26/2022
Project Name: NEW HAVEN WHEELER ST
Project No.: CT2037
Designed By: LBW **Checked By:** MSC

HUDSON Design Group LLC

2.6.5.2 Velocity Pressure Coeff:

$K_z = 2.01\ (z/z_g)^{2/\alpha}$

z=	92.75	(ft)
z_g=	700	(ft)
α=	11.5	

K_z=	**1.414**

Kzmin ≤ Kz ≤ 2.01

Table 2-4

Exposure	Z_g	α	K_{zmin}	K_c
B	1200 ft	7.0	0.70	0.9
C	900 ft	9.5	0.85	1.0
D	700 ft	11.5	1.03	1.1

2.6.6.2 Topographic Factor:

Table 2-5

Topo. Category	K_t	f
2	0.43	1.25
3	0.53	2.0
4	0.72	1.5

$K_{zt} = [1+(K_c\ K_t/K_h)]^2$

$K_h = e^{(f*z/H)}$

K_{zt}=	**1**

(If Category 1 then K_{zt} =1.0)

Category=	**1**

K_h=	1	
K_c=	1.1	(from Table 2-4)
K_t=	0	(from Table 2-5)
f=	0	(from Table 2-5)
z=	92.75	
z_s=	7	(Mean elevation of base of structure above sea level)
H=	0	(Ht. of the crest above surrounding terrain)
K_{zt}=	1.00	(from 2.6.6.2.1)
K_e=	1.00	(from 2.6.8)

2.6.10 Design Ice Thickness

Max Ice Thickness =	t_i =	1.00	in
Importance Factor =	I=	1.0	(from Table 2-3)
	K_{iz} =	1.11	(from Sec. 2.6.10)

$t_{iz} = t_i*I*K_{iz}*(K_{zt})^{0.35}$

t_{iz} = 1.11 in

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2.6.9 Gust Effect Factor

2.6.9.1 Self Supporting Lattice Structures

G_h = 1.0 Latticed Structures > 600 ft

G_h = 0.85 Latticed Structures 450 ft or less

G_h = 0.85 + 0.15 [h/150 - 3.0] h= ht. of structure

h=	98	G_h=	0.85

2.6.9.2 Guyed Masts G_h= 0.85

2.6.9.3 Pole Structures G_h= 1.1

2.6.9 Appurtenances G_h= 1.0

2.6.9.4 Structures Supported on Other Structures
(Cantilivered tubular or latticed spines, pole, structures on buildings (ht. : width ratio > 5)

G_h=	1.35	**Gh=**	**1.00**

2.6.11.2 Design Wind Force on Appurtenances

F= q_z*G_h*$(EPA)_A$

q_z= 0.00256*K_z*K_{zt}*K_s*K_e*K_d*V_{max}^2

q_z=	**53.73**	K_z=	1.414	(from 2.6.5.2)
$q_{z\ (ice)}$=	**8.60**	K_{zt}=	1.0	(from 2.6.6.2.1)
$q_{z\ (30)}$=	**3.09**	K_s=	1.0	(from 2.6.7)
		K_e=	1.00	(from 2.6.8)
		K_d=	0.95	(from Table 2-2)
		V_{max}=	125	mph (Ultimate Wind Speed)
		$V_{max\ (ice)}$=	50	mph
		V_{30}=	30	mph

Table 2-2

Structure Type	Wind Direction Probability Factor, Kd
Latticed structures with triangular, square or rectangular cross sections	0.85
Tubular pole structures, latticed structures with other cross sections, appurtenances	0.95
Tubular pole structures supporting antennas enclosed within a cylindrical shroud	1.00

Date: 3/14/2022
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Determine Ca:

Table 2-9

Force Coefficients (Ca) for Appurtenances				
Member Type		**Aspect Ratio ≤ 2.5**	**Aspect Ratio = 7**	**Aspect Ratio ≥ 25**
		Ca	**Ca**	**Ca**
Flat		1.2	1.4	2.0
Square/Rectangular HSS		$1.2 - 2.8(r_s) \geq 0.85$	$1.4 - 4.0(r_s) \geq 0.90$	$2.0 - 6.0(r_s) \geq 1.25$
Round	**C < 39** (Subcritical)	0.7	0.8	1.2
	39 ≤ C ≤ 78 (Transitional)	$4.14/(C^{0.485})$	$3.66/(C^{0.415})$	$46.8/(C^{-1.0})$
	C > 78 (Supercritical)	0.5	0.6	0.6

Aspect Ratio is the overall length/width ratio in the plane normal to the wind direction.
(Aspect ratio is independent of the spacing between support points of a linear appurtenance,

Note: Linear interpolation may be used for aspect ratios other than those shown.

Ice Thickness = **1.11 in** **Angle = 0 (deg)** **Equivalent Angle = 180 (deg)**

Appurtenances	Height	Width	Depth	Flat Area	Aspect Ratio	Ca	Force (lbs)	Force (lbs) (w/ Ice)	Force (lbs) (30 mph)
QD4616-7 Antenna	51.5	22.0	9.6	7.87	2.34	1.20	**507**	**93**	**29**
QD6616-7 Antenna	72.0	22.0	9.6	11.00	3.27	1.23	**730**	**132**	**42**
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.93	1.20	**224**	**44**	**13**
AIR6449 Antenna	30.4	15.9	8.1	3.36	1.91	1.20	**216**	**42**	**12**
OPA65R-BU4DA Antenna	48.0	21.0	7.8	7.00	2.29	1.20	**451**	**84**	**26**
OPA65R-BU6DA Antenna	71.2	21.0	7.8	10.38	3.39	1.24	**692**	**126**	**40**
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	2.18	1.20	**67**	**15**	**4**
RRUS-E2 B29 RRH (Side)	20.4	7.5	18.5	1.06	2.72	1.21	**69**	**16**	**4**
4426 B66 RRH (Side)	14.9	5.8	13.2	0.60	2.57	1.20	**39**	**10**	**2**
4415 B25 RRH (Side)	16.5	6.3	13.5	0.72	2.62	1.21	**47**	**11**	**3**
RRUS-32 B30 RRH (Side)	27.2	7.0	12.1	1.32	3.89	1.26	**90**	**20**	**5**
B5/B12 4449 RRH (Side)	17.9	9.4	13.2	1.17	1.90	1.20	**75**	**17**	**4**
Surge Arrestor	24.0	9.7	9.7	1.62	2.47	0.70	**61**	**13**	**4**
2" Pipe	2.4	12.0		0.20	0.20	1.20	**13**		
2-1/2" Pipe	2.9	12.0		0.24	0.24	1.20	**15**		
3" Pipe	3.5	12.0		0.29	0.29	1.20	**19**		
3/4" RoundBar	0.8	12.0		0.06	0.06	1.20	**4**		
5x3/8 Plate	0.4	12.0		0.03	0.03	2.00	**3**		

Date: 3/14/2022
Project Name: NEW HAVEN WHEELER ST
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HUDSON Design Group LLC

WIND LOADS

Angle = 30 (deg) | Ice Thickness = 1.11 in. | Equivalent Angle = 210 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Aspect Ratio	Aspect Ratio	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
QD4616-7 Antenna	51.5	22.0	9.6	7.87	3.43	2.34	5.36	1.20	1.33	507	245	442
QD6616-7 Antenna	72.0	22.0	9.6	11.00	4.80	3.27	7.50	1.23	1.42	730	365	638
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.58	1.93	4.26	1.20	1.28	224	108	195
AIR6449 Antenna	30.4	15.9	8.1	3.36	1.71	1.91	3.75	1.20	1.26	216	115	191
OPA65R-BU4DA Antenna	48.0	21.0	7.8	7.00	2.60	2.29	6.15	1.20	1.36	451	190	386
OPA65R-BU6DA Antenna	71.2	21.0	7.8	10.38	3.86	3.39	9.13	1.24	1.47	692	305	595
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	67	109	78
RRUS-E2 B29 RRH (Side)	20.4	7.5	18.5	1.06	2.62	2.72	1.10	1.21	1.20	69	169	94
4426 B66 RRH (Side)	14.9	5.8	13.2	0.60	1.37	2.57	1.13	1.20	1.20	39	88	51
4415 B25 RRH (Side)	16.5	6.3	13.5	0.72	1.55	2.62	1.22	1.21	1.20	47	100	60
RRUS-32 B30 RRH (Side)	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	90	147	104
B5/B12 4449 RRH (Side)	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	75	106	83

WIND LOADS WITH ICE:

QD4616-7 Antenna	53.7	24.2	11.8	9.03	4.41	2.22	4.55	1.20	1.29	93	49	82
QD6616-7 Antenna	74.2	24.2	11.8	12.48	6.09	3.06	6.28	1.23	1.37	131	72	116
AIR6419 Antenna	33.3	18.3	9.5	4.24	2.20	1.82	3.50	1.20	1.24	44	24	39
AIR6449 Antenna	32.6	18.1	10.3	4.10	2.34	1.80	3.16	1.20	1.23	42	25	38
OPA65R-BU4DA Antenna	50.2	23.2	10.0	8.10	3.49	2.16	5.01	1.20	1.31	84	39	72
OPA65R-BU6DA Antenna	73.4	23.2	10.0	11.84	5.11	3.16	7.33	1.23	1.41	125	62	109
B14 4478 RRH (Side)	20.3	10.5	15.6	1.48	2.20	1.93	1.30	1.20	1.20	15	23	17
RRUS-E2 B29 RRH (Side)	22.6	9.7	20.7	1.53	3.25	2.33	1.09	1.20	1.20	16	34	20
4426 B66 RRH (Side)	17.1	8.0	15.4	0.95	1.83	2.13	1.11	1.20	1.20	10	19	12
4415 B25 RRH (Side)	18.7	8.5	15.7	1.11	2.04	2.20	1.19	1.20	1.20	11	21	14
RRUS-32 B30 RRH (Side)	29.4	9.2	14.3	1.88	2.92	3.19	2.05	1.23	1.20	20	30	22
B5/B12 4449 RRH (Side)	20.1	11.6	15.4	1.62	2.15	1.73	1.30	1.20	1.20	17	22	18

WIND LOADS AT 30 MPH:

QD4616-7 Antenna	51.5	22.0	9.6	7.87	3.43	2.34	5.36	1.20	1.33	29	14	25
QD6616-7 Antenna	72.0	22.0	9.6	11.00	4.80	3.27	7.50	1.23	1.42	42	21	37
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.58	1.93	4.26	1.20	1.28	13	6	11
AIR6449 Antenna	30.4	15.9	8.1	3.36	1.71	1.91	3.75	1.20	1.26	12	7	11
OPA65R-BU4DA Antenna	48.0	21.0	7.8	7.00	2.60	2.29	6.15	1.20	1.36	26	11	22
OPA65R-BU6DA Antenna	71.2	21.0	7.8	10.38	3.86	3.39	9.13	1.24	1.47	40	18	34
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	4	6	4
RRUS-E2 B29 RRH (Side)	20.4	7.5	18.5	1.06	2.62	2.72	1.10	1.21	1.20	4	10	5
4426 B66 RRH (Side)	14.9	5.8	13.2	0.60	1.37	2.57	1.13	1.20	1.20	2	5	3
4415 B25 RRH (Side)	16.5	6.3	13.5	0.72	1.55	2.62	1.22	1.21	1.20	3	6	3
RRUS-32 B30 RRH (Side)	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	5	8	6
B5/B12 4449 RRH (Side)	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	4	6	5

Date: 3/14/2022
Project Name: NEW HAVEN WHEELER ST
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HUDSON Design Group LLC

WIND LOADS

Angle = 60 (deg) | Ice Thickness = 1.11 in. | Equivalent Angle = 240 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
QD4616-7 Antenna	51.5	22.0	9.6	7.87	3.43	2.34	5.36	1.20	1.33	507	245	310
QD6616-7 Antenna	72.0	22.0	9.6	11.00	4.80	3.27	7.50	1.23	1.42	730	365	456
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.58	1.93	4.26	1.20	1.28	224	108	137
AIR6449 Antenna	30.4	15.9	8.1	3.36	1.71	1.91	3.75	1.20	1.26	216	115	141
OPA65R-BU4DA Antenna	48.0	21.0	7.8	7.00	2.60	2.29	6.15	1.20	1.36	451	190	256
OPA65R-BU6DA Antenna	71.2	21.0	7.8	10.38	3.86	3.39	9.13	1.24	1.47	692	305	401
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	67	109	98
RRUS-E2 B29 RRH (Side)	20.4	7.5	18.5	1.06	2.62	2.72	1.10	1.21	1.20	69	169	144
4426 B66 RRH (Side)	14.9	5.8	13.2	0.60	1.37	2.57	1.13	1.20	1.20	39	88	76
4415 B25 RRH (Side)	16.5	6.3	13.5	0.72	1.55	2.62	1.22	1.21	1.20	47	100	86
RRUS-32 B30 RRH (Side)	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	90	147	133
B5/B12 4449 RRH (Side)	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	75	106	98

WIND LOADS WITH ICE:

QD4616-7 Antenna	53.7	24.2	11.8	9.03	4.41	2.22	4.55	1.20	1.29	93	49	60
QD6616-7 Antenna	74.2	24.2	11.8	12.48	6.09	3.06	6.28	1.23	1.37	131	72	87
AIR6419 Antenna	33.3	18.3	9.5	4.24	2.20	1.82	3.50	1.20	1.24	44	24	29
AIR6449 Antenna	32.6	18.1	10.3	4.10	2.34	1.80	3.16	1.20	1.23	42	25	29
OPA65R-BU4DA Antenna	50.2	23.2	10.0	8.10	3.49	2.16	5.01	1.20	1.31	84	39	50
OPA65R-BU6DA Antenna	73.4	23.2	10.0	11.84	5.11	3.16	7.33	1.23	1.41	125	62	78
B14 4478 RRH (Side)	20.3	10.5	15.6	1.48	2.20	1.93	1.30	1.20	1.20	15	23	21
RRUS-E2 B29 RRH (Side)	22.6	9.7	20.7	1.53	3.25	2.33	1.09	1.20	1.20	16	34	29
4426 B66 RRH (Side)	17.1	8.0	15.4	0.95	1.83	2.13	1.11	1.20	1.20	10	19	17
4415 B25 RRH (Side)	18.7	8.5	15.7	1.11	2.04	2.20	1.19	1.20	1.20	11	21	19
RRUS-32 B30 RRH (Side)	29.4	9.2	14.3	1.88	2.92	3.19	2.05	1.23	1.20	20	30	28
B5/B12 4449 RRH (Side)	20.1	11.6	15.4	1.62	2.15	1.73	1.30	1.20	1.20	17	22	21

WIND LOADS AT 30 MPH:

