



STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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E-Mail: siting.council@ct.gov

Web Site: portal.ct.gov/csc

VIA ELECTRONIC MAIL

January 10, 2023

Evan Renwick
Site Acquisition Specialist
Centerline Communications, LLC
750 West Center Street, Suite 301
West Bridgewater, MA 02379
erenwick@clinellc.com

RE: EM-AT&T-099-221115 – AT&T notice of intent to modify an existing telecommunications facility located at 88 Parsonage Hill Road, North Branford, Connecticut.

Dear Evan Renwick:

The Connecticut Siting Council (Council) is in receipt of your correspondence of January 6, 2023 submitted in response to the Council's December 2, 2022 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

The submission renders the request for exempt modification 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/RDM/lm

Radio Frequency Exposure Analysis Report

December 7, 2022

Centerline on behalf of AT&T

AT&T Site Name: NORTHFORD - TOTOKET

Site Number: CTL05638

FA#: 10071180

USID: 26043

Site Address: 88 Parsonage Hill Road, Northford, CT 06472



Michael Fischer, P.E.
Registered Professional Engineer (Electrical)
Connecticut License Number 33928
Expires January 31, 2023

Signed 07 December 2022

Site Compliance Summary

AT&T Compliance Status:	Compliant
Cumulative Calculated Power Density (Ground Level):	1.93808 $\mu\text{W}/\text{cm}^2$
Cumulative General Population % MPE (Ground Level):	0.24135%



December 7, 2022

Centerline
Attn: Jennifer Iliades, Project Manager
750 W Center St, Suite 301
West Bridgewater, MA 02379

RF Exposure Analysis for Site: **NORTHFORD - TOTOKET**

Centerline Communications, LLC (“Centerline”) was contracted to analyze the proposed AT&T facility at **88 Parsonage Hill Road, Northford, CT 06472** for the purpose of determining whether the predictive exposure from the proposed facility is within specified federal limits.

All information used in this report was analyzed as a percentage of the Maximum Permissible Exposure (% MPE) limits as detailed in 47 CFR § 1.1310 as well as Federal Communications Commission (FCC) OET Bulletin 65 Edition 97-01. The FCC MPE limits are typically expressed in units of milliwatts per square centimeter (mW/cm^2) or microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The exposure limits vary depending upon the frequencies being utilized. The General Population/Uncontrolled MPE limit (in mW/cm^2) for frequencies between 300 and 1500 is defined as frequency (in MHz) divided by 1500 ($f_{\text{MHz}}/1500$). Frequencies between 1500 and 100,000 MHz have a General Population/Uncontrolled MPE limit of $1 \text{ mW}/\text{cm}^2$ ($1000 \mu\text{W}/\text{cm}^2$). The calculated power density at each sample point divided by the limit at each calculated frequency provides a result in % MPE. Summing the calculated % MPE from all contributors provides a cumulative % MPE at a particular sample point. Wireless carriers use different frequency bands with varying MPE limits; therefore, it is useful to report results in terms of % MPE as opposed to power density.

All results were compared to the FCC radio frequency exposure rules as detailed in 47 CFR § 1.1307(b) to determine compliance with the MPE limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general population may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits, as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means. Additional details can be found in FCC OET 65.



Calculation Methodology

Centerline Communications, LLC has performed theoretical modeling of the site using a software tool, RoofMaster®, which incorporates calculation methodologies detailed in FCC OET 65. RoofMaster® uses a cylindrical model for conservative power density predictions within the near field of the antenna where the antenna pattern has not truly formed yet. Within this area power density values tend to decrease based upon an inverse distance function. At the point where it is appropriate for modeling to change from near-field calculations to far-field calculations, the power decreases inversely with the square of the distance. The modeling is based on worst-case assumptions in terms of transmitter power and duty cycle. No losses were included in the power calculations unless they were specifically provided for the project.

In OET 65, a far field model is presented to calculate the spatial peak power density. The RoofMaster® implementation of this model incorporates antenna manufacturer's horizontal and vertical pattern data to determine the power density in all directions. This model yields the power density at a single point in space. In order to determine the spatial power density for comparison to the FCC limits, the average of several points calculated within the human profile (0-6') must be conducted. RoofMaster® calculates seven power density values between 0-6' above the specified study plane and performs a linear spatial average.



Data & Results

The following table details the antennas and operating parameters for the AT&T antenna system as well as any other antenna systems at the site. This is based on antenna information provided by the client and data compiled from other sources where necessary. The data below was input into Roofmaster® to perform the theoretical exposure calculations at ground level.

The theoretical calculations performed in Roofmaster® determine the cumulative exposure at all sample points at ground level (0-6' spatial average). The results from highest cumulative sample point at ground level surrounding the site are displayed in the table below. The contribution from directional antennas to the maximum cumulative totals varies greatly depending on location; therefore, the contribution from one antenna sector at the highest calculated exposure point may be greater or less than other sectors since sectorized directional antennas are pointed in different directions and there is not much overlapping exposure.

The contribution to the cumulative power density and % MPE for each antenna/frequency band is listed in the table. The cumulative power density and cumulative % MPE are displayed at the bottom of the table.



Maximum Calculated Cumulative Power Density (Location: approximately 7' west of site)

Antenna ID	Make / Model	Frequency Band (MHz)	Antenna Gain (dBd)	Antenna Centerline (ft)	Channel Count	TX Power/Channel (watts)	ERP (watts)	Calculated Power Density ($\mu\text{W}/\text{cm}^2$)	General Population MPE Limit ($\mu\text{W}/\text{cm}^2$)	General Population % MPE
AT&T A 1	CCI TPA65R-BU6D	700	11.75	173.00	4.00	30.00	1795.48	0.00001	466.67	0.00000
AT&T A 1	CCI TPA65R-BU6D	850	12.45	173.00	4.00	30.00	2109.51	0.00000	566.67	0.00000
AT&T A 1	CCI TPA65R-BU6D	1900	15.05	173.00	4.00	30.00	3838.67	0.00002	1000.00	0.00000
AT&T A 1	CCI TPA65R-BU6D	2100	15.95	173.00	4.00	30.00	4722.60	0.00002	1000.00	0.00000
AT&T A 2	ERICSSON AIR6419	3400	23.55	174.50	1.00	108.40	24548.74	0.00354	1000.00	0.00035
AT&T A 3	ERICSSON AIR6449	3700	23.55	171.50	1.00	108.40	24548.74	0.00367	1000.00	0.00037
AT&T A 4	CCI DMP65R-BU6D	700	11.75	173.00	4.00	30.00	1795.48	0.00008	466.67	0.00002
AT&T A 4	CCI DMP65R-BU6D	2300	14.95	173.00	4.00	18.75	2344.56	0.00004	1000.00	0.00000
AT&T B 5	CCI TPA65R-BU6D	700	11.75	173.00	4.00	30.00	1795.48	0.00003	466.67	0.00001
AT&T B 5	CCI TPA65R-BU6D	850	12.45	173.00	4.00	30.00	2109.51	0.00002	566.67	0.00000
AT&T B 5	CCI TPA65R-BU6D	1900	15.05	173.00	4.00	30.00	3838.67	0.00002	1000.00	0.00000
AT&T B 5	CCI TPA65R-BU6D	2100	15.95	173.00	4.00	30.00	4722.60	0.00001	1000.00	0.00000
AT&T B 6	ERICSSON AIR6419	3400	23.55	174.50	1.00	108.40	24548.74	0.00354	1000.00	0.00035
AT&T B 7	ERICSSON AIR6449	3700	23.55	171.50	1.00	108.40	24548.74	0.00367	1000.00	0.00037
AT&T B 8	CCI DMP65R-BU6D	700	11.75	173.00	4.00	30.00	1795.48	0.00006	466.67	0.00001
AT&T B 8	CCI DMP65R-BU6D	2300	14.95	173.00	4.00	18.75	2344.56	0.00001	1000.00	0.00000
AT&T C 9	CCI TPA65R-BU6D	700	11.75	173.00	4.00	30.00	1795.48	0.03930	466.67	0.00842
AT&T C 9	CCI TPA65R-BU6D	850	12.45	173.00	4.00	30.00	2109.51	0.03857	566.67	0.00681
AT&T C 9	CCI TPA65R-BU6D	1900	15.05	173.00	4.00	30.00	3838.67	0.04336	1000.00	0.00434
AT&T C 9	CCI TPA65R-BU6D	2100	15.95	173.00	4.00	30.00	4722.60	0.04498	1000.00	0.00450
AT&T C 10	ERICSSON AIR6419	3400	23.55	174.50	1.00	108.40	24548.74	0.46357	1000.00	0.04636
AT&T C 11	ERICSSON AIR6449	3700	23.55	171.50	1.00	108.40	24548.74	0.48042	1000.00	0.04804
AT&T C 12	CCI DMP65R-BU6D	700	11.75	173.00	4.00	30.00	1795.48	0.04153	466.67	0.00890
AT&T C 12	CCI DMP65R-BU6D	2300	14.95	173.00	4.00	18.75	2344.56	0.02964	1000.00	0.00296
Verizon A 13	GENERIC PANEL 6FT	700	12.33	145.00	4.00	40.00	2736.02	0.00034	466.67	0.00007
Verizon A 14	GENERIC PANEL 6FT	850	12.62	145.00	4.00	40.00	2924.96	0.00001	566.67	0.00000
Verizon A 15	GENERIC PANEL 6FT	1900	15.84	145.00	4.00	40.00	6139.32	0.00002	1000.00	0.00000
Verizon A 16	GENERIC PANEL 6FT	2100	16.39	145.00	4.00	40.00	6968.19	0.00003	1000.00	0.00000
Verizon B 17	GENERIC PANEL 6FT	700	12.33	145.00	4.00	40.00	2736.02	0.00015	466.67	0.00003
Verizon B 18	GENERIC PANEL 6FT	850	12.62	145.00	4.00	40.00	2924.96	0.00020	566.67	0.00004
Verizon B 19	GENERIC PANEL 6FT	1900	15.84	145.00	4.00	40.00	6139.32	0.00011	1000.00	0.00001
Verizon B 20	GENERIC PANEL 6FT	2100	16.39	145.00	4.00	40.00	6968.19	0.00007	1000.00	0.00001
Verizon C 21	GENERIC PANEL 6FT	700	12.33	145.00	4.00	40.00	2736.02	0.07641	466.67	0.01637
Verizon C 22	GENERIC PANEL 6FT	850	12.62	145.00	4.00	40.00	2924.96	0.07891	566.67	0.01393
Verizon C 23	GENERIC PANEL 6FT	1900	15.84	145.00	4.00	40.00	6139.32	0.07870	1000.00	0.00787



Antenna ID	Make / Model	Frequency Band (MHz)	Antenna Gain (dBd)	Antenna Centerline (ft)	Channel Count	TX Power/ Channel (watts)	ERP (watts)	Calculated Power Density ($\mu\text{W}/\text{cm}^2$)	General Population MPE Limit ($\mu\text{W}/\text{cm}^2$)	General Population % MPE
Verizon C 24	GENERIC PANEL 6FT	2100	16.39	145.00	4.00	40.00	6968.19	0.08283	1000.00	0.00828
Sprint A 25	GENERIC PANEL 6FT	850	12.62	160.00	2.00	40.00	1462.48	0.00000	566.67	0.00000
Sprint A 25	GENERIC PANEL 6FT	1900	15.84	160.00	2.00	60.00	4604.49	0.00001	1000.00	0.00000
Sprint A 26	GENERIC PANEL 6FT	2500	14.49	160.00	1.00	35.00	984.17	0.00004	1000.00	0.00000
Sprint B 27	GENERIC PANEL 6FT	850	12.62	160.00	2.00	40.00	1462.48	0.00008	566.67	0.00002
Sprint B 27	GENERIC PANEL 6FT	1900	15.84	160.00	2.00	60.00	4604.49	0.00007	1000.00	0.00001
Sprint B 28	GENERIC PANEL 6FT	2500	14.49	160.00	1.00	35.00	984.17	0.00005	1000.00	0.00001
Sprint C 29	GENERIC PANEL 6FT	850	12.62	160.00	2.00	40.00	1462.48	0.03213	566.67	0.00567
Sprint C 29	GENERIC PANEL 6FT	1900	15.84	160.00	2.00	60.00	4604.49	0.04809	1000.00	0.00481
Sprint C 30	GENERIC PANEL 6FT	2500	14.49	160.00	1.00	35.00	984.17	0.01391	1000.00	0.00139
T-Mobile A 31	GENERIC PANEL 6FT	1900	15.84	181.50	2.00	60.00	4604.49	0.00001	1000.00	0.00000
T-Mobile A 31	GENERIC PANEL 6FT	2100	16.39	181.50	2.00	60.00	5226.14	0.00001	1000.00	0.00000
T-Mobile A 32	GENERIC PANEL 6FT	600	0.00	181.50	2.00	60.00	120.00	0.00016	400.00	0.00004
T-Mobile A 32	GENERIC PANEL 6FT	700	12.33	181.50	2.00	60.00	2052.02	0.00016	466.67	0.00003
T-Mobile B 33	GENERIC PANEL 6FT	1900	15.84	181.50	2.00	60.00	4604.49	0.00005	1000.00	0.00001
T-Mobile B 33	GENERIC PANEL 6FT	2100	16.39	181.50	2.00	60.00	5226.14	0.00003	1000.00	0.00000
T-Mobile B 34	GENERIC PANEL 6FT	600	0.00	181.50	2.00	60.00	120.00	0.00007	400.00	0.00002
T-Mobile B 34	GENERIC PANEL 6FT	700	12.33	181.50	2.00	60.00	2052.02	0.00007	466.67	0.00002
T-Mobile C 35	GENERIC PANEL 6FT	1900	15.84	181.50	2.00	60.00	4604.49	0.03703	1000.00	0.00370
T-Mobile C 35	GENERIC PANEL 6FT	2100	16.39	181.50	2.00	60.00	5226.14	0.03897	1000.00	0.00390
T-Mobile C 36	GENERIC PANEL 6FT	600	0.00	181.50	2.00	60.00	120.00	0.03595	400.00	0.00899
T-Mobile C 36	GENERIC PANEL 6FT	700	12.33	181.50	2.00	60.00	2052.02	0.03595	466.67	0.00770
Unknown A 37	GENERIC PANEL 6FT	700	12.33	190.00	4.00	40.00	2736.02	0.00019	466.67	0.00004
Unknown A 37	GENERIC PANEL 6FT	850	12.62	190.00	4.00	40.00	2924.96	0.00000	566.67	0.00000
Unknown A 38	GENERIC PANEL 6FT	1900	15.84	190.00	4.00	40.00	6139.32	0.00001	1000.00	0.00000
Unknown A 38	GENERIC PANEL 6FT	2100	16.39	190.00	4.00	40.00	6968.19	0.00002	1000.00	0.00000
Unknown B 39	GENERIC PANEL 6FT	700	12.33	190.00	4.00	40.00	2736.02	0.00009	466.67	0.00002
Unknown B 39	GENERIC PANEL 6FT	850	12.62	190.00	4.00	40.00	2924.96	0.00012	566.67	0.00002
Unknown B 40	GENERIC PANEL 6FT	1900	15.84	190.00	4.00	40.00	6139.32	0.00006	1000.00	0.00001
Unknown B 40	GENERIC PANEL 6FT	2100	16.39	190.00	4.00	40.00	6968.19	0.00004	1000.00	0.00000
Unknown C 41	GENERIC PANEL 6FT	700	12.33	190.00	4.00	40.00	2736.02	0.04361	466.67	0.00934
Unknown C 41	GENERIC PANEL 6FT	850	12.62	190.00	4.00	40.00	2924.96	0.04503	566.67	0.00795
Unknown C 42	GENERIC PANEL 6FT	1900	15.84	190.00	4.00	40.00	6139.32	0.04491	1000.00	0.00449
Unknown C 42	GENERIC PANEL 6FT	2100	16.39	190.00	4.00	40.00	6968.19	0.04727	1000.00	0.00473
							Cumulative Power Density:	1.93808 $\mu\text{W}/\text{cm}^2$	Cumulative % MPE:	0.24135%



Summary

The theoretical calculations performed for this analysis yielded cumulative power density totals in all areas at ground level that are within the allowable federal limits for public exposure to RF energy. Therefore, the site is **Compliant** with FCC rules and regulations.

Matt Schulzinger
RF EME Technical Writer
Centerline Communications, LLC

December 15, 2022 (Rev.1)
May 6, 2022



Centerline Communications
750 West Center Street, Suite #301
West Bridgewater, MA 02379

RE: AT&T Site Number: CT5638
FA Number: 10071180
PACE Number: MRCTB062278
PT Number: 2051A146JA
TEP Project Number: 354416
AT&T Site Name: NORTHFORD – TOTOKET
Site Address: 88 Parsonage Hill Road
Northford, CT 06472

To Whom It May Concern:

TEP Northeast (TEP NE) has been authorized by centerline Communications to perform a mount analysis on the existing AT&T antenna/RRH mounts to determine their capability of supporting the following additional loading:

- (3) **DMP65R-BU6DA Antennas (71.2"x20.7"x7.7" – Wt. = 80 lbs. /each)**
- (3) 4478 B14 RRH's (18.1"x13.4"x8.3" – Wt. = 60 lbs. /each)
- (3) 8843 B2/B66A RRH's (14.9"x13.2"x10.9" – Wt. = 72 lbs. /each)
- (3) 4449 B5/B12 RRH's (17.9"x13.2"x9.4" – Wt. = 73 lbs. /each)
- (2) DC6-48-60-18-8F Surge Arrestors (24.0"x9.7"Ø – Wt. = 33 lbs. /each)
- (3) AIR6419 Antennas (31.1"x16.1"x7.3" – Wt. = 66 lbs. /each)
- (3) AIR6449 Antennas (30.6"x15.9"x10.6" – Wt. 82 lbs. /each)
- (3) **TPA65R-BU6DA-K Antennas (71.2"x20.7"x7.7" – Wt. = 69 lbs. /each)**
- (3) 4415 B30 RRH's (16.5"x13.4"x5.9" – Wt. = 46 lbs. /each)
- (1) DC6-48-60-18-8F Surge Arrestor (24.0"x9.7"Ø – Wt. = 33 lbs.)

*Proposed equipment shown in bold.

No original structural design documents or fabrication drawings were available for the existing mounts. TEP NE's subconsultant, ProVertic LLC, conducted a survey climb and mapping of the existing AT&T antenna mounts on April 9, 2019. This office conducted a ground audit of the existing AT&T antenna mounts on December 20, 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 2021 with 2022 Connecticut State Building Code, and AT&T Mount Technical Directive – R22.
- TEP NE 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 P 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 1.18 in was used for this analysis.
- TEP NE considers this site to be exposure category C; tower is located near large, flat, open, terrain/grasslands.
- TEP NE considers this site to be topographic category 1; tower is located on flat terrain or the bottom of a hill or ridge.
- TEP NE considers this site to have a spectral response acceleration parameter at short periods, S_s , of 0.204 and a spectral response acceleration parameter at a period of 1 second, S_1 , of 0.054.
- 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 2.
- 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 mount is secured to the existing self supporting tower with threaded rods and plate clamps tightened around the tower leg. TEP NE considers the threaded rods as the governing connection members.

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	17	LC46	61%	PASS

Reference Documents:

- Mount mapping report prepared by ProVertic LLC dated April 9, 2019.

