December 8, 2023

Ms. Melanie A. Bachman
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: Notice of Exempt Modification New Cingular Wireless PCS LLC ("AT&T") Site CT2034
310 Orange Street, New Haven, CT 06510 (the "Property")
Latitude: 41-18-32.87 N Longitude: -72-55-18.29 W

Dear Ms. Bachman:

AT&T currently maintains (9) antennas on the rooftop of the existing 166' Frontier Central Office Building located at 310 Orange Street, New Haven, CT. The property is owned by Three Ten Orange, LLC and the rooftop is managed by Everest Infrastructure Partner. AT&T intends on modifying its Facility by replacing (1) antenna with (1) MS-MBA-3.2-H4-L4 antenna at the 178' level of the rooftop. AT&T also intends on placing (6) DBC0051F3V51-2 Diplexers, (2) 4490 B5/B12 & (3) 4890 B25/B66 RRUs at the 178' level in the rooftop. The height of AT&Ts existing & proposed antennas is 221' & 178' AGL.

This modification may include B2, B5, B17, B14, B29, B30, B66 & n77 hardware that is 4G(LTE) and/or 5GNR capable through remote software configuration and either or both services may be turned on or off at various times.

AT&T first received CT Siting Council ("CSC") approval to use this Facility on April 19, 1988, but no copy of the approval is available. Attached is next Exempt Modification CSC approval from February 25, 1991. This approval contained no conditions that could feasibly be violated by this modification, including facility height or mounting restrictions. AT&Ts modification complies with the above-mentioned approvals.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies ("R.C.S.A") §16-50j-73 for construction that constitutes an exempt modification pursuant to R.C.S.A §16-50j-72(b)(2). In accordance with to R.C.S.A §16-50j-73, a copy of this letter is being sent to the Honorable Justin Elicker, Mayor, City of New Haven, as chief elected official, Ms. Laura Brown, Executive Director of City Plan, City of New Haven, Three Ten Orange, LLC., the property owner & Everest Infrastructure Partner, the rooftop manager.

The planned modification of the facility falls squarely within those activities explicitly provided for in R.C.S.A §16-50j-72(b)(2). Specifically:

1. The proposed modifications will not result in an increase in the height of the existing building.

2. The proposed modifications will not require an extension of the site boundary.

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the modified facility will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing building and foundation can support the proposed loading.

For the foregoing reasons, AT&T respectfully submits the proposed modifications to the above referenced telecommunication facility constitute an exempt modification pursuant to R.C.S.A §16-50j-72(b)(2).

Sincerely,

Hollis M. Redding

Hollis M. Redding
SAI Communications, LLC
12 Industrial Way
Salem, NH 03079
Mobile: 860-834-6964
hredding@saigrp.com

Enclosures

Cc: Honorable Justin Elicker, Mayor, City of New Haven, chief elected official
Ms. Laura Brown, Executive Director of City Plan, City of Meriden
Three Ten Orange, LLC., the property owner
Everest Infrastructure Partner (''Everest"), the rooftop manager

C Squared Systems, LLC
65 Dartmouth Drive
Auburn, NH 03032
(603) 644-2800
support@csquaredsystems.com

Calculated Radio Frequency Emissions Report

CT2034

310 Orange Street, New Haven, CT 06510

December 6, 2023

Table of Contents

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List of Tables

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modification of AT&T antenna arrays to be mounted at 178' AGL on top of a rooftop located at 310 Orange Street DUP 1 in New Haven, CT. The coordinates of the rooftop are 41° 18' 32.87" N, 72° 55' 18.30" W.

AT&T is proposing the following:

1) Install twelve (12) multi-band antennas (four (4) sector) to support its commercial LTE network and the FirstNet National Public Safety Broadband Network ("NPSBN").

This report considers the planned antenna configuration for AT&T[1] to derive the resulting % MPE of its proposed modification.

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment C of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment C contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

[1] As referenced to AT&T's Radio Frequency Design Sheet, dated 02/13/2023

3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left(\frac{GRF^2 \times 1.64 \times \text{ERP}}{4\pi \times R^2}\right) \text{X Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance = $\sqrt{\left(H^2 + V^2\right)}$

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Off Beam Loss is determined by the selected antenna patterns

GRF = Ground Reflection Factor of 1.6

These calculations assume that the antennas are operating at 100 percent capacity, that all antenna channels are transmitting simultaneously, and that the radio transmitters are operating at full power. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not take into account actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the final installations.

4. Antenna Inventory

Table 1 below outlines AT&T's proposed antenna configuration for the site. The associated data sheets and antenna patterns for these specific antenna models are included in Attachments C.

Operator	Sector / Call Sign	TX Freq (MHz)	Power at Antenna (Watts)	Ant Gain (dBi)	Power EIRP (Watts)	Antenna Model	Beam Width	Mech. Tilt	Length (ft)	Antenna Centerline Height (ft)
	Beta / 20°	722	40	14.9	1236	QD8616-7	72	0	8.0	178
		763	160	15.2	5298		67			
		1900	160	17.2	8397		17.2			
		2100	240	17.5	13496		17.5			
		739	160	15.1	5177	DMP65R-BU8D	75	0	8.0	178
		850	160	16.0	6370		64			
		2300	100	18.1	6457		54			
		3500	54.22	25.65	19914	AIR 6419	11	0	2.35	178
		3700	86.75	25.65	31862	AIR 6449	11	0	2.53	178
	Beta / 140°	722	40	14.9	1236	QD8616-7	72	0	8.0	178
		763	160	15.2	5298		67			
		2300	100	18.4	6918		58			
		739	160	13.5	3582	MS-MBA-3.2-H4-L4	34	0	5.99	178
		850	160	13.5	3582		34			
		1900	720	17.8	43384		23			
		2100	720	17.8	43384		23			
		3500	54.22	25.65	19914	AIR 6419	11	0	2.35	178
		3700	86.75	25.65	31862	AIR 6449	11	0	2.53	178
	Gamma / 260°	722	40	12.3	679	QD4616-7	72	0	4.3	178
		763	160	12.8	3049		66			
		1900	160	16.7	7484		62			
		2100	160	17.1	8206		63			
		739	160	12.7	2979	DMP65R-BU4D	75	0	4.0	178
		850	160	13.0	3192		67			
		2300	100	17.2	5248		57			
		3500	54.22	25.65	19914	AIR 6419	11	0	2.35	178
		3700	86.75	25.65	31862	AIR 6449	11	0	2.53	178

Table 1: Proposed Antenna Inventory[2][3]

[2] AT&T's Radio Frequency Design Sheet, dated 02/13/2023

[3] Transmit power assumes 0 dB of cable loss.

5. Calculation Results

The calculated power density results are shown in Figure 1 below. For completeness, the calculations for this analysis range from 0 feet horizontal distance (directly below the antennas) to a value of 3,000 feet horizontal distance from the site. In addition to the other worst-case scenario considerations that were previously mentioned, the power density calculations to each horizontal distance point away from the antennas was completed using a local maximum off beam antenna gain (within ± 5 degrees of the true mathematical angle) to incorporate a realistic worst-case scenario.

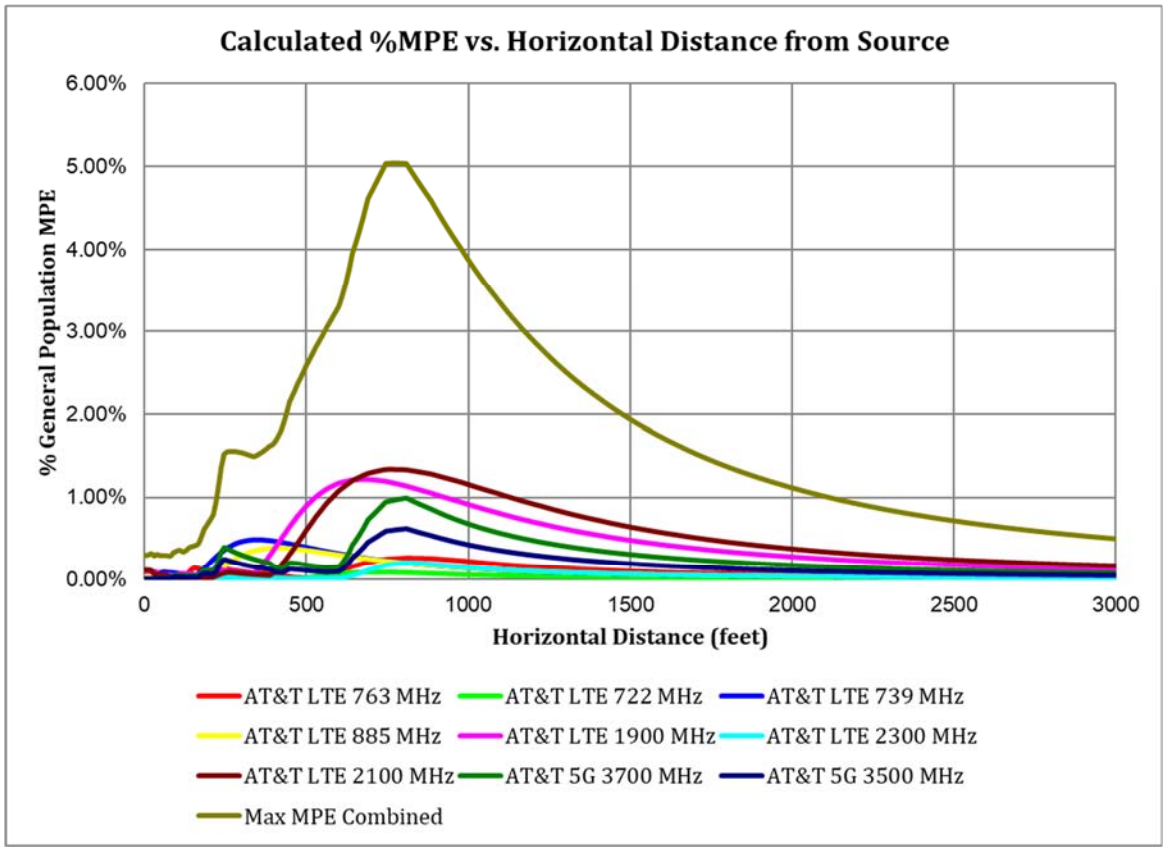


Figure 1: Graph of General Population % MPE vs. Distance

The highest percent of MPE (5.04% of the General Population limit) is calculated to occur at a horizontal distance of 775 feet from antennas. Please note that the percent of MPE calculations close to the site take into account off beam loss, which is determined from the vertical pattern of the antennas used. Therefore, RF power density levels may increase as the distance from the site increases. At distances of approximately 1500 feet and beyond, one would now be in the main beam of the antenna pattern and off beam loss is no longer considered. Beyond this point, RF levels become calculated solely on distance from the site and the percent of MPE decreases significantly as distance from the site increases.

Table 2 below lists percent of MPE values as well as the associated parameters that were included in the calculations. The highest percent of MPE value was calculated to occur at a horizontal distance of 775 feet from the site (reference Figure 1).

As stated in Section 3, all calculations assume that the antennas are operating at 100 percent capacity, that all antenna channels are transmitting simultaneously, and that the radio transmitters are operating at full power. Obstructions (trees, buildings etc.) that would normally attenuate the signal are not taken into account. In addition, a six-foot height offset was considered in this analysis to account for average human height. As a result, the predicted signal levels are significantly higher than the actual signal levels will be from the final configuration. The results presented in Figure 1 and Table 2 assume level ground elevation from the base of the tower out to the horizontal distances calculated.

Carrier	Number of Transmitters	Power out of Base Station Per Transmitter (Watts)	Antenna Height (Feet)	Distance to the Base of Antennas (Feet)	Power Density (mW/cm^2)	Limit (mW/cm^2)	% MPE
AT&T 5G 3500 MHz	1	54.2	178.0	775	0.006060	1.000	0.61%
AT&T 5G 3700 MHz	1	86.8	178.0	775	0.009696	1.000	0.97%
AT&T LTE 1900 MHz	3	240.0	178.0	775	0.011688	1.000	1.17%
AT&T LTE 2100 MHz	3	240.0	178.0	775	0.013380	1.000	1.34%
AT&T LTE 2300 MHz	1	100.0	178.0	775	0.001911	1.000	0.19%
AT&T LTE 722 MHz	1	40.0	178.0	775	0.000421	0.481	0.09%
AT&T LTE 739 MHz	1	160.0	178.0	775	0.001054	0.493	0.21%
AT&T LTE 763 MHz	1	160.0	178.0	775	0.001298	0.509	0.26%
AT&T LTE 885 MHz	1	160.0	178.0	775	0.001254	0.590	0.21%
						Total	**5.04%**

Table 2: Maximum Percent of General Population Exposure Values

6. Conclusion

The above analysis verifies that RF exposure levels from the site with AT&T's proposed antenna configuration will be well below the maximum permissible levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Using the conservative calculation methods and parameters detailed above, the maximum cumulative percent of MPE in consideration of all transmitters is calculated to be **5.04% of the FCC limit (General Population/Uncontrolled)**. This maximum cumulative percent of MPE value is calculated to occur 775 feet away from the site.

7. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.

Report Prepared By: Ram Acharya
RF Engineer
C Squared Systems, LLC

December 4, 2023
Date

Reviewed/Approved By: Martin J. Lavin
Senior RF Engineer
C Squared Systems, LLC

December 6, 2023
Date

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

IEEE C95.1-2005, IEEE Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz IEEE-SA Standards Board

IEEE C95.3-2002 (R2008), IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields, 100 kHz-300 GHz IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure[4]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Population/Uncontrolled Exposure[5]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

Table 3: FCC Limits for Maximum Permissible Exposure

[4] Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

[5] General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

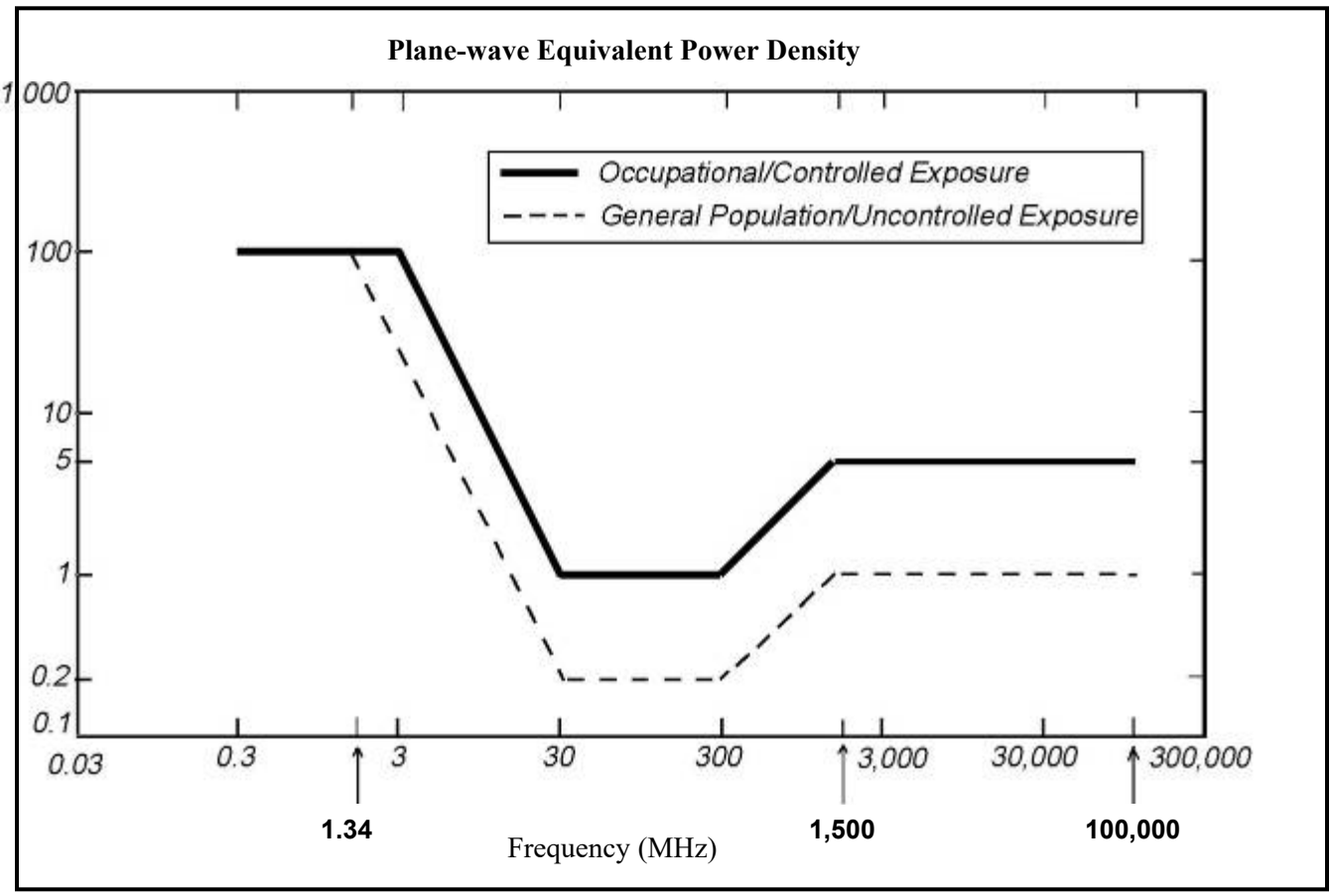
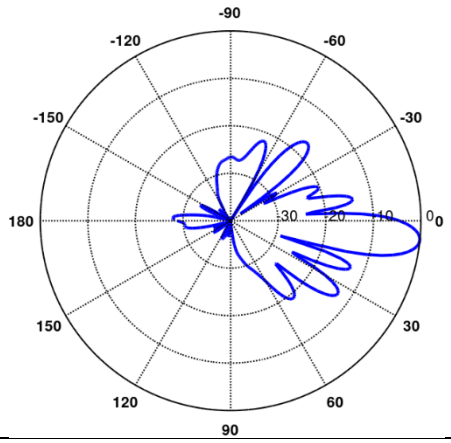


Figure 2: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: AT&T Mobility Antenna Model Data Sheets and Electrical Patterns

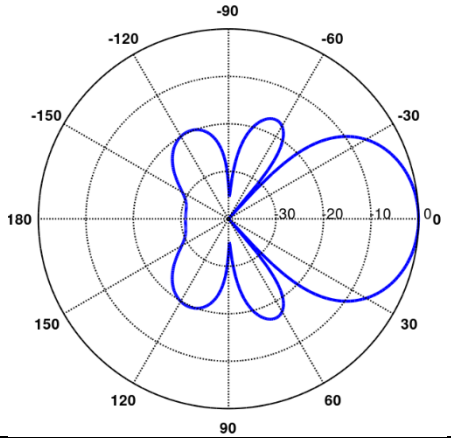
722 MHz

Manufacturer:	QUINTEL
Model #:	QD8616-7
Frequency Band:	698-728 MHz
Gain:	14.9 dBi
Vertical Beamwidth:	9.7°
Horizontal Beamwidth:	72°
Polarization:	±45°
Dimensions (L x W x D):	96” x 22” x 9.6”



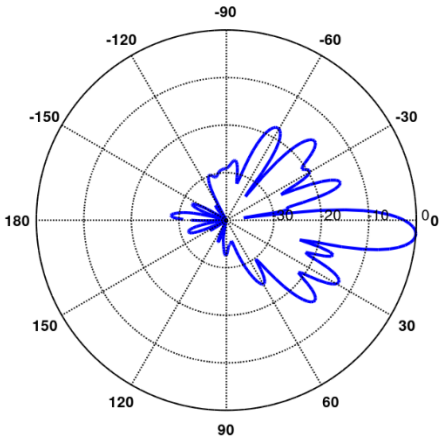
739 MHz

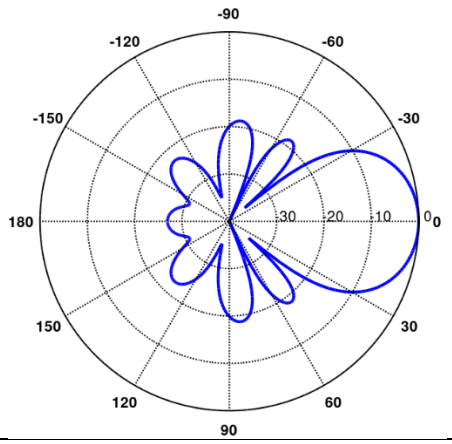
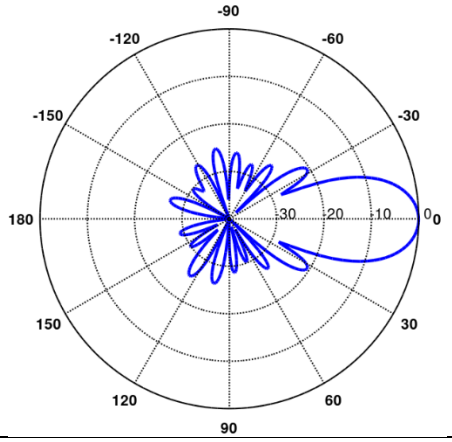
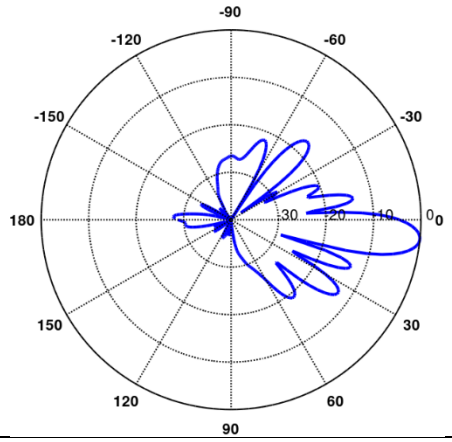
Manufacturer:	MATSING
Model #:	MS-MBA-3.2-H4-L4
Frequency Band:	698-960 MHz
Gain:	13.5 dBi
Vertical Beamwidth:	34°
Horizontal Beamwidth:	34°
Polarization:	Dual Slant ±45°
Dimensions (L x W x D):	71.9” x 24.1” x 28.3”



763 MHz

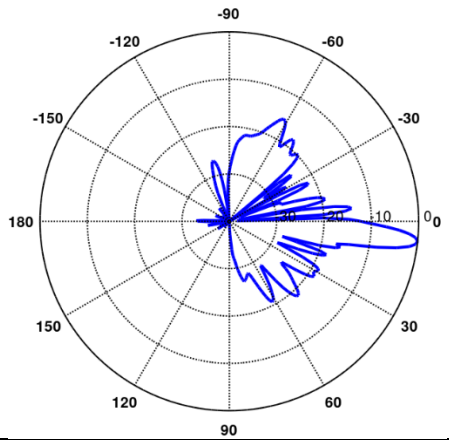
Manufacturer:	QUINTEL
Model #:	QD8616-7
Frequency Band:	758-798 MHz
Gain:	14.9 dBi
Vertical Beamwidth:	9.1°
Horizontal Beamwidth:	67°
Polarization:	±45°
Dimensions (L x W x D):	96” x 22” x 9.6”



850 MHz Manufacturer: MATSING Model #: MS-MBA-3.2-H4-L4 Frequency Band: 698-960 MHz Gain: 13.5 dBi Vertical Beamwidth: 34° Horizontal Beamwidth: 34° Polarization: Dual Slant ±45° Dimensions (L x W x D): 71.9” x 24.1” x 28.3”	
1900 MHz Manufacturer: MATSING Model #: MS-MBA-3.2-H4-L4 Frequency Band: 1695-2690 MHz Gain: 17.8 dBi Vertical Beamwidth: 23° Horizontal Beamwidth: 23° Polarization: Dual Slant ±45° Dimensions (L x W x D): 71.9” x 24.1” x 28.3”	
2100 MHz Manufacturer: MATSING Model #: MS-MBA-3.2-H4-L4 Frequency Band: 1695-2690 MHz Gain: 17.8 dBi Vertical Beamwidth: 23° Horizontal Beamwidth: 23° Polarization: Dual Slant ±45° Dimensions (L x W x D): 71.9” x 24.1” x 28.3”	

2300 MHz

Manufacturer:	QUINTEL
Model #:	QD8616-7
Frequency Band:	2300-2400 MHz
Gain:	18.4 dBi
Vertical Beamwidth:	5.1°
Horizontal Beamwidth:	58°
Polarization:	±45°
Dimensions (L x W x D):	96” x 22” x 9.6”



PROJECT INFORMATION

SCOPE OF WORK:	ITEMS TO BE MOUNTED ON THE EXISTING ROOF TOP: • NEW AT&T ANTENNAS: MS-MBA-3.2-H4-L4 (TOTAL OF 1 PER BETA SECTOR). • NEW AT&T DIPLEXERS: DBC0051F3V51-2 (TOTAL OF 6 PER BETA SECTOR). • NEW AT&T RRUS: 4490 B5/B12 (700) (TOTAL OF 2 PER BETA SECTOR). • NEW AT&T RRUS: 4890 B25/B66 (PCS/AWS) (TOTAL OF 3 PER BETA SECTOR). ITEMS TO BE MOUNTED AT EQUIPMENT LOCATION: • ADD 6651. • ADD IDLe XCEDE. • ADD 6673. ITEMS TO BE REMOVED: • EXISTING AT&T ANTENNAS: DMP65R-BU8DA (TOTAL OF 1 PER BETA SECTOR). • EXISTING AT&T RRUS: 4449 B5/B12 (850/700) (TOTAL OF 1 PER BETA SECTOR). • EXISTING AT&T RRUS: 8843 B2/B66A (PCS/AWS) (TOTAL OF 1 PER BETA SECTOR). • EXISTING AT&T (2) Y-CABLES (BETA SECTOR ONLY). • EXISTING AT&T (2) COAX CABLES (BETA SECTOR ONLY). ITEMS TO REMAIN: (11) ANTENNAS, (12) RRU'S, (6) SURGE ARRESTOR, (4) COAX CABLES, (12) DC POWER & (3) FIBER.
SITE ADDRESS:	310 ORANGE STREET DUP 1 NEW HAVEN, CT 06510
LATITUDE:	41.309131° N, 41° 18' 32.87" N
LONGITUDE:	-72.921749° W, 72° 55' 18.29" W
TYPE OF SITE:	ROOF TOP / INDOOR EQUIPMENT
STRUCTURE HEIGHT:	164'-0"±
RAD CENTER:	221'-0"± (LTE) 222'-9"± & 219'-2"± (C-BAND) (ALPHA & GAMMA SECTOR) 178'-0"± (LTE) 179'-9"± & 176'-2"± (C-BAND) (BETA SECTOR)
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY

DRAWING INDEX

SHEET NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
GN-1	GENERAL NOTES	0
A-1	ROOFTOP & EQUIPMENT PLANS	0
A-2	EXISTING/PROPOSED ANTENNA LAYOUTS	0
A-3	ELEVATION	0
A-4	DETAILS	0
G-1	GROUNDING DETAILS	0
RF-1	RF PLUMBING DIAGRAM	0
RF-2	RF PLUMBING DIAGRAM	0

SITE NUMBER: CTL02034

SITE NAME: N. HAVEN-310 ORANGE ST-SBC CO

FA CODE: 10034992

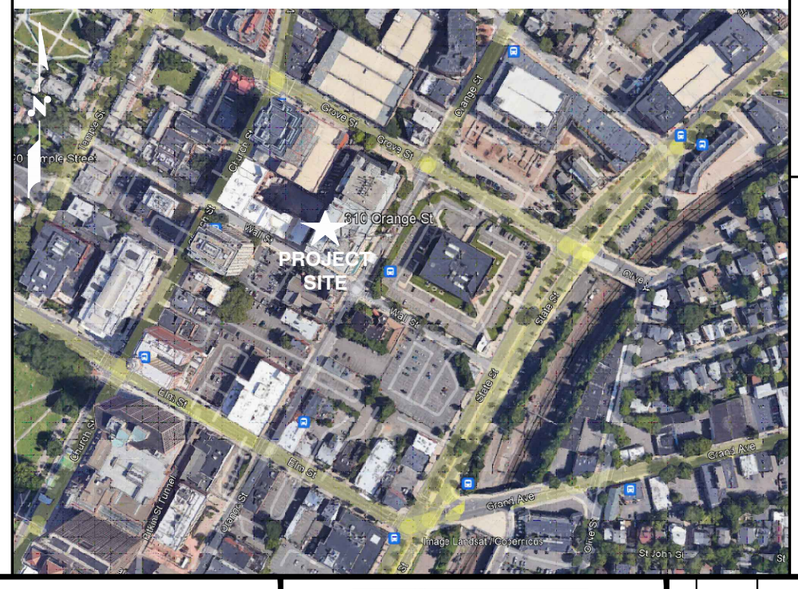
PACE ID: MRCTB057886, MRCTB057896

PROJECT: CELL SITE CAPACITY MODIFICATIONS-BETA SECTOR, SPLIT SECTOR-LTE UPGRADE /5G NR SOFTWARE RADIO/5G NR ACTIVATION

VICINITY MAP

DIRECTIONS TO SITE:

MERGE ONTO I-91 N. CONTINUE ON I-91 N TO EAST HARTFORD. TAKE EXIT 3 FROM CT-2 W MERGE ONTO I-91 N. TAKE EXIT 29 TO MERGE ONTO CT-15 N/US-5 N TOWARD I-84 E/E HARTFORD/BOSTON. CONTINUE ONTO CT-15 N. TAKE EXIT 90 TOWARD CT-2 W. KEEP RIGHT TO STAY ON EXIT 90, FOLLOW SIGNS FOR CT-2 W/E RIVER DR AND MERGE ONTO CT-2 W. TAKE EXIT 3 FOR PITKIN ST. CONTINUE ON PITKIN ST TO YOUR DESTINATION. TURN LEFT ONTO PITKIN ST. TURN RIGHT ONTO DARLIN ST. TURN LEFT ONTO E RIVER DR. TURN RIGHT. TURN RIGHT. DESTINATION WILL BE ON THE LEFT. 99 E RIVER DR EAST HARTFORD, CT 06108



GENERAL NOTES

1. 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.
2. 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.
3. 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.
4. CONSTRUCTION DRAWINGS ARE VALID FOR SIX MONTHS AFTER ENGINEER OF RECORD'S STAMPED AND SIGNED SUBMITTAL DATE LISTED HEREIN.
5. NOTE TO GENERAL CONTRACTOR: (PRIOR TO CONSTRUCTION COMPLETION)

   TEP NORTHEAST (TEP OPCO, LLC.) TO PERFORM POST/CLIMB AND INSPECTION TO CONFIRM PROPOSED INSTALLATION COMPLIES WITH THE RECORD STAMPED DRAWINGS AND STRUCTURAL REPORTS PRIOR TO SUBMITTING FCCA (FINAL CONSTRUCTION CONTROL AFFIDAVIT). GC IS RESPONSIBLE FOR COORDINATING INSPECTIONS WITH TEP NORTHEAST (TEP OPCO, LLC.) PRIOR TO CONSTRUCTION BEING COMPLETED.

