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April 7, 2021

VIA ELECTRONIC MAIL & FIRST CLASS MAIL
Members of the Connecticut Siting Council
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

Re: Tower Sharing Request by New Cingular Wireless PCS, LLC
Premises: 293 Elm Street, Enfield, Connecticut

Dear Members of the Connecticut Siting Council:

Pursuant to Connecticut General Statutes (C.G.S.) § 16-50aa, New Cingular Wireless PCS, LLC ("AT&T" or "the Applicant") hereby requests an order from the Connecticut Siting Council (the "Council") approving the proposed shared use of a communications tower and associated compound at the parcel identified as 293 Elm Street in the Town of Enfield (the "Elm Street Facility"). Annexed here as **Attachment 1** is the Letter of Authorization between the Applicant and the Town of Enfield, the owner of the tower facility, authorizing the Applicant to prepare and file an application for the Applicant's use of the existing tower.

The Elm Street Facility

The Elm Street Facility is located on an approximately 7.43 acre parcel which is the site of the Town of Enfield's Public Safety Complex. A parcel property card and parcel map are included in **Attachment 1**. The facility includes the town's emergency communications equipment and consists of an approximately 160' lattice tower (the "Tower") and associated equipment, with the top of the highest appurtenance on the Tower reaching a height of approximately 172' above ground level ("AGL"). In addition to the town's equipment, the Elm Street Facility includes a T-Mobile facility which was approved by the Siting Council in 2016 through TS-T-Mobile-049-160914.

AT&T Wireless' Facility

As depicted on the plans annexed hereto as **Attachment 2** prepared by Hudson Design Group, LLC dated December 30, 2020 including a site plan, compound plan, and tower elevation, AT&T

proposes the shared use of the Elm Street Facility to provide FCC licensed services. AT&T will install 9 panel antennas and 12 remote radiohead ("RRH") units on a sector frame mount attached to the existing tower at the centerline height of approximately 151' AGL. AT&T's proposed 20' x 12'-6" lease area is located within the existing fenced compound. Within the lease area, AT&T's will install a 6'-8" x 6'-8" unmanned walk-in equipment cabinet upon a proposed 8'-6" x 8'-6" concrete pad as well as a new 20kW diesel generator for emergency back-up power.

Connecticut General Statutes § 16-50aa provides that, upon written request for shared use approval, an order approving such use shall be issued "if the Council finds that the proposed shared use of the facility is technically, legally, environmentally and economically feasible and meets public safety concerns." (C.G.S. § 16-50aa(c)(1)). Further, upon approval of such shared use, it is exclusive, and no local zoning or land use approvals are required. (C.G.S. § 16-50x). Shared use of the Elm Street Facility satisfies the approval criteria set forth in C.G.S. § 16-50aa as follows:

A. Technical Feasibility: As evidenced in the structural analysis prepared by AECOM and dated December 2, 2020, annexed hereto as **Attachment 3** and the mount modification design prepared by Hudson Design Group, LLC dated November 16, 2020 annexed hereto as **Attachment 4**, AT&T confirmed that the Elm Street Facility is capable of supporting the addition of AT&T's antennas and tower mounted equipment. The proposed shared use of this tower is therefore technically feasible.

B. Legal Feasibility: Pursuant to C.G.S. § 16-50aa, the Council is authorized to issue an order approving shared use of the existing Elm Street Facility. (C.G.S. § 16-50aa(c)(1)). Under the authority vested in the Council by C.G.S. § 16-50aa, an order by the Council approving the shared use of a tower would permit the Applicant to obtain a building permit for the proposed installation. The Council has approved an application by T-Mobile to attach its wireless facility equipment at the Elm Street Facility for transmitting and receiving signals in electromagnetic spectrum.

C. Environmental Feasibility: The proposed shared use would have a minimal environmental effect, for the following reasons:

    1. Given the height of the existing tower, 160' AGL, AT&T's proposal to locate antennas at a centerline height of 151' AGL, and the existing equipment on the Tower, AT&T's proposed installation would have a de minimis visual impact and would not cause any significant change or alteration in the physical or environmental characteristics of the facility;

2. The installation by AT&T will not increase the height of the tower;

3. The proposed installation will not increase the noise levels at the site boundaries by six decibels or more;

4. Operation of AT&T's antennas at this site will not exceed the total radio frequency electromagnetic radiation power density level adopted by the FCC and Connecticut Department of Health. AT&T's proposed antenna installation along with the existing equipment is calculated to create less than 12% of the FCC Standard for General Public/Uncontrolled Maximum Permissible Exposure ("MPE") at ground level. Please see the assessment of RF power density dated November 17, 2020, prepared by C Squared Systems, LLC, annexed hereto as **Attachment 5**; and

5. The proposed shared use of the Elm Street Facility would not require any water or sanitary facilities or discharges into any waterbodies. The installation will not generate any traffic other than for periodic maintenance visits.

D. Economic Feasibility: The Applicant and the tower owner anticipate entering into a mutual agreement to share use of the Elm Street Facility on terms agreeable to both parties. The proposed tower sharing is therefore economically feasible.

E. Public Safety: As stated above and evidenced in attachments hereto the tower is structurally capable of supporting AT&T's installation and emissions are well within the maximum permitted by the FCC and the Connecticut Department of Health. Further, the addition of AT&T's telecommunications service in the Enfield area through shared use of the Elm Street Facility is expected to enhance the safety and welfare of local residents and travelers through the surrounding area resulting in an improvement to public safety in this area of the State.

Notice of Tower Share Filing

Pursuant to R.C.S.A. Section 16-50j-88 and the August 2013 Tower Share Filing Guide, copies of AT&T's tower share filing request were sent to the property owner, as well as the chief elected official of Enfield, and the Enfield Planning and Zoning Department. Copies of each notice and their respective FedEx labels are included in **Attachment 6.**

Conclusion

As explained above, the proposed shared use of the Elm Street Facility satisfies the criteria set

forth in C.G.S. §16-50aa and advances the General Assembly's and the Siting Council's goal of preventing the proliferation of towers in the State of Connecticut. AT&T therefore requests the Siting Council issue an order approving the proposed shared use of the Elm Street Facility.

Respectfully submitted,

Lucia Chiocchio

Lucia Chiocchio

Attachments
cc: Melanie Bachman, Executive Director
Mayor Michael Ludwick, Town of Enfield
Jennifer Pacacha, Assistant Town Planner, Town of Enfield
Villalba, Savannah-Nicole Villalba, Assistant Planner, Town of Enfield
SAI Communications
AT&T

ATTACHMENT 1

January 21, 2021

Mr. Mark Roberts
SAI Communications (Agent for AT&T Mobility)
12 Industrial Way
Salem, NH 03079

Re: Letter of Authorization

Applicant: **AT&T Mobility**

Site Address: **293 Elm Street**
Enfield, CT 06082

Dear Mr. Roberts,

The Town of Enfield is the owner of the tower at the above-referenced address on which AT&T Mobility intends to install a wireless antenna facility. As the owner of the property, permission is hereby granted to AT&T Mobility and its agents for the purpose of consummating any applications necessary to gain the required approvals or permits from the Connecticut Siting Council and/or the Town of Enfield.