QD4616-7 Antenna	51.5	22.0	9.6	7.87	3.43	2.34	5.36	1.20	1.33	29	14	18
QD6616-7 Antenna	72.0	22.0	9.6	11.00	4.80	3.27	7.50	1.23	1.42	42	21	26
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.58	1.93	4.26	1.20	1.28	13	6	8
AIR6449 Antenna	30.4	15.9	8.1	3.36	1.71	1.91	3.75	1.20	1.26	12	7	8
OPA65R-BU4DA Antenna	48.0	21.0	7.8	7.00	2.60	2.29	6.15	1.20	1.36	26	11	15
OPA65R-BU6DA Antenna	71.2	21.0	7.8	10.38	3.86	3.39	9.13	1.24	1.47	40	18	23
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	4	6	6
RRUS-E2 B29 RRH (Side)	20.4	7.5	18.5	1.06	2.62	2.72	1.10	1.21	1.20	4	10	8
4426 B66 RRH (Side)	14.9	5.8	13.2	0.60	1.37	2.57	1.13	1.20	1.20	2	5	4
4415 B25 RRH (Side)	16.5	6.3	13.5	0.72	1.55	2.62	1.22	1.21	1.20	3	6	5
RRUS-32 B30 RRH (Side)	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	5	8	8
B5/B12 4449 RRH (Side)	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	4	6	6

Date: 3/14/2022
Project Name: NEW HAVEN WHEELER ST
Project No.: CT2037
Designed By: LBW Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle = 90 (deg) | Ice Thickness = 1.11 in. | Equivalent Angle = 270 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
QD4616-7 Antenna	51.5	22.0	9.6	7.87	3.43	2.34	5.36	1.20	1.33	507	245	245
QD6616-7 Antenna	72.0	22.0	9.6	11.00	4.80	3.27	7.50	1.23	1.42	730	365	365
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.58	1.93	4.26	1.20	1.28	224	108	108
AIR6449 Antenna	30.4	15.9	8.1	3.36	1.71	1.91	3.75	1.20	1.26	216	115	115
OPA65R-BU4DA Antenna	48.0	21.0	7.8	7.00	2.60	2.29	6.15	1.20	1.36	451	190	190
OPA65R-BU6DA Antenna	71.2	21.0	7.8	10.38	3.86	3.39	9.13	1.24	1.47	692	305	305
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	67	109	109
RRUS-E2 B29 RRH (Side)	20.4	7.5	18.5	1.06	2.62	2.72	1.10	1.21	1.20	69	169	169
4426 B66 RRH (Side)	14.9	5.8	13.2	0.60	1.37	2.57	1.13	1.20	1.20	39	88	88
4415 B25 RRH (Side)	16.5	6.3	13.5	0.72	1.55	2.62	1.22	1.21	1.20	47	100	100
RRUS-32 B30 RRH (Side)	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	90	147	147
B5/B12 4449 RRH (Side)	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	75	106	106

WIND LOADS WITH ICE:

QD4616-7 Antenna	53.7	24.2	11.8	9.03	4.41	2.22	4.55	1.20	1.29	93	49	49
QD6616-7 Antenna	74.2	24.2	11.8	12.48	6.09	3.06	6.28	1.23	1.37	131	72	72
AIR6419 Antenna	33.3	18.3	9.5	4.24	2.20	1.82	3.50	1.20	1.24	44	24	24
AIR6449 Antenna	32.6	18.1	10.3	4.10	2.34	1.80	3.16	1.20	1.23	42	25	25
OPA65R-BU4DA Antenna	50.2	23.2	10.0	8.10	3.49	2.16	5.01	1.20	1.31	84	39	39
OPA65R-BU6DA Antenna	73.4	23.2	10.0	11.84	5.11	3.16	7.33	1.23	1.41	125	62	62
B14 4478 RRH (Side)	20.3	10.5	15.6	1.48	2.20	1.93	1.30	1.20	1.20	15	23	23
RRUS-E2 B29 RRH (Side)	22.6	9.7	20.7	1.53	3.25	2.33	1.09	1.20	1.20	16	34	34
4426 B66 RRH (Side)	17.1	8.0	15.4	0.95	1.83	2.13	1.11	1.20	1.20	10	19	19
4415 B25 RRH (Side)	18.7	8.5	15.7	1.11	2.04	2.20	1.19	1.20	1.20	11	21	21
RRUS-32 B30 RRH (Side)	29.4	9.2	14.3	1.88	2.92	3.19	2.05	1.23	1.20	20	30	30
B5/B12 4449 RRH (Side)	20.1	11.6	15.4	1.62	2.15	1.73	1.30	1.20	1.20	17	22	22

WIND LOADS AT 30 MPH:

QD4616-7 Antenna	51.5	22.0	9.6	7.87	3.43	2.34	5.36	1.20	1.33	29	14	14
QD6616-7 Antenna	72.0	22.0	9.6	11.00	4.80	3.27	7.50	1.23	1.42	42	21	21
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.58	1.93	4.26	1.20	1.28	13	6	6
AIR6449 Antenna	30.4	15.9	8.1	3.36	1.71	1.91	3.75	1.20	1.26	12	7	7
OPA65R-BU4DA Antenna	48.0	21.0	7.8	7.00	2.60	2.29	6.15	1.20	1.36	26	11	11
OPA65R-BU6DA Antenna	71.2	21.0	7.8	10.38	3.86	3.39	9.13	1.24	1.47	40	18	18
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	4	6	6
RRUS-E2 B29 RRH (Side)	20.4	7.5	18.5	1.06	2.62	2.72	1.10	1.21	1.20	4	10	10
4426 B66 RRH (Side)	14.9	5.8	13.2	0.60	1.37	2.57	1.13	1.20	1.20	2	5	5
4415 B25 RRH (Side)	16.5	6.3	13.5	0.72	1.55	2.62	1.22	1.21	1.20	3	6	6
RRUS-32 B30 RRH (Side)	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	5	8	8
B5/B12 4449 RRH (Side)	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	4	6	6

Date: 3/14/2022
Project Name: NEW HAVEN WHEELER ST
Project No.: CT2037
Designed By: LBW Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle = 120 (deg) | Ice Thickness = 1.11 in. | Equivalent Angle = 300 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
QD4616-7 Antenna	51.5	22.0	9.6	7.87	3.43	2.34	5.36	1.20	1.33	507	245	310
QD6616-7 Antenna	72.0	22.0	9.6	11.00	4.80	3.27	7.50	1.23	1.42	730	365	456
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.58	1.93	4.26	1.20	1.28	224	108	137
AIR6449 Antenna	30.4	15.9	8.1	3.36	1.71	1.91	3.75	1.20	1.26	216	115	141
OPA65R-BU4DA Antenna	48.0	21.0	7.8	7.00	2.60	2.29	6.15	1.20	1.36	451	190	256
OPA65R-BU6DA Antenna	71.2	21.0	7.8	10.38	3.86	3.39	9.13	1.24	1.47	692	305	401
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	67	109	98
RRUS-E2 B29 RRH (Side)	20.4	7.5	18.5	1.06	2.62	2.72	1.10	1.21	1.20	69	169	144
4426 B66 RRH (Side)	14.9	5.8	13.2	0.60	1.37	2.57	1.13	1.20	1.20	39	88	76
4415 B25 RRH (Side)	16.5	6.3	13.5	0.72	1.55	2.62	1.22	1.21	1.20	47	100	86
RRUS-32 B30 RRH (Side)	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	90	147	133
B5/B12 4449 RRH (Side)	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	75	106	98

WIND LOADS WITH ICE:

QD4616-7 Antenna	53.7	24.2	11.8	9.03	4.41	2.22	4.55	1.20	1.29	93	49	60
QD6616-7 Antenna	74.2	24.2	11.8	12.48	6.09	3.06	6.28	1.23	1.37	131	72	87
AIR6419 Antenna	33.3	18.3	9.5	4.24	2.20	1.82	3.50	1.20	1.24	44	24	29
AIR6449 Antenna	32.6	18.1	10.3	4.10	2.34	1.80	3.16	1.20	1.23	42	25	29
OPA65R-BU4DA Antenna	50.2	23.2	10.0	8.10	3.49	2.16	5.01	1.20	1.31	84	39	50
OPA65R-BU6DA Antenna	73.4	23.2	10.0	11.84	5.11	3.16	7.33	1.23	1.41	125	62	78
B14 4478 RRH (Side)	20.3	10.5	15.6	1.48	2.20	1.93	1.30	1.20	1.20	15	23	21
RRUS-E2 B29 RRH (Side)	22.6	9.7	20.7	1.53	3.25	2.33	1.09	1.20	1.20	16	34	29
4426 B66 RRH (Side)	17.1	8.0	15.4	0.95	1.83	2.13	1.11	1.20	1.20	10	19	17
4415 B25 RRH (Side)	18.7	8.5	15.7	1.11	2.04	2.20	1.19	1.20	1.20	11	21	19
RRUS-32 B30 RRH (Side)	29.4	9.2	14.3	1.88	2.92	3.19	2.05	1.23	1.20	20	30	28
B5/B12 4449 RRH (Side)	20.1	11.6	15.4	1.62	2.15	1.73	1.30	1.20	1.20	17	22	21

WIND LOADS AT 30 MPH:

QD4616-7 Antenna	51.5	22.0	9.6	7.87	3.43	2.34	5.36	1.20	1.33	29	14	18
QD6616-7 Antenna	72.0	22.0	9.6	11.00	4.80	3.27	7.50	1.23	1.42	42	21	26
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.58	1.93	4.26	1.20	1.28	13	6	8
AIR6449 Antenna	30.4	15.9	8.1	3.36	1.71	1.91	3.75	1.20	1.26	12	7	8
OPA65R-BU4DA Antenna	48.0	21.0	7.8	7.00	2.60	2.29	6.15	1.20	1.36	26	11	15
OPA65R-BU6DA Antenna	71.2	21.0	7.8	10.38	3.86	3.39	9.13	1.24	1.47	40	18	23
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	4	6	6
RRUS-E2 B29 RRH (Side)	20.4	7.5	18.5	1.06	2.62	2.72	1.10	1.21	1.20	4	10	8
4426 B66 RRH (Side)	14.9	5.8	13.2	0.60	1.37	2.57	1.13	1.20	1.20	2	5	4
4415 B25 RRH (Side)	16.5	6.3	13.5	0.72	1.55	2.62	1.22	1.21	1.20	3	6	5
RRUS-32 B30 RRH (Side)	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	5	8	8
B5/B12 4449 RRH (Side)	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	4	6	6

Date: 3/14/2022
Project Name: NEW HAVEN WHEELER ST
Project No.: CT2037
Designed By: LBW Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle = 150 (deg) | Ice Thickness = 1.11 in. | Equivalent Angle = 330 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
QD4616-7 Antenna	51.5	22.0	9.6	7.87	3.43	2.34	5.36	1.20	1.33	507	245	442
QD6616-7 Antenna	72.0	22.0	9.6	11.00	4.80	3.27	7.50	1.23	1.42	730	365	638
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.58	1.93	4.26	1.20	1.28	224	108	195
AIR6449 Antenna	30.4	15.9	8.1	3.36	1.71	1.91	3.75	1.20	1.26	216	115	191
OPA65R-BU4DA Antenna	48.0	21.0	7.8	7.00	2.60	2.29	6.15	1.20	1.36	451	190	386
OPA65R-BU6DA Antenna	71.2	21.0	7.8	10.38	3.86	3.39	9.13	1.24	1.47	692	305	595
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	67	109	78
RRUS-E2 B29 RRH (Side)	20.4	7.5	18.5	1.06	2.62	2.72	1.10	1.21	1.20	69	169	94
4426 B66 RRH (Side)	14.9	5.8	13.2	0.60	1.37	2.57	1.13	1.20	1.20	39	88	51
4415 B25 RRH (Side)	16.5	6.3	13.5	0.72	1.55	2.62	1.22	1.21	1.20	47	100	60
RRUS-32 B30 RRH (Side)	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	90	147	104
B5/B12 4449 RRH (Side)	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	75	106	83

WIND LOADS WITH ICE:

QD4616-7 Antenna	53.7	24.2	11.8	9.03	4.41	2.22	4.55	1.20	1.29	93	49	82
QD6616-7 Antenna	74.2	24.2	11.8	12.48	6.09	3.06	6.28	1.23	1.37	131	72	116
AIR6419 Antenna	33.3	18.3	9.5	4.24	2.20	1.82	3.50	1.20	1.24	44	24	39
AIR6449 Antenna	32.6	18.1	10.3	4.10	2.34	1.80	3.16	1.20	1.23	42	25	38
OPA65R-BU4DA Antenna	50.2	23.2	10.0	8.10	3.49	2.16	5.01	1.20	1.31	84	39	72
OPA65R-BU6DA Antenna	73.4	23.2	10.0	11.84	5.11	3.16	7.33	1.23	1.41	125	62	109
B14 4478 RRH (Side)	20.3	10.5	15.6	1.48	2.20	1.93	1.30	1.20	1.20	15	23	17
RRUS-E2 B29 RRH (Side)	22.6	9.7	20.7	1.53	3.25	2.33	1.09	1.20	1.20	16	34	20
4426 B66 RRH (Side)	17.1	8.0	15.4	0.95	1.83	2.13	1.11	1.20	1.20	10	19	12
4415 B25 RRH (Side)	18.7	8.5	15.7	1.11	2.04	2.20	1.19	1.20	1.20	11	21	14
RRUS-32 B30 RRH (Side)	29.4	9.2	14.3	1.88	2.92	3.19	2.05	1.23	1.20	20	30	22
B5/B12 4449 RRH (Side)	20.1	11.6	15.4	1.62	2.15	1.73	1.30	1.20	1.20	17	22	18

WIND LOADS AT 30 MPH:

QD4616-7 Antenna	51.5	22.0	9.6	7.87	3.43	2.34	5.36	1.20	1.33	29	14	25
QD6616-7 Antenna	72.0	22.0	9.6	11.00	4.80	3.27	7.50	1.23	1.42	42	21	37
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.58	1.93	4.26	1.20	1.28	13	6	11
AIR6449 Antenna	30.4	15.9	8.1	3.36	1.71	1.91	3.75	1.20	1.26	12	7	11
OPA65R-BU4DA Antenna	48.0	21.0	7.8	7.00	2.60	2.29	6.15	1.20	1.36	26	11	22
OPA65R-BU6DA Antenna	71.2	21.0	7.8	10.38	3.86	3.39	9.13	1.24	1.47	40	18	34
B14 4478 RRH (Side)	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	4	6	4
RRUS-E2 B29 RRH (Side)	20.4	7.5	18.5	1.06	2.62	2.72	1.10	1.21	1.20	4	10	5
4426 B66 RRH (Side)	14.9	5.8	13.2	0.60	1.37	2.57	1.13	1.20	1.20	2	5	3
4415 B25 RRH (Side)	16.5	6.3	13.5	0.72	1.55	2.62	1.22	1.21	1.20	3	6	3
RRUS-32 B30 RRH (Side)	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	5	8	6
B5/B12 4449 RRH (Side)	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	4	6	5

