



STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

Web Site: portal.ct.gov/csc

VIA ELECTRONIC MAIL

February 22, 2023

Allison Conwell
Site Acquisition Consultant
Centerline Communications LLC
750 West Center St. Ste. 301
West Bridgewater, MA 02379
aconwell@clinellc.com

RE: **EM-AT&T-077-230109** - AT&T notice of intent to modify an existing telecommunications facility located at 52 East Center Road, Manchester, Connecticut.

Dear Allison Conwell:

The Connecticut Siting Council (Council) is in receipt of your correspondence of February 21, 2023, submitted in response to the Council's January 23, 2023 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

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

Thank you for your attention and cooperation.

Sincerely,

Melanie Bachman
Executive Director

MAB/ANM/laf

From: Allison Conwell <aconwell@clinellc.com>
Sent: Tuesday, February 21, 2023 10:36 AM
To: Mathews, Lisa A <Lisa.A.Mathews@ct.gov>
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: RE: Council Incomplete Letter for EM-AT&T-077-230109 (East Center Road)

Hi Lisa,

Please see attached electronic copy of the revised Mount Analysis and Construction Drawings. The hard copies will be going out in the mail today.



Allison Conwell (formerly Hebel) | Site Acquisition
Consultant
750 West Center St. Suite 301 | West Bridgewater, MA 02379
Phone: 215.588.7035 Fax: 508.819.3017
aconwell@clinellc.com | www.centerlinecommunications.com

PROJECT INFORMATION

SCOPE OF WORK: ITEMS TO BE MOUNTED ON THE EXISTING (ROOFTOP) SELF SUPPORT TOWER:

- PROPOSED AT&T MOUNT MODIFICATIONS (SEE "S" SHEETS)
- PROPOSED AT&T LTE ANTENNAS (TPA65R-BU6DA-K) @ POS. 2 (TYP. 1 PER ALPHA & BETA SECTOR, TOTAL OF 2).
- PROPOSED AT&T LTE ANTENNAS (TPA65R-BU8DA-K) @ POS. 2 (GAMMA SECTOR, TOTAL OF 1).
- PROPOSED AT&T LTE ANTENNAS (AIR6449 B77D) @ POS. 3 (TYP. 1 PER SECTOR, TOTAL OF 3)(STACKED) (TOP).
- PROPOSED AT&T LTE ANTENNAS (AIR6419 B77G) @ POS. 3 (TYP. OF 1 PER SECTOR, TOTAL OF 3)(STACKED) (BOTTOM).
- PROPOSED AT&T RRUS (4415 B25) @ POS. 2 (TYP. 1 PER SECTOR, TOTAL OF 3).
- PROPOSED AT&T DC SURGE ARRESTOR DC9-48-60-24-8C-EV (TOTAL OF 1) WITH (1) 6 AWG DC TRUNK & (1) 24 PAIR FIBER

ITEMS TO BE MOUNTED AT EQUIPMENT LOCATION:

- ADD 6648 + XCEDE TO EXISTING BASEBAND.
- FINAL BASEBAND = 1x5216+2xXMU+1x6630+IDLe+6673
- INSTALL (3) -48V RECTIFIERS FOR A TOTAL OF (10) -48V RECTIFIERS
- INSTALL (5) STRING OF 190AH BATTERIES.

ITEMS TO BE REMOVED:

- DECOMMISSION EXISTING AT&T UMTS ANTENNA (80010121) @ POSITION 2 (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- DECOMMISSION EXISTING AT&T LTE ANTENNAS (OPA65R-BU6DA) @ POSITION 3 (TYP. 1 PER ALPHA & BETA SECTOR, TOTAL OF 2).
- DECOMMISSION EXISTING AT&T LTE ANTENNAS (QS66512-2) @ POSITION 4 (TYP. 1 PER ALPHA & BETA SECTOR, TOTAL OF 2).
- DECOMMISSION EXISTING AT&T LTE ANTENNA (OPA65R-BU8DA) @ POSITION 3 (GAMMA SECTOR, TOTAL OF 1).
- DECOMMISSION EXISTING AT&T LTE ANTENNA (TPA-65R-LCUUUU-H8) @ POSITION 4 (GAMMA SECTOR, TOTAL OF 1).
- DECOMMISSION EXISTING AT&T RRUS (RRUS-32 B30) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- DECOMMISSION EXISTING AT&T TMA (CM1007-DBPXB-003) (TYP. OF 2 PER SECTOR, TOTAL OF 6).
- DECOMMISSION EXISTING AT&T TMA (CCI-DTMABP7819VG12A) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- DECOMMISSION EXISTING AT&T TRIPLEXERS (TPX-070821) (TYP. OF 4 PER SECTOR, TOTAL OF 12).
- DECOMMISSION EXISTING AT&T DC SURGE ARRESTOR (DC6-48-60-08F) (TOTAL OF 1).
- DECOMMISSION EXISTING AT&T COAX CABLES (7/8") (TOTAL OF 6).
- REMOVE (5) STRING OF BATTERIES.

ITEMS TO REMAIN:

- (3) ANTENNAS, (12) RRU'S, (2) SURGE ARRESTOR, (6) COAX CABLES, (6) DC POWER & (2) FIBER.

SITE ADDRESS: 52 EAST CENTER STREET
MANCHESTER, CT 06040

LATITUDE: 41.7756311° N, 41° 46' 32.27" N

LONGITUDE: -72.5208050° W, 72° 31' 14.89" W

TYPE OF SITE: (ROOFTOP) SELF SUPPORT TOWER / INDOOR EQUIPMENT

STRUCTURE HEIGHT: 65'-7"±

RAD CENTER: 63'-0"±

CURRENT USE: TELECOMMUNICATIONS FACILITY

PROPOSED USE: TELECOMMUNICATIONS FACILITY

DRAWING INDEX

| SHEET NO. | DESCRIPTION | REV. |
|-----------|-----------------------------------|------|
| T-1 | TITLE SHEET | 1 |
| GN-1 | GENERAL NOTES | 1 |
| A-1 | ROOF & EQUIPMENT PLANS | 1 |
| A-2 | EXISTING & PROPOSED ANTENNA PLANS | 1 |
| A-3 | ELEVATION | 1 |
| A-4 | DETAILS | 1 |
| A-5 | DETAILS | 1 |
| SN-1 | STRUCTURAL NOTES | 1 |
| S-1 | STRUCTURAL DETAILS | 1 |
| S-2 | STRUCTURAL DETAILS | 1 |
| G-1 | GROUNDING DETAILS | 1 |
| RF-1 | RF PLUMBING DIAGRAM | 1 |



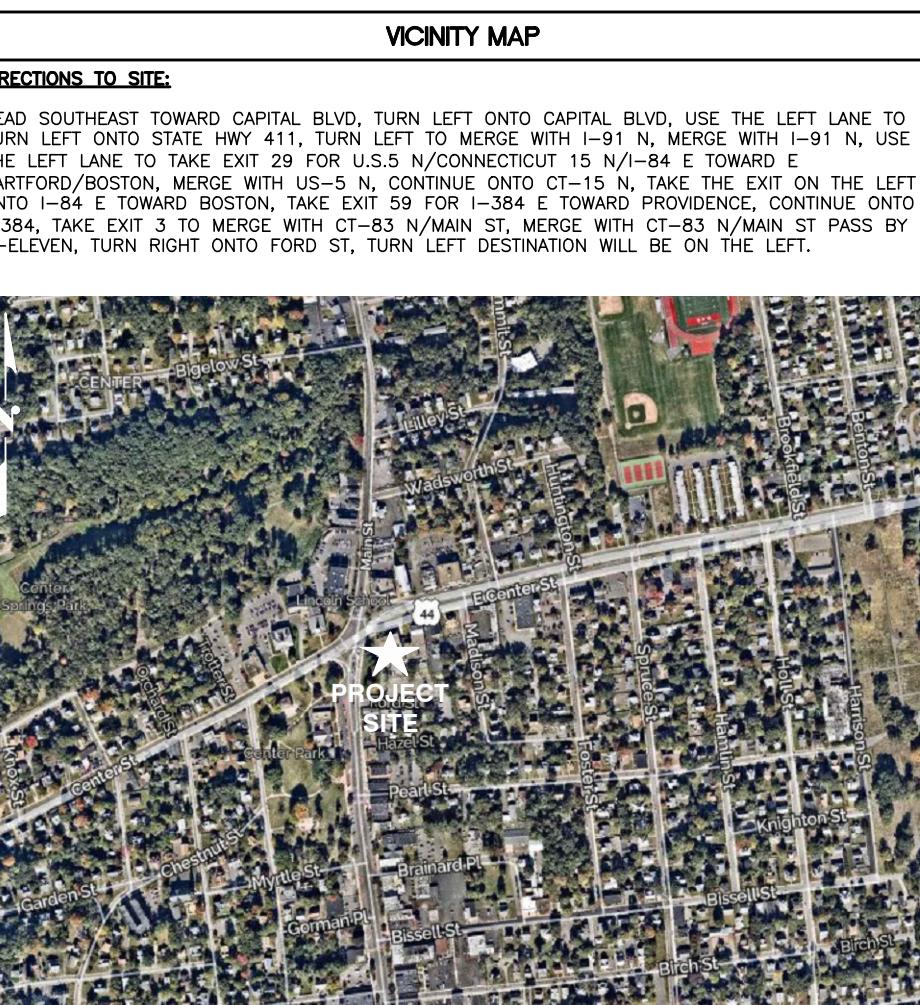
SITE NUMBER: CTL01070

SITE NAME: MANCHESTER-EAST CENTER ST

FA CODE: 10035030

PACE ID: MRCTB064757, MRTCB057966, MRCTB057962, MRCTB051047, MRCTB052260

PROJECT: 5G NR RADIO, 5G NR 1SR CBAND, 5G NR SOFTWARE RADIO, 5G NR ACTIVATION, 2022 UPGRADE



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.

72 HOURS



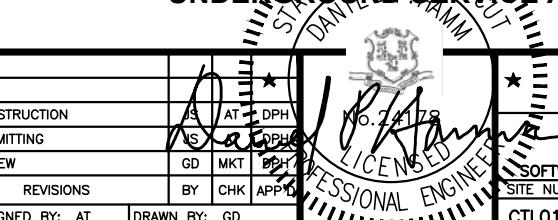
**CALL
BEFORE YOU DIG**



CALL TOLL FREE 1-800-922-4455

OR CALL 811

UNDERGROUND SERVICE ALERT



AT&T

**TITLE SHEET
5G NR RADIO, 5G NR 1SR CBAND, 5G NR
SOFTWARE RADIO, 5G NR ACTIVATION, 2022 UPGRADE**

**SITE NUMBER: CTL01070
DRAWING NUMBER: T-1
REV: 1**

GROUNDING NOTES

- 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.
- 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.
- 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.
- 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.
- 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.
- EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
- APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
- ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO GROUND BAR.
- ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
- MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
- 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.
- 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

- FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

CONTRACTOR – CENTERLINE
SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
OWNER – AT&T MOBILITY
- 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.
- 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.
- DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
- UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
- "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.
- THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
- 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.
- 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.
- THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAVED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
- 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.
- SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
- ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

- 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.
- 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.
- CONSTRUCTION SHALL COMPLY WITH SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T SITES."
- 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.
- 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.
- 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.

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;

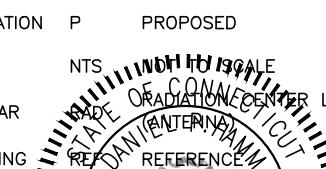
AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) MANUAL OF STEEL CONSTRUCTION, ASD, FOURTEENTH EDITION;

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

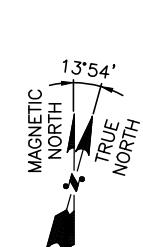
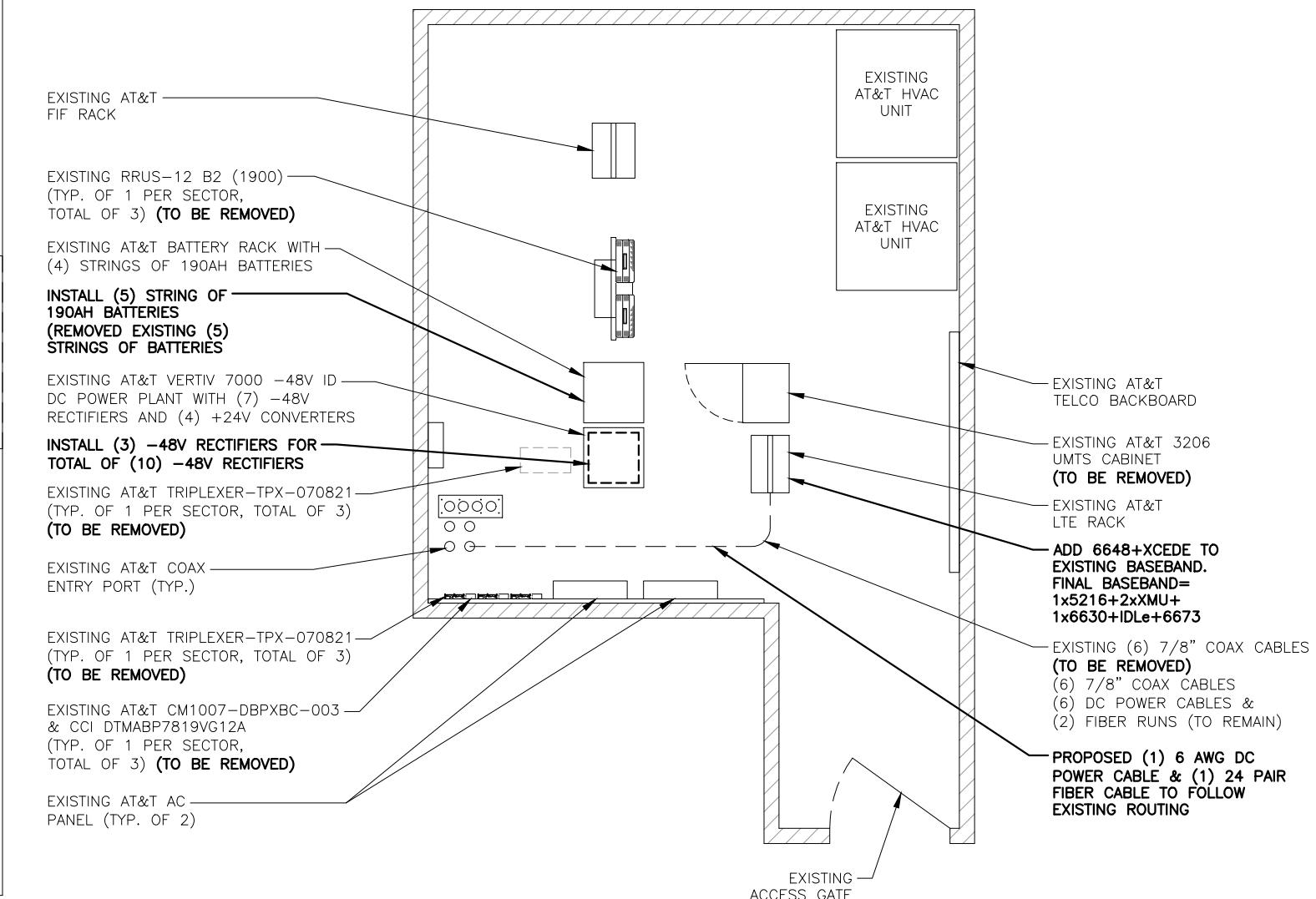
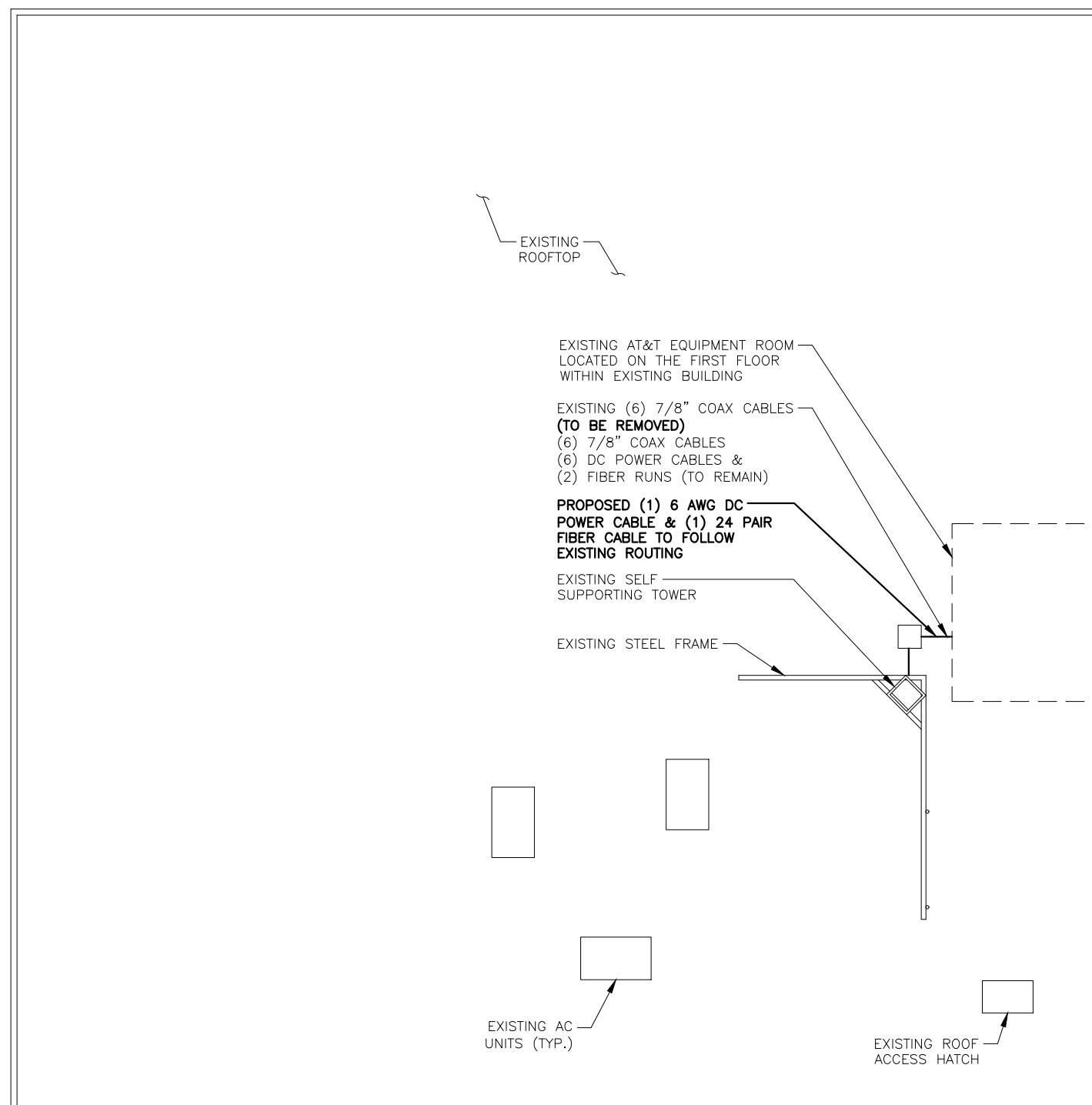
FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

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 | ND | NO DRAWING | VIF | VERIFY IN FIELD |
| EGR | EQUIPMENT GROUND RING | REF | REFERENCE | | |



AT&T
GENERAL NOTES
5G NR RADIO, 5G NR 1SR CBAND, 5G NR SOFTWARE RADIO, 5G NR ACTIVATION, 2022 UPGRADE
SITE NUMBER: CTL01070
DRAWING NUMBER: GN-1
REV: 1



ROOF PLAN

22x34 SCALE: 1/8"=1'-0" 11x17 SCALE: 1/16"=1'-0" 0 4'-0" 8'-0" 16'-0" 24'-0"

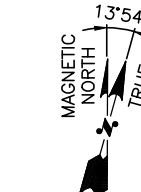
1
A-4

SITE NUMBER: CTL01070
SITE NAME: MANCHESTER-EAST CENTER ST

52 EAST CENTER STREET
MANCHESTER, CT 06040
HARTFORD COUNTY

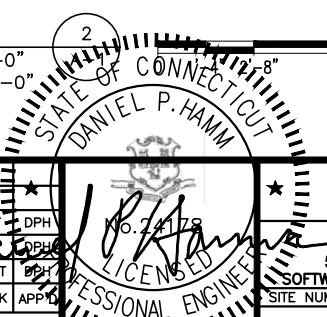


500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067



EQUIPMENT PLAN

22x34 SCALE: 3/8"=1'-0" 11x17 SCALE: 3/16"=1'-0" 11'-8" 5'-4" 8'-0"



AT&T

ROOF & EQUIPMENT PLANS
5G NR RADIO, 5G NR 1SR CBAND, 5G NR SOFTWARE RADIO, 5G NR ACTIVATION, 2022 UPGRADE
SITE NUMBER: CTL01070 DRAWING NUMBER: A-1 REV: 1

NOTE:

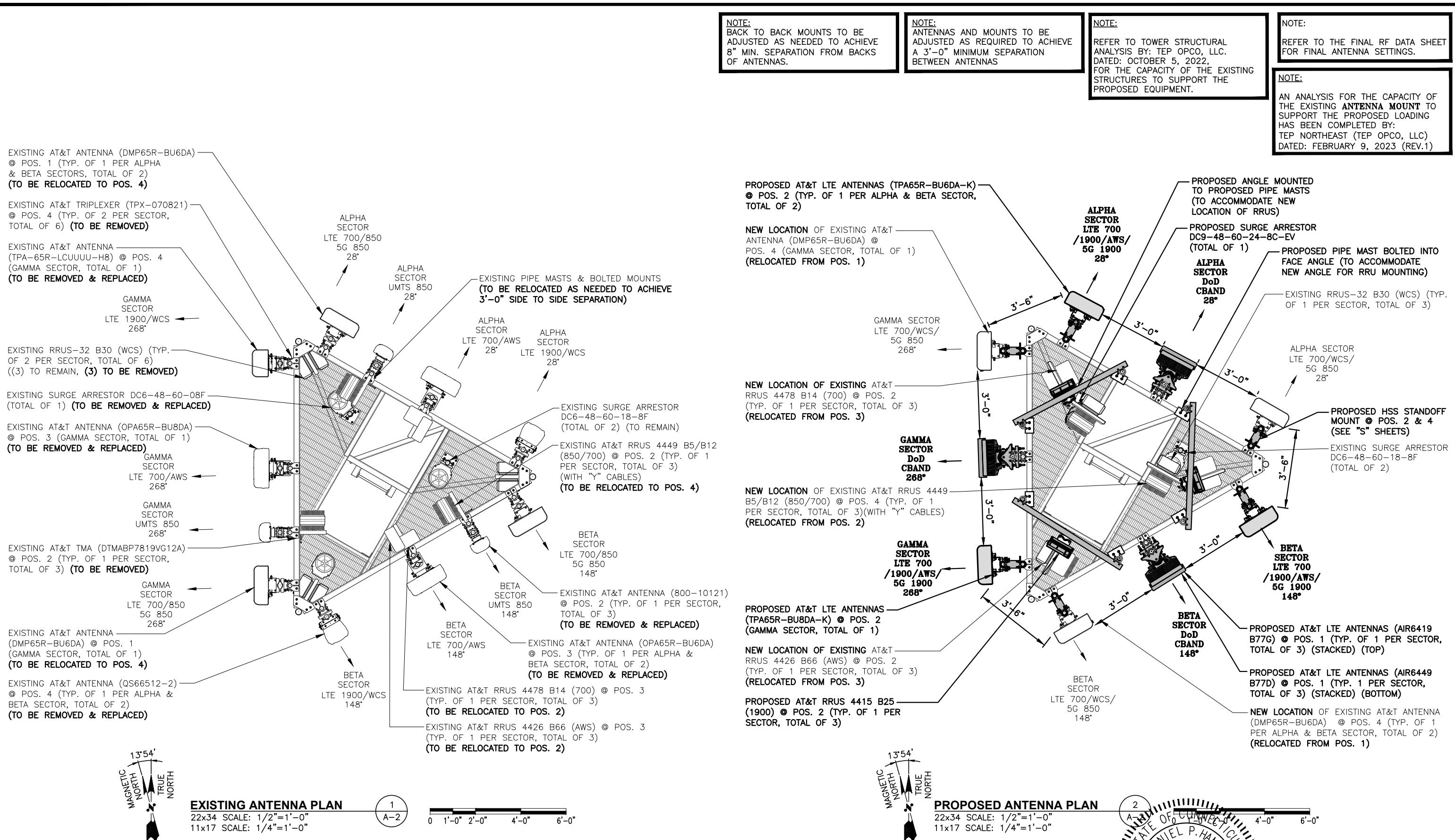
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING ANTENNA MOUNT TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY:
TEP NORTHEAST (TEP OPCO, LLC)
DATED: FEBRUARY 9, 2023 (REV.1)

NOTE:

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

NOTE:

REFER TO TOWER STRUCTURAL ANALYSIS BY: TEP OPCO, LLC. DATED: OCTOBER 5, 2022, FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.