Any fees or charges associated with all applications or permits, and any conditions placed on the applicant shall be the responsibility of AT&T Mobility, its subsidiaries and agents.

Sincerely,

TOWN OF ENFIELD

By: _____

Name: Christopher Bromson

Title: Town Manager
Hereunto Duly Authorized

293 ELM ST

Location	293 ELM ST	**Mblu**	075/ / 0103/ /
Acct#	000600010333E	**Owner**	ENFIELD TOWN OF
Assessment	$2,651,150	**Appraisal**	$3,787,340
PID	85	**Building Count**	1
Fire District	3		

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2020	$2,989,430	$797,910	$3,787,340
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2020	$2,092,610	$558,540	$2,651,150

Owner of Record

Owner	ENFIELD TOWN OF	**Sale Price**	$0
Co-Owner	PUBLIC SAFETY COMPLX	**Certificate**	1
Address	820 ENFIELD ST ENFIELD, CT 06082	**Book & Page**	0626/0014
		Sale Date	

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
ENFIELD TOWN OF	$0	1	0626/0014	

Building Information

Building 1 : Section 1

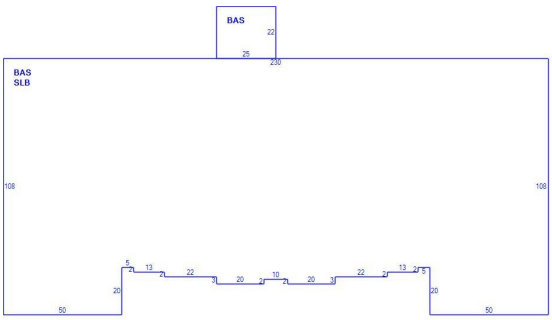
Year Built:	1991
Living Area:	23,348
Replacement Cost:	$3,735,400
Building Percent Good:	73
Replacement Cost Less Depreciation:	$2,726,840

Building Attributes	
Field	**Description**
Style:	Police Station
Model	Comm/Ind
Grade	Average +10
Stories:	1
Occupancy	1.00
Exterior Wall 1	Brick
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Tar & Gravel
Interior Wall 1	Drywall/Sheet
Interior Wall 2	
Interior Floor 1	Vinyl/Asphalt
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Hot Air-no Duc
AC Type	Central
Struct Class	1.25
Bldg Use	Exempt Comm
Total Rooms	
Total Bedrms	
Total Baths	
Total H Bths	
Extra Fixtures	
1st Floor Use:	
Heat/AC	Ht/AC Package
Frame Type	Masonry
Baths/Plumbing	Average
Ceiling/Wall	Sus Ceil Wall
Rooms/Prtns	Average
Wall Height	8.00
% Comn Wall	

Building Photo

(http://images.vgsi.com/photos2/EnfieldCTPhotos//\00\01\70\90.jpg)

Building Layout



(ParcelSketch.ashx?pid=85&bid=85)

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	23,348	23,348
SLB	Slab	22,798	0
		46,146	23,348

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
SPR1	SPRINKLERS-WET	23348.00 SF	$17,040	1

Land

Land Use

Land Line Valuation

Use Code	925	**Size (Acres)**	7.43
Description	Exempt Comm	**Frontage**	
Zone	I-1	**Depth**	
Neighborhood	C110	**Assessed Value**	$558,540
Alt Land Appr	No	**Appraised Value**	$797,910
Category			

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
PAV1	Paving	AS	Asphalt	40000.00 S.F.	$43,000	1
FN4	FENCE-10'CHAIN			2500.00 L.F.	$32,500	1
SHD1	Shed	FR	Frame	480.00 S.F.	$2,940	1
LT1	LIGHTS-IN W/PL			14.00 UNITS	$11,200	1
TWR1	Cell Twr 1 Carrier			2.00 UNITS	$150,100	1
SHD2	Shed gd	MS	Masonry	220.00 S.F.	$3,100	1
PAV1	Paving	AS	Asphalt	2520.00 S.F.	$2,710	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2020	$2,989,430	$797,910	$3,787,340
2019	$2,989,430	$797,910	$3,787,340
2018	$2,989,430	$797,910	$3,787,340

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2020	$2,092,610	$558,540	$2,651,150
2019	$2,092,610	$558,540	$2,651,150
2018	$2,092,610	$558,540	$2,651,150

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293 Elm St, Enfield, CT 06082

N
W E
S

0 200 400 800 1,200 1,600 2,000 Feet

1 inch = 1,059 feet

The Town of Enfield, CT shall assume no liability for any errors,omissions, or inaccuracies in the information provided regardless of how caused or any decision made or action taken or not taken by reader in reliance upon any information or data furnished hereunder.

ATTACHMENT 2

PROJECT INFORMATION

SCOPE OF WORK:	TELECOMMUNICATIONS FACILITY (NSB A EXISTING 160' A.G.L. TALL SELF-SUPPORT TOWER. PROPOSED WALK-IN CABINET, AND GENERATOR WILL BE INSTALLED ON PROPOSED CONCRETE PADS WITH PROPOSED ICE BRIDGE AT GRADE INSIDE A EXISTING FENCED-IN COMPOUND. PROPOSED (3) ANTENNA MOUNTS WITH (6) EPBQ-654L8H8-L2 ANTENNAS, (3) HPA654R-BU8A ANTENNAS, (3) 4478 B14 RRH, (3) 4415 B30 RRH, (3) 4449 B5/B12 RRH, (3) 8843 B2/B66A RRH & (3) SURGE ARRESTORS WILL BE INSTALLED AT A HEIGHT OF 151' A.G.L.):
SITE ADDRESS:	293 ELM STREET ENFIELD, CT 06082
APPLICANT:	AT&T 550 COCHITUATE ROAD FRAMINGHAM, MA 01701
SITE OWNER:	TOWN OF ENFIELD PUBLIC SAFETY COMPLEX 820 ENFIELD STREET ENFIELD, CT 06082
LATITUDE:	41.99767 N, 41° 59' 51.6" N
LONGITUDE:	72.55307 W, 72° 33' 11.0" W
TYPE OF SITE:	SELF SUPPORT TOWER/ WALK-IN CABINET
OVERALL HEIGHT:	172'-0"±
TOWER HEIGHT:	160'-0"±
RAD CENTER:	151'-0"±
APPLICABLE CODES:	ALL WORK SHALL CONFORM TO ALL CURRENT APPLICABLE CT STATE BUILDING CODE, NATIONAL ELECTRIC CODE (NEC 2017), ANSI/EIA/TIA-222 H & COMPLY WITH AT&T MOBILITY SPECIFICATIONS