Date: 3/14/2022
Project Name: NEW HAVEN WHEELER ST
Project No.: CT2037
Designed By: LBW **Checked By:** MSC

HUDSON Design Group LLC

ICE WEIGHT CALCULATIONS

Thickness of ice: 1.11 in.
Density of ice: 56 pcf

QD4616-7 Antenna

Weight of ice based on total radial SF area:		
Height (in):	51.5	
Width (in):	22.0	
Depth (in):	9.6	
Total weight of ice on object:		146 lbs
Weight of object:	109.0 lbs	
Combined weight of ice and object:		255 lbs

QD6616-7 Antenna

Weight of ice based on total radial SF area:		
Height (in):	72.0	
Width (in):	22.0	
Depth (in):	9.6	
Total weight of ice on object:		204 lbs
Weight of object:	130.0 lbs	
Combined weight of ice and object:		334 lbs

AIR6419 Antenna

Weight of ice based on total radial SF area:		
Height (in):	31.1	
Width (in):	16.1	
Depth (in):	7.3	
Total weight of ice on object:		66 lbs
Weight of object:	66.0 lbs	
Combined weight of ice and object:		132 lbs

AIR6449 Antenna

Weight of ice based on total radial SF area:		
Height (in):	30.4	
Width (in):	15.9	
Depth (in):	8.1	
Total weight of ice on object:		65 lbs
Weight of object:	82.0 lbs	
Combined weight of ice and object:		147 lbs

OPA65R-BU4DA Antenna

Weight of ice based on total radial SF area:		
Height (in):	48.0	
Width (in):	21.0	
Depth (in):	7.8	
Total weight of ice on object:		128 lbs
Weight of object:	53.0 lbs	
Combined weight of ice and object:		181 lbs

OPA65R-BU6DA Antenna

Weight of ice based on total radial SF area:		
Height (in):	71.2	
Width (in):	21.0	
Depth (in):	7.8	
Total weight of ice on object:		189 lbs
Weight of object:	64.0 lbs	
Combined weight of ice and object:		253 lbs

B14 4478 RRH

Weight of ice based on total radial SF area:		
Height (in):	18.1	
Width (in):	13.4	
Depth (in):	8.3	
Total weight of ice on object:		35 lbs
Weight of object:	60.0 lbs	
Combined weight of ice and object:		95 lbs

RRUS-E2 B29 RRH

Weight of ice based on total radial SF area:		
Height (in):	20.4	
Width (in):	18.5	
Depth (in):	7.5	
Total weight of ice on object:		49 lbs
Weight of object:	53.0 lbs	
Combined weight of ice and object:		102 lbs

4426 B66 RRH

Weight of ice based on total radial SF area:		
Height (in):	14.9	
Width (in):	13.2	
Depth (in):	5.8	
Total weight of ice on object:		26 lbs
Weight of object:	49.0 lbs	
Combined weight of ice and object:		75 lbs

4415 B25 RRH

Weight of ice based on total radial SF area:		
Height (in):	16.5	
Width (in):	13.5	
Depth (in):	6.3	
Total weight of ice on object:		30 lbs
Weight of object:	46.0 lbs	
Combined weight of ice and object:		76 lbs

RRUS-32 B30 RRH

Weight of ice based on total radial SF area:		
Height (in):	27.2	
Width (in):	12.1	
Depth (in):	7.0	
Total weight of ice on object:		46 lbs
Weight of object:	60.0 lbs	
Combined weight of ice and object:		106 lbs

B5/B12 4449 RRH

Weight of ice based on total radial SF area:		
Height (in):	17.9	
Width (in):	13.2	
Depth (in):	9.4	
Total weight of ice on object:		35 lbs
Weight of object:	73.0 lbs	
Combined weight of ice and object:		108 lbs

Squid Surge Arrestor

Weight of ice based on total radial SF area:		
Depth (in):	24.0	
Diameter(in):	9.7	
Total weight of ice on object:		29 lbs
Weight of object:	33 lbs	
Combined weight of ice and object:		62 lbs

3/4" Round Bar

Per foot weight of ice:		
diameter (in):	0.75	
Per foot weight of ice on object:		3 plf

2-1/2" pipe

Per foot weight of ice:		
diameter (in):	2.88	
Per foot weight of ice on object:		5 plf

2" pipe

Per foot weight of ice:		
diameter (in):	2.38	
Per foot weight of ice on object:		5 plf

3" Pipe

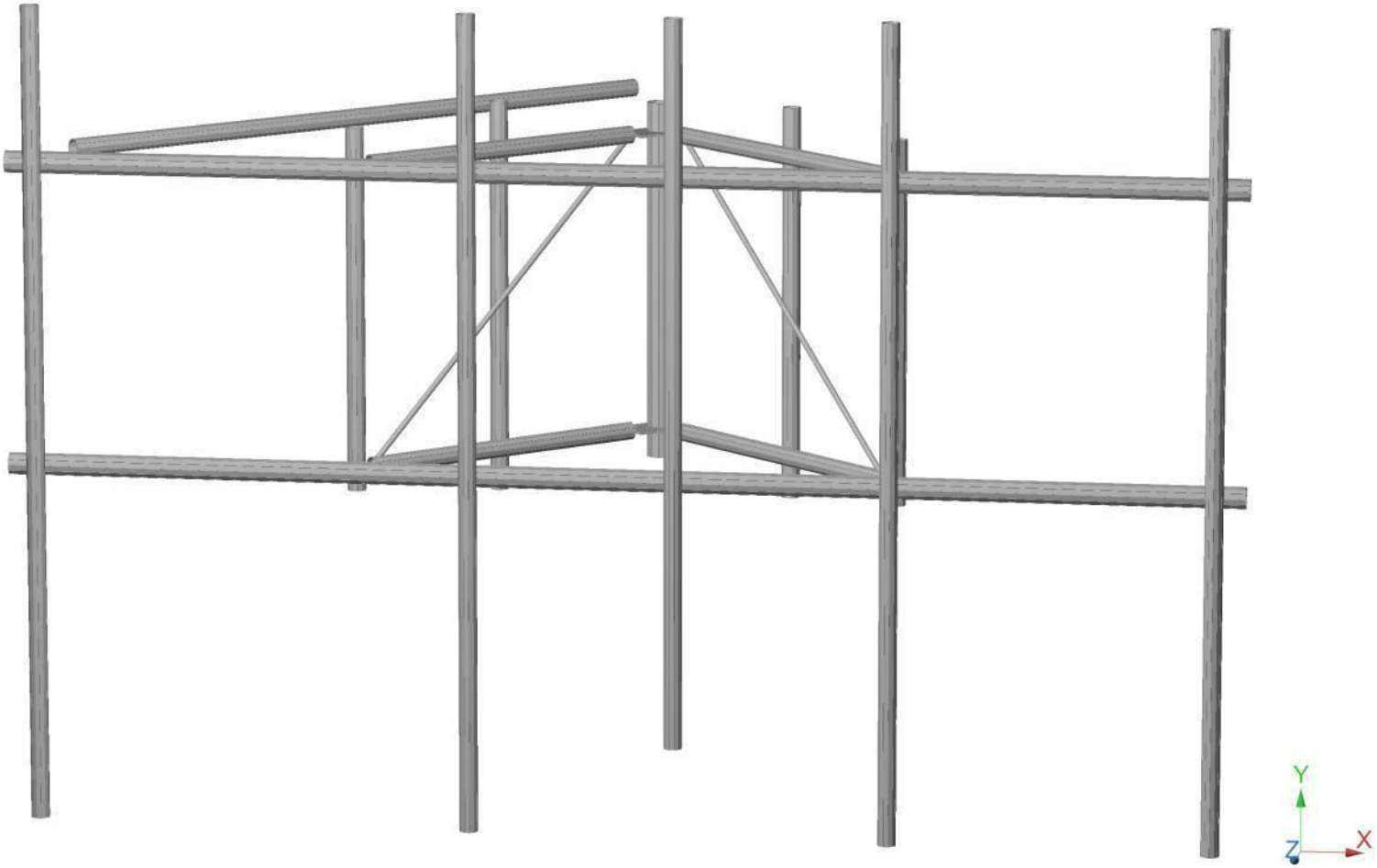
Per foot weight of ice:		
diameter (in):	3.5	
Per foot weight of ice on object:		6 plf

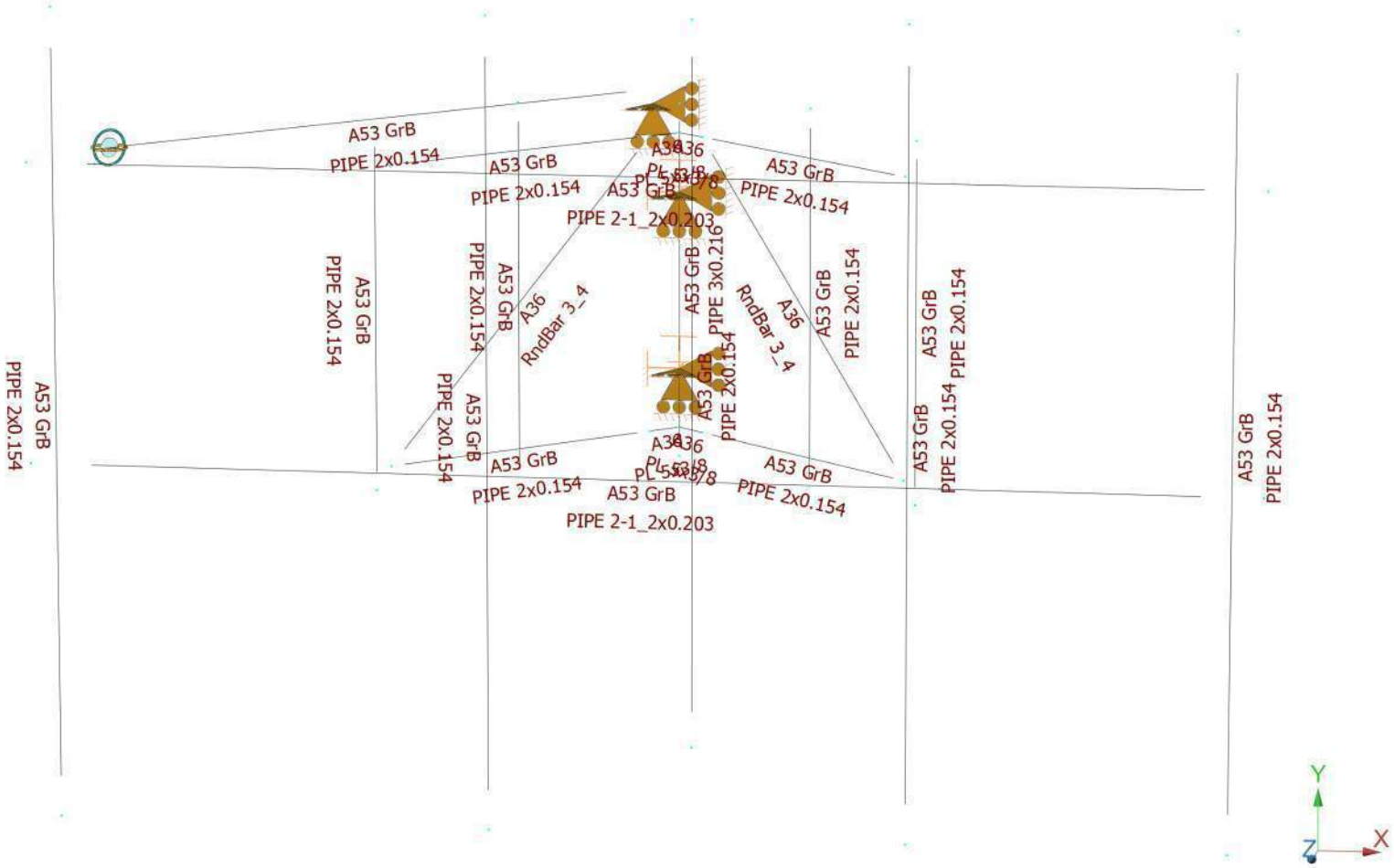
PL 5x3/8

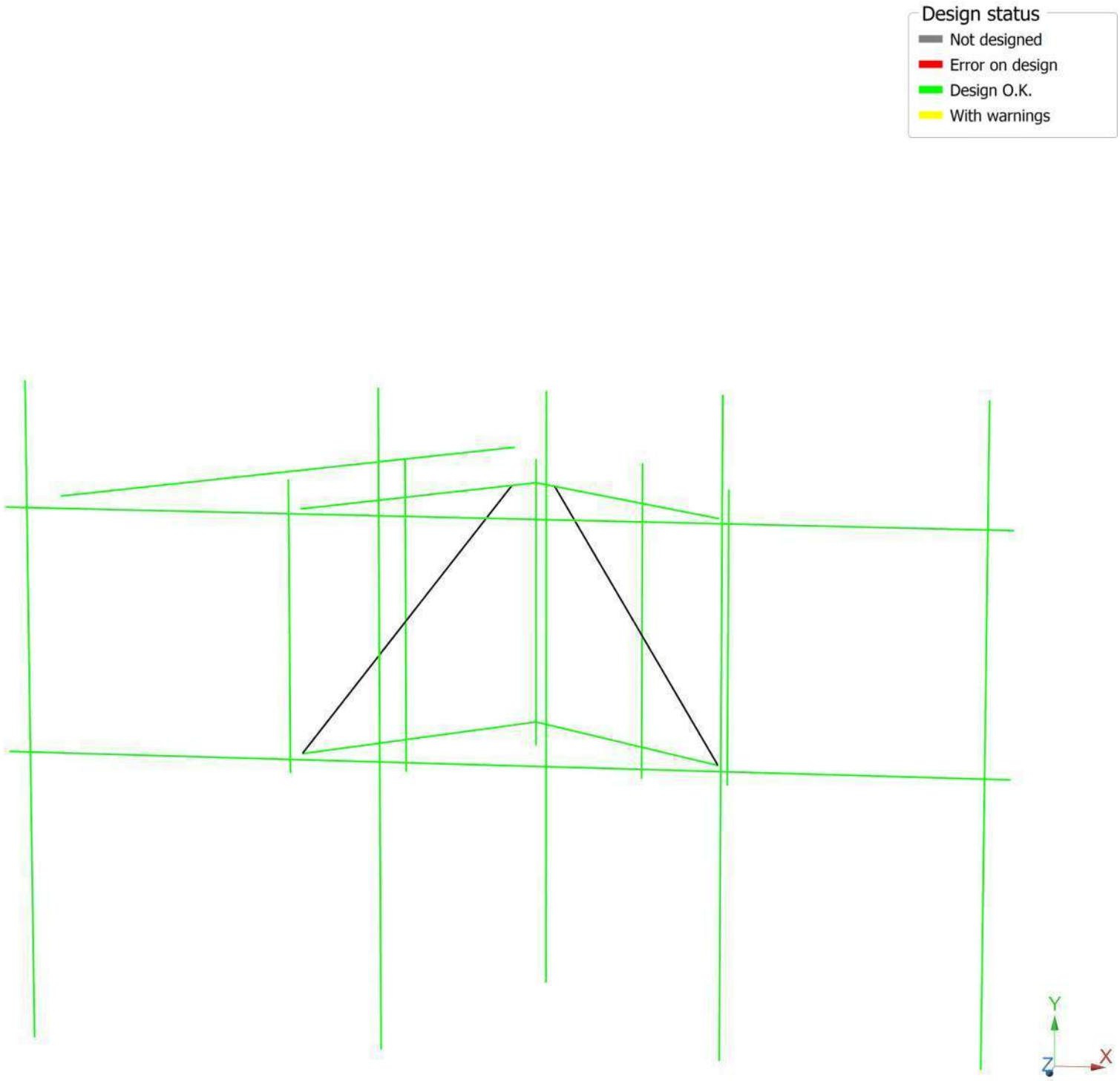
Weight of ice based on total radial SF area:		
Height (in):	5	
Width (in):	0.375	
Per foot weight of ice on object:		8 plf