This determination was based on the following limitations and assumptions:

1. TEP NE is not responsible for any modifications completed prior to and hereafter which TEP NE 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 mount has 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. TEP NE 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,
TEP Northeast

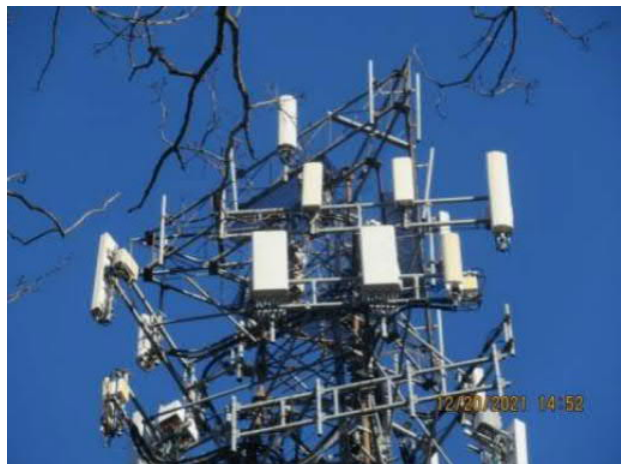


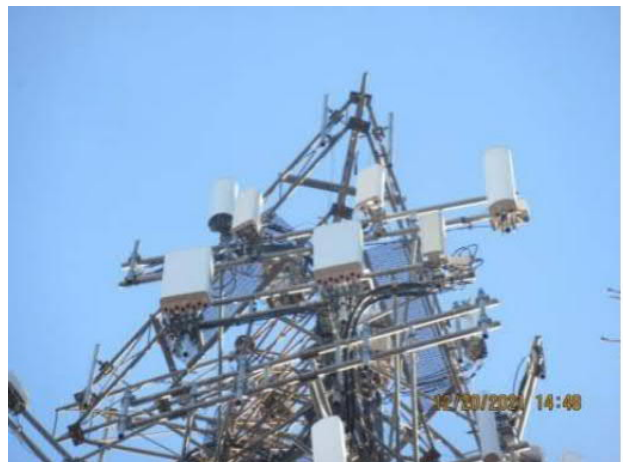
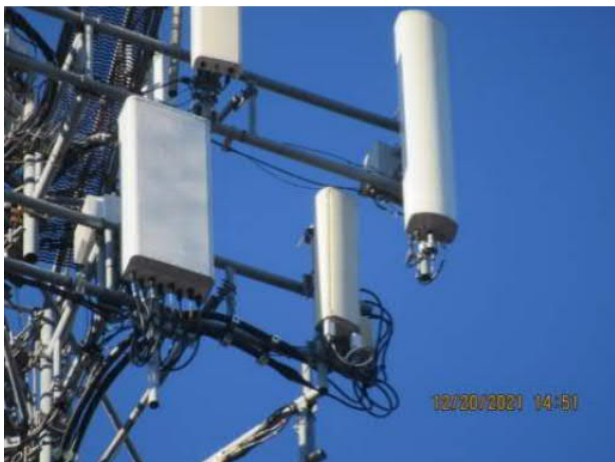
Michael Cabral
Director



Daniel P. Hamm, PE
Vice President

FIELD PHOTOS:







Wind & Ice
Calculations

Date: 12/6/2022
 Project Name: NORTHFORD - TOTOKET
 Project No.: CT5638
 Designed By: RL Checked By: MSC



2.6.5.2 Velocity Pressure Coeff:

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

$K_z =$ 1.420

$z =$ 173 (ft)
 $z_g =$ 900 (ft)
 $\alpha =$ 9.5

$$K_{zmin} \leq K_z \leq 2.01$$

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

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

$K_{zt} =$ 1

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

Category = 1

$$K_h = e^{(fz/H)}$$

$K_h =$ 1.0
 $K_c =$ 1.0 (from Table 2-4)
 $K_t =$ 0 (from Table 2-5)
 $f =$ 0 (from Table 2-5)
 $z =$ 173
 $z_s =$ 279 (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)
 $K_e =$ 0.99 (from 2.6.8)

2.6.10 Design Ice Thickness

Max Ice Thickness =
 Importance Factor =

$t_i =$ 1.00 in
 $I =$ 1.00 (from Table 2-3)
 $K_{iz} =$ 1.18 (from Sec. 2.6.10)

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

$t_{iz} =$ 1.18 in

Date: 12/6/2022
 Project Name: NORTHFORD - TOTOKET
 Project No.: CT5638
 Designed By: RL Checked By: MSC



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

$h =$ 197

$G_h =$ 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

(Cantilevered tubular or latticed spines, pole, structures on buildings (ht. : width ratio > 5)

$G_h =$ 1.35

$G_h =$ 1.00

2.6.11.2 Design Wind Force on Appurtenances

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

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

$q_z =$	47.81
$q_{z(ice)} =$	7.65
$q_{z(30)} =$	2.75

$K_z =$	1.420 (from 2.6.5.2)
$K_{zt} =$	1.0 (from 2.6.6.2.1)
$K_s =$	1.0 (from 2.6.7)
$K_e =$	0.99 (from 2.6.8)
$K_d =$	0.85 (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, K_d
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

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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
	$39 \leq C \leq 78$ (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 = 1.18 in Angle = 0 (deg) Equivalent Angle = 180 (deg)

<u>Appurtenances</u>	<u>Height</u>	<u>Width</u>	<u>Depth</u>	<u>Flat Area</u>	<u>Aspect Ratio</u>	<u>Ca</u>	<u>Force (lbs)</u>	<u>Force (lbs) (w/ Ice)</u>	<u>Force (lbs) (30 mph)</u>
DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.44	1.24	608	112	35
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.93	1.20	199	39	11
AIR6449 Antenna	30.6	15.9	10.6	3.38	1.92	1.20	194	38	11
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.44	1.24	608	112	35
4478 B14 RRH	18.1	13.4	8.3	1.68	1.35	1.20	97	21	6
4415 B30 RRH	16.5	13.4	5.9	1.54	1.23	1.20	88	19	5
8843 B2/B66A RRH	14.9	13.2	10.9	1.37	1.13	1.20	78	17	5
4449 B5/B12 RRH	17.9	13.2	9.4	1.64	1.36	1.20	94	20	5
Surge Arrestor	24.0	9.7	9.7	1.62	2.47	0.70	54	12	3
1-1/2" Pipe	1.9	12.0	-	0.16	0.16	1.20	9		
2" Pipe	2.4	12.0	-	0.20	0.20	1.20	11		
2-1/2" Pipe	2.9	12.0	-	0.24	0.24	1.20	14		
3" Pipe	3.5	12.0	-	0.29	0.29	1.20	17		
HSS 2-1/2x2-1/2	2.5	12.0	-	0.21	0.21	2.00	20		

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WIND LOADS

Angle = 30 (deg)

Ice Thickness = 1.18 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) (normal)	Force (lbs) (side)	Force (lbs) (angle)
DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	608	268	523
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.58	1.93	4.26	1.20	1.28	199	96	174
AIR6449 Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	194	131	178
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	608	268	523
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	97	60	87
4415 B30 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	88	39	76
8843 B2/B66A RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	78	65	75
4449 B5/B12 RRH	17.9	13.2	9.4	1.64	1.17	1.36	1.90	1.20	1.20	94	67	87

WIND LOADS WITH ICE:

DMP65R-BU6DA Antenna	73.6	23.1	10.1	11.78	5.14	3.19	7.31	1.23	1.41	111	55	97
AIR6419 Antenna	33.5	18.5	9.7	4.29	2.24	1.81	3.46	1.20	1.24	39	21	35
AIR6449 Antenna	33.0	18.3	13.0	4.18	2.97	1.81	2.54	1.20	1.20	38	27	36
TPA65R-BU6DA-K Antenna	73.6	23.1	10.1	11.78	5.14	3.19	7.31	1.23	1.41	111	55	97
4478 B14 RRH	20.5	15.8	10.7	2.24	1.51	1.30	1.92	1.20	1.20	21	14	19
4415 B30 RRH	18.9	15.8	8.3	2.06	1.08	1.20	2.28	1.20	1.20	19	10	17
8843 B2/B66A RRH	17.3	15.6	13.3	1.87	1.59	1.11	1.30	1.20	1.20	17	15	16
4449 B5/B12 RRH	20.3	15.6	11.8	2.19	1.65	1.30	1.72	1.20	1.20	20	15	19

WIND LOADS AT 30 MPH:

DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	35	15	30
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.58	1.93	4.26	1.20	1.28	11	6	10
AIR6449 Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	11	8	10
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	35	15	30
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	6	3	5
4415 B30 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	5	2	4
8843 B2/B66A RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	5	4	4
4449 B5/B12 RRH	17.9	13.2	9.4	1.64	1.17	1.36	1.90	1.20	1.20	5	4	5

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WIND LOADS

Angle = 60 (deg)

Ice Thickness = 1.18 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) (normal)	Force (lbs) (side)	Force (lbs) (angle)
DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	608	268	353
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.58	1.93	4.26	1.20	1.28	199	96	122
AIR6449 Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	194	131	147
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	608	268	353
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	97	60	69
4415 B30 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	88	39	51
8843 B2/B66A RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	78	65	68
4449 B5/B12 RRH	17.9	13.2	9.4	1.64	1.17	1.36	1.90	1.20	1.20	94	67	74

WIND LOADS WITH ICE:

DMP65R-BU6DA Antenna	73.6	23.1	10.1	11.78	5.14	3.19	7.31	1.23	1.41	111	55	69
AIR6419 Antenna	33.5	18.5	9.7	4.29	2.24	1.81	3.46	1.20	1.24	39	21	26
AIR6449 Antenna	33.0	18.3	13.0	4.18	2.97	1.81	2.54	1.20	1.20	38	27	30
TPA65R-BU6DA-K Antenna	73.6	23.1	10.1	11.78	5.14	3.19	7.31	1.23	1.41	111	55	69
4478 B14 RRH	20.5	15.8	10.7	2.24	1.51	1.30	1.92	1.20	1.20	21	14	16
4415 B30 RRH	18.9	15.8	8.3	2.06	1.08	1.20	2.28	1.20	1.20	19	10	12
8843 B2/B66A RRH	17.3	15.6	13.3	1.87	1.59	1.11	1.30	1.20	1.20	17	15	15
4449 B5/B12 RRH	20.3	15.6	11.8	2.19	1.65	1.30	1.72	1.20	1.20	20	15	16

WIND LOADS AT 30 MPH:

DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	35	15	20
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.58	1.93	4.26	1.20	1.28	11	6	7
AIR6449 Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	11	8	8
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	35	15	20
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	6	3	4
4415 B30 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	5	2	3
8843 B2/B66A RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	5	4	4
4449 B5/B12 RRH	17.9	13.2	9.4	1.64	1.17	1.36	1.90	1.20	1.20	5	4	4

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WIND LOADS

Angle = 90 (deg) Ice Thickness = 1.18 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) (normal)	Force (lbs) (side)	Force (lbs) (angle)
DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	608	268	268
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.58	1.93	4.26	1.20	1.28	199	96	96
AIR6449 Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	194	131	131
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	608	268	268
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	97	60	60
4415 B30 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	88	39	39
8843 B2/B66A RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	78	65	65
4449 B5/B12 RRH	17.9	13.2	9.4	1.64	1.17	1.36	1.90	1.20	1.20	94	67	67

WIND LOADS WITH ICE:

DMP65R-BU6DA Antenna	73.6	23.1	10.1	11.78	5.14	3.19	7.31	1.23	1.41	111	55	55
AIR6419 Antenna	33.5	18.5	9.7	4.29	2.24	1.81	3.46	1.20	1.24	39	21	21
AIR6449 Antenna	33.0	18.3	13.0	4.18	2.97	1.81	2.54	1.20	1.20	38	27	27
TPA65R-BU6DA-K Antenna	73.6	23.1	10.1	11.78	5.14	3.19	7.31	1.23	1.41	111	55	55
4478 B14 RRH	20.5	15.8	10.7	2.24	1.51	1.30	1.92	1.20	1.20	21	14	14
4415 B30 RRH	18.9	15.8	8.3	2.06	1.08	1.20	2.28	1.20	1.20	19	10	10
8843 B2/B66A RRH	17.3	15.6	13.3	1.87	1.59	1.11	1.30	1.20	1.20	17	15	15
4449 B5/B12 RRH	20.3	15.6	11.8	2.19	1.65	1.30	1.72	1.20	1.20	20	15	15

WIND LOADS AT 30 MPH:

DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	35	15	15
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.58	1.93	4.26	1.20	1.28	11	6	6
AIR6449 Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	11	8	8
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	35	15	15
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	6	3	3
4415 B30 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	5	2	2
8843 B2/B66A RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	5	4	4
4449 B5/B12 RRH	17.9	13.2	9.4	1.64	1.17	1.36	1.90	1.20	1.20	5	4	4

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 Project Name: NORTHFORD - TOTOKEI
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 Designed By: RL Checked By: MSC



WIND LOADS

Angle = 120 (deg) Ice Thickness = 1.18 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) (normal)	Force (lbs) (side)	Force (lbs) (angle)
DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	608	268	353
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.58	1.93	4.26	1.20	1.28	199	96	122
AIR6449 Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	194	131	147
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	608	268	353
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	97	60	69
4415 B30 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	88	39	51
8843 B2/B66A RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	78	65	68
4449 B5/B12 RRH	17.9	13.2	9.4	1.64	1.17	1.36	1.90	1.20	1.20	94	67	74

WIND LOADS WITH ICE:

DMP65R-BU6DA Antenna	73.6	23.1	10.1	11.78	5.14	3.19	7.31	1.23	1.41	111	55	69
AIR6419 Antenna	33.5	18.5	9.7	4.29	2.24	1.81	3.46	1.20	1.24	39	21	26
AIR6449 Antenna	33.0	18.3	13.0	4.18	2.97	1.81	2.54	1.20	1.20	38	27	30
TPA65R-BU6DA-K Antenna	73.6	23.1	10.1	11.78	5.14	3.19	7.31	1.23	1.41	111	55	69
4478 B14 RRH	20.5	15.8	10.7	2.24	1.51	1.30	1.92	1.20	1.20	21	14	16
4415 B30 RRH	18.9	15.8	8.3	2.06	1.08	1.20	2.28	1.20	1.20	19	10	12
8843 B2/B66A RRH	17.3	15.6	13.3	1.87	1.59	1.11	1.30	1.20	1.20	17	15	15
4449 B5/B12 RRH	20.3	15.6	11.8	2.19	1.65	1.30	1.72	1.20	1.20	20	15	16

WIND LOADS AT 30 MPH:

DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	35	15	20
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.58	1.93	4.26	1.20	1.28	11	6	7
AIR6449 Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	11	8	8
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	35	15	20
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	6	3	4
4415 B30 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	5	2	3
8843 B2/B66A RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	5	4	4
4449 B5/B12 RRH	17.9	13.2	9.4	1.64	1.17	1.36	1.90	1.20	1.20	5	4	4

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 Project Name: NORTHFORD - TOTOKEI
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 Designed By: RL Checked By: MSC



WIND LOADS

Angle = 150 (deg) Ice Thickness = 1.18 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) (normal)	Force (lbs) (side)	Force (lbs) (angle)
DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	608	268	523
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.58	1.93	4.26	1.20	1.28	199	96	174
AIR6449 Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	194	131	178
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	608	268	523
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	97	60	87
4415 B30 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	88	39	76
8843 B2/B66A RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	78	65	75
4449 B5/B12 RRH	17.9	13.2	9.4	1.64	1.17	1.36	1.90	1.20	1.20	94	67	87

WIND LOADS WITH ICE:

DMP65R-BU6DA Antenna	73.6	23.1	10.1	11.78	5.14	3.19	7.31	1.23	1.41	111	55	97
AIR6419 Antenna	33.5	18.5	9.7	4.29	2.24	1.81	3.46	1.20	1.24	39	21	35
AIR6449 Antenna	33.0	18.3	13.0	4.18	2.97	1.81	2.54	1.20	1.20	38	27	36
TPA65R-BU6DA-K Antenna	73.6	23.1	10.1	11.78	5.14	3.19	7.31	1.23	1.41	111	55	97
4478 B14 RRH	20.5	15.8	10.7	2.24	1.51	1.30	1.92	1.20	1.20	21	14	19
4415 B30 RRH	18.9	15.8	8.3	2.06	1.08	1.20	2.28	1.20	1.20	19	10	17
8843 B2/B66A RRH	17.3	15.6	13.3	1.87	1.59	1.11	1.30	1.20	1.20	17	15	16
4449 B5/B12 RRH	20.3	15.6	11.8	2.19	1.65	1.30	1.72	1.20	1.20	20	15	19

WIND LOADS AT 30 MPH:

DMP65R-BU6DA Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	35	15	30
AIR6419 Antenna	31.1	16.1	7.3	3.48	1.58	1.93	4.26	1.20	1.28	11	6	10
AIR6449 Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	11	8	10
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	35	15	30
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	6	3	5
4415 B30 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	5	2	4
8843 B2/B66A RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	5	4	4
4449 B5/B12 RRH	17.9	13.2	9.4	1.64	1.17	1.36	1.90	1.20	1.20	5	4	5

Date: 12/5/2022
 Project Name: NORTHFORD - TOTOKET
 Project No.: CT5638
 Designed By: RL Checked By: MSC



ICE WEIGHT CALCULATIONS

Thickness of ice: 1.18 in.
 Density of ice: 56 pcf

DMP65R-BU6DA Antenna

Weight of ice based on total radial SF area:
 Height (in): 71.2
 Width (in): 20.7
 Depth (in): 7.7
 Total weight of ice on object: 199 lbs
 Weight of object: 96.0 lbs
 Combined weight of ice and object: 295 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: 70 lbs
 Weight of object: 66.0 lbs
 Combined weight of ice and object: 136 lbs

AIR6449 Antenna

Weight of ice based on total radial SF area:
 Height (in): 30.6
 Width (in): 15.9
 Depth (in): 10.6
 Total weight of ice on object: 75 lbs
 Weight of object: 82.0 lbs
 Combined weight of ice and object: 157 lbs

TPA65R-BU6DA-K Antenna

Weight of ice based on total radial SF area:
 Height (in): 71.2
 Width (in): 20.7
 Depth (in): 7.7
 Total weight of ice on object: 199 lbs
 Weight of object: 69.0 lbs
 Combined weight of ice and object: 268 lbs

4478 B14 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: 37 lbs
 Weight of object: 60.0 lbs
 Combined weight of ice and object: 97 lbs

4415 B30 RRH

Weight of ice based on total radial SF area:
 Height (in): 16.5
 Width (in): 13.4
 Depth (in): 5.9
 Total weight of ice on object: 31 lbs
 Weight of object: 46.0 lbs
 Combined weight of ice and object: 77 lbs

8843 B2/B66A RRH

Weight of ice based on total radial SF area:
 Height (in): 14.9
 Width (in): 13.2
 Depth (in): 10.9
 Total weight of ice on object: 33 lbs
 Weight of object: 72.0 lbs
 Combined weight of ice and object: 105 lbs

4449 B5/B12 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: 37 lbs
 Weight of object: 73.0 lbs
 Combined weight of ice and object: 110 lbs

Squid Surge Arrestor

Weight of ice based on total radial SF area:
 Depth (in): 31.4
 Diameter(in): 10.2
 Total weight of ice on object: 43 lbs
 Weight of object: 29 lbs
 Combined weight of ice and object: 72 lbs

HSS 2-1/2x2-1/2

Weight of ice based on total radial SF area:
 Height (in): 2.5
 Width (in): 2.5
 Per foot weight of ice on object: 7 plf

1-1/2" Pipe

Per foot weight of ice:
 diameter (in): 1.9
 Per foot weight of ice on object: 4 plf

2" Pipe

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

2-1/2" Pipe

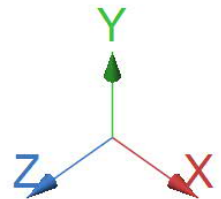
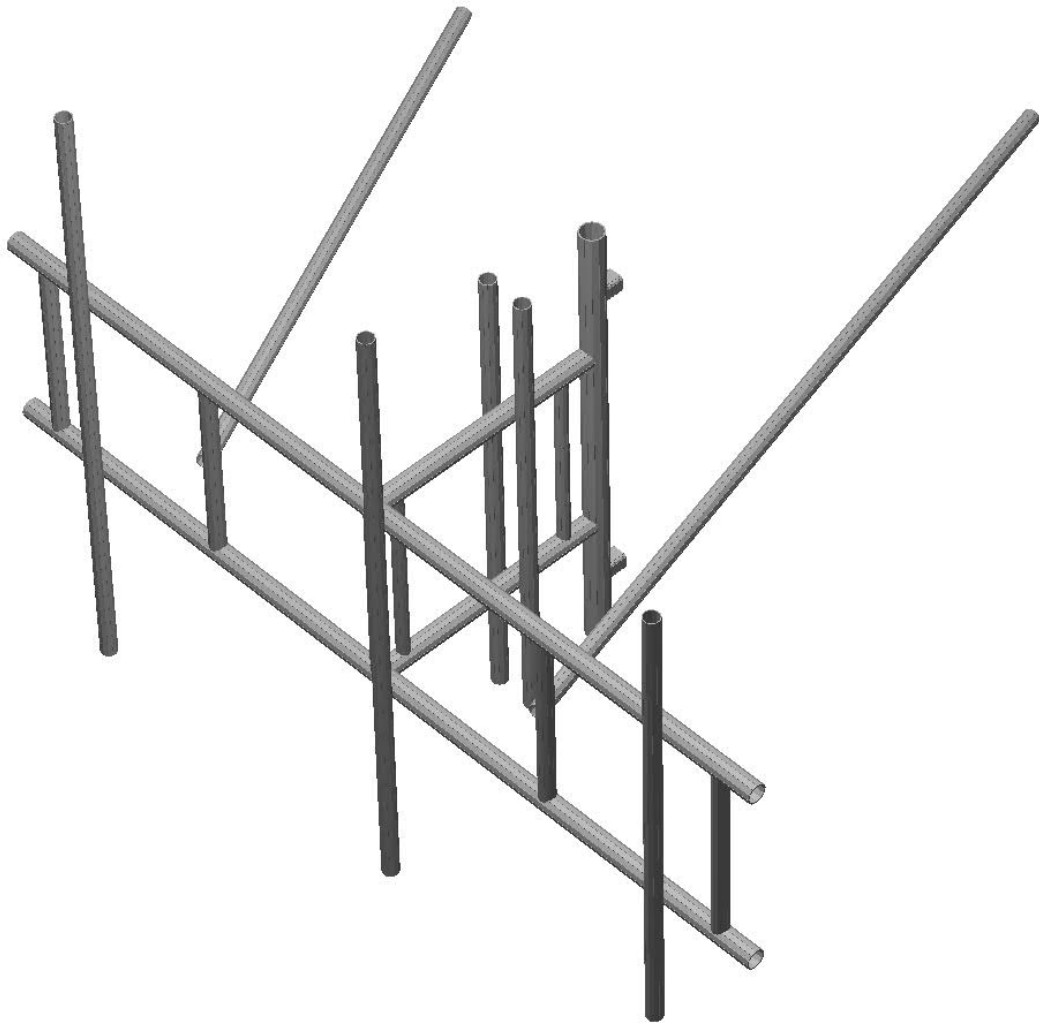
Per foot weight of ice:
 diameter (in): 2.88
 Per foot weight of ice on object: 6 plf

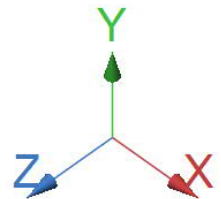
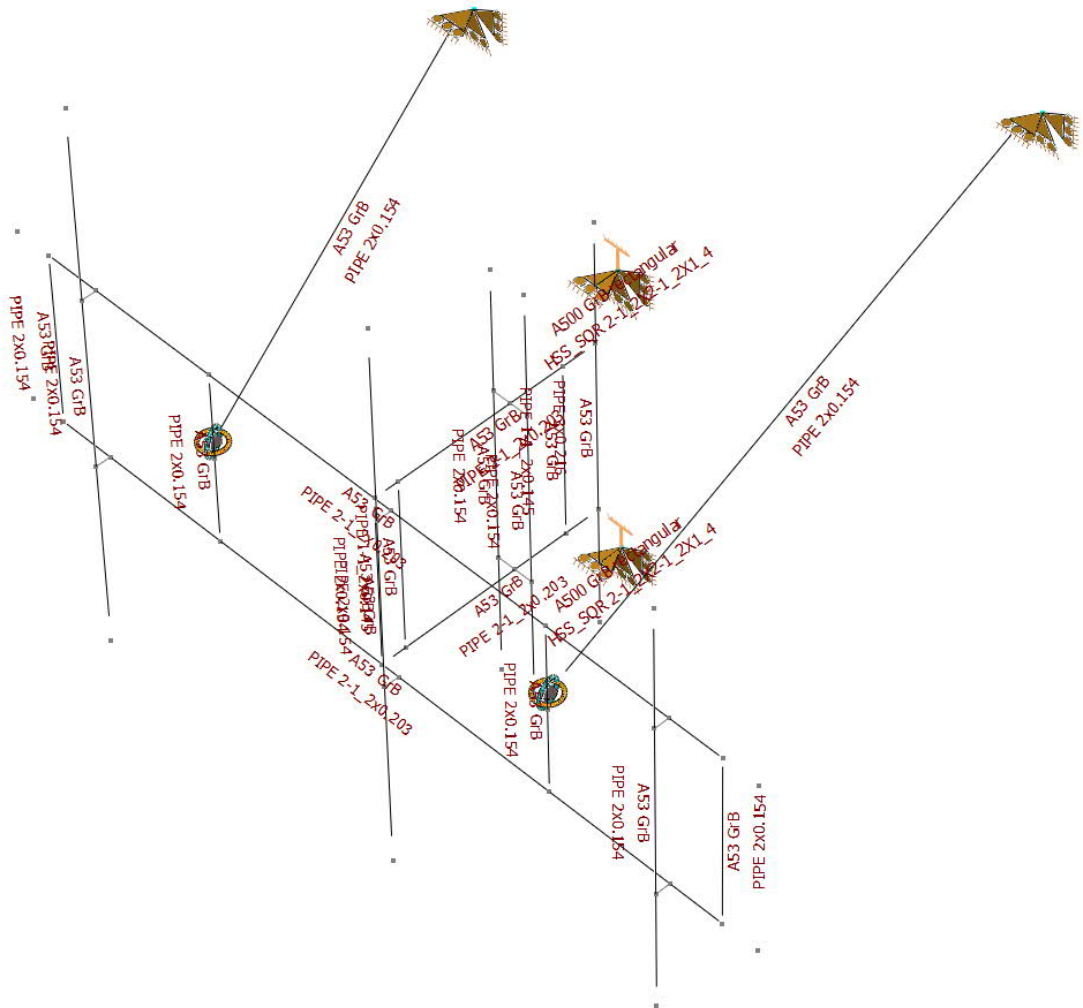
3" Pipe