72 HOURS

CALL
BEFORE YOU DIG
CALL TOLL FREE 1-800-922-4455
OR CALL 811

UNDERGROUND SERVICE ALERT

TEP NORTHEAST
TEP OPCO, LLC.
45 BEECHWOOD DRIVE, NORTH ANDOVER, MA 01845
TEL: (978) 557-5553

SAI
12 INDUSTRIAL WAY
SALEM, NH 03079

SITE NUMBER: CTL02034
SITE NAME: N. HAVEN-310 ORANGE ST-SBC CO

310 ORANGE STREET DUP 1
NEW HAVEN, CT 06510
NEW HAVEN COUNTY

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

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	10/16/23	ISSUED FOR CONSTRUCTION	AA	BB	DPH
A	10/06/23	ISSUED FOR REVIEW	GA	BB	DPH

SCALE: AS SHOWN | DESIGNED BY: BB | DRAWN BY: GA

STATE OF CONNECTICUT · DANIEL P. HAMM · No. 24178 · LICENSED PROFESSIONAL ENGINEER

AT&T

TITLE SHEET
CELL SITE CAPACITY MODIFICATIONS-BETA SECTOR, SPLIT SECTOR-LTE UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CTL02034	T-1	0

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 – SAI
   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	RAD	RADIATION CENTER LINE OF ANTENNA	VIF	VERIFY IN FIELD
EGR	EQUIPMENT GROUND RING	REF	REFERENCE		

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SCALE: AS SHOWN | DESIGNED BY: BB | DRAWN BY: GA

STATE OF CONNECTICUT · DANIEL P. HAMM · No. 24178 · LICENSED PROFESSIONAL ENGINEER

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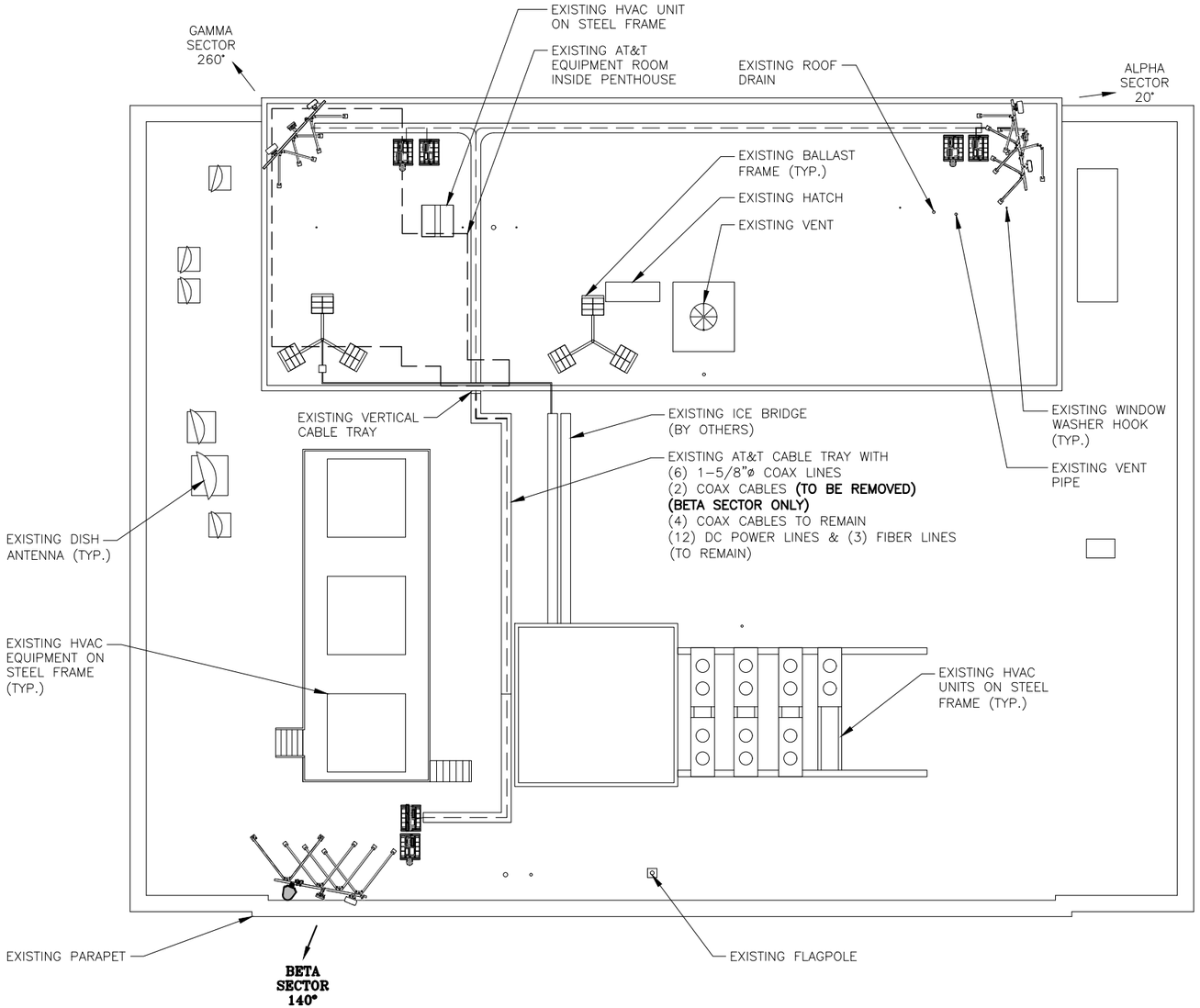
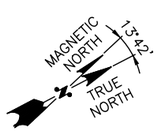
GENERAL NOTES
CELL SITE CAPACITY MODIFICATIONS-BETA
ALL SECTOR, SPLIT SECTOR-LTE UPGRADE

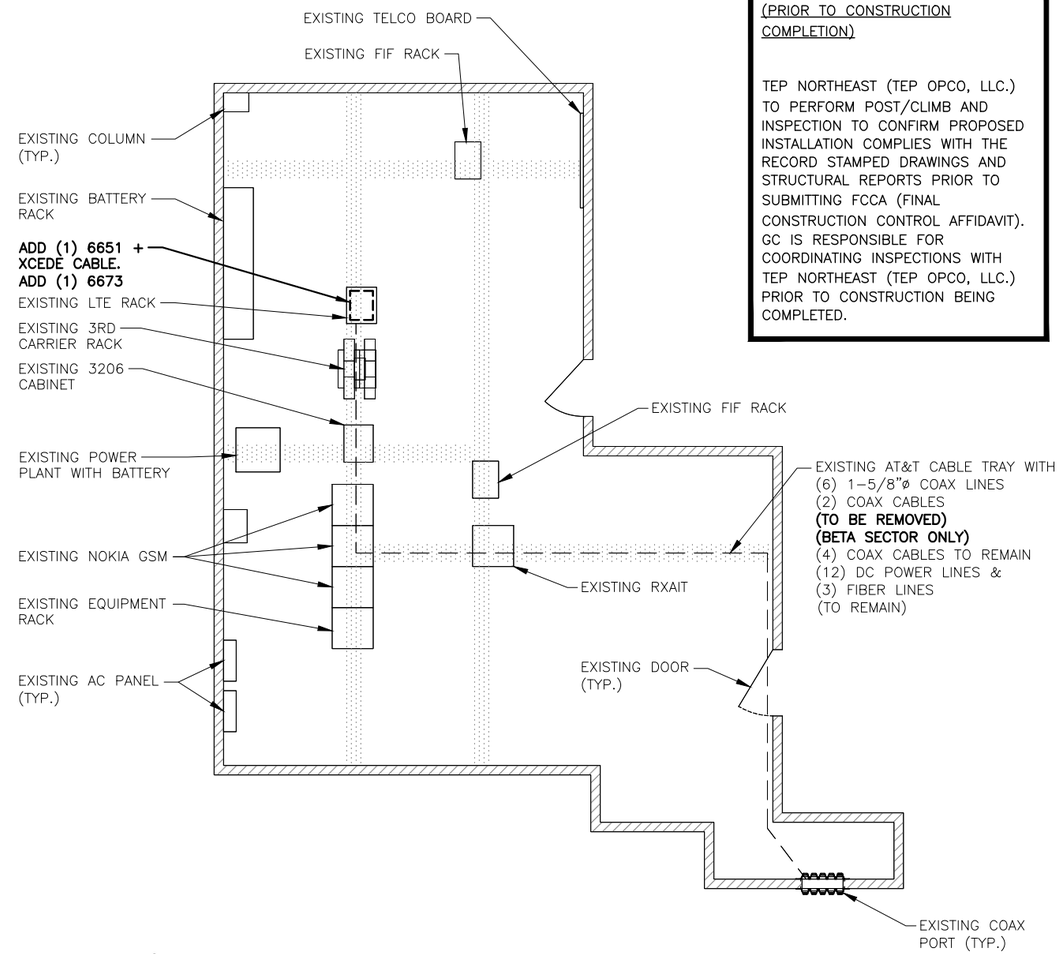
SITE NUMBER	DRAWING NUMBER	REV
CTL02034	GN-1	0

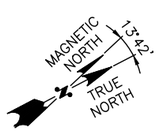




ROOF PLAN (1 / A-1)
22x34 SCALE: 1/4"=1'-0"
11x17 SCALE: 1/8"=1'-0"

0 2'-0" 4'-0" 8'-0" 12'-0"





EQUIPMENT PLAN (2 / A-1)
22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"

0 1'-0" 2'-0" 4'-0" 6'-0"

NOTE:

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

NOTE:

REFER TO STRUCTURAL ANALYSIS BY: TEP NORTHEAST (TEP OPCO, LLC) DATED: SEPTEMBER 29, 2023 (REV.0) FOR THE CAPACITY OF THE EXISTING STRUCTURE TO SUPPORT THE PROPOSED EQUIPMENT

NOTE TO GENERAL CONTRACTOR: (PRIOR TO CONSTRUCTION COMPLETION)

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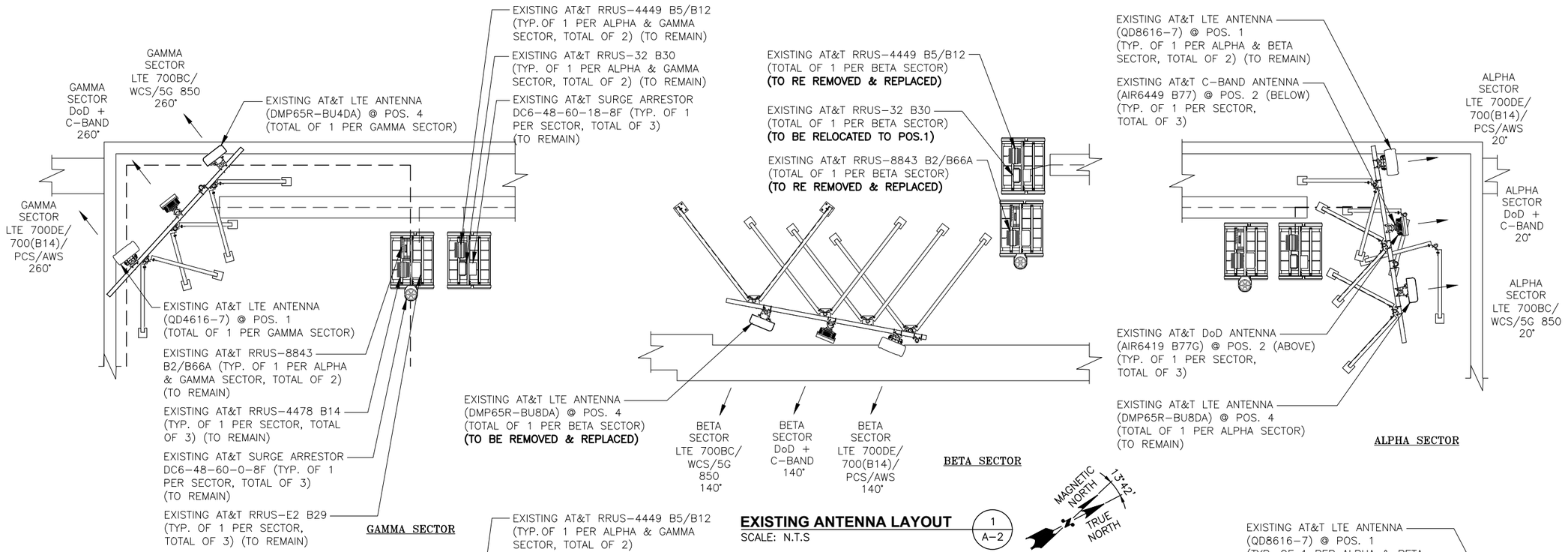
STATE OF CONNECTICUT
DANIEL P. HAMM
No. 24178
LICENSED PROFESSIONAL ENGINEER

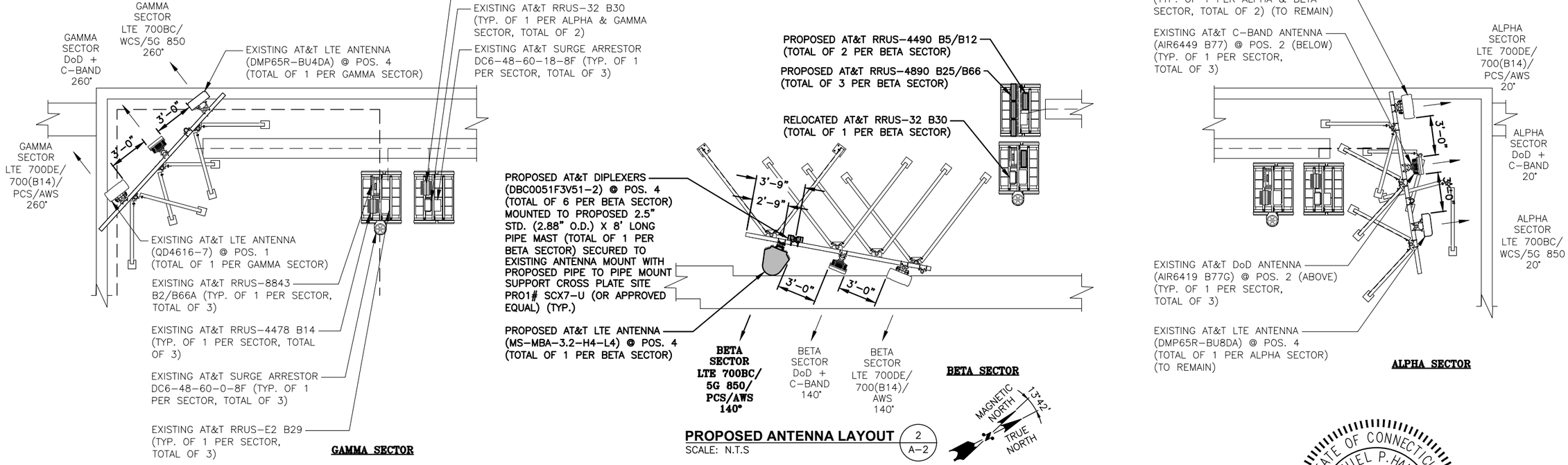
AT&T

ROOFTOP & EQUIPMENT PLANS
CELL SITE CAPACITY MODIFICATIONS-BETA SECTOR, SPLIT SECTOR-LTE UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CTL02034	A-1	0



EXISTING ANTENNA LAYOUT (1 / A-2)
SCALE: N.T.S



PROPOSED ANTENNA LAYOUT (2 / A-2)
SCALE: N.T.S

NOTE:

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

NOTE:

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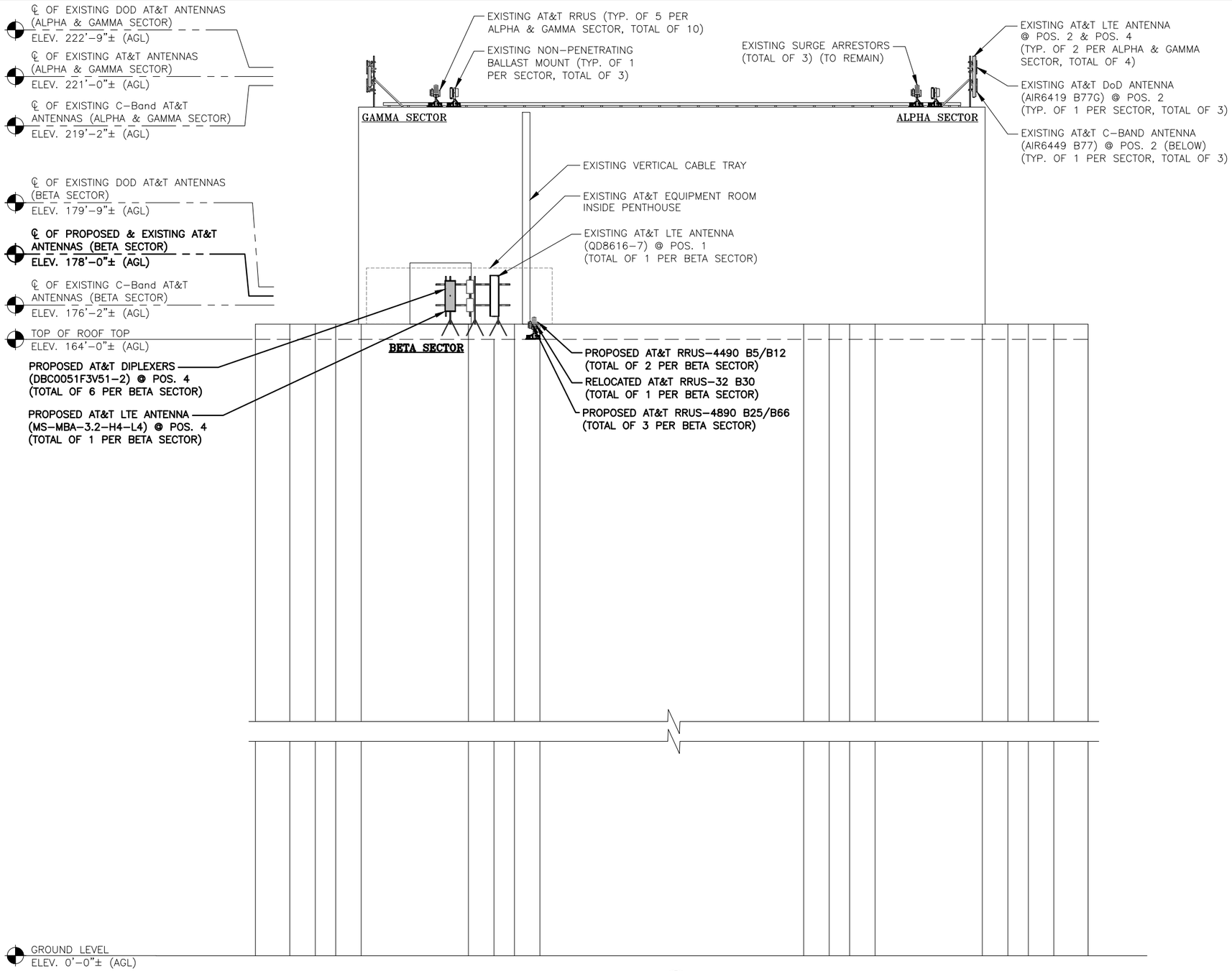
AT&T

EXISTING/PROPOSED ANTENNA LAYOUTS
CELL SITE CAPACITY MODIFICATIONS-BETA SECTOR, SPLIT SECTOR-LTE UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CTL02034	A-2	0



ELEVATION (1 / A-3)
22x34 SCALE: 3/32"=1'-0"
11x17 SCALE: 3/64"=1'-0"
0 5'-4" 10'-8" 21'-4" 32'-0"

NOTE:

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NOTE:

REFER TO STRUCTURAL ANALYSIS BY: TEP NORTHEAST (TEP OPCO, LLC) DATED: SEPTEMBER 29, 2023 (REV.0) FOR THE CAPACITY OF THE EXISTING STRUCTURE TO SUPPORT THE PROPOSED EQUIPMENT

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STATE OF CONNECTICUT · DANIEL P. HAMM · NO. 24178 · LICENSED PROFESSIONAL ENGINEER

AT&T

ELEVATION
CELL SITE CAPACITY MODIFICATIONS-BETA SECTOR, SPLIT SECTOR-LTE UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CTL02034	A-3	0

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	EXISTING	LTE 700(DE)/700(B14/PCS/AWS	QD8616-7	96X22X9.6	221'-0"±	20°	–	(E)(1) 4478 B14 (700) (E)(1) 8843 B2/B66A (PCS/AWS) (E)(1) RRUS-E2 B29 (700)	– – –	(4)(E) DC POWER & (1) FIBER (E)(1) Y-CABLE	(E) (1) RAYCAP DC6-48-60-0-8F (E) (1) RAYCAP DC6-48-60-18-8F
A2	EXISTING	DOD+C-BAND	AIR6449 B77D+ AIR6419 B77G STACKED	31.1X16.1X7.3 30.6X15.9X10.6	222'-9"± 219'-2"±	20°	–	–	–	–	
A3	–	–	–	–			–	–	–	–	
A4	EXISTING	LTE 700(BC)/AWS/5G 850	DMP65R-BU8DA	96.0X20.7X7.7	221'-0"±	20°	–	(E)(1) 4449 B5/B12 (850/700) (E)(1) RRUS-32 B30 (WCS)	– –	(E)(2)1-5/8 COAX (E)(1) Y-CABLE	
B1	EXISTING	LTE 700(DE)/700(B14/PCS/AWS	QD8616-7	96X22X9.6	178'-0"±	140°	–	(E)(1) 4478 B14 (700) (E)(1) RRUS-32 B30 (WCS) (E)(1) RRUS-E2 B29 (700)	– – –	(4)(E) POWER & (1) FIBER	(E) (1) RAYCAP DC6-48-60-0-8F (E) (1) RAYCAP DC6-48-60-18-8F
B2	EXISTING	DOD+C-BAND	AIR6449 B77D+ AIR6419 B77G STACKED	31.1X16.1X7.3 30.6X15.9X10.6	179'-9"± 176'-2"±	140°	–	–	–		
B3	–	–	–	–	–	–	–	–	–	–	
B4	**PROPOSED**	**LTE 700(BC)/AWS/5G 850**	**MS-MBA-3.2-H4-L4**	**72X24X25**	**178'-0"±**	**140°**	**(6) DBC0051F3V51-2**	**(P)(2) 4490 B5/B12 (850/700) (P)(3) 4890 B25/B66 (PCS/AWS)**	**17.5X15.1X6.8 17.5X15.1X6.9**	–	
C1	EXISTING	LTE 700(DE)/700(B14/PCS/AWS	QD4616-7	51.5X22X9.6	221'-0"±	260°	–	(E)(1) 4478 B14 (700) (E)(1) 8843 B2/B66A (PCS/AWS) (E)(1) RRUS-E2 B29 (700)	– – –	(4)(E) DC POWER & (1) FIBER (E)(1) Y-CABLE	(E) (1) RAYCAP DC6-48-60-0-8F (E) (1) RAYCAP DC6-48-60-18-8F
C2	EXISTING	DOD+C-BAND	AIR6449 B77D+ AIR6419 B77G STACKED	31.1X16.1X7.3 30.6X15.9X10.6	222'-9"± 219'-2"±	260°	–	–	–	–	
C3	–	–	–	–	–	–	–	–	–	–	
C4	EXISTING	LTE 700(BC)/AWS/5G 850	DMP65R-BU4DA	48.0X20.7X7.7	221'-0"±	260°	–	(E)(1) 4449 B5/B12 (850/700) (E)(1) RRUS-32 B30 (WCS)	– –	(E)(2)1-5/8 COAX (E)(1) Y-CABLE	

NOTE TO GENERAL CONTRACTOR: (PRIOR TO CONSTRUCTION COMPLETION)

TEP NORTHEAST (TEP OPCO, LLC.) TO PERFORM POST/CLIMB AND INSPECTION TO CONFIRM PROPOSED INSTALLATION COMPLIES WITH THE RECORD STAMPED DRAWINGS AND STRUCTURAL REPORTS PRIOR TO SUBMITTING FCCA (FINAL CONSTRUCTION CONTROL AFFIDAVIT). GC IS RESPONSIBLE FOR COORDINATING INSPECTIONS WITH TEP NORTHEAST (TEP OPCO, LLC.) PRIOR TO CONSTRUCTION BEING COMPLETED.

NOTE:

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

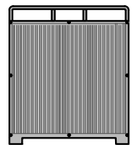
NOTE:

REFER TO STRUCTURAL ANALYSIS BY: TEP NORTHEAST (TEP OPCO, LLC) DATED: SEPTEMBER 29, 2023 (REV.0) FOR THE CAPACITY OF THE EXISTING STRUCTURE TO SUPPORT THE PROPOSED EQUIPMENT

RRU CHART

QUANTITY	MODEL	SIZE (L x W x D)
2(P)	**4490 B5/B12 (850/700)**	**17.5"x15.1"x6.8"**
3(P)	**4890 B25/B66 (PCS/AWS)**	**17.5"X15.1"X6.9"**
2(E)	4449 (850/700)	17.9"X13.2"X10.4"
2(E)	8843 (PCS/AWS)	14.9"x13.2"x10.9"
3(E)	4478 B14 (700)	18.1"x13.4"x8.3"
3(E)	RRUS-32 (WCS)	27.2"x12.1"x7.0"
3(E)	RRUS-E2 B29	20.4"x18.5"x7.5"

NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS



NOTE:
FREQUENCY AND SEE RFDS FOR RRH MODEL NUMBER

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

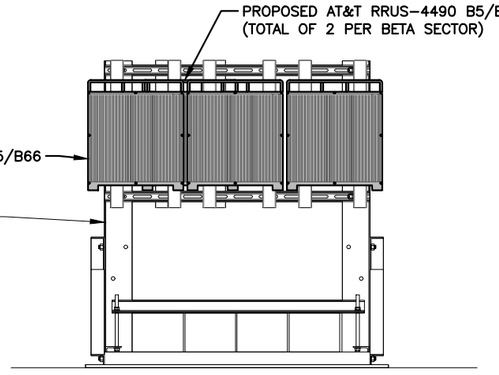
NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

PROPOSED RRUS DETAIL (2 / A-4)
SCALE: N.T.S

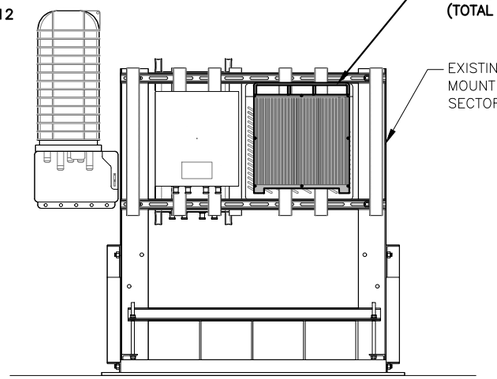
FINAL ANTENNA SCHEDULE (1 / A-4)
SCALE: N.T.S

MINIMUM BALLAST REQUIREMENTS - (RR-TFS)			
	EXISTING	PROPOSED	TOTAL
NUMBER OF BLOCKS	4	14	18
SIZE OF BLOCKS	4"X8"x16" SOLID	4"X8"X16" SOLID	4"X8"x16" SOLID
WEIGHT OF BLOCKS	33 lbs. / EACH	33 LBS. / EACH	33 lbs. / EACH
TOTAL BALLAST WEIGHT	165 lbs.	462 lbs.	594 lbs.

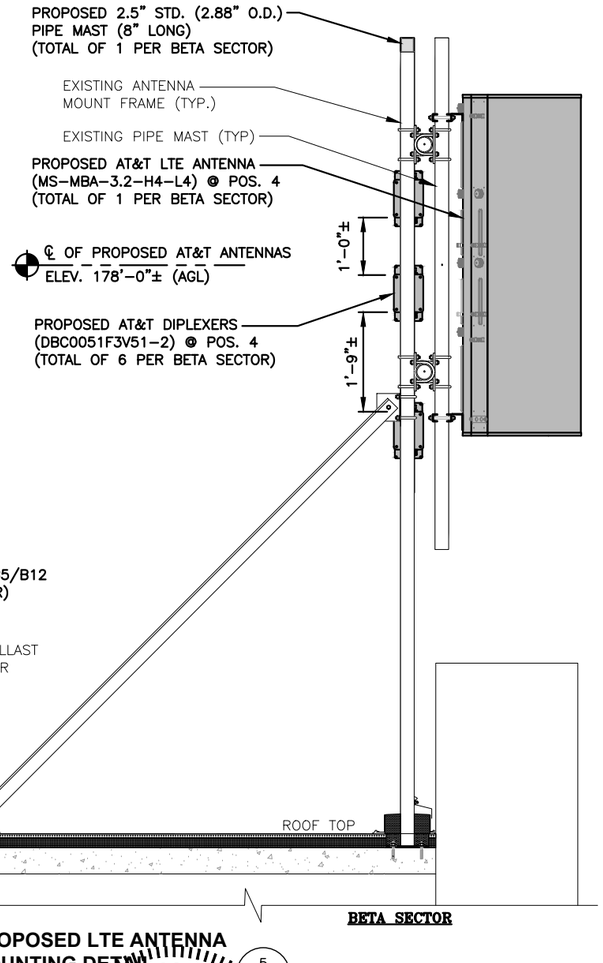
MINIMUM BALLAST REQUIREMENTS - (RT-RRU5HD)			
	EXISTING	PROPOSED	TOTAL
NUMBER OF BLOCKS	10	0	10
SIZE OF BLOCKS	4"X8"x16" SOLID	N/A	4"X8"x16" SOLID
WEIGHT OF BLOCKS	33 lbs. / EACH	N/A	33 lbs. / EACH
TOTAL BALLAST WEIGHT	330 lbs.	N/A	330 lbs.