SITE NUMBER: CT1401

SITE NAME: ENFIELD CT

FA CODE:14563480

PACE ID: MRCTB036649, MRCTB032121, MRCTB036716, MRCTB036667, MRCTB036635, MRCTB036715

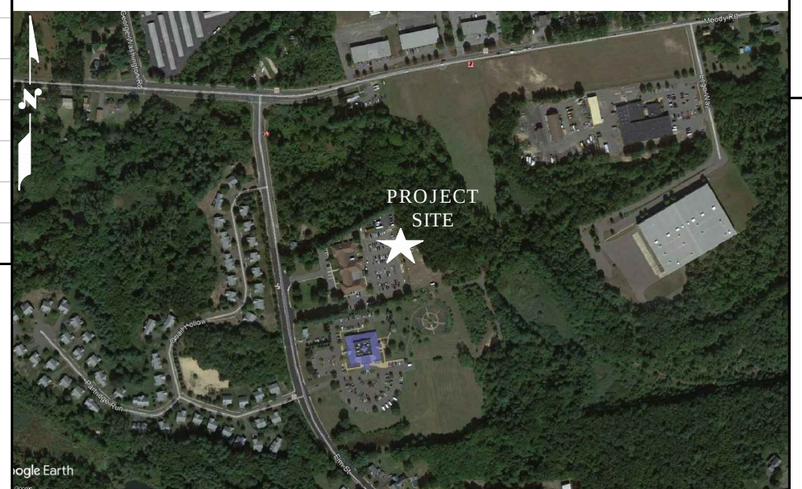
PROJECT: NSB

DRAWING INDEX

VICINITY MAP

DIRECTIONS TO SITE:

GET ON I-90 W, HEAD NORTHWEST TOWARD LEGGATT MCCALL CONN, TURN LEFT ONTO LEGGATT MCCALL CONN, CONTINUE ONTO BURR ST, TURN LEFT ONTO COCHITUATE RD, USE THE RIGHT LANE TO TAKE THE RAMP TO I-90 E/MASSPIKE W/SPRINGFIELD/BOSTON, (TOLL ROAD), KEEP LEFT AT THE FORK, FOLLOW SIGNS FOR I-90 W/WORCESTER/SPRINGFIELD AND MERGE ONTO I-90 W, (TOLL ROAD), CONTINUE ON I-90 W TO ENFIELD. TAKE EXIT 48 FROM I-91 S, MERGE ONTO I-90 W, (TOLL ROAD), TAKE EXIT 6 FOR I-291 TOWARD SPRINGFIELD/HARTFORD CONNECTICUT, USE THE MIDDLE 2 LANES TO CONTINUE TOWARD I-291 W, USE THE LEFT 2 LANES TO TURN LEFT ONTO I-291 W (SIGNS FOR INTERSTATE 291 W/INTERSTATE 91/SPRINGFIELD), USE THE RIGHT 3 LANES TO TAKE EXIT 1A-2A TO MERGE ONTO I-91 S, ENTERING CONNECTICUT, TAKE EXIT 48 FOR CT-220/ELM ST TOWARD THOMPSONVILLE, FOLLOW ELM ST TO YOUR DESTINATION, TURN LEFT ONTO CT-220 E/ELM ST, TURN RIGHT ONTO ELM ST, TURN RIGHT TO STAY ON ELM ST, TURN LEFT



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

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

12 INDUSTRIAL WAY
SALEM, NH 03079

SITE NUMBER: CT1401
SITE NAME: ENFIELD CT

293 ELM STREET
ENFIELD, CT 06082
HARTFORD COUNTY

550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
3	12/30/20	ISSUED FOR REVIEW	AR	JC	DPH
2	12/10/20	ISSUED FOR REVIEW	CC	JC	DPH
1	11/13/20	ISSUED FOR REVIEW	CC	JC	DPH
0	10/14/20	ISSUED FOR REVIEW	CC	JC	DPH

SCALE: AS SHOWN | DESIGNED BY: JC | DRAWN BY: CC

AT&T

TITLE SHEET
(NSB)

SITE NUMBER	DRAWING NUMBER	REV
CT1401	T-1	3

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.

2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.

3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81 STANDARDS) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.

4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.

5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS AND #2 AWG STRANDED COPPER FOR OUTDOOR BTS.

6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.

7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.

8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO GROUND BAR.

9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.

11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

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

   CONTRACTOR – SAI
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – AT&T MOBILITY

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.

3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.

7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.

9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.

10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.

11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

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

17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

20. **APPLICABLE BUILDING CODES:**
    SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

    BUILDING CODE: IBC 2015 WITH 2018 CT STATE BUILDING CODE AMENDMENTS
    ELECTRICAL CODE: 2017 NATIONAL ELECTRICAL CODE (NFPA 70-2017)

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

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

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

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

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

ABBREVIATIONS

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

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SITE NAME: ENFIELD CT

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SCALE: AS SHOWN | DESIGNED BY: JC | DRAWN BY: CC

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GENERAL NOTES
(NSB)

SITE NUMBER	DRAWING NUMBER	REV
CT1401	GN-1	3

STRUCTURAL NOTES:

1. DESIGN REQUIREMENTS ARE PER STATE BUILDING CODE AND APPLICABLE SUPPLEMENTS, INTERNATIONAL BUILDING CODE, EIA/TIA-222-G 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 UON.
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 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 DI.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"x1 5/8"x12GA, 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"ø 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
N/A	ENGINEER OF RECORD APPROVED SHOP DRAWINGS [1]
N/A	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:	