Per foot weight of ice:
 diameter (in): 3.5
 Per foot weight of ice on object: 7 plf



Mount Calculations
(Existing Conditions)

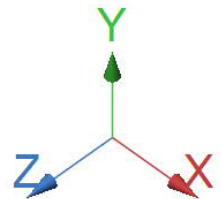
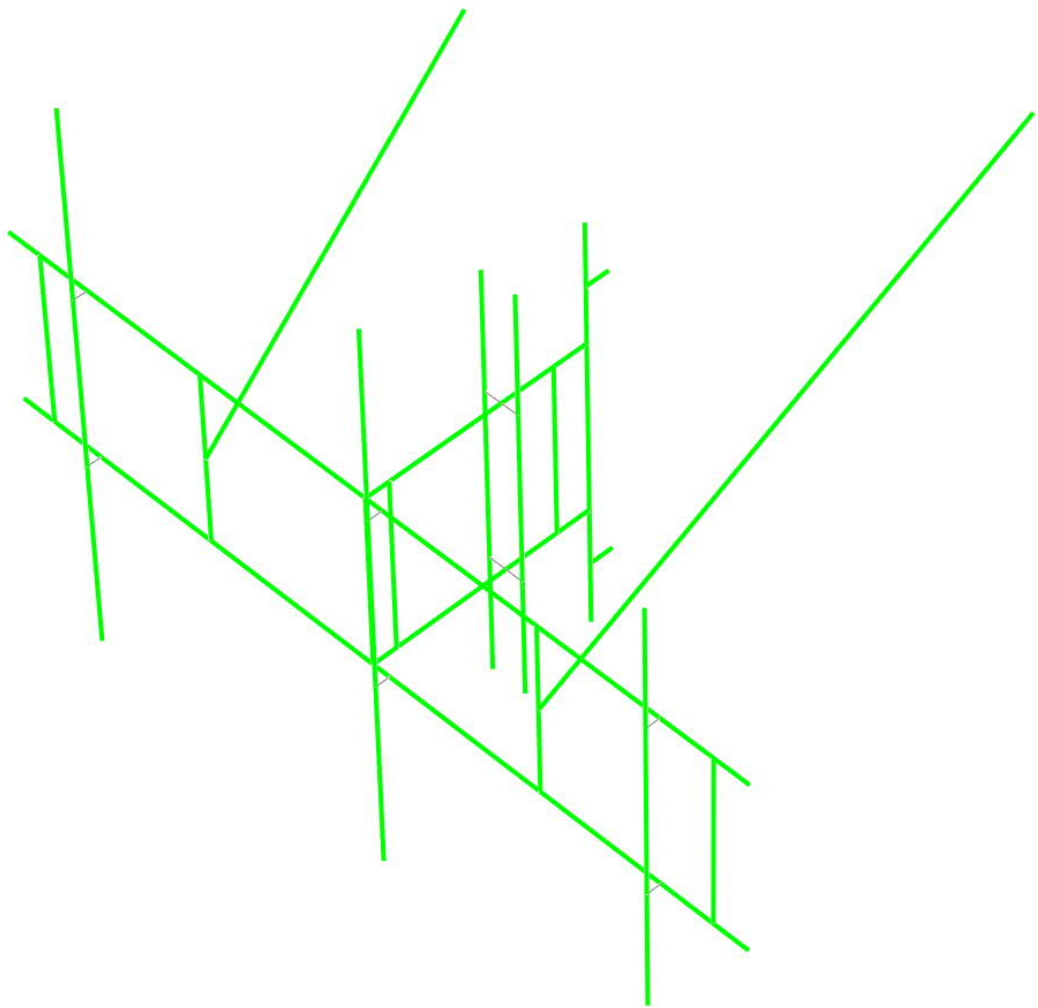


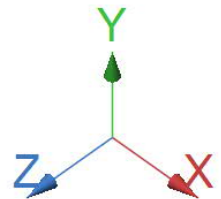
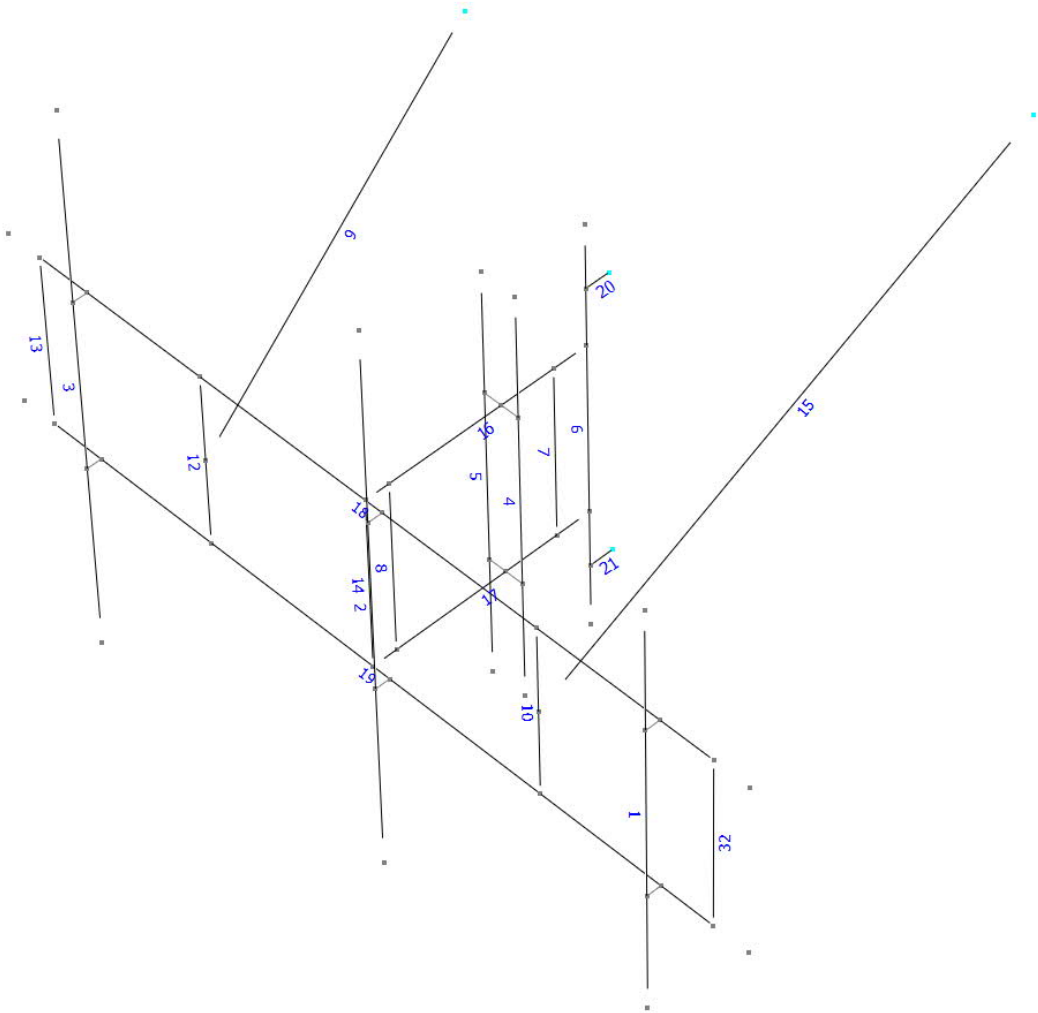




Design status

- Not designed
- Error on design
- Design O.K.
- With warnings





Current Date: 12/5/2022 4:57 PM

Units system: English

Load data

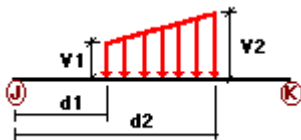
GLOSSARY

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 <td WIND	W120	WL 120deg	No	WIND	W150	WL 150deg	No	WIND	Di	Ice Load	No	LL	W10	WL ICE 0deg	No	WIND	W130	WL ICE 30deg	No	WIND	W160	WL ICE 60deg	No	WIND	W190	WL ICE 90deg	No	WIND	W1120	WL ICE 120deg	No	WIND	W1150	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	500 lb Live Load Antenna 1	No	LL	LLa2	500 lb Live Load Antenna 2	No	LL	LLa3	500 lb Live Load Antenna 3	No	LL
W120	WL 120deg	No	WIND																																																																																			
W150	WL 150deg	No	WIND																																																																																			
Di	Ice Load	No	LL																																																																																			
W10	WL ICE 0deg	No	WIND																																																																																			
W130	WL ICE 30deg	No	WIND																																																																																			
W160	WL ICE 60deg	No	WIND																																																																																			
W190	WL ICE 90deg	No	WIND																																																																																			
W1120	WL ICE 120deg	No	WIND																																																																																			
W1150	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	500 lb Live Load Antenna 1	No	LL																																																																																			
LLa2	500 lb Live Load Antenna 2	No	LL																																																																																			
LLa3	500 lb Live Load Antenna 3	No	LL																																																																																			

Distributed force on members

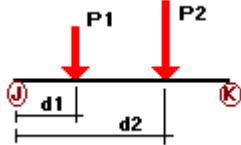


Condition	Member	Dir1	Val1 [Kip/ft]	Val2 [Kip/ft]	Dist1 [ft]	%	Dist2 [ft]	%	
Wo	15	z	-0.011	-0.011	0.00	No	100.00	Yes	
	9	z	-0.011	-0.011	0.00	No	100.00	Yes	
	20	z	-0.02	-0.02	0.00	No	100.00	Yes	
	10	z	-0.011	-0.011	0.00	No	100.00	Yes	
	12	z	-0.011	-0.011	0.00	No	100.00	Yes	
	13	z	-0.011	-0.011	0.00	No	100.00	Yes	
	4	z	-0.011	-0.011	0.00	No	100.00	Yes	
	5	z	-0.011	-0.011	0.00	No	100.00	Yes	
	32	z	-0.011	-0.011	0.00	No	100.00	Yes	
	16	z	-0.014	-0.014	0.00	No	100.00	Yes	
	17	z	-0.014	-0.014	0.00	No	100.00	Yes	
	18	z	-0.014	-0.014	0.00	No	100.00	Yes	
	19	z	-0.014	-0.014	0.00	No	100.00	Yes	
	6	z	-0.017	-0.017	0.00	No	100.00	Yes	
	21	z	-0.02	-0.02	0.00	No	100.00	Yes	
	W30	15	z	-0.011	-0.011	0.00	No	100.00	Yes
		9	z	-0.011	-0.011	0.00	No	100.00	Yes
		20	z	-0.02	-0.02	0.00	No	100.00	Yes
		7	z	-0.009	-0.009	0.00	No	100.00	Yes
		8	z	-0.009	-0.009	0.00	No	100.00	Yes
		10	z	-0.011	-0.011	0.00	No	100.00	Yes
12		z	-0.011	-0.011	0.00	No	100.00	Yes	
13		z	-0.011	-0.011	0.00	No	100.00	Yes	
14		z	-0.011	-0.011	0.00	No	100.00	Yes	
1		z	-0.011	-0.011	0.00	No	100.00	Yes	
2		z	-0.011	-0.011	0.00	No	100.00	Yes	
3		z	-0.011	-0.011	0.00	No	100.00	Yes	
4		z	-0.011	-0.011	0.00	No	100.00	Yes	
5		z	-0.011	-0.011	0.00	No	100.00	Yes	
32		z	-0.011	-0.011	0.00	No	100.00	Yes	
16		z	-0.014	-0.014	0.00	No	100.00	Yes	
17		z	-0.014	-0.014	0.00	No	100.00	Yes	
18		z	-0.014	-0.014	0.00	No	100.00	Yes	
19		z	-0.014	-0.014	0.00	No	100.00	Yes	
6		z	-0.017	-0.017	0.00	No	100.00	Yes	
21		z	-0.02	-0.02	0.00	No	100.00	Yes	
W60	15	x	-0.011	-0.011	0.00	No	100.00	Yes	
	9	x	-0.011	-0.011	0.00	No	100.00	Yes	
	20	x	-0.02	-0.02	0.00	No	100.00	Yes	
	7	x	-0.009	-0.009	0.00	No	100.00	Yes	
	8	x	-0.009	-0.009	0.00	No	100.00	Yes	
	10	x	-0.011	-0.011	0.00	No	100.00	Yes	
	12	x	-0.011	-0.011	0.00	No	100.00	Yes	
	13	x	-0.011	-0.011	0.00	No	100.00	Yes	
	14	x	-0.011	-0.011	0.00	No	100.00	Yes	
	1	x	-0.011	-0.011	0.00	No	100.00	Yes	
	2	x	-0.011	-0.011	0.00	No	100.00	Yes	
	3	x	-0.011	-0.011	0.00	No	100.00	Yes	
	4	x	-0.011	-0.011	0.00	No	100.00	Yes	
	5	x	-0.011	-0.011	0.00	No	100.00	Yes	
	32	x	-0.011	-0.011	0.00	No	100.00	Yes	
	16	x	-0.014	-0.014	0.00	No	100.00	Yes	
	17	x	-0.014	-0.014	0.00	No	100.00	Yes	
	18	x	-0.014	-0.014	0.00	No	100.00	Yes	
	19	x	-0.014	-0.014	0.00	No	100.00	Yes	
	6	x	-0.017	-0.017	0.00	No	100.00	Yes	
	21	x	-0.02	-0.02	0.00	No	100.00	Yes	
W90	15	x	-0.011	-0.011	0.00	No	100.00	Yes	
	9	x	-0.011	-0.011	0.00	No	100.00	Yes	
	20	x	-0.02	-0.02	0.00	No	100.00	Yes	

	7	x	-0.009	-0.009	0.00	No	100.00	Yes
	8	x	-0.009	-0.009	0.00	No	100.00	Yes
	10	x	-0.011	-0.011	0.00	No	100.00	Yes
	12	x	-0.011	-0.011	0.00	No	100.00	Yes
	13	x	-0.011	-0.011	0.00	No	100.00	Yes
	14	x	-0.011	-0.011	0.00	No	100.00	Yes
	1	x	-0.011	-0.011	0.00	No	100.00	Yes
	2	x	-0.011	-0.011	0.00	No	100.00	Yes
	3	x	-0.011	-0.011	0.00	No	100.00	Yes
	4	x	-0.011	-0.011	0.00	No	100.00	Yes
	5	x	-0.011	-0.011	0.00	No	100.00	Yes
	32	x	-0.011	-0.011	0.00	No	100.00	Yes
	16	x	-0.014	-0.014	0.00	No	100.00	Yes
	17	x	-0.014	-0.014	0.00	No	100.00	Yes
	6	x	-0.017	-0.017	0.00	No	100.00	Yes
W120	21	x	-0.02	-0.02	0.00	No	100.00	Yes
	15	x	-0.011	-0.011	0.00	No	100.00	Yes
	9	x	-0.011	-0.011	0.00	No	100.00	Yes
	20	x	-0.02	-0.02	0.00	No	100.00	Yes
	7	x	-0.009	-0.009	0.00	No	100.00	Yes
	8	x	-0.009	-0.009	0.00	No	100.00	Yes
	10	x	-0.011	-0.011	0.00	No	100.00	Yes
	12	x	-0.011	-0.011	0.00	No	100.00	Yes
	13	x	-0.011	-0.011	0.00	No	100.00	Yes
	14	x	-0.011	-0.011	0.00	No	100.00	Yes
	1	x	-0.011	-0.011	0.00	No	100.00	Yes
	2	x	-0.011	-0.011	0.00	No	100.00	Yes
	3	x	-0.011	-0.011	0.00	No	100.00	Yes
	4	x	-0.011	-0.011	0.00	No	100.00	Yes
	5	x	-0.011	-0.011	0.00	No	100.00	Yes
	32	x	-0.011	-0.011	0.00	No	100.00	Yes
	16	x	-0.014	-0.014	0.00	No	100.00	Yes
	17	x	-0.014	-0.014	0.00	No	100.00	Yes
	18	x	-0.014	-0.014	0.00	No	100.00	Yes
	19	x	-0.014	-0.014	0.00	No	100.00	Yes
	6	x	-0.017	-0.017	0.00	No	100.00	Yes
W150	21	x	-0.02	-0.02	0.00	No	100.00	Yes
	15	z	0.011	0.011	0.00	No	100.00	Yes
	9	z	0.011	0.011	0.00	No	100.00	Yes
	20	z	0.02	0.02	0.00	No	100.00	Yes
	7	z	0.009	0.009	0.00	No	100.00	Yes
	8	z	0.009	0.009	0.00	No	100.00	Yes
	10	z	0.011	0.011	0.00	No	100.00	Yes
	12	z	0.011	0.011	0.00	No	100.00	Yes
	13	z	0.011	0.011	0.00	No	100.00	Yes
	14	z	0.011	0.011	0.00	No	100.00	Yes
	1	z	0.011	0.011	0.00	No	100.00	Yes
	2	z	0.011	0.011	0.00	No	100.00	Yes
	3	z	0.011	0.011	0.00	No	100.00	Yes
	4	z	0.011	0.011	0.00	No	100.00	Yes
	5	z	0.011	0.011	0.00	No	100.00	Yes
	32	z	0.011	0.011	0.00	No	100.00	Yes
	16	z	0.014	0.014	0.00	No	100.00	Yes
	17	z	0.014	0.014	0.00	No	100.00	Yes
	18	z	0.014	0.014	0.00	No	100.00	Yes
	19	z	0.014	0.014	0.00	No	100.00	Yes
	6	z	0.017	0.017	0.00	No	100.00	Yes
	21	z	0.02	0.02	0.00	No	100.00	Yes
Di	15	y	-0.005	-0.005	0.00	No	100.00	Yes
	9	y	-0.005	-0.005	0.00	No	100.00	Yes

20	y	-0.007	-0.007	0.00	No	100.00	Yes
7	y	-0.004	-0.004	0.00	No	100.00	Yes
8	y	-0.004	-0.004	0.00	No	100.00	Yes
10	y	-0.005	-0.005	0.00	No	100.00	Yes
12	y	-0.005	-0.005	0.00	No	100.00	Yes
13	y	-0.005	-0.005	0.00	No	100.00	Yes
14	y	-0.005	-0.005	0.00	No	100.00	Yes
1	y	-0.005	-0.005	0.00	No	100.00	Yes
2	y	-0.005	-0.005	0.00	No	100.00	Yes
3	y	-0.005	-0.005	0.00	No	100.00	Yes
4	y	-0.005	-0.005	0.00	No	100.00	Yes
5	y	-0.005	-0.005	0.00	No	100.00	Yes
32	y	-0.005	-0.005	0.00	No	100.00	Yes
16	y	-0.006	-0.006	0.00	No	100.00	Yes
17	y	-0.006	-0.006	0.00	No	100.00	Yes
18	y	-0.006	-0.006	0.00	No	100.00	Yes
19	y	-0.006	-0.006	0.00	No	100.00	Yes
6	y	-0.007	-0.007	0.00	No	100.00	Yes
21	y	-0.007	-0.007	0.00	No	100.00	Yes

Concentrated forces on members



Condition	Member	Dir1	Value1 [Kip]	Dist1 [ft]	%
D	1	y	-0.048	0.50	No
		y	-0.048	5.50	No
	2	y	-0.033	2.00	No
		y	-0.033	3.00	No
		y	-0.041	5.00	No
		y	-0.041	6.00	No
		y	-0.035	1.50	No
	3	y	-0.035	6.50	No
		y	-0.06	3.00	No
	4	y	-0.046	3.00	No
		y	-0.072	3.00	No
	5	y	-0.073	3.00	No
y		-0.033	3.00	No	
Wo	1	z	-0.304	0.50	No
		z	-0.304	5.50	No
	2	z	-0.10	2.00	No
		z	-0.10	3.00	No
		z	-0.097	5.00	No
		z	-0.097	6.00	No
	3	z	-0.304	1.50	No
		z	-0.304	6.50	No
	4	z	-0.097	3.00	No
		z	-0.094	3.00	No
	5	z	-0.054	3.00	No
		z	-0.054	3.00	No
W30	1	3	-0.262	0.50	No
		3	-0.262	5.50	No