HUDSON
Design Group LLC

Mount Calculations
(Existing Conditions)

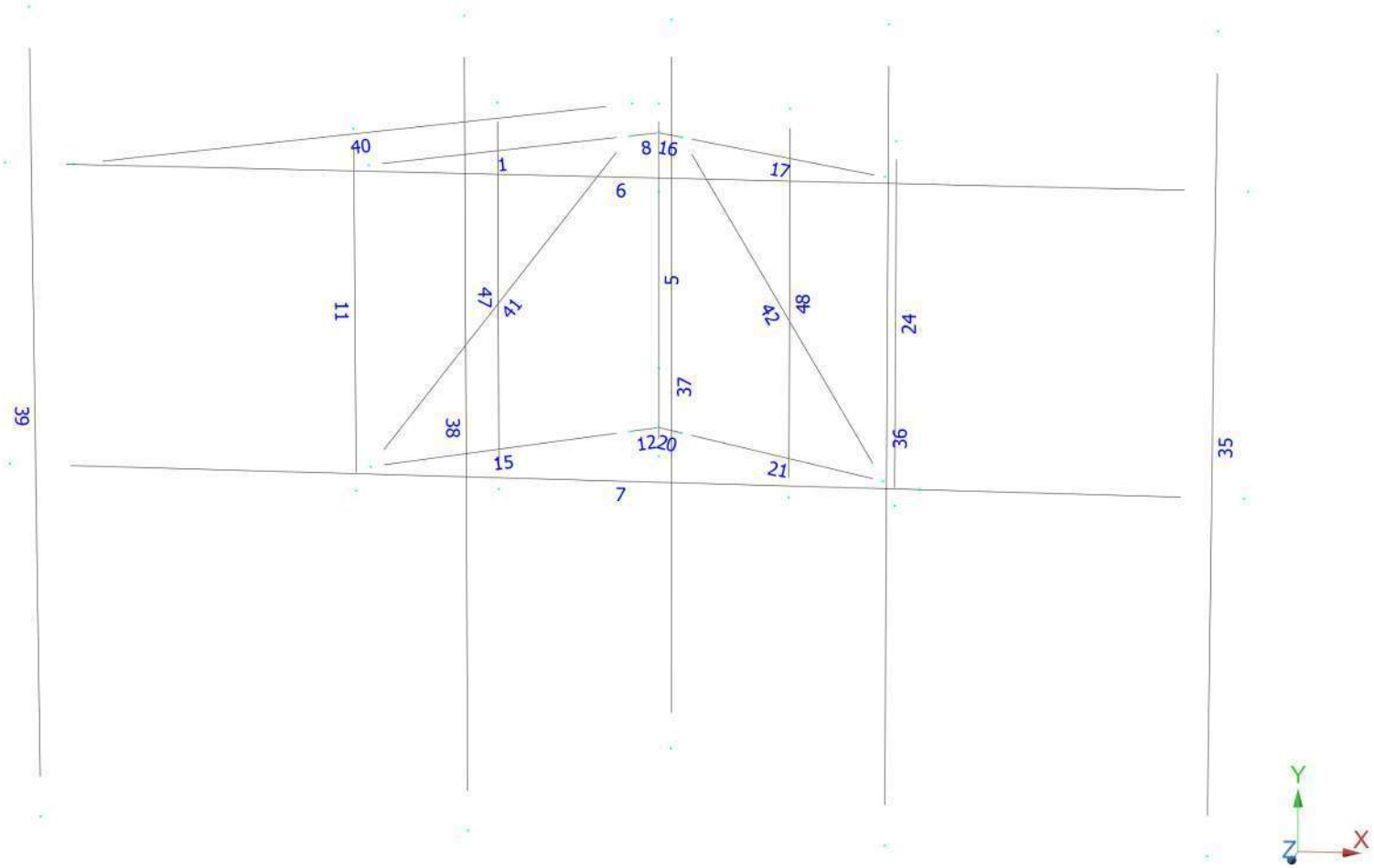

Y
X
Z


A53 GrB
PIPE 2x0.154
A53 GrB
PIPE 2x0.154
A53 GrB
PIPE 2x0.154
A53 GrB
PIPE 2x0.154
A36
PL 5x3/8
A53 GrB
PIPE 2x0.154
A53 GrB
PIPE 2-1_2x0.203
A53 GrB
PIPE 3x0.216
A36
RndBar 3_4
A53 GrB
PIPE 2x0.154
A53 GrB
PIPE 2x0.154
A53 GrB
PIPE 2x0.154
A36
RndBar 3_4
A53 GrB
PIPE 2x0.154
A53 GrB
PIPE 2x0.154
A53 GrB
PIPE 2x0.154
A53 GrB
PIPE 2x0.154
A53 GrB
PIPE 2x0.154
A53 GrB
PIPE 2x0.154
A36
PL 5x3/8
A53 GrB
PIPE 2x0.154
A53 GrB
PIPE 2-1_2x0.203
A53 GrB
PIPE 2x0.154
A53 GrB
PIPE 2x0.154
Y
X
Z


Design status
Not designed
Error on design
Design O.K.
With warnings
Y
X
Z

RAM® Elements
CONNECT Edition

Current Date: 1/26/2022 1:35 PM
Units system: English



Current Date: 3/14/2022 5:29 PM
Units system: English

Load data

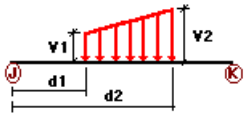
GLOSSARY

Comb : Indicates if load condition is a load combination

Load Conditions

Condition	Description	Comb.	Category
D	Dead Load	No	DL
Wo	Wind Load (NO ICE)	No	WIND
W30	WL 30deg	No	WIND
W60	WL 60deg	No	WIND
W90	WL 90deg	No	WIND
W120	WL 120deg	No	WIND
W150	WL 150deg	No	WIND
Di	Ice Load	No	LL
WI0	WL ICE 0deg	No	WIND
WI30	WL ICE 30deg	No	WIND
WI60	WL ICE 60deg	No	WIND
WI90	WL ICE 90deg	No	WIND
WI120	WL ICE 120deg	No	WIND
WI150	WL ICE 150deg	No	WIND
WL0	WL 30 mph 0deg	No	WIND
WL30	WL 30 mph 30deg	No	WIND
WL60	WL 30 mph 60deg	No	WIND
WL90	WL 30 mph 90deg	No	WIND
WL120	WL 30 mph 120deg	No	WIND
WL150	WL 30 mph 150deg	No	WIND
LL1	250 lb Live Load Center of Mount	No	LL
LL2	250 lb Live Load Right End of Mount	No	LL
LL3	250 lb Live Load Left End of Mount	No	LL
LLa1	250 lb Live Load Antenna 1	No	LL
LLa2	250 lb Live Load Antenna 2	No	LL
LLa3	250 lb Live Load Antenna 3	No	LL
LLa4	250 lb Live Load Antenna 4	No	LL

Distributed force on members



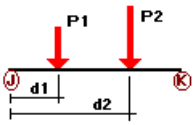
Condition	Member	Dir1	Val1 [Kip/ft]	Val2 [Kip/ft]	Dist1 [ft]	%	Dist2 [ft]	%
Wo	1	z	-0.013	0.00	0.00	No	0.00	No
	5	z	-0.019	0.00	0.00	No	0.00	No
	6	z	-0.015	0.00	0.00	No	0.00	No
	7	z	-0.015	0.00	0.00	No	0.00	No
	8	z	-0.003	0.00	0.00	No	0.00	No
	11	z	-0.013	0.00	0.00	No	0.00	No
	12	z	-0.003	0.00	0.00	No	0.00	No
	15	z	-0.013	0.00	0.00	No	0.00	No
	16	z	-0.003	0.00	0.00	No	0.00	No
	17	z	-0.013	0.00	0.00	No	0.00	No

	20	z	-0.003	0.00	0.00	No	0.00	No
	21	z	-0.013	0.00	0.00	No	0.00	No
	24	z	-0.013	0.00	0.00	No	0.00	No
	35	z	-0.013	0.00	0.00	No	0.00	No
	36	z	-0.013	-0.013	75.00	Yes	100.00	Yes
	37	z	-0.013	0.00	0.00	No	0.00	No
	38	z	-0.013	-0.013	75.00	Yes	100.00	Yes
	39	z	-0.013	-0.013	75.00	Yes	100.00	Yes
	40	z	-0.013	0.00	0.00	No	0.00	No
	41	z	-0.004	0.00	0.00	No	0.00	No
	42	z	-0.004	0.00	0.00	No	0.00	No
	47	z	-0.013	0.00	0.00	No	0.00	No
	48	z	-0.013	0.00	0.00	No	0.00	No
W30	1	z	-0.013	0.00	0.00	No	0.00	No
	5	z	-0.019	0.00	0.00	No	0.00	No
	6	z	-0.015	0.00	0.00	No	0.00	No
	7	z	-0.015	0.00	0.00	No	0.00	No
	8	z	-0.003	0.00	0.00	No	0.00	No
	11	z	-0.013	0.00	0.00	No	0.00	No
	12	z	-0.003	0.00	0.00	No	0.00	No
	15	z	-0.013	0.00	0.00	No	0.00	No
	16	z	-0.003	0.00	0.00	No	0.00	No
	17	z	-0.013	0.00	0.00	No	0.00	No
	20	z	-0.003	0.00	0.00	No	0.00	No
	21	z	-0.013	0.00	0.00	No	0.00	No
	24	z	-0.013	0.00	0.00	No	0.00	No
	35	z	-0.013	0.00	0.00	No	0.00	No
	36	z	-0.013	-0.013	75.00	Yes	100.00	Yes
	37	z	-0.013	0.00	0.00	No	0.00	No
	38	z	-0.013	-0.013	75.00	Yes	100.00	Yes
	39	z	-0.013	-0.013	75.00	Yes	100.00	Yes
	40	z	-0.013	0.00	0.00	No	0.00	No
	41	z	-0.004	0.00	0.00	No	0.00	No
	42	z	-0.004	0.00	0.00	No	0.00	No
	47	z	-0.013	0.00	0.00	No	0.00	No
	48	z	-0.013	0.00	0.00	No	0.00	No
W60	1	x	-0.013	0.00	0.00	No	0.00	No
	5	x	-0.019	0.00	0.00	No	0.00	No
	6	x	-0.015	0.00	0.00	No	0.00	No
	7	x	-0.015	0.00	0.00	No	0.00	No
	8	x	-0.003	0.00	0.00	No	0.00	No
	11	x	-0.013	0.00	0.00	No	0.00	No
	12	x	-0.003	0.00	0.00	No	0.00	No
	15	x	-0.013	0.00	0.00	No	0.00	No
	16	x	-0.003	0.00	0.00	No	0.00	No
	17	x	-0.013	0.00	0.00	No	0.00	No
	20	x	-0.003	0.00	0.00	No	0.00	No
	21	x	-0.013	0.00	0.00	No	0.00	No
	24	x	-0.013	0.00	0.00	No	0.00	No
	35	x	-0.013	0.00	0.00	No	0.00	No
	36	x	-0.013	0.00	0.00	No	0.00	No
	37	x	-0.013	0.00	0.00	No	0.00	No
	38	x	-0.013	0.00	0.00	No	0.00	No
	39	x	-0.013	0.00	0.00	No	0.00	No
	40	x	-0.013	0.00	0.00	No	0.00	No
	41	x	-0.004	0.00	0.00	No	0.00	No
	42	x	-0.004	0.00	0.00	No	0.00	No
	47	x	-0.013	0.00	0.00	No	0.00	No
	48	x	-0.013	0.00	0.00	No	0.00	No
W90	1	x	-0.013	0.00	0.00	No	0.00	No
	5	x	-0.019	0.00	0.00	No	0.00	No
	8	x	-0.003	0.00	0.00	No	0.00	No
	11	x	-0.013	0.00	0.00	No	0.00	No
	12	x	-0.003	0.00	0.00	No	0.00	No
	15	x	-0.013	0.00	0.00	No	0.00	No
	16	x	-0.003	0.00	0.00	No	0.00	No