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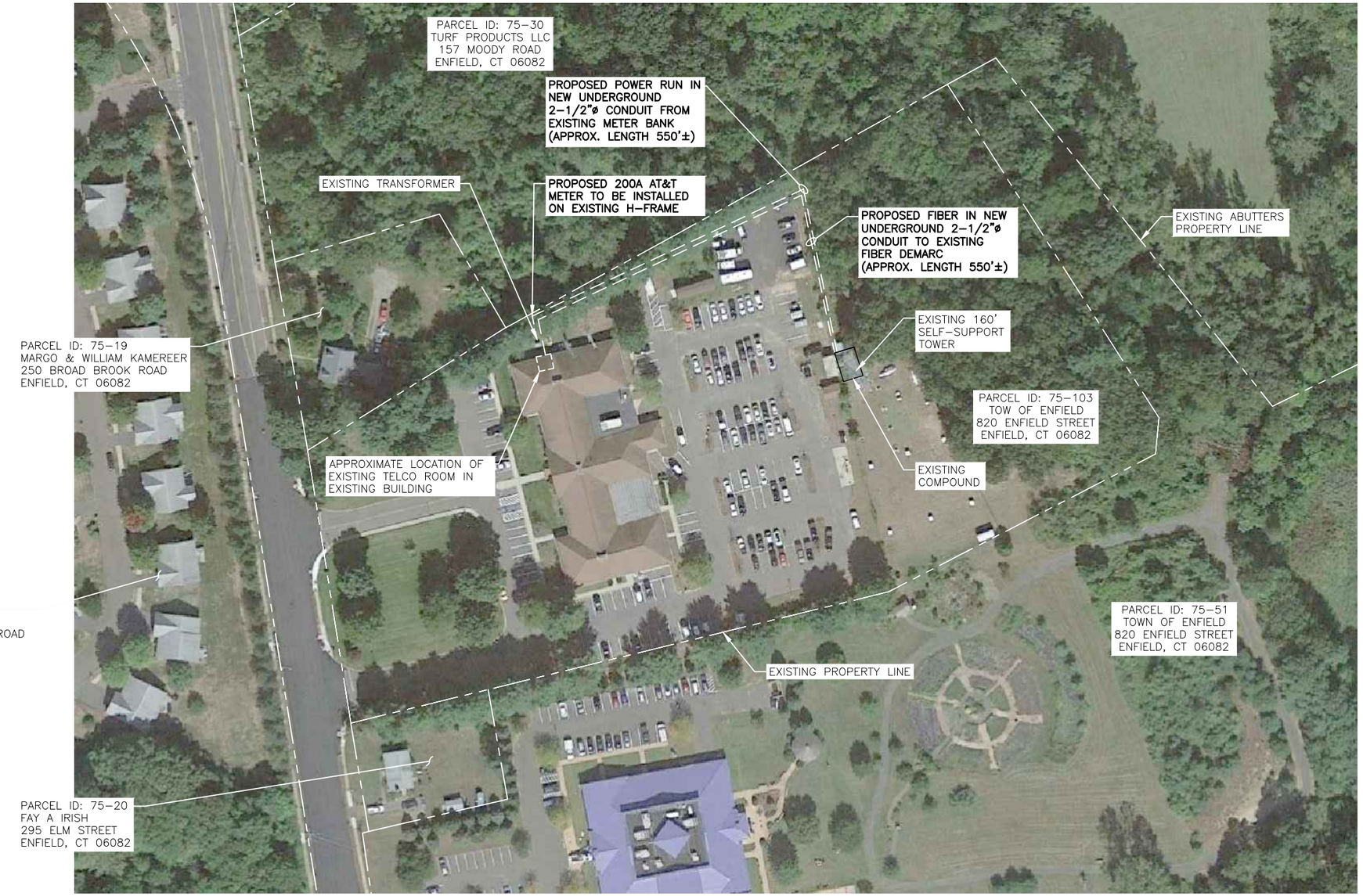
STRUCTURAL NOTES
(NSB)

SITE NUMBER	DRAWING NUMBER	REV
CT1401	SN-1	3



SITE PLAN (1 / C-1)
22x34 SCALE: 1"=30'
11x17 SCALE: 1"=60'

0 15' 30' 60' 90'

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SITE PLAN
(NSB)

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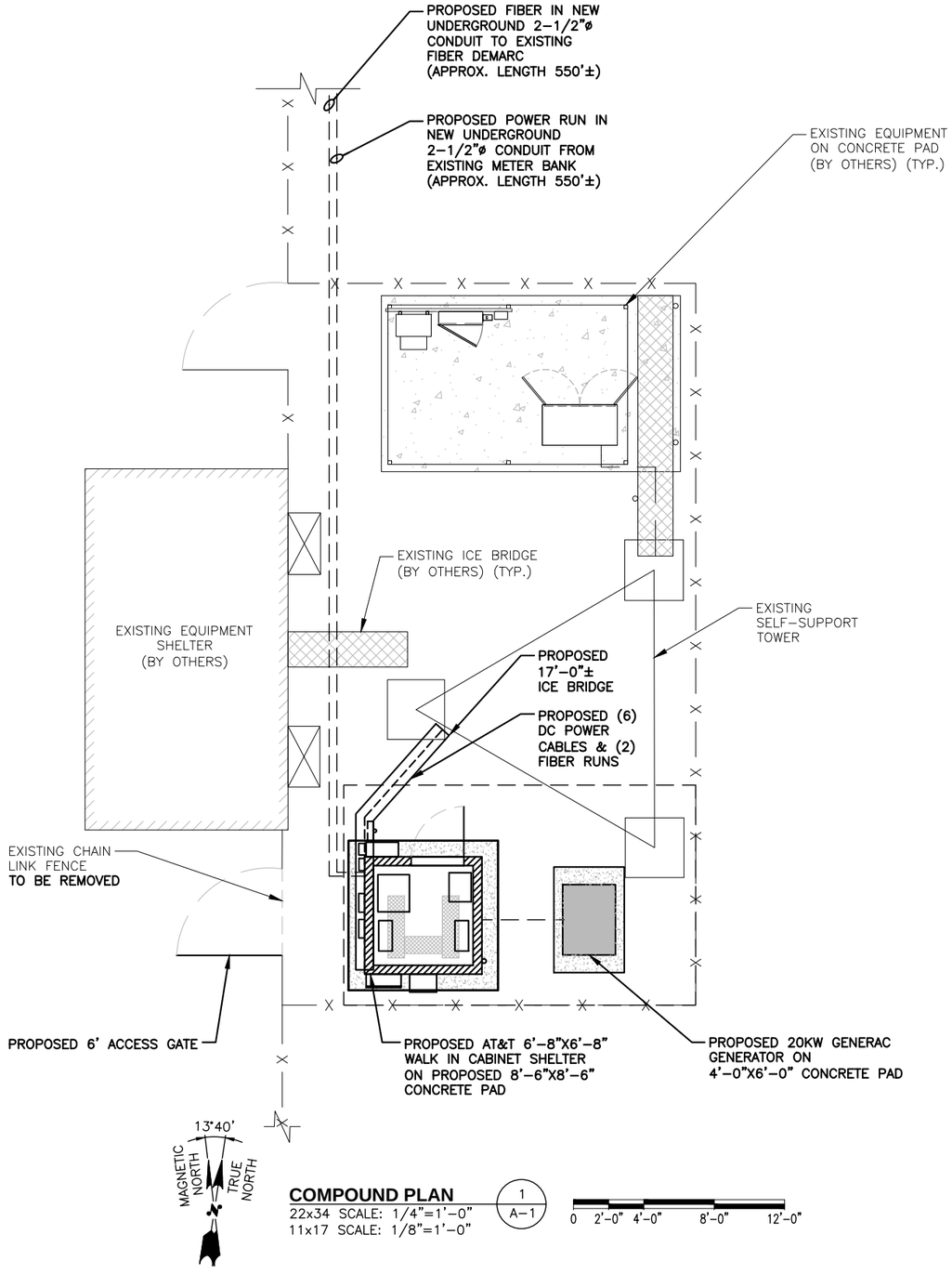


COMPOUND PLAN (1 / A–1)
22x34 SCALE: 1/4"=1'–0"
11x17 SCALE: 1/8"=1'–0"