	2	3	-0.087	2.00	No
		3	-0.087	3.00	No
		3	-0.09	5.00	No
		3	-0.09	6.00	No
	3	3	-0.262	1.50	No
		3	-0.262	6.50	No
	4	3	-0.087	3.00	No
	5	3	-0.087	3.00	No
W60	6	3	-0.054	3.00	No
	1	3	-0.177	0.50	No
		3	-0.177	5.50	No
	2	3	-0.062	2.00	No
		3	-0.062	3.00	No
		3	-0.074	5.00	No
		3	-0.074	6.00	No
	3	3	-0.177	1.50	No
		3	-0.177	6.50	No
	4	3	-0.069	3.00	No
	5	3	-0.074	3.00	No
W90	6	3	-0.054	3.00	No
	1	x	-0.135	0.50	No
		x	-0.135	5.50	No
	2	x	-0.049	2.00	No
		x	-0.049	3.00	No
		x	-0.066	5.00	No
		x	-0.066	6.00	No
	3	x	-0.135	1.50	No
		x	-0.135	6.50	No
	4	x	-0.06	3.00	No
		x	-0.039	3.00	No
	5	x	-0.065	3.00	No
		x	-0.067	3.00	No
W120	6	x	-0.054	3.00	No
	1	2	-0.177	0.50	No
		2	-0.177	5.50	No
	2	2	-0.062	2.00	No
		2	-0.062	3.00	No
		2	-0.074	5.00	No
		2	-0.074	6.00	No
	3	2	-0.177	1.50	No
		2	-0.177	6.50	No
	4	2	-0.069	3.00	No
	5	2	-0.074	3.00	No
W150	6	2	-0.054	3.00	No
	1	2	-0.262	0.50	No
		2	-0.262	5.50	No
	2	2	-0.087	2.00	No
		2	-0.087	3.00	No
		2	-0.09	5.00	No
		2	-0.09	6.00	No
	3	2	-0.262	1.50	No
		2	-0.262	6.50	No
	4	2	-0.087	3.00	No
	5	2	-0.087	3.00	No
	6	2	-0.054	3.00	No
Di	1	y	-0.10	0.50	No
		y	-0.10	5.50	No
	2	y	-0.035	2.00	No
		y	-0.035	3.00	No
		y	-0.037	5.00	No

		y	-0.037	6.00	No
	3	y	-0.10	1.50	No
		y	-0.10	6.50	No
	4	y	-0.037	3.00	No
		y	-0.031	3.00	No
	5	y	-0.033	3.00	No
		y	-0.037	3.00	No
	6	y	-0.043	3.00	No
W10	1	z	-0.056	0.50	No
		z	-0.056	5.50	No
	2	z	-0.02	2.00	No
		z	-0.02	3.00	No
		z	-0.02	5.00	No
		z	-0.02	6.00	No
	3	z	-0.056	1.50	No
		z	-0.056	6.50	No
	4	z	-0.021	3.00	No
	5	z	-0.02	3.00	No
W130	6	z	-0.012	3.00	No
	1	3	-0.049	0.50	No
		3	-0.049	5.50	No
	2	3	-0.018	2.00	No
		3	-0.018	3.00	No
		3	-0.018	5.00	No
		3	-0.018	6.00	No
	3	3	-0.049	1.50	No
		3	-0.049	6.50	No
	4	3	-0.019	3.00	No
	5	3	-0.019	3.00	No
W160	6	3	-0.012	3.00	No
	1	3	-0.035	0.50	No
		3	-0.035	5.50	No
	2	3	-0.013	2.00	No
		3	-0.013	3.00	No
		3	-0.016	5.00	No
		3	-0.016	6.00	No
	3	3	-0.035	1.50	No
		3	-0.035	6.50	No
	4	3	-0.016	3.00	No
	5	3	-0.016	3.00	No
W190	6	3	-0.012	3.00	No
	1	x	-0.028	0.50	No
		x	-0.028	5.50	No
	2	x	-0.011	2.00	No
		x	-0.011	3.00	No
		x	-0.014	5.00	No
		x	-0.014	6.00	No
	3	x	-0.028	1.50	No
		x	-0.028	6.50	No
	4	x	-0.014	3.00	No
		x	-0.01	3.00	No
	5	x	-0.015	3.00	No
		x	-0.015	3.00	No
W1120	6	x	-0.012	3.00	No
	1	2	-0.035	0.50	No
		2	-0.035	5.50	No
	2	2	-0.013	2.00	No
		2	-0.013	3.00	No
		2	-0.016	5.00	No
		2	-0.016	6.00	No

	3	2	-0.035	1.50	No
		2	-0.035	6.50	No
	4	2	-0.016	3.00	No
	5	2	-0.016	3.00	No
WI150	6	2	-0.012	3.00	No
	1	2	-0.049	0.50	No
		2	-0.049	5.50	No
	2	2	-0.018	2.00	No
		2	-0.018	3.00	No
		2	-0.018	5.00	No
		2	-0.018	6.00	No
	3	2	-0.049	1.50	No
		2	-0.049	6.50	No
	4	2	-0.019	3.00	No
	5	2	-0.019	3.00	No
WL0	6	2	-0.012	3.00	No
	1	z	-0.018	0.50	No
		z	-0.018	5.50	No
	2	z	-0.006	2.00	No
		z	-0.006	3.00	No
		z	-0.006	5.00	No
		z	-0.006	6.00	No
	3	z	-0.018	1.50	No
		z	-0.018	6.50	No
	4	z	-0.006	3.00	No
	5	z	-0.005	3.00	No
WL30	6	z	-0.003	3.00	No
	1	3	-0.016	0.50	No
		3	-0.016	5.50	No
	2	3	-0.006	2.00	No
		3	-0.006	3.00	No
		3	-0.006	5.00	No
		3	-0.006	6.00	No
	3	3	-0.016	1.50	No
		3	-0.016	6.50	No
	4	3	-0.005	3.00	No
	5	3	-0.005	3.00	No
WL60	6	3	-0.003	3.00	No
	1	3	-0.011	0.50	No
		3	-0.011	5.50	No
	2	3	-0.004	2.00	No
		3	-0.004	3.00	No
		3	-0.005	5.00	No
		3	-0.005	6.00	No
	3	3	-0.011	1.50	No
		3	-0.011	6.50	No
	4	3	-0.004	3.00	No
	5	3	-0.004	3.00	No
WL90	6	3	-0.003	3.00	No
	1	x	-0.008	0.50	No
		x	-0.008	5.50	No
	2	x	-0.003	2.00	No
		x	-0.003	3.00	No
		x	-0.004	5.00	No
		x	-0.004	6.00	No
	3	x	-0.008	1.50	No
		x	-0.008	6.50	No
	4	x	-0.003	3.00	No
	5	x	-0.004	3.00	No
	6	x	-0.003	3.00	No

WL120	1	2	-0.011	0.50	No
		2	-0.011	5.50	No
	2	2	-0.004	2.00	No
		2	-0.004	3.00	No
		2	-0.005	5.00	No
		2	-0.005	6.00	No
3	2	-0.011	1.50	No	
	2	-0.011	6.50	No	
WL150	4	2	-0.004	3.00	No
		2	-0.004	3.00	No
	6	2	-0.003	3.00	No
		2	-0.016	0.50	No
		2	-0.016	5.50	No
		2	-0.006	2.00	No
LL1	19	2	-0.006	3.00	No
		2	-0.006	5.00	No
	3	2	-0.016	1.50	No
		2	-0.016	6.50	No
	4	2	-0.005	3.00	No
		2	-0.005	3.00	No
LL2	19	y	-0.25	50.00	Yes
		y	-0.25	100.00	Yes
LL3	19	y	-0.25	0.00	Yes
		y	-0.50	50.00	Yes
LLa1	1	y	-0.50	50.00	Yes
		y	-0.50	50.00	Yes
LLa2	2	y	-0.50	50.00	Yes
		y	-0.50	50.00	Yes
LLa3	3	y	-0.50	50.00	Yes
		y	-0.50	50.00	Yes

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	500 lb Live Load Antenna 1	No	0.00	0.00	0.00
LLa2	500 lb Live Load Antenna 2	No	0.00	0.00	0.00
LLa3	500 lb Live Load Antenna 3	No	0.00	0.00	0.00

Earthquake (Dynamic analysis only)

Condition	a/g	Ang. [Deg]	Damp. [%]
D	0.00	0.00	0.00
Wo	0.00	0.00	0.00
W30	0.00	0.00	0.00
W60	0.00	0.00	0.00
W90	0.00	0.00	0.00
W120	0.00	0.00	0.00
W150	0.00	0.00	0.00
Di	0.00	0.00	0.00
W10	0.00	0.00	0.00
W130	0.00	0.00	0.00
W160	0.00	0.00	0.00
W190	0.00	0.00	0.00
W1120	0.00	0.00	0.00
W1150	0.00	0.00	0.00
WL0	0.00	0.00	0.00
WL30	0.00	0.00	0.00
WL60	0.00	0.00	0.00
WL90	0.00	0.00	0.00
WL120	0.00	0.00	0.00
WL150	0.00	0.00	0.00
LL1	0.00	0.00	0.00
LL2	0.00	0.00	0.00
LL3	0.00	0.00	0.00
LLa1	0.00	0.00	0.00
LLa2	0.00	0.00	0.00
LLa3	0.00	0.00	0.00

Current Date: 12/5/2022 4:57 PM
Units system: English

Steel Code Check

Report: Summary - Group by member

Load conditions to be included in design :

LC1=1.4D
LC2=1.2D+Wo
LC3=1.2D+W30
LC4=1.2D+W60
LC5=1.2D+W90
LC6=1.2D+W120
LC7=1.2D+W150
LC8=1.2D-Wo
LC9=1.2D-W30
LC10=1.2D-W60
LC11=1.2D-W90
LC12=1.2D-W120
LC13=1.2D-W150
LC14=0.9D+Wo
LC15=0.9D+W30
LC16=0.9D+W60
LC17=0.9D+W90
LC18=0.9D+W120
LC19=0.9D+W150
LC20=0.9D-Wo
LC21=0.9D-W30
LC22=0.9D-W60
LC23=0.9D-W90
LC24=0.9D-W120
LC25=0.9D-W150
LC26=1.2D+Di+W10
LC27=1.2D+Di+W130
LC28=1.2D+Di+W160
LC29=1.2D+Di+W190
LC30=1.2D+Di+W120
LC31=1.2D+Di+W1150
LC32=1.2D+Di-W10
LC33=1.2D+Di-W130
LC34=1.2D+Di-W160
LC35=1.2D+Di-W190
LC36=1.2D+Di-W1120
LC37=1.2D+Di-W1150
LC38=1.2D+1.6LL1
LC39=1.2D+1.6LL2
LC40=1.2D+1.6LL3
LC41=1.2D+W10+1.6LLa1
LC42=1.2D+W130+1.6LLa1
LC43=1.2D+W160+1.6LLa1
LC44=1.2D+W190+1.6LLa1
LC45=1.2D+W120+1.6LLa1
LC46=1.2D+W150+1.6LLa1
LC47=1.2D-W10+1.6LLa1
LC48=1.2D-W130+1.6LLa1
LC49=1.2D-W160+1.6LLa1
LC50=1.2D-W190+1.6LLa1
LC51=1.2D-W120+1.6LLa1
LC52=1.2D-W150+1.6LLa1
LC53=1.2D+W10+1.6LLa2
LC54=1.2D+W130+1.6LLa2

LC55=1.2D+WL60+1.6LLa2
 LC56=1.2D+WL90+1.6LLa2
 LC57=1.2D+WL120+1.6LLa2
 LC58=1.2D+WL150+1.6LLa2
 LC59=1.2D-WL0+1.6LLa2
 LC60=1.2D-WL30+1.6LLa2
 LC61=1.2D-WL60+1.6LLa2
 LC62=1.2D-WL90+1.6LLa2
 LC63=1.2D-WL120+1.6LLa2
 LC64=1.2D-WL150+1.6LLa2
 LC65=1.2D+WL0+1.6LLa3
 LC66=1.2D+WL30+1.6LLa3
 LC67=1.2D+WL60+1.6LLa3
 LC68=1.2D+WL90+1.6LLa3
 LC69=1.2D+WL120+1.6LLa3
 LC70=1.2D+WL150+1.6LLa3
 LC71=1.2D-WL0+1.6LLa3
 LC72=1.2D-WL30+1.6LLa3
 LC73=1.2D-WL60+1.6LLa3
 LC74=1.2D-WL90+1.6LLa3
 LC75=1.2D-WL120+1.6LLa3
 LC76=1.2D-WL150+1.6LLa3

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	HSS_SQR 2-1_2X2-1_2X1_4	20	LC7 at 0.00%	0.25	OK	
		21	LC13 at 0.00%	0.25	OK	
	PIPE 1-1_2x0.145	7	LC52 at 0.00%	0.21	OK	
		8	LC41 at 0.00%	0.27	OK	
	PIPE 2-1_2x0.203	16	LC52 at 0.00%	0.60	OK	
		17	LC46 at 0.00%	0.61	OK	
		18	LC48 at 50.00%	0.43	OK	
		19	LC42 at 50.00%	0.45	OK	
	PIPE 2x0.154	9	LC3 at 100.00%	0.11	OK	
		10	LC47 at 0.00%	0.47	OK	
		12	LC66 at 100.00%	0.46	OK	
		13	LC40 at 0.00%	0.19	OK	
		14	LC71 at 0.00%	0.25	OK	
		1	LC8 at 70.83%	0.29	OK	
		2	LC53 at 64.58%	0.16	OK	
		3	LC8 at 33.33%	0.27	OK	
		4	LC47 at 29.17%	0.24	OK	
		5	LC70 at 29.17%	0.24	OK	
		15	LC2 at 100.00%	0.16	OK	
		32	LC39 at 100.00%	0.20	OK	
	PIPE 3x0.216	6	LC76 at 71.25%	0.22	OK	

Geometry data

GLOSSARY

Cb22, Cb33	: Moment gradient coefficients
Cm22, Cm33	: Coefficients applied to bending term in interaction formula
d0	: Tapered member section depth at J end of member
DJX	: Rigid end offset distance measured from J node in axis X
DJY	: Rigid end offset distance measured from J node in axis Y
DJZ	: Rigid end offset distance measured from J node in axis Z
DKX	: Rigid end offset distance measured from K node in axis X
DKY	: Rigid end offset distance measured from K node in axis Y
DKZ	: Rigid end offset distance measured from K node in axis Z
dL	: Tapered member section depth at K end of member
Ig factor	: Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members
K22	: Effective length factor about axis 2
K33	: Effective length factor about axis 3
L22	: Member length for calculation of axial capacity
L33	: Member length for calculation of axial capacity
LB pos	: Lateral unbraced length of the compression flange in the positive side of local axis 2
LB neg	: Lateral unbraced length of the compression flange in the negative side of local axis 2
RX	: Rotation about X
RY	: Rotation about Y
RZ	: Rotation about Z
TO	: 1 = Tension only member 0 = Normal member
TX	: Translation in X
TY	: Translation in Y
TZ	: Translation in Z

Nodes

Node	X [ft]	Y [ft]	Z [ft]	Rigid Floor
1	0.00	2.0833	0.00	0
2	0.00	-2.0833	0.00	0
3	0.00	0.00	-6.50	0
4	-5.6292	0.00	-3.25	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
1	1	1	1	0	1	0
2	1	1	1	0	1	0
3	1	1	1	0	0	0
4	1	1	1	0	0	0

Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	Ig factor
15	41	3		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
9	42	4		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
20	47	1		HSS_SQR 2-1_2X2-1_2...	A500 GrB rectangular	0.00	0.00	0.00
7	6	10		PIPE 1-1_2x0.145	A53 GrB	0.00	0.00	0.00
8	7	11		PIPE 1-1_2x0.145	A53 GrB	0.00	0.00	0.00
10	21	22		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
12	19	20		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
13	17	18		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
14	12	8		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
1	38	35		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
2	39	36		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
3	40	37		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
4	55	56		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
5	57	58		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
32	24	23		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
16	9	12		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
17	5	8		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
18	16	14		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
19	15	13		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
6	45	46		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
21	48	2		HSS_SQR 2-1_2X2-1_2...	A500 GrB rectangular	0.00	0.00	0.00

Orientation of local axes

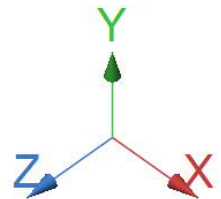
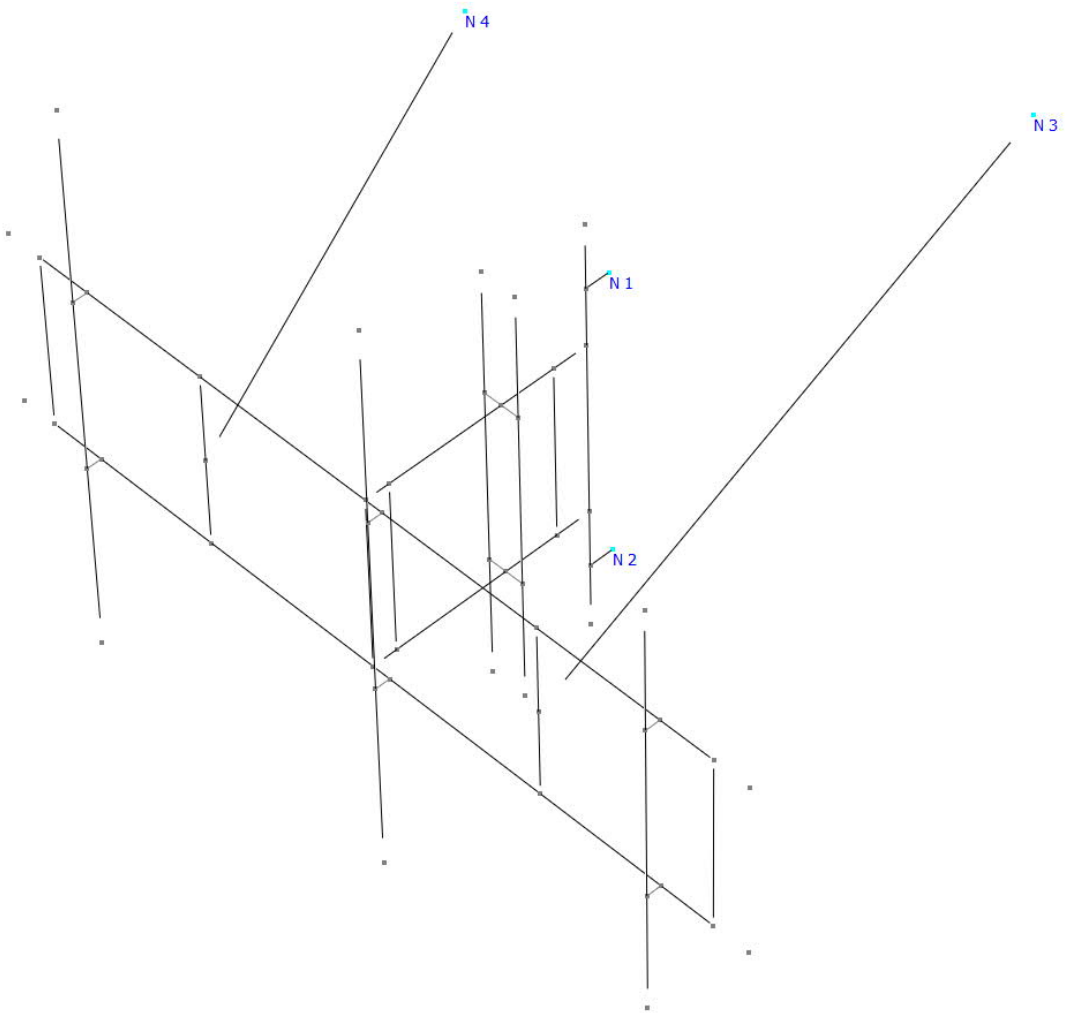
Member	Rotation [Deg]	Axes23	NX	NY	NZ
1	315.00	0	0.00	0.00	0.00
2	315.00	0	0.00	0.00	0.00
3	315.00	0	0.00	0.00	0.00
4	315.00	0	0.00	0.00	0.00
5	315.00	0	0.00	0.00	0.00
6	315.00	0	0.00	0.00	0.00

Rigid end offsets

Member	DJX [in]	DJY [in]	DJZ [in]	DKX [in]	DKY [in]	DKZ [in]
15	-1.50	0.00	0.00	-1.50	0.00	0.00
9	-1.50	0.00	0.00	-1.50	0.00	0.00

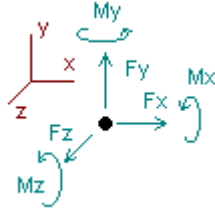
Hinges

Member	Node-J				Node-K				TOR	AXL	Axial rigidity
	M33	M22	V3	V2	M33	M22	V3	V2			
15	1	1	0	0	0	0	0	0	0	0	Full
9	1	1	0	0	0	0	0	0	0	0	Full



Analysis result

Reactions



Direction of positive forces and moments

Node	Forces [Kip]			Moments [Kip*ft]		
	FX	FY	FZ	MX	MY	MZ
Condition LC1=1.4D						
1	-0.04087	0.70693	-0.90684	0.00000	-0.03802	0.00000
2	0.04078	0.70668	0.90661	0.00000	0.03819	0.00000
3	0.00002	0.02442	0.00007	0.00000	0.00000	0.00000
4	0.00007	0.01769	0.00016	0.00000	0.00000	0.00000
SUM	0.00000	1.45572	0.00000	0.00000	0.00017	0.00000
Condition LC2=1.2D+Wo						
1	-0.35080	0.31890	-0.51295	0.00000	-0.59322	0.00000
2	-0.28045	0.89399	1.03900	0.00000	-0.52876	0.00000
3	0.30738	0.02014	1.30173	0.00000	0.00000	0.00000
4	0.32387	0.01473	0.74115	0.00000	0.00000	0.00000
SUM	0.00000	1.24776	2.56892	0.00000	-1.12197	0.00000
Condition LC3=1.2D+W30						
1	0.17750	0.57976	-0.73502	0.00000	0.26507	0.00000
2	0.25047	0.63315	0.82373	0.00000	0.33380	0.00000
3	0.22139	0.02035	0.94598	0.00000	0.00000	0.00000
4	0.50322	0.01450	1.14631	0.00000	0.00000	0.00000
SUM	1.15258	1.24776	2.18100	0.00000	0.59887	0.00000
Condition LC4=1.2D+W60						
1	0.56367	0.82904	-0.97839	0.00000	0.78734	0.00000
2	0.64549	0.38334	0.58833	0.00000	0.86541	0.00000
3	0.13339	0.02072	0.33123	0.00000	0.00000	0.00000
4	0.43342	0.01466	0.89110	0.00000	0.00000	0.00000
SUM	1.77597	1.24776	0.83226	0.00000	1.65275	0.00000
Condition LC5=1.2D+W90						
1	0.75850	0.97263	-1.08762	0.00000	1.08397	0.00000
2	0.85238	0.23935	0.46617	0.00000	1.17397	0.00000
3	0.03222	0.02100	-0.09578	0.00000	0.00000	0.00000
4	0.35560	0.01478	0.71723	0.00000	0.00000	0.00000
SUM	1.99871	1.24776	0.00000	0.00000	2.25794	0.00000

Condition LC6=1.2D+W120

1	0.77000	1.04311	-1.13428	0.00000	1.15334	0.00000
2	0.85153	0.16845	0.40677	0.00000	1.23200	0.00000
3	-0.06943	0.02127	-0.52565	0.00000	0.00000	0.00000
4	0.22387	0.01493	0.42090	0.00000	0.00000	0.00000

SUM	1.77597	1.24776	-0.83226	0.00000	2.38533	0.00000
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Condition LC7=1.2D+W150