45 BEECHWOOD DRIVE, NORTH ANDOVER, MA 01845
TEL: (978) 557-5553

750 WEST CENTER STREET, SUITE #30
WEST BRIDGEWATER, MA 02379

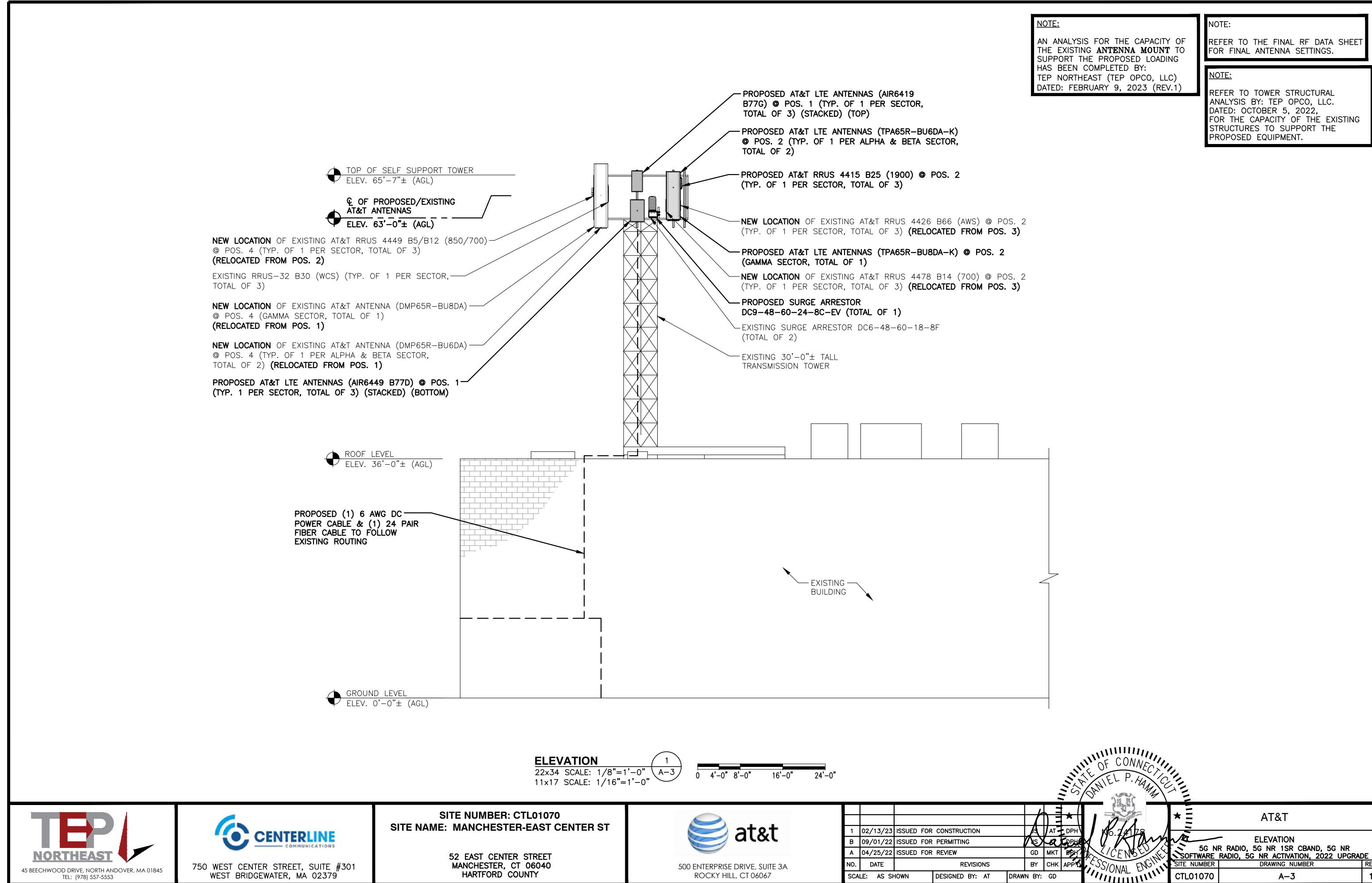
SITE NUMBER: CTL01070
SITE NAME: MANCHESTER-EAST CENTER ST

52 EAST CENTER STREET
MANCHESTER, CT 06040
HARTFORD COUNTY



500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

| | | | | | |
|---|----------|-------------------------|----------------|-----|-------|
| | | | | ★ | |
| 1 | 02/13/23 | ISSUED FOR CONSTRUCTION | IS | AT | DPH |
| B | 09/01/22 | ISSUED FOR PERMITTING | NS | AT | DPH |
| A | 04/25/22 | ISSUED FOR REVIEW | GD | MKT | DPH |
| NO. | DATE | REVISIONS | BY | CHK | APP'D |
| SCALE: AS SHOWN DESIGNED BY: AT DRAWN BY: GD | | | | | |
|   LICENSED PROFESSIONAL ENGINEER | | | | | |
| ★ EXISTING & PROPOSED ANTENNA PLANS 5G NR RADIO, 5G NR 1SR CBAND, 5G NR SOFTWARE RADIO, 5G NR ACTIVATION, 2022 UPGRADE | | | | | |
| SITE NUMBER | | | DRAWING NUMBER | | |
| CTL01070 | | | A-2 | | |
| 1 | | | | | |



| ANTENNA SCHEDULE | | | | | | | | | | | |
|------------------|-------------------|------------------------------|--------------------------------|-------------------------------------|---------------------|---------|------------------|--|-------------------------------|--|--------------------------------------|
| SECTOR | EXISTING/PROPOSED | BAND | ANTENNA | SIZE (INCHES) (L x W x D) | ANTENNA & HEIGHT | AZIMUTH | TMA/ COMBINER | RRU | SIZE (INCHES) (L x W x D) | FEEDER | RAYCAP |
| A1 | - | - | - | - | - | - | - | - | - | - | - |
| A2 | PROPOSED | LTE 700/1900 /AWS/5G 1900 | TPA65R-BU6DA-K | 71.2"X20"X7.7" | 63'-0"± | 28° | - | (E)(1) 4478 B14 (700) (E)(1) 4426 B66 (AWS) (P)(1) 4415 B25 (1900) | - 16.5X13.4X5.9 | (E)(2) 7/8" COAX (E)(2) DC CABLES (1) FIBER | (E) (1) RAYCAP DC6-48-60-18-8F |
| A3 | PROPOSED | DOD C-BAND | AIR 6419 B77G AIR 6449 B77D | 31.1"X16.1X7.3" 30.4"X15.9"X8.1" | 63'-0"± | 28° | - | - | - | - | (E) (1) RAYCAP DC6-48-60-18-8F |
| A4 | EXISTING | LTE 700 /WCS/5G 850 | DMP65R-BU6DA | 71.2"X20.7X7.7" | 63'-0"± | 28° | - | (E)(1) 4449 B5/B12 (850/700) (E)(1) RRUS-32 B30 (WCS) | - | (E) (1) Y-CABLE | (E) (1) RAYCAP DC6-48-60-18-8F |
| B1 | - | - | - | - | - | - | - | - | - | - | - |
| B2 | PROPOSED | LTE 700/1900 /AWS/5G 1900 | TPA65R-BU6DA-K | 71.2"X20"X7.7" | 63'-0"± | 148° | - | (E)(1) 4478 B14 (700) (E)(1) 4426 B66 (AWS) (P)(1) 4415 B25 (1900) | - 16.5X13.4X5.9 | (E)(2) 7/8" COAX (E)(2) DC CABLES (1) FIBER | (E) (1) RAYCAP DC6-48-60-18-8F |
| B3 | PROPOSED | DOD C-BAND | AIR 6419 B77G AIR 6449 B77D | 31.1"X16.1X7.3" 30.4"X15.9"X8.1" | 63'-0"± | 148° | - | - | - | - | (E) (1) RAYCAP DC6-48-60-18-8F |
| B4 | EXISTING | LTE 700 /WCS/5G 850 | DMP65R-BU6DA | 71.2"X20.7X7.7" | 63'-0"± | 148° | - | (E)(1) 4449 B5/B12 (850/700) (E)(1) RRUS-32 B30 (WCS) | - | (E) (1) Y-CABLE | (E) (1) RAYCAP DC6-48-60-18-8F |
| C1 | - | - | - | - | - | - | - | - | - | - | - |
| C2 | PROPOSED | LTE 700/1900 /AWS/5G 1900 | TPA65R-BU8DA-K | 96"X20.7"X7.7" | 63'-0"± | 268° | - | (E)(1) 4478 B14 (700) (E)(1) 4426 B66 (AWS) (P)(1) 4415 B25 (1900) | - 16.5X13.4X5.9 | (E)(2) 7/8" COAX (E)(2) DC CABLES (1) FIBER | (E) (1) RAYCAP DC9-48-60-24-8C-EV |
| C3 | PROPOSED | DOD C-BAND | AIR 6419 B77G AIR 6449 B77D | 31.1"X16.1X7.3" 30.4"X15.9"X8.1" | 63'-0"± | 268° | - | - | - | (P)(1) 6 AWG DC CABLES (P)(1) 24 PAIR FIBER | (P) (1) RAYCAP DC9-48-60-24-8C-EV |
| C4 | EXISTING | LTE 700 /WCS/5G 850 | DMP65R-BU8DA | 96"X20.7X7.7" | 63'-0"± | 268° | - | (E)(1) 4449 B5/B12 (850/700) (E)(1) RRUS-32 B30 (WCS) | - | (E) (1) Y-CABLE | (E) (1) RAYCAP DC9-48-60-24-8C-EV |

| RRU CHART | | |
|-----------|------------------------|------------------|
| QUANTITY | MODEL | SIZE (L x W x D) |
| 3(E) | RRUS-4426 B66 (AWS) | 27.2"X12.1"X7.0" |
| 3(E) | RRUS-32 B30 (WCS) | 27.2"X12.1"X7.0" |
| 3(E) | RRUS-4478 B14 (700) | 18.1"X13.4"X8.3" |
| 3(E) | RRUS-4449 B5/B12 (700) | 17.9"X13.9"X9.4" |
| 3(P) | RRUS-4415 B25 (1900) | 16.5"X13.4"X5.9" |

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

NOTE:
REFER TO TOWER STRUCTURAL ANALYSIS BY: TEP OPCO, LLC. DATED: OCTOBER 5, 2022, FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.

NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS

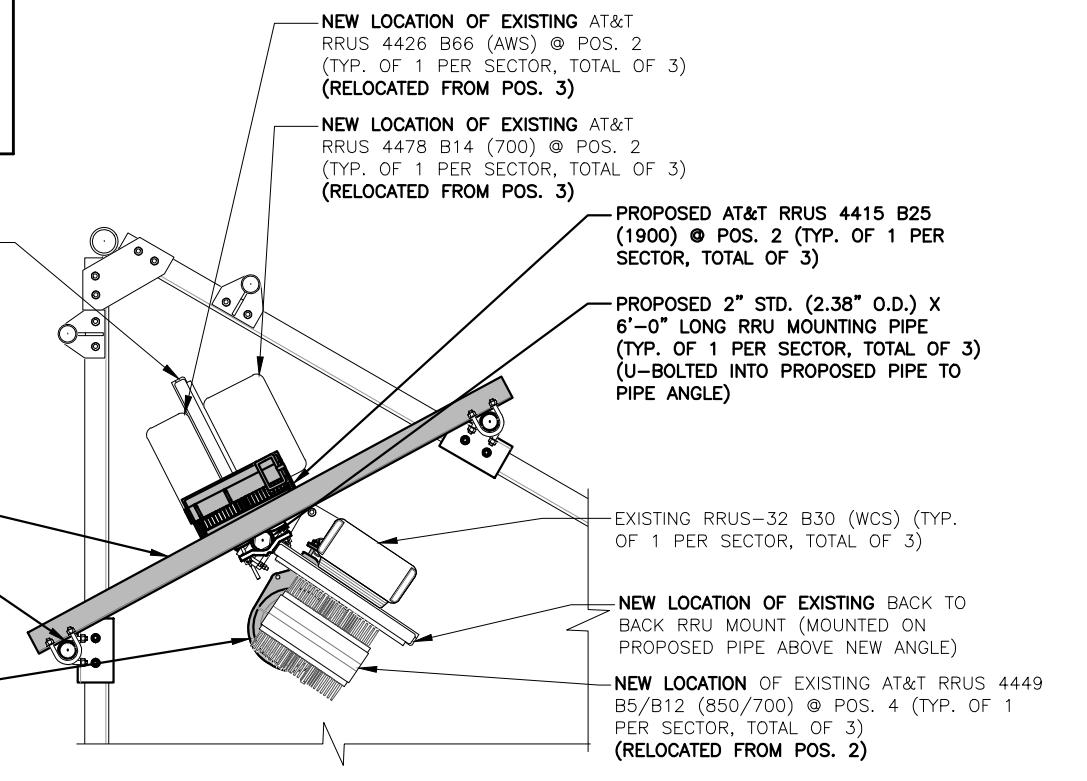
NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING ANTENNA MOUNT TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY: TEP NORTHEAST (TEP OPCO, LLC) DATED: FEBRUARY 9, 2023 (REV.1)

NOTE:
SEE RFDS FOR RRH FREQUENCY AND MODEL NUMBER

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

NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

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



PROPOSED SURGE PROTECTOR MOUNTING DETAIL 4
22x34 SCALE: 1"=1'-0"
11x17 SCALE: 1/2"=1'-0"
0 0'-6" 1'-0" 2'-0" 3'-0"

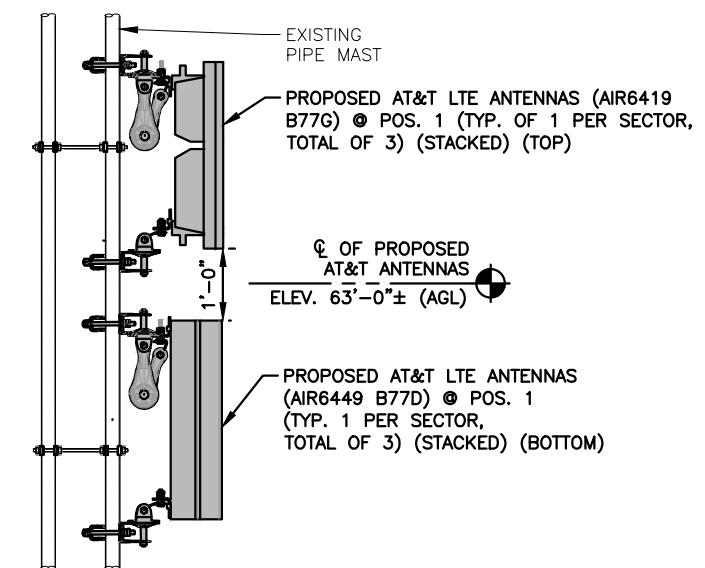
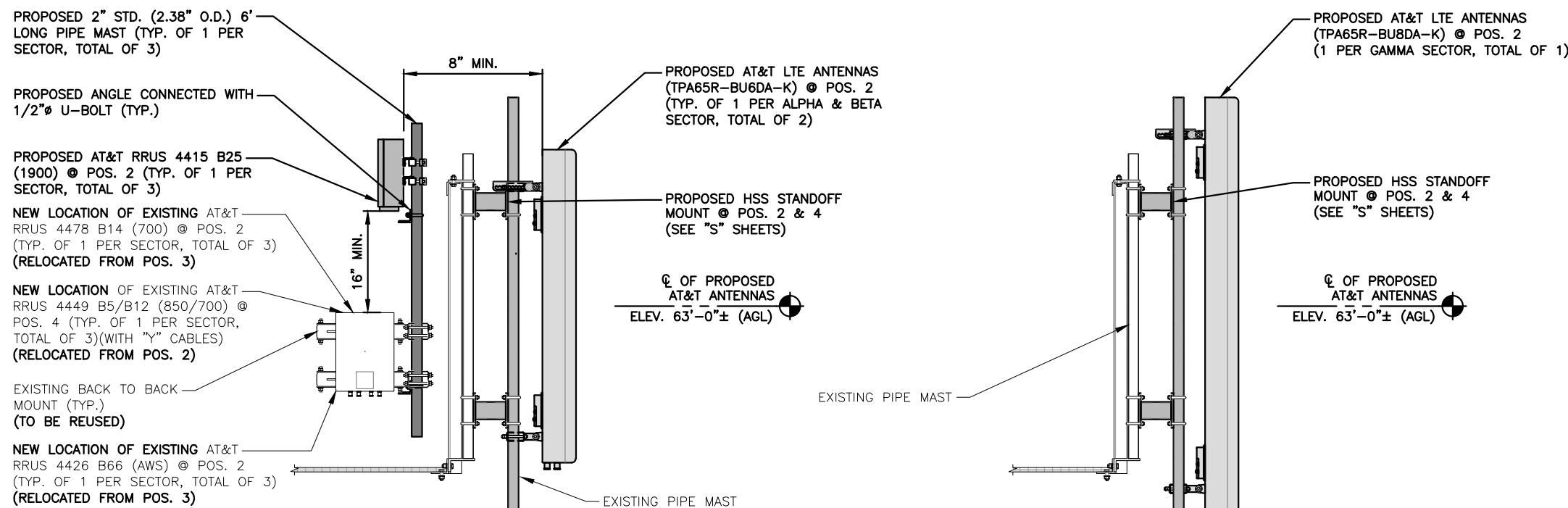
PROPOSED RADIO MOUNTING DETAIL 5
22x34 SCALE: 1"=1'-0"
11x17 SCALE: 1/2"=1'-0"
0 0'-6" 1'-0" 2'-0"

STATE OF CONNECTICUT
DANIEL P. HAMM
PROFESSIONAL ENGINEER
LICENCED NO. 24178
ISSUED FOR CONSTRUCTION
09/01/22
ISSUED FOR PERMITTING
04/25/22
ISSUED FOR REVIEW
NO. DATE
SCALE: AS SHOWN
DESIGNED BY: AT
DRAWN BY: CD
REV. 1
AT&T
DETAILS
5G NR RADIO, 5G NR 1SR CBAND, 5G NR SOFTWARE RADIO, 5G NR ACTIVATION, 2022 UPGRADE
SITE NUMBER CTL01070
DRAWING NUMBER A-4
REV. 1

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

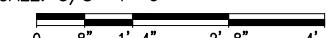
NOTE:
REFER TO TOWER STRUCTURAL ANALYSIS BY: TEP OPCO, LLC.
DATED: OCTOBER 5, 2022,
FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.

NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING ANTENNA MOUNT TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY:
TEP NORTHEAST (TEP OPCO, LLC)
DATED: FEBRUARY 9, 2023 (REV.1)



PROPOSED ANTENNA MOUNTING DETAIL @ POS. 2 (ALPHA & BETA SECTOR)

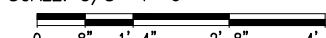
22x34 SCALE: 3/4"-1'-0"
11x17 SCALE: 3/8"-1'-0"



1
A-5

PROPOSED ANTENNA MOUNTING DETAIL @ POS. 2 (GAMMA SECTOR)

22x34 SCALE: 3/4"-1'-0"
11x17 SCALE: 3/8"-1'-0"



2
A-5

PROPOSED ANTENNA MOUNTING DETAIL @ POS. 3

22x34 SCALE: 3/4"-1'-0"
11x17 SCALE: 3/8"-1'-0"



3
A-5

STRUCTURAL NOTES:

1. DESIGN REQUIREMENTS ARE PER STATE BUILDING CODE AND APPLICABLE SUPPLEMENTS, INTERNATIONAL BUILDING CODE, EIA/TIA-222-H STRUCTURAL STANDARDS FOR STEEL ANTENNA, TOWERS AND ANTENNA SUPPORTING STRUCTURES.
2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. ANY UNUSUAL CONDITIONS SHALL BE REPORTED TO THE ATTENTION OF THE CONSTRUCTION MANAGER AND ENGINEER OF RECORD.
3. DESIGN AND CONSTRUCTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS".
4. STRUCTURAL STEEL SHALL CONFORM TO ASTM A992 (Fy=50 ksi), MISCELLANEOUS STEEL SHALL CONFORM TO ASTM A36 UNLESS OTHERWISE INDICATED.
5. STEEL PIPE SHALL CONFORM TO ASTM A500 "COLD-FORMED WELDED & SEAMLESS CARBON STEEL STRUCTURAL TUBING", GRADE B, OR ASTM A53 PIPE STEEL BLACK AND HOT-DIPPED ZINC-COATED WELDED AND SEAMLESS TYPE E OR S, GRADE B. PIPE SIZES INDICATED ARE NOMINAL. ACTUAL OUTSIDE DIAMETER IS LARGER.
6. STRUCTURAL CONNECTION BOLTS SHALL BE HIGH STRENGTH BOLTS (BEARING TYPE) AND CONFORM TO ASTM A325 TYPE-X "HIGH STRENGTH BOLTS FOR STRUCTURAL JOINTS, INCLUDING SUITABLE NUTS AND PLAIN HARDENED WASHERS". ALL BOLTS SHALL BE 3/4" DIA UNI.
7. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS OTHERWISE NOTED.
8. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS OTHERWISE NOTED.
9. FIELD WELDS, DRILL HOLES, SAW CUTS AND ALL DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED WITH AN ORGANIC ZINC REPAIR PAINT COMPLYING WITH REQUIREMENTS OF ASTM A780. GALVANIZING REPAIR PAINT SHALL HAVE 65 PERCENT ZINC BY WEIGHT, ZIRP BY DUNCAN GALVANIZING, GALVA BRIGHT PREMIUM BY CROWN OR EQUAL. THICKNESS OF APPLIED GALVANIZING REPAIR PAINT SHALL BE NOT LESS THAN 4 COATS (ALLOW TIME TO DRY BETWEEN COATS) WITH A RESULTING COATING THICKNESS REQUIRED BY ASTM A123 OR A153 AS APPLICABLE.
10. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES, APPEARANCE AND QUALITY OF WELDS, AND FOR METHODS USED IN CORRECTING WELDING. ALL WELDERS AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D.I. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "STEEL CONSTRUCTION MANUAL". 14TH EDITION.
11. INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON-CONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE CONSTRUCTION MANAGER PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE CONSTRUCTION MANAGER APPROVAL.
12. UNISTRUT SHALL BE FORMED STEEL CHANNEL STRUT FRAMING AS MANUFACTURED BY UNISTRUT CORP., WAYNE, MI OR EQUAL. STRUT MEMBERS SHALL BE 1 5/8" x 1 5/8" x 12GA, UNLESS OTHERWISE NOTED, AND SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
13. EPOXY ANCHOR ASSEMBLY SHALL CONSIST OF STAINLESS STEEL ANCHOR ROD WITH NUTS & WASHERS. AN INTERNALLY THREADED INSERT, A SCREEN TUBE AND A EPOXY ADHESIVE. THE ANCHORING SYSTEM SHALL BE THE HILTI-HIT HY-270 AND OR HY-200 SYSTEMS (AS SPECIFIED IN DWG.) OR ENGINEERS APPROVED EQUAL.
14. EXPANSION BOLTS SHALL CONFORM TO FEDERAL SPECIFICATION FF-S-325, GROUP II, TYPE 4, CLASS I, HILTI KWIK BOLT III OR APPROVED EQUAL. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
15. LUMBER SHALL COMPLY WITH THE REQUIREMENTS OF THE AMERICAN INSTITUTE OF TIMBER CONSTRUCTION AND THE NATIONAL FOREST PRODUCTS ASSOCIATION'S NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION. ALL LUMBER SHALL BE PRESSURE TREATED AND SHALL BE STRUCTURAL GRADE NO. 2 OR BETTER.
16. WHERE ROOF PENETRATIONS ARE REQUIRED, THE CONTRACTOR SHALL CONTACT AND COORDINATE RELATED WORK WITH THE BUILDING OWNER AND THE EXISTING ROOF INSTALLER. WORK SHALL BE PERFORMED IN SUCH A MANNER AS TO NOT VOID THE EXISTING ROOF WARRANTY. ROOF SHALL BE WATERTIGHT.
17. ALL FIBERGLASS MEMBERS USED ARE AS MANUFACTURED BY STRONGWELL COMPANY OF BRISTOL, VA 24203. ALL DESIGN CRITERIA FOR THESE MEMBERS IS BASED ON INFORMATION PROVIDED IN THE DESIGN MANUAL. ALL REQUIREMENTS PUBLISHED IN SAID MANUAL MUST BE STRICTLY ADHERED TO.
18. NO MATERIALS TO BE ORDERED AND NO WORK TO BE COMPLETED UNTIL SHOP DRAWINGS HAVE BEEN REVIEWED AND APPROVED IN WRITING.
19. SUBCONTRACTOR SHALL FIREPROOF ALL STEEL TO PRE-EXISTING CONDITIONS.

SPECIAL INSPECTIONS (REFERENCE IBC CHAPTER 17):

GENERAL: WHERE APPLICATION IS MADE FOR CONSTRUCTION, THE OWNER OR THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE ACTING AS THE OWNER'S AGENT SHALL EMPLOY ONE OR MORE APPROVED AGENCIES TO PERFORM INSPECTIONS DURING CONSTRUCTION ON THE TYPES OF WORK LISTED IN THE INSPECTION CHECKLIST ABOVE.

THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE AND ENGINEERS OF RECORD INVOLVED IN THE DESIGN OF THE PROJECT ARE PERMITTED TO ACT AS THE APPROVED AGENCY AND THEIR PERSONNEL ARE PERMITTED TO ACT AS THE SPECIAL INSPECTOR FOR THE WORK DESIGNED BY THEM, PROVIDED THOSE PERSONNEL MEET THE QUALIFICATION REQUIREMENTS.

STATEMENT OF SPECIAL INSPECTIONS: THE APPLICANT SHALL SUBMIT A STATEMENT OF SPECIAL INSPECTIONS PREPARED BY THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE IN ACCORDANCE WITH SECTION 107.1 AS A CONDITION FOR ISSUANCE. THIS STATEMENT SHALL BE IN ACCORDANCE WITH SECTION 1705.

REPORT REQUIREMENT: SPECIAL INSPECTORS SHALL KEEP RECORDS OF INSPECTIONS. THE SPECIAL INSPECTOR SHALL FURNISH INSPECTION REPORTS TO THE BUILDING OFFICIAL, AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. REPORTS SHALL INDICATE THAT WORK INSPECTED WAS OR WAS NOT COMPLETED IN CONFORMANCE TO APPROVED CONSTRUCTION DOCUMENTS. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF THEY ARE NOT CORRECTED, THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. A FINAL REPORT DOCUMENTING REQUIRED SPECIAL INSPECTIONS SHALL BE SUBMITTED.