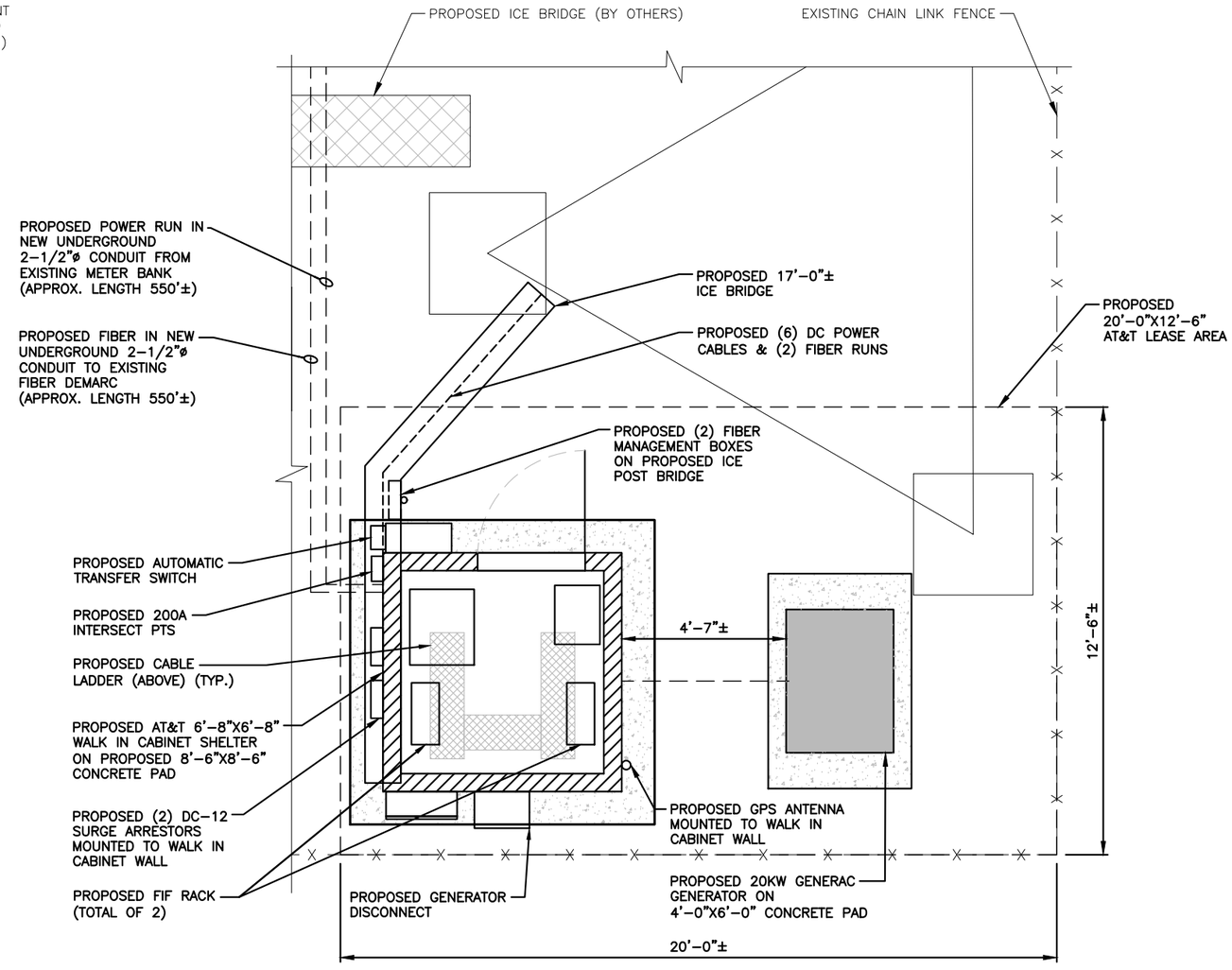
0 2'–0" 4'–0" 8'–0" 12'–0"

NOTE:

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

NOTE:

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



EQUIPMENT PLAN (2 / A–1)
22x34 SCALE: 3/4"=1'–0"
11x17 SCALE: 3/8"=1'–0"

0 8" 1'–4" 2'–8" 4'–0"