1	0.67897	1.18134	-1.28379	0.00000	1.15085	0.00000
2	0.75135	0.02961	0.26546	0.00000	1.22098	0.00000
3	-0.25520	0.02161	-1.09396	0.00000	0.00000	0.00000
4	-0.02253	0.01519	-0.06871	0.00000	0.00000	0.00000

SUM	1.15258	1.24776	-2.18100	0.00000	2.37184	0.00000
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Condition LC8=1.2D-W0

1	0.27976	0.88907	-1.03841	0.00000	0.52495	0.00000
2	0.34937	0.32136	0.51843	0.00000	0.59114	0.00000
3	-0.30626	0.02173	-1.30557	0.00000	0.00000	0.00000
4	-0.32287	0.01559	-0.74337	0.00000	0.00000	0.00000

SUM	0.00000	1.24776	-2.56892	0.00000	1.11609	0.00000
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Condition LC9=1.2D-W30

1	-0.24641	0.63127	-0.81884	0.00000	-0.32864	0.00000
2	-0.17936	0.57915	0.73118	0.00000	-0.26666	0.00000
3	-0.22194	0.02151	-0.94573	0.00000	0.00000	0.00000
4	-0.50487	0.01584	-1.14762	0.00000	0.00000	0.00000

SUM	-1.15258	1.24776	-2.18100	0.00000	-0.59530	0.00000
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Condition LC10=1.2D-W60

1	-0.63191	0.38209	-0.57558	0.00000	-0.85129	0.00000
2	-0.57363	0.82882	0.96640	0.00000	-0.79855	0.00000
3	-0.13426	0.02113	-0.33214	0.00000	0.00000	0.00000
4	-0.43617	0.01572	-0.89094	0.00000	0.00000	0.00000

SUM	-1.77597	1.24776	-0.83226	0.00000	-1.64983	0.00000
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Condition LC11=1.2D-W90

1	-0.82717	0.23853	-0.46644	0.00000	-1.15007	0.00000
2	-0.78088	0.97272	1.08837	0.00000	-1.10927	0.00000
3	-0.03234	0.02088	0.09420	0.00000	0.00000	0.00000
4	-0.35832	0.01563	-0.71613	0.00000	0.00000	0.00000

SUM	-1.99871	1.24776	0.00000	0.00000	-2.25934	0.00000
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Condition LC12=1.2D-W120

1	-0.83976	0.16759	-0.41947	0.00000	-1.22188	0.00000
2	-0.78126	1.04412	1.14816	0.00000	-1.16992	0.00000
3	0.07040	0.02062	0.52309	0.00000	0.00000	0.00000
4	-0.22535	0.01543	-0.41952	0.00000	0.00000	0.00000

SUM	-1.77597	1.24776	0.83226	0.00000	-2.39180	0.00000
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Condition LC13=1.2D-W150

1	-0.74987	0.02541	-0.26678	0.00000	-1.22299	0.00000
2	-0.68229	1.18694	1.29273	0.00000	-1.16251	0.00000
3	0.25687	0.02028	1.08657	0.00000	0.00000	0.00000
4	0.02271	0.01513	0.06849	0.00000	0.00000	0.00000

SUM	-1.15258	1.24776	2.18100	0.00000	-2.38550	0.00000
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Condition LC14=0.9D+W6

1	-0.34199	0.16725	-0.31838	0.00000	-0.58519	0.00000
2	-0.28923	0.74242	0.84450	0.00000	-0.53684	0.00000
3	0.30738	0.01510	1.30170	0.00000	0.00000	0.00000
4	0.32385	0.01105	0.74110	0.00000	0.00000	0.00000

SUM	0.00000	0.93582	2.56892	0.00000	-1.12202	0.00000
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Condition LC15=0.9D+W30

1	0.18625	0.42810	-0.54052	0.00000	0.27328	0.00000
2	0.24175	0.48157	0.62930	0.00000	0.32554	0.00000
3	0.22138	0.01526	0.94596	0.00000	0.00000	0.00000
4	0.50320	0.01088	1.14626	0.00000	0.00000	0.00000

SUM	1.15258	0.93582	2.18100	0.00000	0.59882	0.00000
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Condition LC16=0.9D+W60

1	0.57238	0.67745	-0.78404	0.00000	0.79564	0.00000
2	0.63681	0.23183	0.39405	0.00000	0.85705	0.00000
3	0.13338	0.01554	0.33120	0.00000	0.00000	0.00000
4	0.43340	0.01100	0.89105	0.00000	0.00000	0.00000

SUM	1.77597	0.93582	0.83226	0.00000	1.65269	0.00000
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Condition LC17=0.9D+W90

1	0.76718	0.82108	-0.89334	0.00000	1.09232	0.00000
2	0.84374	0.08789	0.27198	0.00000	1.16555	0.00000
3	0.03222	0.01575	-0.09580	0.00000	0.00000	0.00000
4	0.35558	0.01110	0.71717	0.00000	0.00000	0.00000

SUM	1.99871	0.93582	0.00000	0.00000	2.25787	0.00000
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Condition LC18=0.9D+W120

1	0.77867	0.89162	-0.94008	0.00000	1.16170	0.00000
2	0.84289	0.01705	0.21265	0.00000	1.22356	0.00000
3	-0.06943	0.01596	-0.52567	0.00000	0.00000	0.00000
4	0.22385	0.01120	0.42084	0.00000	0.00000	0.00000

SUM	1.77597	0.93582	-0.83226	0.00000	2.38527	0.00000
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Condition LC19=0.9D+W150

1	0.68765	1.02993	-1.08972	0.00000	1.15923	0.00000
2	0.74270	-0.12171	0.07145	0.00000	1.21254	0.00000
3	-0.25521	0.01621	-1.09398	0.00000	0.00000	0.00000
4	-0.02256	0.01140	-0.06876	0.00000	0.00000	0.00000

SUM	1.15258	0.93582	-2.18100	0.00000	2.37178	0.00000
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Condition LC20=0.9D-Wo						
1	0.28847	0.73773	-0.84431	0.00000	0.53320	0.00000
2	0.34068	0.17010	0.32440	0.00000	0.58284	0.00000
3	-0.30626	0.01630	-1.30560	0.00000	0.00000	0.00000
4	-0.32290	0.01169	-0.74342	0.00000	0.00000	0.00000

SUM	0.00000	0.93582	-2.56892	0.00000	1.11603	0.00000
Condition LC21=0.9D-W30						
1	-0.23764	0.47993	-0.62467	0.00000	-0.32056	0.00000
2	-0.18811	0.42788	0.53708	0.00000	-0.27478	0.00000
3	-0.22194	0.01613	-0.94575	0.00000	0.00000	0.00000
4	-0.50489	0.01188	-1.14767	0.00000	0.00000	0.00000

SUM	-1.15258	0.93582	-2.18100	0.00000	-0.59535	0.00000
Condition LC22=0.9D-W60						
1	-0.62309	0.23069	-0.38127	0.00000	-0.84330	0.00000
2	-0.58243	0.67749	0.77215	0.00000	-0.80657	0.00000
3	-0.13427	0.01585	-0.33217	0.00000	0.00000	0.00000
4	-0.43619	0.01179	-0.89098	0.00000	0.00000	0.00000

SUM	-1.77597	0.93582	-0.83226	0.00000	-1.64987	0.00000
Condition LC23=0.9D-W90						
1	-0.81832	0.08708	-0.27205	0.00000	-1.14214	0.00000
2	-0.78970	0.82134	0.89404	0.00000	-1.11723	0.00000
3	-0.03234	0.01566	0.09417	0.00000	0.00000	0.00000
4	-0.35834	0.01173	-0.71617	0.00000	0.00000	0.00000

SUM	-1.99871	0.93582	0.00000	0.00000	-2.25937	0.00000
Condition LC24=0.9D-W120						
1	-0.83091	0.01609	-0.22500	0.00000	-1.21397	0.00000
2	-0.79008	0.89269	0.95377	0.00000	-1.17787	0.00000
3	0.07039	0.01547	0.52306	0.00000	0.00000	0.00000
4	-0.22537	0.01157	-0.41957	0.00000	0.00000	0.00000

SUM	-1.77597	0.93582	0.83226	0.00000	-2.39184	0.00000
Condition LC25=0.9D-W150						
1	-0.74103	-0.12617	-0.07219	0.00000	-1.21509	0.00000
2	-0.69111	1.03543	1.09821	0.00000	-1.17046	0.00000
3	0.25686	0.01521	1.08654	0.00000	0.00000	0.00000
4	0.02269	0.01135	0.06844	0.00000	0.00000	0.00000

SUM	-1.15258	0.93582	2.18100	0.00000	-2.38555	0.00000
Condition LC26=1.2D+Di+WIO						
1	-0.09171	1.03976	-1.44772	0.00000	-0.12447	0.00000
2	-0.00099	1.11574	1.50794	0.00000	-0.04028	0.00000
3	0.04551	0.04651	0.19113	0.00000	0.00000	0.00000
4	0.04719	0.03371	0.10566	0.00000	0.00000	0.00000

SUM	0.00000	2.23572	0.35700	0.00000	-0.16475	0.00000

Condition LC27=1.2D+Di+WI30						
1	0.01694	1.10508	-1.50231	0.00000	0.05079	0.00000
2	0.10747	1.05040	1.45306	0.00000	0.13554	0.00000
3	0.02497	0.04661	0.10497	0.00000	0.00000	0.00000
4	0.07549	0.03363	0.16915	0.00000	0.00000	0.00000

SUM	0.22486	2.23572	0.22486	0.00000	0.18633	0.00000
Condition LC28=1.2D+Di+WI60						
1	0.00214	1.09251	-1.49328	0.00000	0.02796	0.00000
2	0.09575	1.06288	1.46511	0.00000	0.11548	0.00000
3	0.01793	0.04664	0.07538	0.00000	0.00000	0.00000
4	0.05530	0.03369	0.12390	0.00000	0.00000	0.00000

SUM	0.17112	2.23572	0.17112	0.00000	0.14343	0.00000
Condition LC29=1.2D+Di+WI90						
1	0.04677	1.12729	-1.51977	0.00000	0.09488	0.00000
2	0.14157	1.02796	1.43532	0.00000	0.18380	0.00000
3	-0.00226	0.04674	-0.00950	0.00000	0.00000	0.00000
4	0.04192	0.03373	0.09395	0.00000	0.00000	0.00000

SUM	0.22800	2.23572	0.00000	0.00000	0.27868	0.00000
Condition LC30=1.2D+Di+WI120						
1	0.04311	1.14266	-1.52971	0.00000	0.10088	0.00000
2	0.13667	1.01241	1.42212	0.00000	0.18868	0.00000
3	-0.02247	0.04684	-0.09447	0.00000	0.00000	0.00000
4	0.01381	0.03381	0.03095	0.00000	0.00000	0.00000

SUM	0.17112	2.23572	-0.17112	0.00000	0.28956	0.00000
Condition LC31=1.2D+Di+WI150						
1	0.07418	1.15706	-1.54344	0.00000	0.15254	0.00000
2	0.16464	0.99798	1.41136	0.00000	0.23765	0.00000
3	-0.03130	0.04688	-0.13164	0.00000	0.00000	0.00000
4	0.01733	0.03380	0.03886	0.00000	0.00000	0.00000

SUM	0.22486	2.23572	-0.22486	0.00000	0.39020	0.00000
Condition LC32=1.2D+Di-WI0						
1	0.00078	1.11582	-1.50809	0.00000	0.04008	0.00000
2	0.09139	1.03896	1.44666	0.00000	0.12487	0.00000
3	-0.04535	0.04695	-0.19066	0.00000	0.00000	0.00000
4	-0.04682	0.03399	-0.10491	0.00000	0.00000	0.00000

SUM	0.00000	2.23572	-0.35700	0.00000	0.16495	0.00000
Condition LC33=1.2D+Di-WI30						
1	-0.10780	1.05058	-1.45356	0.00000	-0.13507	0.00000
2	-0.01700	1.10422	1.50147	0.00000	-0.05084	0.00000
3	-0.02486	0.04685	-0.10440	0.00000	0.00000	0.00000
4	-0.07520	0.03407	-0.16837	0.00000	0.00000	0.00000

SUM	-0.22486	2.23572	-0.22486	0.00000	-0.18591	0.00000

Condition LC34=1.2D+Di-WI60						
1	-0.09303	1.06315	-1.46260	0.00000	-0.11226	0.00000
2	-0.00530	1.09174	1.48941	0.00000	-0.03080	0.00000
3	-0.01781	0.04682	-0.07482	0.00000	0.00000	0.00000
4	-0.05498	0.03401	-0.12311	0.00000	0.00000	0.00000

SUM	-0.17112	2.23572	-0.17112	0.00000	-0.14305	0.00000
Condition LC35=1.2D+Di-WI90						
1	-0.13766	1.02835	-1.43610	0.00000	-0.17922	0.00000
2	-0.05112	1.12667	1.51921	0.00000	-0.09916	0.00000
3	0.00239	0.04672	0.01003	0.00000	0.00000	0.00000
4	-0.04161	0.03397	-0.09314	0.00000	0.00000	0.00000

SUM	-0.22800	2.23572	0.00000	0.00000	-0.27838	0.00000
Condition LC36=1.2D+Di-WI120						
1	-0.13402	1.01295	-1.42612	0.00000	-0.18527	0.00000
2	-0.04625	1.14226	1.53244	0.00000	-0.10411	0.00000
3	0.02261	0.04662	0.09495	0.00000	0.00000	0.00000
4	-0.01347	0.03389	-0.03014	0.00000	0.00000	0.00000

SUM	-0.17112	2.23572	0.17112	0.00000	-0.28938	0.00000
Condition LC37=1.2D+Di-WI150						
1	-0.16510	0.99851	-1.41237	0.00000	-0.23700	0.00000
2	-0.07422	1.15673	1.54323	0.00000	-0.15313	0.00000
3	0.03146	0.04658	0.13203	0.00000	0.00000	0.00000
4	-0.01700	0.03390	-0.03804	0.00000	0.00000	0.00000

SUM	-0.22486	2.23572	0.22486	0.00000	-0.39013	0.00000
Condition LC38=1.2D+1.6LL1						
1	-0.03497	0.80582	-1.11124	0.00000	-0.03243	0.00000
2	0.03492	0.80584	1.11112	0.00000	0.03273	0.00000
3	0.00000	0.02093	0.00001	0.00000	0.00000	0.00000
4	0.00005	0.01516	0.00011	0.00000	0.00000	0.00000

SUM	0.00000	1.64776	0.00000	0.00000	0.00030	0.00000
Condition LC39=1.2D+1.6LL2						
1	-0.56234	0.80577	-1.11128	0.00000	-0.51615	0.00000
2	0.56200	0.80588	1.11125	0.00000	0.52068	0.00000
3	-0.00037	0.02094	-0.00155	0.00000	0.00000	0.00000
4	0.00070	0.01517	0.00157	0.00000	0.00000	0.00000

SUM	0.00000	1.64776	0.00000	0.00000	0.00453	0.00000
Condition LC40=1.2D+1.6LL3						
1	0.49279	0.80437	-1.11007	0.00000	0.45136	0.00000
2	-0.49177	0.80728	1.11242	0.00000	-0.45392	0.00000
3	-0.00003	0.02093	-0.00011	0.00000	0.00000	0.00000
4	-0.00100	0.01517	-0.00223	0.00000	0.00000	0.00000

SUM	0.00000	1.64776	0.00000	0.00000	-0.00256	0.00000

Condition LC41=1.2D+WL0+1.6LLa1						
1	-0.86674	0.99825	-1.47792	0.00000	-0.80351	0.00000
2	0.83544	1.01355	1.48950	0.00000	0.75914	0.00000
3	0.01443	0.02071	0.06064	0.00000	0.00000	0.00000
4	0.01687	0.01525	0.03778	0.00000	0.00000	0.00000

SUM	0.00000	2.04776	0.11000	0.00000	-0.04436	0.00000
Condition LC42=1.2D+WL30+1.6LLa1						
1	-0.83262	1.01757	-1.49402	0.00000	-0.74751	0.00000
2	0.86977	0.99408	1.47304	0.00000	0.81553	0.00000
3	0.00796	0.02081	0.03347	0.00000	0.00000	0.00000
4	0.02630	0.01530	0.05892	0.00000	0.00000	0.00000

SUM	0.07142	2.04776	0.07142	0.00000	0.06802	0.00000
Condition LC43=1.2D+WL60+1.6LLa1						
1	-0.83801	1.01327	-1.49092	0.00000	-0.75598	0.00000
2	0.86524	0.99838	1.47719	0.00000	0.80783	0.00000
3	0.00546	0.02085	0.02292	0.00000	0.00000	0.00000
4	0.01894	0.01526	0.04243	0.00000	0.00000	0.00000

SUM	0.05162	2.04776	0.05162	0.00000	0.05185	0.00000
Condition LC44=1.2D+WL90+1.6LLa1						
1	-0.82983	1.02054	-1.49619	0.00000	-0.74241	0.00000
2	0.87370	0.99104	1.47077	0.00000	0.82174	0.00000
3	-0.00090	0.02095	-0.00378	0.00000	0.00000	0.00000
4	0.01303	0.01523	0.02920	0.00000	0.00000	0.00000

SUM	0.05600	2.04776	0.00000	0.00000	0.07933	0.00000
Condition LC45=1.2D+WL120+1.6LLa1						
1	-0.82502	1.02633	-1.50018	0.00000	-0.73297	0.00000
2	0.87794	0.98519	1.46565	0.00000	0.83068	0.00000
3	-0.00722	0.02105	-0.03034	0.00000	0.00000	0.00000
4	0.00591	0.01520	0.01325	0.00000	0.00000	0.00000

SUM	0.05162	2.04776	-0.05162	0.00000	0.09770	0.00000
Condition LC46=1.2D+WL150+1.6LLa1						
1	-0.81375	1.03197	-1.50544	0.00000	-0.71412	0.00000
2	0.88823	0.97949	1.46128	0.00000	0.84868	0.00000
3	-0.01040	0.02110	-0.04371	0.00000	0.00000	0.00000
4	0.00734	0.01520	0.01645	0.00000	0.00000	0.00000

SUM	0.07142	2.04776	-0.07142	0.00000	0.13456	0.00000
Condition LC47=1.2D-WL0+1.6LLa1						
1	-0.83675	1.01692	-1.49265	0.00000	-0.75036	0.00000
2	0.86477	0.99458	1.47425	0.00000	0.81191	0.00000
3	-0.01469	0.02116	-0.06172	0.00000	0.00000	0.00000
4	-0.01334	0.01510	-0.02988	0.00000	0.00000	0.00000

SUM	0.00000	2.04776	-0.11000	0.00000	0.06154	0.00000

Condition LC48=1.2D-WL30+1.6LLa1						
1	-0.87087	0.99761	-1.47657	0.00000	-0.80635	0.00000
2	0.83045	1.01404	1.49071	0.00000	0.75553	0.00000
3	-0.00822	0.02106	-0.03455	0.00000	0.00000	0.00000
4	-0.02277	0.01505	-0.05101	0.00000	0.00000	0.00000

SUM	-0.07142	2.04776	-0.07142	0.00000	-0.05082	0.00000
Condition LC49=1.2D-WL60+1.6LLa1						
1	-0.86548	1.00191	-1.47966	0.00000	-0.79788	0.00000
2	0.83498	1.00974	1.48657	0.00000	0.76323	0.00000
3	-0.00571	0.02102	-0.02400	0.00000	0.00000	0.00000
4	-0.01541	0.01508	-0.03452	0.00000	0.00000	0.00000

SUM	-0.05162	2.04776	-0.05162	0.00000	-0.03465	0.00000
Condition LC50=1.2D-WL90+1.6LLa1						
1	-0.87366	0.99464	-1.47440	0.00000	-0.81146	0.00000
2	0.82652	1.01708	1.49298	0.00000	0.74932	0.00000
3	0.00064	0.02092	0.00270	0.00000	0.00000	0.00000
4	-0.00950	0.01512	-0.02129	0.00000	0.00000	0.00000

SUM	-0.05600	2.04776	0.00000	0.00000	-0.06214	0.00000
Condition LC51=1.2D-WL120+1.6LLa1						
1	-0.87848	0.98885	-1.47040	0.00000	-0.82090	0.00000
2	0.82228	1.02293	1.49810	0.00000	0.74037	0.00000
3	0.00696	0.02083	0.02925	0.00000	0.00000	0.00000
4	-0.00238	0.01515	-0.00533	0.00000	0.00000	0.00000

SUM	-0.05162	2.04776	0.05162	0.00000	-0.08052	0.00000
Condition LC52=1.2D-WL150+1.6LLa1						
1	-0.88975	0.98320	-1.46514	0.00000	-0.83976	0.00000
2	0.81199	1.02863	1.50248	0.00000	0.72236	0.00000
3	0.01015	0.02078	0.04262	0.00000	0.00000	0.00000
4	-0.00381	0.01514	-0.00853	0.00000	0.00000	0.00000

SUM	-0.07142	2.04776	0.07142	0.00000	-0.11740	0.00000
Condition LC53=1.2D+WL0+1.6LLa2						
1	-0.09795	0.99651	-1.47642	0.00000	-0.10168	0.00000
2	0.06808	1.01525	1.49092	0.00000	0.04944	0.00000
3	0.01458	0.02086	0.06127	0.00000	0.00000	0.00000
4	0.01529	0.01513	0.03423	0.00000	0.00000	0.00000

SUM	0.00000	2.04776	0.11000	0.00000	-0.05225	0.00000
Condition LC54=1.2D+WL30+1.6LLa2						
1	-0.06369	1.01590	-1.49265	0.00000	-0.04558	0.00000
2	0.10227	0.99585	1.47459	0.00000	0.10572	0.00000
3	0.00812	0.02090	0.03411	0.00000	0.00000	0.00000
4	0.02472	0.01511	0.05537	0.00000	0.00000	0.00000

SUM	0.07142	2.04776	0.07142	0.00000	0.06014	0.00000

Condition **LC55=1.2D+WL60+1.6LLa2**

1	-0.06916	1.01159	-1.48953	0.00000	-0.05412	0.00000
2	0.09782	1.00014	1.47871	0.00000	0.09809	0.00000
3	0.00561	0.02091	0.02356	0.00000	0.00000	0.00000
4	0.01735	0.01513	0.03888	0.00000	0.00000	0.00000

SUM	0.05162	2.04776	0.05162	0.00000	0.04396	0.00000
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Condition **LC56=1.2D+WL90+1.6LLa2**