PROPOSED RRUS MOUNTING DETAIL (3 / A-4)
22x34 SCALE: N.T.S



PROPOSED RRUS MOUNTING DETAIL (4 / A-4)
22x34 SCALE: N.T.S



PROPOSED LTE ANTENNA MOUNTING DETAIL (5 / A-4)
22x34 SCALE: 1/2" = 1'-0"
11x17 SCALE: 1/4" = 1'-0"

0 8" 1'-4" 2'-8" 4'-0"

TEP NORTHEAST
TEP OPCO, LLC.
45 BEECHWOOD DRIVE, NORTH ANDOVER, MA 01845
TEL: (978) 557-5553

SAI
12 INDUSTRIAL WAY
SALEM, NH 03079

SITE NUMBER: CTL02034
SITE NAME: N. HAVEN-310 ORANGE ST-SBC CO

310 ORANGE STREET DUP 1
NEW HAVEN, CT 06510
NEW HAVEN COUNTY

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

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	10/16/23	ISSUED FOR CONSTRUCTION	AA	BB	DPH
A	10/06/23	ISSUED FOR REVIEW	AA	BB	DPH

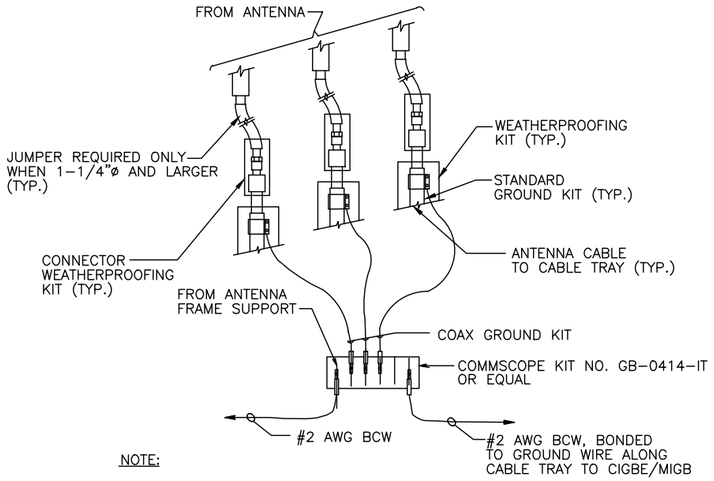
SCALE: AS SHOWN | DESIGNED BY: BB | DRAWN BY: GA

DENISE P. HAMM — No. 24178 — LICENSED PROFESSIONAL ENGINEER — CONNECTICUT

AT&T

DETAILS
CELL SITE CAPACITY MODIFICATIONS-BETA SECTOR, SPLIT SECTOR-LTE UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CTL02034	A-4	0



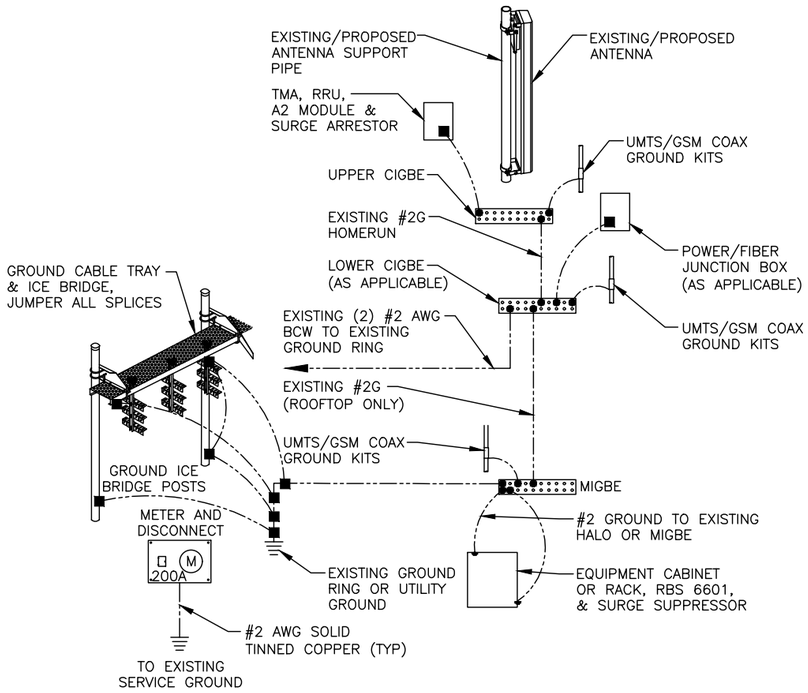
NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

GROUND WIRE TO GROUND BAR CONNECTION DETAIL

SCALE: N.T.S

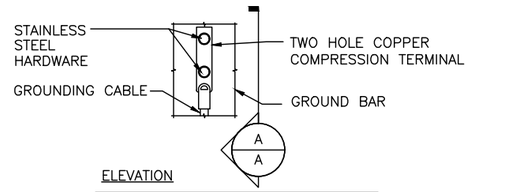
1 / G-1



GROUNDING RISER DIAGRAM

SCALE: N.T.S

2 / 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

SCALE: N.T.S

3 / G-1

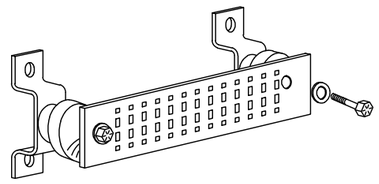
EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

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

4 / G-1

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A	10/06/23	ISSUED FOR REVIEW	GA	BB	DPH

SCALE: AS SHOWN | DESIGNED BY: BB | DRAWN BY: GA

STATE OF CONNECTICUT
DANIEL P. HAMM
No. 24178
LICENSED PROFESSIONAL ENGINEER

AT&T

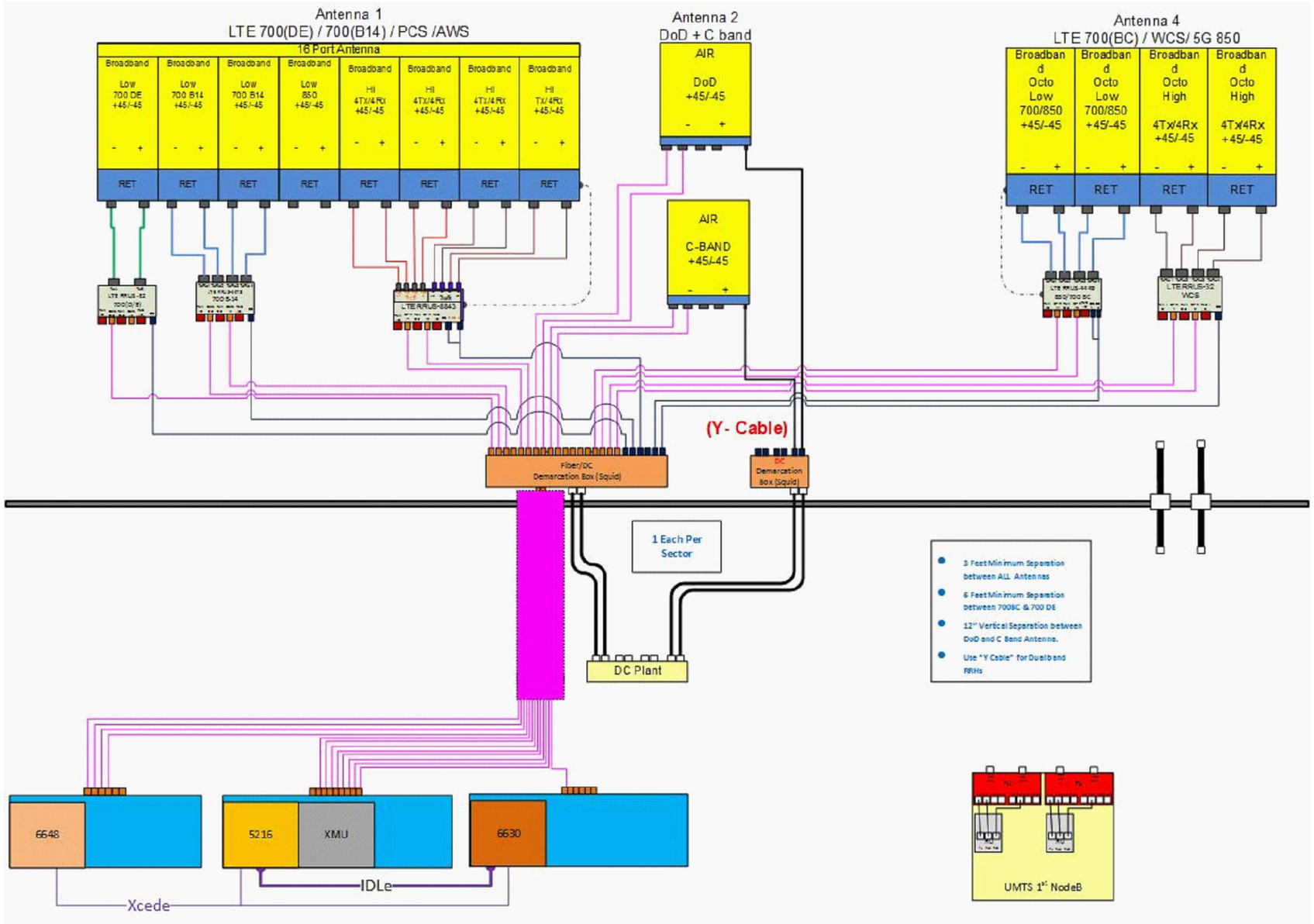
GROUNDING DETAILS
CELL SITE CAPACITY MODIFICATIONS-BETA SECTOR, SPLIT SECTOR-LTE UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CTL02034	G-1	0

ALPHA & GAMMA

NOTE:

REV: 2
DATED: 09/07/2023
RFDS ID: 5618305



RF PLUMBING DIAGRAM (1 / RF–1)
SCALE: N.T.S

NOTE:
1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS.
3. RFDS USED FOR REFERENCE.

NOTE:

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

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0	10/16/23	ISSUED FOR CONSTRUCTION	AM	BB	DPH
A	10/06/23	ISSUED FOR REVIEW	GA	BB	DPH

SCALE: AS SHOWN | DESIGNED BY: BB | DRAWN BY: GA

AT&T

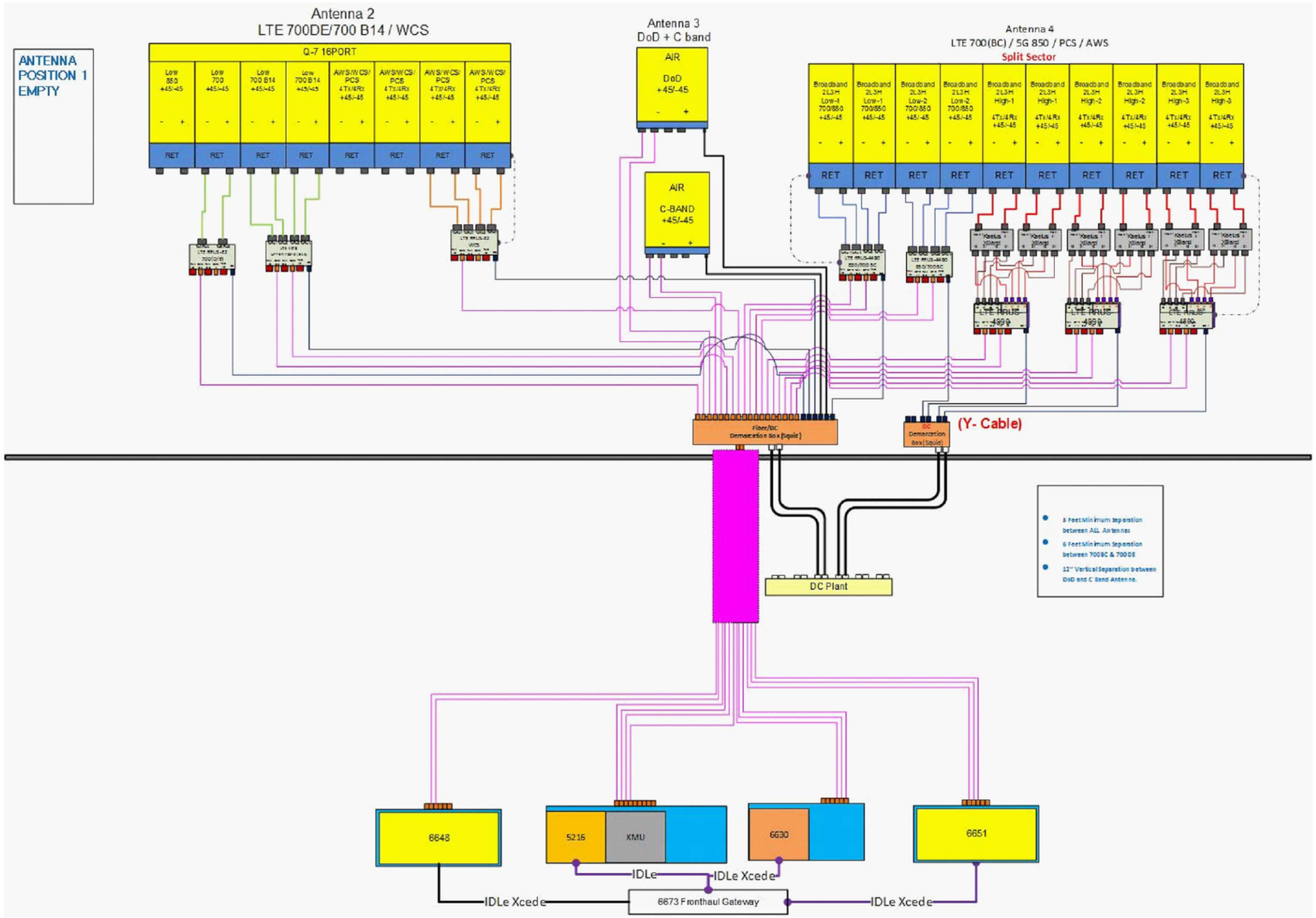
RF PLUMBING DIAGRAM
CELL SITE CAPACITY MODIFICATIONS–BETA
SECTOR, SPLIT SECTOR–LTE UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CTL02034	RF–1	0

BETA

NOTE:

REV: 2
DATED: 09/07/2023
RFDS ID: 5618305



RF PLUMBING DIAGRAM (1 / RF–2)
SCALE: N.T.S

NOTE:
1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS.
3. RFDS USED FOR REFERENCE.

NOTE:

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

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NEW HAVEN COUNTY

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A	10/06/23	ISSUED FOR REVIEW	GA	BB	DPH

SCALE: AS SHOWN | DESIGNED BY: BB | DRAWN BY: GA

AT&T

RF PLUMBING DIAGRAM
CELL SITE CAPACITY MODIFICATIONS–BETA
SECTOR, SPLIT SECTOR–LTE UPGRADE

SITE NUMBER	DRAWING NUMBER	REV
CTL02034	RF–2	0

STRUCTURAL ANALYSIS REPORT

For

AT&T Site Number: CT2034 (C-BAND)

TEP Project Number: 320371.883049

AT&T Site Name: N. HAVEN-310 ORANGE ST-SBC CO

310 Orange Street Dup 1
New Haven, CT 06510

Antennas Mounted on Rooftop Steel Frames; RRH's on Non-Penetrating Ballast Sleds on the Rooftop

Prepared for:

SAI at&t

Dated: September 29, 2023

Prepared by:

TEP NORTHEAST

(TEP OPCO, LLC)
45 Beechwood Drive
North Andover, MA 01845
(P) 978.557.5553
www.tepgroup.net

STATE OF CONNECTICUT
DANIEL HAMM
24178
LICENSED
PROFESSIONAL ENGINEER

SCOPE OF WORK:

TEP Northeast (TEP NE) has been authorized by AT&T to conduct a structural evaluation of the structure supporting the proposed equipment located in the areas depicted in the latest TEP NE construction drawings.

This report represents this office's findings, conclusions and recommendations pertaining to the support of AT&T's proposed antennas listed below.

This office conducted an on-site visual survey of the above site on August 29, 2023. Attendees included Ethan Steinberg (TEP NE – CAD Technician).

The following documents were used for our reference:

- Construction Drawings prepared by Hudson Design Group LLC dated July 27, 2017.
- Previous Structural Analysis Report prepared by Hudson Design Group LLC dated January 12, 2022.

CONCLUSION SUMMARY:

Based on our evaluation, we have determined that the existing structure **IS CAPABLE** of supporting the proposed equipment loading.

	Member	Controlling Load Case	Stress Ratio	Pass/Fail
Roof Structure	Slab	Bending	41%	**PASS**

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

	Member	Controlling Load Case	Stress Ratio	Pass/Fail
Beta Sector Antenna Mount	22	LC3	83%	**PASS**

Based on our evaluation, we have determined that the existing connections **ARE CAPABLE** of supporting the proposed equipment loading.

	Member	Stress Ratio	Pass/Fail
Existing Connection	1/2" Epoxy Anchor	20%	**PASS**

* Reference Documents attached.

CONCLUSION SUMMARY:

Reference the table below for the minimum ballast requirements:

MINIMUM BALLAST REQUIREMENTS – RRH BALLAST SLED (RR-TFS)			
	Existing (Per Side)	**Proposed (Per Side)**	**Total**
Number of Blocks	2	7	9
Size of Blocks	4"x8"x16" Solid	4"x8"x16" Solid	4"x8"x16" Solid
Weight of Blocks	33 lbs. /each	33 lbs. /each	33 lbs. /each
Total Ballast Weight	66 lbs.	231 lbs.	594 lbs.

Reference the table below for the minimum ballast requirements:

MINIMUM BALLAST REQUIREMENTS – RRH BALLAST SLED (RT-RRU5HD)			
	Existing (Per Side)	**Proposed (Per Side)**	**Total**
Number of Blocks	5	0	10
Size of Blocks	4"x8"x16" Solid	N/A	4"x8"x16" Solid
Weight of Blocks	33 lbs. /each	N/A	33 lbs. /each
Total Ballast Weight	165 lbs.	0 lbs.	330 lbs.

No additional ballast is required. The number of blocks required for the proposed equipment does not exceed the current number of blocks.

* Reference Documents attached.

APPURTENANCE CONFIGURATION:

Appurtenances	Dimensions	Weight	**Elevation	Mount
(3) AIR6419 Antennas	31.2"x16.1"x9.1"	66 lbs	Varies	Pipe Mast
(3) AIR6449 Antennas	30.6"x15.9"x10.6"	84 lbs	Varies	Pipe Mast
(2) QD8616-7 Antennas	96.0"x22.0"x9.6"	150 lbs	Varies	Pipe Mast
(1) QD4616-7 Antenna	51.5"x22.0"x9.6"	109 lbs	221'-0"	Pipe Mast
(1) DMP65R-BU8DA Antenna	96.0"x20.7"x7.7"	119 lbs	221'-0"	Pipe Mast
(1) DMP65R-BU4DA Antenna	48.0"x20.7"x7.7"	68 lbs	221'-0"	Pipe Mast
(3) 4478 B14 RRH's	18.1"x13.4"x8.3"	60 lbs	--	Ballast Sled
(3) RRUS-E2 B29 RRH's	20.4"x18.5"x7.5"	53 lbs	--	Ballast Sled
(3) RRUS-32 B30 RRH's	27.2"x12.1"x7.0"	60 lbs	--	Ballast Sled
(2) 8843 B2/B66A RRH's	14.9"x13.2"x10.9"	72 lbs	--	Ballast Sled
(2) 4449 B5/B12 RRH's	17.9"x13.2"x9.4"	73 lbs	--	Ballast Sled
(3) DC6-48-60-0-8F Surge Arrestors	31.4"x10.2" Ø	29 lbs	--	Ballast Sled
(3) DC6-48-60-18-8F Surge Arrestors	20.1"x18.2"x6.4"	44 lbs	--	Ballast Sled
(1) MS-MBA-3.2-H4-L4 Antenna	72.0"x24.0"x26.0"	132 lbs	178'-0"	Pipe Mast
(2) 4490 B5/B12 RRH's	17.5"x15.1"x6.8"	68 lbs	--	Ballast Sled
(3) 4890 B25/B66 RRH's	17.5"x15.2"x6.9"	68 lbs	--	Ballast Sled
(6) DBC0051F3V51-2 Diplexers	8.5"x5.0"x2.2"	8 lbs	--	Pipe Mast

** Proposed equipment shown in bold.*
*** Elevation to antenna centerline.*
*** Alpha and Gamma sectors at elevation 221'-0"; Beta sector at elevation 178'-0".*

DESIGN CRITERIA:

International Building Code (IBC) 2021 with 2022 Connecticut State Building Code Amendments, and ASCE 7-16 (Minimum Design Loads for Buildings and Other Structures).		
Wind		
Reference Wind Speed:	125 mph	(2022 CSBC Appendix P)
Exposure Category:	B	(ASCE 7-16 Chapter 26)
Risk Category:	II	(ASCE 7-16 Table 1.5-1)
Snow		
Ground Snow, P_G:	30 psf	(2022 CSBC Appendix P)
Importance Factor (I_s):	1.0	(ASCE 7-16 Table 1.5-2)
Exposure Factor (C_e):	0.9	(Fully Exposed, Table 7.3-1)
Thermal Factor (C_t):	1.0	(ASCE 7-16 Table 7.3-2)
Flat Roof Snow Load:	19 psf	(ASCE 7-16 Equation 7.3-1)
Min. Flat Roof Snow Load:	30 psf	
EIA/TIA-222-H Structural Standards for Steel Antenna Towers and Antenna Supporting Structures		
Wind		
City/Town:	New Haven	
County:	New Haven	
Wind Load:	125 mph	(TIA-222-H Figure B-2)
Ice		
Design Ice Thickness (t_i):	1.00 in	(TIA-222-H Figure B-9)
Structure Class:	II	(TIA-222-H Table 2-1)
Importance Factor (I_i):	1.0	(TIA-222-H Table 2-3)
Factored Thickness of Radial Ice (t_{iz}):	1.21 in	(TIA-222-H Sec. 2.6.10)

EXISTING ROOF CONSTRUCTION:

The existing roof construction consists of a roofing membrane over rigid insulation over a composite concrete slab supported by a system of concrete beams and columns.

ANTENNA SUPPORT RECOMMENDATIONS:

The proposed antenna is to be mounted on an existing pipe mast installed on an existing steel frame secured to the existing concrete roof slab with epoxy anchors.

RRH SUPPORT RECOMMENDATIONS:

The proposed RRH's are to be mounted on existing non-penetrating ballast sleds located on the roof of the existing building. Reference the tables on page 3 for the minimum ballast requirements.

Limitations and Assumptions:

1. Reference the latest TEP NE construction drawings for all the equipment locations and details.
2. All detail requirements will be designed and furnished in the construction drawings.
3. 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.
4. TEP NE is not responsible for any modifications completed prior to and hereafter which TEP NE was not directly involved.
5. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer requirements.
6. If field conditions differ from what is assumed in this report, then the engineer of record is to be notified as soon as possible.

FIELD PHOTOS:

Photo 1: Sample photo illustrating the existing Alpha sector.

Photo 2: Sample photo illustrating the existing Beta sector.

FIELD PHOTOS (CONT.):

Photo 3: Sample photo illustrating the existing Gamma sector.

Photo 4: Sample photo illustrating an existing RRH ballast sled at Beta sector.

Wind & Ice
Calculations

Date: 9/26/2023
Project Name: N. HAVEN-310 ORANGE ST-SBC CO
Project No.: CT2034
Designed By: CL **Checked By:** MSC

TEP NORTHEAST

2.6.5.2 Velocity Pressure Coeff:

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

z=	221	(ft)
z_g=	1200	(ft)
α=	7.0	

K_z= 1.240

Kzmin ≤ Kz ≤ 2.01

Table 2-4

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

2.6.6.2 Topographic Factor:

Table 2-5

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

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

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

K_{zt}= 1

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

Category= 1

K_h=	1	
K_c=	0.9	(from Table 2-4)
K_t=	0	(from Table 2-5)
f=	0	(from Table 2-5)
z=	221	
z_s=	15	(Mean elevation of base of structure above sea level)
H=	0	(Ht. of the crest above surrounding terrain)
K_{zt}=	1.00	(from 2.6.6.2.1)
K_e=	1.00	(from 2.6.8)

2.6.10 Design Ice Thickness

Max Ice Thickness = t_i = 1.00 in
Importance Factor = I= 1.00 (from Table 2-3)
K_{iz} = 1.21 (from Sec. 2.6.10)

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

t_{iz} = 1.21 in

Date: 9/26/2023
Project Name: N. HAVEN-310 ORANGE ST-SBC CO
Project No.: CT2034
Designed By: CL 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=	164	G_h=	0.85
2.6.9.2 Guyed Masts		G_h=	0.85
2.6.9.3 Pole Structures		G_h=	1.1
2.6.9 Appurtenances		G_h=	1.0

2.6.9.4 Structures Supported on Other Structures

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

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

2.6.11.2 Design Wind Force on Appurtenances

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

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

		K_z=	1.240	(from 2.6.5.2)
		K_{zt}=	1.0	(from 2.6.6.2.1)
		K_s=	1.0	(from 2.6.7)
q_z=	**47.08**	K_e=	1.00	(from 2.6.8)
$q_{z\ (ice)}$=	**7.53**	K_d=	0.95	(from Table 2-2)
$q_{z\ (30)}$=	**2.71**	V_{max}=	125	mph (Ultimate Wind Speed)
		$V_{max\ (ice)}$=	50	mph
		V_{30}=	30	mph

Table 2-2

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

Date: 9/26/2023
Project Name: N. HAVEN-310 ORANGE ST-SBC CO
Project No.: CT2034
Designed By: CL Checked By: MSC

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) ≥ 0.85	1.4 - 4.0(r_s) ≥ 0.90	2.0 - 6.0(r_s) ≥ 1.25
Round	C < 39 (Subcritical)	0.7	0.8	1.2
	39 ≤ C ≤ 78 (Transitional)	$4.14/(C^{0.485})$	$3.66/(C^{0.415})$	$46.8/(C^{1.0})$
	C > 78 (Supercritical)	0.5	0.6	0.6

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

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

Ice Thickness = 1.21 in | **Angle =** 0 (deg) | **Equivalent Angle =** 180 (deg)

Appurtenances	Height	Width	Depth	Flat Area	Aspect Ratio	Ca	Force (lbs)	Force (lbs) (w/ Ice)
AIR6419 Antenna	31.2	16.1	9.1	3.49	1.94	1.20	197	39
AIR6449 Antenna	30.6	15.9	10.6	3.38	1.92	1.20	191	38
QD8616-7 Antenna	96.0	22.0	9.6	14.67	4.36	1.28	886	161
QD4616-7 Antenna	51.5	22.0	9.6	7.87	2.34	1.20	444	83
DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	4.64	1.30	841	154
DMP65R-BU4DA Antenna	48.0	20.7	7.7	6.90	2.32	1.20	390	73
MS-MBA-3.2-H4-L4 Antenna	72.0	24.0	26.0	12.00	3.00	1.22	690	126
4478 B14 RRH	18.1	13.4	8.3	1.68	1.35	1.20	95	20
RRUS-E2 B29 RRH	20.4	18.5	7.5	2.62	1.10	1.20	148	30
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	2.25	1.20	129	27
8843 B2/B66A RRH	14.9	13.2	10.9	1.37	1.13	1.20	77	17
4449 B5/B12 RRH	17.9	13.2	9.4	1.64	1.36	1.20	93	20
4490 B5/B12 RRH	17.5	15.1	6.8	1.84	1.16	1.20	104	22
4890 B25/B66 RRH	17.5	15.2	6.9	1.85	1.15	1.20	104	22
DBC0051F3V51-2 Diplexer	8.5	5.0	2.2	0.30	1.70	1.20	17	5
DC6-48-60-18-8F Surge Arrestor	20.1	18.2	6.4	2.54	1.10	1.20	144	29
DC6-48-60-0-8F Surge Arrestor	31.4	10.2	10.2	2.22	3.08	0.70	73	16
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	16	
L 3x3 Angles	3.0	12.0		0.25	0.25	2.00	24	
PL 8x1/4"	8.0	12.0		0.67	0.67	2.00	63	

Date: 9/26/2023
Project Name: N. HAVEN-310 ORANGE ST-SBC CO
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Designed By: CL Checked By: MSC

WIND LOADS

Angle =	90	(deg)	Ice Thickness =	1.21	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)
AIR6419 Antenna	31.2	16.1	9.1	3.49	1.97	1.94	3.43	1.20	1.24	197	115	115
AIR6449 Antenna	30.6	15.9	10.6	3.38	2.25	1.92	2.89	1.20	1.22	191	129	129
QD8616-7 Antenna	96.0	22.0	9.6	14.67	6.40	4.36	10.00	1.28	1.50	886	452	452
QD4616-7 Antenna	51.5	22.0	9.6	7.87	3.43	2.34	5.36	1.20	1.33	444	215	215
DMP65R-BU8DA Antenna	96.0	20.7	7.7	13.80	5.13	4.64	12.47	1.30	1.58	841	382	382
DMP65R-BU4DA Antenna	48.0	20.7	7.7	6.90	2.57	2.32	6.23	1.20	1.37	390	165	165
MS-MBA-3.2-H4-L4 Antenna	72.0	24.0	26.0	12.00	13.00	3.00	2.77	1.22	1.21	690	742	742
4478 B14 RRH	18.1	13.4	8.3	1.68	1.04	1.35	2.18	1.20	1.20	95	59	59
RRUS-E2 B29 RRH	20.4	18.5	7.5	2.62	1.06	1.10	2.72	1.20	1.21	148	61	61
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	129	79	79
8843 B2/B66A RRH	14.9	13.2	10.9	1.37	1.13	1.13	1.37	1.20	1.20	77	64	64
4449 B5/B12 RRH	17.9	13.2	9.4	1.64	1.17	1.36	1.90	1.20	1.20	93	66	66
4490 B5/B12 RRH	17.5	15.1	6.8	1.84	0.83	1.16	2.57	1.20	1.20	104	47	47
4890 B25/B66 RRH	17.5	15.2	6.9	1.85	0.84	1.15	2.54	1.20	1.20	104	47	47
DBC0051F3V51-2 Diplexer	8.5	5.0	2.2	0.30	0.13	1.70	3.86	1.20	1.26	17	8	8
DC6-48-60-18-8F Surge Arrestor	20.1	18.2	6.4	2.54	0.89	1.10	3.14	1.20	1.23	144	52	52

WIND LOADS WITH ICE:

AIR6419 Antenna	33.6	18.5	11.5	4.32	2.69	1.82	2.92	1.20	1.22	39	25	25
AIR6449 Antenna	33.0	18.3	13.0	4.20	2.99	1.80	2.54	1.20	1.20	38	27	27
QD8616-7 Antenna	98.4	24.4	12.0	16.69	8.21	4.03	8.19	1.27	1.44	159	89	89
QD4616-7 Antenna	53.9	24.4	12.0	9.14	4.50	2.21	4.49	1.20	1.29	83	44	44
DMP65R-BU8DA Antenna	98.4	23.1	10.1	15.80	6.92	4.26	9.73	1.28	1.49	152	78	78
DMP65R-BU4DA Antenna	50.4	23.1	10.1	8.09	3.54	2.18	4.98	1.20	1.31	73	35	35
MS-MBA-3.2-H4-L4 Antenna	74.4	26.4	28.4	13.65	14.69	2.82	2.62	1.21	1.21	125	133	133
4478 B14 RRH	20.5	15.8	10.7	2.25	1.53	1.30	1.91	1.20	1.20	20	14	14
RRUS-E2 B29 RRH	22.8	20.9	9.9	3.31	1.57	1.09	2.30	1.20	1.20	30	14	14
RRUS-32 B30 RRH	29.6	14.5	9.4	2.99	1.94	2.04	3.14	1.20	1.23	27	18	18
8843 B2/B66A RRH	17.3	15.6	13.3	1.88	1.60	1.11	1.30	1.20	1.20	17	14	14
4449 B5/B12 RRH	20.3	15.6	11.8	2.20	1.67	1.30	1.72	1.20	1.20	20	15	15
4490 B5/B12 RRH	19.9	17.5	9.2	2.42	1.28	1.14	2.16	1.20	1.20	22	12	12
4890 B25/B66 RRH	19.9	17.6	9.3	2.44	1.29	1.13	2.14	1.20	1.20	22	12	12
DBC0051F3V51-2 Diplexer	10.9	7.4	4.6	0.56	0.35	1.47	2.36	1.20	1.20	5	3	3
DC6-48-60-18-8F Surge Arrestor	22.5	20.6	8.8	3.22	1.38	1.09	2.55	1.20	1.20	29	12	12

Date: 9/26/2023
Project Name: N. HAVEN-310 ORANGE ST-SBC CO
Project No.: CT2034
Designed By: CL **Checked By:** MSC

ICE WEIGHT CALCULATIONS

Thickness of ice: 1.21 in.
Density of ice: 56 pcf

AIR6419 Antenna
Weight of ice based on total radial SF area:
Height (in): 31.2
Width (in): 16.1
Depth (in): 9.1
Total weight of ice on object: 76 lbs
Weight of object: 66.0 lbs
Combined weight of ice and object: 142 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: 77 lbs
Weight of object: 84.0 lbs
Combined weight of ice and object: 161 lbs

QD8616-7 Antenna
Weight of ice based on total radial SF area:
Height (in): 96.0
Width (in): 22.0
Depth (in): 9.6
Total weight of ice on object: 298 lbs
Weight of object: 150.0 lbs
Combined weight of ice and object: 448 lbs

QD4616-7 Antenna
Weight of ice based on total radial SF area:
Height (in): 51.5
Width (in): 22.0
Depth (in): 9.6
Total weight of ice on object: 160 lbs
Weight of object: 109.0 lbs
Combined weight of ice and object: 269 lbs

DMP65R-BU8DA Antenna
Weight of ice based on total radial SF area:
Height (in): 96.0
Width (in): 20.7
Depth (in): 7.7
Total weight of ice on object: 276 lbs
Weight of object: 119.0 lbs
Combined weight of ice and object: 395 lbs

DMP65R-BU4DA Antenna
Weight of ice based on total radial SF area:
Height (in): 48.0
Width (in): 20.7
Depth (in): 7.7
Total weight of ice on object: 138 lbs
Weight of object: 68.0 lbs
Combined weight of ice and object: 206 lbs

MS-MBA-3.2-H4-L4 Antenna
Weight of ice based on total radial SF area:
Height (in): 72.0
Width (in): 24.0
Depth (in): 26.0
Total weight of ice on object: 325 lbs
Weight of object: 132.0 lbs
Combined weight of ice and object: 457 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: 38 lbs
Weight of object: 60.0 lbs
Combined weight of ice and object: 98 lbs

RRUS-E2 B29 RRH
Weight of ice based on total radial SF area:
Height (in): 20.4
Width (in): 18.5
Depth (in): 7.5
Total weight of ice on object: 53 lbs
Weight of object: 53.0 lbs
Combined weight of ice and object: 106 lbs

RRUS-32 B30 RRH
Weight of ice based on total radial SF area:
Height (in): 27.2
Width (in): 12.1
Depth (in): 7.0
Total weight of ice on object: 51 lbs
Weight of object: 60.0 lbs
Combined weight of ice and object: 111 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: 34 lbs
Weight of object: 72.0 lbs
Combined weight of ice and object: 106 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: 38 lbs
Weight of object: 73.0 lbs
Combined weight of ice and object: 111 lbs

4490 B5/B12 RRH
Weight of ice based on total radial SF area:
Height (in): 17.5
Width (in): 15.1
Depth (in): 6.8
Total weight of ice on object: 38 lbs
Weight of object: 68.0 lbs
Combined weight of ice and object: 106 lbs

4890 B25/B66 RRH
Weight of ice based on total radial SF area:
Height (in): 17.5
Width (in): 15.2
Depth (in): 6.9
Total weight of ice on object: 39 lbs
Weight of object: 68.0 lbs
Combined weight of ice and object: 107 lbs