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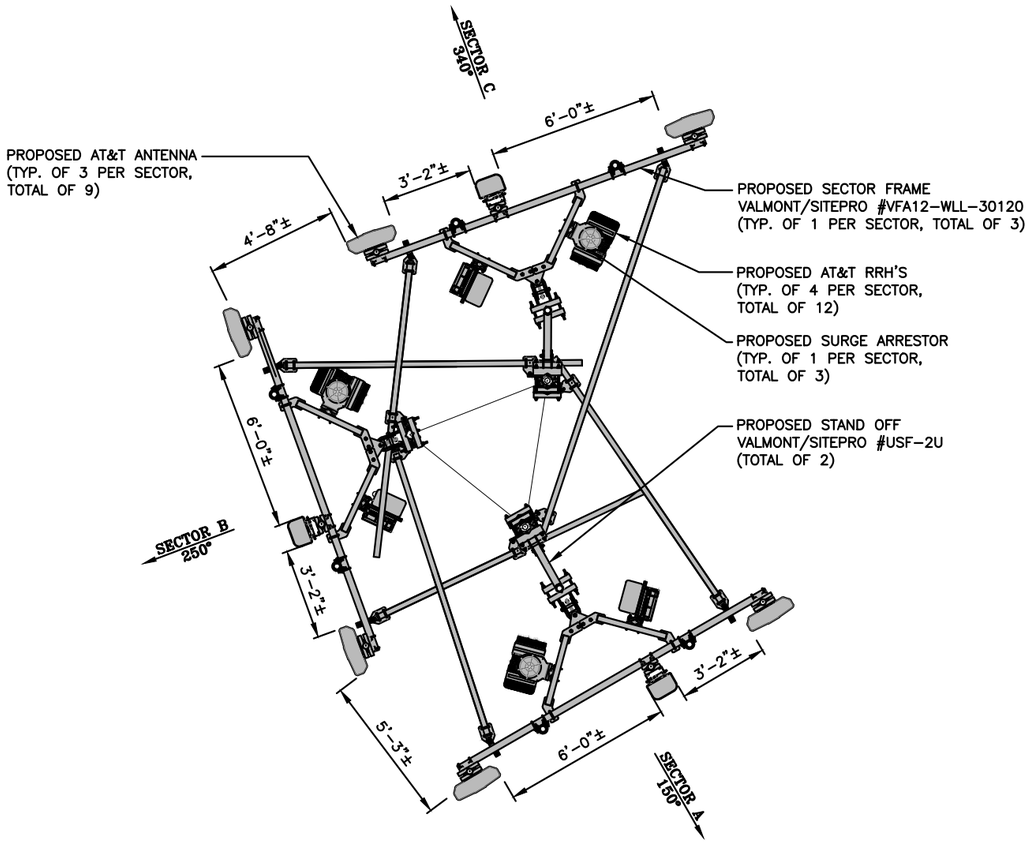
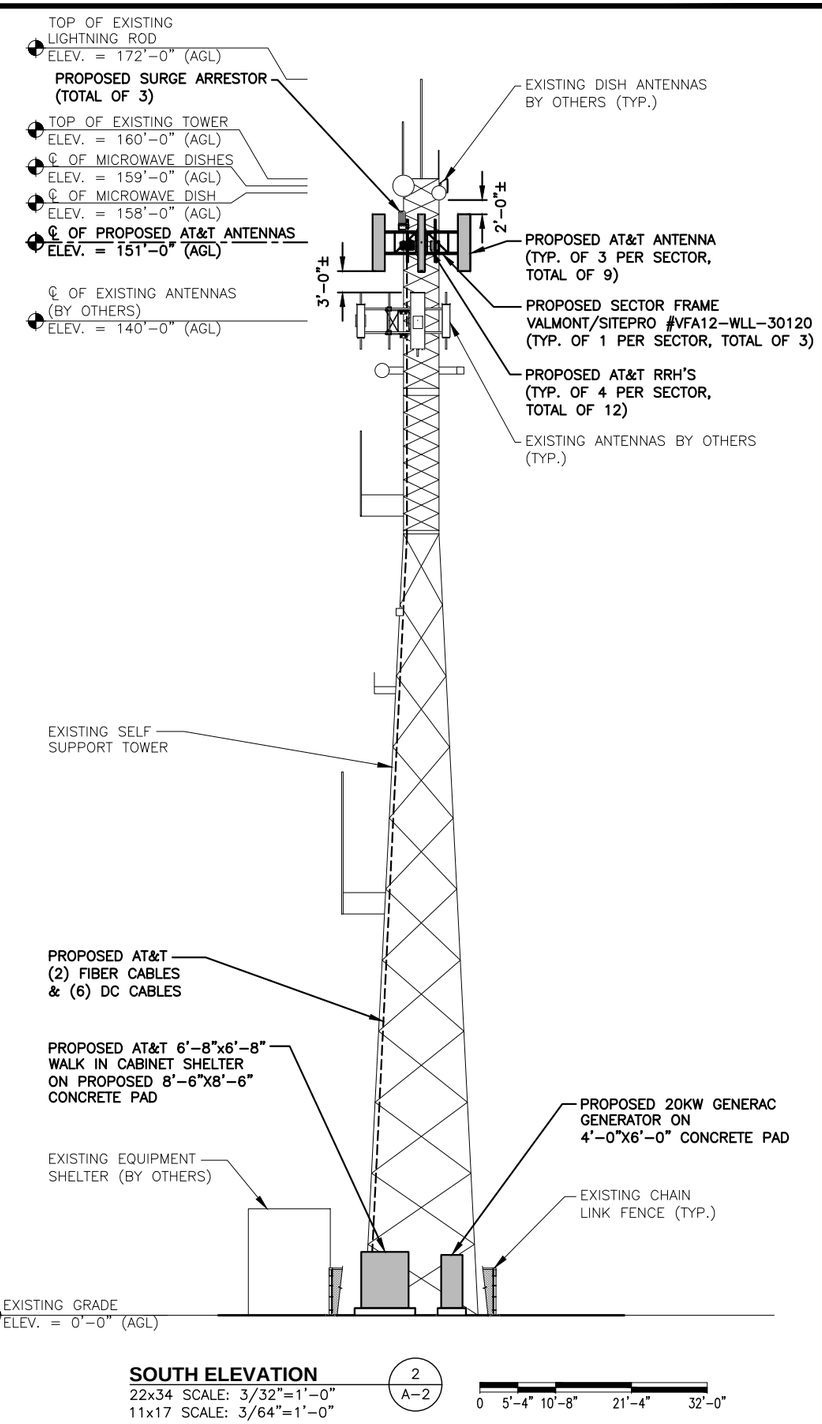
COMPOUND & EQUIPMENT PLANS (NSB)

SITE NUMBER	DRAWING NUMBER	REV
CT1401	A–1	3



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



SOUTH ELEVATION (2 / A-2)
22x34 SCALE: 3/32"=1'-0"
11x17 SCALE: 3/64"=1'-0"

0 5'-4" 10'-8" 21'-4" 32'-0"

NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING **ANTENNA MOUNT** TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY: HUDSON DESIGN GROUP, LLC. DATED: NOVEMBER 5, 2020.

NOTE:

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

NOTE:

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

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ANTENNA LAYOUT & ELEVATIONS
(NSB)

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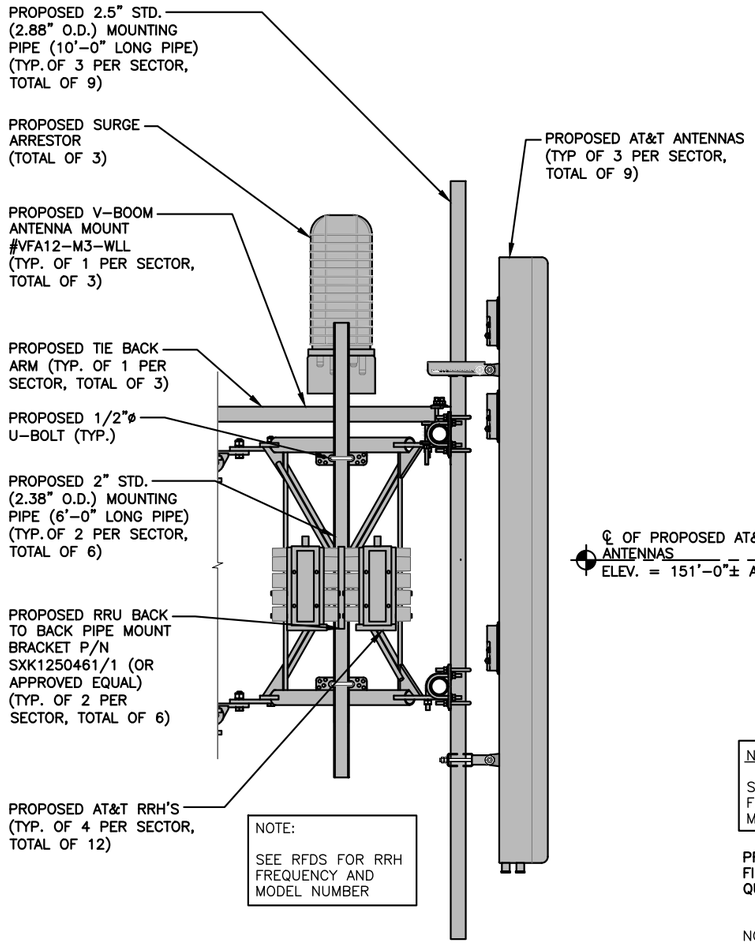