NOTES:

1. ALL CONNECTIONS TO BE SHOP WELDED & FIELD BOLTED USING 3/4" A325-X BOLTS, UNLESS OTHERWISE NOTIFIED.
2. SHOP DRAWING ENGINEER REVIEW & APPROVAL REQUIRED BEFORE ORDERING MATERIAL.
3. SHOP DRAWING ENGINEER REVIEW & APPROVAL REQUIRED PRIOR TO STEEL FABRICATION.
4. VERIFICATION OF EXISTING ROOF CONSTRUCTION IS REQUIRED PRIOR TO THE INSTALLATION OF THE ROOF PLATFORM. ENGINEER OF RECORD IS TO APPROVE EXISTING CONDITIONS IN ORDER TO MOVE FORWARD.
5. CENTERLINE OF PROPOSED STEEL PLATFORM SUPPORT COLUMNS TO BE CENTRALLY LOCATED OVER THE EXISTING BUILDING COLUMNS.
6. EXISTING BRICK MASONRY COLUMNS/BEARING TO BE REPAIRED/REPLACED AT ALL PROPOSED PLATFORM SUPPORT POINTS. ENGINEER OF RECORD TO REVIEW AND APPROVE.

NOTES:

1. REQUIRED FOR ANY NEW SHOP FABRICATED FRP OR STEEL.
2. PROVIDED BY MANUFACTURER, REQUIRED IF HIGH STRENGTH BOLTS OR STEEL.
3. PROVIDED BY GENERAL CONTRACTOR; PROOF OF MATERIALS.
4. HIGH WIND ZONE INSPECTION CATB 120MPH OR CAT C,D 110MPH INSPECT FRAMING OF WALLS, ANCHORING, FASTENING SCHEDULE.
5. ADHESIVE FOR REBAR AND ANCHORS SHALL HAVE BEEN TESTED IN ACCORDANCE WITH ACI 355.4 AND ICC-ES AC308 FOR CRACKED CONCRETE AND SEISMIC APPLICATIONS. DESIGN ADHESIVE BOND STRENGTH HAS BEEN BASED ON ACI 355.4 TEMPERATURE CATEGORY B WITH INSTALLATIONS INTO DRY HOLES DRILLED USING A CARBIDE BIT INTO CRACKED CONCRETE THAT HAS CURED FOR AT LEAST 21 DAYS. ADHESIVE ANCHORS REQUIRING CERTIFIED INSTALLATIONS SHALL BE INSTALLED BY A CERTIFIED ADHESIVE ANCHOR INSTALLER PER ACI 318-11 D.9.2.2. INSTALLATIONS REQUIRING CERTIFIED INSTALLERS SHALL BE INSPECTED PER ACI 318-11 D.8.2.4.
6. AS REQUIRED; FOR ANY FIELD CHANGES TO THE ITEMS IN THIS TABLE.

SPECIAL INSPECTION CHECKLIST
BEFORE CONSTRUCTION

| | |
|--|--|
| CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD) | REPORT ITEM |
| REQUIRED | ENGINEER OF RECORD APPROVED SHOP DRAWINGS ¹ |
| REQUIRED | MATERIAL SPECIFICATIONS REPORT ² |
| N/A | FABRICATOR NDE INSPECTION |
| REQUIRED | PACKING SLIPS ³ |

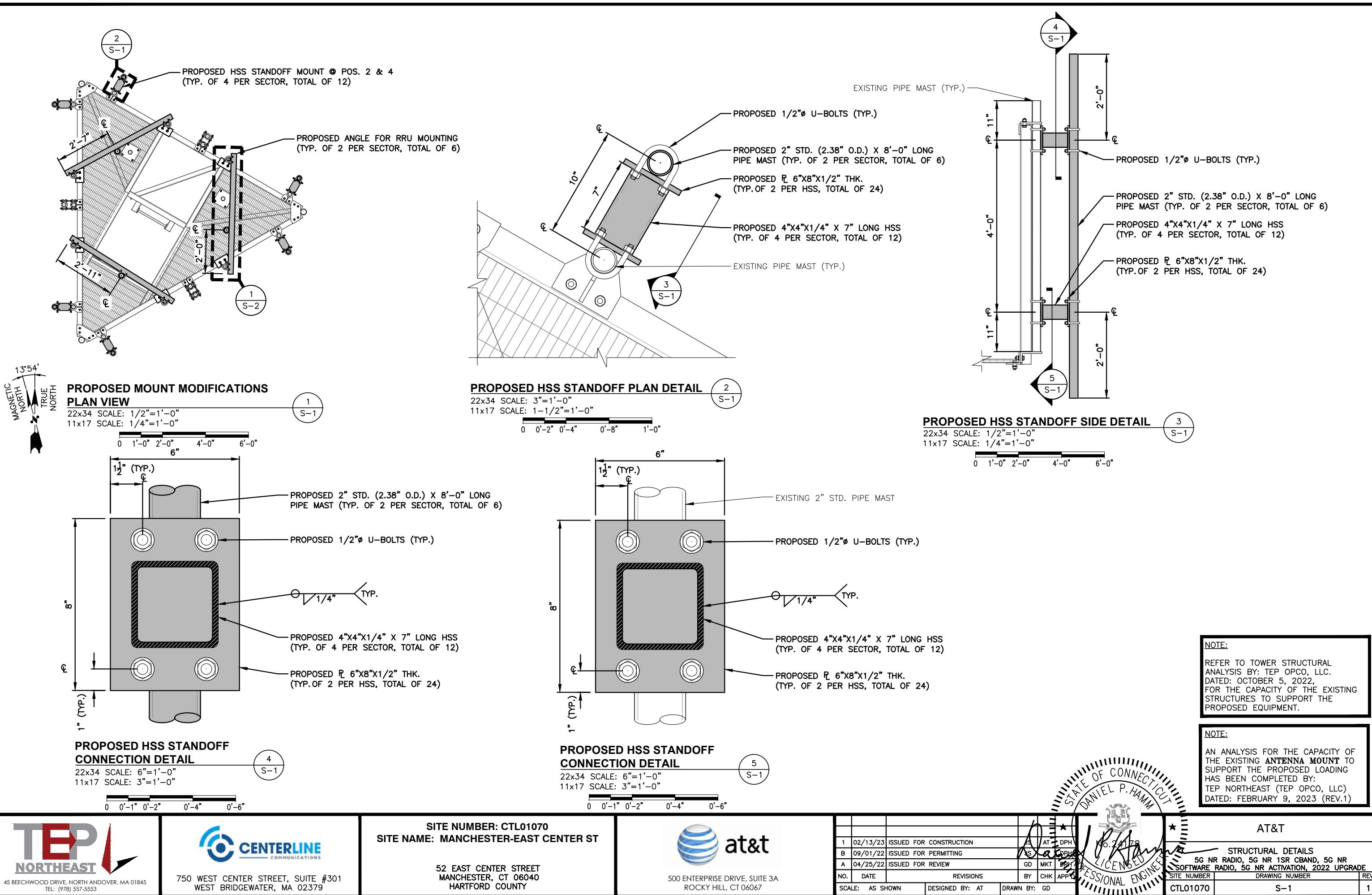
ADDITIONAL TESTING AND INSPECTIONS:
DURING CONSTRUCTION

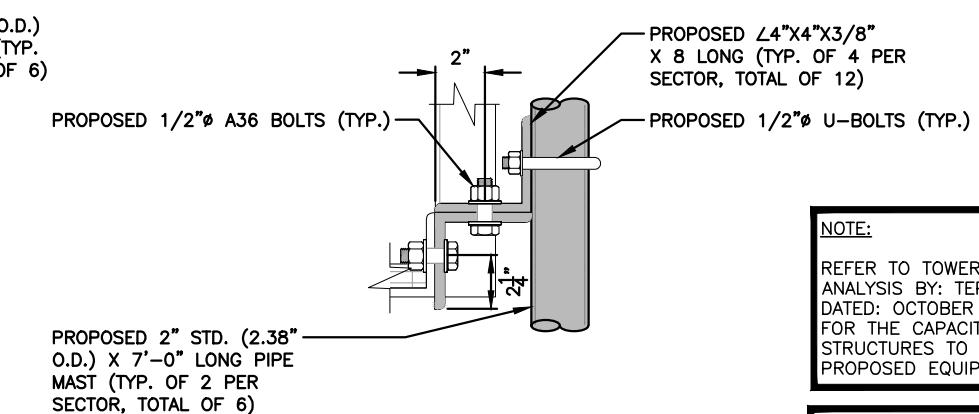
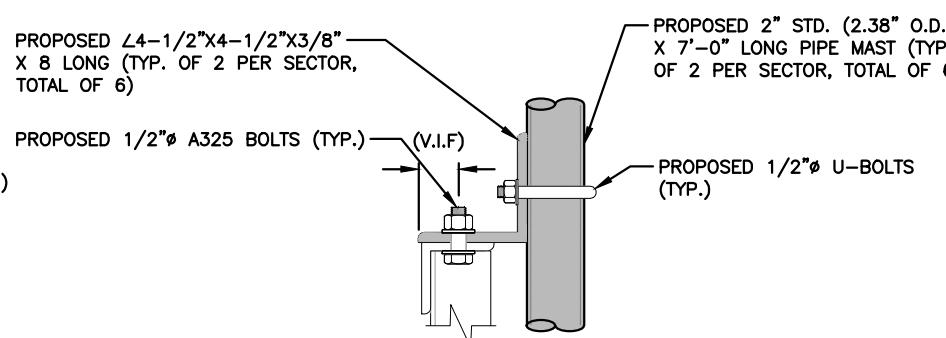
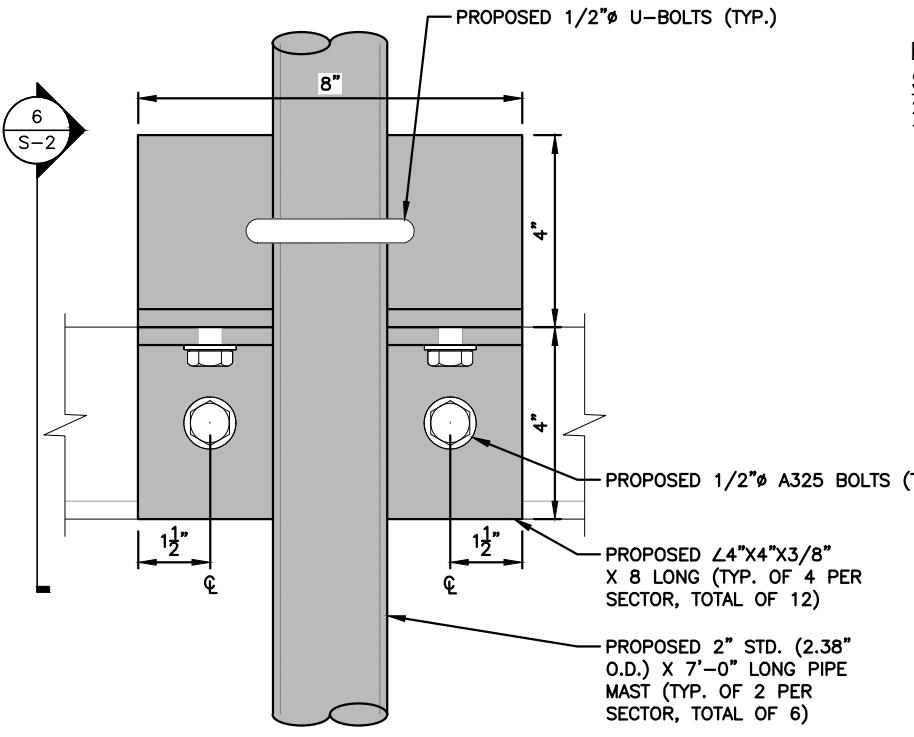
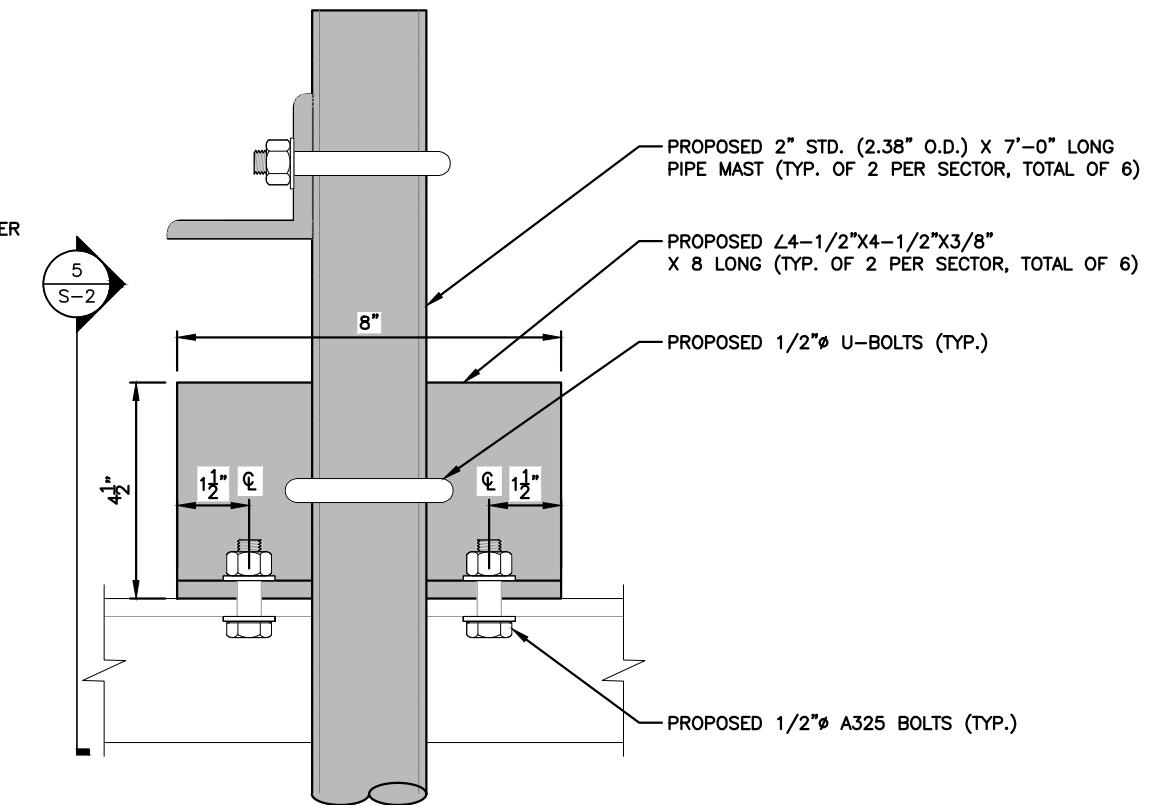
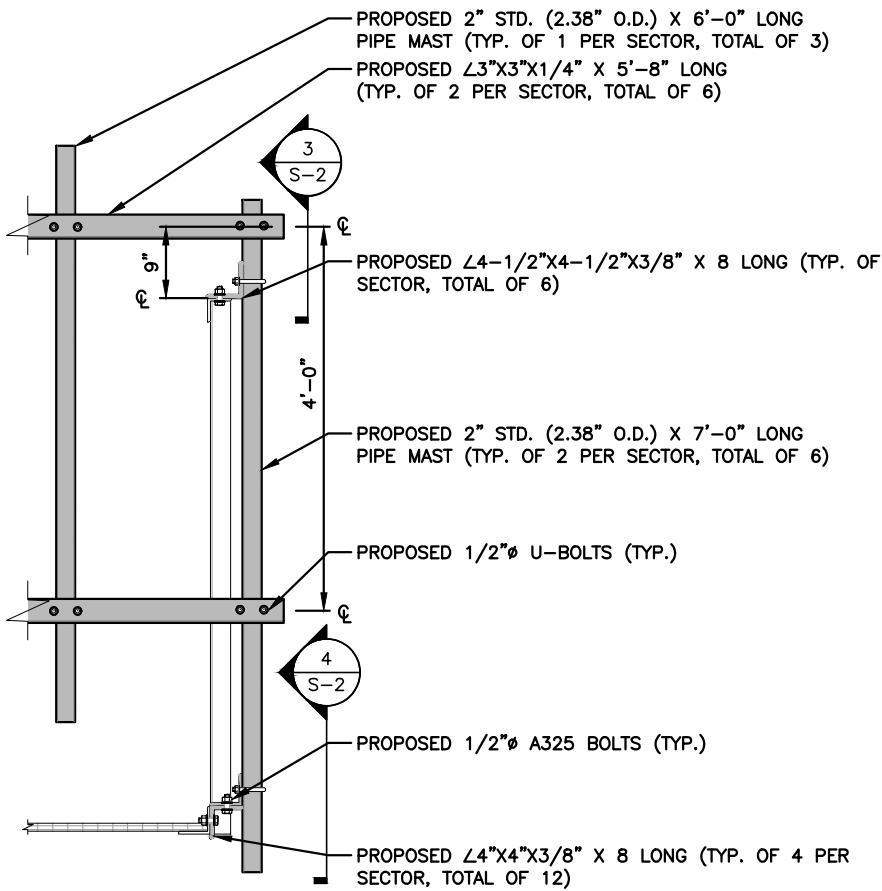
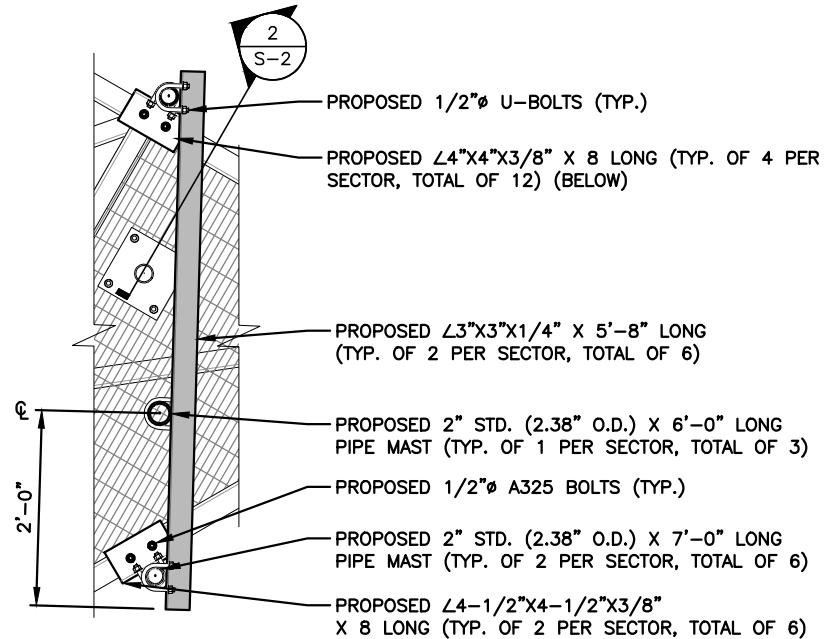
| | |
|--|--|
| CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD) | REPORT ITEM |
| REQUIRED | STEEL INSPECTIONS |
| N/A | HIGH STRENGTH BOLT INSPECTIONS |
| N/A | HIGH WIND ZONE INSPECTIONS ⁴ |
| N/A | FOUNDATION INSPECTIONS |
| N/A | CONCRETE COMP. STRENGTH, SLUMP TESTS AND PLACEMENT |
| N/A | POST INSTALLED ANCHOR VERIFICATION ⁵ |
| N/A | GROUT VERIFICATION |
| N/A | CERTIFIED WELD INSPECTION |
| N/A | EARTHWORK: LIFT AND DENSITY |
| N/A | ON SITE COLD GALVANIZING VERIFICATION |
| N/A | GUY WIRE TENSION REPORT |

ADDITIONAL TESTING AND INSPECTIONS:
AFTER CONSTRUCTION

| | |
|--|--|
| CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD) | REPORT ITEM |
| REQUIRED | MODIFICATION INSPECTOR REDLINE OR RECORD DRAWINGS ⁶ |
| N/A | POST INSTALLED ANCHOR PULL-OUT TESTING |
| REQUIRED | PHOTOGRAPHS |

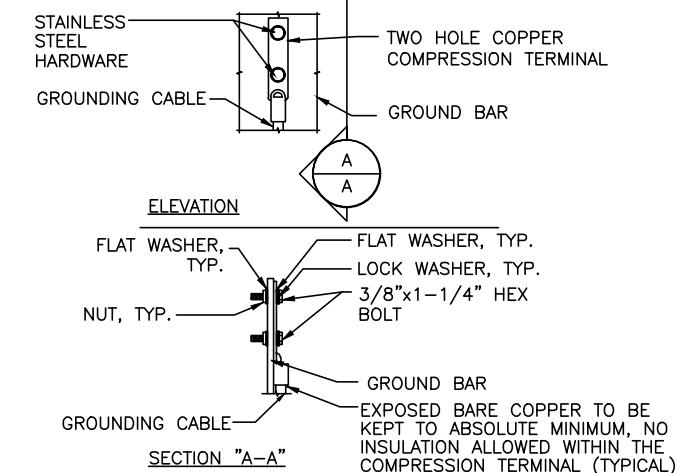
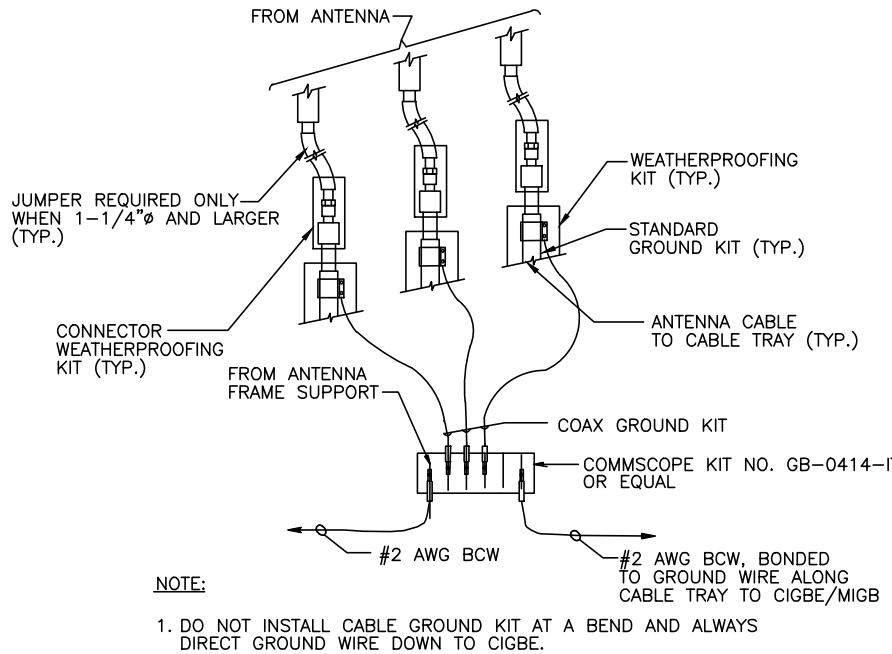
ADDITIONAL TESTING AND INSPECTIONS:





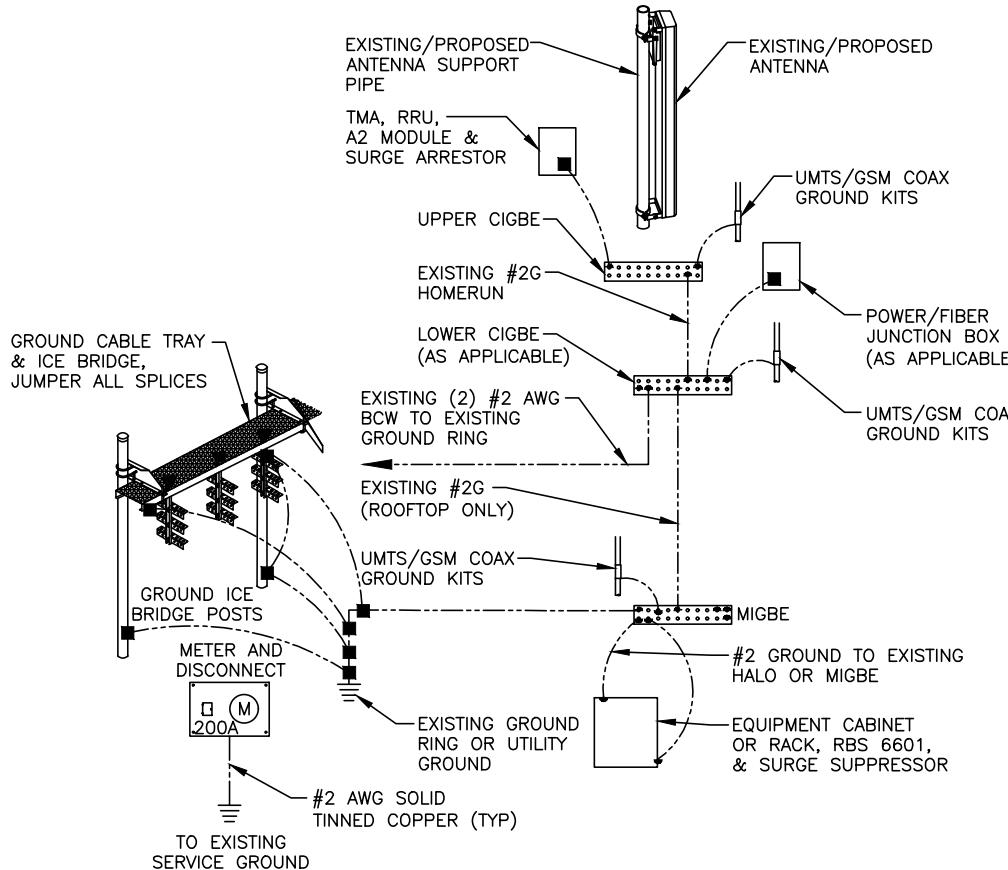
NOTE:
REFER TO TOWER STRUCTURAL ANALYSIS BY: TEP OPCO, LLC.
DATED: OCTOBER 5, 2022,
FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.

NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING ANTENNA MOUNT TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY:
TEP NORTHEAST (TEP OPCO, LLC)
DATED: FEBRUARY 9, 2023 (REV.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

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



GROUNDING RISER DIAGRAM
SCALE: N.T.S

TYPICAL GROUND BAR CONNECTION DETAIL
SCALE: N.T.S

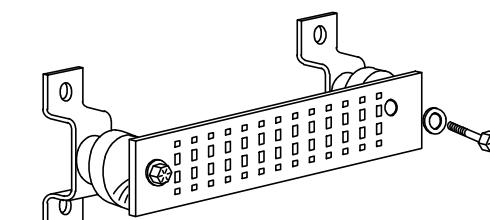
EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

SECTION "P" – SURGE PRODUCERS

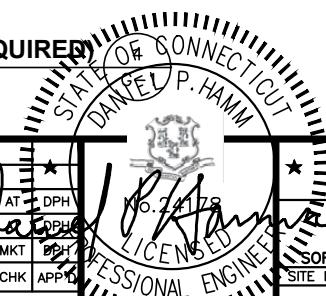
CABLE ENTRY PORTS (HATCH PLATES) (#2 AWG)
GENERATOR FRAMEWORK (IF AVAILABLE) (#2 AWG)
TELCO GROUND BAR
COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2 AWG)
+24V POWER SUPPLY RETURN BAR (#2 AWG)
-48V POWER SUPPLY RETURN BAR (#2 AWG)
RECTIFIER FRAMES.

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)

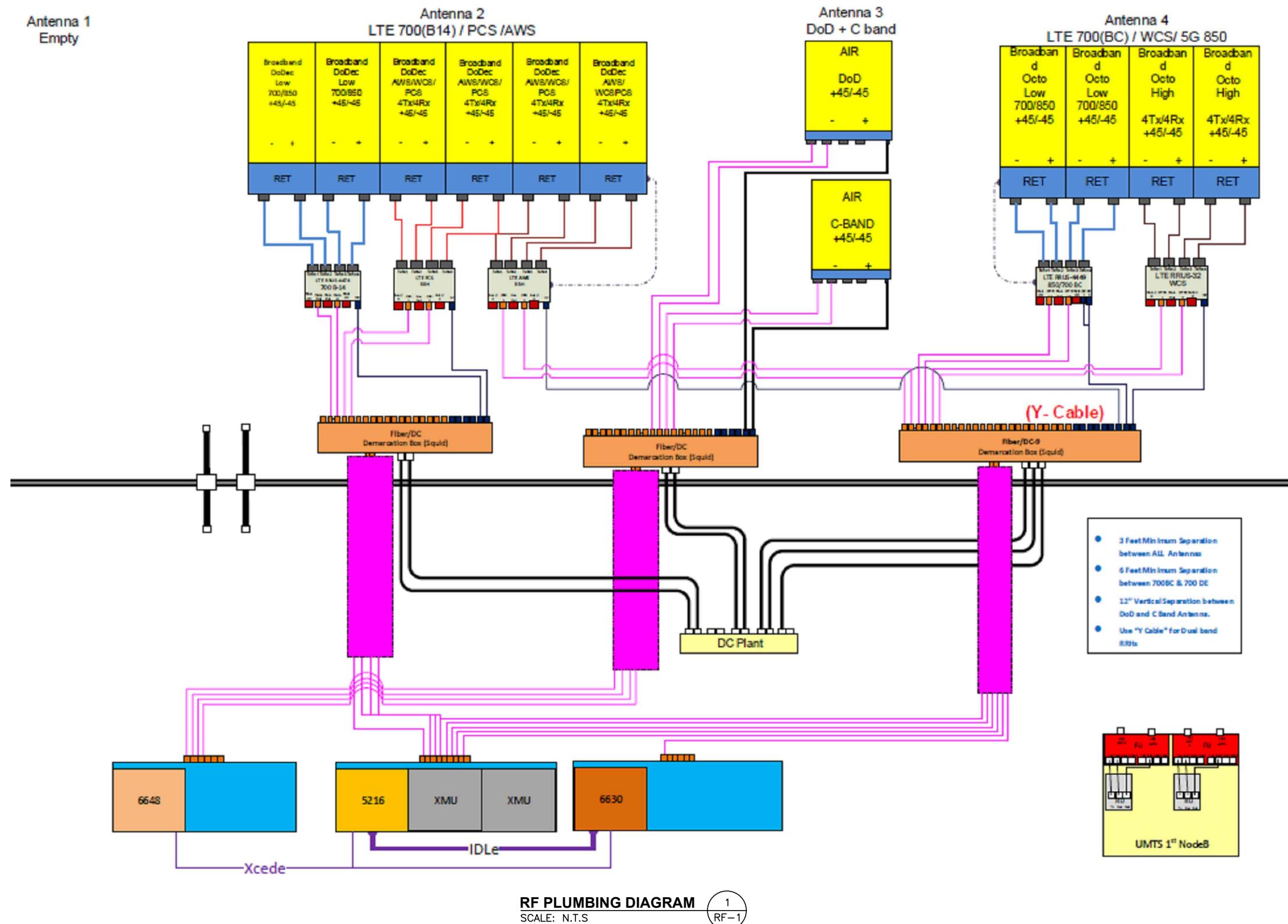


GROUND BAR - DETAIL (AS REQUIRED)
SCALE: N.T.S



AT&T

GROUNDING DETAILS
5G NR RADIO, 5G NR 1SR CBAND, 5G NR
SOFTWARE RADIO, 5G NR ACTIVATION, 2022 UPGRADE
SITE NUMBER: CTL01070
DRAWING NUMBER: G-1
REV: 1



May 25, 2022
February 9, 2023 (Rev.1)



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

RE: AT&T Site Number: CT1070
 FA Number: 10035030
 PACE Number: MRCTB051047
 PT Number: 2051A0Z81N
 TEP Project Number: 350544
 Site Name: MANCHESTER-EAST CENTER ST
 Site Address: 52 East Center Street
 Manchester, CT 06040

To Whom It May Concern:

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

- (1) DMP65R-BU8DA Antenna (96.0"x20.7"x7.7" – Wt. = 119 lbs. /each)
- (2) DMP65R-BU6DA Antennas (71.2"x20.7"x7.7" – Wt. = 96 lbs. /each)
- (3) 4478 B14 RRH's (18.1"x13.4"x8.3" – Wt. = 60 lbs. /each)
- (3) 4426 B66 RRH's (14.9"x13.2"x5.8" – Wt. = 49 lbs. /each)
- (3) 4449 B5/B12 RRH's (17.9"x13.2"x9.4" – Wt. = 73 lbs. /each)
- (3) RRUS-32 B30 RRH's (27.2"x12.1"x7.0" – Wt. = 60 lbs. /each)
- (2) DC6-48-60-18-8F Surge Arrestors (31.4"x10.2" Ø – Wt. = 29 lbs.)
- (1) TPA65R-BU8DA-K Antenna (96.0"x20.7"x7.7" – Wt. = 87 lbs. /each)
- (2) TPA65R-BU6DA-K Antennas (71.2"x20.7"x7.7" – Wt. = 69 lbs. /each)
- (3) AIR6419 Antennas (31.0"x16.1"x7.3" – Wt. = 66 lbs. /each)
- (3) AIR6449 Antennas (30.6"x15.9"x10.6" – Wt. = 82 lbs. /each)
- (3) 4415 B25 RRH's (16.5"x13.4"x5.9" – Wt. = 46 lbs. /each) (AT&T)
- (1) DC9-48-60-24-8C-EV Surge Arrestor (31.4"x10.2" Ø – Wt. = 29 lbs.)

*Proposed equipment shown in bold.

No original structural design documents or fabrication drawings were available for the existing mounts. TEP NE conducted a survey climb and mapping of the existing AT&T antenna mount on May 4, 2022.

Mount Analysis Methods:

- This analysis was conducted in accordance with EIA/TIA-222-H, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, the International Building Code 2021 with 2022 Connecticut State Building Code, and AT&T Mount Technical Directive – R22.
- TEP NE considers this mount to be asymmetrical and has applied wind loads in 30 degree increments all around the mount. Per TIA-222-H and Appendix P of the Connecticut State Building Code, the max basic wind speed for this site is equal to 120 mph with a max basic wind speed with ice of 50 mph and a max ice thickness of 1.5 in. An escalated ice thickness of 1.60 in was used for this analysis.
- TEP NE considers this site to be exposure category B; tower is located in an urban/suburban or wooded area with numerous closely spaced obstructions.
- TEP NE considers this site to be topographic category 1; tower is located on flat terrain or the bottom of a hill or ridge.
- TEP NE considers this site to have a spectral response acceleration parameter at short periods, S_s , of 0.190 and a spectral response acceleration parameter at a period of 1 second, S_1 , of 0.055.
- The mount has been analyzed with load combinations consisting of 500 lbs live load using a service wind speed of 30 mph wind on the worst case antenna. Analysis performed on each antenna pipe to determine worst case location; worst case location was antenna position 3.
- The mount has been analyzed with load combinations consisting of a 250 lbs live load in a worst case location on the mount.
- The existing mount is secured to the existing self supporting tower with threaded rods secured to the tower leg and face. TEP NE considers the threaded rods to be the governing connection member.

Based on our evaluation, we have determined that the existing mount **IS CAPABLE** of supporting the proposed installation with the following modifications.

- Install proposed custom standoff brackets secured to the existing pipe mast to achieve antenna sector separation requirements (typ. of 4 per sector, total of 12).
- Install proposed 2" std (2.38" O.D.) vertical pipes secured to the existing mount to accommodate proposed angles for RRU mounting (typ. of 2 per sector, total of 6).
- Install proposed L3x3x1/4 steel angles secured to the proposed vertical pipes to accommodate new location of RRUS (typ. of 2 per sector, total of 6).

| | Component | Controlling Load Case | Stress Ratio | Pass/Fail |
|-----------------------|-----------|-----------------------|--------------|-----------|
| Modified Mount Rating | 72 | LC11 | 42% | PASS |

Reference Documents:

- Mount mapping report prepared by TEP NE.

This determination was based on the following limitations and assumptions:

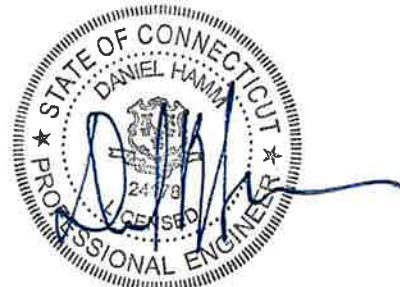
1. TEP NE is not responsible for any modifications completed prior to and hereafter which TEP NE was not directly involved.
2. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.
3. All antennas, coax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

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

Respectfully Submitted,
TEP Northeast



Michael Cabral
Director

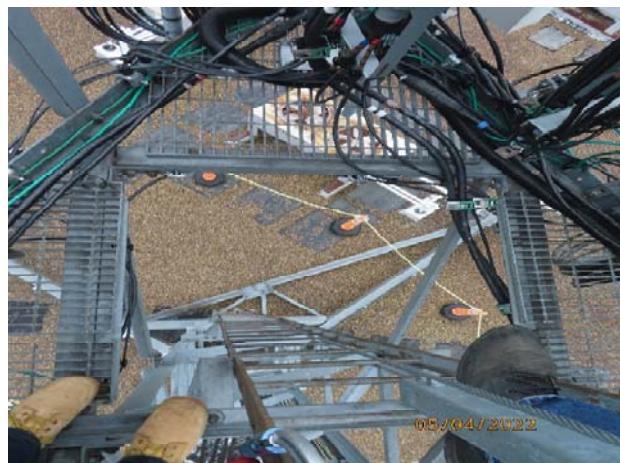


Daniel P. Hamm, PE
Vice President

FIELD PHOTOS:



FIELD PHOTOS (CONT.):





Wind & Ice Calculations

Date: 2/6/2023
 Project Name: MANCHESTER-EAST CENTER ST
 Project No.: CT1070
 Designed By: KSBM Checked By: MSC



2.6.5.2 Velocity Pressure Coeff:

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

$$K_z =$$

$$0.866$$

$$z = 63.0 \text{ (ft)}$$

$$z_g = 1200 \text{ (ft)}$$

$$\alpha = 7$$

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

Table 2-4

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

2.6.6.2 Topographic Factor:

Table 2-5

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

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

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

$$K_{zt} =$$

$$1$$

$$K_h = 1$$

$$K_c = 0.9 \text{ (from Table 2-4)}$$

$$K_t = 0 \text{ (from Table 2-5)}$$

$$f = 0 \text{ (from Table 2-5)}$$

$$z = 63.0$$

$$z_s = 268 \text{ (Mean elevation of base of structure above sea level)}$$

$$H = 0 \text{ (Ht. of the crest above surrounding terrain)}$$

$$K_{zt} = 1.00 \text{ (from 2.6.6.2.1)}$$

$$K_e = 0.99 \text{ (from 2.6.8)}$$

2.6.10 Design Ice Thickness

Max Ice Thickness =

$$t_i = 1.50 \text{ in}$$

Importance Factor =

$$I = 1.00 \text{ (from Table 2-3)}$$

$$K_{iz} = 1.07 \text{ (from Sec. 2.6.10)}$$

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

$$t_{iz} = 1.60 \text{ in}$$

Date: 2/6/2023
 Project Name: MANCHESTER-EAST CENTER ST
 Project No.: CT1070
 Designed By: KSBM 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= 65.6

$G_h =$ 0.85

2.6.9.2 Guyed Masts

$G_h =$ 0.85

2.6.9.3 Pole Structures

$G_h =$ 1.1

2.6.9 Appurtenances

$G_h =$ 1.0

2.6.9.4 Structures Supported on Other Structures

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

$G_h =$ 1.35

$G_h =$ 1.00

2.6.11.2 Design Wind Force on Appurtenances

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

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

$K_z =$ 0.866 (from 2.6.5.2)

$K_{zt} =$ 1.0 (from 2.6.6.2.1)

$K_s =$ 1.0 (from 2.6.7)

$K_e =$ 0.99 (from 2.6.8)

$K_d =$ 0.85 (from Table 2-2)

$V_{max} =$ 120 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 |

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 |
| | 39 ≤ C ≤ 78 (Transitional) | $4.14/(C^{0.485})$ | $3.66/(C^{0.415})$ |
| | C > 78 (Supercritical) | 0.5 | 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.)

| Appurtenances | Height | Width | Depth | Flat Area | Aspect Ratio | Ca | Force (lbs) | Force (lbs) (w/ Ice) | Force (lbs) (30 mph) |
|-----------------------------------|--------|-------|-------|-----------|--------------|------|-------------|-------------------------|-------------------------|
| TPA65R-BU8DA-K Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 4.64 | 1.30 | 480 | 99 | 30 |
| TPA65R-BU6DA-K Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.44 | 1.24 | 342 | 72 | 21 |
| AIR6419 Antenna | 31.1 | 16.1 | 7.3 | 3.48 | 1.93 | 1.20 | 112 | 26 | 7 |
| AIR6449 Antenna | 30.6 | 15.9 | 10.6 | 3.38 | 1.92 | 1.20 | 109 | 25 | 7 |
| DMP65R-BU8DA Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 4.64 | 1.30 | 480 | 99 | 30 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.44 | 1.24 | 342 | 72 | 21 |
| 4415 B25 RRH (Side) | 16.5 | 6.3 | 13.5 | 0.72 | 2.62 | 1.21 | 23 | 7 | 1 |
| 4478 B14 RRH | 18.1 | 13.4 | 8.3 | 1.68 | 1.35 | 1.20 | 54 | 14 | 3 |
| 4426 B66 RRH | 14.9 | 13.2 | 5.8 | 1.37 | 1.13 | 1.20 | 44 | 12 | 3 |
| 4449 B5/B12 RRH | 17.9 | 13.2 | 9.4 | 1.64 | 1.36 | 1.20 | 53 | 13 | 3 |
| RRUS-32 B30 RRH | 27.2 | 12.1 | 7.0 | 2.29 | 2.25 | 1.20 | 74 | 18 | 5 |
| DC6-48-60-18-8F Surge Arrestor | 31.4 | 10.2 | 10.2 | 2.22 | 3.08 | 0.70 | 42 | 11 | 3 |
| DC9-48-60-24-8C-EV Surge Arrestor | 31.4 | 10.2 | 10.2 | 2.22 | 3.08 | 0.70 | 42 | 11 | 3 |
| 2-1/2x2-1/2 Angle | 2.5 | 12.0 | | 0.21 | 0.21 | 2.00 | 11 | | |
| 3x3 Angle | 3.0 | 12.0 | | 0.25 | 0.25 | 2.00 | 13 | | |
| 4x3 Angle | 3.0 | 12.0 | | 0.25 | 0.25 | 2.00 | 13 | | |
| 2" Pipe | 2.4 | 12.0 | | 0.20 | 0.20 | 1.20 | 6 | | |
| 3" Pipe | 3.5 | 12.0 | | 0.29 | 0.29 | 1.20 | 9 | | |
| HSS 4x4 | 4.0 | 12.0 | | 0.33 | 0.33 | 1.25 | 11 | | |

| WIND LOADS | | | | | | | | | | | | |
|---------------------------------------|--------|-------|--------------------------|--------------------|------------------|------------------------------|--------------|-------------|-----------|-------------|-------------|-------------|
| Angle = 30 (deg) | | | Ice Thickness = 1.60 in. | | | Equivalent Angle = 210 (deg) | | | | | | |
| <u>WIND LOADS WITH NO ICE:</u> | | | | | | | | | | | | |
| Appurtenances | Height | Width | Depth | Flat Area (normal) | Flat Area (side) | Aspect Ratio | Aspect Ratio | Ca (normal) | Ca (side) | Force (lbs) | Force (lbs) | Force (lbs) |
| TPA65R-BU8DA-K Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 480 | 218 | 415 |
| TPA65R-BU6DA-K Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 342 | 151 | 294 |
| AIR6419 Antenna | 31.1 | 16.1 | 7.3 | 3.48 | 1.58 | 1.93 | 4.26 | 1.20 | 1.28 | 112 | 54 | 98 |
| AIR6449 Antenna | 30.6 | 15.9 | 10.6 | 3.38 | 2.25 | 1.92 | 2.89 | 1.20 | 1.22 | 109 | 74 | 100 |
| DMP65R-BU8DA Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 480 | 218 | 415 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 342 | 151 | 294 |
| 4415 B25 RRH (Side) | 16.5 | 6.3 | 13.5 | 0.72 | 1.55 | 2.62 | 1.22 | 1.21 | 1.20 | 23 | 50 | 30 |
| 4478 B14 RRH | 18.1 | 13.4 | 8.3 | 1.68 | 1.04 | 1.35 | 2.18 | 1.20 | 1.20 | 54 | 34 | 49 |
| 4426 B66 RRH | 14.9 | 13.2 | 5.8 | 1.37 | 0.60 | 1.13 | 2.57 | 1.20 | 1.20 | 44 | 19 | 38 |
| 4449 B5/B12 RRH | 17.9 | 13.2 | 9.4 | 1.64 | 1.17 | 1.36 | 1.90 | 1.20 | 1.20 | 53 | 38 | 49 |
| RRUS-32 B30 RRH | 27.2 | 12.1 | 7.0 | 2.29 | 1.32 | 2.25 | 3.89 | 1.20 | 1.26 | 74 | 45 | 66 |
| <u>WIND LOADS WITH ICE:</u> | | | | | | | | | | | | |
| TPA65R-BU8DA-K Antenna | 99.2 | 23.9 | 10.9 | 16.46 | 7.51 | 4.15 | 9.10 | 1.27 | 1.47 | 98 | 52 | 86 |
| TPA65R-BU6DA-K Antenna | 74.4 | 23.9 | 10.9 | 12.35 | 5.63 | 3.11 | 6.83 | 1.23 | 1.39 | 71 | 37 | 62 |
| AIR6419 Antenna | 34.3 | 19.3 | 10.5 | 4.60 | 2.50 | 1.78 | 3.27 | 1.20 | 1.23 | 26 | 14 | 23 |
| AIR6449 Antenna | 33.8 | 19.1 | 13.8 | 4.48 | 3.24 | 1.77 | 2.45 | 1.20 | 1.20 | 25 | 18 | 23 |
| DMP65R-BU8DA Antenna | 99.2 | 23.9 | 10.9 | 16.46 | 7.51 | 4.15 | 9.10 | 1.27 | 1.47 | 98 | 52 | 86 |
| DMP65R-BU6DA Antenna | 74.4 | 23.9 | 10.9 | 12.35 | 5.63 | 3.11 | 6.83 | 1.23 | 1.39 | 71 | 37 | 62 |
| 4415 B25 RRH (Side) | 19.7 | 9.5 | 16.7 | 1.30 | 2.28 | 2.07 | 1.18 | 1.20 | 1.20 | 7 | 13 | 9 |
| 4478 B14 RRH | 21.3 | 16.6 | 11.5 | 2.46 | 1.70 | 1.28 | 1.85 | 1.20 | 1.20 | 14 | 10 | 13 |
| 4426 B66 RRH | 18.1 | 16.4 | 9.0 | 2.06 | 1.13 | 1.10 | 2.01 | 1.20 | 1.20 | 12 | 6 | 10 |
| 4449 B5/B12 RRH | 21.1 | 16.4 | 12.6 | 2.40 | 1.85 | 1.29 | 1.67 | 1.20 | 1.20 | 13 | 10 | 13 |
| RRUS-32 B30 RRH | 30.4 | 15.3 | 10.2 | 3.23 | 2.15 | 1.99 | 2.98 | 1.20 | 1.22 | 18 | 12 | 17 |
| <u>WIND LOADS AT 30 MPH:</u> | | | | | | | | | | | | |
| TPA65R-BU8DA-K Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 30 | 14 | 26 |
| TPA65R-BU6DA-K Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 21 | 9 | 18 |
| AIR6419 Antenna | 31.1 | 16.1 | 7.3 | 3.48 | 1.58 | 1.93 | 4.26 | 1.20 | 1.28 | 7 | 3 | 6 |
| AIR6449 Antenna | 30.6 | 15.9 | 10.6 | 3.38 | 2.25 | 1.92 | 2.89 | 1.20 | 1.22 | 7 | 5 | 6 |
| DMP65R-BU8DA Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 30 | 14 | 26 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 21 | 9 | 18 |
| 4415 B25 RRH (Side) | 16.5 | 6.3 | 13.5 | 0.72 | 1.55 | 2.62 | 1.22 | 1.21 | 1.20 | 1 | 3 | 2 |
| 4478 B14 RRH | 18.1 | 13.4 | 8.3 | 1.68 | 1.04 | 1.35 | 2.18 | 1.20 | 1.20 | 3 | 2 | 3 |
| 4426 B66 RRH | 14.9 | 13.2 | 5.8 | 1.37 | 0.60 | 1.13 | 2.57 | 1.20 | 1.20 | 3 | 1 | 2 |
| 4449 B5/B12 RRH | 17.9 | 13.2 | 9.4 | 1.64 | 1.17 | 1.36 | 1.90 | 1.20 | 1.20 | 3 | 2 | 3 |
| RRUS-32 B30 RRH | 27.2 | 12.1 | 7.0 | 2.29 | 1.32 | 2.25 | 3.89 | 1.20 | 1.26 | 5 | 3 | 4 |