DBC0051F3V51-2 Diplexer
Weight of ice based on total radial SF area:
Height (in): 8.5
Width (in): 5.0
Depth (in): 2.2
Total weight of ice on object: 7 lbs
Weight of object: 15.0 lbs
Combined weight of ice and object: 22 lbs

DC6-48-60-18-8F Surge Arrestor
Weight of ice based on total radial SF area:
Height (in): 20.1
Width (in): 18.2
Depth (in): 6.4
Total weight of ice on object: 51 lbs
Weight of object: 44.0 lbs
Combined weight of ice and object: 95 lbs

DC6-48-60-0-8F 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: 44 lbs
Weight of object: 29 lbs
Combined weight of ice and object: 73 lbs

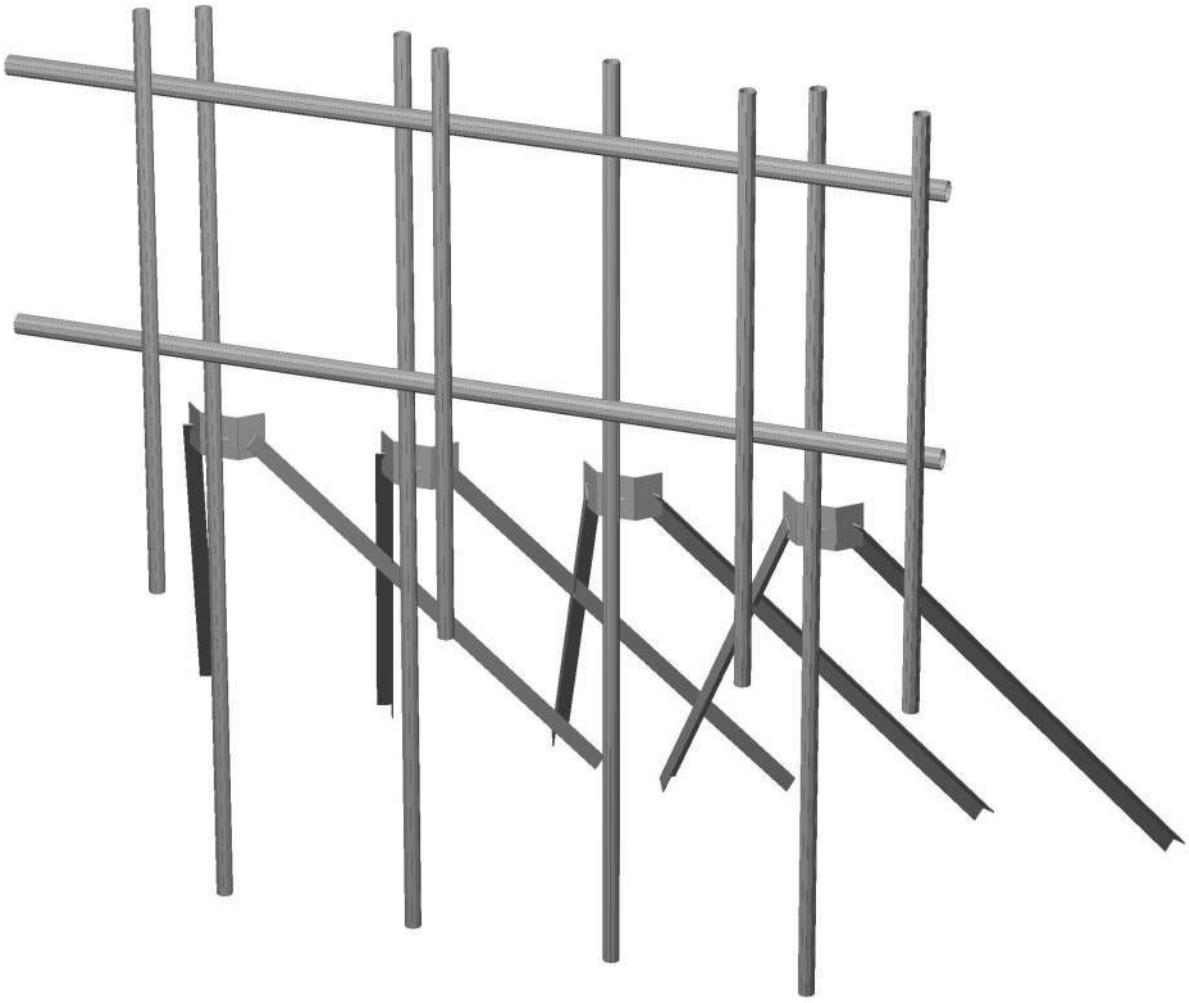
2-1/2" Pipe
Per foot weight of ice:
diameter (in): 2.88
Per foot weight of ice on object: 6 plf

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

L 3x3 Angles
Weight of ice based on total radial SF area:
Height (in): 3
Width (in): 3
Per foot weight of ice on object: 8 plf

PL 8x1/4"
Weight of ice based on total radial SF area:
Height (in): 8
Width (in): 0.25
Per foot weight of ice on object: 14 plf

Antenna Mount
Calculations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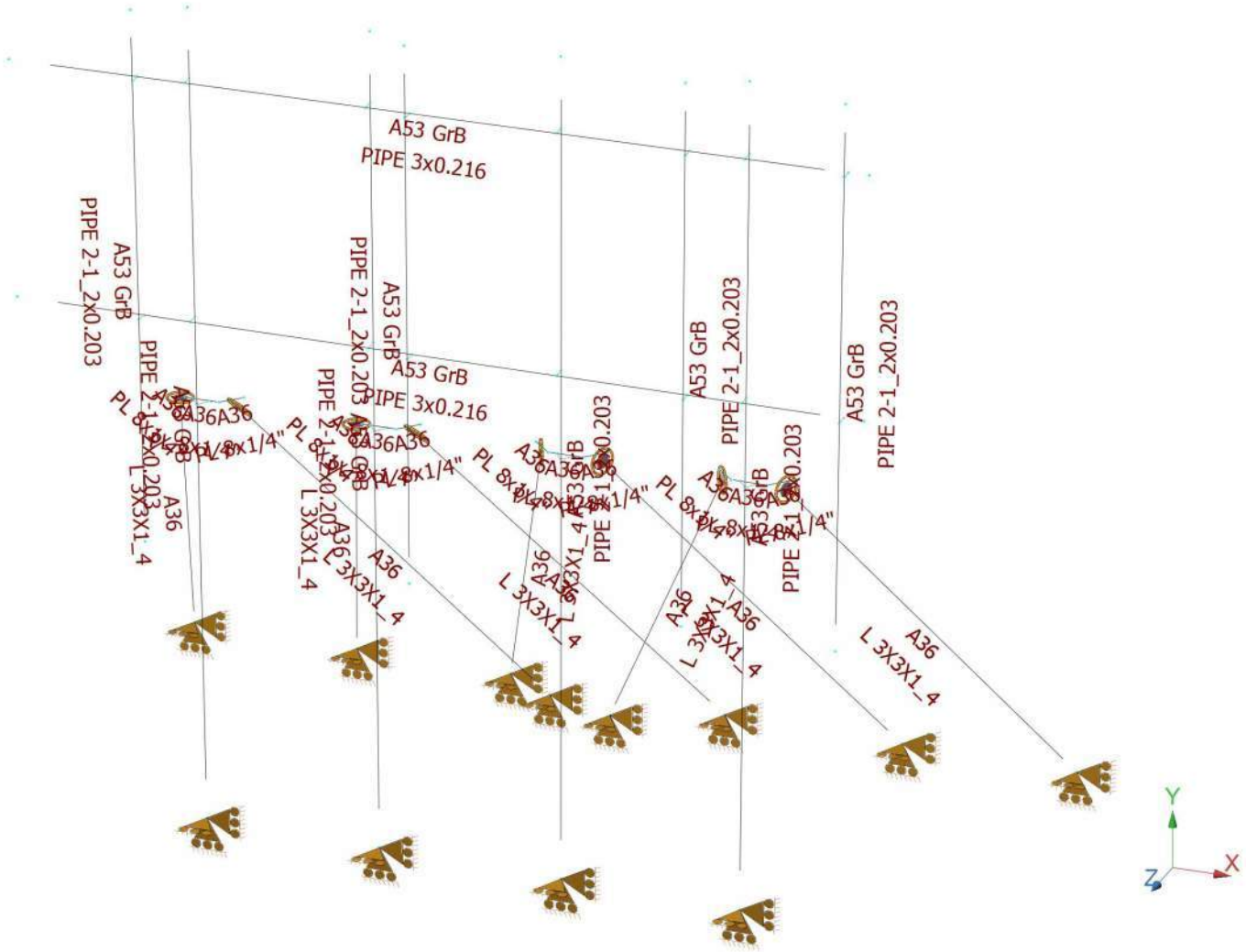
X
Z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PIPE 3x0.216
A53 GrB
PIPE 2-1_2x0.203
A53 GrB
PIPE 3x0.216
A53 GrB
PIPE 2-1_2x0.203
A53 GrB
PIPE 2-1_2x0.203
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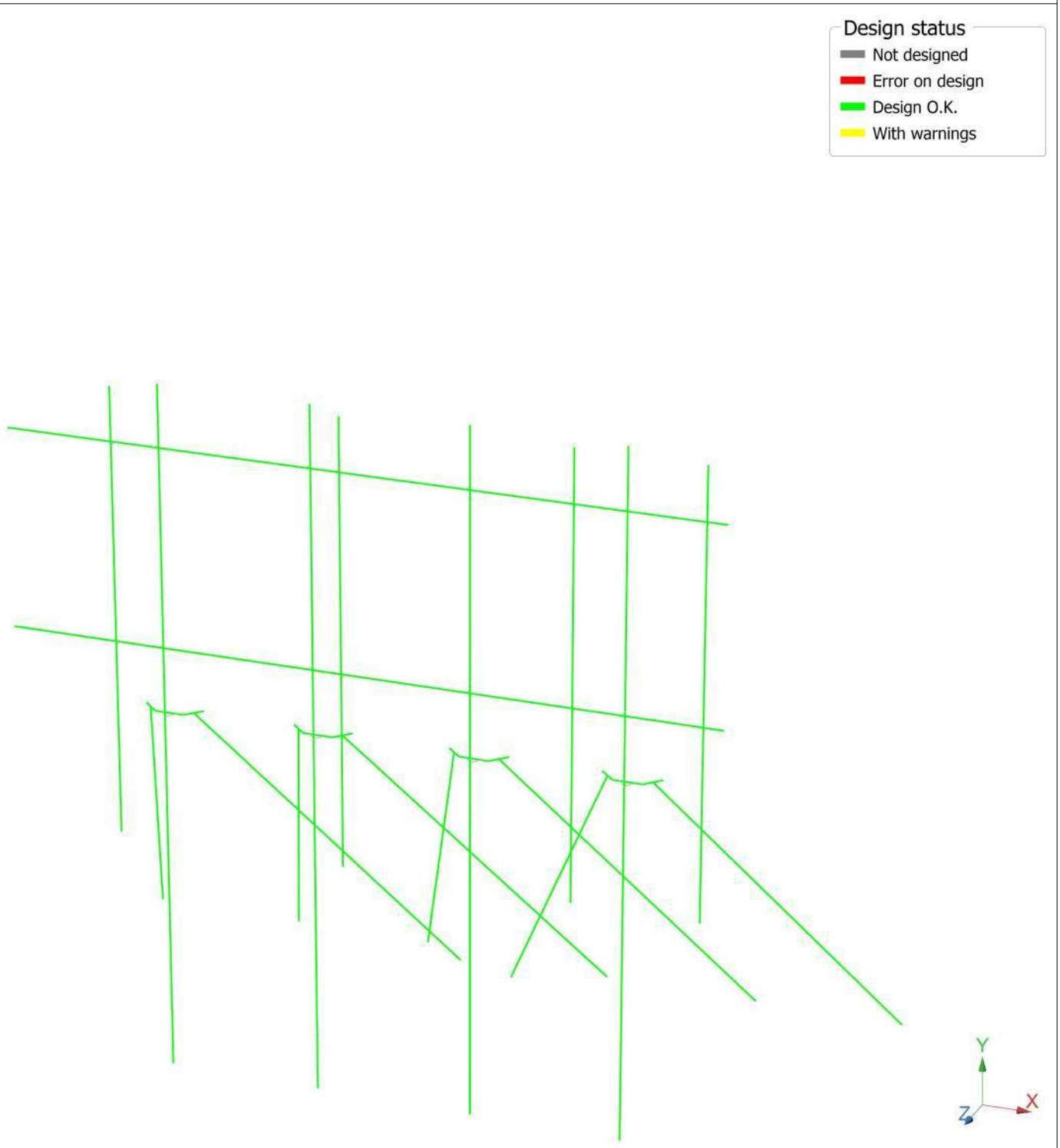
PIPE 2-1_2x0.203
A36
L 3X3X1_4
PL 8x1/4"
Y
Z
X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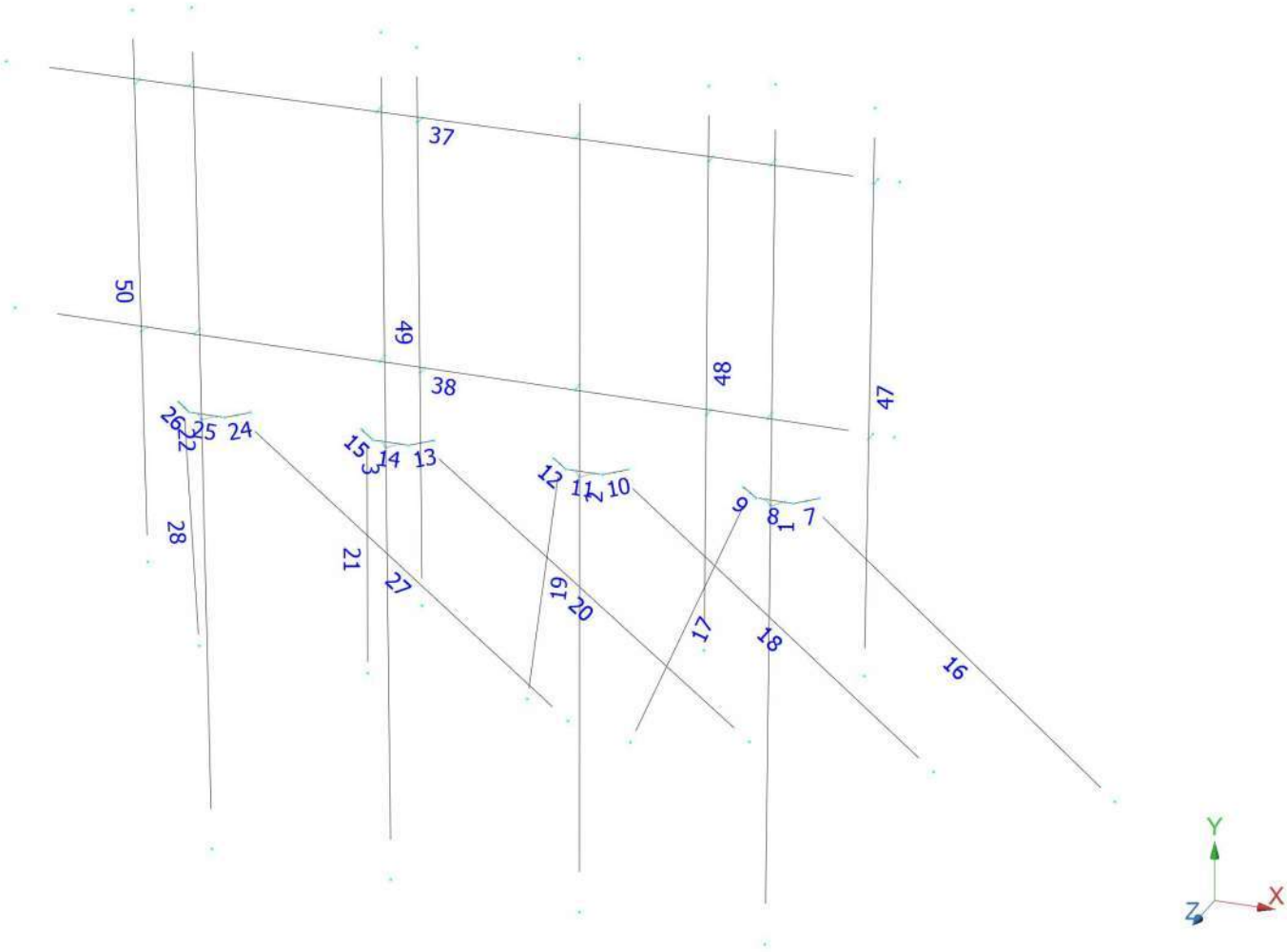
Error on design
Design O.K.
With warnings
Y
X
Z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X

RAM® Elements
CONNECT Edition

Current Date: 9/26/2023 4:49 PM
Units system: English

Load data

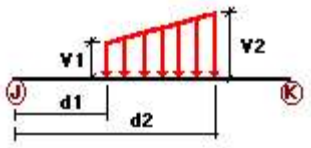
GLOSSARY

Comb : Indicates if load condition is a load combination

Load Conditions

Condition	Description	Comb.	Category
DL	Dead Load	No	DL
Wf	Wind Load (FRONT)	No	WIND
Ws	Wind Load (SIDE)	No	WIND
Wfice	Wind ICE (FRONT)	No	WIND
Wsice	Wind ICE (SIDE)	No	WIND
Di	Ice Load	No	LL

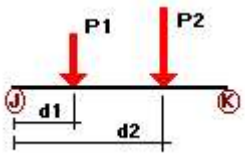
Distributed force on members



Condition	Member	Dir1	Val1 [Kip/ft]	Val2 [Kip/ft]	Dist1 [ft]	%	Dist2 [ft]	%
Wf	1	z	-0.014	-0.014	0.00	No	100.00	Yes
	2	z	-0.014	-0.014	0.00	No	100.00	Yes
	3	z	-0.014	-0.014	0.00	No	100.00	Yes
	7	z	-0.063	-0.063	0.00	No	100.00	Yes
	8	z	-0.063	-0.063	0.00	No	100.00	Yes
	9	z	-0.063	-0.063	0.00	No	100.00	Yes
	10	z	-0.063	-0.063	0.00	No	100.00	Yes
	11	z	-0.063	-0.063	0.00	No	100.00	Yes
	12	z	-0.063	-0.063	0.00	No	100.00	Yes
	13	z	-0.063	-0.063	0.00	No	100.00	Yes
	14	z	-0.063	-0.063	0.00	No	100.00	Yes
	15	z	-0.063	-0.063	0.00	No	100.00	Yes
	16	z	-0.024	-0.024	0.00	No	100.00	Yes
	17	z	-0.024	-0.024	0.00	No	100.00	Yes
	18	z	-0.024	-0.024	0.00	No	100.00	Yes
	19	z	-0.024	-0.024	0.00	No	100.00	Yes
	20	z	-0.024	-0.024	0.00	No	100.00	Yes
	21	z	-0.024	-0.024	0.00	No	100.00	Yes
	22	z	-0.014	-0.014	0.00	No	100.00	Yes
	24	z	-0.063	-0.063	0.00	No	100.00	Yes
	25	z	-0.063	-0.063	0.00	No	100.00	Yes
	26	z	-0.063	-0.063	0.00	No	100.00	Yes
	27	z	-0.024	-0.024	0.00	No	100.00	Yes
	28	z	-0.024	-0.024	0.00	No	100.00	Yes

	37	z	-0.016	-0.016	0.00	No	100.00	Yes
	38	z	-0.016	-0.016	0.00	No	100.00	Yes
	47	z	-0.014	-0.014	0.00	No	100.00	Yes
	48	z	-0.014	-0.014	90.00	Yes	100.00	Yes
	49	z	-0.014	-0.014	80.00	Yes	100.00	Yes
	50	z	-0.014	-0.014	80.00	Yes	100.00	Yes
Ws	1	x	-0.014	-0.014	0.00	No	100.00	Yes
	2	x	-0.014	-0.014	0.00	No	100.00	Yes
	3	x	-0.014	-0.014	0.00	No	100.00	Yes
	7	x	-0.063	-0.063	0.00	No	100.00	Yes
	9	x	-0.063	-0.063	0.00	No	100.00	Yes
	10	x	-0.063	-0.063	0.00	No	100.00	Yes
	12	x	-0.063	-0.063	0.00	No	100.00	Yes
	13	x	-0.063	-0.063	0.00	No	100.00	Yes
	15	x	-0.063	-0.063	0.00	No	100.00	Yes
	16	x	-0.024	-0.024	0.00	No	100.00	Yes
	17	x	-0.024	-0.024	0.00	No	100.00	Yes
	18	x	-0.024	-0.024	0.00	No	100.00	Yes
	19	x	-0.024	-0.024	0.00	No	100.00	Yes
	20	x	-0.024	-0.024	0.00	No	100.00	Yes
	21	x	-0.024	-0.024	0.00	No	100.00	Yes
	22	x	-0.014	-0.014	0.00	No	100.00	Yes
	24	x	-0.063	-0.063	0.00	No	100.00	Yes
	26	x	-0.063	-0.063	0.00	No	100.00	Yes
	27	x	-0.024	-0.024	0.00	No	100.00	Yes
	28	x	-0.024	-0.024	0.00	No	100.00	Yes
	47	x	-0.014	-0.014	0.00	No	100.00	Yes
	48	x	-0.014	-0.014	0.00	No	100.00	Yes
	49	x	-0.014	-0.014	0.00	No	100.00	Yes
	50	x	-0.014	-0.014	0.00	No	100.00	Yes
Di	1	y	-0.006	-0.006	0.00	No	100.00	Yes
	2	y	-0.006	-0.006	0.00	No	100.00	Yes
	3	y	-0.006	-0.006	0.00	No	100.00	Yes
	7	y	-0.014	-0.014	0.00	No	100.00	Yes
	8	y	-0.014	-0.014	0.00	No	100.00	Yes
	9	y	-0.014	-0.014	0.00	No	100.00	Yes
	10	y	-0.014	-0.014	0.00	No	100.00	Yes
	11	y	-0.014	-0.014	0.00	No	100.00	Yes
	12	y	-0.014	-0.014	0.00	No	100.00	Yes
	13	y	-0.014	-0.014	0.00	No	100.00	Yes
	14	y	-0.014	-0.014	0.00	No	100.00	Yes
	15	y	-0.014	-0.014	0.00	No	100.00	Yes
	16	y	-0.008	-0.008	0.00	No	100.00	Yes
	17	y	-0.008	-0.008	0.00	No	100.00	Yes
	18	y	-0.008	-0.008	0.00	No	100.00	Yes
	19	y	-0.008	-0.008	0.00	No	100.00	Yes
	20	y	-0.008	-0.008	0.00	No	100.00	Yes
	21	y	-0.008	-0.008	0.00	No	100.00	Yes
	22	y	-0.006	-0.006	0.00	No	100.00	Yes
	24	y	-0.014	-0.014	0.00	No	100.00	Yes
	25	y	-0.014	-0.014	0.00	No	100.00	Yes
	26	y	-0.014	-0.014	0.00	No	100.00	Yes
	27	y	-0.008	-0.008	0.00	No	100.00	Yes
	28	y	-0.008	-0.008	0.00	No	100.00	Yes
	37	y	-0.007	-0.007	0.00	No	100.00	Yes
	38	y	-0.007	-0.007	0.00	No	100.00	Yes
	47	y	-0.006	-0.006	0.00	No	100.00	Yes
	48	y	-0.006	-0.006	0.00	No	100.00	Yes
	49	y	-0.006	-0.006	0.00	No	100.00	Yes
	50	y	-0.006	-0.006	0.00	No	100.00	Yes

Concentrated forces on members



Condition	Member	Dir1	Value1 [Kip]	Dist1 [ft]	%
DL	48	y	-0.075	0.50	No
		y	-0.075	7.50	No
	49	y	-0.033	1.00	No
		y	-0.033	3.50	No
		y	-0.042	4.50	No
		y	-0.042	7.00	No
	50	y	-0.066	1.50	No
		y	-0.066	6.50	No
Wf	48	z	-0.443	0.50	No
		z	-0.443	7.50	No
	49	z	-0.099	1.00	No
		z	-0.099	3.50	No
		z	-0.096	4.50	No
		z	-0.096	7.00	No
	50	z	-0.345	1.50	No
		z	-0.345	6.50	No
Ws	48	x	-0.226	0.50	No
		x	-0.226	7.50	No
	49	x	-0.058	1.00	No
		x	-0.058	3.50	No
		x	-0.065	4.50	No
		x	-0.065	7.00	No
	50	x	-0.371	1.50	No
		x	-0.371	6.50	No
Wfice	48	z	-0.081	0.50	No
		z	-0.081	7.50	No
	49	z	-0.02	1.00	No
		z	-0.02	3.50	No
		z	-0.019	4.50	No
		z	-0.019	7.00	No
	50	z	-0.063	1.50	No
		z	-0.063	6.50	No
Wsice	48	x	-0.045	0.50	No
		x	-0.045	7.50	No
	49	x	-0.013	1.00	No
		x	-0.013	3.50	No
		x	-0.014	4.50	No
		x	-0.014	7.00	No
	50	x	-0.067	1.50	No
		x	-0.067	6.50	No
Di	48	y	-0.149	0.50	No
		y	-0.149	7.50	No
	49	y	-0.038	1.00	No
		y	-0.038	3.50	No
		y	-0.039	4.50	No

	y	-0.039	7.00	No
50	y	-0.163	1.50	No
	y	-0.163	6.50	No

Self weight multipliers for load conditions

Condition	Description	Self weight multiplier			
		Comb.	MultX	MultY	MultZ
DL	Dead Load	No	0.00	-1.00	0.00
Wf	Wind Load (FRONT)	No	0.00	0.00	0.00
Ws	Wind Load (SIDE)	No	0.00	0.00	0.00
Wfice	Wind ICE (FRONT)	No	0.00	0.00	0.00
Wsice	Wind ICE (SIDE)	No	0.00	0.00	0.00
Di	Ice Load	No	0.00	0.00	0.00

RAM® Elements
CONNECT Edition

Current Date: 9/26/2023 4:49 PM
Units system: English

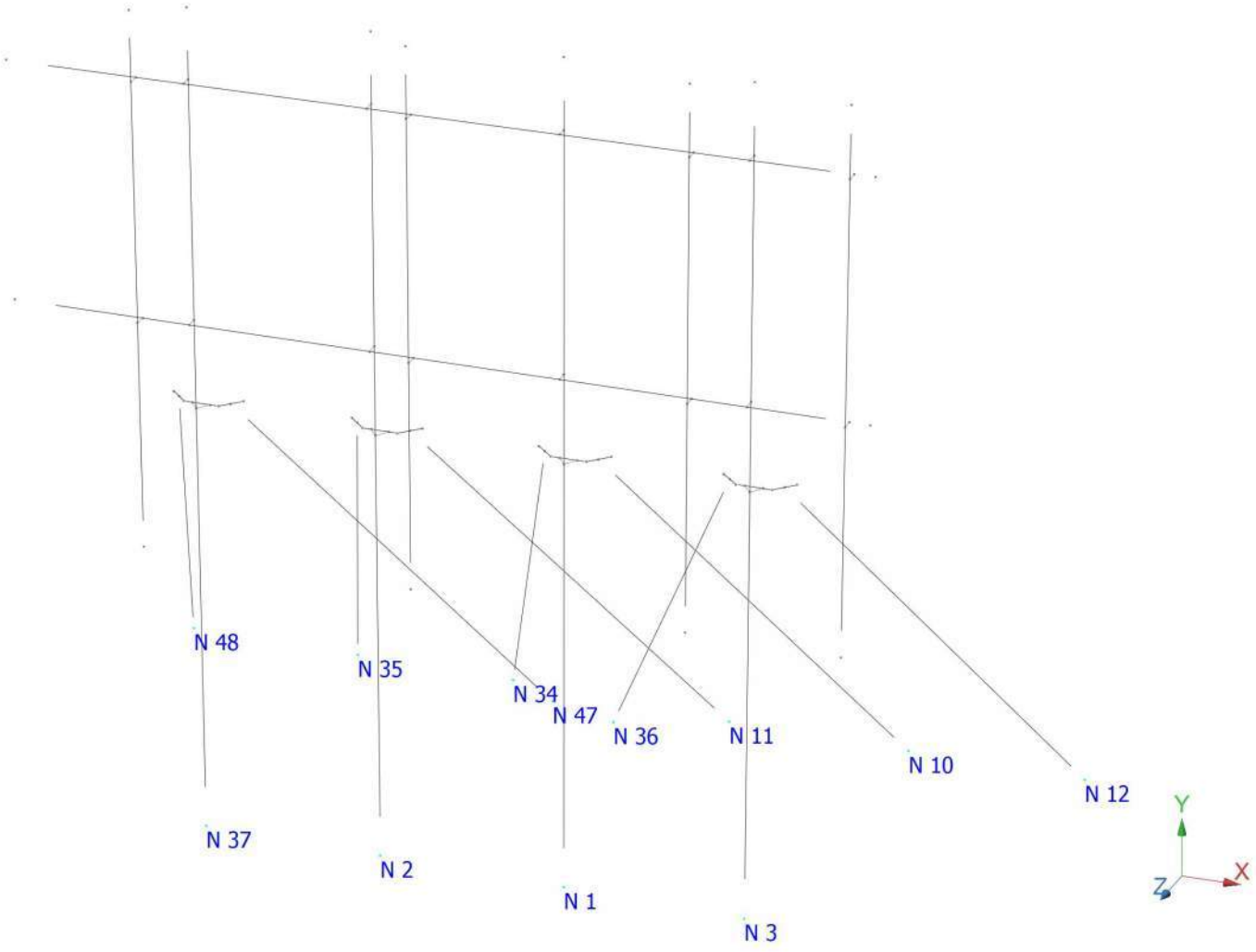
Steel Code Check

Report: Summary - Group by member

Load conditions to be included in design :

LC1=1.2DL+Wf
LC2=1.2DL+Ws
LC3=0.9DL+Wf
LC4=0.9DL+Ws
LC5=1.2DL+Wfice+Di
LC6=1.2DL+Wsice+Di
LC7=1.4DL
LC8=0.9DL

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	L 3X3X1_4	**16**	LC3 at 50.00%	0.24	OK	
		17	LC4 at 50.00%	**0.31**	**OK**	
		18	LC4 at 43.75%	0.21	OK	
		19	LC4 at 56.25%	0.22	OK	
		20	LC2 at 50.00%	0.21	OK	
		21	LC2 at 43.75%	0.22	OK	
		27	LC2 at 50.00%	0.21	OK	
		28	LC3 at 56.25%	0.23	OK	
	PIPE 2-1_2x0.203	**1**	LC3 at 46.88%	0.81	OK	
		2	LC3 at 46.88%	0.73	OK	
		3	LC3 at 46.88%	0.71	OK	
		22	LC3 at 46.88%	**0.83**	**OK**	
		47	LC2 at 56.25%	0.08	OK	
		48	LC1 at 58.33%	0.41	OK	
		49	LC2 at 56.25%	0.16	OK	
		50	LC2 at 58.33%	0.22	OK	
	PIPE 3x0.216	**37**	LC1 at 47.22%	**0.12**	**OK**	
		38	LC3 at 79.86%	0.12	OK	
	PL 8x1/4"	**7**	LC4 at 50.00%	0.29	OK	
		8	LC2 at 75.00%	**0.69**	**OK**	
		9	LC2 at 0.00%	0.25	OK	
		10	LC4 at 50.00%	0.29	OK	
		11	LC4 at 75.00%	0.57	OK	
		12	LC2 at 0.00%	0.24	OK	
		13	LC4 at 100.00%	0.21	OK	
		14	LC2 at 22.92%	0.51	OK	
		15	LC2 at 46.88%	0.31	OK	
		24	LC4 at 100.00%	0.22	OK	
		25	LC4 at 22.92%	0.55	OK	
		26	LC2 at 46.88%	0.29	OK	