1	-0.06104	1.01887	-1.49482	0.00000	-0.04060	0.00000
2	0.10634	0.99281	1.47231	0.00000	0.11204	0.00000
3	-0.00075	0.02094	-0.00314	0.00000	0.00000	0.00000
4	0.01145	0.01514	0.02565	0.00000	0.00000	0.00000

SUM	0.05600	2.04776	0.00000	0.00000	0.07145	0.00000
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Condition **LC57=1.2D+WL120+1.6LLa2**

1	-0.05629	1.02467	-1.49883	0.00000	-0.03123	0.00000
2	0.11065	0.98697	1.46721	0.00000	0.12105	0.00000
3	-0.00707	0.02097	-0.02971	0.00000	0.00000	0.00000
4	0.00433	0.01516	0.00970	0.00000	0.00000	0.00000

SUM	0.05162	2.04776	-0.05162	0.00000	0.08983	0.00000
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Condition **LC58=1.2D+WL150+1.6LLa2**

1	-0.04499	1.03033	-1.50412	0.00000	-0.01235	0.00000
2	0.12090	0.98129	1.46289	0.00000	0.13903	0.00000
3	-0.01025	0.02098	-0.04308	0.00000	0.00000	0.00000
4	0.00576	0.01515	0.01290	0.00000	0.00000	0.00000

SUM	0.07142	2.04776	-0.07142	0.00000	0.12668	0.00000
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Condition **LC59=1.2D-WL0+1.6LLa2**

1	-0.06824	1.01523	-1.49125	0.00000	-0.04880	0.00000
2	0.09769	0.99632	1.47576	0.00000	0.10246	0.00000
3	-0.01454	0.02100	-0.06109	0.00000	0.00000	0.00000
4	-0.01492	0.01520	-0.03342	0.00000	0.00000	0.00000

SUM	0.00000	2.04776	-0.11000	0.00000	0.05366	0.00000
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Condition **LC60=1.2D-WL30+1.6LLa2**

1	-0.10249	0.99585	-1.47504	0.00000	-0.10489	0.00000
2	0.06350	1.01571	1.49209	0.00000	0.04619	0.00000
3	-0.00807	0.02097	-0.03392	0.00000	0.00000	0.00000
4	-0.02436	0.01522	-0.05456	0.00000	0.00000	0.00000

SUM	-0.07142	2.04776	-0.07142	0.00000	-0.05870	0.00000
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Condition **LC61=1.2D-WL60+1.6LLa2**

1	-0.09702	1.00017	-1.47815	0.00000	-0.09634	0.00000
2	0.06795	1.01143	1.48797	0.00000	0.05382	0.00000
3	-0.00556	0.02096	-0.02337	0.00000	0.00000	0.00000
4	-0.01699	0.01520	-0.03806	0.00000	0.00000	0.00000

SUM	-0.05162	2.04776	-0.05162	0.00000	-0.04253	0.00000
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Condition **LC62=1.2D-WL90+1.6LLa2**

1	-0.10514	0.99288	-1.47286	0.00000	-0.10987	0.00000
2	0.05944	1.01876	1.49437	0.00000	0.03986	0.00000
3	0.00079	0.02093	0.00333	0.00000	0.00000	0.00000
4	-0.01109	0.01519	-0.02483	0.00000	0.00000	0.00000

SUM	-0.05600	2.04776	0.00000	0.00000	-0.07002	0.00000
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Condition **LC63=1.2D-WL120+1.6LLa2**

1	-0.10989	0.98708	-1.46885	0.00000	-0.11925	0.00000
2	0.05512	1.02461	1.49947	0.00000	0.03084	0.00000
3	0.00711	0.02090	0.02989	0.00000	0.00000	0.00000
4	-0.00397	0.01517	-0.00888	0.00000	0.00000	0.00000

SUM	-0.05162	2.04776	0.05162	0.00000	-0.08841	0.00000
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Condition **LC64=1.2D-WL150+1.6LLa2**

1	-0.12119	0.98141	-1.46355	0.00000	-0.13814	0.00000
2	0.04487	1.03028	1.50380	0.00000	0.01286	0.00000
3	0.01030	0.02088	0.04325	0.00000	0.00000	0.00000
4	-0.00540	0.01518	-0.01208	0.00000	0.00000	0.00000

SUM	-0.07142	2.04776	0.07142	0.00000	-0.12528	0.00000
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Condition **LC65=1.2D+WL0+1.6LLa3**

1	0.76688	0.99474	-1.47492	0.00000	0.68446	0.00000
2	-0.79527	1.01700	1.49239	0.00000	-0.74564	0.00000
3	0.01476	0.02102	0.06202	0.00000	0.00000	0.00000
4	0.01362	0.01500	0.03050	0.00000	0.00000	0.00000

SUM	0.00000	2.04776	0.11000	0.00000	-0.06117	0.00000
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Condition **LC66=1.2D+WL30+1.6LLa3**

1	0.80122	1.01421	-1.49128	0.00000	0.74062	0.00000
2	-0.76115	0.99768	1.47620	0.00000	-0.68941	0.00000
3	0.00830	0.02098	0.03486	0.00000	0.00000	0.00000
4	0.02305	0.01489	0.05164	0.00000	0.00000	0.00000

SUM	0.07142	2.04776	0.07142	0.00000	0.05121	0.00000
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Condition **LC67=1.2D+WL60+1.6LLa3**

1	0.79567	1.00987	-1.48813	0.00000	0.73200	0.00000
2	-0.76553	1.00194	1.48029	0.00000	-0.69698	0.00000
3	0.00579	0.02097	0.02432	0.00000	0.00000	0.00000
4	0.01569	0.01498	0.03514	0.00000	0.00000	0.00000

SUM	0.05162	2.04776	0.05162	0.00000	0.03503	0.00000
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Condition **LC68=1.2D+WL90+1.6LLa3**

1	0.80372	1.01716	-1.49343	0.00000	0.74546	0.00000
2	-0.75693	0.99461	1.47390	0.00000	-0.68294	0.00000
3	-0.00057	0.02093	-0.00239	0.00000	0.00000	0.00000
4	0.00978	0.01505	0.02192	0.00000	0.00000	0.00000

SUM	0.05600	2.04776	0.00000	0.00000	0.06252	0.00000
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Condition LC69=1.2D+WL120+1.6LLa3						
1	0.80838	1.02296	-1.49744	0.00000	0.75476	0.00000
2	-0.75254	0.98877	1.46880	0.00000	-0.67385	0.00000
3	-0.00689	0.02090	-0.02895	0.00000	0.00000	0.00000
4	0.00267	0.01513	0.00597	0.00000	0.00000	0.00000

SUM	0.05162	2.04776	-0.05162	0.00000	0.08091	0.00000
Condition LC70=1.2D+WL150+1.6LLa3						
1	0.81968	1.02864	-1.50278	0.00000	0.77363	0.00000
2	-0.74228	0.98312	1.46451	0.00000	-0.65587	0.00000
3	-0.01007	0.02088	-0.04232	0.00000	0.00000	0.00000
4	0.00409	0.01512	0.00917	0.00000	0.00000	0.00000

SUM	0.07142	2.04776	-0.07142	0.00000	0.11776	0.00000
Condition LC71=1.2D-WL0+1.6LLa3						
1	0.79622	1.01347	-1.48977	0.00000	0.73700	0.00000
2	-0.76528	0.99807	1.47725	0.00000	-0.69226	0.00000
3	-0.01436	0.02086	-0.06033	0.00000	0.00000	0.00000
4	-0.01658	0.01536	-0.03715	0.00000	0.00000	0.00000

SUM	0.00000	2.04776	-0.11000	0.00000	0.04474	0.00000
Condition LC72=1.2D-WL30+1.6LLa3						
1	0.76189	0.99401	-1.47341	0.00000	0.68086	0.00000
2	-0.79939	1.01739	1.49344	0.00000	-0.74848	0.00000
3	-0.00789	0.02089	-0.03316	0.00000	0.00000	0.00000
4	-0.02602	0.01547	-0.05828	0.00000	0.00000	0.00000

SUM	-0.07142	2.04776	-0.07142	0.00000	-0.06762	0.00000
Condition LC73=1.2D-WL60+1.6LLa3						
1	0.76744	0.99835	-1.47657	0.00000	0.68947	0.00000
2	-0.79502	1.01312	1.48935	0.00000	-0.74091	0.00000
3	-0.00538	0.02090	-0.02262	0.00000	0.00000	0.00000
4	-0.01866	0.01539	-0.04179	0.00000	0.00000	0.00000

SUM	-0.05162	2.04776	-0.05162	0.00000	-0.05144	0.00000
Condition LC74=1.2D-WL90+1.6LLa3						
1	0.75939	0.99105	-1.47126	0.00000	0.67601	0.00000
2	-0.80361	1.02045	1.49574	0.00000	-0.75495	0.00000
3	0.00097	0.02094	0.00408	0.00000	0.00000	0.00000
4	-0.01275	0.01532	-0.02856	0.00000	0.00000	0.00000

SUM	-0.05600	2.04776	0.00000	0.00000	-0.07894	0.00000
Condition LC75=1.2D-WL120+1.6LLa3						
1	0.75473	0.98525	-1.46725	0.00000	0.66671	0.00000
2	-0.80801	1.02630	1.50085	0.00000	-0.76405	0.00000
3	0.00729	0.02097	0.03064	0.00000	0.00000	0.00000
4	-0.00563	0.01523	-0.01262	0.00000	0.00000	0.00000

SUM	-0.05162	2.04776	0.05162	0.00000	-0.09734	0.00000

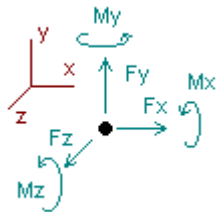
Condition **LC76=1.2D-WL150+1.6LLa3**

1	0.74343	0.97956	-1.46191	0.00000	0.64783	0.00000
2	-0.81826	1.03195	1.50513	0.00000	-0.78204	0.00000
3	0.01048	0.02099	0.04400	0.00000	0.00000	0.00000
4	-0.00706	0.01525	-0.01581	0.00000	0.00000	0.00000

SUM	-0.07142	2.04776	0.07142	0.00000	-0.13421	0.00000

Envelope for nodal reactions

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



Direction of positive forces and moments

Envelope of nodal reactions for :

- LC1=1.4D
- LC2=1.2D+W_o
- LC3=1.2D+W₃₀
- LC4=1.2D+W₆₀
- LC5=1.2D+W₉₀
- LC6=1.2D+W₁₂₀
- LC7=1.2D+W₁₅₀
- LC8=1.2D-W_o
- LC9=1.2D-W₃₀
- LC10=1.2D-W₆₀
- LC11=1.2D-W₉₀
- LC12=1.2D-W₁₂₀
- LC13=1.2D-W₁₅₀
- LC14=0.9D+W_o
- LC15=0.9D+W₃₀
- LC16=0.9D+W₆₀
- LC17=0.9D+W₉₀
- LC18=0.9D+W₁₂₀
- LC19=0.9D+W₁₅₀
- LC20=0.9D-W_o
- LC21=0.9D-W₃₀
- LC22=0.9D-W₆₀
- LC23=0.9D-W₉₀
- LC24=0.9D-W₁₂₀
- LC25=0.9D-W₁₅₀
- LC26=1.2D+D_i+W_{I0}
- LC27=1.2D+D_i+W_{I30}
- LC28=1.2D+D_i+W_{I60}
- LC29=1.2D+D_i+W_{I90}
- LC30=1.2D+D_i+W_{I120}
- LC31=1.2D+D_i+W_{I150}
- LC32=1.2D+D_i-W_{I0}
- LC33=1.2D+D_i-W_{I30}
- LC34=1.2D+D_i-W_{I60}
- LC35=1.2D+D_i-W_{I90}

LC36=1.2D+Di-WI120
 LC37=1.2D+Di-WI150
 LC38=1.2D+1.6LL1
 LC39=1.2D+1.6LL2
 LC40=1.2D+1.6LL3
 LC41=1.2D+WLO+1.6LLa1
 LC42=1.2D+WL30+1.6LLa1
 LC43=1.2D+WL60+1.6LLa1
 LC44=1.2D+WL90+1.6LLa1
 LC45=1.2D+WL120+1.6LLa1
 LC46=1.2D+WL150+1.6LLa1
 LC47=1.2D-WLO+1.6LLa1
 LC48=1.2D-WL30+1.6LLa1
 LC49=1.2D-WL60+1.6LLa1
 LC50=1.2D-WL90+1.6LLa1
 LC51=1.2D-WL120+1.6LLa1
 LC52=1.2D-WL150+1.6LLa1
 LC53=1.2D+WLO+1.6LLa2
 LC54=1.2D+WL30+1.6LLa2
 LC55=1.2D+WL60+1.6LLa2
 LC56=1.2D+WL90+1.6LLa2
 LC57=1.2D+WL120+1.6LLa2
 LC58=1.2D+WL150+1.6LLa2
 LC59=1.2D-WLO+1.6LLa2
 LC60=1.2D-WL30+1.6LLa2
 LC61=1.2D-WL60+1.6LLa2
 LC62=1.2D-WL90+1.6LLa2
 LC63=1.2D-WL120+1.6LLa2
 LC64=1.2D-WL150+1.6LLa2
 LC65=1.2D+WLO+1.6LLa3
 LC66=1.2D+WL30+1.6LLa3
 LC67=1.2D+WL60+1.6LLa3
 LC68=1.2D+WL90+1.6LLa3
 LC69=1.2D+WL120+1.6LLa3
 LC70=1.2D+WL150+1.6LLa3
 LC71=1.2D-WLO+1.6LLa3
 LC72=1.2D-WL30+1.6LLa3
 LC73=1.2D-WL60+1.6LLa3
 LC74=1.2D-WL90+1.6LLa3
 LC75=1.2D-WL120+1.6LLa3
 LC76=1.2D-WL150+1.6LLa3

Node		Forces						Moments					
		Fx [Kip]	lc	Fy [Kip]	lc	Fz [Kip]	lc	Mx [Kip*ft]	lc	My [Kip*ft]	lc	Mz [Kip*ft]	lc
1	Max	0.820	LC70	1.181	LC7	-0.072	LC25	0.00000	LC1	1.16170	LC18	0.00000	LC1
	Min	-0.890	LC52	-0.126	LC25	-1.543	LC31	0.00000	LC1	-1.22299	LC13	0.00000	LC1
2	Max	0.888	LC46	1.187	LC13	1.543	LC37	0.00000	LC1	1.23200	LC6	0.00000	LC1
	Min	-0.818	LC76	-0.122	LC19	0.071	LC19	0.00000	LC1	-1.17787	LC24	0.00000	LC1
3	Max	0.307	LC2	0.047	LC32	1.302	LC2	0.00000	LC1	0.00000	LC1	0.00000	LC1
	Min	-0.306	LC20	0.015	LC14	-1.306	LC20	0.00000	LC1	0.00000	LC1	0.00000	LC1
4	Max	0.503	LC3	0.034	LC33	1.146	LC3	0.00000	LC1	0.00000	LC1	0.00000	LC1
	Min	-0.505	LC21	0.011	LC15	-1.148	LC21	0.00000	LC1	0.00000	LC1	0.00000	LC1



Connection Check

Date: 12/15/2022
Project Name: NORTHFORD - TOTOKET
Project No.: CT5638
Designed By: RL Checked By: MSC



CHECK CONNECTION CAPACITY (Worst Case)

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

Bolt Type = A36 1/2" Threaded Rod

Allowable Tensile Load =

$F_{Tall} = 4271$ lbs.

Allowable Shear Load =

$F_{vall} = 2562$ lbs.

CONNECTION PLATE CONFIGURATION (4-BOLTS)

$N_{BOLT\ ROWS} = 1$ rows $S_x = 4$ in (Min.)
 $N_{BOLTS} = 2$ bolts/row

TENSILE FORCES

Moment in Y axis: 1232 lb-ft. (See Bentley Output)
Couple Reaction from M_Y : 7392 lbs.
Reaction in Z direction: 1543 lbs. (See Bentley Output)
Resultant: 2978 lbs.

SHEAR FORCES

Reaction in X direction: 888 lbs. (See Bentley Output)
Reaction in Y direction: 1187 lbs. (See Bentley Output)
Resultant: 494 lbs.

Date: 12/15/2022
Project Name: NORTHFORD - TOTOKET
Project No.: CT5638
Designed By: RL Checked By: MSC



(CONT.)

Tension Design Load /Bolts =

$$f_t = 2978 \text{ lbs.} < 4271 \text{ lbs.} \text{ Therefore, OK!}$$

Shear Design Load / Bolts=

$$f_v = 494 \text{ lbs.} < 2562 \text{ lbs.} \text{ Therefore, OK!}$$

CHECK COMBINED TENSION AND SHEAR

$$\begin{array}{rclclcl} f_t / F_T & + & f_v / F_V & \leq & 1.0 & \\ 0.697 & + & 0.193 & = & 0.890 & < 1.0 \text{ Therefore, OK!} \end{array}$$

PROJECT INFORMATION

SCOPE OF WORK: **ITEMS TO BE MOUNTED ON THE EXISTING SELF SUPPORT:**

- NEW AT&T DUAL ANTENNAS: (AIR 6419 B77G & AIR 6449 B77D) STACKED @ POS 3 (TYP. OF 2 PER SECTOR, TOTAL OF 6).
- NEW AT&T ANTENNAS: TPA65R-BU6DA-K (TYP. OF 1 PER SECTORS, TOTAL OF 3).
- NEW AT&T RRUS: 4415 B30 (WCS) @ POS. 4 (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- NEW AT&T SURGE ARRESTOR: DC6-48-60-18-8F (TOTAL OF 1).
- NEW AT&T (2) 6 AWG DC POWER CABLES & (1) 18 PAIRS OF FIBER RUNS.
- RELOCATED EXISTING AT&T ANTENNA: DMP65R-BU6DA @ POS. 2 (TYP. OF 1 PER SECTOR, TOTAL OF 3).

ITEMS TO BE MOUNTED IN EQUIPMENT LOCATION:

- INSTALL (1) 6648 IDLe+XCEDE CABLE.
- FINAL=5216+XMU/6630+IDLe/6648+Xcede.
- INSTALL (5) NEW RECTIFIERS IN EXISTING POWER PLANT
- INSTALL (1) NEW BATTERY CABINET WITH (2) STRINGS OF 190AH BATTERIES
- REMOVE & REPLACE (3) STRINGS OF 155AH BATTERIES INSIDE EXISTING POWER PLANT.

ITEMS TO BE REMOVED:

- DECOMMISSION EXISTING AT&T (3) BATTERY STRINGS FROM EXISTING POWER PLANT.
- DECOMMISSION EXISTING AT&T ANTENNA: 800-10121 (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- DECOMMISSION EXISTING AT&T ANTENNA: OPA65R-BU6DA (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- DECOMMISSION EXISTING AT&T DIPLEXERS: LGP21901 (TYP. OF 2 PER SECTOR, TOTAL OF 6).
- DECOMMISSION EXISTING AT&T TMAS: LGP21401 (TYP. OF 2 PER SECTOR, TOTAL OF 6).

ITEMS TO REMAIN:

- (3) ANTENNAS, (9) RRU'S, (6) 1-5/8" COAX CABLES, (2) SURGE ARRESTOR, (4) DC POWER & (2) FIBER.

SITE ADDRESS: 88 PARSONAGE HILL ROAD
NORTHFORD, CT 06472

LATITUDE: 41.3690919° N, 41° 22' 9.00" N
LONGITUDE: -72.8104989° W, 72° 48' 37.60" W

TYPE OF SITE: SELF SUPPORT TOWER / OUTDOOR EQUIPMENT

STRUCTURE HEIGHT: 197'-0"±
RAD CENTER: 173'-0"±

CURRENT USE: TELECOMMUNICATIONS FACILITY
PROPOSED USE: TELECOMMUNICATIONS FACILITY



SITE NUMBER: CTL05638
SITE NAME: NORTHFORD - TOTOKET
FA CODE: 10071180

PACE ID: MRCTB054235, MRCTB055621, MRCTB055657, MRCTB055168, MRCTB056325, MRCTB053739, MRCTB053317, MRCTB062278

PROJECT: ANTENNA MODIFICATIONS, 4TXRX SOFTWARE RETROFIT, BBU RECONFIGURATION, 5G NR SOFTWARE RADIO, 5G NR ACTIVATION, 5G NR 1SR CBAND, LTE 6C 2022 UPGRADE

VICINITY MAP

DIRECTIONS TO SITE:

HEAD SOUTHEAST TOWARD CAPITAL BLVD, TURN LEFT ONTO CAPITAL BLVD, USE THE LEFT 2 LANES TO TURN LEFT ONTO STATE HWY 411, TURN LEFT TO MERGE WITH I-91 S, MERGE WITH I-91 S TAKE EXIT 14 FOR E CENTER ST TOWARD CT-150/WALLINGFORD, TURN RIGHT ONTO E CENTER ST TURN LEFT ONTO S AIRLINE RD, TURN LEFT ONTO CT-150 S/WOODHOUSE AVE, CONTINUE STRAIGHT ONTO VILLAGE ST, TURN RIGHT ONTO PARSONAGE HILL RD, DESTINATION WILL BE ON THE LEFT.



GENERAL NOTES

- THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
- THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
- CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T MOBILITY REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.
- CONSTRUCTION DRAWINGS ARE VALID FOR SIX MONTHS AFTER ENGINEER OF RECORD'S STAMPED AND SIGNED SUBMITTAL DATE LISTED HEREIN.