	17	x	-0.013	0.00	0.00	No	0.00	No
	20	x	-0.003	0.00	0.00	No	0.00	No
	21	x	-0.013	0.00	0.00	No	0.00	No
	24	x	-0.013	0.00	0.00	No	0.00	No
	35	x	-0.013	0.00	0.00	No	0.00	No
	36	x	-0.013	0.00	0.00	No	0.00	No
	37	x	-0.013	0.00	0.00	No	0.00	No
	38	x	-0.013	0.00	0.00	No	0.00	No
	39	x	-0.013	0.00	0.00	No	0.00	No
	40	x	-0.013	0.00	0.00	No	0.00	No
	41	x	-0.004	0.00	0.00	No	0.00	No
	42	x	-0.004	0.00	0.00	No	0.00	No
	47	x	-0.013	0.00	0.00	No	0.00	No
	48	x	-0.013	0.00	0.00	No	0.00	No
W120	1	x	-0.013	0.00	0.00	No	0.00	No
	5	x	-0.019	0.00	0.00	No	0.00	No
	6	x	-0.015	0.00	0.00	No	0.00	No
	7	x	-0.015	0.00	0.00	No	0.00	No
	8	x	-0.003	0.00	0.00	No	0.00	No
	11	x	-0.013	0.00	0.00	No	0.00	No
	12	x	-0.003	0.00	0.00	No	0.00	No
	15	x	-0.013	0.00	0.00	No	0.00	No
	16	x	-0.003	0.00	0.00	No	0.00	No
	17	x	-0.013	0.00	0.00	No	0.00	No
	20	x	-0.003	0.00	0.00	No	0.00	No
	21	x	-0.013	0.00	0.00	No	0.00	No
	24	x	-0.013	0.00	0.00	No	0.00	No
	35	x	-0.013	0.00	0.00	No	0.00	No
	36	x	-0.013	0.00	0.00	No	0.00	No
	37	x	-0.013	0.00	0.00	No	0.00	No
	38	x	-0.013	0.00	0.00	No	0.00	No
	39	x	-0.013	0.00	0.00	No	0.00	No
	40	x	-0.013	0.00	0.00	No	0.00	No
	41	x	-0.004	0.00	0.00	No	0.00	No
	42	x	-0.004	0.00	0.00	No	0.00	No
	47	x	-0.013	0.00	0.00	No	0.00	No
	48	x	-0.013	0.00	0.00	No	0.00	No
W150	1	z	0.013	0.00	0.00	No	0.00	No
	5	z	0.019	0.00	0.00	No	0.00	No
	6	z	0.015	0.00	0.00	No	0.00	No
	7	z	0.015	0.00	0.00	No	0.00	No
	8	z	0.003	0.00	0.00	No	0.00	No
	11	z	0.013	0.00	0.00	No	0.00	No
	12	z	0.003	0.00	0.00	No	0.00	No
	15	z	0.013	0.00	0.00	No	0.00	No
	16	z	0.003	0.00	0.00	No	0.00	No
	17	z	0.013	0.00	0.00	No	0.00	No
	20	z	0.003	0.00	0.00	No	0.00	No
	21	z	0.013	0.00	0.00	No	0.00	No
	24	z	0.013	0.00	0.00	No	0.00	No
	35	z	0.013	0.00	0.00	No	0.00	No
	36	z	0.013	0.00	0.00	No	0.00	No
	37	z	0.013	0.00	0.00	No	0.00	No
	38	z	0.013	0.00	0.00	No	0.00	No
	39	z	0.013	0.00	0.00	No	0.00	No
	40	z	0.013	0.00	0.00	No	0.00	No
	41	z	0.004	0.00	0.00	No	0.00	No
	42	z	0.004	0.00	0.00	No	0.00	No
	47	z	0.013	0.00	0.00	No	0.00	No
	48	z	0.013	0.00	0.00	No	0.00	No
Di	1	y	-0.005	0.00	0.00	No	0.00	No
	5	y	-0.006	0.00	0.00	No	0.00	No
	6	y	-0.005	0.00	0.00	No	0.00	No
	7	y	-0.005	0.00	0.00	No	0.00	No
	8	y	-0.008	0.00	0.00	No	0.00	No
	11	y	-0.005	0.00	0.00	No	0.00	No

12	y	-0.008	0.00	0.00	No	0.00	No
15	y	-0.005	0.00	0.00	No	0.00	No
16	y	-0.008	0.00	0.00	No	0.00	No
17	y	-0.005	0.00	0.00	No	0.00	No
20	y	-0.008	0.00	0.00	No	0.00	No
21	y	-0.005	0.00	0.00	No	0.00	No
24	y	-0.005	0.00	0.00	No	0.00	No
35	y	-0.005	0.00	0.00	No	0.00	No
36	y	-0.005	0.00	0.00	No	0.00	No
37	y	-0.005	0.00	0.00	No	0.00	No
38	y	-0.005	0.00	0.00	No	0.00	No
39	y	-0.005	0.00	0.00	No	0.00	No
40	y	-0.005	0.00	0.00	No	0.00	No
41	y	-0.003	0.00	0.00	No	0.00	No
42	y	-0.003	0.00	0.00	No	0.00	No
47	y	-0.005	0.00	0.00	No	0.00	No
48	y	-0.005	0.00	0.00	No	0.00	No

Concentrated forces on members



Condition	Member	Dir1	Value1 [Kip]	Dist1 [ft]	%
D	11	y	-0.06	2.00	No
		y	-0.073	2.00	No
	24	y	-0.06	2.00	No
		y	-0.053	2.00	No
	36	y	-0.065	1.00	No
		y	-0.065	6.00	No
	37	y	-0.049	2.50	No
		y	-0.046	2.50	No
	38	y	-0.033	0.50	No
		y	-0.033	2.25	No
		y	-0.041	4.25	No
		y	-0.041	6.00	No
	39	y	-0.032	1.00	No
		y	-0.032	6.00	No
	47	y	-0.033	2.00	No
	48	y	-0.033	2.00	No
Wo	11	z	-0.09	2.00	No
	24	z	-0.069	2.00	No
	36	z	-0.365	1.00	No
		z	-0.365	6.00	No
	37	z	-0.047	2.50	No
	38	z	-0.113	0.50	No
		z	-0.113	2.25	No
		z	-0.109	4.25	No
		z	-0.109	6.00	No
	39	z	-0.346	1.00	No
		z	-0.346	6.00	No
	47	z	-0.061	2.00	No
	48	z	-0.061	2.00	No
W30	11	3	-0.104	2.00	No
	24	3	-0.094	2.00	No
	36	3	-0.32	1.00	No
		3	-0.32	6.00	No
	37	3	-0.06	2.50	No
	38	3	-0.098	0.50	No

		3	-0.098	2.25	No
		3	-0.096	4.25	No
		3	-0.096	6.00	No
	39	3	-0.298	1.00	No
		3	-0.298	6.00	No
	47	3	-0.061	2.00	No
	48	3	-0.061	2.00	No
W60	11	3	-0.133	2.00	No
	24	3	-0.144	2.00	No
	36	3	-0.229	1.00	No
		3	-0.229	6.00	No
	37	3	-0.086	2.50	No
	38	3	-0.069	0.50	No
		3	-0.069	2.25	No
		3	-0.071	4.25	No
		3	-0.071	6.00	No
	39	3	-0.201	1.00	No
		3	-0.201	6.00	No
	47	3	-0.061	2.00	No
	48	3	-0.061	2.00	No
W90	11	x	-0.147	2.00	No
	24	x	-0.169	2.00	No
	36	x	-0.183	1.00	No
		x	-0.183	6.00	No
	37	x	-0.10	2.50	No
	38	x	-0.055	0.50	No
		x	-0.055	2.25	No
		x	-0.058	4.25	No
		x	-0.058	6.00	No
	39	x	-0.153	1.00	No
		x	-0.153	6.00	No
	47	x	-0.061	2.00	No
	48	x	-0.061	2.00	No
W120	11	2	-0.133	2.00	No
	24	2	-0.144	2.00	No
	36	2	-0.229	1.00	No
		2	-0.229	6.00	No
	37	2	-0.086	2.50	No
	38	2	-0.069	0.50	No
		2	-0.069	2.25	No
		2	-0.071	4.25	No
		2	-0.071	6.00	No
	39	2	-0.201	1.00	No
		2	-0.201	6.00	No
	47	2	-0.061	2.00	No
	48	2	-0.061	2.00	No
W150	11	2	-0.104	2.00	No
	24	2	-0.094	2.00	No
	36	2	-0.32	1.00	No
		2	-0.32	6.00	No
	37	2	-0.06	2.50	No
	38	2	-0.098	0.50	No
		2	-0.098	2.25	No
		2	-0.096	4.25	No
		2	-0.096	6.00	No
	39	2	-0.298	1.00	No
		2	-0.298	6.00	No
	47	2	-0.061	2.00	No
	48	2	-0.061	2.00	No
Di	11	y	-0.046	2.00	No
		y	-0.035	2.00	No
	24	y	-0.035	2.00	No
		y	-0.049	2.00	No
	36	y	-0.102	1.00	No
		y	-0.102	6.00	No
	37	y	-0.026	2.50	No

		y	-0.03	2.50	No
	38	y	-0.033	0.50	No
		y	-0.033	2.25	No
		y	-0.033	4.25	No
		y	-0.033	6.00	No
	39	y	-0.095	1.00	No
		y	-0.095	6.00	No
	47	y	-0.029	2.00	No
	48	y	-0.029	2.00	No
WI0	11	z	-0.02	2.00	No
	24	z	-0.016	2.00	No
	36	z	-0.067	1.00	No
		z	-0.067	6.00	No
	37	z	-0.011	2.50	No
	38	z	-0.022	0.50	No
		z	-0.022	2.25	No
		z	-0.022	4.25	No
		z	-0.022	6.00	No
	39	z	-0.064	1.00	No
		z	-0.064	6.00	No
	47	z	-0.013	2.00	No
	48	z	-0.013	2.00	No
WI30	11	3	-0.022	2.00	No
	24	3	-0.02	2.00	No
	36	3	-0.059	1.00	No
		3	-0.059	6.00	No
	37	3	-0.014	2.50	No
	38	3	-0.02	0.50	No
		3	-0.02	2.25	No
		3	-0.019	4.25	No
		3	-0.019	6.00	No
	39	3	-0.055	1.00	No
		3	-0.055	6.00	No
	47	3	-0.013	2.00	No
	48	3	-0.013	2.00	No
WI60	11	3	-0.028	2.00	No
	24	3	-0.029	2.00	No
	36	3	-0.044	1.00	No
		3	-0.044	6.00	No
	37	3	-0.019	2.50	No
	38	3	-0.015	0.50	No
		3	-0.015	2.25	No
		3	-0.015	4.25	No
		3	-0.015	6.00	No
	39	3	-0.039	1.00	No
		3	-0.039	6.00	No
	47	3	-0.013	2.00	No
	48	3	-0.013	2.00	No
WI90	11	x	-0.03	2.00	No
	24	x	-0.034	2.00	No
	36	x	-0.036	1.00	No
		x	-0.036	6.00	No
	37	x	-0.021	2.50	No
	38	x	-0.012	0.50	No
		x	-0.012	2.25	No
		x	-0.013	4.25	No
		x	-0.013	6.00	No
	39	x	-0.031	1.00	No
		x	-0.031	6.00	No
	47	x	-0.013	2.00	No
	48	x	-0.013	2.00	No
WI120	11	2	-0.028	2.00	No
	24	2	-0.029	2.00	No
	36	2	-0.044	1.00	No
		2	-0.044	6.00	No
	37	2	-0.019	2.50	No

	38	2	-0.015	0.50	No
		2	-0.015	2.25	No
		2	-0.015	4.25	No
		2	-0.015	6.00	No
	39	2	-0.039	1.00	No
		2	-0.039	6.00	No
	47	2	-0.013	2.00	No
	48	2	-0.013	2.00	No
WI150	11	2	-0.022	2.00	No
	24	2	-0.02	2.00	No
	36	2	-0.059	1.00	No
		2	-0.059	6.00	No
	37	2	-0.014	2.50	No
	38	2	-0.02	0.50	No
		2	-0.02	2.25	No
		2	-0.019	4.25	No
		2	-0.019	6.00	No
	39	2	-0.055	1.00	No
		2	-0.055	6.00	No
	47	2	-0.013	2.00	No
	48	2	-0.013	2.00	No
WL0	11	z	-0.005	2.00	No
	24	z	-0.004	2.00	No
	36	z	-0.022	1.00	No
		z	-0.022	6.00	No
	37	z	-0.003	2.50	No
	38	z	-0.007	0.50	No
		z	-0.007	2.25	No
		z	-0.007	4.25	No
		z	-0.007	6.00	No
	39	z	-0.02	1.00	No
		z	-0.02	6.00	No
	47	z	-0.004	2.00	No
	48	z	-0.004	2.00	No
WL30	11	3	-0.006	2.00	No
	24	3	-0.005	2.00	No
	36	3	-0.019	1.00	No
		3	-0.019	6.00	No
	37	3	-0.003	2.50	No
	38	3	-0.006	0.50	No
		3	-0.006	2.25	No
		3	-0.006	4.25	No
		3	-0.006	6.00	No
	39	3	-0.018	1.00	No
		3	-0.018	6.00	No
	47	3	-0.004	2.00	No
	48	3	-0.004	2.00	No
WL60	11	3	-0.008	2.00	No
	24	3	-0.008	2.00	No
	36	3	-0.014	1.00	No
		3	-0.014	6.00	No
	37	3	-0.005	2.50	No
	38	3	-0.004	0.50	No
		3	-0.004	2.25	No
		3	-0.005	4.25	No
		3	-0.005	6.00	No
	39	3	-0.012	1.00	No
		3	-0.012	6.00	No
	47	3	-0.004	2.00	No
	48	3	-0.004	2.00	No
WL90	11	x	-0.008	2.00	No
	24	x	-0.01	2.00	No
	36	x	-0.011	1.00	No
		x	-0.011	6.00	No
	37	x	-0.006	2.50	No
	38	x	-0.004	0.50	No

		x	-0.004	2.25	No
		x	-0.004	4.25	No
		x	-0.004	6.00	No
	39	x	-0.009	1.00	No
		x	-0.009	6.00	No
	47	x	-0.004	2.00	No
	48	x	-0.004	2.00	No
WL120	11	2	-0.008	2.00	No
	24	2	-0.008	2.00	No
	36	2	-0.014	1.00	No
		2	-0.014	6.00	No
	37	2	-0.005	2.50	No
	38	2	-0.004	0.50	No
		2	-0.004	2.25	No
		2	-0.005	4.25	No
		2	-0.005	6.00	No
	39	2	-0.012	1.00	No
		2	-0.012	6.00	No
	47	2	-0.004	2.00	No
	48	2	-0.004	2.00	No
WL150	11	2	-0.006	2.00	No
	24	2	-0.005	2.00	No
	36	2	-0.019	1.00	No
		2	-0.019	6.00	No
	37	2	-0.003	2.50	No
	38	2	-0.006	0.50	No
		2	-0.006	2.25	No
		2	-0.006	4.25	No
		2	-0.006	6.00	No
	39	2	-0.018	1.00	No
		2	-0.018	6.00	No
	47	2	-0.004	2.00	No
	48	2	-0.004	2.00	No
LL1	6	y	-0.25	6.75	No
LL2	6	y	-0.25	13.50	No
LL3	6	y	-0.25	0.00	No
LLa1	35	y	-0.50	4.50	No
LLa2	36	y	-0.50	4.50	No
LLa3	38	y	-0.50	4.50	No
LLa4	39	y	-0.50	4.50	No

Self weight multipliers for load conditions

Condition	Description	Self weight multiplier			
		Comb.	MultX	MultY	MultZ
D	Dead Load	No	0.00	-1.00	0.00
Wo	Wind Load (NO ICE)	No	0.00	0.00	0.00
W30	WL 30deg	No	0.00	0.00	0.00
W60	WL 60deg	No	0.00	0.00	0.00
W90	WL 90deg	No	0.00	0.00	0.00
W120	WL 120deg	No	0.00	0.00	0.00
W150	WL 150deg	No	0.00	0.00	0.00
Di	Ice Load	No	0.00	0.00	0.00
WI0	WL ICE 0deg	No	0.00	0.00	0.00
WI30	WL ICE 30deg	No	0.00	0.00	0.00
WI60	WL ICE 60deg	No	0.00	0.00	0.00
WI90	WL ICE 90deg	No	0.00	0.00	0.00
WI120	WL ICE 120deg	No	0.00	0.00	0.00
WI150	WL ICE 150deg	No	0.00	0.00	0.00
WL0	WL 30 mph 0deg	No	0.00	0.00	0.00
WL30	WL 30 mph 30deg	No	0.00	0.00	0.00