| WIND LOADS | | | | | | | | | | | | |
|--------------------------------|--------|-------|--------------------------|--------------------|------------------|------------------------------|--------------|-------------|-----------|-------------|-------------|-------------|
| Angle = 60 (deg) | | | Ice Thickness = 1.60 in. | | | Equivalent Angle = 240 (deg) | | | | | | |
| WIND LOADS WITH NO ICE: | | | | | | | | | | | | |
| Appurtenances | Height | Width | Depth | Flat Area (normal) | Flat Area (side) | Ratio (normal) | Ratio (side) | Ca (normal) | Ca (side) | Force (lbs) | Force (lbs) | Force (lbs) |
| TPA65R-BU8DA-K Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 480 | 218 | 284 |
| TPA65R-BU6DA-K Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 342 | 151 | 199 |
| AIR6419 Antenna | 31.1 | 16.1 | 7.3 | 3.48 | 1.58 | 1.93 | 4.26 | 1.20 | 1.28 | 112 | 54 | 69 |
| AIR6449 Antenna | 30.6 | 15.9 | 10.6 | 3.38 | 2.25 | 1.92 | 2.89 | 1.20 | 1.22 | 109 | 74 | 83 |
| DMP65R-BU8DA Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 480 | 218 | 284 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 342 | 151 | 199 |
| 4415 B25 RRH (Side) | 16.5 | 6.3 | 13.5 | 0.72 | 1.55 | 2.62 | 1.22 | 1.21 | 1.20 | 23 | 50 | 43 |
| 4478 B14 RRH | 18.1 | 13.4 | 8.3 | 1.68 | 1.04 | 1.35 | 2.18 | 1.20 | 1.20 | 54 | 34 | 39 |
| 4426 B66 RRH | 14.9 | 13.2 | 5.8 | 1.37 | 0.60 | 1.13 | 2.57 | 1.20 | 1.20 | 44 | 19 | 26 |
| 4449 B5/B12 RRH | 17.9 | 13.2 | 9.4 | 1.64 | 1.17 | 1.36 | 1.90 | 1.20 | 1.20 | 53 | 38 | 41 |
| RRUS-32 B30 RRH | 27.2 | 12.1 | 7.0 | 2.29 | 1.32 | 2.25 | 3.89 | 1.20 | 1.26 | 74 | 45 | 52 |
| WIND LOADS WITH ICE: | | | | | | | | | | | | |
| TPA65R-BU8DA-K Antenna | 99.2 | 23.9 | 10.9 | 16.46 | 7.51 | 4.15 | 9.10 | 1.27 | 1.47 | 98 | 52 | 63 |
| TPA65R-BU6DA-K Antenna | 74.4 | 23.9 | 10.9 | 12.35 | 5.63 | 3.11 | 6.83 | 1.23 | 1.39 | 71 | 37 | 45 |
| AIR6419 Antenna | 34.3 | 19.3 | 10.5 | 4.60 | 2.50 | 1.78 | 3.27 | 1.20 | 1.23 | 26 | 14 | 17 |
| AIR6449 Antenna | 33.8 | 19.1 | 13.8 | 4.48 | 3.24 | 1.77 | 2.45 | 1.20 | 1.20 | 25 | 18 | 20 |
| DMP65R-BU8DA Antenna | 99.2 | 23.9 | 10.9 | 16.46 | 7.51 | 4.15 | 9.10 | 1.27 | 1.47 | 98 | 52 | 63 |
| DMP65R-BU6DA Antenna | 74.4 | 23.9 | 10.9 | 12.35 | 5.63 | 3.11 | 6.83 | 1.23 | 1.39 | 71 | 37 | 45 |
| 4415 B25 RRH (Side) | 19.7 | 9.5 | 16.7 | 1.30 | 2.28 | 2.07 | 1.18 | 1.20 | 1.20 | 7 | 13 | 11 |
| 4478 B14 RRH | 21.3 | 16.6 | 11.5 | 2.46 | 1.70 | 1.28 | 1.85 | 1.20 | 1.20 | 14 | 10 | 11 |
| 4426 B66 RRH | 18.1 | 16.4 | 9.0 | 2.06 | 1.13 | 1.10 | 2.01 | 1.20 | 1.20 | 12 | 6 | 8 |
| 4449 B5/B12 RRH | 21.1 | 16.4 | 12.6 | 2.40 | 1.85 | 1.29 | 1.67 | 1.20 | 1.20 | 13 | 10 | 11 |
| RRUS-32 B30 RRH | 30.4 | 15.3 | 10.2 | 3.23 | 2.15 | 1.99 | 2.98 | 1.20 | 1.22 | 18 | 12 | 14 |
| WIND LOADS AT 30 MPH: | | | | | | | | | | | | |
| TPA65R-BU8DA-K Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 30 | 14 | 18 |
| TPA65R-BU6DA-K Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 21 | 9 | 12 |
| AIR6419 Antenna | 31.1 | 16.1 | 7.3 | 3.48 | 1.58 | 1.93 | 4.26 | 1.20 | 1.28 | 7 | 3 | 4 |
| AIR6449 Antenna | 30.6 | 15.9 | 10.6 | 3.38 | 2.25 | 1.92 | 2.89 | 1.20 | 1.22 | 7 | 5 | 5 |
| DMP65R-BU8DA Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 30 | 14 | 18 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 21 | 9 | 12 |
| 4415 B25 RRH (Side) | 16.5 | 6.3 | 13.5 | 0.72 | 1.55 | 2.62 | 1.22 | 1.21 | 1.20 | 1 | 3 | 3 |
| 4478 B14 RRH | 18.1 | 13.4 | 8.3 | 1.68 | 1.04 | 1.35 | 2.18 | 1.20 | 1.20 | 3 | 2 | 2 |
| 4426 B66 RRH | 14.9 | 13.2 | 5.8 | 1.37 | 0.60 | 1.13 | 2.57 | 1.20 | 1.20 | 3 | 1 | 2 |
| 4449 B5/B12 RRH | 17.9 | 13.2 | 9.4 | 1.64 | 1.17 | 1.36 | 1.90 | 1.20 | 1.20 | 3 | 2 | 3 |
| RRUS-32 B30 RRH | 27.2 | 12.1 | 7.0 | 2.29 | 1.32 | 2.25 | 3.89 | 1.20 | 1.26 | 5 | 3 | 3 |

| WIND LOADS | | | | | | | | | | | | |
|--------------------------------|--------|-------|--------------------------|--------------------|------------------|------------------------------|--------------|-------------|-----------|-------------|-------------|-------------|
| Angle = 90 (deg) | | | Ice Thickness = 1.60 in. | | | Equivalent Angle = 270 (deg) | | | | | | |
| WIND LOADS WITH NO ICE: | | | | | | | | | | | | |
| Appurtenances | Height | Width | Depth | Flat Area (normal) | Flat Area (side) | Ratio (normal) | Ratio (side) | Ca (normal) | Ca (side) | Force (lbs) | Force (lbs) | Force (lbs) |
| TPA65R-BU8DA-K Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 480 | 218 | 218 |
| TPA65R-BU6DA-K Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 342 | 151 | 151 |
| AIR6419 Antenna | 31.1 | 16.1 | 7.3 | 3.48 | 1.58 | 1.93 | 4.26 | 1.20 | 1.28 | 112 | 54 | 54 |
| AIR6449 Antenna | 30.6 | 15.9 | 10.6 | 3.38 | 2.25 | 1.92 | 2.89 | 1.20 | 1.22 | 109 | 74 | 74 |
| DMP65R-BU8DA Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 480 | 218 | 218 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 342 | 151 | 151 |
| 4415 B25 RRH (Side) | 16.5 | 6.3 | 13.5 | 0.72 | 1.55 | 2.62 | 1.22 | 1.21 | 1.20 | 23 | 50 | 50 |
| 4478 B14 RRH | 18.1 | 13.4 | 8.3 | 1.68 | 1.04 | 1.35 | 2.18 | 1.20 | 1.20 | 54 | 34 | 34 |
| 4426 B66 RRH | 14.9 | 13.2 | 5.8 | 1.37 | 0.60 | 1.13 | 2.57 | 1.20 | 1.20 | 44 | 19 | 19 |
| 4449 B5/B12 RRH | 17.9 | 13.2 | 9.4 | 1.64 | 1.17 | 1.36 | 1.90 | 1.20 | 1.20 | 53 | 38 | 38 |
| RRUS-32 B30 RRH | 27.2 | 12.1 | 7.0 | 2.29 | 1.32 | 2.25 | 3.89 | 1.20 | 1.26 | 74 | 45 | 45 |
| WIND LOADS WITH ICE: | | | | | | | | | | | | |
| TPA65R-BU8DA-K Antenna | 99.2 | 23.9 | 10.9 | 16.46 | 7.51 | 4.15 | 9.10 | 1.27 | 1.47 | 98 | 52 | 52 |
| TPA65R-BU6DA-K Antenna | 74.4 | 23.9 | 10.9 | 12.35 | 5.63 | 3.11 | 6.83 | 1.23 | 1.39 | 71 | 37 | 37 |
| AIR6419 Antenna | 34.3 | 19.3 | 10.5 | 4.60 | 2.50 | 1.78 | 3.27 | 1.20 | 1.23 | 26 | 14 | 14 |
| AIR6449 Antenna | 33.8 | 19.1 | 13.8 | 4.48 | 3.24 | 1.77 | 2.45 | 1.20 | 1.20 | 25 | 18 | 18 |
| DMP65R-BU8DA Antenna | 99.2 | 23.9 | 10.9 | 16.46 | 7.51 | 4.15 | 9.10 | 1.27 | 1.47 | 98 | 52 | 52 |
| DMP65R-BU6DA Antenna | 74.4 | 23.9 | 10.9 | 12.35 | 5.63 | 3.11 | 6.83 | 1.23 | 1.39 | 71 | 37 | 37 |
| 4415 B25 RRH (Side) | 19.7 | 9.5 | 16.7 | 1.30 | 2.28 | 2.07 | 1.18 | 1.20 | 1.20 | 7 | 13 | 13 |
| 4478 B14 RRH | 21.3 | 16.6 | 11.5 | 2.46 | 1.70 | 1.28 | 1.85 | 1.20 | 1.20 | 14 | 10 | 10 |
| 4426 B66 RRH | 18.1 | 16.4 | 9.0 | 2.06 | 1.13 | 1.10 | 2.01 | 1.20 | 1.20 | 12 | 6 | 6 |
| 4449 B5/B12 RRH | 21.1 | 16.4 | 12.6 | 2.40 | 1.85 | 1.29 | 1.67 | 1.20 | 1.20 | 13 | 10 | 10 |
| RRUS-32 B30 RRH | 30.4 | 15.3 | 10.2 | 3.23 | 2.15 | 1.99 | 2.98 | 1.20 | 1.22 | 18 | 12 | 12 |
| WIND LOADS AT 30 MPH: | | | | | | | | | | | | |
| TPA65R-BU8DA-K Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 30 | 14 | 14 |
| TPA65R-BU6DA-K Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 21 | 9 | 9 |
| AIR6419 Antenna | 31.1 | 16.1 | 7.3 | 3.48 | 1.58 | 1.93 | 4.26 | 1.20 | 1.28 | 7 | 3 | 3 |
| AIR6449 Antenna | 30.6 | 15.9 | 10.6 | 3.38 | 2.25 | 1.92 | 2.89 | 1.20 | 1.22 | 7 | 5 | 5 |
| DMP65R-BU8DA Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 30 | 14 | 14 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 21 | 9 | 9 |
| 4415 B25 RRH (Side) | 16.5 | 6.3 | 13.5 | 0.72 | 1.55 | 2.62 | 1.22 | 1.21 | 1.20 | 1 | 3 | 3 |
| 4478 B14 RRH | 18.1 | 13.4 | 8.3 | 1.68 | 1.04 | 1.35 | 2.18 | 1.20 | 1.20 | 3 | 2 | 2 |
| 4426 B66 RRH | 14.9 | 13.2 | 5.8 | 1.37 | 0.60 | 1.13 | 2.57 | 1.20 | 1.20 | 3 | 1 | 1 |
| 4449 B5/B12 RRH | 17.9 | 13.2 | 9.4 | 1.64 | 1.17 | 1.36 | 1.90 | 1.20 | 1.20 | 3 | 2 | 2 |
| RRUS-32 B30 RRH | 27.2 | 12.1 | 7.0 | 2.29 | 1.32 | 2.25 | 3.89 | 1.20 | 1.26 | 5 | 3 | 3 |

Date: 2/6/2023
 Project Name: MANCHESTER-EAST CENTER ST
 Project No.: CT1070
 Designed By: KSBM Checked By: MSC



| WIND LOADS | | | | | | | | | | | | |
|--------------------------------|--------|-------|--------------------------|--------------------|------------------|------------------------------|--------------|-------------|-----------|-------------|-------------|-------------|
| Angle = 120 (deg) | | | Ice Thickness = 1.60 in. | | | Equivalent Angle = 300 (deg) | | | | | | |
| WIND LOADS WITH NO ICE: | | | | | | | | | | | | |
| Appurtenances | Height | Width | Depth | Flat Area (normal) | Flat Area (side) | Ratio (normal) | Ratio (side) | Ca (normal) | Ca (side) | Force (lbs) | Force (lbs) | Force (lbs) |
| TPA65R-BU8DA-K Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 480 | 218 | 284 |
| TPA65R-BU6DA-K Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 342 | 151 | 199 |
| AIR6419 Antenna | 31.1 | 16.1 | 7.3 | 3.48 | 1.58 | 1.93 | 4.26 | 1.20 | 1.28 | 112 | 54 | 69 |
| AIR6449 Antenna | 30.6 | 15.9 | 10.6 | 3.38 | 2.25 | 1.92 | 2.89 | 1.20 | 1.22 | 109 | 74 | 83 |
| DMP65R-BU8DA Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 480 | 218 | 284 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 342 | 151 | 199 |
| 4415 B25 RRH (Side) | 16.5 | 6.3 | 13.5 | 0.72 | 1.55 | 2.62 | 1.22 | 1.21 | 1.20 | 23 | 50 | 43 |
| 4478 B14 RRH | 18.1 | 13.4 | 8.3 | 1.68 | 1.04 | 1.35 | 2.18 | 1.20 | 1.20 | 54 | 34 | 39 |
| 4426 B66 RRH | 14.9 | 13.2 | 5.8 | 1.37 | 0.60 | 1.13 | 2.57 | 1.20 | 1.20 | 44 | 19 | 26 |
| 4449 B5/B12 RRH | 17.9 | 13.2 | 9.4 | 1.64 | 1.17 | 1.36 | 1.90 | 1.20 | 1.20 | 53 | 38 | 41 |
| RRUS-32 B30 RRH | 27.2 | 12.1 | 7.0 | 2.29 | 1.32 | 2.25 | 3.89 | 1.20 | 1.26 | 74 | 45 | 52 |
| WIND LOADS WITH ICE: | | | | | | | | | | | | |
| TPA65R-BU8DA-K Antenna | 99.2 | 23.9 | 10.9 | 16.46 | 7.51 | 4.15 | 9.10 | 1.27 | 1.47 | 98 | 52 | 63 |
| TPA65R-BU6DA-K Antenna | 74.4 | 23.9 | 10.9 | 12.35 | 5.63 | 3.11 | 6.83 | 1.23 | 1.39 | 71 | 37 | 45 |
| AIR6419 Antenna | 34.3 | 19.3 | 10.5 | 4.60 | 2.50 | 1.78 | 3.27 | 1.20 | 1.23 | 26 | 14 | 17 |
| AIR6449 Antenna | 33.8 | 19.1 | 13.8 | 4.48 | 3.24 | 1.77 | 2.45 | 1.20 | 1.20 | 25 | 18 | 20 |
| DMP65R-BU8DA Antenna | 99.2 | 23.9 | 10.9 | 16.46 | 7.51 | 4.15 | 9.10 | 1.27 | 1.47 | 98 | 52 | 63 |
| DMP65R-BU6DA Antenna | 74.4 | 23.9 | 10.9 | 12.35 | 5.63 | 3.11 | 6.83 | 1.23 | 1.39 | 71 | 37 | 45 |
| 4415 B25 RRH (Side) | 19.7 | 9.5 | 16.7 | 1.30 | 2.28 | 2.07 | 1.18 | 1.20 | 1.20 | 7 | 13 | 11 |
| 4478 B14 RRH | 21.3 | 16.6 | 11.5 | 2.46 | 1.70 | 1.28 | 1.85 | 1.20 | 1.20 | 14 | 10 | 11 |
| 4426 B66 RRH | 18.1 | 16.4 | 9.0 | 2.06 | 1.13 | 1.10 | 2.01 | 1.20 | 1.20 | 12 | 6 | 8 |
| 4449 B5/B12 RRH | 21.1 | 16.4 | 12.6 | 2.40 | 1.85 | 1.29 | 1.67 | 1.20 | 1.20 | 13 | 10 | 11 |
| RRUS-32 B30 RRH | 30.4 | 15.3 | 10.2 | 3.23 | 2.15 | 1.99 | 2.98 | 1.20 | 1.22 | 18 | 12 | 14 |
| WIND LOADS AT 30 MPH: | | | | | | | | | | | | |
| TPA65R-BU8DA-K Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 30 | 14 | 18 |
| TPA65R-BU6DA-K Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 21 | 9 | 12 |
| AIR6419 Antenna | 31.1 | 16.1 | 7.3 | 3.48 | 1.58 | 1.93 | 4.26 | 1.20 | 1.28 | 7 | 3 | 4 |
| AIR6449 Antenna | 30.6 | 15.9 | 10.6 | 3.38 | 2.25 | 1.92 | 2.89 | 1.20 | 1.22 | 7 | 5 | 5 |
| DMP65R-BU8DA Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 30 | 14 | 18 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 21 | 9 | 12 |
| 4415 B25 RRH (Side) | 16.5 | 6.3 | 13.5 | 0.72 | 1.55 | 2.62 | 1.22 | 1.21 | 1.20 | 1 | 3 | 3 |
| 4478 B14 RRH | 18.1 | 13.4 | 8.3 | 1.68 | 1.04 | 1.35 | 2.18 | 1.20 | 1.20 | 3 | 2 | 2 |
| 4426 B66 RRH | 14.9 | 13.2 | 5.8 | 1.37 | 0.60 | 1.13 | 2.57 | 1.20 | 1.20 | 3 | 1 | 2 |
| 4449 B5/B12 RRH | 17.9 | 13.2 | 9.4 | 1.64 | 1.17 | 1.36 | 1.90 | 1.20 | 1.20 | 3 | 2 | 3 |
| RRUS-32 B30 RRH | 27.2 | 12.1 | 7.0 | 2.29 | 1.32 | 2.25 | 3.89 | 1.20 | 1.26 | 5 | 3 | 3 |

| WIND LOADS | | | | | | | | | | | | |
|--------------------------------|--------|-------|--------------------------|--------------------|------------------|----------------|------------------------------|-------------|-----------|-------------|-------------|-------------|
| Angle = 150 (deg) | | | Ice Thickness = 1.60 in. | | | | Equivalent Angle = 330 (deg) | | | | | |
| WIND LOADS WITH NO ICE: | | | | | | | | | | | | |
| Appurtenances | Height | Width | Depth | Flat Area (normal) | Flat Area (side) | Ratio (normal) | Ratio (side) | Ca (normal) | Ca (side) | Force (lbs) | Force (lbs) | Force (lbs) |
| TPA65R-BU8DA-K Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 480 | 218 | 415 |
| TPA65R-BU6DA-K Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 342 | 151 | 294 |
| AIR6419 Antenna | 31.1 | 16.1 | 7.3 | 3.48 | 1.58 | 1.93 | 4.26 | 1.20 | 1.28 | 112 | 54 | 98 |
| AIR6449 Antenna | 30.6 | 15.9 | 10.6 | 3.38 | 2.25 | 1.92 | 2.89 | 1.20 | 1.22 | 109 | 74 | 100 |
| DMP65R-BU8DA Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 480 | 218 | 415 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 342 | 151 | 294 |
| 4415 B25 RRH (Side) | 16.5 | 6.3 | 13.5 | 0.72 | 1.55 | 2.62 | 1.22 | 1.21 | 1.20 | 23 | 50 | 30 |
| 4478 B14 RRH | 18.1 | 13.4 | 8.3 | 1.68 | 1.04 | 1.35 | 2.18 | 1.20 | 1.20 | 54 | 34 | 49 |
| 4426 B66 RRH | 14.9 | 13.2 | 5.8 | 1.37 | 0.60 | 1.13 | 2.57 | 1.20 | 1.20 | 44 | 19 | 38 |
| 4449 B5/B12 RRH | 17.9 | 13.2 | 9.4 | 1.64 | 1.17 | 1.36 | 1.90 | 1.20 | 1.20 | 53 | 38 | 49 |
| RRUS-32 B30 RRH | 27.2 | 12.1 | 7.0 | 2.29 | 1.32 | 2.25 | 3.89 | 1.20 | 1.26 | 74 | 45 | 66 |
| WIND LOADS WITH ICE: | | | | | | | | | | | | |
| TPA65R-BU8DA-K Antenna | 99.2 | 23.9 | 10.9 | 16.46 | 7.51 | 4.15 | 9.10 | 1.27 | 1.47 | 98 | 52 | 86 |
| TPA65R-BU6DA-K Antenna | 74.4 | 23.9 | 10.9 | 12.35 | 5.63 | 3.11 | 6.83 | 1.23 | 1.39 | 71 | 37 | 62 |
| AIR6419 Antenna | 34.3 | 19.3 | 10.5 | 4.60 | 2.50 | 1.78 | 3.27 | 1.20 | 1.23 | 26 | 14 | 23 |
| AIR6449 Antenna | 33.8 | 19.1 | 13.8 | 4.48 | 3.24 | 1.77 | 2.45 | 1.20 | 1.20 | 25 | 18 | 23 |
| DMP65R-BU8DA Antenna | 99.2 | 23.9 | 10.9 | 16.46 | 7.51 | 4.15 | 9.10 | 1.27 | 1.47 | 98 | 52 | 86 |
| DMP65R-BU6DA Antenna | 74.4 | 23.9 | 10.9 | 12.35 | 5.63 | 3.11 | 6.83 | 1.23 | 1.39 | 71 | 37 | 62 |
| 4415 B25 RRH (Side) | 19.7 | 9.5 | 16.7 | 1.30 | 2.28 | 2.07 | 1.18 | 1.20 | 1.20 | 7 | 13 | 9 |
| 4478 B14 RRH | 21.3 | 16.6 | 11.5 | 2.46 | 1.70 | 1.28 | 1.85 | 1.20 | 1.20 | 14 | 10 | 13 |
| 4426 B66 RRH | 18.1 | 16.4 | 9.0 | 2.06 | 1.13 | 1.10 | 2.01 | 1.20 | 1.20 | 12 | 6 | 10 |
| 4449 B5/B12 RRH | 21.1 | 16.4 | 12.6 | 2.40 | 1.85 | 1.29 | 1.67 | 1.20 | 1.20 | 13 | 10 | 13 |
| RRUS-32 B30 RRH | 30.4 | 15.3 | 10.2 | 3.23 | 2.15 | 1.99 | 2.98 | 1.20 | 1.22 | 18 | 12 | 17 |
| WIND LOADS AT 30 MPH: | | | | | | | | | | | | |
| TPA65R-BU8DA-K Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 30 | 14 | 26 |
| TPA65R-BU6DA-K Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 21 | 9 | 18 |
| AIR6419 Antenna | 31.1 | 16.1 | 7.3 | 3.48 | 1.58 | 1.93 | 4.26 | 1.20 | 1.28 | 7 | 3 | 6 |
| AIR6449 Antenna | 30.6 | 15.9 | 10.6 | 3.38 | 2.25 | 1.92 | 2.89 | 1.20 | 1.22 | 7 | 5 | 6 |
| DMP65R-BU8DA Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 30 | 14 | 26 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 21 | 9 | 18 |
| 4415 B25 RRH (Side) | 16.5 | 6.3 | 13.5 | 0.72 | 1.55 | 2.62 | 1.22 | 1.21 | 1.20 | 1 | 3 | 2 |
| 4478 B14 RRH | 18.1 | 13.4 | 8.3 | 1.68 | 1.04 | 1.35 | 2.18 | 1.20 | 1.20 | 3 | 2 | 3 |
| 4426 B66 RRH | 14.9 | 13.2 | 5.8 | 1.37 | 0.60 | 1.13 | 2.57 | 1.20 | 1.20 | 3 | 1 | 2 |
| 4449 B5/B12 RRH | 17.9 | 13.2 | 9.4 | 1.64 | 1.17 | 1.36 | 1.90 | 1.20 | 1.20 | 3 | 2 | 3 |
| RRUS-32 B30 RRH | 27.2 | 12.1 | 7.0 | 2.29 | 1.32 | 2.25 | 3.89 | 1.20 | 1.26 | 5 | 3 | 4 |

Date: 2/6/2023
Project Name: MANCHESTER-EAST CENTER ST
Project No.: CT1070
Designed By: KSBM Checked By: MSC



ICE WEIGHT CALCULATIONS

Thickness of ice: 1.60 in.
Density of ice: 56 pcf

TPA65R-BU8DA-K 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: 370 lbs
Weight of object: 87.0 lbs
Combined weight of ice and object: 457 lbs

TPA65R-BU6DA-K Antenna

Weight of ice based on total radial SF area:
Height (in): 71.2
Width (in): 20.7
Depth (in): 7.7
Total weight of ice on object: 275 lbs
Weight of object: 69.0 lbs
Combined weight of ice and object: 344 lbs

AIR6419 Antenna

Weight of ice based on total radial SF area:
Height (in): 31.1
Width (in): 16.1
Depth (in): 7.3
Total weight of ice on object: 98 lbs
Weight of object: 66.0 lbs
Combined weight of ice and object: 164 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: 103 lbs
Weight of object: 82.0 lbs
Combined weight of ice and object: 185 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: 370 lbs
Weight of object: 119.0 lbs
Combined weight of ice and object: 489 lbs

DMP65R-BU6DA Antenna

Weight of ice based on total radial SF area:
Height (in): 71.2
Width (in): 20.7
Depth (in): 7.7
Total weight of ice on object: 275 lbs
Weight of object: 96.0 lbs
Combined weight of ice and object: 371 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: 51 lbs
Weight of object: 60.0 lbs
Combined weight of ice and object: 111 lbs

4415 B25 RRH

Weight of ice based on total radial SF area:
Height (in): 16.5
Width (in): 13.5
Depth (in): 6.3
Total weight of ice on object: 44 lbs
Weight of object: 46.0 lbs
Combined weight of ice and object: 90 lbs

4426 B66 RRH

Weight of ice based on total radial SF area:
Height (in): 14.9
Width (in): 13.2
Depth (in): 5.8
Total weight of ice on object: 39 lbs
Weight of object: 49.0 lbs
Combined weight of ice and object: 88 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: 52 lbs
Weight of object: 73.0 lbs
Combined weight of ice and object: 125 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: 69 lbs
Weight of object: 60.0 lbs
Combined weight of ice and object: 129 lbs

DC6-48-60-24-8C-EV Surge Arrestor

Weight of ice based on total radial SF area:
Depth (in): 31.4
Diameter(in): 10.3
Total weight of ice on object: 61 lbs
Weight of object: 29 lbs
Combined weight of ice and object: 90 lbs

Weight of ice based on total radial SF area:
Depth (in): 31.4
Diameter(in): 10.3
Total weight of ice on object: 61 lbs
Weight of object: 29 lbs
Combined weight of ice and object: 90 lbs

HSS 4x4

Weight of ice based on total radial SF area:
Height (in): 4
Width (in): 4
Per foot weight of ice on object: 14 plf

L 4x3 Angles

Weight of ice based on total radial SF area:
Height (in): 4
Width (in): 3
Per foot weight of ice on object: 13 plf

2" pipe

Per foot weight of ice:
diameter (in): 2.38
Per foot weight of ice on object: 8 plf

L 2-1/2x2-1/2 Angles

Weight of ice based on total radial SF area:
Height (in): 2.5
Width (in): 2.5
Per foot weight of ice on object: 10 plf

3" Pipe

Per foot weight of ice:
diameter (in): 3.5
Per foot weight of ice on object: 10 plf