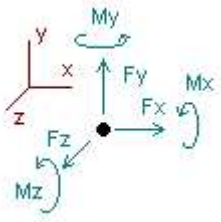

N 48
N 35
N 34
N 47
N 36
N 11
N 10
N 12
N 37
N 2
N 1
N 3
Y
X
Z

RAM® Elements
CONNECT Edition

Current Date: 9/26/2023 4:49 PM
Units system: English

Analysis result

Reactions



Direction of positive forces and moments

	Forces [Kip]			Moments [Kip*ft]		
Node	**FX**	**FY**	**FZ**	**MX**	**MY**	**MZ**
Condition **LC1=1.2DL+Wf**						
1	0.00163	-0.99500	-0.13648	0.00000	0.00000	0.00000
2	0.00327	-0.91149	-0.13626	0.00000	0.00000	0.00000
3	-0.00158	-1.34999	-0.14714	0.00000	0.00000	0.00000
10	-0.29795	0.69864	0.64637	0.00000	0.00000	0.00000
11	-0.28216	0.66110	0.60703	0.00000	0.00000	0.00000
12	-0.37479	0.86575	0.78498	0.00000	0.00000	0.00000
34	0.26803	0.71190	0.66775	0.00000	0.00000	0.00000
35	0.20973	0.62917	0.60525	0.00000	0.00000	0.00000
36	0.50349	1.00985	0.80791	0.00000	0.00000	0.00000
37	0.00614	-1.28858	-0.15425	0.00000	0.00000	0.00000
47	-0.37800	0.87609	0.74855	0.00000	0.00000	0.00000
48	0.34218	0.99461	0.92002	0.00000	0.00000	0.00000
SUM	0.00000	1.90206	5.21373	0.00000	0.00000	0.00000
Condition **LC2=1.2DL+Ws**						
1	0.05516	0.65511	0.01509	0.00000	0.00000	0.00000
2	0.05750	0.28364	-0.00268	0.00000	0.00000	0.00000
3	0.04464	-0.30582	0.00767	0.00000	0.00000	0.00000
10	0.58379	-0.97858	-0.83697	0.00000	0.00000	0.00000
11	0.53895	-0.92163	-0.77860	0.00000	0.00000	0.00000
12	0.60374	-1.02281	-0.87359	0.00000	0.00000	0.00000
34	0.46049	0.91643	0.75386	0.00000	0.00000	0.00000
35	0.46697	0.97681	0.82165	0.00000	0.00000	0.00000
36	0.80306	1.38684	0.99275	0.00000	0.00000	0.00000
37	0.05470	1.08431	0.00424	0.00000	0.00000	0.00000
47	0.59528	-1.05356	-0.84275	0.00000	0.00000	0.00000
48	0.43237	0.88131	0.73931	0.00000	0.00000	0.00000
SUM	4.69664	1.90206	0.00000	0.00000	0.00000	0.00000
Condition **LC3=0.9DL+Wf**						
1	0.00160	-1.08480	-0.13792	0.00000	0.00000	0.00000
2	0.00332	-1.00134	-0.13769	0.00000	0.00000	0.00000
3	-0.00163	-1.46658	-0.14860	0.00000	0.00000	0.00000
10	-0.29792	0.69148	0.64649	0.00000	0.00000	0.00000
11	-0.28372	0.65721	0.60982	0.00000	0.00000	0.00000
12	-0.37428	0.85755	0.78423	0.00000	0.00000	0.00000
34	0.26922	0.70752	0.67024	0.00000	0.00000	0.00000

35	0.20929	0.62098	0.60444	0.00000	0.00000	0.00000
36	0.50440	1.00438	0.80912	0.00000	0.00000	0.00000
37	0.00642	-1.41714	-0.15573	0.00000	0.00000	0.00000
47	-0.37867	0.87031	0.74963	0.00000	0.00000	0.00000
48	0.34197	0.98698	0.91970	0.00000	0.00000	0.00000
SUM	0.00000	1.42654	5.21373	0.00000	0.00000	0.00000

Condition **LC4=0.9DL+Ws**

1	0.05524	0.56449	0.01323	0.00000	0.00000	0.00000
2	0.05768	0.19288	-0.00458	0.00000	0.00000	0.00000
3	0.04471	-0.42264	0.00580	0.00000	0.00000	0.00000
10	0.58372	-0.98548	-0.83665	0.00000	0.00000	0.00000
11	0.53692	-0.92451	-0.77501	0.00000	0.00000	0.00000
12	0.60435	-1.03122	-0.87451	0.00000	0.00000	0.00000
34	0.46190	0.91259	0.75679	0.00000	0.00000	0.00000
35	0.46649	0.96859	0.82079	0.00000	0.00000	0.00000
36	0.80425	1.38192	0.99432	0.00000	0.00000	0.00000
37	0.05516	0.95525	0.00233	0.00000	0.00000	0.00000
47	0.59426	-1.05857	-0.84111	0.00000	0.00000	0.00000
48	0.43196	0.87326	0.73861	0.00000	0.00000	0.00000
SUM	4.69664	1.42654	0.00000	0.00000	0.00000	0.00000

Condition **LC5=1.2DL+Wfice+Di**

1	0.00018	0.52267	-0.01003	0.00000	0.00000	0.00000
2	-0.00028	0.42280	-0.00975	0.00000	0.00000	0.00000
3	-0.00014	0.62571	-0.01067	0.00000	0.00000	0.00000
10	-0.02717	0.11562	0.04872	0.00000	0.00000	0.00000
11	-0.01035	0.08009	0.01870	0.00000	0.00000	0.00000
12	-0.03504	0.13260	0.06282	0.00000	0.00000	0.00000
34	0.01533	0.09615	0.03291	0.00000	0.00000	0.00000
35	0.01831	0.10605	0.04296	0.00000	0.00000	0.00000
36	0.03641	0.12604	0.05152	0.00000	0.00000	0.00000
37	-0.00182	0.86598	-0.01204	0.00000	0.00000	0.00000
47	-0.03411	0.13190	0.05921	0.00000	0.00000	0.00000
48	0.03868	0.16277	0.09166	0.00000	0.00000	0.00000
SUM	0.00000	3.38839	0.36600	0.00000	0.00000	0.00000

Condition **LC6=1.2DL+Wsice+Di**

1	-0.00129	0.68059	0.01538	0.00000	0.00000	0.00000
2	-0.00197	0.52566	0.01453	0.00000	0.00000	0.00000
3	-0.00234	0.70494	0.01488	0.00000	0.00000	0.00000
10	0.03784	-0.02738	-0.06938	0.00000	0.00000	0.00000
11	0.05114	-0.05775	-0.09321	0.00000	0.00000	0.00000
12	0.03404	-0.01927	-0.06264	0.00000	0.00000	0.00000
34	0.01806	0.10374	0.04049	0.00000	0.00000	0.00000
35	0.03018	0.13471	0.06853	0.00000	0.00000	0.00000
36	0.04135	0.13577	0.05989	0.00000	0.00000	0.00000
37	-0.00408	1.11107	0.01507	0.00000	0.00000	0.00000
47	0.04360	-0.04244	-0.07543	0.00000	0.00000	0.00000
48	0.03146	0.13875	0.07189	0.00000	0.00000	0.00000
SUM	0.27800	3.38839	0.00000	0.00000	0.00000	0.00000

Condition **LC7=1.4DL**

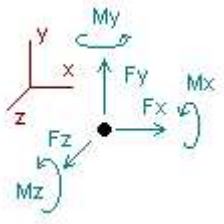
1	0.00019	0.42279	0.00881	0.00000	0.00000	0.00000
2	-0.00025	0.42329	0.00877	0.00000	0.00000	0.00000
3	0.00030	0.54598	0.00876	0.00000	0.00000	0.00000
10	0.00007	0.03273	-0.00109	0.00000	0.00000	0.00000
11	0.00897	0.01444	-0.01591	0.00000	0.00000	0.00000
12	-0.00318	0.03985	0.00480	0.00000	0.00000	0.00000
34	-0.00692	0.01705	-0.01438	0.00000	0.00000	0.00000
35	0.00204	0.03781	0.00353	0.00000	0.00000	0.00000
36	-0.00587	0.02234	-0.00782	0.00000	0.00000	0.00000
37	-0.00132	0.60164	0.00883	0.00000	0.00000	0.00000
47	0.00435	0.02420	-0.00703	0.00000	0.00000	0.00000
48	0.00161	0.03696	0.00272	0.00000	0.00000	0.00000
SUM	0.00000	2.21907	0.00000	0.00000	0.00000	0.00000

Condition **LC8=0.9DL**

1	0.00013	0.27174	0.00563	0.00000	0.00000	0.00000
2	-0.00016	0.27207	0.00561	0.00000	0.00000	0.00000
3	0.00019	0.35096	0.00561	0.00000	0.00000	0.00000
10	0.00004	0.02105	-0.00069	0.00000	0.00000	0.00000
11	0.00575	0.00933	-0.01019	0.00000	0.00000	0.00000
12	-0.00204	0.02560	0.00307	0.00000	0.00000	0.00000
34	-0.00443	0.01101	-0.00921	0.00000	0.00000	0.00000
35	0.00131	0.02431	0.00227	0.00000	0.00000	0.00000
36	-0.00375	0.01440	-0.00500	0.00000	0.00000	0.00000
37	-0.00085	0.38674	0.00565	0.00000	0.00000	0.00000
47	0.00278	0.01559	-0.00449	0.00000	0.00000	0.00000
48	0.00103	0.02374	0.00174	0.00000	0.00000	0.00000
SUM	0.00000	1.42654	0.00000	0.00000	0.00000	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=1.2DL+Wf
LC2=1.2DL+Ws
LC3=0.9DL+Wf
LC4=0.9DL+Ws
LC5=1.2DL+Wfice+Di
LC6=1.2DL+Wsice+Di
LC7=1.4DL
LC8=0.9DL

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	0.055	LC4	0.681	LC6	0.015	LC6	0.00000	LC1	0.00000	LC1	0.00000	LC1
	Min	-0.001	LC6	-1.085	LC3	-0.138	LC3	0.00000	LC1	0.00000	LC1	0.00000	LC1
2	Max	0.058	LC4	0.526	LC6	0.015	LC6	0.00000	LC1	0.00000	LC1	0.00000	LC1
	Min	-0.002	LC6	-1.001	LC3	-0.138	LC3	0.00000	LC1	0.00000	LC1	0.00000	LC1
3	Max	0.045	LC4	0.705	LC6	0.015	LC6	0.00000	LC1	0.00000	LC1	0.00000	LC1
	Min	-0.002	LC6	-1.467	LC3	-0.149	LC3	0.00000	LC1	0.00000	LC1	0.00000	LC1
10	Max	0.584	LC2	0.699	LC1	0.646	LC3	0.00000	LC1	0.00000	LC1	0.00000	LC1
	Min	-0.298	LC1	-0.985	LC4	-0.837	LC2	0.00000	LC1	0.00000	LC1	0.00000	LC1
11	Max	0.539	LC2	0.661	LC1	0.610	LC3	0.00000	LC1	0.00000	LC1	0.00000	LC1
	Min	-0.284	LC3	-0.925	LC4	-0.779	LC2	0.00000	LC1	0.00000	LC1	0.00000	LC1
12	Max	0.604	LC4	0.866	LC1	0.785	LC1	0.00000	LC1	0.00000	LC1	0.00000	LC1
	Min	-0.375	LC1	-1.031	LC4	-0.875	LC4	0.00000	LC1	0.00000	LC1	0.00000	LC1
34	Max	0.462	LC4	0.916	LC2	0.757	LC4	0.00000	LC1	0.00000	LC1	0.00000	LC1
	Min	-0.007	LC7	0.011	LC8	-0.014	LC7	0.00000	LC1	0.00000	LC1	0.00000	LC1
35	Max	0.467	LC2	0.977	LC2	0.822	LC2	0.00000	LC1	0.00000	LC1	0.00000	LC1
	Min	0.001	LC8	0.024	LC8	0.002	LC8	0.00000	LC1	0.00000	LC1	0.00000	LC1
36	Max	0.804	LC4	1.387	LC2	0.994	LC4	0.00000	LC1	0.00000	LC1	0.00000	LC1
	Min	-0.006	LC7	0.014	LC8	-0.008	LC7	0.00000	LC1	0.00000	LC1	0.00000	LC1
37	Max	0.055	LC4	1.111	LC6	0.015	LC6	0.00000	LC1	0.00000	LC1	0.00000	LC1
	Min	-0.004	LC6	-1.417	LC3	-0.156	LC3	0.00000	LC1	0.00000	LC1	0.00000	LC1
47	Max	0.595	LC2	0.876	LC1	0.750	LC3	0.00000	LC1	0.00000	LC1	0.00000	LC1
	Min	-0.379	LC3	-1.059	LC4	-0.843	LC2	0.00000	LC1	0.00000	LC1	0.00000	LC1
48	Max	0.432	LC2	0.995	LC1	0.920	LC1	0.00000	LC1	0.00000	LC1	0.00000	LC1
	Min	0.001	LC8	0.024	LC8	0.002	LC8	0.00000	LC1	0.00000	LC1	0.00000	LC1

Company:	TEP Northeast	Page:	1
Address:	45 Beechwood Drive	Specifier:	Connor Leavitt
Phone I Fax:	(978) 557-5553 |	E-Mail:	cleavitt@tepgroup.net
Design:	CT2034 - Beta Sector - Kicker	Date:	9/26/2023
Fastening point:	Beta Sector - Kicker Connection (N12)		

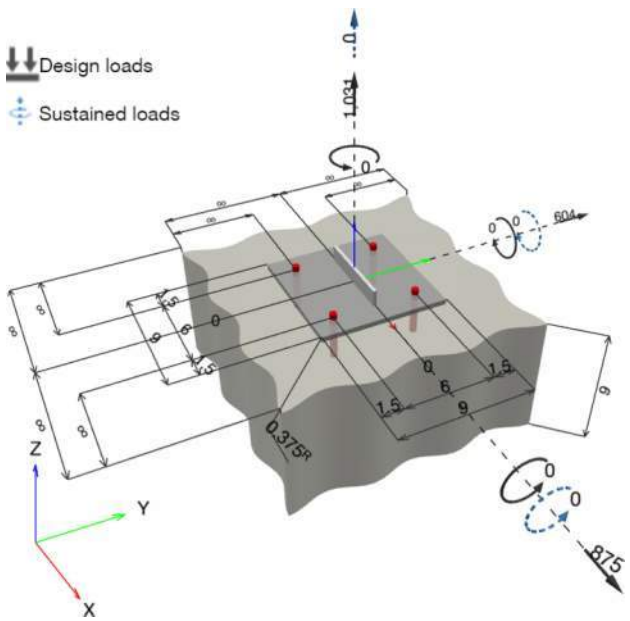
Specifier's comments:

1 Input data

Anchor type and diameter:	**HIT-HY 200 V3 + HIT-Z 1/2**
Item number:	2018443 HIT-Z 1/2" x 4 1/2" (element) / 2334276 HIT-HY 200-R V3 (adhesive)
Effective embedment depth:	$h_{ef,act}$ = 2.750 in. ($h_{ef,limit}$ = - in.)
Material:	DIN EN ISO 4042
Evaluation Service Report:	ESR-4868
Issued I Valid:	11/1/2022 | 11/1/2024
Proof:	Design Method ACI 318-19 / Chem
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.375 in.
Anchor plate[R]:	l_x x l_y x t = 9.000 in. x 9.000 in. x 0.375 in.; (Recommended plate thickness: not calculated)
Profile:	Rectangular plates and bars (AISC), 6 - 1/4; (L x W x T) = 6.000 in. x 0.250 in.
Base material:	cracked concrete, 2500, f_c' = 2,500 psi; h = 9.000 in., Temp. short/long: 32/32 °F
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: not present, shear: not present; no supplemental splitting reinforcement present edge reinforcement: none or < No. 4 bar

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, ft.lb]



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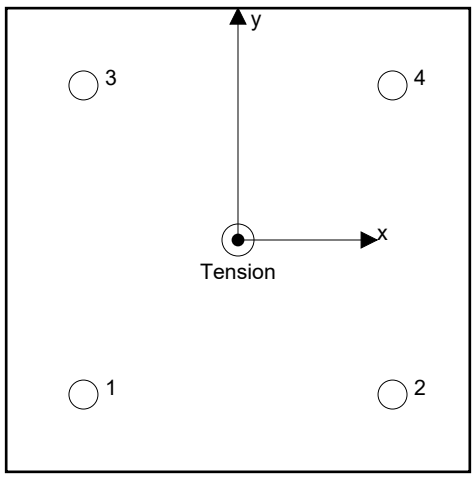
Phone I Fax:	(978) 557-5553 |	E-Mail:	cleavitt@tepgroup.net
Design:	CT2034 - Beta Sector - Kicker	Date:	9/26/2023
Fastening point:	Beta Sector - Kicker Connection (N12)		

1.1 Design results

Case	Description	Forces [lb] / Moments [ft.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 1,031; V_x = 875; V_y = 604; M_x = 0.000; M_y = 0.000; M_z = 0.000;	no	14

2 Load case/Resulting anchor forces



Anchor reactions [lb]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	258	266	219	151
2	258	266	219	151
3	258	266	219	151
4	258	266	219	151

max. concrete compressive strain: - [‰]
max. concrete compressive stress: - [psi]
resulting tension force in (x/y)=(-0.000/0.000): 1,031 [lb]
resulting compression force in (x/y)=(0.000/0.000): 0 [lb]

Anchor forces are calculated based on the assumption of a rigid anchor plate.

3 Tension load

	Load N_{ua} [lb]	Capacity ϕ N_n [lb]	Utilization $\beta_N = N_{ua}/\phi$ N_n	Status
Steel Strength*	258	8,695	3	OK
Pullout Strength*	258	7,108	4	OK
Sustained Tension Load Bond Strength*	N/A	N/A	N/A	N/A
Concrete Breakout Failure**	1,031	7,517	14	OK

* highest loaded anchor **anchor group (anchors in tension)

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Fastening point:	Beta Sector - Kicker Connection (N12)		

3.1 Steel Strength

N_{sa} = ESR value — refer to ICC-ES ESR-4868
$\phi\ N_{sa} \geq N_{ua}$ — ACI 318-19 Table 17.5.2

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.14	94,200

Calculations

N_{sa} [lb]
13,377

Results

N_{sa} [lb]	ϕ_{steel}	$\phi\ N_{sa}$ [lb]	N_{ua} [lb]
13,377	0.650	8,695	258

3.2 Pullout Strength

$N_{pn} = N_p\ \lambda_a$ — refer to ICC-ES ESR-4868
$\phi\ N_{pn} \geq N_{ua}$ — ACI 318-19 Table 17.5.2

Variables

λ_a	N_p [lb]
1.000	10,936

Calculations

N_{pn} [lb]
10,936

Results

N_{pn} [lb]	$\phi_{concrete}$	$\phi\ N_{pn}$ [lb]	N_{ua} [lb]
10,936	0.650	7,108	258

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Fastening point:	Beta Sector - Kicker Connection (N12)		

3.3 Concrete Breakout Failure

$N_{cbg} = \left(\frac{A_{Nc}}{A_{Nc0}}\right) \psi_{ec,N}\ \psi_{ed,N}\ \psi_{c,N}\ \psi_{cp,N}\ N_b$ — ACI 318-19 Eq. (17.6.2.1b)

$\phi\ N_{cbg} \geq N_{ua}$ — ACI 318-19 Table 17.5.2

A_{Nc} see ACI 318-19, Section 17.6.2.1, Fig. R 17.6.2.1(b)

$A_{Nc0} = 9\ h_{ef}^2$ — ACI 318-19 Eq. (17.6.2.1.4)

$\psi_{ec,N} = \left(\frac{1}{1 + \frac{2\ e'_N}{3\ h_{ef}}}\right) \leq 1.0$ — ACI 318-19 Eq. (17.6.2.3.1)

$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5 h_{ef}}\right) \leq 1.0$ — ACI 318-19 Eq. (17.6.2.4.1b)

$\psi_{cp,N} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5 h_{ef}}{c_{ac}}\right) \leq 1.0$ — ACI 318-19 Eq. (17.6.2.6.1b)

$N_b = k_c\ \lambda_a\ \sqrt{f'_c}\ h_{ef}^{1.5}$ — ACI 318-19 Eq. (17.6.2.2.1)

Variables

h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]	$\psi_{c,N}$
2.750	0.000	0.000	∞	1.000

c_{ac} [in.]	k_c	λ_a	f'_c [psi]
4.125	17	1.000	2,500

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [lb]
203.06	68.06	1.000	1.000	1.000	1.000	3,876

Results

N_{cbg} [lb]	$\phi_{concrete}$	$\phi\ N_{cbg}$ [lb]	N_{ua} [lb]
11,565	0.650	7,517	1,031

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Fastening point:	Beta Sector - Kicker Connection (N12)		

4 Shear load

	Load V_{ua} [lb]	Capacity ϕ V_n [lb]	Utilization $\beta_V = V_{ua}/\phi$ V_n	Status
Steel Strength*	266	3,532	8	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength (Concrete Breakout Strength controls)**	1,063	16,191	7	OK
Concrete edge failure in direction **	N/A	N/A	N/A	N/A

* highest loaded anchor **anchor group (relevant anchors)

4.1 Steel Strength

V_{sa} = ESR value refer to ICC-ES ESR-4868
ϕ $V_{steel} \geq V_{ua}$ ACI 318-19 Table 17.5.2

Variables

$A_{se,V}$ [in.^{2}]	f_{uta} [psi]
0.14	94,200

Calculations

V_{sa} [lb]
5,886

Results

V_{sa} [lb]	ϕ steel	ϕ V_{sa} [lb]	V_{ua} [lb]
5,886	0.600	3,532	266

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Fastening point:	Beta Sector - Kicker Connection (N12)		

4.2 Pryout Strength (Concrete Breakout Strength controls)

$V_{cpg} = k_{cp} \left[\left(\frac{A_{Nc}}{A_{Nc0}} \right) \psi_{ec,N} \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b \right]$ ACI 318-19 Eq. (17.7.3.1b)

$\phi V_{cpg} \geq V_{ua}$ ACI 318-19 Table 17.5.2

A_{Nc} see ACI 318-19, Section 17.6.2.1, Fig. R 17.6.2.1(b)

$A_{Nc0} = 9 h_{ef}^2$ ACI 318-19 Eq. (17.6.2.1.4)

$\psi_{ec,N} = \left(\frac{1}{1 + \frac{2 e'_N}{3 h_{ef}}} \right) \leq 1.0$ ACI 318-19 Eq. (17.6.2.3.1)

$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5 h_{ef}} \right) \leq 1.0$ ACI 318-19 Eq. (17.6.2.4.1b)

$\psi_{cp,N} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5 h_{ef}}{c_{ac}} \right) \leq 1.0$ ACI 318-19 Eq. (17.6.2.6.1b)

$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5}$ ACI 318-19 Eq. (17.6.2.2.1)

Variables

k_{cp}	h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]
2	2.750	0.000	0.000	∞

$\psi_{c,N}$	c_{ac} [in.]	k_c	λ_a	f'_c [psi]
1.000	4.125	17	1.000	2,500

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [lb]
203.06	68.06	1.000	1.000	1.000	1.000	3,876

Results

V_{cpg} [lb]	$\phi_{concrete}$	ϕV_{cpg} [lb]	V_{ua} [lb]
23,130	0.700	16,191	1,063

5 Combined tension and shear loads, per ACI 318-19 section 17.8

β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
0.137	0.075	5/3	5	OK

$\beta_{NV} = \beta_N^{\zeta} + \beta_V^{\zeta} <= 1$

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Fastening point:	Beta Sector - Kicker Connection (N12)		

6 Warnings

- The anchor design methods in PROFIS Engineering require rigid anchor plates per current regulations (AS 5216:2021, ETAG 001/Annex C, EOTA TR029 etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Engineering calculates the minimum required anchor plate thickness with CBFEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid anchor plate assumption is valid is not carried out by PROFIS Engineering. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies where the potential concrete failure surfaces are crossed by supplementary reinforcement proportioned to tie the potential concrete failure prism into the structural member. Condition B applies where such supplementary reinforcement is not provided, or where pullout or pryout strength governs.
- Design Strengths of adhesive anchor systems are influenced by the cleaning method. Refer to the INSTRUCTIONS FOR USE given in the Evaluation Service Report for cleaning and installation instructions.
- For additional information about ACI 318 strength design provisions, please go to https://submittals.us.hilti.com/PROFISAnchorDesignGuide/
- Installation of Hilti adhesive anchor systems shall be performed by personnel trained to install Hilti adhesive anchors. Reference ACI 318-19, Section 26.7.

Fastening meets the design criteria!

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Fastening point:	Beta Sector - Kicker Connection (N12)		

7 Installation data

Profile: Rectangular plates and bars (AISC), 6 - 1/4; (L x W x T) = 6.000 in. x 0.250 in.

Hole diameter in the fixture (pre-setting) : d_f = 0.562 in.

Hole diameter in the fixture (through fastening) : d_f = 0.625 in.

Plate thickness (input): 0.375 in.

Recommended plate thickness: not calculated

Drilling method: Hammer drilled

Cleaning: Compressed air cleaning of the drilled hole according to instructions for use is required

Anchor type and diameter: HIT-HY 200 V3 + HIT-Z 1/2

Item number: 2018443 HIT-Z 1/2" x 4 1/2" (element) / 2334276 HIT-HY 200-R V3 (adhesive)

Maximum installation torque: 29.502 ft.lb

Hole diameter in the base material: 0.562 in.

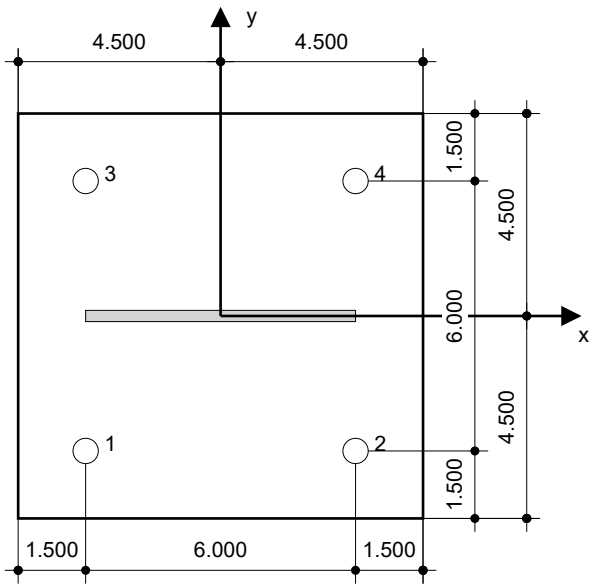
Hole depth in the base material: 3.750 in.

Minimum thickness of the base material: 5.000 in.

1/2 Hilti HIT-Z Carbon steel non-cleaning bonded expansion anchor with Hilti HIT-HY 200 V3 Safe Set System

7.1 Recommended accessories

Drilling	Cleaning	Setting
• Suitable Rotary Hammer • Properly sized drill bit	• -	• Dispenser including cassette and mixer • Torque wrench



Coordinates Anchor [in.]

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	-3.000	-3.000	-	-	-	-
2	3.000	-3.000	-	-	-	-
3	-3.000	3.000	-	-	-	-
4	3.000	3.000	-	-	-	-

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Fastening point:	Beta Sector - Kicker Connection (N12)		

8 Remarks; Your Cooperation Duties

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- You must take all necessary and reasonable steps to prevent or limit damage caused by the Software. In particular, you must arrange for the regular backup of programs and data and, if applicable, carry out the updates of the Software offered by Hilti on a regular basis. If you do not use the AutoUpdate function of the Software, you must ensure that you are using the current and thus up-to-date version of the Software in each case by carrying out manual updates via the Hilti Website. Hilti will not be liable for consequences, such as the recovery of lost or damaged data or programs, arising from a culpable breach of duty by you.

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Fastening point:	Beta Sector - Mast Connection (N3)		

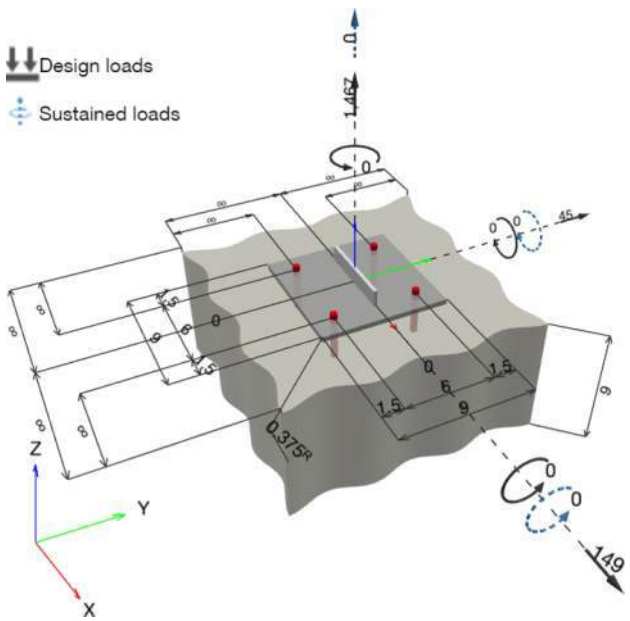
Specifier's comments:

1 Input data

Anchor type and diameter:	**HIT-HY 200 V3 + HIT-Z 1/2**
Item number:	2018443 HIT-Z 1/2" x 4 1/2" (element) / 2334276 HIT-HY 200-R V3 (adhesive)
Effective embedment depth:	$h_{ef,act}$ = 2.750 in. ($h_{ef,limit}$ = - in.)
Material:	DIN EN ISO 4042
Evaluation Service Report:	ESR-4868
Issued I Valid:	11/1/2022 | 11/1/2024
Proof:	Design Method ACI 318-19 / Chem
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.375 in.
Anchor plate[R]:	l_x x l_y x t = 9.000 in. x 9.000 in. x 0.375 in.; (Recommended plate thickness: not calculated)
Profile:	Rectangular plates and bars (AISC), 6 - 1/4; (L x W x T) = 6.000 in. x 0.250 in.
Base material:	cracked concrete, 2500, f_c' = 2,500 psi; h = 9.000 in., Temp. short/long: 32/32 °F
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: not present, shear: not present; no supplemental splitting reinforcement present edge reinforcement: none or < No. 4 bar

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, ft.lb]



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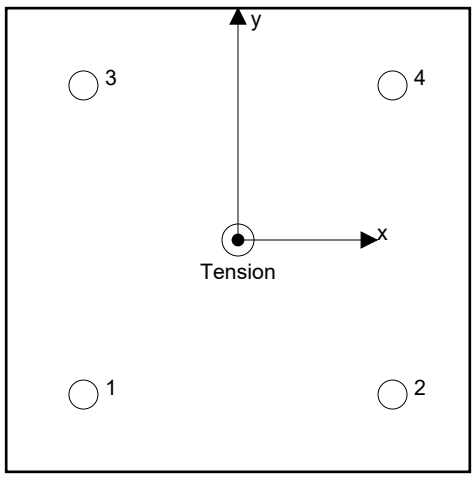
Fastening point:	Beta Sector - Mast Connection (N3)		

1.1 Design results

Case	Description	Forces [lb] / Moments [ft.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 1,467; V_x = 149; V_y = 45; M_x = 0.000; M_y = 0.000; M_z = 0.000;	no	20

2 Load case/Resulting anchor forces



Anchor reactions [lb]
Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	367	39	37	11
2	367	39	37	11
3	367	39	37	11
4	367	39	37	11

max. concrete compressive strain: - [‰]
max. concrete compressive stress: - [psi]
resulting tension force in (x/y)=(0.000/0.000): 1,467 [lb]
resulting compression force in (x/y)=(0.000/0.000): 0 [lb]

Anchor forces are calculated based on the assumption of a rigid anchor plate.