PROPOSED SECTOR FRAME, ANTENNA,SURGE SUPPRESSOR & RRH'S MOUNTING DETAIL (2 / A-3)
SCALE: N.T.S

℄ OF PROPOSED AT&T ANTENNAS
ELEV. = 151'-0"± A.G.L

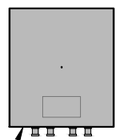
ANTENNA SCHEDULE

SECTOR	EXISTING/ PROPOSED	BAND	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA ℄ HEIGHT	AZIMUTH	TMA/ DIPLEXER	RRU	SIZE (INCHES) (L x W x D)	FEEDER	RAYCAP
A1	PROPOSED	LTE B14/AWS	EPBQ-654L8H8-L2	96X21X6.3	151'-0"	150°	–	(P) (1) B14 4478	18.1X13.4X8.3	(2) DC POWER CABLES & (1) FIBER RUN	(P) (1) RAYCAP DC6-48-60-18-8C
A2	PROPOSED	LTE DE/WCS	HPA65R-BU8A	96X11.7X7.6	151'-0"	150°	–	(P) (1) 4415 B30	16.5X13.4X5.9 20.4X18.5X7.5		
A3	PROPOSED	LTE 700 BC/580/PCS	EPBQ-654L8H8-L2	96X21X6.3	151'-0"	150°	–	(P) (1) 4449 B5/B12 (P) (1) 8843 B2/B66A	14.9X13.2X10.4 14.9X13.2X10.9		
A4	–	–	–	–	–	–	–	–	–		
B1	PROPOSED	LTE B14/AWS	EPBQ-654L8H8-L2	96X21X6.3	151'-0"	250°	–	(P) (1) B14 4478	18.1X13.4X8.3	(2) DC POWER CABLES & (1) FIBER RUN	(P) (1) RAYCAP DC6-48-60-18-8C
B2	PROPOSED	LTE DE/WCS	HPA65R-BU8A	96X11.7X7.6	151'-0"	250°	–	(P) (1) 4415 B30	16.5X13.4X5.9 20.4X18.5X7.5		
B3	PROPOSED	LTE 700 BC/580/PCS	EPBQ-654L8H8-L2	96X21X6.3	151'-0"	250°	–	(P) (1) 4449 B5/B12 (P) (1) 8843 B2/B66A	14.9X13.2X10.4 14.9X13.2X10.9		
B4	–	–	–	–	–	–	–	–	–		
C1	PROPOSED	LTE B14/AWS	EPBQ-654L8H8-L2	96X21X6.3	151'-0"	340°	–	(P) (1) B14 4478	18.1X13.4X8.3	(2) DC POWER CABLES	(P) (1) RAYCAP DC6-48-60-0-8C-EV
C2	PROPOSED	LTE DE/WCS	HPA65R-BU8A	96X11.7X7.6	151'-0"	340°	–	(P) (1) 4415 B30	16.5X13.4X5.9 20.4X18.5X7.5		
C3	PROPOSED	LTE 700 BC/580/PCS	EPBQ-654L8H8-L2	96X21X6.3	151'-0"	340°	–	(P) (1) 4449 B5/B12 (P) (1) 8843 B2/B66A	14.9X13.2X10.4 14.9X13.2X10.9		
C4	–	–	–	–	–	–	–	–	–		

FINAL ANTENNA SCHEDULE (1 / A-3)
SCALE: N.T.S

NOTE:

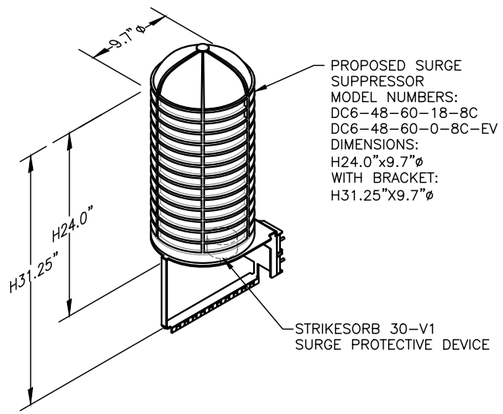
SEE RFDS FOR RRH FREQUENCY AND MODEL NUMBER



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

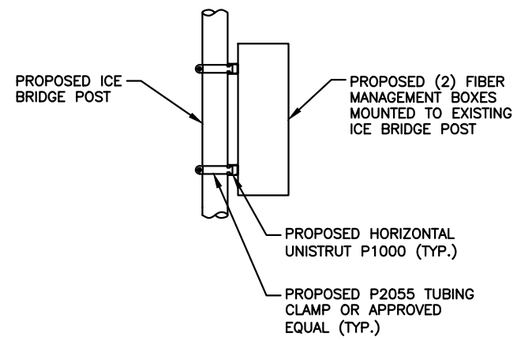
NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

PROPOSED RRUS DETAIL (3 / A-3)
SCALE: N.T.S



NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

DC SURGE SUPPRESSOR DETAIL (4 / A-3)
SCALE: N.T.S



PROPOSED FIBER MANAGEMENT BOX MOUNTING DETAIL (5 / A-3)
SCALE: N.T.S

HUDSON Design Group LLC
45 BEECHWOOD DRIVE
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FAX: (978) 336-5586

12 INDUSTRIAL WAY
SALEM, NH 03079

SITE NUMBER: CT1401
SITE NAME: ENFIELD CT

293 ELM STREET
ENFIELD, CT 06082
HARTFORD COUNTY

at&t
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
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0	10/14/20	ISSUED FOR REVIEW	CC	JC	DPH

SCALE: AS SHOWN | DESIGNED BY: JC | DRAWN BY: CC

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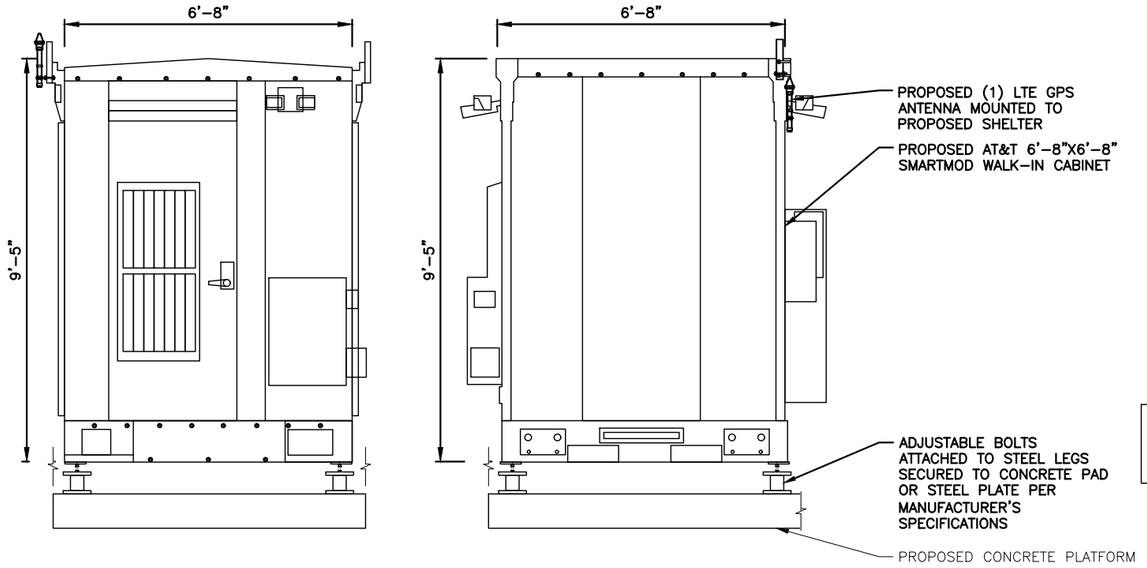
DETAILS
(NSB)

SITE NUMBER	DRAWING NUMBER	REV
CT1401	A-3	3

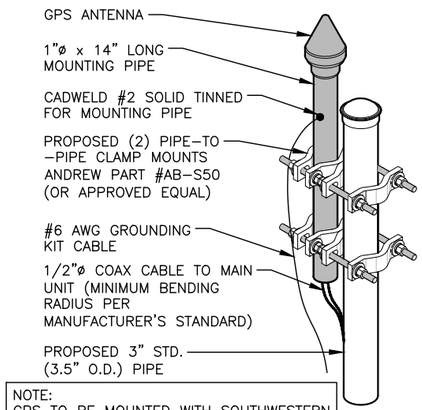


NOTE:
SHELTER SHALL BE MOUNTED PER MANUFACTURER'S SPECIFICATIONS.