WL60	WL 30 mph 60deg	No	0.00	0.00	0.00
WL90	WL 30 mph 90deg	No	0.00	0.00	0.00
WL120	WL 30 mph 120deg	No	0.00	0.00	0.00
WL150	WL 30 mph 150deg	No	0.00	0.00	0.00
LL1	250 lb Live Load Center of Mount	No	0.00	0.00	0.00
LL2	250 lb Live Load Right End of Mount	No	0.00	0.00	0.00
LL3	250 lb Live Load Left End of Mount	No	0.00	0.00	0.00
LLa1	250 lb Live Load Antenna 1	No	0.00	0.00	0.00
LLa2	250 lb Live Load Antenna 2	No	0.00	0.00	0.00
LLa3	250 lb Live Load Antenna 3	No	0.00	0.00	0.00
LLa4	250 lb Live Load Antenna 4	No	0.00	0.00	0.00

Current Date: 3/14/2022 5:30 PM
Units system: English

Steel Code Check

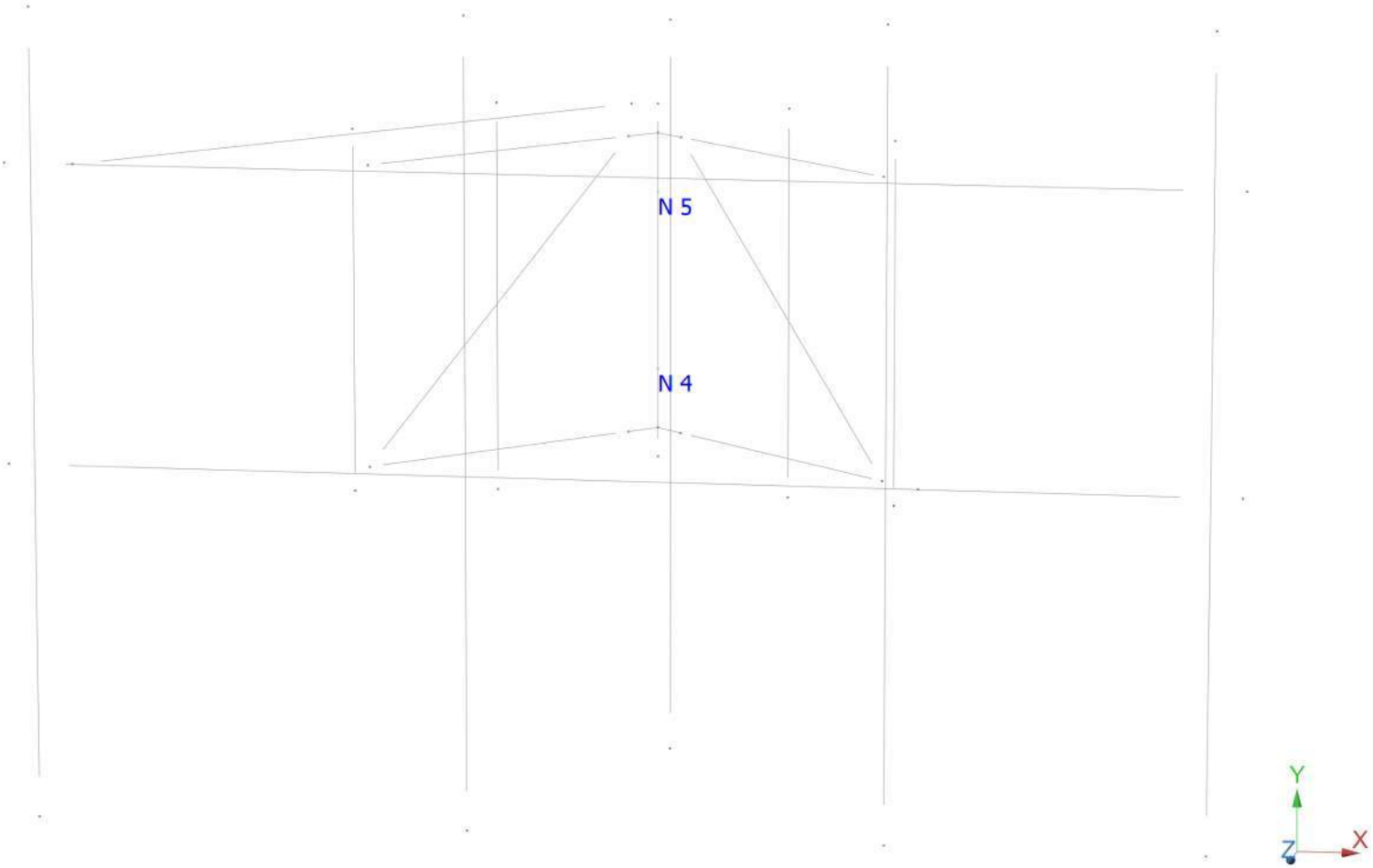
Report: Summary - Group by member

Load conditions to be included in design :

LC1=1.2D+Wo
LC2=1.2D+W30
LC3=1.2D+W60
LC4=1.2D+W90
LC5=1.2D+W120
LC6=1.2D+W150
LC7=1.2D-Wo
LC8=1.2D-W30
LC9=1.2D-W60
LC10=1.2D-W90
LC11=1.2D-W120
LC12=1.2D-W150
LC13=0.9D+Wo
LC14=0.9D+W30
LC15=0.9D+W60
LC16=0.9D+W90
LC17=0.9D+W120
LC18=0.9D+W150
LC19=0.9D-Wo
LC20=0.9D-W30
LC21=0.9D-W60
LC22=0.9D-W90
LC23=0.9D-W120
LC24=0.9D-W150
LC25=1.2D+Di+WI0
LC26=1.2D+Di+WI30
LC27=1.2D+Di+WI60
LC28=1.2D+Di+WI90
LC29=1.2D+Di+WI120
LC30=1.2D+Di+WI150
LC31=1.2D+Di-WI0
LC32=1.2D+Di-WI30
LC33=1.2D+Di-WI60
LC34=1.2D+Di-WI90
LC35=1.2D+Di-WI120
LC36=1.2D+Di-WI150
LC37=1.2D+1.6LL1
LC38=1.2D+1.6LL2
LC39=1.2D+1.6LL3
LC40=1.2D+WL0+1.6LLa1
LC41=1.2D+WL30+1.6LLa1
LC42=1.2D+WL60+1.6LLa1
LC43=1.2D+WL90+1.6LLa1
LC44=1.2D+WL120+1.6LLa1
LC45=1.2D+WL150+1.6LLa1
LC46=1.2D-WL0+1.6LLa1
LC47=1.2D-WL30+1.6LLa1
LC48=1.2D-WL60+1.6LLa1
LC49=1.2D-WL90+1.6LLa1
LC50=1.2D-WL120+1.6LLa1
LC51=1.2D-WL150+1.6LLa1
LC52=1.2D+WL0+1.6LLa2
LC53=1.2D+WL30+1.6LLa2
LC54=1.2D+WL60+1.6LLa2
LC55=1.2D+WL90+1.6LLa2
LC56=1.2D+WL120+1.6LLa2
LC57=1.2D+WL150+1.6LLa2
LC58=1.2D-WL0+1.6LLa2
LC59=1.2D-WL30+1.6LLa2
LC60=1.2D-WL60+1.6LLa2

LC61=1.2D-WL90+1.6LLa2
LC62=1.2D-WL120+1.6LLa2
LC63=1.2D-WL150+1.6LLa2
LC64=1.2D+WL0+1.6LLa3
LC65=1.2D+WL30+1.6LLa3
LC66=1.2D+WL60+1.6LLa3
LC67=1.2D+WL90+1.6LLa3
LC68=1.2D+WL120+1.6LLa3
LC69=1.2D+WL150+1.6LLa3
LC70=1.2D-WL0+1.6LLa3
LC71=1.2D-WL30+1.6LLa3
LC72=1.2D-WL60+1.6LLa3
LC73=1.2D-WL90+1.6LLa3
LC74=1.2D-WL120+1.6LLa3
LC75=1.2D-WL150+1.6LLa3
LC76=1.2D+WL0+1.6LLa4
LC77=1.2D+WL30+1.6LLa4
LC78=1.2D+WL60+1.6LLa4
LC79=1.2D+WL90+1.6LLa4
LC80=1.2D+WL120+1.6LLa4
LC81=1.2D+WL150+1.6LLa4
LC82=1.2D-WL0+1.6LLa4
LC83=1.2D-WL30+1.6LLa4
LC84=1.2D-WL60+1.6LLa4
LC85=1.2D-WL90+1.6LLa4
LC86=1.2D-WL120+1.6LLa4
LC87=1.2D-WL150+1.6LLa4

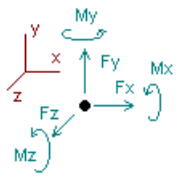
Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	PIPE 2-1_2x0.203	**6**	LC10 at 25.69%	**0.52**	**OK**	
		7	LC6 at 25.78%	0.33	OK	
	PIPE 2x0.154	**1**	LC10 at 0.00%	**0.71**	**OK**	
		11	LC85 at 93.75%	0.28	OK	
		15	LC10 at 0.00%	0.62	OK	
		17	LC4 at 0.00%	0.53	OK	
		21	LC4 at 0.00%	0.52	OK	
		24	LC43 at 93.75%	0.24	OK	
		35	LC47 at 56.25%	0.33	OK	
		36	LC7 at 58.33%	0.27	OK	
		37	LC2 at 62.50%	0.12	OK	
		38	LC1 at 56.25%	0.21	OK	
		39	LC87 at 56.25%	0.44	OK	
		40	LC15 at 100.00%	0.16	OK	
		47	LC83 at 87.50%	0.07	OK	
		48	LC41 at 87.50%	0.07	OK	
	PIPE 3x0.216	**5**	LC77 at 23.75%	**0.48**	**OK**	
	PL 5x3/8	**8**	LC77 at 0.00%	**0.78**	**OK**	
		12	LC10 at 0.00%	0.26	OK	
		16	LC49 at 0.00%	0.73	OK	
		20	LC10 at 0.00%	0.22	OK	
	RndBar 3_4	**41**	LC83 at 0.00%	**0.20**	**With warnings**	
		42	LC41 at 0.00%	0.18	With warnings	


N 5
N 4
Y
X
Z

Current Date: 3/14/2022 5:30 PM
Units system: English

Analysis result

Reactions



Direction of positive forces and moments

Node	Forces [Kip] FX	FY	FZ	Moments [Kip*ft] MX	MY	MZ
Condition **LC1=1.2D+Wo**						
4	-0.10615	0.13279	3.00558	-1.99325	0.38899	-0.07284
5	0.82501	1.33591	-0.26278	-0.39612	0.44666	-0.54852
SUM	0.71886	1.46870	2.74280	-2.38937	0.83564	-0.62136
Condition **LC2=1.2D+W30**						
4	0.58089	0.13479	2.62429	-1.74078	1.59022	0.38037
5	1.81219	1.32635	-0.88833	-0.80828	1.67298	-1.19264
SUM	2.39308	1.46114	1.73595	-2.54906	3.26320	-0.81227
Condition **LC3=1.2D+W60**						
4	1.10347	0.13783	1.73089	-1.17190	2.29740	0.70998
5	2.11723	1.32302	-1.50735	-1.19166	2.29762	-1.34730
SUM	3.22070	1.46085	0.22354	-2.36357	4.59502	-0.63731
Condition **LC4=1.2D+W90**						
4	1.23460	0.14458	1.17122	-0.80513	2.33455	0.79432
5	2.08253	1.32190	-1.92342	-1.46447	2.34630	-1.32868
SUM	3.31714	1.46648	-0.75221	-2.26960	4.68085	-0.53436
Condition **LC5=1.2D+W120**						
4	1.10930	0.15233	0.60721	-0.43572	1.84139	0.71165
5	1.53875	1.32547	-2.16223	-1.62101	1.83675	-0.97802
SUM	2.64805	1.47780	-1.55502	-2.05674	3.67814	-0.26637
Condition **LC6=1.2D+W150**						
4	0.58443	0.15970	-0.42586	0.22446	1.18577	0.38279
5	0.83581	1.33128	-2.46725	-1.79888	1.21473	-0.55980
SUM	1.42024	1.49098	-2.89311	-1.57442	2.40049	-0.17701
Condition **LC7=1.2D-Wo**						
4	-0.09818	0.16312	-0.69958	0.40345	-0.38921	-0.06844
5	-0.62500	1.34970	-2.03532	-1.51545	-0.38965	0.38801
SUM	-0.72318	1.51282	-2.73489	-1.11201	-0.77886	0.31958

Condition **LC8=1.2D-W30**

4	-0.78519	0.16117	-0.31690	0.15015	-1.58468	-0.52129
5	-1.59623	1.35897	-1.41135	-1.10416	-1.60502	1.02249
SUM	-2.38142	1.52013	-1.72825	-0.95401	-3.18970	0.50120

Condition **LC9=1.2D-W60**

4	-1.30756	0.15827	0.57862	-0.42015	-2.30400	-0.85085
5	-1.90150	1.36189	-0.78685	-0.71691	-2.24227	1.17729
SUM	-3.20907	1.52016	-0.20823	-1.13707	-4.54627	0.32644

Condition **LC10=1.2D-W90**

4	-1.43849	0.15156	1.13711	-0.78617	-2.36062	-0.93523
5	-1.88085	1.36327	-0.36139	-0.43794	-2.31214	1.16754
SUM	-3.31934	1.51484	0.77572	-1.22411	-4.67276	0.23230

Condition **LC11=1.2D-W120**

4	-1.31315	0.14385	1.69923	-1.15435	-1.87641	-0.85276
5	-1.35285	1.35996	-0.11862	-0.27895	-1.81506	0.82664
SUM	-2.66600	1.50381	1.58062	-1.43330	-3.69147	-0.02612

Condition **LC12=1.2D-W150**

4	-0.78822	0.13642	2.73051	-1.81340	-1.22670	-0.52406
5	-0.66059	1.35451	0.18919	-0.09942	-1.20244	0.41482
SUM	-1.44880	1.49094	2.91970	-1.91282	-2.42914	-0.10924

Condition **LC13=0.9D+Wo**

4	-0.07996	0.09653	2.71717	-1.79441	0.39062	-0.05474
5	0.80041	0.99932	0.02414	-0.15727	0.44065	-0.52872
SUM	0.72045	1.09585	2.74132	-1.95168	0.83127	-0.58346

Condition **LC14=0.9D+W30**

4	0.60856	0.09846	2.33617	-1.54216	1.59276	0.39945
5	1.78613	0.98978	-0.60171	-0.56968	1.66603	-1.17204
SUM	2.39469	1.08824	1.73446	-2.11184	3.25880	-0.77260