3 Tension load

	Load N_{ua} [lb]	Capacity ϕ N_n [lb]	Utilization $\beta_N = N_{ua}/\phi$ N_n	Status
Steel Strength*	367	8,695	5	OK
Pullout Strength*	367	7,108	6	OK
Sustained Tension Load Bond Strength*	N/A	N/A	N/A	N/A
Concrete Breakout Failure**	1,467	7,517	20	OK

* highest loaded anchor **anchor group (anchors in tension)

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Fastening point:	Beta Sector - Mast Connection (N3)		

3.1 Steel Strength

N_{sa} = ESR value — refer to ICC-ES ESR-4868
$\phi\ N_{sa} \geq N_{ua}$ — ACI 318-19 Table 17.5.2

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.14	94,200

Calculations

N_{sa} [lb]
13,377

Results

N_{sa} [lb]	ϕ_{steel}	$\phi\ N_{sa}$ [lb]	N_{ua} [lb]
13,377	0.650	8,695	367

3.2 Pullout Strength

N_{pn} = $N_p\ \lambda_a$ — refer to ICC-ES ESR-4868
$\phi\ N_{pn} \geq N_{ua}$ — ACI 318-19 Table 17.5.2

Variables

λ_a	N_p [lb]
1.000	10,936

Calculations

N_{pn} [lb]
10,936

Results

N_{pn} [lb]	$\phi_{concrete}$	$\phi\ N_{pn}$ [lb]	N_{ua} [lb]
10,936	0.650	7,108	367

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Fastening point:	Beta Sector - Mast Connection (N3)		

3.3 Concrete Breakout Failure

$N_{cbg} = \left(\frac{A_{Nc}}{A_{Nc0}}\right) \psi_{ec,N} \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b$ ACI 318-19 Eq. (17.6.2.1b)

$\phi N_{cbg} \geq N_{ua}$ ACI 318-19 Table 17.5.2

A_{Nc} see ACI 318-19, Section 17.6.2.1, Fig. R 17.6.2.1(b)

$A_{Nc0} = 9 h_{ef}^2$ ACI 318-19 Eq. (17.6.2.1.4)

$\psi_{ec,N} = \left(\frac{1}{1 + \frac{2 e'_N}{3 h_{ef}}}\right) \leq 1.0$ ACI 318-19 Eq. (17.6.2.3.1)

$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5 h_{ef}}\right) \leq 1.0$ ACI 318-19 Eq. (17.6.2.4.1b)

$\psi_{cp,N} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5 h_{ef}}{c_{ac}}\right) \leq 1.0$ ACI 318-19 Eq. (17.6.2.6.1b)

$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5}$ ACI 318-19 Eq. (17.6.2.2.1)

Variables

h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]	$\psi_{c,N}$
2.750	0.000	0.000	∞	1.000

c_{ac} [in.]	k_c	λ_a	f'_c [psi]
4.125	17	1.000	2,500

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [lb]
203.06	68.06	1.000	1.000	1.000	1.000	3,876

Results

N_{cbg} [lb]	$\phi_{concrete}$	ϕN_{cbg} [lb]	N_{ua} [lb]
11,565	0.650	7,517	1,467

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Fastening point:	Beta Sector - Mast Connection (N3)		

4 Shear load

	Load V_{ua} [lb]	Capacity ϕ V_n [lb]	Utilization $\beta_V = V_{ua}/\phi$ V_n	Status
Steel Strength*	39	3,532	2	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength (Concrete Breakout Strength controls)**	156	16,191	1	OK
Concrete edge failure in direction **	N/A	N/A	N/A	N/A

* highest loaded anchor **anchor group (relevant anchors)

4.1 Steel Strength

V_{sa} = ESR value refer to ICC-ES ESR-4868
ϕ $V_{steel} \geq V_{ua}$ ACI 318-19 Table 17.5.2

Variables

$A_{se,V}$ [in.^{2}]	f_{uta} [psi]
0.14	94,200

Calculations

V_{sa} [lb]
5,886

Results

V_{sa} [lb]	ϕ_{steel}	ϕ V_{sa} [lb]	V_{ua} [lb]
5,886	0.600	3,532	39

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Fastening point:	Beta Sector - Mast Connection (N3)		

4.2 Pryout Strength (Concrete Breakout Strength controls)

$V_{cpg} = k_{cp} \left[\left(\frac{A_{Nc}}{A_{Nc0}} \right) \psi_{ec,N} \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b \right]$ ACI 318-19 Eq. (17.7.3.1b)

$\phi V_{cpg} \geq V_{ua}$ ACI 318-19 Table 17.5.2

A_{Nc} see ACI 318-19, Section 17.6.2.1, Fig. R 17.6.2.1(b)

$A_{Nc0} = 9 h_{ef}^2$ ACI 318-19 Eq. (17.6.2.1.4)

$\psi_{ec,N} = \left(\frac{1}{1 + \frac{2 e'_N}{3 h_{ef}}} \right) \leq 1.0$ ACI 318-19 Eq. (17.6.2.3.1)

$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5 h_{ef}} \right) \leq 1.0$ ACI 318-19 Eq. (17.6.2.4.1b)

$\psi_{cp,N} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5 h_{ef}}{c_{ac}} \right) \leq 1.0$ ACI 318-19 Eq. (17.6.2.6.1b)

$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5}$ ACI 318-19 Eq. (17.6.2.2.1)

Variables

k_{cp}	h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]
2	2.750	0.000	0.000	∞

$\psi_{c,N}$	c_{ac} [in.]	k_c	λ_a	f'_c [psi]
1.000	4.125	17	1.000	2,500

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [lb]
203.06	68.06	1.000	1.000	1.000	1.000	3,876

Results

V_{cpg} [lb]	$\phi_{concrete}$	ϕV_{cpg} [lb]	V_{ua} [lb]
23,130	0.700	16,191	156

5 Combined tension and shear loads, per ACI 318-19 section 17.8

β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
0.195	0.011	5/3	7	OK

$\beta_{NV} = \beta_N^{\zeta} + \beta_V^{\zeta} <= 1$

Company:	TEP Northeast	Page:	7
Address:	45 Beechwood Drive	Specifier:	Connor Leavitt
Phone I Fax:	(978) 557-5553 |	E-Mail:	cleavitt@tepgroup.net
Design:	CT2034 - Beta Sector - Mast	Date:	9/26/2023
Fastening point:	Beta Sector - Mast Connection (N3)		

6 Warnings

- The anchor design methods in PROFIS Engineering require rigid anchor plates per current regulations (AS 5216:2021, ETAG 001/Annex C, EOTA TR029 etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Engineering calculates the minimum required anchor plate thickness with CBFEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid anchor plate assumption is valid is not carried out by PROFIS Engineering. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies where the potential concrete failure surfaces are crossed by supplementary reinforcement proportioned to tie the potential concrete failure prism into the structural member. Condition B applies where such supplementary reinforcement is not provided, or where pullout or pryout strength governs.
- Design Strengths of adhesive anchor systems are influenced by the cleaning method. Refer to the INSTRUCTIONS FOR USE given in the Evaluation Service Report for cleaning and installation instructions.
- For additional information about ACI 318 strength design provisions, please go to https://submittals.us.hilti.com/PROFISAnchorDesignGuide/
- Installation of Hilti adhesive anchor systems shall be performed by personnel trained to install Hilti adhesive anchors. Reference ACI 318-19, Section 26.7.

Fastening meets the design criteria!

Company:	TEP Northeast	Page:	8
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Design:	CT2034 - Beta Sector - Mast	Date:	9/26/2023
Fastening point:	Beta Sector - Mast Connection (N3)		

7 Installation data

Profile: Rectangular plates and bars (AISC), 6 - 1/4; (L x W x T) = 6.000 in. x 0.250 in.

Hole diameter in the fixture (pre-setting) : d_f = 0.562 in.

Hole diameter in the fixture (through fastening) : d_f = 0.625 in.

Plate thickness (input): 0.375 in.

Recommended plate thickness: not calculated

Drilling method: Hammer drilled

Cleaning: Compressed air cleaning of the drilled hole according to instructions for use is required

Anchor type and diameter: HIT-HY 200 V3 + HIT-Z 1/2

Item number: 2018443 HIT-Z 1/2" x 4 1/2" (element) / 2334276 HIT-HY 200-R V3 (adhesive)

Maximum installation torque: 29.502 ft.lb

Hole diameter in the base material: 0.562 in.

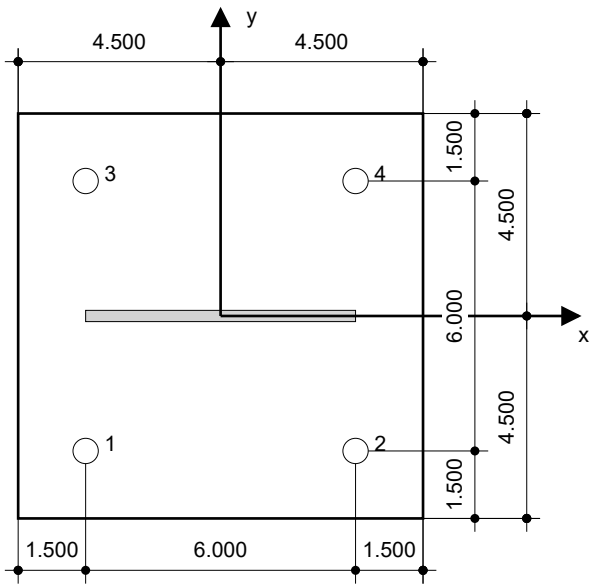
Hole depth in the base material: 3.750 in.

Minimum thickness of the base material: 5.000 in.

1/2 Hilti HIT-Z Carbon steel non-cleaning bonded expansion anchor with Hilti HIT-HY 200 V3 Safe Set System

7.1 Recommended accessories

Drilling	Cleaning	Setting
• Suitable Rotary Hammer • Properly sized drill bit	• -	• Dispenser including cassette and mixer • Torque wrench



Coordinates Anchor [in.]

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	-3.000	-3.000	-	-	-	-
2	3.000	-3.000	-	-	-	-
3	-3.000	3.000	-	-	-	-
4	3.000	3.000	-	-	-	-

Company:	TEP Northeast	Page:	9
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Fastening point:	Beta Sector - Mast Connection (N3)		

8 Remarks; Your Cooperation Duties

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- You must take all necessary and reasonable steps to prevent or limit damage caused by the Software. In particular, you must arrange for the regular backup of programs and data and, if applicable, carry out the updates of the Software offered by Hilti on a regular basis. If you do not use the AutoUpdate function of the Software, you must ensure that you are using the current and thus up-to-date version of the Software in each case by carrying out manual updates via the Hilti Website. Hilti will not be liable for consequences, such as the recovery of lost or damaged data or programs, arising from a culpable breach of duty by you.

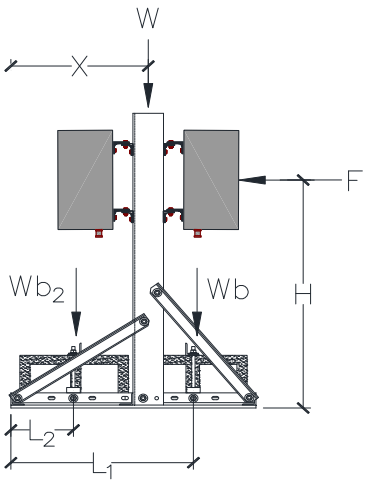
RRH Ballast Mount
Calculations

Date: 9/29/2023
Project Name: N. HAVEN-310 ORANGE ST-SBC CO
Project No.: CT2034
Designed By: CL **Checked By:** MSC

Calculate Total Ballast Required for Ballast Mount

Assume (2) RRH's and (1) Surge Arrestor as projected area

Wind Force, F =	352	lbs
Height, H =	3.25	ft
Weight of Frame =	163	lbs
Weight of Appurtenances =	316	lbs
Weight of Frame + Equipment, W =	479	lbs
50% of Frame Width, X =	1.75	ft
Length, L_1 =	2.83	ft
Length, L_2 =	0.67	ft



Weight of Existing Ballast, W_{b2}	66	lbs
(2) 4"x8"x16" Solid Blocks @ 33 lbs. /each		
Sled Length, L_{sled} =	3.50	ft
Sled Width, W_{sled} =	3.50	ft
Factor of Safety (FS) =	1.5	

Overturning at Ballast

$\Sigma M = 0 \rightarrow$ $W_b = [(F*H*FS) - (W*X) - (W_{b2}*L_2)] / L_1 =$ **295 lbs.**

Calculate Required Ballast

(Assume Proposed Blocks to be 4"x8"x16" Solid Concrete Block @ 33 lbs. /each)

Weight Req'd to Resist Overturning =	295	lbs	
Weight of Existing Ballast =	66	lbs	*(2) 4"x8"x16" Solid Blocks @ 33 lbs. /each*
Req'd Add. Weight per Tray =	229	lbs	
Number of Proposed Blocks =	**7**	**BLOCKS PER SIDE**	

Calculate Imposed Loading from Ballast Mount

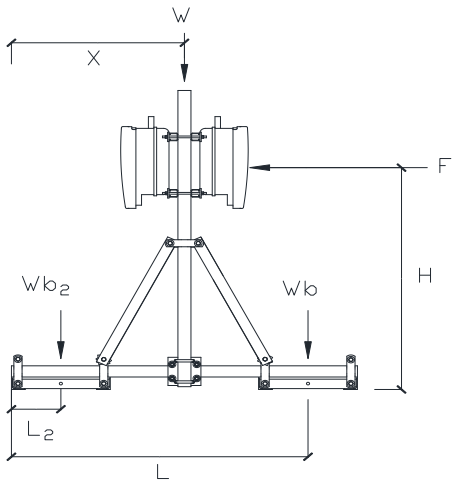
Bearing Area of Ballast Mount, A_{SLED} =	12.25	ft^2
Net Weight of Loaded Frame, W_{NET} =	1073	lbs
Resultant Area Load =	87.58	psf

Date: 9/29/2023
Project Name: N. HAVEN-310 ORANGE ST-SBC CO
Project No.: CT2034
Designed By: CL **Checked By:** MSC

Calculate Total Ballast Required for Ballast Mount

Assume (2) RRH's and (1) Surge Arrestor as projected area

Wind Force, F =	350	lbs
Height, H =	3.25	ft
Weight of Frame =	282	lbs
Weight of Appurtenances =	165	lbs
Weight of Frame + Equipment, W =	447	lbs
50% of Frame Width, X =	2.625	ft
Length, L_1 =	4.58	ft
Length, L_2 =	0.67	ft



Weight of Existing Ballast, W_{b2}	165	lbs

(5) 4"x8"x16" Solid Blocks @ 33 lbs. /each

Sled Length, L_{sled} =	5.25	ft
Sled Width, W_{sled} =	4.33	ft
Factor of Safety (FS) =	1.5	

Overturning at Ballast

$\Sigma M = 0 \rightarrow$ $Wb = [(F*H*SF) - (W*X) - (Wb_2*L_2)] / L_1 =$ **92 lbs.**

Calculate Required Ballast

(Assume Proposed Blocks to be 4"x8"x16" Solid Concrete Block @ 33 lbs. /each)

Weight Req'd to Resist Overturning =	92	lbs
Weight of Existing Ballast =	165	lbs

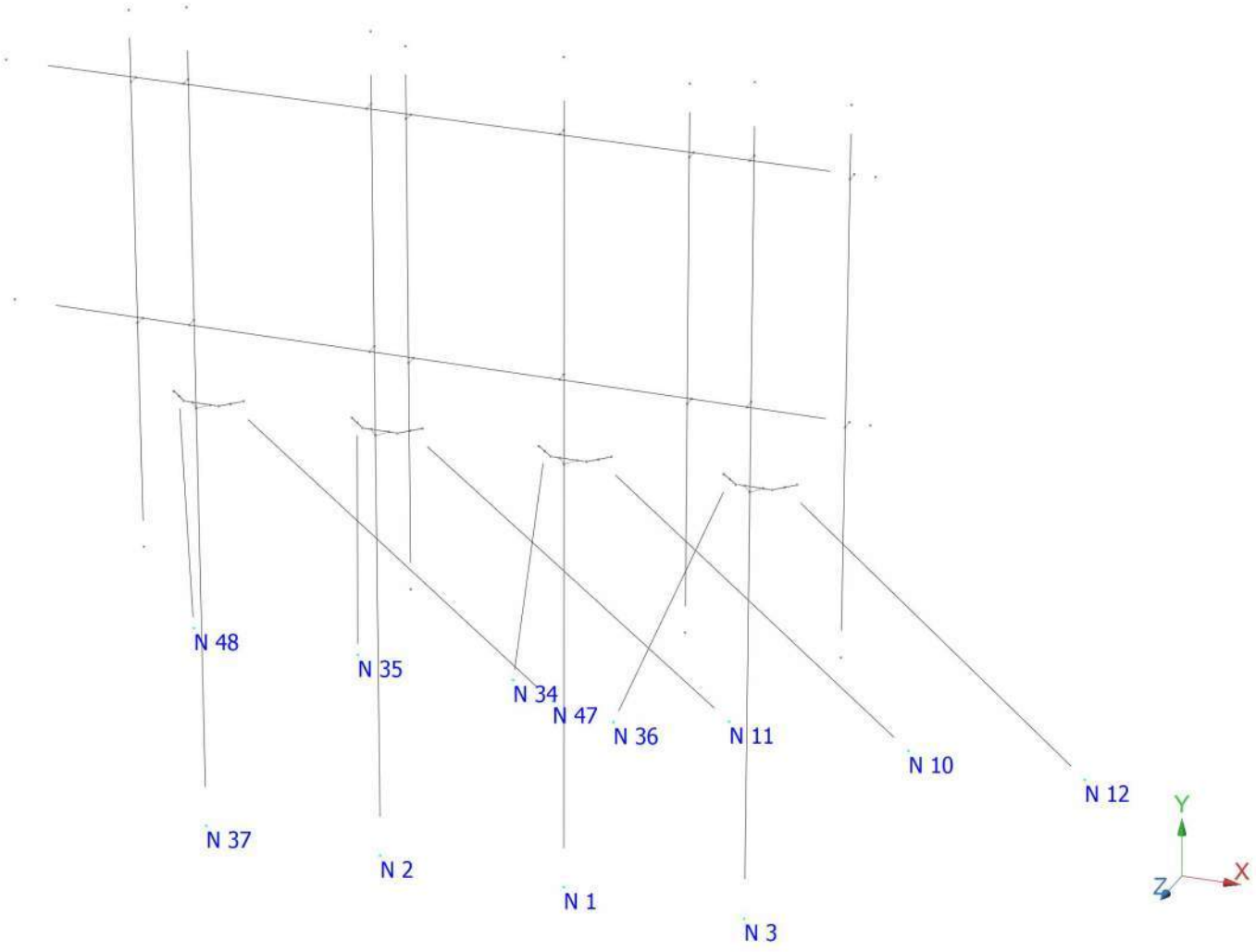
(5) 4"x8"x16" Solid Blocks @ 33 lbs. /each

Req'd Add. Weight per Tray =	0	lbs
Number of Proposed Blocks =	**0**	**BLOCKS PER SIDE**

Calculate Imposed Loading from Ballast Mount

Bearing Area of Ballast Mount, A_{SLED} =	22.73	ft^2
Net Weight of Loaded Frame, W_{NET} =	777	lbs
Resultant Area Load =	34.18	psf

Roof Framing
Calculations

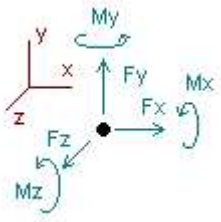

N 48
N 35
N 34
N 47
N 36
N 11
N 10
N 12
N 37
N 2
N 1
N 3
Y
X
Z

RAM® Elements
CONNECT Edition

Current Date: 9/29/2023 9:35 AM
Units system: English

Analysis result

Reactions



Direction of positive forces and moments

	Forces [Kip]			Moments [Kip*ft]		
Node	**FX**	**FY**	**FZ**	**MX**	**MY**	**MZ**
Condition **DL=Dead Load**						
1	0.00014	0.30195	0.00627	0.00000	0.00000	0.00000
2	-0.00018	0.30231	0.00624	0.00000	0.00000	0.00000
3	0.00022	0.38996	0.00624	0.00000	0.00000	0.00000
10	0.00005	0.02338	-0.00077	0.00000	0.00000	0.00000
11	0.00639	0.01036	-0.01133	0.00000	0.00000	0.00000
12	-0.00226	0.02845	0.00342	0.00000	0.00000	0.00000
34	-0.00493	0.01222	-0.01024	0.00000	0.00000	0.00000
35	0.00146	0.02701	0.00252	0.00000	0.00000	0.00000
36	-0.00417	0.01599	-0.00556	0.00000	0.00000	0.00000
37	-0.00095	0.42972	0.00628	0.00000	0.00000	0.00000
47	0.00309	0.01732	-0.00500	0.00000	0.00000	0.00000
48	0.00115	0.02639	0.00193	0.00000	0.00000	0.00000
SUM	0.00000	1.58505	0.00000	0.00000	0.00000	0.00000
Condition **Wf=Wind Load (FRONT)**						
1	0.00152	-1.35409	-0.14219	0.00000	0.00000	0.00000
2	0.00346	-1.27081	-0.14193	0.00000	0.00000	0.00000
3	-0.00177	-1.81631	-0.15293	0.00000	0.00000	0.00000
10	-0.29782	0.66997	0.64683	0.00000	0.00000	0.00000
11	-0.28838	0.64545	0.61812	0.00000	0.00000	0.00000
12	-0.37277	0.83296	0.78203	0.00000	0.00000	0.00000
34	0.27277	0.69429	0.67765	0.00000	0.00000	0.00000
35	0.20797	0.59641	0.60200	0.00000	0.00000	0.00000
36	0.50709	0.98791	0.81270	0.00000	0.00000	0.00000
37	0.00724	-1.80277	-0.16011	0.00000	0.00000	0.00000
47	-0.38063	0.85290	0.75281	0.00000	0.00000	0.00000
48	0.34132	0.96408	0.91875	0.00000	0.00000	0.00000
SUM	0.00000	0.00000	5.21373	0.00000	0.00000	0.00000
Condition **Ws=Wind Load (SIDE)**						
1	0.05547	0.29272	0.00768	0.00000	0.00000	0.00000
2	0.05821	-0.07929	-0.01022	0.00000	0.00000	0.00000
3	0.04491	-0.77305	0.00025	0.00000	0.00000	0.00000
10	0.58352	-1.00622	-0.83571	0.00000	0.00000	0.00000
11	0.53090	-0.93326	-0.76434	0.00000	0.00000	0.00000
12	0.60619	-1.05641	-0.87725	0.00000	0.00000	0.00000
34	0.46608	0.90099	0.76548	0.00000	0.00000	0.00000

35	0.46503	0.94390	0.81820	0.00000	0.00000	0.00000
36	0.80776	1.36706	0.99898	0.00000	0.00000	0.00000
37	0.05653	0.56813	-0.00336	0.00000	0.00000	0.00000
47	0.59127	-1.07368	-0.83624	0.00000	0.00000	0.00000
48	0.43076	0.84911	0.73652	0.00000	0.00000	0.00000
SUM	4.69664	0.00000	0.00000	0.00000	0.00000	0.00000

Condition **Wfice=Wind ICE (FRONT)**

1	0.00007	-0.12457	-0.02448	0.00000	0.00000	0.00000
2	0.00043	-0.11123	-0.02461	0.00000	0.00000	0.00000
3	-0.00015	-0.15557	-0.02483	0.00000	0.00000	0.00000
10	-0.02767	0.06233	0.05117	0.00000	0.00000	0.00000
11	-0.02676	0.05979	0.04790	0.00000	0.00000	0.00000
12	-0.02939	0.06591	0.05418	0.00000	0.00000	0.00000
34	0.02560	0.06497	0.05418	0.00000	0.00000	0.00000
35	0.01624	0.04731	0.04017	0.00000	0.00000	0.00000
36	0.04584	0.08929	0.06412	0.00000	0.00000	0.00000
37	0.00087	-0.18980	-0.02744	0.00000	0.00000	0.00000
47	-0.04062	0.09094	0.06959	0.00000	0.00000	0.00000
48	0.03554	0.10062	0.08605	0.00000	0.00000	0.00000
SUM	0.00000	0.00000	0.36600	0.00000	0.00000	0.00000

Condition **Wsice=Wind ICE (SIDE)**

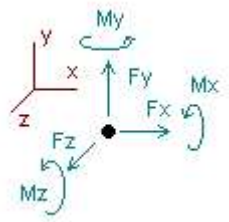
1	-0.00136	0.03256	0.00053	0.00000	0.00000	0.00000
2	-0.00121	-0.00947	-0.00080	0.00000	0.00000	0.00000
3	-0.00231	-0.07640	0.00035	0.00000	0.00000	0.00000
10	0.03731	-0.08057	-0.06687	0.00000	0.00000	0.00000
11	0.03428	-0.07703	-0.06320	0.00000	0.00000	0.00000
12	0.03985	-0.08626	-0.07154	0.00000	0.00000	0.00000
34	0.02856	0.07313	0.06221	0.00000	0.00000	0.00000
35	0.02816	0.07618	0.06591	0.00000	0.00000	0.00000
36	0.05110	0.09964	0.07290	0.00000	0.00000	0.00000
37	-0.00130	0.05490	-0.00072	0.00000	0.00000	0.00000
47	0.03682	-0.08278	-0.06462	0.00000	0.00000	0.00000
48	0.02811	0.07611	0.06583	0.00000	0.00000	0.00000
SUM	0.27800	0.00000	0.00000	0.00000	0.00000	0.00000

Condition **Di=Ice Load**

1	-0.00004	0.28532	0.00718	0.00000	0.00000	0.00000
2	-0.00050	0.17200	0.00765	0.00000	0.00000	0.00000
3	-0.00024	0.31354	0.00690	0.00000	0.00000	0.00000
10	0.00045	0.02520	-0.00155	0.00000	0.00000	0.00000
11	0.00899	0.00731	-0.01605	0.00000	0.00000	0.00000
12	-0.00305	0.03279	0.00475	0.00000	0.00000	0.00000
34	-0.00452	0.01610	-0.00932	0.00000	0.00000	0.00000
35	0.00028	0.02614	-0.00039	0.00000	0.00000	0.00000
36	-0.00463	0.01716	-0.00620	0.00000	0.00000	0.00000
37	-0.00158	0.54014	0.00806	0.00000	0.00000	0.00000
47	0.00295	0.01983	-0.00462	0.00000	0.00000	0.00000
48	0.00190	0.03082	0.00359	0.00000	0.00000	0.00000
SUM	0.00000	1.48634	0.00000	0.00000	0.00000	0.00000

Envelope for nodal reactions

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



Direction of positive forces and moments

Envelope of nodal reactions for :
DL=Dead Load
Wf=Wind Load (FRONT)
Ws=Wind Load (SIDE)
Wfice=Wind ICE (FRONT)
Wsice=Wind ICE (SIDE)
Di=Ice Load

		Forces						Moments					
Node		**Fx** [Kip]	**Ic**	**Fy** [Kip]	**Ic**	**Fz** [Kip]	**Ic**	**Mx** [Kip*ft]	**Ic**	**My** [Kip*ft]	**Ic**	**Mz** [Kip*ft]	**Ic**
1	Max	0.055	Ws	0.302	DL	0.008	Ws	0.00000	DL	0.00000	DL	0.00000	DL
	Min	-0.001	Wsice	-1.354	Wf	-0.142	Wf	0.00000	DL	0.00000	DL	0.00000	DL
2	Max	0.058	Ws	0.302	DL	0.008	Di	0.00000	DL	0.00000	DL	0.00000	DL
	Min	-0.001	Wsice	-1.271	Wf	-0.142	Wf	0.00000	DL	0.00000	DL	0.00000	DL
3	Max	0.045	Ws	0.390	DL	0.007	Di	0.00000	DL	0.00000	DL	0.00000	DL
	Min	-0.002	Wsice	-1.816	Wf	-0.153	Wf	0.00000	DL	0.00000	DL	0.00000	DL
10	Max	0.584	Ws	0.670	Wf	0.647	Wf	0.00000	DL	0.00000	DL	0.00000	DL
	Min	-0.298	Wf	-1.006	Ws	-0.836	Ws	0.00000	DL	0.00000	DL	0.00000	DL
11	Max	0.531	Ws	0.645	Wf	0.618	Wf	0.00000	DL	0.00000	DL	0.00000	DL
	Min	-0.288	Wf	-0.933	Ws	-0.764	Ws	0.00000	DL	0.00000	DL	0.00000	DL
12	Max	0.606	Ws	0.833	Wf	0.782	Wf	0.00000	DL	0.00000	DL	0.00000	DL
	Min	-0.373	Wf	-1.056	Ws	-0.877	Ws	0.00000	DL	0.00000	DL	0.00000	DL
34	Max	0.466	Ws	0.901	Ws	0.765	Ws	0.00000	DL	0.00000	DL	0.00000	DL
	Min	-0.005	DL	0.012	DL	-0.010	DL	0.00000	DL	0.00000	DL	0.00000	DL
35	Max	0.465	Ws	0.944	Ws	0.818	Ws	0.00000	DL	0.00000	DL	0.00000	DL
	Min	0.000	Di	0.026	Di	0.000	Di	0.00000	DL	0.00000	DL	0.00000	DL
36	Max	0.808	Ws	1.367	Ws	0.999	Ws	0.00000	DL	0.00000	DL	0.00000	DL
	Min	-0.005	Di	0.016	DL	-0.006	Di	0.00000	DL	0.00000	DL	0.00000	DL
37	Max	0.057	Ws	0.568	Ws	0.008	Di	0.00000	DL	0.00000	DL	0.00000	DL
	Min	-0.002	Di	-1.803	Wf	-0.160	Wf	0.00000	DL	0.00000	DL	0.00000	DL
47	Max	0.591	Ws	0.853	Wf	0.753	Wf	0.00000	DL	0.00000	DL	0.00000	DL
	Min	-0.381	Wf	-1.074	Ws	-0.836	Ws	0.00000	DL	0.00000	DL	0.00000	DL
48	Max	0.431	Ws	0.964	Wf	0.919	Wf	0.00000	DL	0.00000	DL	0.00000	DL
	Min	0.001	DL	0.026	DL	0.002	DL	0.00000	DL	0.00000	DL	0.00000	DL

TEP Northeast
45 Beechwood Drive
North Andover, MA 01845
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Project Title: N. HAVEN-310 ORANGE ST-SBC CO
Engineer: CL
Project ID: CT2034
Project Descr: Antennas and RRH's on Rooftop Frames

Concrete Beam

Project File: CT2034 - Existing Roof Structure (Rev.0).ec6

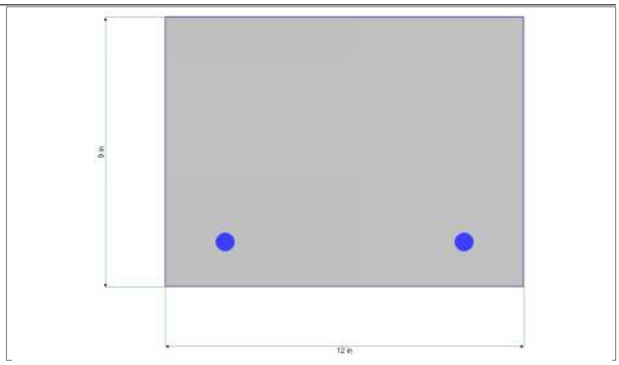
DESCRIPTION: One-Way Concrete Slab Check - Antenna Frame

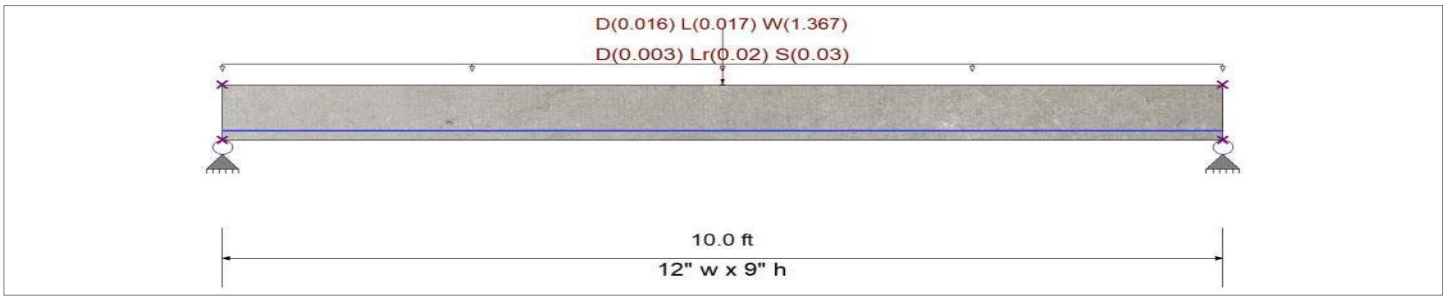
CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

General Information

f'c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c$^{1/2}$ * 7.50	=	410.792 psi		Shear :	0.750
ψ Density	=	150.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups		40.0 ksi
fy - Main Rebar	=	40.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #		3
			Number of Resisting Legs Per Stirrup	=	2





Cross Section & Reinforcing Details

Rectangular Section, Width = 12.0 in, Height = 9.0 in
Span #1 Reinforcing....
2-#5 at 1.50 in from Bottom, from 0.0 to 10.0 ft in this span

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0030, Lr = 0.020, S = 0.030 ksf, Tributary Width = 1.0 ft, (Uniform Roof Load)

Point Load : D = 0.0160, L = 0.0170, W = 1.367 k @ 5.0 ft, (Antenna Frame Reaction (Worst Case))

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.411** : 1	
Section used for this span	**Typical Section**	
Mu : Applied	5.422	k-ft
Mn * Phi : Allowable	13.196	k-ft
Location of maximum on span	5.009	ft
Span # where maximum occurs	Span # 1	

Maximum Deflection

Max Downward Transient Deflection	0.022 in	Ratio =	5551	>=360.0	L Only
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360.0	W Only
Max Downward Total Deflection	0.025 in	Ratio =	4870	>=180.0	Span: 1 : +D+0.60W
Max Upward Total Deflection	0.000 in	Ratio =	0	<180.0	Span: 1 : +D+0.750L+0.750S+0.450W

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	1.012	1.012
Max Upward from Load Combinations	1.012	1.012
Max Upward from Load Cases	0.683	0.683
D Only	0.585	0.585
+D+L	0.594	0.594

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Project Title: N. HAVEN-310 ORANGE ST-SBC CO
Engineer: CL
Project ID: CT2034
Project Descr: Antennas and RRH's on Rooftop Frames

Concrete Beam

DESCRIPTION: One-Way Concrete Slab Check - Antenna Frame

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
+D+Lr	0.685	0.685
+D+S	0.735	0.735
+D+0.750Lr+0.750L	0.667	0.667
+D+0.750L+0.750S	0.704	0.704
+D+0.60W	0.996	0.996
+D+0.750Lr+0.750L+0.450W	0.974	0.974
+D+0.750L+0.750S+0.450W	1.012	1.012
+0.60D+0.60W	0.761	0.761
+0.60D	0.351	0.351
Lr Only	0.100	0.100
L Only	0.008	0.008
S Only	0.150	0.150
W Only	0.683	0.683

Shear Stirrup Requirements

Entire Beam Span Length : Vu < Phi*Vc / 2, Req'd Vs = Not Reqd per 9.6.3.1, Stirrups are not required.