DRAWING INDEX

SHEET NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	1
GN-1	GENERAL NOTES	1
A-1	COMPOUND & EQUIPMENT PLANS	1
A-2	ANTENNA LAYOUT PLANS & ELEVATION	1
A-3	DETAILS	1
A-4	DETAILS	1
G-1	GROUNDING DETAILS	1
RF-1	RF PLUMBING DIAGRAM	1

72 HOURS



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OR CALL **811**

UNDERGROUND SERVICE ALERT

HGD HUDSON Design Group LLC
45 BEECHWOOD DRIVE NORTH ANDOVER, MA 01845
TEL: (978) 557-5553 FAX: (978) 336-5586

CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET, SUITE #301 WEST BRIDGEWATER, MA 02379

SITE NUMBER: CTL05638
SITE NAME: NORTHFORD - TOTOKET
88 PARSONAGE HILL ROAD NORTHFORD, CT 06472 NEW HAVEN COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP
1	12/05/22	ISSUED FOR CONSTRUCTION	JL	AT	DPH
B	09/21/22	ISSUED FOR PERMITTING	JS	AT	DPH
A	03/23/22	ISSUED FOR REVIEW	GC	AT	DPH



AT&T
TITLE SHEET
ANTENNA MODIFICATIONS, 4TXRX SOFTWARE RETROFIT, BBU RECONFIGURATION, 5G NR SOFTWARE RADIO, 5G NR ACTIVATION, 5G NR 1SR CBAND, LTE 6C 2022 UPGRADE
SITE NUMBER: CTL05638
DRAWING NUMBER: T-1
REV: 1

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81 STANDARDS) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS AND #2 AWG STRANDED COPPER FOR OUTDOOR BTS.
6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO GROUND BAR.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
 CONTRACTOR – CENTERLINE
 SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
 OWNER – AT&T MOBILITY
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
16. CONSTRUCTION SHALL COMPLY WITH SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T SITES."
17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
20. **APPLICABLE BUILDING CODES:**
 SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

BUILDING CODE: IBC 2021 WITH 2022 CT STATE BUILDING CODE AMENDMENTS
ELECTRICAL CODE: 2020 NATIONAL ELECTRICAL CODE (NFPA 70-2020)

SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) MANUAL OF STEEL CONSTRUCTION, ASD, FOURTEENTH EDITION;

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-H, STRUCTURAL STANDARDS FOR STEEL

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	EQ	EQUAL	REQ	REQUIRED
AWG	AMERICAN WIRE GAUGE	GC	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
BBU	BATTERY BACKUP UNIT	GRC	GALVANIZED RIGID CONDUIT	TBD	TO BE DETERMINED
BTCW	BARE TINNED SOLID COPPER WIRE	MGB	MASTER GROUND BAR	TBR	TO BE REMOVED
BGR	BURIED GROUND RING	MIN	MINIMUM	TBRR	TO BE REMOVED AND REPLACED
BTS	BASE TRANSCEIVER STATION	P	PROPOSED	TYP	TYPICAL
E	EXISTING	NTS	NOT TO SCALE	UG	UNDER GROUND
EGB	EQUIPMENT GROUND BAR			VIF	VERIFY IN FIELD
EGR	EQUIPMENT GROUND RING				

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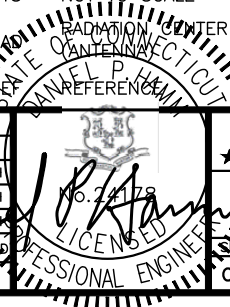
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 750 WEST CENTER STREET, SUITE #301 WEST BRIDGEWATER, MA 02379

SITE NUMBER: CTL05638
SITE NAME: NORTHFORD - TOTOKET

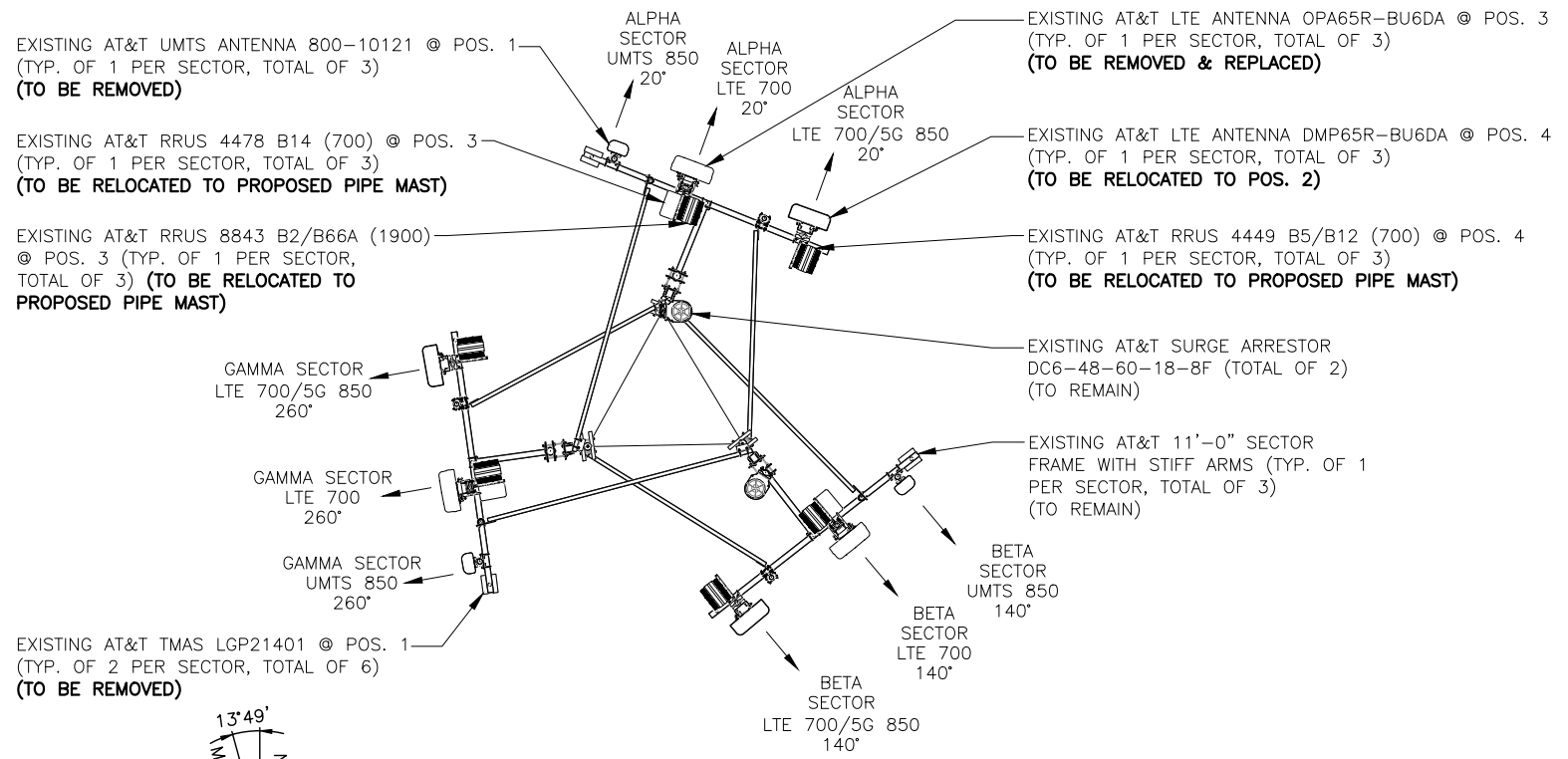
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 NORTHFORD, CT 06472
 NEW HAVEN COUNTY

at&t
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 ROCKY HILL, CT 06067

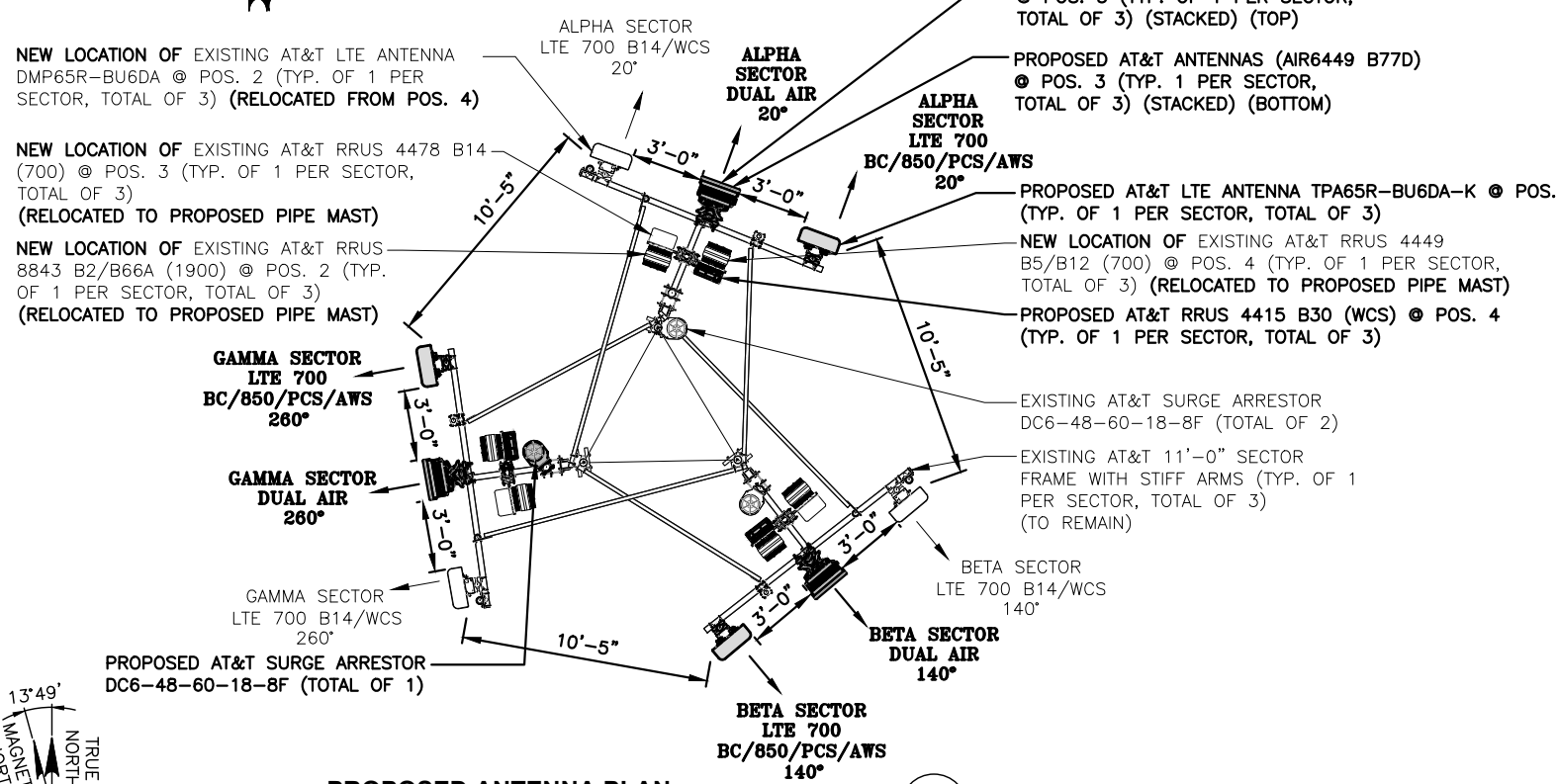
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B	09/21/22	ISSUED FOR PERMITTING	JS	AT	DPH
A	03/23/22	ISSUED FOR REVIEW	JS	AT	DPH
NO.	DATE	REVISIONS	BY	CHK	APP
SCALE: AS SHOWN		DESIGNED BY: AT	DRAWN BY: GD		



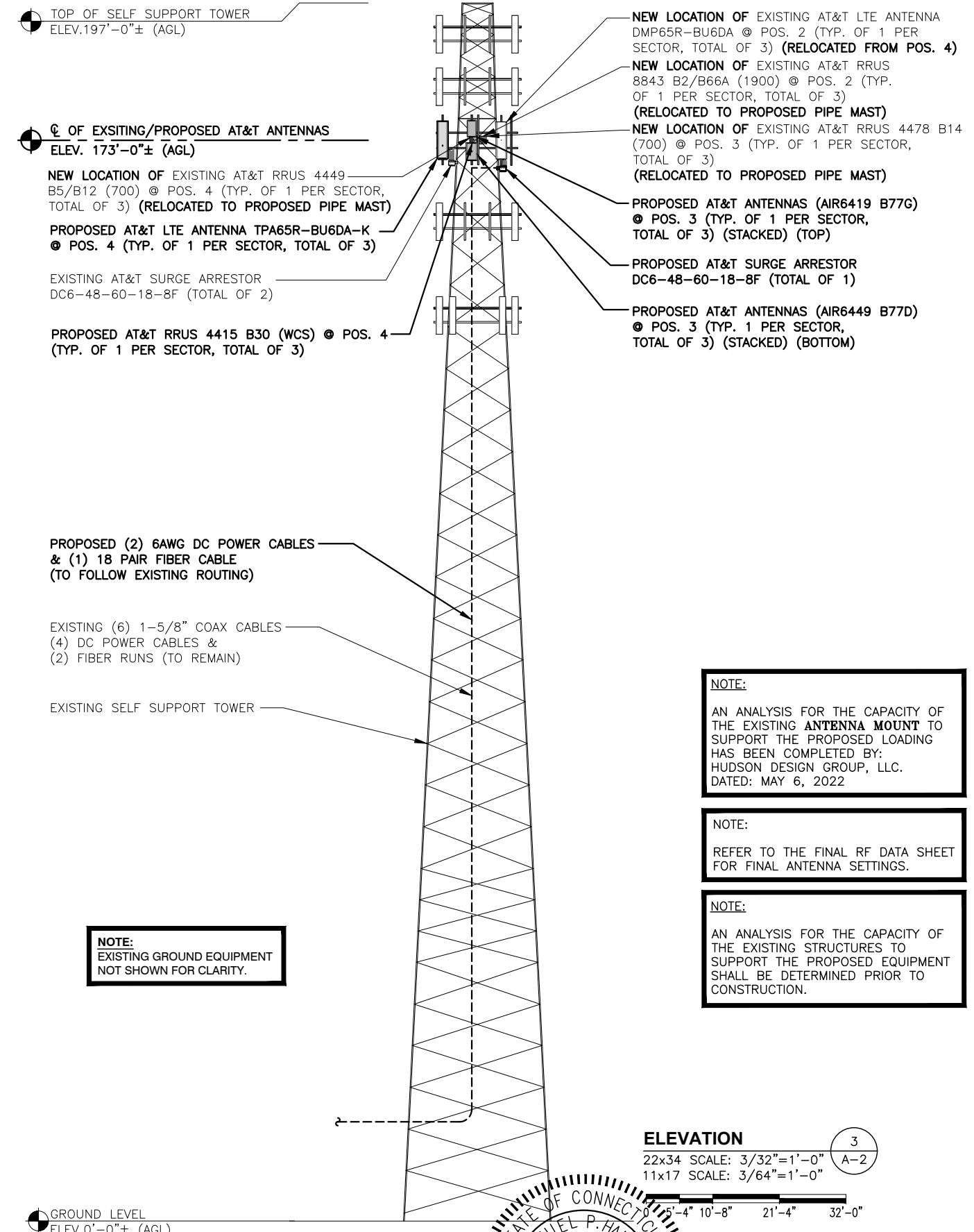
AT&T
 GENERAL NOTES
 INTERNAL MODIFICATIONS, AT&T SOFTWARE RETROFIT, BBU RECONFIGURATION, 5G NR SOFTWARE RADIO, 5G NR ACTIVATION, 5G NR 15R CSW, LTE GC 2022 UPGRADE
 SITE NUMBER: CTL05638
 DRAWING NUMBER: GN-1
 REV: 1



EXISTING ANTENNA PLAN
 22x34 SCALE: 1/4"=1'-0"
 11x17 SCALE: 1/8"=1'-0"



PROPOSED ANTENNA PLAN
 22x34 SCALE: 1/4"=1'-0"
 11x17 SCALE: 1/8"=1'-0"



NOTE:
 EXISTING GROUND EQUIPMENT NOT SHOWN FOR CLARITY.

NOTE:
 AN ANALYSIS FOR THE CAPACITY OF THE EXISTING ANTENNA MOUNT TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY: HUDSON DESIGN GROUP, LLC. DATED: MAY 6, 2022

NOTE:
 REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:
 AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

ELEVATION
 22x34 SCALE: 3/32"=1'-0"
 11x17 SCALE: 3/64"=1'-0"

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NO.	DATE	REVISIONS	BY	CHK	APP'D
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AT&T
 ANTENNA LAYOUT PLANS & ELEVATION
 ORIGINAL MODIFICATIONS, AT&T SOFTWARE RETROFIT, OBU RECONFIGURATION, 5G NR SOFTWARE RADIO, 5G NR ACTIVATION, 5G NR 15R CSW, LTE GC 2022 UPGRADE
 SITE NUMBER: CTL05638
 DRAWING NUMBER: A-2
 REV: 1

ANTENNA SCHEDULE

SECTOR	EXISTING/ PROPOSED	BAND	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA HEIGHT	AZIMUTH	TMA/ DIPLEXER	RRU	SIZE (INCHES) (L x W x D)	FEEDER	RAYCAP
A1	-	-	-	-	-	-	-	-	-	(2) 1-5/8" COAX	(E) (1) RAYCAP DC6-48-60-18-8F
A2	EXISTING	LTE 700 B14/WCS	DMP65R-BU6DA	71.2"x20.7"x7.7"	173'-0"±	20°	-	(E)(1)RRUS-4478 B14 (700) (P)(1)RRUS-4415 B30 (WCS)	16.5"x13.4"x5.9"	(E)(2) DC POWER (1) FIBER	
A3	PROPOSED	DUAL AIR	AIR6419 B77G AIR6449 B77D	31.1"x16.1"x7.3" 30.4"x15.9"x8.1"	173'-0"±	20°	-	-	-	-	
A4	PROPOSED	LTE 700 BC/850/PCS/AWS	TPA65R-BU6DA-K	71.2"x20.7"x7.7"	173'-0"±	20°	-	(E)(1)RRUS-4449 B5/B12 (700) (E)(1)RRUS-8843 B2/B66A (1900)	-	(E)(1)(Y-CABLE) (E)(1)(Y-CABLE)	
B1	-	-	-	-	-	-	-	-	-	(2) 1-5/8" COAX	(E) (1) RAYCAP DC6-48-60-18-8F
B2	EXISTING	LTE 700 B14/WCS	DMP65R-BU6DA	71.2"x20.7"x7.7"	173'-0"±	140°	-	(E)(1)RRUS-4478 B14 (700) (P)(1)RRUS-4415 B30 (WCS)	16.5"x13.4"x5.9"	(E)(2) DC POWER (1) FIBER	
B3	PROPOSED	DUAL AIR	AIR6419 B77G AIR6449 B77D	31.1"x16.1"x7.3" 30.4"x15.9"x8.1"	173'-0"±	140°	-	-	-	-	
B4	PROPOSED	LTE 700 BC/850/PCS/AWS	TPA65R-BU6DA-K	71.2"x20.7"x7.7"	173'-0"±	140°	-	(E)(1)RRUS-4449 B5/B12 (700) (E)(1)RRUS-8843 B2/B66A (1900)	-	(E)(1)(Y-CABLE) (E)(1)(Y-CABLE)	
C1	-	-	-	-	-	-	-	-	-	(2) 1-5/8" COAX	(P) (1) RAYCAP DC6-48-60-18-8F
C2	EXISTING	LTE 700 B14/WCS	DMP65R-BU6DA	71.2"x20.7"x7.7"	173'-0"±	260°	-	(E)(1)RRUS-4478 B14 (700) (P)(1)RRUS-4415 B30 (WCS)	16.5"x13.4"x5.9"	(P)(2) 6 AWG DC POWER (P)(1) 18 PAIR FIBER	
C3	PROPOSED	DUAL AIR	AIR6419 B77G AIR6449 B77D	31.1"x16.1"x7.3" 30.4"x15.9"x8.1"	173'-0"±	260°	-	-	-	-	
C4	PROPOSED	LTE 700 BC/850/PCS/AWS	TPA65R-BU6DA-K	71.2"x20.7"x7.7"	173'-0"±	260°	-	(E)(1)RRUS-4449 B5/B12 (700) (E)(1)RRUS-8843 B2/B66A (1900)	-	(E)(1)(Y-CABLE) (E)(1)(Y-CABLE)	

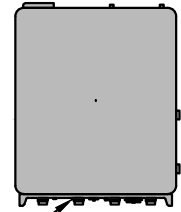
NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING ANTENNA MOUNT TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY: HUDSON DESIGN GROUP, LLC. DATED: MAY 6, 2022

NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

RRU CHART		
QUANTITY	MODEL	SIZE (L x W x D)
E(3)	4478 B14 (700)	18.1"x13.4"x8.3"
E(3)	8843 B2/B66A (1900)	14.9"x13.2"x10.9"
E(3)	4449 B5/B12 (700)	17.9"x13.2"x10.4"
P(3)	4415 B30 (WCS)	16.5"x13.4"x5.9"

NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS



NOTE:
SEE RFDS FOR RRH FREQUENCY AND MODEL NUMBER

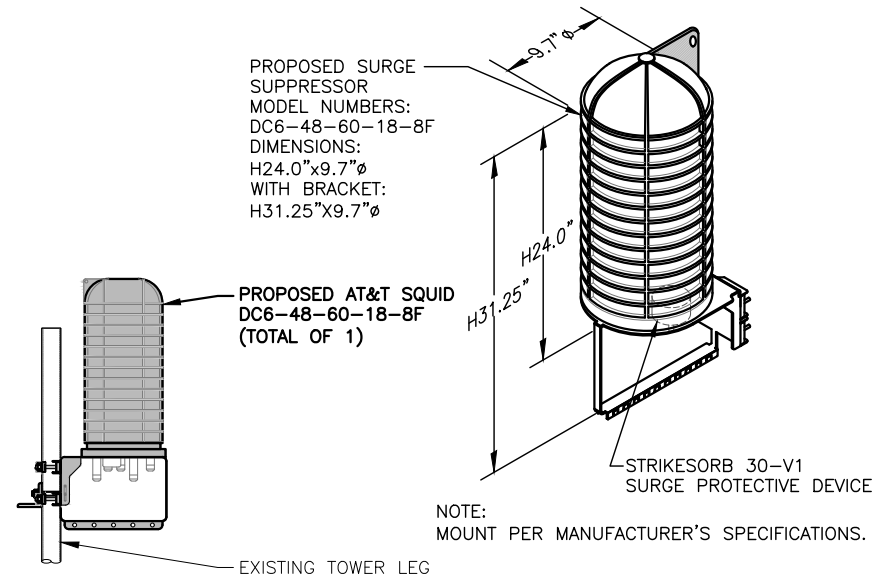
PROPOSED RRU REFER TO THE FINAL RFDS AND CHART FOR QUANTITY, MODEL AND DIMENSIONS

NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

PROPOSED RRUS DETAIL
SCALE: N.T.S

FINAL ANTENNA SCHEDULE
SCALE: N.T.S

1
A-3



PROPOSED SURGE PROTECTOR MOUNTING DETAIL
SCALE: N.T.S

3
A-3

HG HUDSON Design Group LLC
45 BEECHWOOD DRIVE
NORTH ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET, SUITE #301
WEST BRIDGEWATER, MA 02379