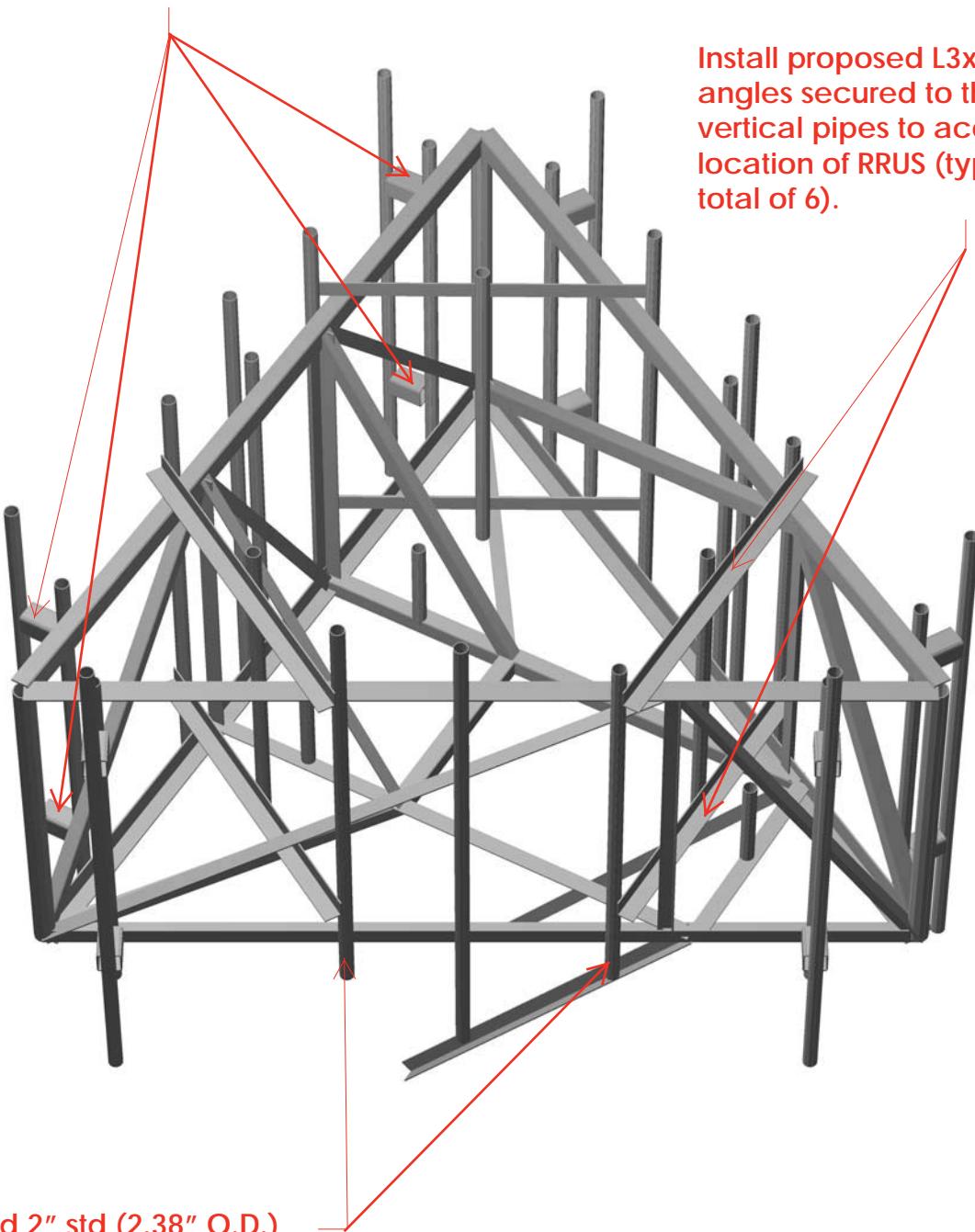
L3x3 Angles

Weight of ice based on total radial SF area:
Height (in): 3
Width (in): 3
Per foot weight of ice on object: 11 plf



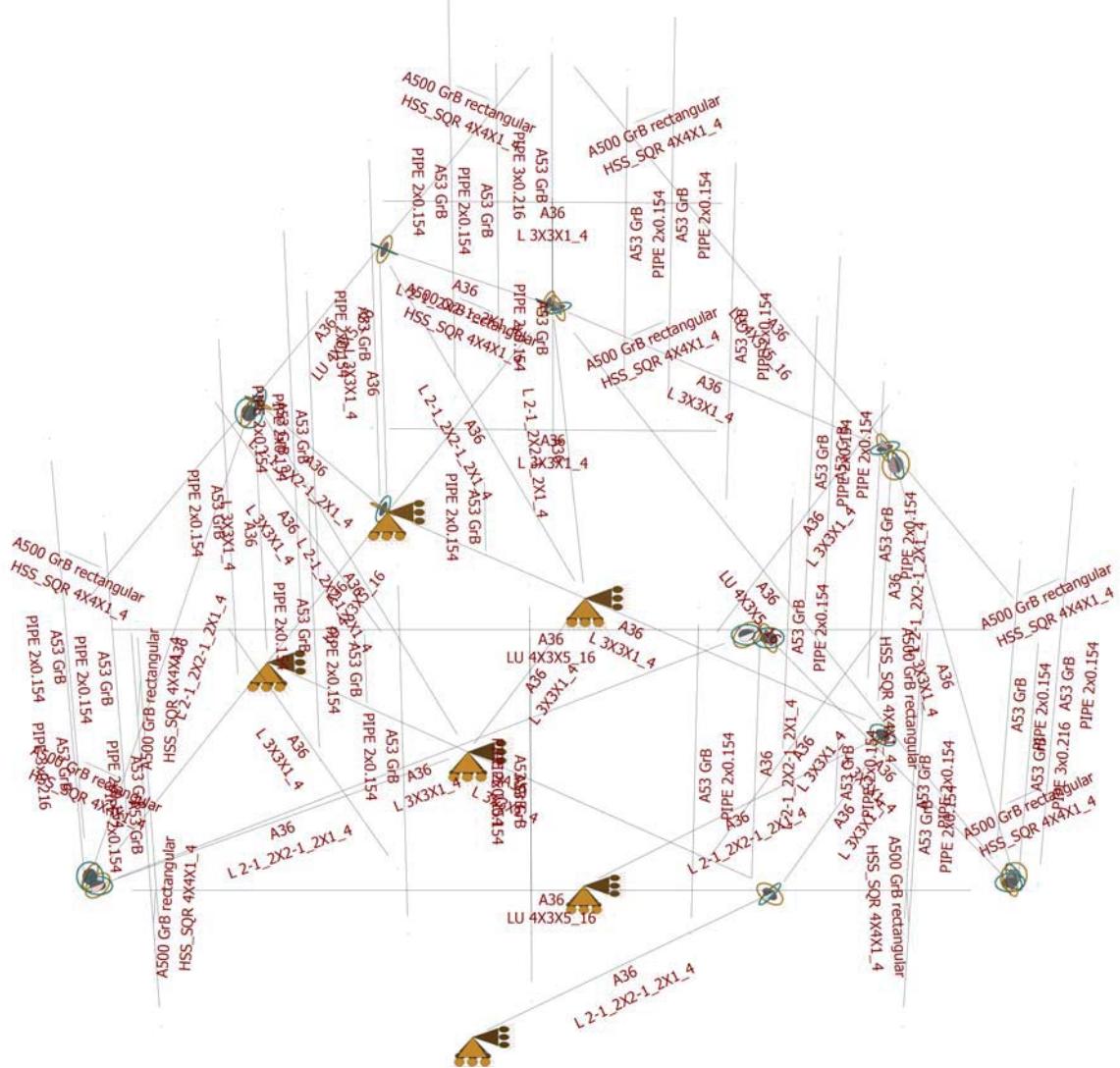
**Mount Calculations
(Modified Conditions)**

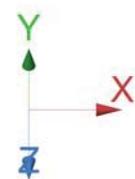
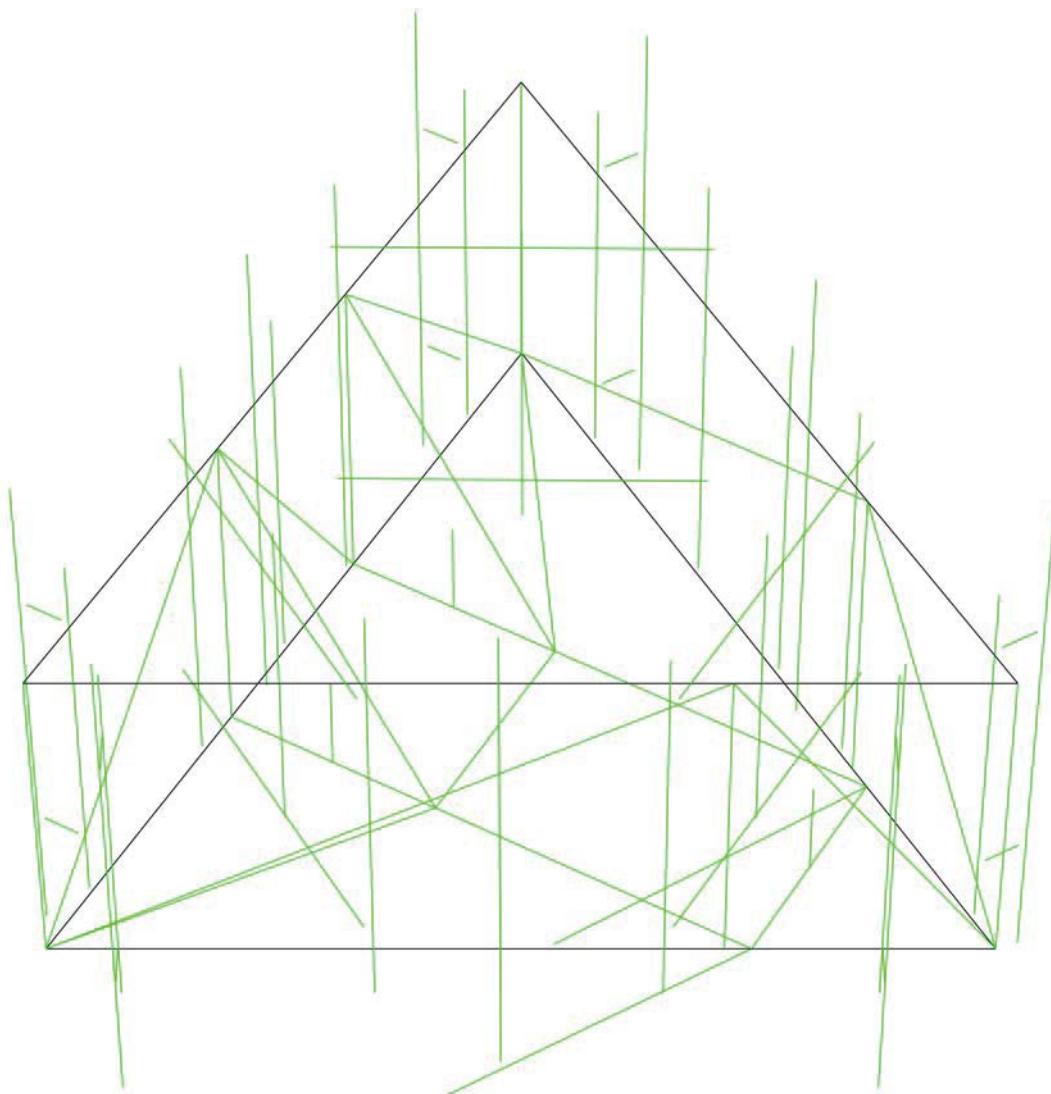
Install proposed custom standoff brackets secured to the existing pipe mast to achieve antenna sector separation requirements (typ. of 4 per sector, total of 12).

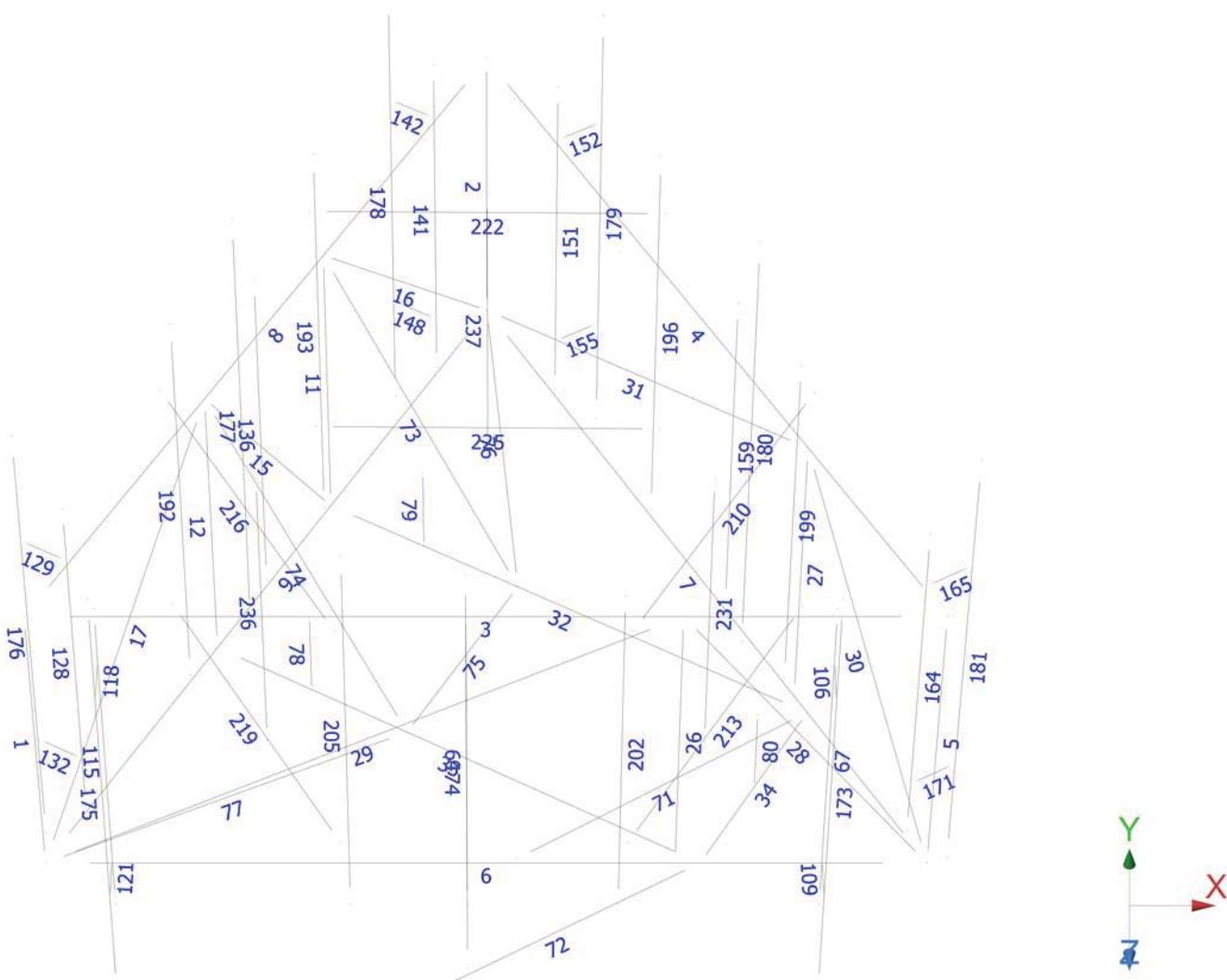


Install proposed L3x3x1/4 steel angles secured to the proposed vertical pipes to accommodate new location of RRUS (typ. of 2 per sector, total of 6).

Install proposed 2" std (2.38" O.D.) vertical pipes secured to the existing mount to accommodate proposed angles for RRU mounting (typ. of 2 per sector, total of 6).







Current Date: 2/6/2023 9:13 AM
Units system: English

Load data

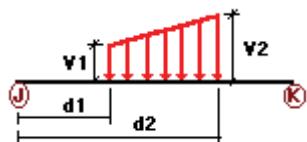
GLOSSARY

Comb : Indicates if load condition is a load combination

Load Conditions

| Condition | Description | Comb. | Category |
|-----------|----------------------------------|-------|----------|
| DL | Dead Load | No | DL |
| W0 | Wind Load 0/60/120 deg | No | WIND |
| W30 | Wind Load 30/90/150 deg | No | WIND |
| Di | Ice Load | No | LL |
| Wi0 | Ice Wind Load 0/60/120 deg | No | WIND |
| Wi30 | Ice Wind Load 30/90/150 deg | No | WIND |
| WL0 | WL 30 mph 0/60/120 deg | No | WIND |
| WL30 | WL 30 mph 30/90/150 deg | No | WIND |
| LL1 | 250 lb Live Load Center of Mount | No | LL |
| LL2 | 250 lb Live Load End of Mount | No | LL |
| LLa1 | 500 lb Live Load Antenna 1 | No | LL |
| LLa2 | 500 lb Live Load Antenna 2 | No | LL |
| LLa3 | 500 lb Live Load Antenna 3 | No | LL |
| LLa4 | 500 lb Live Load Antenna 4 | No | LL |

Distributed force on members



| Condition | Member | Dir1 | Val1 [Kip/ft] | Val2 [Kip/ft] | Dist1 [ft] | % | Dist2 [ft] | % |
|-----------|--------|------|------------------|------------------|---------------|----|---------------|----|
| DL | 6 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 7 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 9 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 32 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 33 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 34 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 75 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 76 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 77 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 1 | z | -0.009 | 0.00 | 0.00 | No | 0.00 | No |
| W0 | 2 | z | -0.009 | 0.00 | 0.00 | No | 0.00 | No |
| | 3 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| | 4 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| | 5 | z | -0.009 | 0.00 | 0.00 | No | 0.00 | No |
| | 6 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| | 7 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No |

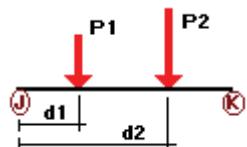
| | | | | | | | |
|-----|---|--------|------|------|----|------|----|
| 8 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| 9 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| 11 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| 12 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| 15 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 16 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 17 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 26 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 27 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 28 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| 29 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| 30 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| 31 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| 32 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| 33 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| 34 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| 71 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 72 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 73 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 74 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 75 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| 76 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 77 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 78 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 79 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 80 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 106 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 109 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 118 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 121 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 128 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 129 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 132 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 136 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 141 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 142 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 148 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 151 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 152 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 155 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 159 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 164 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 165 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 171 | z | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 176 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 177 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 178 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 179 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 180 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 181 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 192 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 193 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 196 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 199 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 202 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 205 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No |
| 210 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| 213 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| 216 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| 219 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No |

| | | | | | | | | |
|-----|---|--------|--------|------|------|------|------|----|
| 222 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 225 | z | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 231 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 236 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 237 | z | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| W30 | 1 | x | -0.009 | 0.00 | 0.00 | No | 0.00 | No |
| | 2 | x | -0.009 | 0.00 | 0.00 | No | 0.00 | No |
| 4 | x | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 5 | x | -0.009 | 0.00 | 0.00 | No | 0.00 | No | |
| 7 | x | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 8 | x | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 9 | x | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 11 | x | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 12 | x | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 15 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 16 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 17 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 26 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 27 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 28 | x | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 29 | x | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 30 | x | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 31 | x | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 32 | x | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 33 | x | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 34 | x | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 64 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 67 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 71 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 72 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 73 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 74 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 75 | x | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 76 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 77 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 78 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 79 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 80 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 106 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 109 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 115 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 118 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 121 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 128 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 129 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 132 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 136 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 141 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 142 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 148 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 151 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 152 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 155 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 159 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 164 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 165 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 171 | x | -0.011 | 0.00 | 0.00 | No | 0.00 | No | |
| 173 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 174 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 175 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |

| | | | | | | | | |
|-----|-----|--------|--------|------|------|------|------|----|
| 176 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 177 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 178 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 179 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 180 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 181 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 192 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 193 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 196 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 199 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 202 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 205 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 210 | x | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 213 | x | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 216 | x | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 219 | x | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 222 | x | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 225 | x | -0.013 | 0.00 | 0.00 | No | 0.00 | No | |
| 231 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 236 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| 237 | x | -0.006 | 0.00 | 0.00 | No | 0.00 | No | |
| Di | 1 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 2 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 3 | y | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| | 4 | y | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| | 5 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 6 | y | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| | 7 | y | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| | 8 | y | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| | 9 | y | -0.013 | 0.00 | 0.00 | No | 0.00 | No |
| | 11 | y | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| | 12 | y | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| | 15 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 16 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 17 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 26 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 27 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 28 | y | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| | 29 | y | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| | 30 | y | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| | 31 | y | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| | 32 | y | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| | 33 | y | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| | 34 | y | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| | 64 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| | 67 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| | 71 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 72 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 73 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 74 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 75 | y | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| | 76 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 77 | y | -0.01 | 0.00 | 0.00 | No | 0.00 | No |
| | 78 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| | 79 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| | 80 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| | 106 | y | -0.014 | 0.00 | 0.00 | No | 0.00 | No |
| | 109 | y | -0.014 | 0.00 | 0.00 | No | 0.00 | No |
| | 115 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| | 118 | y | -0.014 | 0.00 | 0.00 | No | 0.00 | No |

| | | | | | | | |
|-----|---|--------|------|------|----|------|----|
| 121 | y | -0.014 | 0.00 | 0.00 | No | 0.00 | No |
| 128 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 129 | y | -0.014 | 0.00 | 0.00 | No | 0.00 | No |
| 132 | y | -0.014 | 0.00 | 0.00 | No | 0.00 | No |
| 136 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 141 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 142 | y | -0.014 | 0.00 | 0.00 | No | 0.00 | No |
| 148 | y | -0.014 | 0.00 | 0.00 | No | 0.00 | No |
| 151 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 152 | y | -0.014 | 0.00 | 0.00 | No | 0.00 | No |
| 155 | y | -0.014 | 0.00 | 0.00 | No | 0.00 | No |
| 159 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 164 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 165 | y | -0.014 | 0.00 | 0.00 | No | 0.00 | No |
| 171 | y | -0.014 | 0.00 | 0.00 | No | 0.00 | No |
| 173 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 174 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 175 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 176 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 177 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 178 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 179 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 180 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 181 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 192 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 193 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 196 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 199 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 202 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 205 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 210 | y | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 213 | y | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 216 | y | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 219 | y | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 222 | y | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 225 | y | -0.011 | 0.00 | 0.00 | No | 0.00 | No |
| 231 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 236 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |
| 237 | y | -0.008 | 0.00 | 0.00 | No | 0.00 | No |