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd
+1.20D+L+0.50S+W	1	0.00	7.50	1.47	1.47	0.00	1.00	8.19	Vu < Phi*Vc / 2 ot Reqd per	8.2		0.0
+1.20D+L+0.50S+W	1	0.11	7.50	1.45	1.45	0.16	1.00	8.19	Vu < Phi*Vc / 2 ot Reqd per	8.2		0.0
+1.20D+L+0.50S+W	1	0.22	7.50	1.44	1.44	0.32	1.00	8.19	Vu < Phi*Vc / 2 ot Reqd per	8.2		0.0
+1.20D+L+0.50S+W	1	0.33	7.50	1.42	1.42	0.47	1.00	8.19	Vu < Phi*Vc / 2 ot Reqd per	8.2		0.0
+1.20D+L+0.50S+W	1	0.44	7.50	1.40	1.40	0.63	1.00	8.19	Vu < Phi*Vc / 2 ot Reqd per	8.2		0.0
+1.20D+L+0.50S+W	1	0.55	7.50	1.39	1.39	0.78	1.00	8.19	Vu < Phi*Vc / 2 ot Reqd per	8.2		0.0
+1.20D+L+0.50S+W	1	0.66	7.50	1.37	1.37	0.93	0.92	8.09	Vu < Phi*Vc / 2 ot Reqd per	8.1		0.0
+1.20D+L+0.50S+W	1	0.77	7.50	1.35	1.35	1.08	0.78	7.93	Vu < Phi*Vc / 2 ot Reqd per	7.9		0.0
+1.20D+L+0.50S+W	1	0.87	7.50	1.34	1.34	1.23	0.68	7.82	Vu < Phi*Vc / 2 ot Reqd per	7.8		0.0
+1.20D+L+0.50S+W	1	0.98	7.50	1.32	1.32	1.37	0.60	7.72	Vu < Phi*Vc / 2 ot Reqd per	7.7		0.0
+1.20D+L+0.50S+W	1	1.09	7.50	1.30	1.30	1.51	0.54	7.65	Vu < Phi*Vc / 2 ot Reqd per	7.6		0.0
+1.20D+L+0.50S+W	1	1.20	7.50	1.28	1.28	1.66	0.49	7.59	Vu < Phi*Vc / 2 ot Reqd per	7.6		0.0
+1.20D+L+0.50S+W	1	1.31	7.50	1.27	1.27	1.80	0.44	7.54	Vu < Phi*Vc / 2 ot Reqd per	7.5		0.0
+1.20D+L+0.50S+W	1	1.42	7.50	1.25	1.25	1.93	0.40	7.49	Vu < Phi*Vc / 2 ot Reqd per	7.5		0.0
+1.20D+L+0.50S+W	1	1.53	7.50	1.23	1.23	2.07	0.37	7.46	Vu < Phi*Vc / 2 ot Reqd per	7.5		0.0
+1.20D+L+0.50S+W	1	1.64	7.50	1.22	1.22	2.20	0.35	7.43	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	1.75	7.50	1.20	1.20	2.33	0.32	7.40	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	1.86	7.50	1.18	1.18	2.47	0.30	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	1.97	7.50	1.17	1.17	2.59	0.28	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	2.08	7.50	1.15	1.15	2.72	0.26	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	2.19	7.50	1.13	1.13	2.85	0.25	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	2.30	7.50	1.12	1.12	2.97	0.24	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	2.40	7.50	1.10	1.10	3.09	0.22	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	2.51	7.50	1.08	1.08	3.21	0.21	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	2.62	7.50	1.07	1.07	3.33	0.20	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	2.73	7.50	1.05	1.05	3.44	0.19	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	2.84	7.50	1.03	1.03	3.56	0.18	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	2.95	7.50	1.02	1.02	3.67	0.17	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	3.06	7.50	1.00	1.00	3.78	0.17	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	3.17	7.50	0.98	0.98	3.89	0.16	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	3.28	7.50	0.97	0.97	3.99	0.15	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	3.39	7.50	0.95	0.95	4.10	0.14	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	3.50	7.50	0.93	0.93	4.20	0.14	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	3.61	7.50	0.92	0.92	4.30	0.13	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	3.72	7.50	0.90	0.90	4.40	0.13	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	3.83	7.50	0.88	0.88	4.50	0.12	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	3.93	7.50	0.87	0.87	4.59	0.12	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	4.04	7.50	0.85	0.85	4.69	0.11	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	4.15	7.50	0.83	0.83	4.78	0.11	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0
+1.20D+L+0.50S+W	1	4.26	7.50	0.81	0.81	4.87	0.10	7.39	Vu < Phi*Vc / 2 ot Reqd per	7.4		0.0

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Project Descr: Antennas and RRH's on Rooftop Frames

Concrete Beam

DESCRIPTION: One-Way Concrete Slab Check - Antenna Frame

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu Actual	(k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd
+1.20D+L+0.50S+W	1	4.37	7.50	0.80	0.80	4.96	0.10	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	4.48	7.50	0.78	0.78	5.04	0.10	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	4.59	7.50	0.76	0.76	5.13	0.09	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	4.70	7.50	0.75	0.75	5.21	0.09	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	4.81	7.50	0.73	0.73	5.29	0.09	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	4.92	7.50	0.71	0.71	5.37	0.08	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	5.03	7.50	-0.71	0.71	5.41	0.08	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	5.14	7.50	-0.72	0.72	5.33	0.08	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	5.25	7.50	-0.74	0.74	5.25	0.09	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	5.36	7.50	-0.76	0.76	5.17	0.09	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	5.46	7.50	-0.77	0.77	5.09	0.09	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	5.57	7.50	-0.79	0.79	5.00	0.10	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	5.68	7.50	-0.81	0.81	4.91	0.10	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	5.79	7.50	-0.82	0.82	4.82	0.11	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	5.90	7.50	-0.84	0.84	4.73	0.11	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	6.01	7.50	-0.86	0.86	4.64	0.12	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	6.12	7.50	-0.87	0.87	4.55	0.12	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	6.23	7.50	-0.89	0.89	4.45	0.13	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	6.34	7.50	-0.91	0.91	4.35	0.13	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	6.45	7.50	-0.92	0.92	4.25	0.14	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	6.56	7.50	-0.94	0.94	4.15	0.14	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	6.67	7.50	-0.96	0.96	4.05	0.15	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	6.78	7.50	-0.97	0.97	3.94	0.15	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	6.89	7.50	-0.99	0.99	3.83	0.16	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	6.99	7.50	-1.01	1.01	3.72	0.17	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	7.10	7.50	-1.02	1.02	3.61	0.18	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	7.21	7.50	-1.04	1.04	3.50	0.19	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	7.32	7.50	-1.06	1.06	3.38	0.20	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	7.43	7.50	-1.08	1.08	3.27	0.21	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	7.54	7.50	-1.09	1.09	3.15	0.22	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	7.65	7.50	-1.11	1.11	3.03	0.23	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	7.76	7.50	-1.13	1.13	2.91	0.24	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	7.87	7.50	-1.14	1.14	2.78	0.26	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	7.98	7.50	-1.16	1.16	2.66	0.27	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	8.09	7.50	-1.18	1.18	2.53	0.29	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	8.20	7.50	-1.19	1.19	2.40	0.31	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	8.31	7.50	-1.21	1.21	2.27	0.33	7.41	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	8.42	7.50	-1.23	1.23	2.14	0.36	7.44	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+L+0.50S+W	1	8.52	7.50	-1.24	1.24	2.00	0.39	7.48	Vu < Phi*Vc / 2	ot Reqd per	7.5	0.0
+1.20D+L+0.50S+W	1	8.63	7.50	-1.26	1.26	1.86	0.42	7.52	Vu < Phi*Vc / 2	ot Reqd per	7.5	0.0
+1.20D+L+0.50S+W	1	8.74	7.50	-1.28	1.28	1.73	0.46	7.56	Vu < Phi*Vc / 2	ot Reqd per	7.6	0.0
+1.20D+L+0.50S+W	1	8.85	7.50	-1.29	1.29	1.59	0.51	7.62	Vu < Phi*Vc / 2	ot Reqd per	7.6	0.0
+1.20D+L+0.50S+W	1	8.96	7.50	-1.31	1.31	1.44	0.57	7.68	Vu < Phi*Vc / 2	ot Reqd per	7.7	0.0
+1.20D+L+0.50S+W	1	9.07	7.50	-1.33	1.33	1.30	0.64	7.77	Vu < Phi*Vc / 2	ot Reqd per	7.8	0.0
+1.20D+L+0.50S+W	1	9.18	7.50	-1.34	1.34	1.15	0.73	7.87	Vu < Phi*Vc / 2	ot Reqd per	7.9	0.0
+1.20D+L+0.50S+W	1	9.29	7.50	-1.36	1.36	1.01	0.85	8.01	Vu < Phi*Vc / 2	ot Reqd per	8.0	0.0
+1.20D+L+0.50S+W	1	9.40	7.50	-1.38	1.38	0.86	1.00	8.19	Vu < Phi*Vc / 2	ot Reqd per	8.2	0.0
+1.20D+L+0.50S+W	1	9.51	7.50	-1.39	1.39	0.70	1.00	8.19	Vu < Phi*Vc / 2	ot Reqd per	8.2	0.0
+1.20D+L+0.50S+W	1	9.62	7.50	-1.41	1.41	0.55	1.00	8.19	Vu < Phi*Vc / 2	ot Reqd per	8.2	0.0
+1.20D+L+0.50S+W	1	9.73	7.50	-1.43	1.43	0.40	1.00	8.19	Vu < Phi*Vc / 2	ot Reqd per	8.2	0.0
+1.20D+L+0.50S+W	1	9.84	7.50	-1.44	1.44	0.24	1.00	8.19	Vu < Phi*Vc / 2	ot Reqd per	8.2	0.0
+1.20D+L+0.50S+W	1	9.95	7.50	-1.46	1.46	0.08	1.00	8.19	Vu < Phi*Vc / 2	ot Reqd per	8.2	0.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	10.000	5.42	13.20	0.41

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Engineer: CL
Project ID: CT2034
Project Descr: Antennas and RRH's on Rooftop Frames

Concrete Beam

DESCRIPTION: One-Way Concrete Slab Check - Antenna Frame

Load Combination Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
+1.40D					
Span # 1	1	10.000	2.08	13.20	0.16
+1.20D+0.50Lr+1.60L					
Span # 1	1	10.000	1.97	13.20	0.15
+1.20D+1.60L+0.50S					
Span # 1	1	10.000	2.04	13.20	0.15
+1.20D+1.60Lr+L					
Span # 1	1	10.000	2.22	13.20	0.17
+1.20D+1.60Lr+0.50W					
Span # 1	1	10.000	3.89	13.20	0.29
+1.20D+L+1.60S					
Span # 1	1	10.000	2.42	13.20	0.18
+1.20D+1.60S+0.50W					
Span # 1	1	10.000	4.09	13.20	0.31
+1.20D+0.50Lr+L+W					
Span # 1	1	10.000	5.36	13.20	0.41
+1.20D+L+0.50S+W					
Span # 1	1	10.000	5.42	13.20	0.41
+0.90D+W					
Span # 1	1	10.000	4.75	13.20	0.36
+1.20D+L+0.20S					
Span # 1	1	10.000	1.90	13.20	0.14
+0.90D					
Span # 1	1	10.000	1.34	13.20	0.10

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft	Load Combination	Max. "+" Defl (in)	Location in Span (ft
+D+0.60W	1	0.0246	5.000		0.0000	0.000

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Project Descr: Antennas and RRH's on Rooftop Frames

Concrete Beam

Project File: CT2034 - Existing Roof Structure (Rev.0).ec6

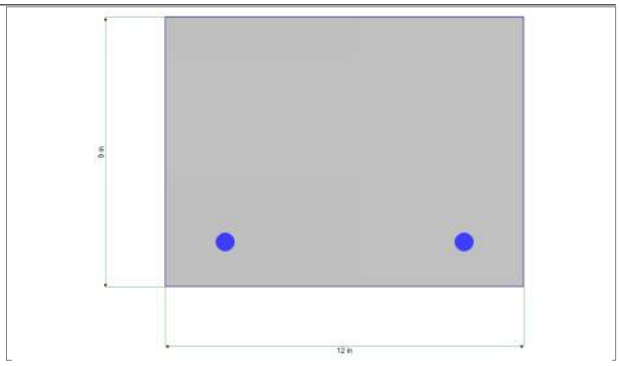
DESCRIPTION: One-Way Concrete Slab Check - RRH Ballast Sleds

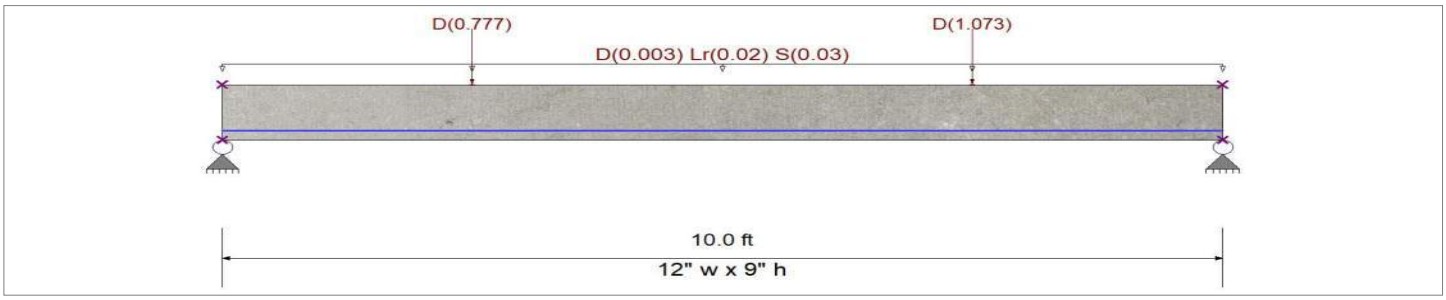
CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

General Information

f'c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c$^{1/2}$ * 7.50	=	410.792 psi		Shear :	0.750
ψ Density	=	150.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups		40.0 ksi
fy - Main Rebar	=	40.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #		3
			Number of Resisting Legs Per Stirrup	=	2





Cross Section & Reinforcing Details

Rectangular Section, Width = 12.0 in, Height = 9.0 in
Span #1 Reinforcing....
2-#5 at 1.50 in from Bottom, from 0.0 to 10.0 ft in this span

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0030, Lr = 0.020, S = 0.030 ksf, Tributary Width = 1.0 ft, (Uniform Roof Load)

Point Load : D = 0.7770 k @ 2.50 ft, (RRH Ballast Sled (RT-RRU5HD))
Point Load : D = 1.073 k @ 7.50 ft, (RRH Ballast Sled (RR-TFS))

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.401** : 1	
Section used for this span	**Typical Section**	
Mu : Applied	5.292	k-ft
Mn * Phi : Allowable	13.196	k-ft
Location of maximum on span	5.647	ft
Span # where maximum occurs	Span # 1	

Maximum Deflection

Max Downward Transient Deflection	0.003 in	Ratio =	40474	>=360.0	Lr Only
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360.0	S Only
Max Downward Total Deflection	0.034 in	Ratio =	3479	>=180.0	Span: 1 : +D+S
Max Upward Total Deflection	0.000 in	Ratio =	0	<180.0	Span: 1 : +D+S

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	1.578	1.726
Max Upward from Load Combinations	1.578	1.726
Max Upward from Load Cases	1.428	1.576

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Concrete Beam

DESCRIPTION: One-Way Concrete Slab Check - RRH Ballast Sleds

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
D Only	1.428	1.576
+D+Lr	1.528	1.676
+D+S	1.578	1.726
+D+0.750Lr	1.503	1.651
+D+0.750S	1.541	1.689
+0.60D	0.857	0.946
Lr Only	0.100	0.100
S Only	0.150	0.150

Shear Stirrup Requirements

Entire Beam Span Length : Vu < Phi*Vc / 2, Req'd Vs = Not Reqd per 9.6.3.1, Stirrups are not required.

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd
+1.40D	1	0.00	7.50	2.00	2.00	0.00	1.00	8.19	Vu < Phi*Vc / 2	ot Reqd per	8.2	0.0
+1.40D	1	0.11	7.50	1.98	1.98	0.22	1.00	8.19	Vu < Phi*Vc / 2	ot Reqd per	8.2	0.0
+1.40D	1	0.22	7.50	1.96	1.96	0.43	1.00	8.19	Vu < Phi*Vc / 2	ot Reqd per	8.2	0.0
+1.40D	1	0.33	7.50	1.95	1.95	0.65	1.00	8.19	Vu < Phi*Vc / 2	ot Reqd per	8.2	0.0
+1.40D	1	0.44	7.50	1.93	1.93	0.86	1.00	8.19	Vu < Phi*Vc / 2	ot Reqd per	8.2	0.0
+1.40D	1	0.55	7.50	1.91	1.91	1.07	1.00	8.19	Vu < Phi*Vc / 2	ot Reqd per	8.2	0.0
+1.40D	1	0.66	7.50	1.89	1.89	1.28	0.93	8.10	Vu < Phi*Vc / 2	ot Reqd per	8.1	0.0
+1.40D	1	0.77	7.50	1.88	1.88	1.48	0.79	7.94	Vu < Phi*Vc / 2	ot Reqd per	7.9	0.0
+1.40D	1	0.87	7.50	1.86	1.86	1.69	0.69	7.83	Vu < Phi*Vc / 2	ot Reqd per	7.8	0.0
+1.40D	1	0.98	7.50	1.84	1.84	1.89	0.61	7.73	Vu < Phi*Vc / 2	ot Reqd per	7.7	0.0
+1.40D	1	1.09	7.50	1.82	1.82	2.09	0.55	7.66	Vu < Phi*Vc / 2	ot Reqd per	7.7	0.0
+1.40D	1	1.20	7.50	1.81	1.81	2.29	0.49	7.60	Vu < Phi*Vc / 2	ot Reqd per	7.6	0.0
+1.40D	1	1.31	7.50	1.79	1.79	2.48	0.45	7.55	Vu < Phi*Vc / 2	ot Reqd per	7.5	0.0
+1.40D	1	1.42	7.50	1.77	1.77	2.68	0.41	7.50	Vu < Phi*Vc / 2	ot Reqd per	7.5	0.0
+1.40D	1	1.53	7.50	1.75	1.75	2.87	0.38	7.47	Vu < Phi*Vc / 2	ot Reqd per	7.5	0.0
+1.40D	1	1.64	7.50	1.73	1.73	3.06	0.35	7.44	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	1.75	7.50	1.72	1.72	3.25	0.33	7.41	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	1.86	7.50	1.70	1.70	3.44	0.31	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	1.97	7.50	1.68	1.68	3.62	0.29	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	2.08	7.50	1.66	1.66	3.80	0.27	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	2.19	7.50	1.65	1.65	3.99	0.26	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	2.30	7.50	1.63	1.63	4.16	0.24	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	2.40	7.50	1.61	1.61	4.34	0.23	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	2.51	7.50	0.55	0.55	4.31	0.08	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	2.62	7.50	0.53	0.53	4.37	0.08	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	2.73	7.50	0.51	0.51	4.43	0.07	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	2.84	7.50	0.49	0.49	4.48	0.07	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	2.95	7.50	0.47	0.47	4.53	0.06	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	3.06	7.50	0.45	0.45	4.58	0.06	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	3.17	7.50	0.43	0.43	4.63	0.06	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	3.28	7.50	0.41	0.41	4.68	0.05	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	3.39	7.50	0.39	0.39	4.72	0.05	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	3.50	7.50	0.37	0.37	4.76	0.05	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	3.61	7.50	0.35	0.35	4.80	0.05	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	3.72	7.50	0.33	0.33	4.84	0.04	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	3.83	7.50	0.31	0.31	4.87	0.04	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	3.93	7.50	0.29	0.29	4.91	0.04	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	4.04	7.50	0.27	0.27	4.94	0.03	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	4.15	7.50	0.25	0.25	4.97	0.03	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	4.26	7.50	0.23	0.23	4.99	0.03	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	4.37	7.50	0.21	0.21	5.01	0.03	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	4.48	7.50	0.19	0.19	5.18	0.02	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	4.59	7.50	0.17	0.17	5.20	0.02	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	4.70	7.50	0.15	0.15	5.22	0.02	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	4.81	7.50	0.13	0.13	5.24	0.02	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0

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Concrete Beam

DESCRIPTION: One-Way Concrete Slab Check - RRH Ballast Sleds

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu Actual	(k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd
+1.40D	1	4.92	7.50	0.12	0.12	5.25	0.01	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	5.03	7.50	0.10	0.10	5.26	0.01	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	5.14	7.50	0.08	0.08	5.27	0.01	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	5.25	7.50	0.06	0.06	5.28	0.01	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	5.36	7.50	0.05	0.05	5.29	0.01	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	5.46	7.50	0.03	0.03	5.29	0.00	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	5.57	7.50	-0.02	0.02	5.13	0.00	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	5.68	7.50	-0.04	0.04	5.12	0.00	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	5.79	7.50	-0.06	0.06	5.12	0.01	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	5.90	7.50	-0.08	0.08	5.11	0.01	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	6.01	7.50	-0.10	0.10	5.10	0.01	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	6.12	7.50	-0.12	0.12	5.09	0.01	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	6.23	7.50	-0.14	0.14	5.08	0.02	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	6.34	7.50	-0.16	0.16	5.06	0.02	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	6.45	7.50	-0.18	0.18	5.04	0.02	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	6.56	7.50	-0.20	0.20	5.02	0.03	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	6.67	7.50	-0.22	0.22	5.00	0.03	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	6.78	7.50	-0.24	0.24	4.97	0.03	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	6.89	7.50	-0.26	0.26	4.94	0.03	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	6.99	7.50	-0.28	0.28	4.91	0.04	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	7.10	7.50	-0.30	0.30	4.88	0.04	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	7.21	7.50	-0.32	0.32	4.85	0.04	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	7.32	7.50	-0.34	0.34	4.81	0.04	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.20D+1.60S	1	7.43	7.50	-0.36	0.36	4.77	0.05	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	7.54	7.50	-1.81	1.81	4.94	0.23	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	7.65	7.50	-1.83	1.83	4.74	0.24	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	7.76	7.50	-1.84	1.84	4.54	0.25	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	7.87	7.50	-1.86	1.86	4.34	0.27	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	7.98	7.50	-1.88	1.88	4.13	0.28	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	8.09	7.50	-1.90	1.90	3.93	0.30	7.39	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	8.20	7.50	-1.92	1.92	3.72	0.32	7.40	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	8.31	7.50	-1.93	1.93	3.51	0.34	7.43	Vu < Phi*Vc / 2	ot Reqd per	7.4	0.0
+1.40D	1	8.42	7.50	-1.95	1.95	3.29	0.37	7.45	Vu < Phi*Vc / 2	ot Reqd per	7.5	0.0
+1.40D	1	8.52	7.50	-1.97	1.97	3.08	0.40	7.49	Vu < Phi*Vc / 2	ot Reqd per	7.5	0.0
+1.40D	1	8.63	7.50	-1.99	1.99	2.86	0.43	7.53	Vu < Phi*Vc / 2	ot Reqd per	7.5	0.0
+1.40D	1	8.74	7.50	-2.00	2.00	2.65	0.47	7.57	Vu < Phi*Vc / 2	ot Reqd per	7.6	0.0
+1.40D	1	8.85	7.50	-2.02	2.02	2.43	0.52	7.63	Vu < Phi*Vc / 2	ot Reqd per	7.6	0.0
+1.40D	1	8.96	7.50	-2.04	2.04	2.20	0.58	7.70	Vu < Phi*Vc / 2	ot Reqd per	7.7	0.0
+1.40D	1	9.07	7.50	-2.06	2.06	1.98	0.65	7.78	Vu < Phi*Vc / 2	ot Reqd per	7.8	0.0
+1.40D	1	9.18	7.50	-2.07	2.07	1.75	0.74	7.88	Vu < Phi*Vc / 2	ot Reqd per	7.9	0.0
+1.40D	1	9.29	7.50	-2.09	2.09	1.53	0.86	8.02	Vu < Phi*Vc / 2	ot Reqd per	8.0	0.0
+1.40D	1	9.40	7.50	-2.11	2.11	1.30	1.00	8.19	Vu < Phi*Vc / 2	ot Reqd per	8.2	0.0
+1.40D	1	9.51	7.50	-2.13	2.13	1.07	1.00	8.19	Vu < Phi*Vc / 2	ot Reqd per	8.2	0.0
+1.40D	1	9.62	7.50	-2.15	2.15	0.83	1.00	8.19	Vu < Phi*Vc / 2	ot Reqd per	8.2	0.0
+1.40D	1	9.73	7.50	-2.16	2.16	0.60	1.00	8.19	Vu < Phi*Vc / 2	ot Reqd per	8.2	0.0
+1.40D	1	9.84	7.50	-2.18	2.18	0.36	1.00	8.19	Vu < Phi*Vc / 2	ot Reqd per	8.2	0.0
+1.40D	1	9.95	7.50	-2.20	2.20	0.12	1.00	8.19	Vu < Phi*Vc / 2	ot Reqd per	8.2	0.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	10.000	5.29	13.20	0.40
+1.40D					
Span # 1	1	10.000	5.29	13.20	0.40
+1.20D+0.50Lr					
Span # 1	1	10.000	4.66	13.20	0.35
+1.20D+0.50S					
Span # 1	1	10.000	4.72	13.20	0.36

TEP Northeast
45 Beechwood Drive
North Andover, MA 01845
(978) 557-5553

Project Title: N. HAVEN-310 ORANGE ST-SBC CO
Engineer: CL
Project ID: CT2034
Project Descr: Antennas and RRH's on Rooftop Frames

Concrete Beam

DESCRIPTION: One-Way Concrete Slab Check - RRH Ballast Sleds

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
+1.20D+1.60Lr					
Span # 1	1	10.000	4.93	13.20	0.37
+1.20D+1.60S					
Span # 1	1	10.000	5.13	13.20	0.39
+0.90D					
Span # 1	1	10.000	3.40	13.20	0.26
+1.20D+0.20S					
Span # 1	1	10.000	4.61	13.20	0.35

Overall Maximum Deflections

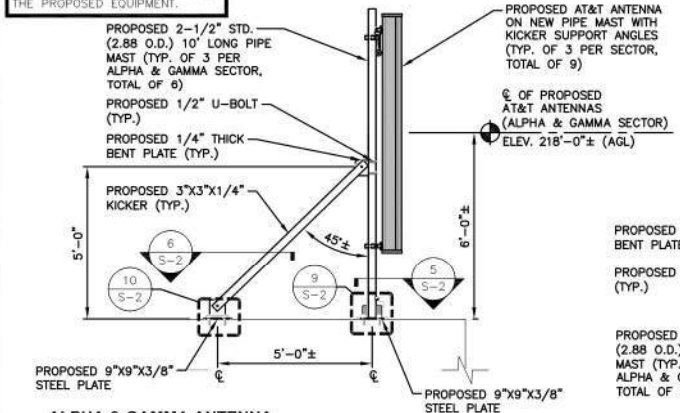
Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft	Load Combination	Max. "+" Defl (in)	Location in Span (ft
+D+S	1	0.0345	5.000		0.0000	0.000

Reference Documents

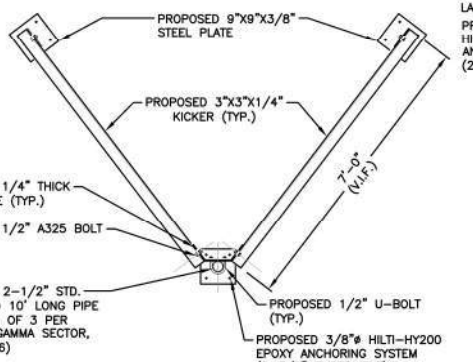
NOTE:
REFER TO STRUCTURAL ANALYSIS BY: HUDSON DESIGN GROUP, LLC, DATED: FEBRUARY 03, 2017, FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.

NOTE:
ANTENNAS, WIRES, MOUNTS, AND ASSOCIATED EQUIPMENT WILL BE PAINTED TO MATCH THE ADJACENT BUILDING FACADE OR BACKGROUND

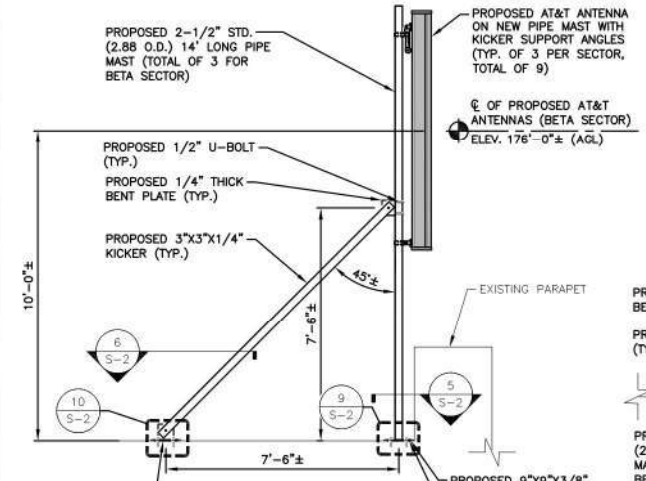
NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.