Condition **LC15=0.9D+W60**

4	1.13196	0.10130	1.44304	-0.97349	2.30038	0.72961
5	2.09036	0.98664	-1.22100	-0.95332	2.29018	-1.32625
SUM	3.22232	1.08794	0.22204	-1.92680	4.59056	-0.59664

Condition **LC16=0.9D+W90**

4	1.26306	0.10794	0.88352	-0.60682	2.33754	0.81392
5	2.05572	0.98568	-1.63724	-1.22628	2.33891	-1.30767
SUM	3.31878	1.09361	-0.75372	-1.83310	4.67644	-0.49375

Condition **LC17=0.9D+W120**

4	1.13705	0.11555	0.31958	-0.23747	1.84400	0.73077
5	1.51269	0.98946	-1.87614	-1.38293	1.82981	-0.95745
SUM	2.64974	1.10501	-1.55656	-1.62040	3.67381	-0.22668

Condition **LC18=0.9D+W150**

4	0.61138	0.12268	-0.71337	0.42262	1.18799	0.40139
5	0.81059	0.99561	-2.18133	-1.56096	1.20828	-0.53971
SUM	1.42197	1.11829	-2.89470	-1.13835	2.39627	-0.13832

Condition **LC19=0.9D-Wo**

4	-0.07330	0.12600	-0.98726	0.60173	-0.38817	-0.05120
5	-0.64812	1.01429	-1.74924	-1.27742	-0.39479	0.40692
SUM	-0.72142	1.14029	-2.73650	-0.67570	-0.78296	0.35572

Condition **LC20=0.9D-W30**

4	-0.76177	0.12412	-0.60488	0.34864	-1.58454	-0.50502
5	-1.61790	1.02354	-1.12498	-0.86588	-1.60923	1.04061
SUM	-2.37967	1.14767	-1.72985	-0.51724	-3.19377	0.53559

Condition **LC21=0.9D-W60**

4	-1.28500	0.12142	0.29038	-0.22146	-2.30431	-0.83514
5	-1.92233	1.02628	-0.50021	-0.47838	-2.24596	1.19493
SUM	-3.20733	1.14770	-0.20983	-0.69984	-4.55027	0.35979

Condition **LC22=0.9D-W90**

4	-1.41593	0.11483	0.84871	-0.58737	-2.36098	-0.91953
5	-1.90170	1.02751	-0.07457	-0.19924	-2.31584	1.18521
SUM	-3.31763	1.14234	0.77414	-0.78661	-4.67682	0.26568

Condition **LC23=0.9D-W120**

4	-1.28990	0.10724	1.41076	-0.95548	-1.87641	-0.83660
5	-1.37442	1.02399	0.16830	-0.04014	-1.81920	0.84474
SUM	-2.66432	1.13123	1.57906	-0.99563	-3.69561	0.00814

Condition **LC24=0.9D-W150**

4	-0.76418	0.10006	2.44191	-1.61444	-1.22632	-0.50738
5	-0.68299	1.01820	0.47626	0.13955	-1.20707	0.43339
SUM	-1.44717	1.11826	2.91818	-1.47488	-2.43339	-0.07399

Condition **LC25=1.2D+Di+Wl0**

4	-0.36601	0.23758	2.20869	-1.51460	0.08774	-0.25213
5	0.48969	2.30987	-1.89966	-1.59452	0.18186	-0.37000
SUM	0.12368	2.54745	0.30904	-3.10912	0.26961	-0.62213

Condition **LC26=1.2D+Di+Wl30**

4	-0.23510	0.23803	2.13430	-1.46537	0.31741	-0.16590
5	0.68265	2.30800	-2.01931	-1.67329	0.41828	-0.49605
SUM	0.44755	2.54603	0.11499	-3.13865	0.73569	-0.66195

Condition **LC27=1.2D+Di+Wl60**

4	-0.25628	0.23808	2.11126	-1.45011	0.24797	-0.18012
5	0.61634	2.30924	-1.99728	-1.65897	0.34789	-0.45325
SUM	0.36006	2.54732	0.11398	-3.10908	0.59586	-0.63337

Condition **LC28=1.2D+Di+Wl90**

4	-0.22648	0.23949	1.99934	-1.37679	0.26033	-0.16082
5	0.61602	2.30879	-2.08636	-1.71734	0.36216	-0.45366
SUM	0.38954	2.54828	-0.08702	-3.09412	0.62249	-0.61449

Condition **LC29=1.2D+Di+Wl120**

4	-0.25467	0.24111	1.88665	-1.30301	0.15388	-0.17944
5	0.50491	2.30935	-2.13544	-1.74945	0.25249	-0.38206
SUM	0.25023	2.55046	-0.24879	-3.05246	0.40637	-0.56149

Condition **LC30=1.2D+Di+Wl150**

4	-0.23279	0.24113	1.86430	-1.28810	0.17818	-0.16486
5	0.51754	2.30955	-2.14823	-1.75805	0.27591	-0.39042
SUM	0.28474	2.55069	-0.28392	-3.04615	0.45409	-0.55527

Condition **LC31=1.2D+Di-Wl0**

4	-0.36210	0.24218	1.78611	-1.23686	-0.14727	-0.25039
5	0.21326	2.31307	-2.07174	-1.70788	-0.05753	-0.19324
SUM	-0.14884	2.55525	-0.28563	-2.94474	-0.20480	-0.44363

Condition **LC32=1.2D+Di-Wl30**

4	-0.49300	0.24173	1.86056	-1.28613	-0.37717	-0.33661
5	0.02067	2.31494	-1.95193	-1.62900	-0.29404	-0.06741
SUM	-0.47234	2.55666	-0.09137	-2.91513	-0.67121	-0.40402

Condition **LC33=1.2D+Di-Wl60**

4	-0.47182	0.24167	1.88356	-1.30136	-0.30773	-0.32238
5	0.08672	2.31370	-1.97398	-1.64333	-0.22374	-0.11006
SUM	-0.38510	2.55538	-0.09042	-2.94469	-0.53146	-0.43244

Condition **LC34=1.2D+Di-Wl90**

4	-0.50161	0.24027	1.99545	-1.37467	-0.32059	-0.34168
5	0.08667	2.31415	-1.88464	-1.58480	-0.23856	-0.10941
SUM	-0.41493	2.55442	0.11081	-2.95947	-0.55915	-0.45110

Condition **LC35=1.2D+Di-Wl120**

4	-0.47342	0.23865	2.10811	-1.44842	-0.21425	-0.32307
5	0.19746	2.31360	-1.83553	-1.55267	-0.12907	-0.18082
SUM	-0.27595	2.55225	0.27258	-3.00109	-0.34332	-0.50389

Condition **LC36=1.2D+Di-Wl150**

4	-0.49530	0.23862	2.13045	-1.46333	-0.23871	-0.33765
5	0.18475	2.31340	-1.82268	-1.54402	-0.15267	-0.17240
SUM	-0.31055	2.55202	0.30778	-3.00735	-0.39137	-0.51005

Condition **LC37=1.2D+1.6LL1**

4	-0.10213	0.17696	1.49411	-1.02914	-0.00492	-0.07095
5	0.09313	1.71384	-1.48581	-1.23373	0.02768	-0.07562
SUM	-0.00900	1.89080	0.00830	-2.26286	0.02276	-0.14657

Condition **LC38=1.2D+1.6LL2**

4	0.67176	0.16463	1.49577	-1.02551	0.08904	0.46408
5	-0.68183	1.72621	-1.48648	-1.23288	-0.06238	0.54263
SUM	-0.01007	1.89083	0.00930	-2.25839	0.02665	1.00671

Condition **LC39=1.2D+1.6LL3**

4	-0.87568	0.16368	1.49579	-1.02533	-0.08213	-0.60444
5	0.86692	1.72709	-1.48772	-1.23348	0.10303	-0.69550
SUM	-0.00875	1.89077	0.00807	-2.25881	0.02090	-1.29994

Condition **LC40=1.2D+WL0+1.6LLa1**

4	1.37099	0.17919	1.95408	-1.33259	0.18573	0.94457
5	-1.34138	2.11044	-1.84940	-1.52693	-0.08211	1.07101
SUM	0.02961	2.28963	0.10468	-2.85952	0.10362	2.01559

Condition **LC41=1.2D+WL30+1.6LLa1**

4	1.41202	0.17931	1.93145	-1.31762	0.26011	0.97165
5	-1.28003	2.10979	-1.89008	-1.55371	-0.00624	1.03103
SUM	0.13199	2.28910	0.04137	-2.87133	0.25387	2.00268

Condition **LC42=1.2D+WL60+1.6LLa1**

4	1.40504	0.17932	1.92366	-1.31246	0.23505	0.96699
5	-1.30455	2.11029	-1.88178	-1.54833	-0.03202	1.04693
SUM	0.10049	2.28961	0.04187	-2.86079	0.20302	2.01392

Condition **LC43=1.2D+WL90+1.6LLa1**

4	1.41232	0.17972	1.88889	-1.28967	0.23763	0.97162
5	-1.30458	2.11022	-1.90711	-1.56491	-0.02791	1.04655
SUM	0.10774	2.28993	-0.01821	-2.85458	0.20972	2.01817

Condition **LC44=1.2D+WL120+1.6LLa1**

4	1.40553	0.18020	1.85369	-1.26660	0.20716	0.96716
5	-1.33861	2.11042	-1.92084	-1.57390	-0.05968	1.06858
SUM	0.06692	2.29062	-0.06716	-2.84050	0.14748	2.03574

Condition **LC45=1.2D+WL150+1.6LLa1**

4	1.41275	0.18020	1.84636	-1.26171	0.21458	0.97195
5	-1.33461	2.11053	-1.92502	-1.57672	-0.05253	1.06589
SUM	0.07813	2.29073	-0.07865	-2.83843	0.16204	2.03784

Condition **LC46=1.2D-WL0+1.6LLa1**

4	1.37210	0.18049	1.82136	-1.24529	0.11625	0.94504
5	-1.42613	2.11168	-1.90347	-1.56262	-0.15286	1.12516
SUM	-0.05403	2.29217	-0.08211	-2.80792	-0.03661	2.07020

Condition **LC47=1.2D-WL30+1.6LLa1**

4	1.33107	0.18037	1.84399	-1.26027	0.04184	0.91796
5	-1.48744	2.11233	-1.86278	-1.53583	-0.22873	1.16512
SUM	-0.15637	2.29270	-0.01879	-2.79610	-0.18689	2.08308

Condition **LC48=1.2D-WL60+1.6LLa1**

4	1.33804	0.18036	1.85178	-1.26543	0.06691	0.92263
5	-1.46295	2.11184	-1.87108	-1.54122	-0.20296	1.14923
SUM	-0.12491	2.29219	-0.01929	-2.80664	-0.13605	2.07186

Condition **LC49=1.2D-WL90+1.6LLa1**

4	1.33076	0.17997	1.88654	-1.28821	0.06428	0.91800
5	-1.46295	2.11190	-1.84573	-1.52462	-0.20713	1.14963
SUM	-0.13219	2.29187	0.04081	-2.81282	-0.14284	2.06763

Condition **LC50=1.2D-WL120+1.6LLa1**

4	1.33755	0.17948	1.92175	-1.31128	0.09474	0.92246
5	-1.42895	2.11170	-1.83199	-1.51562	-0.17537	1.12762
SUM	-0.09139	2.29118	0.08975	-2.82691	-0.08063	2.05008

Condition **LC51=1.2D-WL150+1.6LLa1**

4	1.33034	0.17948	1.92907	-1.31617	0.08731	0.91766
5	-1.43296	2.11159	-1.82781	-1.51280	-0.18254	1.13032
SUM	-0.10262	2.29107	0.10126	-2.82897	-0.09523	2.04798

Condition **LC52=1.2D+WL0+1.6LLa2**

4	0.56593	0.19568	1.95122	-1.33699	0.03255	0.38716
5	-0.53110	2.09381	-1.85134	-1.53055	0.05519	0.43652
SUM	0.03483	2.28949	0.09988	-2.86754	0.08774	0.82367

Condition **LC53=1.2D+WL30+1.6LLa2**

4	0.60699	0.19579	1.92838	-1.32188	0.10686	0.41425
5	-0.46977	2.09317	-1.89180	-1.55719	0.13111	0.39653
SUM	0.13721	2.28896	0.03658	-2.87907	0.23797	0.81078

Condition **LC54=1.2D+WL60+1.6LLa2**

4	0.60000	0.19581	1.92066	-1.31677	0.08182	0.40958
5	-0.49428	2.09365	-1.88358	-1.55186	0.10532	0.41244
SUM	0.10572	2.28946	0.03708	-2.86863	0.18714	0.82202

Condition **LC55=1.2D+WL90+1.6LLa2**

4	0.60728	0.19621	1.88589	-1.29398	0.08441	0.41421
5	-0.49432	2.09358	-1.90891	-1.56845	0.10945	0.41207
SUM	0.11296	2.28978	-0.02302	-2.86242	0.19386	0.82628

Condition **LC56=1.2D+WL120+1.6LLa2**

4	0.60048	0.19669	1.85077	-1.27096	0.05398	0.40975
5	-0.52834	2.09377	-1.92275	-1.57750	0.07766	0.43411
SUM	0.07214	2.29047	-0.07197	-2.84846	0.13164	0.84386

Condition **LC57=1.2D+WL150+1.6LLa2**

4	0.60770	0.19670	1.84343	-1.26606	0.06139	0.41455
5	-0.52434	2.09388	-1.92690	-1.58031	0.08482	0.43141
SUM	0.08336	2.29058	-0.08347	-2.84637	0.14621	0.84597

Condition **LC58=1.2D-WL0+1.6LLa2**

4	0.56701	0.19699	1.81871	-1.24984	-0.03683	0.38763
5	-0.61583	2.09501	-1.90566	-1.56640	-0.01556	0.49069
SUM	-0.04882	2.29200	-0.08695	-2.81624	-0.05239	0.87832

Condition **LC59=1.2D-WL30+1.6LLa2**

4	0.52595	0.19687	1.84155	-1.26496	-0.11116	0.36053
5	-0.67712	2.09565	-1.86518	-1.53975	-0.09149	0.53065
SUM	-0.15117	2.29252	-0.02363	-2.80471	-0.20265	0.89119

Condition **LC60=1.2D-WL60+1.6LLa2**

4	0.53294	0.19685	1.84927	-1.27007	-0.08612	0.36520
5	-0.65264	2.09517	-1.87340	-1.54508	-0.06571	0.51477
SUM	-0.11970	2.29202	-0.02413	-2.81515	-0.15183	0.87997

Condition **LC61=1.2D-WL90+1.6LLa2**

4	0.52566	0.19646	1.88403	-1.29285	-0.08876	0.36057
5	-0.65264	2.09524	-1.84805	-1.52849	-0.06989	0.51516
SUM	-0.12698	2.29170	0.03598	-2.82134	-0.15864	0.87573