Concentrated forces on members



| Condition | Member | Dir1 | Value1 [Kip] | Dist1 [ft] | % |
|-----------|--------|------|-----------------|---------------|----|
| DL | 78 | y | -0.029 | 0.00 | No |
| | 79 | y | -0.029 | 0.00 | No |
| | 80 | y | -0.029 | 0.00 | No |
| | 173 | y | -0.044 | 0.50 | No |
| | | y | -0.044 | 7.50 | No |
| | 174 | y | -0.033 | 1.25 | No |

| | | | | | |
|-----|-----|--------|--------|------|----|
| | y | -0.033 | 3.00 | No | |
| | y | -0.041 | 5.00 | No | |
| | y | -0.041 | 6.75 | No | |
| 175 | y | -0.06 | 0.50 | No | |
| | y | -0.06 | 7.50 | No | |
| 176 | y | -0.035 | 1.50 | No | |
| | y | -0.035 | 6.50 | No | |
| 177 | y | -0.033 | 1.25 | No | |
| | y | -0.033 | 3.00 | No | |
| | y | -0.041 | 5.00 | No | |
| | y | -0.041 | 6.75 | No | |
| 178 | y | -0.048 | 1.50 | No | |
| | y | -0.048 | 6.50 | No | |
| 179 | y | -0.035 | 1.50 | No | |
| | y | -0.035 | 6.50 | No | |
| 180 | y | -0.033 | 1.25 | No | |
| | y | -0.033 | 3.00 | No | |
| | y | -0.041 | 5.00 | No | |
| | y | -0.041 | 6.75 | No | |
| 181 | y | -0.048 | 1.50 | No | |
| | y | -0.048 | 6.50 | No | |
| 231 | y | -0.046 | 10.00 | Yes | |
| | y | -0.06 | 35.00 | Yes | |
| | y | -0.049 | 35.00 | Yes | |
| | y | -0.073 | 75.00 | Yes | |
| | y | -0.06 | 75.00 | Yes | |
| 236 | y | -0.046 | 10.00 | Yes | |
| | y | -0.06 | 35.00 | Yes | |
| | y | -0.049 | 35.00 | Yes | |
| | y | -0.073 | 75.00 | Yes | |
| | y | -0.06 | 75.00 | Yes | |
| 237 | y | -0.046 | 10.00 | Yes | |
| | y | -0.06 | 35.00 | Yes | |
| | y | -0.049 | 35.00 | Yes | |
| | y | -0.073 | 75.00 | Yes | |
| | y | -0.06 | 75.00 | Yes | |
| W0 | 78 | z | -0.042 | 0.00 | No |
| | 79 | z | -0.042 | 0.00 | No |
| | 80 | z | -0.042 | 0.00 | No |
| | 173 | z | -0.241 | 0.50 | No |
| | | z | -0.241 | 7.50 | No |
| | 174 | z | -0.057 | 1.25 | No |
| | | z | -0.057 | 3.00 | No |
| | | z | -0.055 | 5.00 | No |
| | | z | -0.055 | 6.75 | No |
| | 175 | z | -0.241 | 0.50 | No |
| | | z | -0.241 | 7.50 | No |
| | 176 | z | -0.10 | 1.50 | No |
| | | z | -0.10 | 6.50 | No |
| | 177 | z | -0.035 | 1.25 | No |
| | | z | -0.035 | 3.00 | No |
| | | z | -0.042 | 5.00 | No |
| | | z | -0.042 | 6.75 | No |
| | 178 | z | -0.10 | 1.50 | No |
| | | z | -0.10 | 6.50 | No |
| | 179 | z | -0.10 | 1.50 | No |
| | | z | -0.10 | 6.50 | No |
| | 180 | z | -0.035 | 1.25 | No |
| | | z | -0.035 | 3.00 | No |
| | | z | -0.042 | 5.00 | No |

| | | | | | |
|-----|--|---|--------|-------|-----|
| | | z | -0.042 | 6.75 | No |
| 181 | | z | -0.10 | 1.50 | No |
| | | z | -0.10 | 6.50 | No |
| 231 | | z | -0.023 | 10.00 | Yes |
| | | z | -0.054 | 35.00 | Yes |
| 236 | | z | -0.074 | 75.00 | Yes |
| | | z | -0.023 | 10.00 | Yes |
| 237 | | z | -0.054 | 35.00 | Yes |
| | | z | -0.074 | 75.00 | Yes |
| W30 | | z | -0.043 | 10.00 | Yes |
| | | z | -0.039 | 35.00 | Yes |
| 78 | | z | -0.052 | 75.00 | Yes |
| | | x | -0.042 | 0.00 | No |
| 79 | | x | -0.042 | 0.00 | No |
| | | x | -0.042 | 0.00 | No |
| 80 | | x | -0.11 | 0.50 | No |
| | | x | -0.11 | 7.50 | No |
| 173 | | x | -0.028 | 1.25 | No |
| | | x | -0.028 | 3.00 | No |
| 174 | | x | -0.037 | 5.00 | No |
| | | x | -0.037 | 6.75 | No |
| 175 | | x | -0.11 | 0.50 | No |
| | | x | -0.11 | 7.50 | No |
| 176 | | x | -0.147 | 1.50 | No |
| | | x | -0.147 | 6.50 | No |
| 177 | | x | -0.049 | 1.25 | No |
| | | x | -0.049 | 3.00 | No |
| 178 | | x | -0.051 | 5.00 | No |
| | | x | -0.051 | 6.75 | No |
| 179 | | x | -0.147 | 1.50 | No |
| | | x | -0.147 | 6.50 | No |
| 180 | | x | -0.049 | 1.25 | No |
| | | x | -0.049 | 3.00 | No |
| 181 | | x | -0.051 | 5.00 | No |
| | | x | -0.051 | 6.75 | No |
| 231 | | x | -0.147 | 1.50 | No |
| | | x | -0.147 | 6.50 | No |
| 236 | | x | -0.05 | 10.00 | Yes |
| | | x | -0.034 | 35.00 | Yes |
| 237 | | x | -0.045 | 75.00 | Yes |
| | | x | -0.05 | 10.00 | Yes |
| Di | | x | -0.034 | 35.00 | Yes |
| | | x | -0.045 | 75.00 | Yes |
| 78 | | y | -0.03 | 10.00 | Yes |
| | | y | -0.049 | 35.00 | Yes |
| 79 | | y | -0.066 | 75.00 | Yes |
| | | y | -0.029 | 0.00 | No |
| 80 | | y | -0.029 | 0.00 | No |
| | | y | -0.186 | 0.50 | No |
| 173 | | y | -0.186 | 7.50 | No |
| | | y | -0.049 | 1.25 | No |
| 174 | | y | -0.049 | 3.00 | No |
| | | y | -0.052 | 5.00 | No |
| 175 | | y | -0.052 | 6.75 | No |
| | | y | -0.186 | 0.50 | No |
| 176 | | y | -0.186 | 7.50 | No |
| | | y | -0.138 | 1.50 | No |

| | | | | | |
|-----|-----|---|--------|-------|-----|
| | | y | -0.138 | 6.50 | No |
| 177 | | y | -0.049 | 1.25 | No |
| | | y | -0.049 | 3.00 | No |
| | | y | -0.052 | 5.00 | No |
| | | y | -0.052 | 6.75 | No |
| 178 | | y | -0.138 | 1.50 | No |
| | | y | -0.138 | 6.50 | No |
| 179 | | y | -0.138 | 1.50 | No |
| | | y | -0.138 | 6.50 | No |
| 180 | | y | -0.049 | 1.25 | No |
| | | y | -0.049 | 3.00 | No |
| | | y | -0.052 | 5.00 | No |
| | | y | -0.052 | 6.75 | No |
| 181 | | y | -0.138 | 1.50 | No |
| | | y | -0.138 | 6.50 | No |
| 231 | | y | -0.044 | 10.00 | Yes |
| | | y | -0.051 | 35.00 | Yes |
| | | y | -0.039 | 35.00 | Yes |
| | | y | -0.052 | 75.00 | Yes |
| | | y | -0.069 | 75.00 | Yes |
| 236 | | y | -0.044 | 10.00 | Yes |
| | | y | -0.051 | 35.00 | Yes |
| | | y | -0.039 | 35.00 | Yes |
| | | y | -0.052 | 75.00 | Yes |
| | | y | -0.069 | 75.00 | Yes |
| 237 | | y | -0.044 | 10.00 | Yes |
| | | y | -0.051 | 35.00 | Yes |
| | | y | -0.039 | 35.00 | Yes |
| | | y | -0.052 | 75.00 | Yes |
| | | y | -0.069 | 75.00 | Yes |
| Wi0 | 78 | z | -0.011 | 0.00 | No |
| | 79 | z | -0.011 | 0.00 | No |
| | 80 | z | -0.011 | 0.00 | No |
| | 173 | z | -0.05 | 0.50 | No |
| | | z | -0.05 | 7.50 | No |
| | 174 | z | -0.013 | 1.25 | No |
| | | z | -0.013 | 3.00 | No |
| | | z | -0.013 | 5.00 | No |
| | | z | -0.013 | 6.75 | No |
| | 175 | z | -0.05 | 0.50 | No |
| | | z | -0.05 | 7.50 | No |
| | 176 | z | -0.023 | 1.50 | No |
| | | z | -0.023 | 6.50 | No |
| | 177 | z | -0.009 | 1.25 | No |
| | | z | -0.009 | 3.00 | No |
| | | z | -0.01 | 5.00 | No |
| | | z | -0.01 | 6.75 | No |
| | 178 | z | -0.023 | 1.50 | No |
| | | z | -0.023 | 6.50 | No |
| | 179 | z | -0.023 | 1.50 | No |
| | | z | -0.023 | 6.50 | No |
| | 180 | z | -0.009 | 1.25 | No |
| | | z | -0.009 | 3.00 | No |
| | | z | -0.01 | 5.00 | No |
| | | z | -0.01 | 6.75 | No |
| | 181 | z | -0.023 | 1.50 | No |
| | | z | -0.023 | 6.50 | No |
| | 231 | z | -0.007 | 10.00 | Yes |
| | | z | -0.014 | 35.00 | Yes |
| | | z | -0.018 | 75.00 | Yes |

| | | | | | |
|------|-----|--------|--------|------|----|
| 236 | z | -0.007 | 10.00 | Yes | |
| | z | -0.014 | 35.00 | Yes | |
| | z | -0.018 | 75.00 | Yes | |
| 237 | z | -0.011 | 10.00 | Yes | |
| | z | -0.011 | 35.00 | Yes | |
| | z | -0.014 | 75.00 | Yes | |
| Wi30 | 78 | x | -0.011 | 0.00 | No |
| | 79 | x | -0.011 | 0.00 | No |
| | 80 | x | -0.011 | 0.00 | No |
| | 173 | x | -0.026 | 0.50 | No |
| | | x | -0.026 | 7.50 | No |
| | 174 | x | -0.008 | 1.25 | No |
| | | x | -0.008 | 3.00 | No |
| | | x | -0.01 | 5.00 | No |
| | | x | -0.01 | 6.75 | No |
| | 175 | x | -0.026 | 0.50 | No |
| | | x | -0.026 | 7.50 | No |
| 176 | x | -0.032 | 1.50 | No | |
| | x | -0.032 | 6.50 | No | |
| 177 | x | -0.012 | 1.25 | No | |
| | x | -0.012 | 3.00 | No | |
| | x | -0.012 | 5.00 | No | |
| | x | -0.012 | 6.75 | No | |
| 178 | x | -0.032 | 1.50 | No | |
| | x | -0.032 | 6.50 | No | |
| 179 | x | -0.032 | 1.50 | No | |
| | x | -0.032 | 6.50 | No | |
| 180 | x | -0.012 | 1.25 | No | |
| | x | -0.012 | 3.00 | No | |
| | x | -0.012 | 5.00 | No | |
| | x | -0.012 | 6.75 | No | |
| 181 | x | -0.032 | 1.50 | No | |
| | x | -0.032 | 6.50 | No | |
| 231 | x | -0.013 | 10.00 | Yes | |
| | x | -0.01 | 35.00 | Yes | |
| | x | -0.012 | 75.00 | Yes | |
| 236 | x | -0.013 | 10.00 | Yes | |
| | x | -0.01 | 35.00 | Yes | |
| | x | -0.012 | 75.00 | Yes | |
| WL0 | 78 | z | -0.003 | 0.00 | No |
| | 79 | z | -0.003 | 0.00 | No |
| | 80 | z | -0.003 | 0.00 | No |
| | 173 | z | -0.016 | 0.50 | No |
| | | z | -0.016 | 7.50 | No |
| | 174 | z | -0.004 | 1.25 | No |
| | | z | -0.004 | 3.00 | No |
| | | z | -0.004 | 5.00 | No |
| | | z | -0.004 | 6.75 | No |
| | 175 | z | -0.016 | 0.50 | No |
| | | z | -0.016 | 7.50 | No |
| | 176 | z | -0.007 | 1.50 | No |
| | | z | -0.007 | 6.50 | No |
| 177 | z | -0.003 | 1.25 | No | |
| | z | -0.003 | 3.00 | No | |
| | z | -0.003 | 5.00 | No | |
| | z | -0.003 | 6.75 | No | |
| 178 | z | -0.007 | 1.50 | No | |
| | z | -0.007 | 6.50 | No | |
| 179 | z | -0.007 | 1.50 | No | |
| | z | -0.007 | 6.50 | No | |

| | | | | | |
|------|-----|--------|--------|-------|-----|
| 180 | z | -0.003 | 1.25 | No | |
| | z | -0.003 | 3.00 | No | |
| | z | -0.003 | 5.00 | No | |
| | z | -0.003 | 6.75 | No | |
| 181 | z | -0.007 | 1.50 | No | |
| | z | -0.007 | 6.50 | No | |
| 231 | z | -0.001 | 10.00 | Yes | |
| | z | -0.003 | 35.00 | Yes | |
| | z | -0.005 | 75.00 | Yes | |
| 236 | z | -0.001 | 10.00 | Yes | |
| | z | -0.003 | 35.00 | Yes | |
| | z | -0.005 | 75.00 | Yes | |
| 237 | z | -0.003 | 10.00 | Yes | |
| | z | -0.002 | 35.00 | Yes | |
| | z | -0.003 | 75.00 | Yes | |
| WL30 | 78 | x | -0.003 | 0.00 | No |
| | 79 | x | -0.003 | 0.00 | No |
| | 80 | x | -0.003 | 0.00 | No |
| | 173 | x | -0.007 | 0.50 | No |
| | | x | -0.007 | 7.50 | No |
| | 174 | x | -0.002 | 1.25 | No |
| | | x | -0.002 | 3.00 | No |
| | | x | -0.003 | 5.00 | No |
| | | x | -0.003 | 6.75 | No |
| | 175 | x | -0.007 | 0.50 | No |
| | | x | -0.007 | 7.50 | No |
| | 176 | x | -0.01 | 1.50 | No |
| | | x | -0.01 | 6.50 | No |
| | 177 | x | -0.004 | 1.25 | No |
| | | x | -0.004 | 3.00 | No |
| | | x | -0.004 | 5.00 | No |
| | | x | -0.004 | 6.75 | No |
| | 178 | x | -0.01 | 1.50 | No |
| | | x | -0.01 | 6.50 | No |
| | 179 | x | -0.01 | 1.50 | No |
| | | x | -0.01 | 6.50 | No |
| | 180 | x | -0.004 | 1.25 | No |
| | | x | -0.004 | 3.00 | No |
| | | x | -0.004 | 5.00 | No |
| | | x | -0.004 | 6.75 | No |
| | 181 | x | -0.01 | 1.50 | No |
| | | x | -0.01 | 6.50 | No |
| | 231 | x | -0.003 | 10.00 | Yes |
| | | x | -0.002 | 35.00 | Yes |
| | | x | -0.003 | 75.00 | Yes |
| | 236 | x | -0.003 | 10.00 | Yes |
| | | x | -0.002 | 35.00 | Yes |
| | | x | -0.003 | 75.00 | Yes |
| | 237 | x | -0.002 | 10.00 | Yes |
| | | x | -0.003 | 35.00 | Yes |
| | | x | -0.004 | 75.00 | Yes |
| LL1 | 3 | y | -0.25 | 50.00 | Yes |
| LL2 | 3 | y | -0.25 | 0.00 | Yes |
| LLa2 | 173 | y | -0.50 | 50.00 | Yes |
| LLa3 | 174 | y | -0.50 | 50.00 | Yes |
| LLa4 | 175 | y | -0.50 | 50.00 | Yes |

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 |
| W0 | Wind Load 0/60/120 deg | No | 0.00 | 0.00 | 0.00 |
| W30 | Wind Load 30/90/150 deg | No | 0.00 | 0.00 | 0.00 |
| Di | Ice Load | No | 0.00 | 0.00 | 0.00 |
| Wi0 | Ice Wind Load 0/60/120 deg | No | 0.00 | 0.00 | 0.00 |
| Wi30 | Ice Wind Load 30/90/150 deg | No | 0.00 | 0.00 | 0.00 |
| WL0 | WL 30 mph 0/60/120 deg | No | 0.00 | 0.00 | 0.00 |
| WL30 | WL 30 mph 30/90/150 deg | No | 0.00 | 0.00 | 0.00 |
| LL1 | 250 lb Live Load Center of Mount | No | 0.00 | 0.00 | 0.00 |
| LL2 | 250 lb Live Load End of Mount | No | 0.00 | 0.00 | 0.00 |
| LLa1 | 500 lb Live Load Antenna 1 | No | 0.00 | 0.00 | 0.00 |
| LLa2 | 500 lb Live Load Antenna 2 | No | 0.00 | 0.00 | 0.00 |
| LLa3 | 500 lb Live Load Antenna 3 | No | 0.00 | 0.00 | 0.00 |
| LLa4 | 500 lb Live Load Antenna 4 | No | 0.00 | 0.00 | 0.00 |

Earthquake (Dynamic analysis only)

| Condition | a/g | Ang. [Deg] | Damp. [%] |
|-----------|------|---------------|--------------|
| DL | 0.00 | 0.00 | 0.00 |
| W0 | 0.00 | 0.00 | 0.00 |
| W30 | 0.00 | 0.00 | 0.00 |
| Di | 0.00 | 0.00 | 0.00 |
| Wi0 | 0.00 | 0.00 | 0.00 |
| Wi30 | 0.00 | 0.00 | 0.00 |
| WL0 | 0.00 | 0.00 | 0.00 |
| WL30 | 0.00 | 0.00 | 0.00 |
| LL1 | 0.00 | 0.00 | 0.00 |
| LL2 | 0.00 | 0.00 | 0.00 |
| LLa1 | 0.00 | 0.00 | 0.00 |
| LLa2 | 0.00 | 0.00 | 0.00 |
| LLa3 | 0.00 | 0.00 | 0.00 |
| LLa4 | 0.00 | 0.00 | 0.00 |

Current Date: 2/6/2023 9:13 AM

Units system: English

Steel Code Check

Report: Summary - Group by member
Load conditions to be included in design :

LC1=1.2DL+W0
 LC2=1.2DL+W30
 LC3=1.2DL-W0
 LC4=1.2DL-W30
 LC5=0.9DL+W0
 LC6=0.9DL+W30
 LC7=0.9DL-W0
 LC8=0.9DL-W30
 LC9=1.2DL+Di+Wi0
 LC10=1.2DL+Di+Wi30
 LC11=1.2DL+Di-Wi0
 LC12=1.2DL+Di-Wi30
 LC13=1.4DL
 LC14=1.2DL+1.6LL1
 LC15=1.2DL+1.6LL2
 LC16=1.2DL+WL0+1.6LLa1
 LC17=1.2DL+WL30+1.6LLa1
 LC18=1.2DL-WL0+1.6LLa1
 LC19=1.2DL-WL30+1.6LLa1
 LC20=1.2DL+WL0+1.6LLa2
 LC21=1.2DL+WL30+1.6LLa2
 LC22=1.2DL-WL0+1.6LLa2
 LC23=1.2DL-WL30+1.6LLa2
 LC24=1.2DL+WL0+1.6LLa3
 LC25=1.2DL+WL30+1.6LLa3
 LC26=1.2DL-WL0+1.6LLa3
 LC27=1.2DL-WL30+1.6LLa3
 LC28=1.2DL+WL0+1.6LLa4
 LC29=1.2DL+WL30+1.6LLa4
 LC30=1.2DL-WL0+1.6LLa4
 LC31=1.2DL-WL30+1.6LLa4

| Description | Section | Member | Ctrl Eq. | Ratio | Status | Reference |
|---------------------------------|---------|--------|----------------|-------------|-----------|-----------|
| <i>HSS_SQR 4X4X1_4</i> | | 106 | LC1 at 100.00% | 0.02 | OK | |
| | | 109 | LC3 at 100.00% | 0.02 | OK | |
| | | 118 | LC1 at 100.00% | 0.02 | OK | |
| | | 121 | LC3 at 100.00% | 0.02 | OK | |
| | | 129 | LC2 at 0.00% | 0.01 | OK | |
| | | 132 | LC4 at 0.00% | 0.01 | OK | |
| | | 142 | LC2 at 0.00% | 0.01 | OK | |
| | | 148 | LC4 at 0.00% | 0.01 | OK | |
| | | 152 | LC4 at 0.00% | 0.01 | OK | |
| | | 155 | LC2 at 0.00% | 0.01 | OK | |
| | | 165 | LC4 at 0.00% | 0.01 | OK | |
| | | 171 | LC2 at 0.00% | 0.01 | OK | |
| <i>L 2-1_2X2-1_2X1_4</i> | | 15 | LC5 at 100.00% | 0.29 | OK | |
| | | 16 | LC9 at 50.00% | 0.07 | OK | |
| | | 17 | LC10 at 50.00% | 0.09 | OK | |
| | | 26 | LC11 at 0.00% | 0.18 | OK | |
| | | 27 | LC4 at 100.00% | 0.16 | OK | |
| | | 71 | LC12 at 62.50% | 0.38 | OK | |

| | | | |
|---------------------|-----------------|-------------|----------------------|
| 72 | LC11 at 50.00% | 0.42 | OK |
| 73 | LC4 at 100.00% | 0.13 | OK |
| 74 | LC3 at 50.00% | 0.14 | OK |
| 76 | LC3 at 56.25% | 0.27 | OK |
| 77 | LC1 at 0.00% | 0.22 | OK |
| <hr/> | | | |
| L 3X3X1_4 | | | |
| 11 | LC2 at 100.00% | 0.13 | OK |
| 12 | LC2 at 0.00% | 0.15 | OK |
| 28 | LC5 at 50.00% | 0.06 | OK |
| 29 | LC2 at 62.50% | 0.17 | OK |
| 30 | LC7 at 50.00% | 0.05 | OK |
| 31 | LC1 at 56.25% | 0.18 | OK |
| 32 | LC6 at 58.33% | 0.16 | OK |
| 33 | LC5 at 0.00% | 0.18 | OK |
| 34 | LC26 at 100.00% | 0.06 | OK |
| 75 | LC3 at 100.00% | 0.05 | OK |
| 210 | LC10 at 50.00% | 0.16 | OK |
| 213 | LC9 at 50.00% | 0.15 | OK |
| 216 | LC11 at 48.44% | 0.19 | OK |
| 219 | LC11 at 48.44% | 0.20 | OK |
| 222 | LC11 at 50.00% | 0.19 | OK |
| 225 | LC12 at 50.00% | 0.19 | OK |
| <hr/> | | | |
| LU 4X3X5_16 | | | |
| 3 | LC25 at 48.21% | 0.25 | With warnings |
| 4 | LC12 at 70.54% | 0.21 | With warnings |
| 6 | LC12 at 74.22% | 0.36 | With warnings |
| 7 | LC4 at 74.22% | 0.37 | With warnings |
| 8 | LC5 at 36.72% | 0.12 | With warnings |
| 9 | LC2 at 36.72% | 0.34 | With warnings |
| <hr/> | | | |
| PIPE 2x0.154 | | | |
| 64 | LC24 at 8.75% | 0.14 | OK |
| 67 | LC21 at 82.50% | 0.15 | OK |
| 78 | LC3 at 0.00% | 0.01 | OK |
| 79 | LC1 at 0.00% | 0.01 | OK |
| 80 | LC2 at 0.00% | 0.01 | OK |
| 115 | LC29 at 82.50% | 0.16 | OK |
| 128 | LC2 at 83.75% | 0.06 | OK |
| 136 | LC2 at 75.00% | 0.08 | OK |
| 141 | LC2 at 83.75% | 0.05 | OK |
| 151 | LC10 at 91.25% | 0.07 | OK |
| 159 | LC9 at 91.25% | 0.08 | OK |
| 164 | LC10 at 91.25% | 0.08 | OK |
| 173 | LC3 at 75.00% | 0.24 | OK |
| 174 | LC24 at 72.92% | 0.08 | OK |
| 175 | LC3 at 75.00% | 0.24 | OK |
| 176 | LC10 at 25.00% | 0.06 | OK |
| 177 | LC2 at 29.17% | 0.05 | OK |
| 178 | LC10 at 25.00% | 0.06 | OK |
| 179 | LC4 at 75.00% | 0.06 | OK |
| 180 | LC4 at 29.17% | 0.05 | OK |
| 181 | LC4 at 75.00% | 0.06 | OK |
| 192 | LC11 at 21.25% | 0.25 | OK |
| 193 | LC12 at 21.25% | 0.20 | OK |
| 196 | LC4 at 21.25% | 0.08 | OK |
| 199 | LC9 at 8.75% | 0.11 | OK |
| 202 | LC27 at 91.25% | 0.15 | OK |
| 205 | LC3 at 21.25% | 0.10 | OK |
| 231 | LC1 at 89.58% | 0.06 | OK |
| 236 | LC9 at 89.58% | 0.11 | OK |
| 237 | LC9 at 89.58% | 0.07 | OK |
| <hr/> | | | |
| PIPE 3x0.216 | | | |
| 1 | LC9 at 100.00% | 0.11 | OK |
| 2 | LC10 at 100.00% | 0.11 | OK |
| 5 | LC27 at 0.00% | 0.03 | OK |