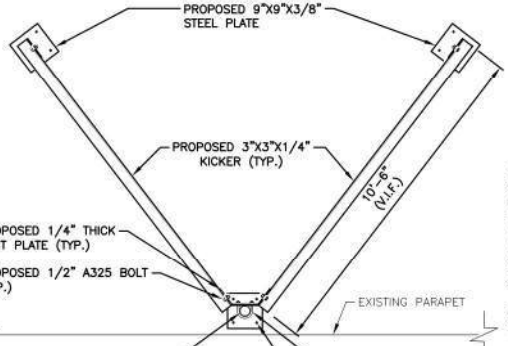
ALPHA & GAMMA ANTENNA MOUNTING DETAIL (1 / S-2)
22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"



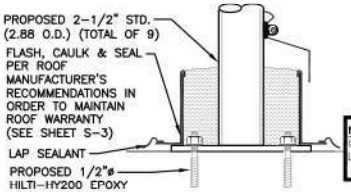
ALPHA & GAMMA MOUNT PLAN (3 / S-2)
22x34 SCALE: 3/4"=1'-0"
11x17 SCALE: 3/8"=1'-0"



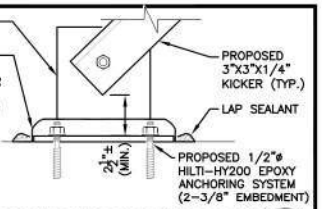
BETA ANTENNA MOUNTING DETAIL (2 / S-2)
22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"



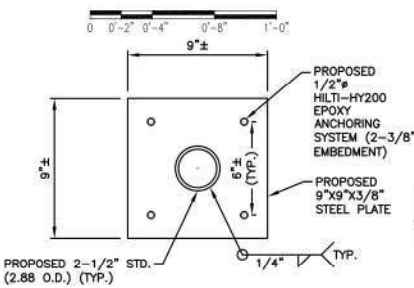
BETA MOUNT PLAN (4 / S-2)
22x34 SCALE: 3/4"=1'-0"
11x17 SCALE: 3/8"=1'-0"



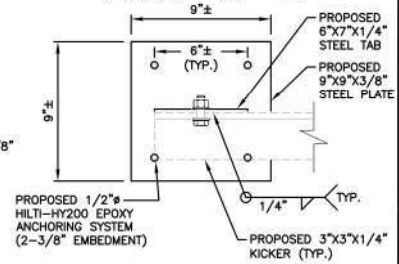
NOTE:
GENERAL CONTRACTOR TO USE LANDLORD APPROVED ROOFER.



KICKER BASE PLATE FLASHING DETAIL (10 / S-2)
22x34 SCALE: 3"=1'-0"
11x17 SCALE: 1-1/2"=1'-0"

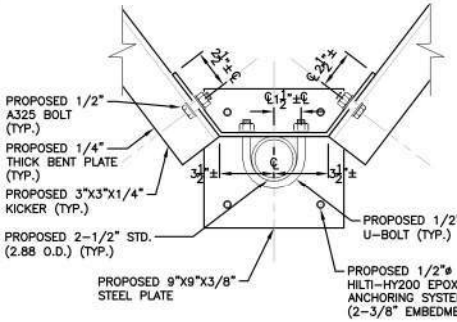


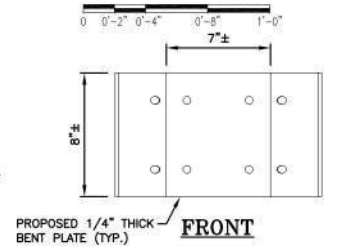
PIPE BASE PLATE FLASHING DETAIL (9 / S-2)
22x34 SCALE: 3"=1'-0"
11x17 SCALE: 1-1/2"=1'-0"

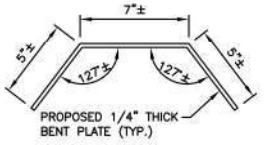


KICKER BASE PLATE DETAIL (6 / S-2)
22x34 SCALE: 3"=1'-0"
11x17 SCALE: 1-1/2"=1'-0"

BASE PLATE DETAIL (5 / S-2)
22x34 SCALE: 3"=1'-0"
11x17 SCALE: 1-1/2"=1'-0"







CONNECTION DETAIL (7 / S-2)
22x34 SCALE: 3"=1'-0"
11x17 SCALE: 1-1/2"=1'-0"

BENT PLATE DETAIL (8 / S-2)
22x34 SCALE: 3"=1'-0"
11x17 SCALE: 1-1/2"=1'-0"

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 3090
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

SAI
27 NORTHWESTERN DR.
SALEM, NH 03079

SITE NUMBER: CT2034
SITE NAME: N. HAVEN-310 ORANGE ST-SBC CO
310 ORANGE STREET
NEW HAVEN, CT 06510
NEW HAVEN COUNTY

at&t
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
4	07/27/17	ISSUED FOR CONSTRUCTION	SG	AT	DRH
3	06/16/17	ISSUED FOR CONSTRUCTION	SG	AT	DRH
2	03/29/17	ISSUED FOR CONSTRUCTION	SG	AT	DRH
1	03/21/17	ISSUED FOR CONSTRUCTION	SG	AT	DRH
0	11/14/16	ISSUED FOR REVIEW	SG	AT	DRH

SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: EB

DEREK J. CREASER — STATE OF CONNECTICUT — LICENSED PROFESSIONAL ENGINEER

AT&T

STRUCTURAL DETAILS
(LTE 2C/3C)

SITE NUMBER	DRAWING NUMBER	REV
CT2034	S-2	4

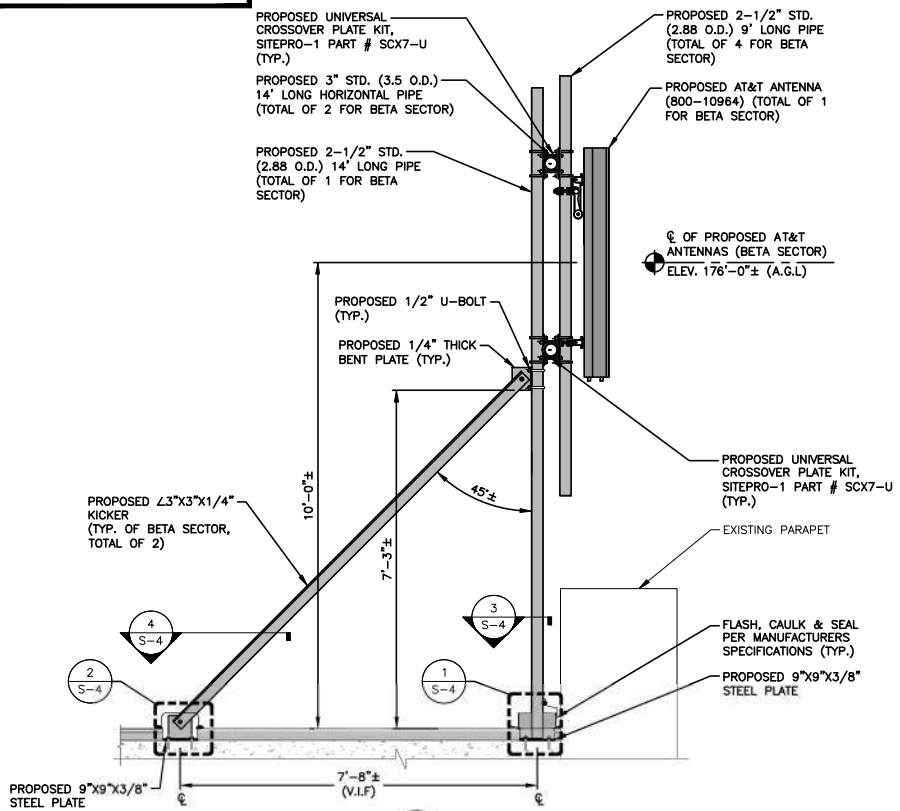
NOTE:

REFER TO **STRUCTURAL ANALYSIS** BY: HUDSON DESIGN GROUP, LLC, DATED: NOVEMBER 15, 2019 (REV.5) FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.

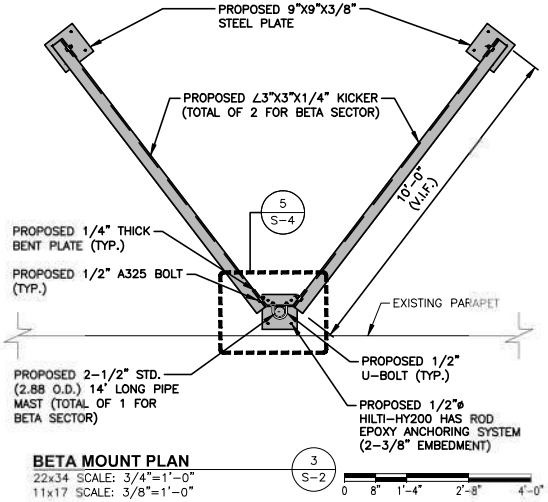
NOTE:

ANTENNAS, WIRES, MOUNTS, AND ASSOCIATED EQUIPMENT WILL BE PAINTED TO MATCH THE ADJACENT BUILDING FACADE OR BACKGROUND

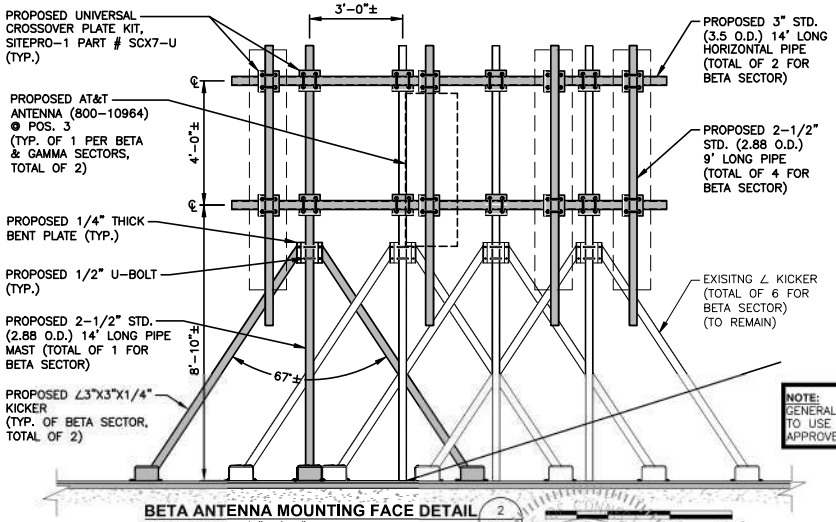
NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.



BETA ANTENNA MOUNTING DETAIL 1 S-2
22x34 SCALE: 3/4"=1'-0"
11x17 SCALE: 3/8"=1'-0"
0 8" 1'-4" 2'-8" 4'-0"



BETA MOUNT PLAN 3 S-2
22x34 SCALE: 3/4"=1'-0"
11x17 SCALE: 3/8"=1'-0"
0 8" 1'-4" 2'-8" 4'-0"



NOTE:
GENERAL CONTRACTOR TO USE LANDLORD APPROVED ROOFER.

BETA ANTENNA MOUNTING FACE DETAIL 2 S-2
22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"
0 1'-0" 2'-0" 4'-0" 6'-0"

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

SAI
12 INDUSTRIAL WAY
SALEM, NH 03079

SITE NUMBER: CT2034
SITE NAME: N. HAVEN-310 ORANGE ST-SBC CO

310 ORANGE STREET DUP 1
NEW HAVEN, CT 06510
NEW HAVEN COUNTY

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

NO.	DATE	REVISIONS	BY	CHK	APP'D
3	11/15/19	CONSTRUCTION REVISED	AM	AT	DPH
2	09/17/19	CONSTRUCTION REVISED	AM	AT	DPH
1	06/19/19	ISSUED FOR CONSTRUCTION	AM	AT	DPH
0	06/04/19	ISSUED FOR REVIEW	SG	AT	DPH
A	05/22/19	ISSUED FOR REVIEW	AM	AT	DPH

SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: AM

CONNECTICUT LICENSED PROFESSIONAL ENGINEER No. 24178

AT&T

STRUCTURAL DETAILS (BETA SECTOR)
(LTE 4C_5C_6C_7C)

SITE NUMBER	DRAWING NUMBER	REV
CT2034	S-2	3

310 ORANGE ST

Location	310 ORANGE ST	**Mblu**	243/ 0312/ 00300/ /
Acct#	243 0312 00300	**Owner**	THREE TEN ORANGE LLC
Assessment	$18,821,810	**Appraisal**	$26,888,300
PID	13872	**Building Count**	2

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2022	$18,193,100	$8,695,200	$26,888,300
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2022	$12,735,170	$6,086,640	$18,821,810

Owner of Record

Owner	THREE TEN ORANGE LLC	**Sale Price**	$73,846
Co-Owner		**Certificate**	
Address	PO BOX 2629	**Book & Page**	10421/271
	ADISON, TX 75001	**Sale Date**	08/08/2022
		Instrument	00

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
THREE TEN ORANGE LLC	$73,846		10421/271	00	08/08/2022
SOUTHERN NEW ENGLAND TELEPHONE	$0		0/0		01/01/1900

Building Information

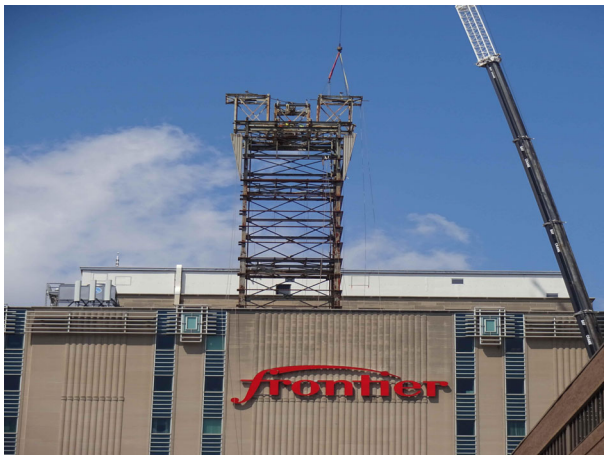
Building 1 : Section 1

Year Built:	1955
Living Area:	227,607
Replacement Cost:	$32,925,407
Building Percent Good:	30

Replacement Cost
Less Depreciation: $9,877,600

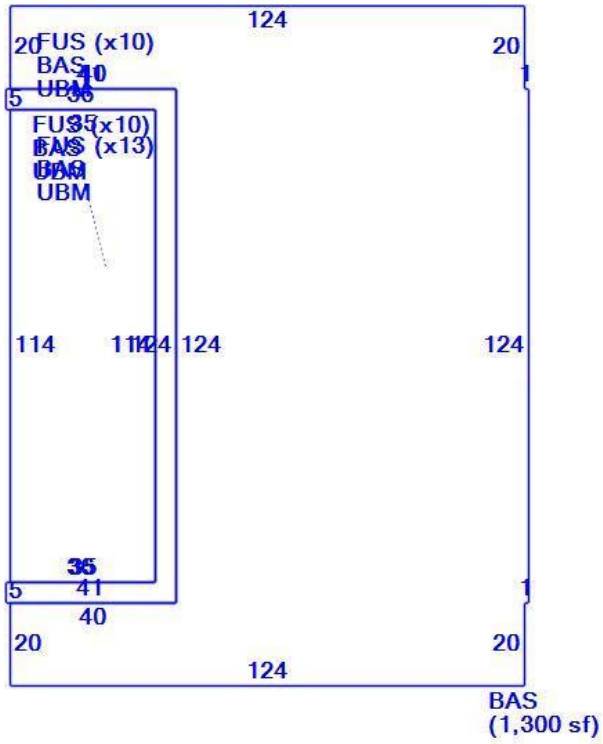
Building Attributes	
Field	**Description**
Style:	Equip Bldg
Model	Commercial
Grade	Good
Stories:	14
Occupancy	1.00
Exterior Wall 1	Stone
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	T&G/Rubber
Interior Wall 1	Drywall/Plaste
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	
Heating Fuel	Oil/Gas
Heating Type	Hot Water
AC Type	Central
Struct Class	
Bldg Use	OFFICE BLD MDL-94
Total Rooms	
Total Bedrms	00
Total Baths	0
NBHD Code	
1st Floor Use:	3400
Heat/AC	HEAT/AC SPLIT
Frame Type	STEEL
Baths/Plumbing	AVERAGE
Ceiling/Wall	SUS-CEIL & WL
Rooms/Prtns	AVERAGE
Wall Height	15.00
% Comn Wall	5.00

Building Photo



(https://images.vgsi.com/photos/NewHavenCTPhotos//\00\05\82\36.jpg)

Building Layout



(ParcelSketch.ashx?pid=13872&bid=19718)

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
FUS	Finished Upper Story	216,670	205,837
BAS	First Floor	21,770	21,770
UBM	Unfinished Basement	20,470	0
		258,910	227,607

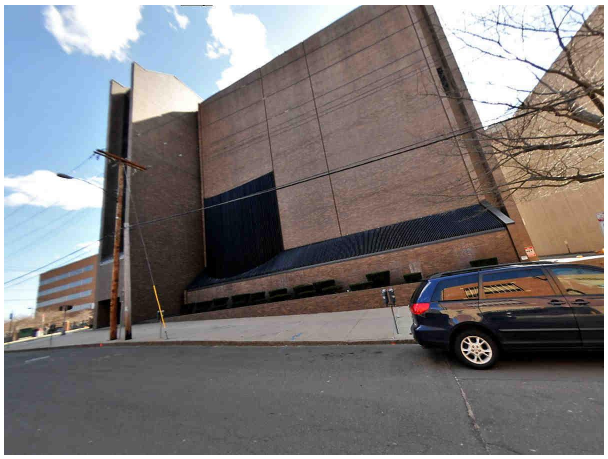
Building 2 : Section 1

Year Built: 1970
Living Area: 127,851
Replacement Cost: $20,033,132

Building Percent Good: 35
Replacement Cost
Less Depreciation: $7,011,600

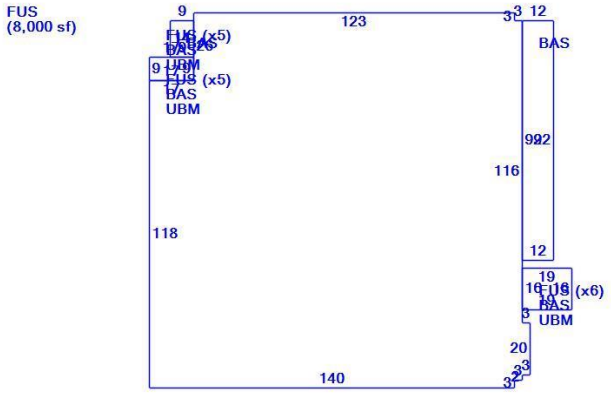
Building Attributes : Bldg 2 of 2	
Field	**Description**
Style:	Equip Bldg
Model	Ind/Lg Com
Grade	Good
Stories:	7
Occupancy	1.00
Exterior Wall 1	Brick
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	T&G/Rubber
Interior Wall 1	Drywall/Plaste
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	
Heating Fuel	Oil/Gas
Heating Type	Hot Water
AC Type	Central
Struct Class	
Bldg Use	OFFICE BLD MDL-96
Total Rooms	
Total Bedrms	00
Total Baths	0
NBHD Code	
1st Floor Use:	340I
Heat/AC	HEAT/AC SPLIT
Frame Type	MASONRY
Baths/Plumbing	AVERAGE
Ceiling/Wall	CEIL & WALLS
Rooms/Prtns	AVERAGE
Wall Height	15.00
% Comn Wall	11.00

Building Photo



(https://images.vgsi.com/photos/NewHavenCTPhotos//\00\05\14\17.jpg)

Building Layout



(ParcelSketch.ashx?pid=13872&bid=19719)

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
FUS	Finished Upper Story	111,549	105,972
BAS	First Floor	21,879	21,879
UBM	Unfinished Basement	20,649	0
		154,077	127,851

Extra Features

Extra Features					Legend
Code	**Description**	**Size**	**Value**	**Assessed Value**	**Bldg #**
ELV2	PASS ELEV	15.00 STOPS	$139,500	$97,650	1
SPR1	SPRINKLERS-WET	154077.00 S.F.	$140,200	$98,140	2
ELV1	FREIGHT ELEV	15.00 STOPS	$76,500	$53,550	1

ELV2	PASS ELEV	8.00 STOPS	$86,800	$60,760	2
SPR1	SPRINKLERS-WET	257610.00 S.F.	$200,900	$140,630	1

Land

Land Use

Use Code	3400
Description	OFFICE BLD MDL-94
Zone	BD
Neighborhood	ODT
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	1.52
Frontage	0
Depth	0
Assessed Value	$6,086,640
Appraised Value	$8,695,200

Outbuildings

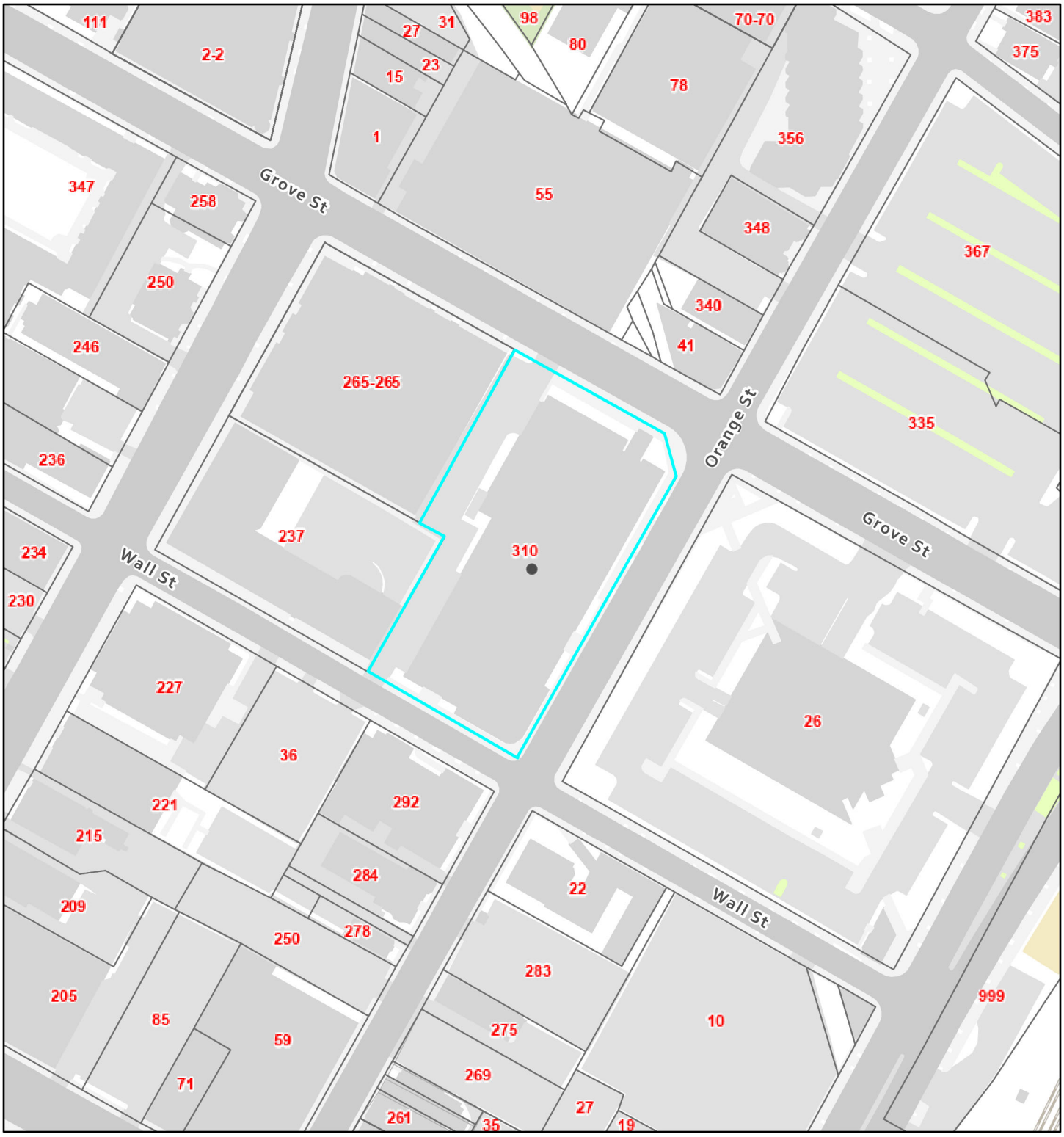
Outbuildings							Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Assessed Value**	**Bldg #**
CELT	CELL ANTENNA			2.00 UNITS	$660,000	$462,000	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2022	$18,193,100	$8,695,200	$26,888,300
2021	$18,193,100	$8,695,200	$26,888,300
2020	$16,721,800	$6,192,700	$22,914,500

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2022	$12,735,170	$6,086,640	$18,821,810
2021	$12,735,170	$6,086,640	$18,821,810
2020	$11,705,260	$4,334,890	$16,040,150

310 Orange St, New Haven, CT



10/5/2023, 3:07:39 PM

NH Parcels Web

New Haven Web Parcels

1:2,257

0 0.01 0.03 0.05 mi

0 0.02 0.04 0.09 km

City of New Haven
City of New Haven GIS

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

136 Main Street, Suite 401
New Britain, Connecticut 06051
Phone: 827-7682

February 27, 1991

Peter J. Tyrrell, Esq.
Senior Attorney
SNET Cellular, Inc.
227 Church Street
New Haven, CT 06506

RE: Springwich Cellular Limited Partnership, Notice of Exempt Modification on existing telecommunications towers in the Cities of Danbury, New Haven, Norwalk, and the Towns of East Haddam, Harwinton, Monroe, New Milford, Plymouth, Tolland, and Winchester, Connecticut.

Dear Attorney Tyrrell:

At a meeting held on February 25, 1991, the Connecticut Siting Council acknowledged your notice of exempt modifications at existing tower sites operated by Springwich Cellular Limited Partnership in the cities and towns listed above.

As proposed in your notice dated February 4, 1991, the modifications are in compliance with the exception criteria specified in Regulations of State Agencies 16-50j-72 for changes to the existing facility sites that do not increase the tower height, extend the boundary of the tower site, increase noise levels at the tower site boundary by 6 decibels, and add radio frequency transmitting capability which increases the total power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to Section 22a-162 of the Connecticut General Statutes.

The Council is pleased to note that the shared use of existing towers meets the Council's long-time goal and the public interest to avoid proliferation of additional tower structures.

Very truly yours,

Gloria Dibble Pond

Gloria Dibble Pond
Chairperson

GDP/foc

5145E

Southern New England Telephone
227 Church Street
New Haven, Connecticut 06510
Phone (203) 771-7381

SNET

FILE COPY

Peter J. Tyrrell
Senior Attorney

February 4, 1991

RECEIVED
FEB - 8 1991
CONNECTICUT
SITING COUNCIL

Gloria Dibble Pond, Chairperson
Connecticut Siting Council
136 Main Street Suite 401
New Britain, Connecticut 06051

Dear Honorable Chairperson Pond:

Enclosed please find a Notice of Intent to Modify Exempt Towers and Associated Equipment for facilities operated by Springwich Cellular Limited Partnership (SCLP). SNET Paging, Inc. (SPI), an affiliate of SCLP, proposes to add an antenna on each of the ten (10) sites to be used in providing its Paging Service. This filing is similar to the April 5, 1989 filing by SNET Cellular, Inc. which was approved on April 24, 1989.

Attached is a page for each location detailing the required information. As is shown in the attachments, the proposed additions meet all the necessary criteria established in the Regulations of Connecticut State Agencies, Section 16-50j-72(b)(2) and are thus exempt facilities pursuant to Section 16-50j-73.

Please record me as counsel for the Springwich Cellular Limited Partnership in this matter and in all correspondence from the Council.

Thank you for your cooperation.

Sincerely,

Peter J. Tyrrell

cc: See next page

As required by the Public Utility Environmental Standards Act, Section 16-50L (b), a copy of this application has been sent, by messenger or certified mail, to:

Honorable Gene Eriquez, Mayor, City of Danbury,
City Hall, 155 Deer Hill Avenue, Danbury, CT 06810

Honorable John J. Blashik, First Selectman, Town of East Haddam,
Town Office Building, Goodspeed Plaza, East Haddam, CT 06423

Honorable Lloyd T. Shanely, Jr., First Selectman, Town of Harwinton,
Town Hall, 100 Bentley Drive, Harwinton, CT 06791

Honorable Kenneth S. Heitzke, First Selectman, Town of Monroe,
Town Hall, 7 Fan Hill Road, Monroe, CT 06468

Honorable John C. Daniels, Mayor, City of New Haven,
Kennedy Mitchell Hall of Records, 200 Orange Street, New Haven, CT 06510

Honorable Walter J. Rogg, Mayor, Town of New Milford,
Town Hall, 10 Main Street, New Milford, CT 06776

Honorable Frank Esposito, Mayor, City of Norwalk,
City Hall, 125 East Avenue, P.O. Box 91, 06359

Honorable David M. Dennis, Mayor, Town of Plymouth,
Town Hall, 19 East Main Street, Terryville, CT 06786

Honorable John B. Harkins, Town Manager, Town of Tolland,
Hicks Memorial Municipal Center, 21 Tolland Green, Tolland, CT 06084

Honorable David E. Battistoni, Town Manager, Town of Winchester,
Town Hall, 338 Main Street, Winsted, CT 06098

NEW HAVEN

Pursuant to Section 16-50i(a)(5) of the Connecticut General Statutes and Section 16-50j-72(b)(2), as amended, of the Regulations of Connecticut State Agencies, Springwich Cellular Limited Partnership, an entity which provides cellular radio telecommunications service in the State of Connecticut, hereby notifies the Connecticut Siting Council that it intends to modify an existing telecommunications facility by the addition of a paging service antenna. The site is located on Orange Street, New Haven, Connecticut.

DISCUSSION

The proposed additional antenna will be located near the SCLP cellular antennas, but will not increase the overall height of the existing tower.

The maximum power density in the cellular and paging frequency bands is set forth below. The level shown indicates the total power density in milliwatts per square centimeter.

LOCATION NAME	LOCATION HEIGHT AMSL FT.	DISTANCE TO ANTENNA CENTERLINE FEET	INCREASE IN POWER DENSITY mW/cm2	TOTAL POWER DENSITY mW/cm2
Cell Site Boundary	20	293	0.00653767	0.06537673

The current Connecticut (and ANSI) power density level standard for non-ionizing radiation in the cellular frequency bands is 2.933 milliwatts/cm2. The level demonstrated in this case is well below the standard levels.

The proposed addition does not constitute a "modification" of an existing facility as defined in Connecticut General Statutes, Section 16-50i(d). This is because there is no change in the tower's height. There is no extension of the boundaries of the tower site. There will be no increase in noise levels at the tower's boundary by six decibels or more, and the total radio frequency electromagnetic radiation is not at or above the standard set forth in Section 22(a)-162 of the Connecticut General Statutes. This addition will not have a substantially adverse environmental effect.

For the reasons discussed above, Springwich Cellular Limited Partnership requests the Council to acknowledge that the Notice of Modification meets the Council's exemption criteria.

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NEW HAVEN CT 06510-2010

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THREE TEN ORANGE LLC
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ADDISON TX 75001-2629

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C002

MATT MONAHAN, SR. PROJ MGR
EVEREST INFRASTRUCTURE PARTNERS
STE 1002
2 ALLEGHENY CTR
PITTSBURGH PA 15212-5414

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C006

MELANIE BACHMAN EXECUTIVE DIRECTOR
CT SITING COUNCIL
10 FRANKLIN SQ
NEW BRITAIN CT 06051-2655

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Hollis Redding

Mayor & Ex Dir City Plan

From: auto-reply@usps.com
Sent: Thursday, December 7, 2023 9:37 PM
To: Hollis Redding
Subject: USPS® Arrived at USPS Regional Facility 940550369930063393654 6

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Property Owner Copy

From: auto-reply@usps.com
Sent: Friday, December 8, 2023 2:00 AM
To: Hollis Redding
Subject: USPS® Arrived at USPS Regional Origin Facility 9405503699300633936553

Hello **HOLLIS M REDDING**,

Your item arrived at our SPRINGFIELD MA NETWORK DISTRIBUTION CENTER origin facility on December 8, 2023 at 1:53 am. The item is currently in transit to the destination.

Tracking Number: **9405503699300633936553**

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Hollis Redding

Rooftop Manager Copy

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Sent: Friday, December 8, 2023 1:30 AM
To: Hollis Redding
Subject: USPS® Arrived at USPS Regional Origin Facility 9405503699300633936560

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