SITE NUMBER: CTL05638
SITE NAME: NORTHFORD - TOTOKET
88 PARSONAGE HILL ROAD
NORTHFORD, CT 06472
NEW HAVEN COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP
1	12/05/22	ISSUED FOR CONSTRUCTION	JL	AT	DPH
B	09/21/22	ISSUED FOR PERMITTING	JS	AT	DPH
A	03/23/22	ISSUED FOR REVIEW	GO	AT	DPH

SCALE: AS SHOWN DESIGNED BY: AT DRAWN BY: GD

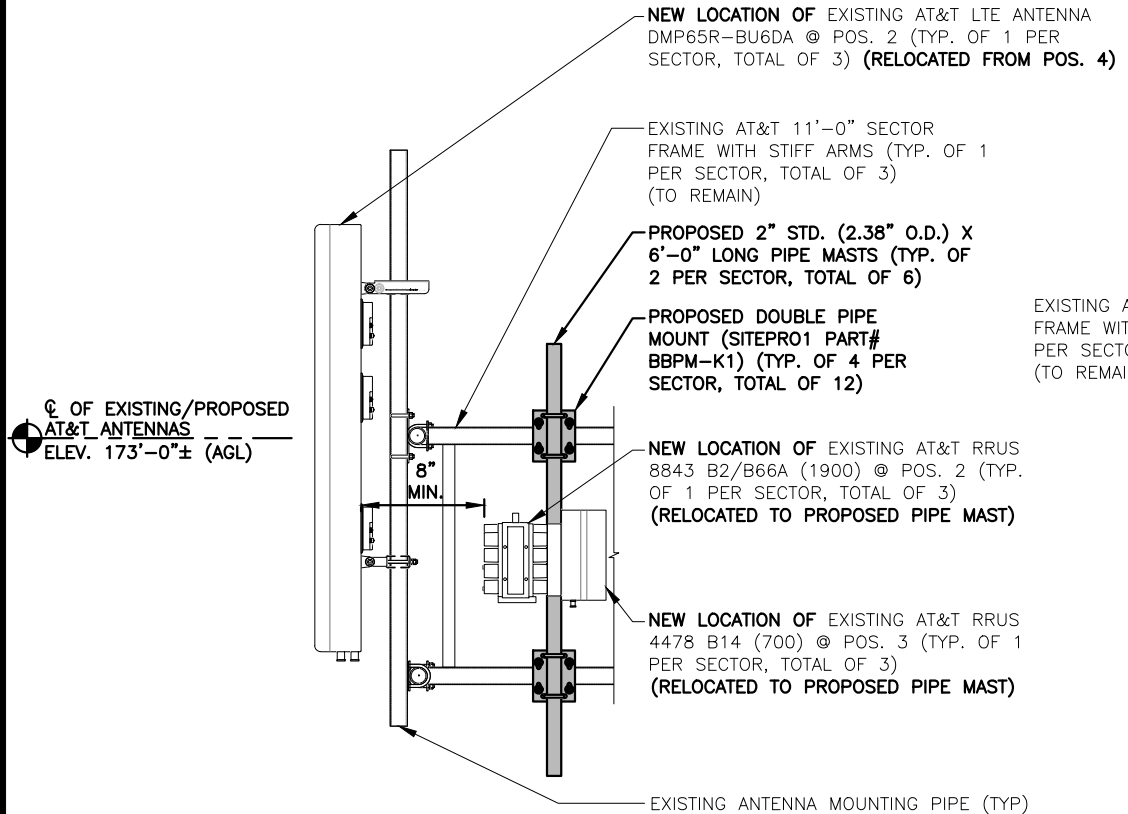


AT&T
DETAILS
INTERNAL MODIFICATIONS, 4TRX SOFTWARE RETROFIT, RRU RECONFIGURATION, 5G NR SOFTWARE RADIO, 5G NR ACTIVATION, 5G NR 15R CBAND, LTE GC 2022 UPGRADE
SITE NUMBER: CTL05638 DRAWING NUMBER: A-3 REV: 1

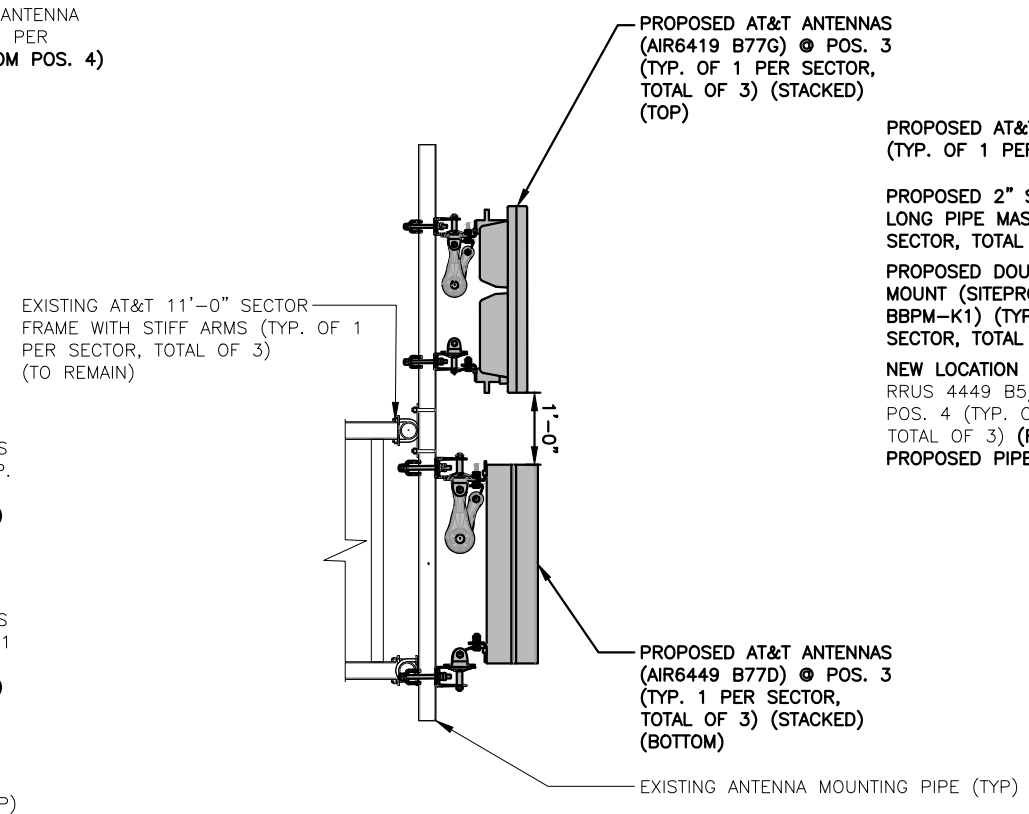
NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING ANTENNA MOUNT TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY: HUDSON DESIGN GROUP, LLC. DATED: MAY 6, 2022

NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

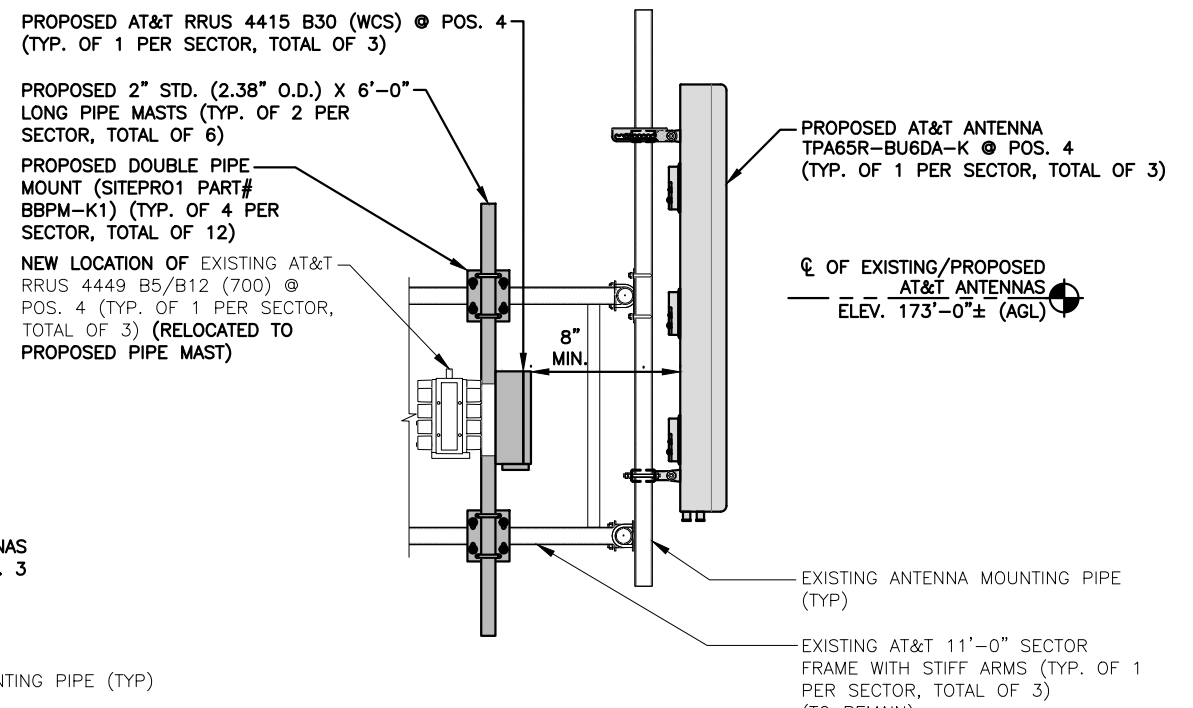
NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.



EXISTING ANTENNA @ POS. 2
22x34 SCALE: 1"=1'-0"
11x17 SCALE: 1/2"=1'-0"
0 0'-6" 1'-0" 2'-0" 3'-0"



PROPOSED ANTENNA @ POS. 3
22x34 SCALE: 3/4"=1'-0"
11x17 SCALE: 3/8"=1'-0"
0 8" 1'-4" 2'-8" 4'-0"



PROPOSED ANTENNA @ POS. 4
22x34 SCALE: 3/4"=1'-0"
11x17 SCALE: 3/8"=1'-0"
0 8" 1'-4" 2'-8" 4'-0"

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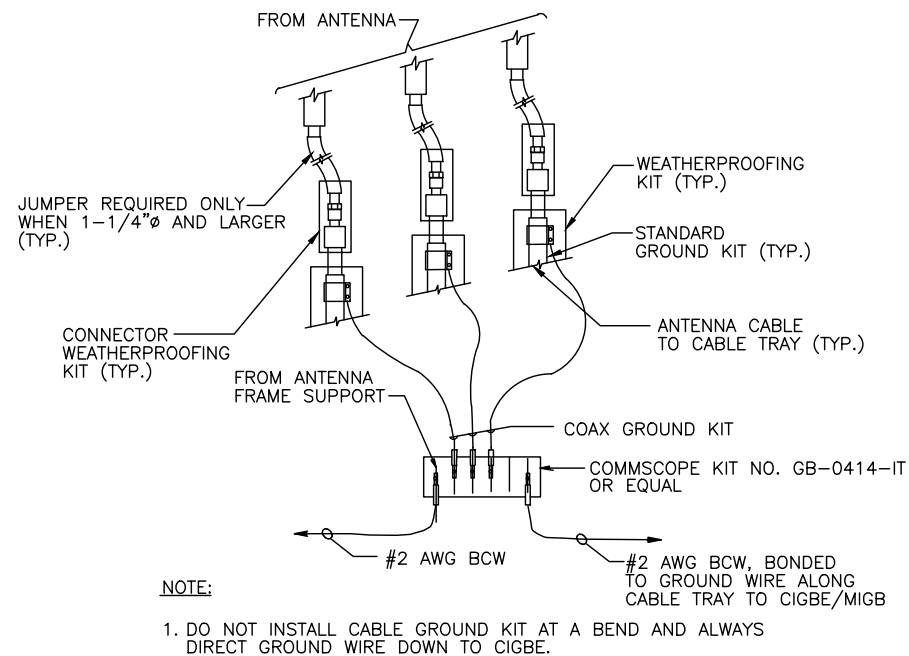
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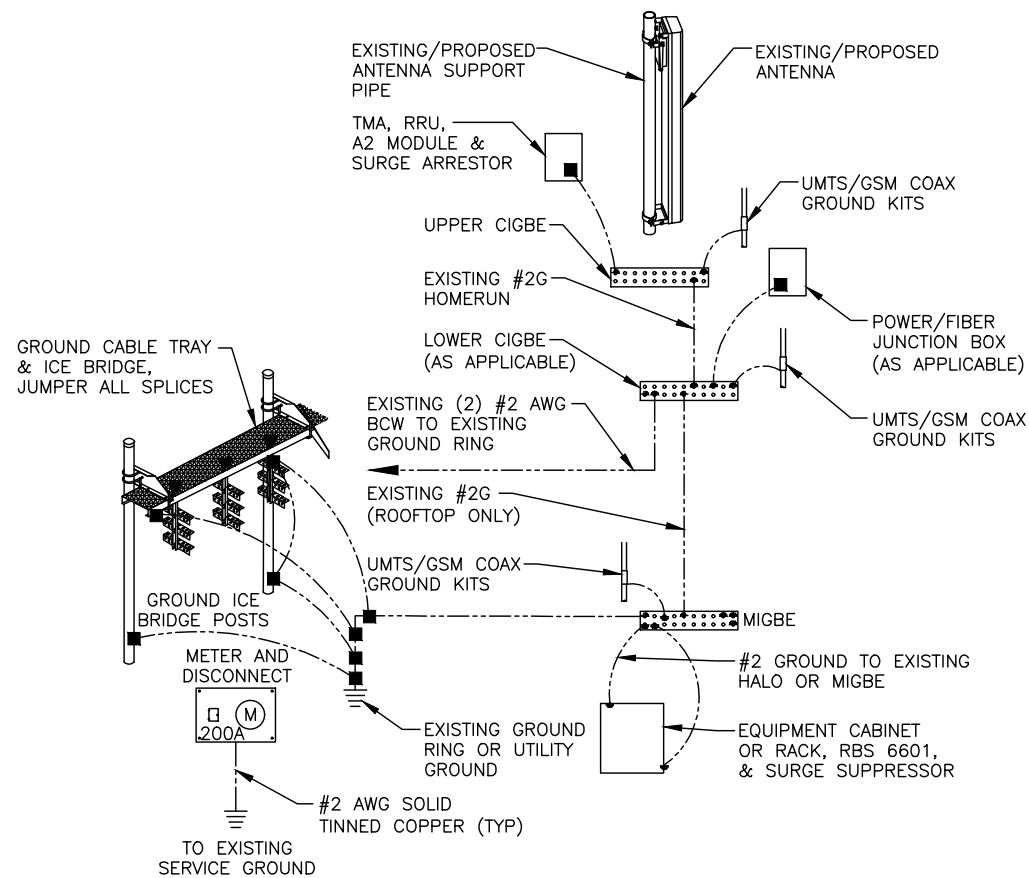
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SCALE: AS SHOWN		DESIGNED BY: AT	DRAWN BY: GD		



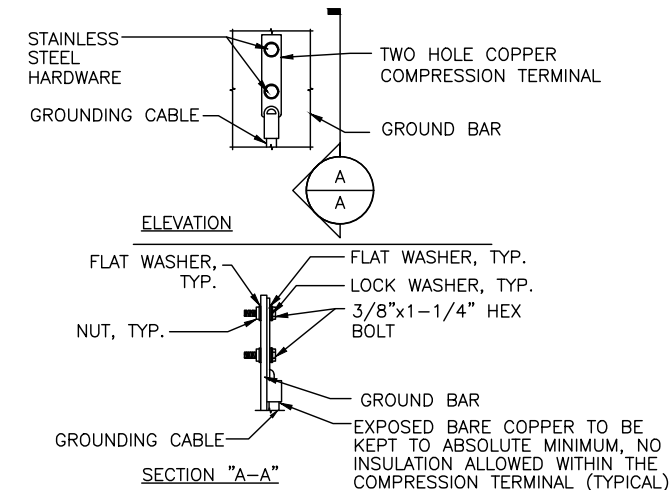
AT&T
DETAILS
ANTENNA MODIFICATIONS, 4TRX SOFTWARE RETROFIT, OBU RECONFIGURATION, 5G NR SOFTWARE RADIO, 5G NR ACTIVATION, 5G NR 15R CBAND, LTE GC 2022 UPGRADE
SITE NUMBER: CTL05638
DRAWING NUMBER: A-4
REV: 1



GROUND WIRE TO GROUND BAR CONNECTION DETAIL 1
SCALE: N.T.S. G-1



GROUNDING RISER DIAGRAM 2
SCALE: N.T.S. G-1



- NOTES:
1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
 2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATION.
 3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB

TYPICAL GROUND BAR CONNECTION DETAIL 3
SCALE: N.T.S. G-1

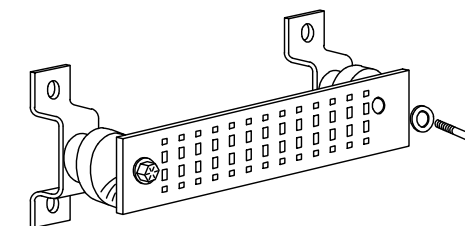
EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

SECTION "P" - SURGE PRODUCERS

- CABLE ENTRY PORTS (HATCH PLATES) (#2 AWG)
- GENERATOR FRAMEWORK (IF AVAILABLE) (#2 AWG)
- TELCO GROUND BAR
- COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2 AWG)
- +24V POWER SUPPLY RETURN BAR (#2 AWG)
- 48V POWER SUPPLY RETURN BAR (#2 AWG)
- RECTIFIER FRAMES.

SECTION "A" - SURGE ABSORBERS

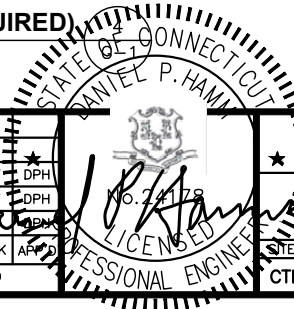
- INTERIOR GROUND RING (#2 AWG)
- EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2 AWG)
- METALLIC COLD WATER PIPE (IF AVAILABLE) (#2 AWG)
- BUILDING STEEL (IF AVAILABLE) (#2 AWG)

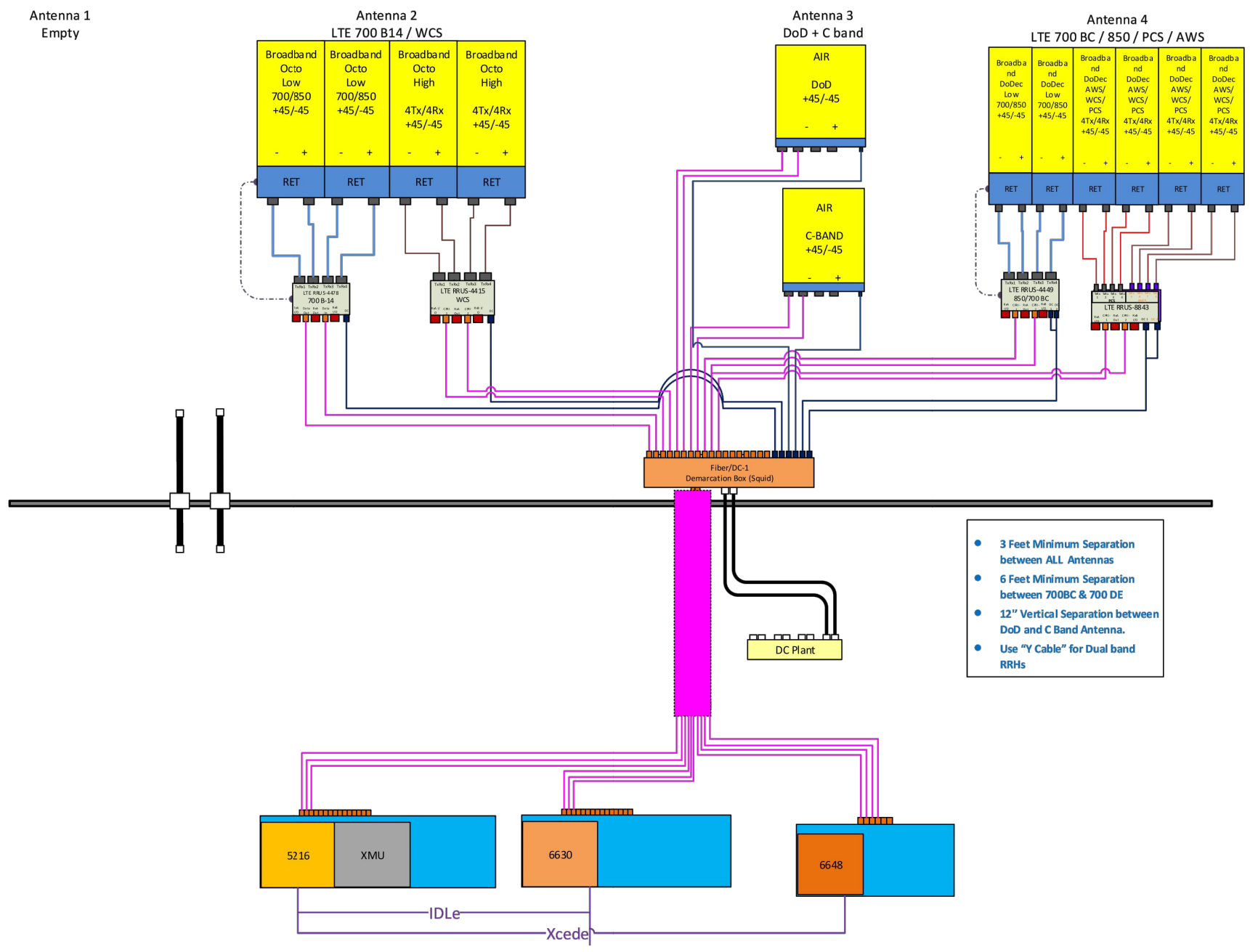


GROUND BAR - DETAIL (AS REQUIRED)
SCALE: N.T.S.

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SCALE: AS SHOWN DESIGNED BY: AT DRAWN BY: GD





- 3 Feet Minimum Separation between ALL Antennas
- 6 Feet Minimum Separation between 700BC & 700 DE
- 12" Vertical Separation between DoD and C Band Antenna.
- Use "Y Cable" for Dual band RRHs

NOTE:
 1. CONTRACTOR TO CONFIRM ALL PARTS.
 2. INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS

NOTE:
 REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

RF PLUMBING DIAGRAM 1
 SCALE: N.T.S. RF-1

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SCALE: AS SHOWN		DESIGNED BY: AT	DRAWN BY: GD		