Current Date: 2/6/2023 9:14 AM

Units system: English

Geometry data

GLOSSARY

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

Nodes

| Node | X [ft] | Y [ft] | Z [ft] | Rigid Floor |
|------|-----------|-----------|-----------|-------------|
| 37 | -5.8333 | 5.00 | 6.7358 | 0 |
| 38 | 0.00 | 0.00 | -3.3679 | 0 |
| 39 | 0.00 | 5.00 | -3.3679 | 0 |
| 41 | 5.8333 | 5.00 | 6.7358 | 0 |
| 42 | 5.8333 | 0.00 | 6.7358 | 0 |
| 51 | -3.6667 | 5.00 | 2.983 | 0 |
| 52 | -3.6667 | 0.00 | 2.983 | 0 |
| 53 | -2.1667 | 5.00 | 0.3849 | 0 |
| 54 | -2.1667 | 0.00 | 0.3849 | 0 |
| 75 | 4.1667 | 5.00 | 3.849 | 0 |
| 76 | 4.1667 | 0.00 | 3.849 | 0 |
| 79 | 2.50 | 5.00 | 6.7358 | 0 |
| 80 | 2.50 | 0.00 | 6.7358 | 0 |
| 82 | 2.8333 | 0.00 | 6.7358 | 0 |
| 84 | 4.3333 | 0.00 | 4.1377 | 0 |
| 110 | -0.25 | 5.50 | 7.0358 | 0 |
| 116 | -0.25 | -0.50 | 7.0358 | 0 |
| 120 | 4.4167 | 5.50 | 7.0358 | 0 |
| 124 | 4.4167 | -0.50 | 7.0358 | 0 |
| 133 | -1.0686 | -6.00 | 4.483 | 0 |
| 134 | 0.4314 | -6.00 | 1.8849 | 0 |
| 135 | 0.4314 | 0.00 | 1.8849 | 0 |
| 136 | -1.0686 | 0.00 | 4.483 | 0 |

| | | | | |
|-----|---------|-------|--------|---|
| 137 | -2.3676 | 0.00 | 3.733 | 0 |
| 138 | -0.8676 | 0.00 | 1.1349 | 0 |
| 139 | -2.3676 | 1.50 | 3.733 | 0 |
| 140 | -0.8676 | 1.50 | 1.1349 | 0 |
| 141 | 3.5833 | 0.00 | 5.4367 | 0 |
| 142 | 3.5833 | 1.50 | 5.4367 | 0 |
| 191 | -5.8333 | 0.00 | 6.7358 | 0 |
| 192 | 4.4167 | 4.50 | 7.1358 | 0 |
| 193 | 4.4167 | 4.50 | 7.6358 | 0 |
| 196 | 4.4167 | 0.50 | 7.1358 | 0 |
| 197 | 4.4167 | 0.50 | 7.6358 | 0 |
| 205 | -4.9167 | 5.50 | 7.0358 | 0 |
| 207 | -4.9167 | -0.50 | 7.0358 | 0 |
| 212 | -4.9167 | 4.50 | 7.1358 | 0 |
| 213 | -4.9167 | 4.50 | 7.6358 | 0 |
| 216 | -4.9167 | 0.50 | 7.1358 | 0 |
| 217 | -4.9167 | 0.50 | 7.6358 | 0 |
| 226 | -5.3848 | 5.50 | 5.3589 | 0 |
| 227 | -5.3848 | -0.50 | 5.3589 | 0 |
| 228 | -5.4714 | 4.50 | 5.3089 | 0 |
| 229 | -5.9044 | 4.50 | 5.0589 | 0 |
| 232 | -5.4714 | 0.50 | 5.3089 | 0 |
| 233 | -5.9044 | 0.50 | 5.0589 | 0 |
| 238 | -3.0515 | -0.50 | 1.3174 | 0 |
| 239 | -3.0515 | 5.50 | 1.3174 | 0 |
| 248 | -0.7181 | 5.50 | -2.724 | 0 |
| 249 | -0.7181 | -0.50 | -2.724 | 0 |
| 250 | -0.8047 | 4.50 | -2.774 | 0 |
| 251 | -1.2378 | 4.50 | -3.024 | 0 |
| 259 | -0.8047 | 0.50 | -2.774 | 0 |
| 260 | -1.2378 | 0.50 | -3.024 | 0 |
| 264 | 0.9681 | 5.50 | -2.291 | 0 |
| 265 | 0.9681 | -0.50 | -2.291 | 0 |
| 266 | 1.0547 | 4.50 | -2.341 | 0 |
| 267 | 1.4878 | 4.50 | -2.591 | 0 |
| 270 | 1.0547 | 0.50 | -2.341 | 0 |
| 271 | 1.4878 | 0.50 | -2.591 | 0 |
| 276 | 3.3015 | -0.50 | 1.7505 | 0 |
| 277 | 3.3015 | 5.50 | 1.7505 | 0 |
| 286 | 5.6348 | 5.50 | 5.7919 | 0 |
| 287 | 5.6348 | -0.50 | 5.7919 | 0 |
| 288 | 5.7214 | 4.50 | 5.7419 | 0 |
| 289 | 6.1544 | 4.50 | 5.4919 | 0 |
| 297 | 5.7214 | 0.50 | 5.7419 | 0 |
| 298 | 6.1544 | 0.50 | 5.4919 | 0 |
| 300 | 4.4167 | -1.50 | 7.7358 | 0 |
| 301 | 4.4167 | 6.50 | 7.7358 | 0 |
| 302 | -0.25 | -1.50 | 7.3358 | 0 |
| 303 | -0.25 | 6.50 | 7.3358 | 0 |
| 304 | -4.9167 | -1.50 | 7.7358 | 0 |
| 305 | -4.9167 | 6.50 | 7.7358 | 0 |
| 306 | -5.991 | -1.50 | 5.0089 | 0 |
| 307 | -5.991 | 6.50 | 5.0089 | 0 |
| 308 | -3.3113 | -1.50 | 1.1674 | 0 |
| 309 | -3.3113 | 6.50 | 1.1674 | 0 |
| 310 | -1.3244 | -1.50 | -3.074 | 0 |
| 311 | -1.3244 | 6.50 | -3.074 | 0 |
| 312 | 1.5744 | -1.50 | -2.641 | 0 |
| 313 | 1.5744 | 6.50 | -2.641 | 0 |
| 314 | 3.5613 | -1.50 | 1.6005 | 0 |

| | | | | |
|-----|---------|-------|---------|---|
| 315 | 3.5613 | 6.50 | 1.6005 | 0 |
| 316 | 6.241 | -1.50 | 5.4419 | 0 |
| 317 | 6.241 | 6.50 | 5.4419 | 0 |
| 334 | -4.0515 | 6.50 | 3.0495 | 0 |
| 335 | -4.0515 | -0.50 | 3.0495 | 0 |
| 336 | -2.2765 | 6.50 | -0.0249 | 0 |
| 337 | -2.2765 | -0.50 | -0.0249 | 0 |
| 346 | 2.3015 | 6.50 | 0.0184 | 0 |
| 347 | 1.75 | 5.75 | 7.0358 | 0 |
| 348 | 2.3015 | -0.50 | 0.0184 | 0 |
| 349 | 1.75 | -0.50 | 7.0358 | 0 |
| 358 | 4.0765 | 5.75 | 3.0928 | 0 |
| 359 | -1.80 | 6.50 | 7.0358 | 0 |
| 360 | 4.0765 | -0.50 | 3.0928 | 0 |
| 361 | -1.80 | -0.50 | 7.0358 | 0 |
| 375 | 4.2637 | 5.25 | 3.1035 | 0 |
| 376 | 1.8499 | 5.25 | 7.1945 | 0 |
| 387 | 4.2637 | 1.00 | 3.1035 | 0 |
| 388 | 1.8499 | 1.00 | 7.1945 | 0 |
| 389 | -4.2389 | 5.25 | 3.0566 | 0 |
| 390 | -1.9029 | 5.25 | 7.1925 | 0 |
| 395 | -4.2389 | 1.00 | 3.0566 | 0 |
| 396 | -1.9029 | 1.00 | 7.1925 | 0 |
| 401 | 2.389 | 5.25 | -0.1475 | 0 |
| 402 | -2.3608 | 5.25 | -0.1924 | 0 |
| 407 | 2.389 | 1.00 | -0.1475 | 0 |
| 408 | -2.3608 | 1.00 | -0.1924 | 0 |
| 418 | 2.9132 | 5.75 | 5.0643 | 0 |
| 419 | 2.9132 | 0.50 | 5.0643 | 0 |
| 428 | -2.9257 | 5.75 | 5.0426 | 0 |
| 429 | -2.9257 | 0.50 | 5.0426 | 0 |
| 430 | 0.0125 | 5.75 | -0.0033 | 0 |
| 431 | 0.0125 | 0.50 | -0.0033 | 0 |

Restraints

| Node | TX | TY | TZ | RX | RY | RZ |
|------|----|----|----|----|----|----|
| 52 | 1 | 1 | 1 | 0 | 0 | 0 |
| 54 | 1 | 1 | 1 | 0 | 0 | 0 |
| 133 | 1 | 1 | 1 | 0 | 0 | 0 |
| 134 | 1 | 1 | 1 | 0 | 0 | 0 |
| 135 | 1 | 1 | 1 | 0 | 0 | 0 |
| 136 | 1 | 1 | 1 | 0 | 0 | 0 |

Members

| Member | NJ | NK | Description | Section | Material | d0 [in] | dL [in] | Ig factor |
|--------|-----|-----|-------------|-------------------|----------------------|------------|------------|-----------|
| 1 | 37 | 191 | | PIPE 3x0.216 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 2 | 39 | 38 | | PIPE 3x0.216 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 3 | 37 | 41 | | LU 4X3X5_16 | A36 | 0.00 | 0.00 | 0.00 |
| 4 | 39 | 41 | | LU 4X3X5_16 | A36 | 0.00 | 0.00 | 0.00 |
| 5 | 42 | 41 | | PIPE 3x0.216 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 6 | 191 | 42 | | LU 4X3X5_16 | A36 | 0.00 | 0.00 | 0.00 |
| 7 | 38 | 42 | | LU 4X3X5_16 | A36 | 0.00 | 0.00 | 0.00 |
| 8 | 37 | 39 | | LU 4X3X5_16 | A36 | 0.00 | 0.00 | 0.00 |
| 9 | 191 | 38 | | LU 4X3X5_16 | A36 | 0.00 | 0.00 | 0.00 |
| 11 | 53 | 54 | | L 3X3X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 12 | 51 | 52 | | L 3X3X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 15 | 51 | 54 | | L 2-1_2X2-1_2X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 16 | 53 | 38 | | L 2-1_2X2-1_2X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 17 | 51 | 191 | | L 2-1_2X2-1_2X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 26 | 79 | 80 | | L 2-1_2X2-1_2X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 27 | 75 | 76 | | L 2-1_2X2-1_2X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 28 | 42 | 79 | | L 3X3X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 29 | 79 | 191 | | L 3X3X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 30 | 75 | 42 | | L 3X3X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 31 | 75 | 38 | | L 3X3X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 32 | 84 | 54 | | L 3X3X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 33 | 82 | 52 | | L 3X3X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 34 | 84 | 82 | | L 3X3X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 64 | 116 | 110 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 67 | 120 | 124 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 71 | 84 | 134 | | L 2-1_2X2-1_2X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 72 | 82 | 133 | | L 2-1_2X2-1_2X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 73 | 53 | 135 | | L 2-1_2X2-1_2X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 74 | 51 | 136 | | L 2-1_2X2-1_2X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 75 | 135 | 136 | | L 3X3X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 76 | 135 | 38 | | L 2-1_2X2-1_2X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 77 | 136 | 191 | | L 2-1_2X2-1_2X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 78 | 137 | 139 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 79 | 138 | 140 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 80 | 141 | 142 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 106 | 192 | 193 | | HSS_SQR 4X4X1_4 | A500 GrB rectangular | 0.00 | 0.00 | 0.00 |
| 109 | 196 | 197 | | HSS_SQR 4X4X1_4 | A500 GrB rectangular | 0.00 | 0.00 | 0.00 |
| 115 | 205 | 207 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 118 | 212 | 213 | | HSS_SQR 4X4X1_4 | A500 GrB rectangular | 0.00 | 0.00 | 0.00 |
| 121 | 216 | 217 | | HSS_SQR 4X4X1_4 | A500 GrB rectangular | 0.00 | 0.00 | 0.00 |
| 128 | 226 | 227 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 129 | 228 | 229 | | HSS_SQR 4X4X1_4 | A500 GrB rectangular | 0.00 | 0.00 | 0.00 |
| 132 | 232 | 233 | | HSS_SQR 4X4X1_4 | A500 GrB rectangular | 0.00 | 0.00 | 0.00 |
| 136 | 238 | 239 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 141 | 248 | 249 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 142 | 250 | 251 | | HSS_SQR 4X4X1_4 | A500 GrB rectangular | 0.00 | 0.00 | 0.00 |
| 148 | 259 | 260 | | HSS_SQR 4X4X1_4 | A500 GrB rectangular | 0.00 | 0.00 | 0.00 |
| 151 | 264 | 265 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 152 | 266 | 267 | | HSS_SQR 4X4X1_4 | A500 GrB rectangular | 0.00 | 0.00 | 0.00 |
| 155 | 270 | 271 | | HSS_SQR 4X4X1_4 | A500 GrB rectangular | 0.00 | 0.00 | 0.00 |
| 159 | 276 | 277 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 164 | 286 | 287 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 165 | 288 | 289 | | HSS_SQR 4X4X1_4 | A500 GrB rectangular | 0.00 | 0.00 | 0.00 |
| 171 | 297 | 298 | | HSS_SQR 4X4X1_4 | A500 GrB rectangular | 0.00 | 0.00 | 0.00 |
| 173 | 301 | 300 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 174 | 303 | 302 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 175 | 305 | 304 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 176 | 307 | 306 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 177 | 309 | 308 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 178 | 311 | 310 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |

| | | | | | | | |
|-----|-----|-----|--------------|---------|------|------|------|
| 179 | 313 | 312 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 180 | 315 | 314 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 181 | 317 | 316 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 192 | 334 | 335 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 193 | 336 | 337 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 196 | 346 | 348 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 199 | 358 | 360 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 202 | 347 | 349 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 205 | 359 | 361 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 210 | 376 | 375 | L 3X3X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 213 | 388 | 387 | L 3X3X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 216 | 389 | 390 | L 3X3X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 219 | 395 | 396 | L 3X3X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 222 | 401 | 402 | L 3X3X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 225 | 407 | 408 | L 3X3X1_4 | A36 | 0.00 | 0.00 | 0.00 |
| 231 | 418 | 419 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 236 | 428 | 429 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 237 | 430 | 431 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |

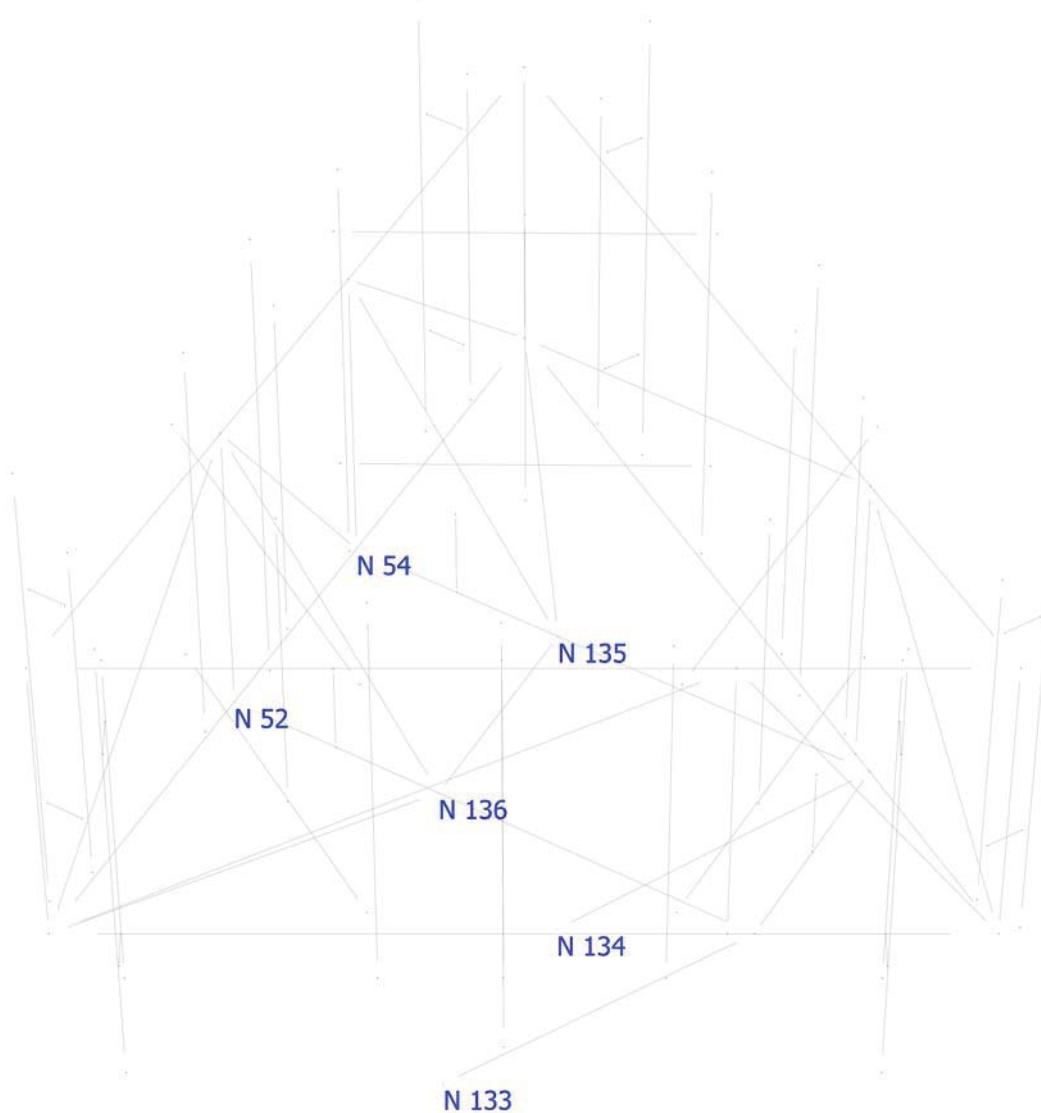
Orientation of local axes

| Member | Rotation [Deg] | Axes23 | NX | NY | NZ |
|--------|-------------------|--------|---------|------|--------|
| 1 | 0.00 | 2 | 0.50 | 0.00 | -0.866 |
| 2 | 0.00 | 2 | 0.50 | 0.00 | -0.866 |
| 3 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 4 | 180.00 | 0 | 0.00 | 0.00 | 0.00 |
| 5 | 0.00 | 2 | -0.50 | 0.00 | 0.866 |
| 6 | 270.00 | 0 | 0.00 | 0.00 | 0.00 |
| 8 | 180.00 | 0 | 0.00 | 0.00 | 0.00 |
| 11 | 0.00 | 2 | 0.866 | 0.00 | 0.50 |
| 12 | 0.00 | 2 | 0.50 | 0.00 | -0.866 |
| 15 | 180.00 | 0 | 0.00 | 0.00 | 0.00 |
| 16 | 270.00 | 0 | 0.00 | 0.00 | 0.00 |
| 17 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 26 | 0.00 | 2 | 0.00 | 0.00 | 1.00 |
| 27 | 0.00 | 2 | 0.866 | 0.00 | -0.50 |
| 28 | 180.00 | 0 | 0.00 | 0.00 | 0.00 |
| 29 | 180.00 | 0 | 0.00 | 0.00 | 0.00 |
| 30 | 180.00 | 0 | 0.00 | 0.00 | 0.00 |
| 31 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 32 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 33 | 180.00 | 0 | 0.00 | 0.00 | 0.00 |
| 34 | 180.00 | 0 | 0.00 | 0.00 | 0.00 |
| 64 | 0.00 | 2 | -0.9659 | 0.00 | 0.2588 |
| 67 | 0.00 | 2 | 0.50 | 0.00 | -0.866 |
| 72 | 270.00 | 0 | 0.00 | 0.00 | 0.00 |
| 73 | 180.00 | 0 | 0.00 | 0.00 | 0.00 |
| 74 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 75 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 76 | 180.00 | 0 | 0.00 | 0.00 | 0.00 |
| 77 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 78 | 0.00 | 2 | -0.50 | 0.00 | 0.866 |
| 79 | 0.00 | 2 | -0.50 | 0.00 | 0.866 |
| 80 | 0.00 | 2 | -0.50 | 0.00 | 0.866 |
| 115 | 0.00 | 2 | 0.50 | 0.00 | -0.866 |

| | | | | | |
|-----|------|---|---------|------|--------|
| 128 | 0.00 | 2 | 0.50 | 0.00 | -0.866 |
| 136 | 0.00 | 2 | -0.9659 | 0.00 | 0.2588 |
| 141 | 0.00 | 2 | 0.50 | 0.00 | -0.866 |
| 151 | 0.00 | 2 | 0.50 | 0.00 | -0.866 |
| 159 | 0.00 | 2 | -0.9659 | 0.00 | 0.2588 |
| 164 | 0.00 | 2 | 0.50 | 0.00 | -0.866 |
| 173 | 0.00 | 2 | -0.9659 | 0.00 | 0.2588 |
| 174 | 0.00 | 2 | -0.9659 | 0.00 | 0.2588 |
| 175 | 0.00 | 2 | -0.9659 | 0.00 | 0.2588 |
| 176 | 0.00 | 2 | -0.9659 | 0.00 | 0.2588 |
| 177 | 0.00 | 2 | -0.9659 | 0.00 | 0.2588 |
| 178 | 0.00 | 2 | -0.9659 | 0.00 | 0.2588 |
| 179 | 0.00 | 2 | -0.9659 | 0.00 | 0.2588 |
| 180 | 0.00 | 2 | -0.9659 | 0.00 | 0.2588 |
| 181 | 0.00 | 2 | -0.9659 | 0.00 | 0.2588 |
| 192 | 0.00 | 2 | 0.50 | 0.00 | -0.866 |
| 193 | 0.00 | 2 | 0.50 | 0.00 | -0.866 |
| 196 | 0.00 | 2 | 0.50 | 0.00 | -0.866 |
| 199 | 0.00 | 2 | 0.50 | 0.00 | -0.866 |
| 202 | 0.00 | 2 | 0.50 | 0.00 | -0.866 |
| 205 | 0.00 | 2 | 0.50 | 0.00 | -0.866 |
| 231 | 0.00 | 2 | 0.50 | 0.00 | -0.866 |
| 236 | 0.00 | 2 | 0.50 | 0.00 | -0.866 |
| 237 | 0.00 | 2 | 0.50 | 0.00 | -0.866 |

Hinges

| Member | Node-J | | | | Node-K | | | | TOR | AXL | Axial rigidity |
|--------|--------|-----|----|----|--------|-----|----|----|-----|-----|----------------|
| | M33 | M22 | V3 | V2 | M33 | M22 | V3 | V2 | | | |
| 15 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | Full |
| 16 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | Full |
| 17 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | Full |
| 28 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | Full |
| 29 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | Full |
| 30 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | Full |
| 31 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | Full |
| 71 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |
| 72 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |



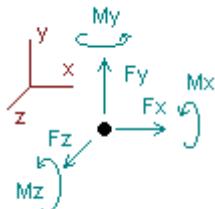
Current Date: 2/6/2023 9:15 AM

Units system: English

Analysis result

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+W0
 LC2=1.2DL+W30
 LC3=1.2DL-W0
 LC4=1.2DL-W30
 LC5=0.9DL+W0
 LC6=0.9DL+W30
 LC7=0.9DL-W0
 LC8=0.9DL-W30
 LC9=1.2DL+Di+Wi0
 LC10=1.2DL+Di+Wi30
 LC11=1.2DL+Di-Wi0
 LC12=1.2DL+Di-Wi30
 LC13=1.4DL
 LC14=1.2DL+1.6LL1
 LC15=1.2DL+1.6LL2
 LC16=1.2DL+WL0+1.6LLa1
 LC17=1.2DL+WL30+1.6LLa1
 LC18=1.2DL-WL0+1.6LLa1
 LC19=1.2DL-WL30+1.6LLa1
 LC20=1.2DL+WL0+1.6LLa2
 LC21=1.2DL+WL30+1.6LLa2
 LC22=1.2DL-WL0+1.6LLa2
 LC23=1.2DL-WL30+1.6LLa2
 LC24=1.2DL+WL0+1.6LLa3
 LC25=1.2DL+WL30+1.6LLa3
 LC26=1.2DL-WL0+1.6LLa3
 LC27=1.2DL-WL30+1.6LLa3
 LC28=1.2DL+WL0+1.6LLa4
 LC29=1.2DL+WL30+1.6LLa4
 LC30=1.2DL-WL0+1.6LLa4
 LC31=1.2DL-WL30+1.6LLa4

| Node | Forces | | | | | | Moments | | | | | |
|------|--------|--------|-------|----|--------|-----|----------|-----|----------|-----|----------|-----|
| | Fx | Ic | Fy | Ic | Fz | Ic | Mx | Ic | My | Ic | Mz | Ic |
| | [Kip] | | [Kip] | | [Kip] | | [Kip*ft] | | [Kip*ft] | | [Kip*ft] | |
| 52 | Max | 0.380 | LC8 | | 4.214 | LC2 | 2.052 | LC2 | 0.00000 | LC1 | 0.00000 | LC1 |
| | Min | -0.941 | LC2 | | -1.938 | LC8 | -1.101 | LC8 | 0.00000 | LC1 | 0.00000 | LC1 |
| 54 | Max | 1.653 | LC2 | | 5.035 | LC1 | 1.023 | LC8 | 0.00000 | LC1 | 0.00000 | LC1 |
| | Min | -1.106 | LC8 | | -2.859 | LC7 | -1.970 | LC2 | 0.00000 | LC1 | 0.00000 | LC1 |

| | | | | | | | | | | | | | |
|-----|-----|--------|------|--------|------|--------|------|---------|-----|---------|-----|---------|-----|
| 133 | Max | 1.501 | LC11 | 2.349 | LC11 | 0.867 | LC11 | 0.00000 | LC1 | 0.00000 | LC1 | 0.00000 | LC1 |
| | Min | 0.095 | LC5 | 0.160 | LC5 | 0.094 | LC5 | 0.00000 | LC1 | 0.00000 | LC1 | 0.00000 | LC1 |
| 134 | Max | 1.475 | LC12 | 2.309 | LC12 | 0.852 | LC12 | 0.00000 | LC1 | 0.00000 | LC1 | 0.00000 | LC1 |
| | Min | 0.025 | LC6 | -0.003 | LC6 | -0.006 | LC6 | 0.00000 | LC1 | 0.00000 | LC1 | 0.00000 | LC1 |
| 135 | Max | 2.105 | LC6 | 1.515 | LC4 | 3.166 | LC5 | 0.00000 | LC1 | 0.00000 | LC1 | 0.00000 | LC1 |
| | Min | -3.197 | LC4 | -0.829 | LC6 | -4.162 | LC3 | 0.00000 | LC1 | 0.00000 | LC1 | 0.00000 | LC1 |
| 136 | Max | 2.719 | LC6 | 1.746 | LC3 | 2.403 | LC5 | 0.00000 | LC1 | 0.00000 | LC1 | 0.00000 | LC1 |
| | Min | -4.105 | LC4 | -0.872 | LC5 | -2.843 | LC3 | 0.00000 | LC1 | 0.00000 | LC1 | 0.00000 | LC1 |



Connection Check

Date: 2/6/2023
Project Name: MANCHESTER-EAST CENTER ST
Project No.: CT1070
Designed By: KSBM Checked By: MSC



CHECK CONNECTION CAPACITY (Worst Case)

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

Bolt Type = A307 5/8" (Bolt)

Allowable Tensile Load =

$F_{Tall} =$ 6903 lbs.

Allowable Shear Load =

$F_{Vall} =$ 4142 lbs.

TENSILE FORCES

Reaction $F =$ 1970 lbs. (See Bentley Output)

SHEAR FORCES

Reactions in X direction: 1653 lbs. (See Bentley Output)

Reactions in Y direction: 5035 lbs. (See Bentley Output)

Resultant: 5299 lbs.

No. of Supports = 1

No. of Bolts / Support = 2

Tension Design Load / Bolts =

$f_t =$ 985.00 lbs. $<$ 6903 lbs. Therefore, OK !

Shear Design Load / Bolts=

$f_v =$ 2649.70 lbs. $<$ 4142 lbs. Therefore, OK !

CHECK COMBINED TENSION AND SHEAR

| | | | | |
|-------------|---|-------------|--------|-----------------------------|
| f_t / F_t | + | f_v / F_v | \leq | 1.0 |
| 0.143 | + | 0.640 | = | 0.782 < 1.0 Therefore, OK ! |