Condition **LC62=1.2D-WL120+1.6LLa2**

4	0.53246	0.19597	1.91914	-1.31587	-0.05833	0.36503
5	-0.61865	2.09505	-1.83421	-1.51943	-0.03812	0.49314
SUM	-0.08618	2.29102	0.08494	-2.83529	-0.09645	0.85817

Condition **LC63=1.2D-WL150+1.6LLa2**

4	0.52524	0.19597	1.92649	-1.32077	-0.06576	0.36023
5	-0.62265	2.09494	-1.83005	-1.51662	-0.04529	0.49583
SUM	-0.09741	2.29091	0.09644	-2.83738	-0.11105	0.85607

Condition **LC64=1.2D+WL0+1.6LLa3**

4	-0.48225	0.20075	1.95002	-1.33823	0.04331	-0.33112
5	0.50965	2.08897	-1.84328	-1.52590	0.06338	-0.40813
SUM	0.02740	2.28972	0.10674	-2.86413	0.10669	-0.73926

Condition **LC65=1.2D+WL30+1.6LLa3**

4	-0.44120	0.20087	1.92680	-1.32285	0.11760	-0.30403
5	0.57098	2.08833	-1.88336	-1.55230	0.13930	-0.44811
SUM	0.12978	2.28920	0.04345	-2.87515	0.25690	-0.75214

Condition **LC66=1.2D+WL60+1.6LLa3**

4	-0.44818	0.20089	1.91921	-1.31783	0.09257	-0.30870
5	0.54647	2.08880	-1.87528	-1.54705	0.11351	-0.43220
SUM	0.09828	2.28969	0.04393	-2.86488	0.20608	-0.74090

Condition **LC67=1.2D+WL90+1.6LLa3**

4	-0.44090	0.20129	1.88444	-1.29503	0.09517	-0.30407
5	0.54643	2.08872	-1.90060	-1.56363	0.11764	-0.43256
SUM	0.10553	2.29001	-0.01616	-2.85866	0.21280	-0.73663

Condition **LC68=1.2D+WL120+1.6LLa3**

4	-0.44770	0.20178	1.84947	-1.27213	0.06474	-0.30852
5	0.51241	2.08891	-1.91459	-1.57279	0.08584	-0.41051
SUM	0.06470	2.29069	-0.06512	-2.84491	0.15059	-0.71904

Condition **LC69=1.2D+WL150+1.6LLa3**

4	-0.44048	0.20179	1.84209	-1.26720	0.07215	-0.30372
5	0.51640	2.08901	-1.91870	-1.57557	0.09300	-0.41320
SUM	0.07592	2.29080	-0.07662	-2.84276	0.16515	-0.71693

Condition **LC70=1.2D-WL0+1.6LLa3**

4	-0.48116	0.20208	1.81787	-1.25133	-0.02604	-0.33064
5	0.42491	2.09012	-1.89797	-1.56198	-0.00740	-0.35393
SUM	-0.05625	2.29220	-0.08011	-2.81331	-0.03343	-0.68457

Condition **LC71=1.2D-WL30+1.6LLa3**

4	-0.52221	0.20196	1.84109	-1.26670	-0.10035	-0.35773
5	0.36362	2.09076	-1.85788	-1.53558	-0.08333	-0.31398
SUM	-0.15860	2.29273	-0.01679	-2.80228	-0.18367	-0.67171

Condition **LC72=1.2D-WL60+1.6LLa3**

4	-0.51522	0.20194	1.84868	-1.27172	-0.07532	-0.35307
5	0.38810	2.09029	-1.86597	-1.54083	-0.05754	-0.32986
SUM	-0.12713	2.29223	-0.01729	-2.81255	-0.13286	-0.68293

Condition **LC73=1.2D-WL90+1.6LLa3**

4	-0.52251	0.20154	1.88345	-1.29452	-0.07796	-0.35770
5	0.38810	2.09037	-1.84062	-1.52424	-0.06172	-0.32948
SUM	-0.13441	2.29191	0.04283	-2.81875	-0.13967	-0.68718

Condition **LC74=1.2D-WL120+1.6LLa3**

4	-0.51571	0.20105	1.91841	-1.31742	-0.04754	-0.35324
5	0.42210	2.09019	-1.82663	-1.51508	-0.02994	-0.35151
SUM	-0.09361	2.29123	0.09178	-2.83250	-0.07749	-0.70476

Condition **LC75=1.2D-WL150+1.6LLa3**

4	-0.52293	0.20104	1.92580	-1.32235	-0.05497	-0.35804
5	0.41809	2.09009	-1.82251	-1.51229	-0.03711	-0.34882
SUM	-0.10484	2.29113	0.10329	-2.83464	-0.09208	-0.70686

Condition **LC76=1.2D+WL0+1.6LLa4**

4	-1.57597	0.17585	1.95317	-1.33123	-0.07105	-1.08457
5	1.58799	2.11437	-1.83225	-1.51556	0.21470	-1.26489
SUM	0.01202	2.29022	0.12092	-2.84679	0.14366	-2.34946

Condition **LC77=1.2D+WL30+1.6LLa4**

4	-1.53483	0.17599	1.92963	-1.31563	0.00333	-1.05741
5	1.64928	2.11378	-1.87203	-1.54177	0.29053	-1.30478
SUM	0.11445	2.28977	0.05760	-2.85740	0.29387	-2.36219

Condition **LC78=1.2D+WL60+1.6LLa4**

4	-1.54185	0.17600	1.92213	-1.31068	-0.02173	-1.06210
5	1.62475	2.11420	-1.86401	-1.53656	0.26476	-1.28887
SUM	0.08290	2.29020	0.05813	-2.84723	0.24303	-2.35097

Condition **LC79=1.2D+WL90+1.6LLa4**

4	-1.53456	0.17640	1.88733	-1.28786	-0.01914	-1.05746
5	1.62466	2.11408	-1.88927	-1.55308	0.26887	-1.28919
SUM	0.09010	2.29048	-0.00193	-2.84095	0.24972	-2.34665

Condition **LC80=1.2D+WL120+1.6LLa4**

4	-1.54133	0.17689	1.85248	-1.26503	-0.04960	-1.06190
5	1.59052	2.11418	-1.90331	-1.56226	0.23708	-1.26706
SUM	0.04919	2.29107	-0.05083	-2.82729	0.18748	-2.32896

Condition **LC81=1.2D+WL150+1.6LLa4**

4	-1.53406	0.17690	1.84506	-1.26008	-0.04218	-1.05706
5	1.59445	2.11426	-1.90737	-1.56501	0.24421	-1.26970
SUM	0.06039	2.29116	-0.06232	-2.82508	0.20203	-2.32676

Condition **LC82=1.2D-WL0+1.6LLa4**

4	-1.57480	0.17717	1.82124	-1.24448	-0.14049	-1.08403
5	1.50286	2.11521	-1.88694	-1.55158	0.14390	-1.21039
SUM	-0.07194	2.29238	-0.06569	-2.79606	0.00341	-2.29443

Condition **LC83=1.2D-WL30+1.6LLa4**

4	-1.61594	0.17704	1.84480	-1.26008	-0.21489	-1.11119
5	1.44161	2.11580	-1.84714	-1.52536	0.06807	-1.17052
SUM	-0.17433	2.29283	-0.00234	-2.78544	-0.14683	-2.28171

Condition **LC84=1.2D-WL60+1.6LLa4**

4	-1.60892	0.17702	1.85228	-1.26504	-0.18983	-1.10650
5	1.46611	2.11538	-1.85516	-1.53058	0.09383	-1.18641
SUM	-0.14281	2.29240	-0.00288	-2.79561	-0.09600	-2.29291

Condition **LC85=1.2D-WL90+1.6LLa4**

4	-1.61621	0.17662	1.88708	-1.28785	-0.19246	-1.11114
5	1.46617	2.11550	-1.82988	-1.51403	0.08967	-1.18608
SUM	-0.15004	2.29213	0.05720	-2.80188	-0.10279	-2.29721

Condition **LC86=1.2D-WL120+1.6LLa4**

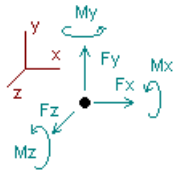
4	-1.60944	0.17613	1.92193	-1.31068	-0.16201	-1.10671
5	1.50028	2.11540	-1.81583	-1.50485	0.12144	-1.20818
SUM	-0.10916	2.29154	0.10610	-2.81553	-0.04057	-2.31489

Condition **LC87=1.2D-WL150+1.6LLa4**

4	-1.61670	0.17612	1.92936	-1.31563	-0.16945	-1.11154
5	1.49634	2.11532	-1.81177	-1.50210	0.11429	-1.20554
SUM	-0.12037	2.29144	0.11759	-2.81774	-0.05516	-2.31708

Envelope for nodal reactions

Note.- **lc** is the controlling load condition



Direction of positive forces and moments

Envelope of nodal reactions for :

LC1=1.2D+Wo
LC2=1.2D+W30
LC3=1.2D+W60
LC4=1.2D+W90
LC5=1.2D+W120
LC6=1.2D+W150
LC7=1.2D-Wo
LC8=1.2D-W30
LC9=1.2D-W60
LC10=1.2D-W90
LC11=1.2D-W120
LC12=1.2D-W150
LC13=0.9D+Wo
LC14=0.9D+W30
LC15=0.9D+W60
LC16=0.9D+W90
LC17=0.9D+W120
LC18=0.9D+W150
LC19=0.9D-Wo
LC20=0.9D-W30
LC21=0.9D-W60
LC22=0.9D-W90
LC23=0.9D-W120
LC24=0.9D-W150
LC25=1.2D+Di+WI0
LC26=1.2D+Di+WI30
LC27=1.2D+Di+WI60
LC28=1.2D+Di+WI90
LC29=1.2D+Di+WI120
LC30=1.2D+Di+WI150
LC31=1.2D+Di-WI0
LC32=1.2D+Di-WI30

LC33=1.2D+Di-WI60
LC34=1.2D+Di-WI90
LC35=1.2D+Di-WI120
LC36=1.2D+Di-WI150
LC37=1.2D+1.6LL1
LC38=1.2D+1.6LL2
LC39=1.2D+1.6LL3
LC40=1.2D+WL0+1.6LLa1
LC41=1.2D+WL30+1.6LLa1
LC42=1.2D+WL60+1.6LLa1
LC43=1.2D+WL90+1.6LLa1
LC44=1.2D+WL120+1.6LLa1
LC45=1.2D+WL150+1.6LLa1
LC46=1.2D-WL0+1.6LLa1
LC47=1.2D-WL30+1.6LLa1
LC48=1.2D-WL60+1.6LLa1
LC49=1.2D-WL90+1.6LLa1
LC50=1.2D-WL120+1.6LLa1
LC51=1.2D-WL150+1.6LLa1
LC52=1.2D+WL0+1.6LLa2
LC53=1.2D+WL30+1.6LLa2
LC54=1.2D+WL60+1.6LLa2
LC55=1.2D+WL90+1.6LLa2
LC56=1.2D+WL120+1.6LLa2
LC57=1.2D+WL150+1.6LLa2
LC58=1.2D-WL0+1.6LLa2
LC59=1.2D-WL30+1.6LLa2
LC60=1.2D-WL60+1.6LLa2
LC61=1.2D-WL90+1.6LLa2
LC62=1.2D-WL120+1.6LLa2
LC63=1.2D-WL150+1.6LLa2
LC64=1.2D+WL0+1.6LLa3
LC65=1.2D+WL30+1.6LLa3
LC66=1.2D+WL60+1.6LLa3
LC67=1.2D+WL90+1.6LLa3
LC68=1.2D+WL120+1.6LLa3
LC69=1.2D+WL150+1.6LLa3
LC70=1.2D-WL0+1.6LLa3
LC71=1.2D-WL30+1.6LLa3
LC72=1.2D-WL60+1.6LLa3
LC73=1.2D-WL90+1.6LLa3
LC74=1.2D-WL120+1.6LLa3
LC75=1.2D-WL150+1.6LLa3
LC76=1.2D+WL0+1.6LLa4
LC77=1.2D+WL30+1.6LLa4
LC78=1.2D+WL60+1.6LLa4
LC79=1.2D+WL90+1.6LLa4
LC80=1.2D+WL120+1.6LLa4
LC81=1.2D+WL150+1.6LLa4
LC82=1.2D-WL0+1.6LLa4
LC83=1.2D-WL30+1.6LLa4
LC84=1.2D-WL60+1.6LLa4
LC85=1.2D-WL90+1.6LLa4
LC86=1.2D-WL120+1.6LLa4
LC87=1.2D-WL150+1.6LLa4

		Forces						Moments					
Node		**Fx** [Kip]	**lc**	**Fy** [Kip]	**lc**	**Fz** [Kip]	**lc**	**Mx** [Kip*ft]	**lc**	**My** [Kip*ft]	**lc**	**Mz** [Kip*ft]	**lc**
4	Max	1.413	LC45	0.242	LC31	3.006	LC1	0.60173	LC19	2.33754	LC16	0.97195	LC45
	Min	-1.617	LC87	0.097	LC13	-0.987	LC19	-1.99325	LC1	-2.36098	LC22	-1.11154	LC87
5	Max	2.117	LC3	2.315	LC32	0.476	LC24	0.13955	LC24	2.34630	LC4	1.19493	LC21
	Min	-1.922	LC21	0.986	LC16	-2.467	LC6	-1.79888	LC6	-2.31584	LC22	-1.34730	LC3

Date: 3/14/2022
Project Name: NEW HAVEN WHEELER ST
Project No.: CT2037
Designed By: LBW **Checked By:** MSC

HUDSON Design Group LLC

CHECK CONNECTION CAPACITY (Worst Case)

Reference: AISC Steel Construction Manual 14th Edition (ASD)

Bolt Type = A36 3/4" (Threaded Rod)

Allowable Tensile Load =

F_{Tall} = 9609 lbs.

Allowable Shear Load =

F_{Vall}= 5765 lbs.

TENSILE FORCES

Reaction **F =** 2467 lbs. (See Bentley Output)

SHEAR FORCES

Reactions in X direction: 2117 lbs. (See Bentley Output)
Reactions in Y direction: 2315 lbs. (See Bentley Output)

Resultant: 3137 lbs.

No. of Supports = 1
No. of Bolts / Support = 4

Tension Design Load /Bolts =

f_t= 616.75 lbs. < 9609 lbs. **Therefore, OK !**

Shear Design Load / Bolts=

f_v= 784.26 lbs. < 5765 lbs. **Therefore, OK !**

CHECK COMBINED TENSION AND SHEAR

f_t / F_T	+	f_v / F_V	≤	1.0			
0.064	+	0.136	=	0.200	<	1.0	**Therefore, OK !**