TYPICAL SHELTER DETAIL (1 / A-4)
SCALE: N.T.S

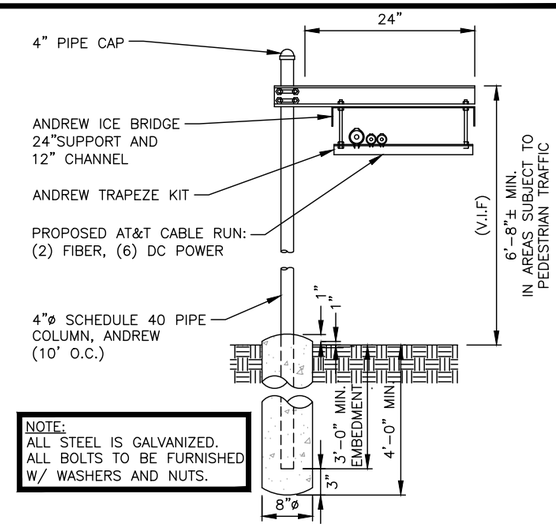
20 KW GENERATOR DIMENSIONS	
MODEL #	**G007098-0**
MANUF.	GENERAC
HEIGHT	90"
WIDTH	36"
LENGTH	48"

GENERATOR DETAIL (4 / A-4)
SCALE: N.T.S



NOTE:
GPS TO BE MOUNTED WITH SOUTHWESTERN EXPOSURE. (MIN. OF 10' AWAY FROM EXISTING GPS ANTENNA)

GPS MOUNTING DETAIL (2 / A-4)
N.T.S

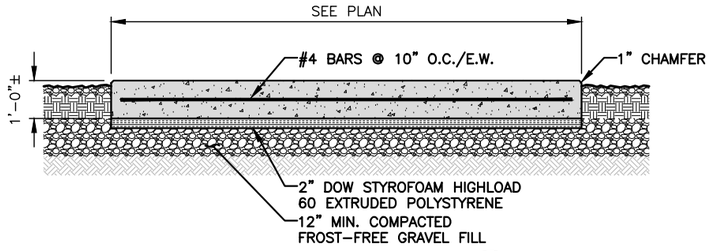


NOTE:
ALL STEEL IS GALVANIZED.
ALL BOLTS TO BE FURNISHED W/ WASHERS AND NUTS.

ICE BRIDGE DETAIL (3 / A-4)
SCALE: N.T.S

FOUNDATION NOTES & CONCRETE SPECIFICATIONS:

1. FOUNDATION AREA SHALL BE EXCAVATED TO THE DEPTH AND DIMENSIONS SHOWN ON THE PLANS. EXISTING LEDGE AND ALL OTHER EXISTING UNSUITABLE MATERIAL SHALL BE REMOVED AND LEGALLY DISPOSED OF OFF-SITE. THE SUBGRADE SHALL BE ROLLED WITH A 1-TON, VIBRATORY, WALK-BEHIND ROLLER AT A SPEED OF LESS THAN 2 FPS, 6 PASSES MINIMUM, TO PROVIDE UNYIELDING SURFACE.
2. UNDERCUT SOFT OR "WEAVING" AREAS A MINIMUM OF 12 INCHES DEEP. BACKFILL UNDERCUT AREA WITH FILL MEETING THE SPECIFICATIONS OF STRUCTURAL FILL.
3. CONCRETE TO HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH (f'c)=4000 psi. CONCRETE TO BE AIR ENTRAINED, DESIRED AIR CONTENT TO BE 6% (PLUS OR MINUS 2%)
4. REINFORCING BAR TO BE ASTM A615 GRADE 60.
5. WELDED WIRE FABRIC TO CONFORM TO THE REQUIREMENTS OF ASTM A185. WIRES FOR FABRIC TO CONFORM TO THE REQUIREMENTS OF ASTM A82.
6. COORDINATE WITH MANUFACTURER OF PREFABRICATED SHELTER FOR LOCATION OF ATTACHMENTS TO BASE SLAB.
7. ALL REINFORCING TO HAVE MINIMUM CONCRETE COVER PER ACI SPECIFICATIONS.
8. ALL CONCRETE MATERIALS AND WORKMANSHIP SHALL CONFORM TO LATEST EDITION OF ACI 318 AND APPLICABLE STATE BUILDING CODE.

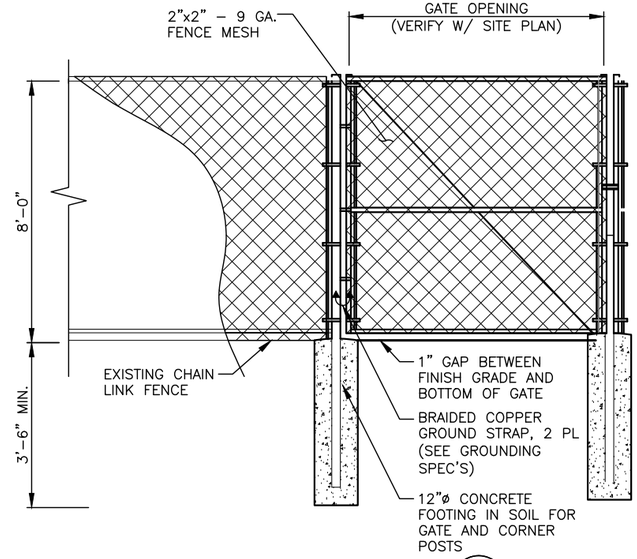


CONCRETE PAD DETAIL (5 / A-4)
22x34 SCALE: N.T.S

FENCE NOTES

1. ALTERNATE FOOTINGS FOR ALL FENCE POSTS IN LEDGE: IF LEDGE IS ENCOUNTERED AT GRADE, OR AT A DEPTH SHALLOWER THAN 3'-6", CORE DRILL AN 8" DIA HOLE 18" INTO THE LEDGE. CENTER POST IN THE HOLE AND FILL WITH CONCRETE OR GROUT. IF LEDGE IS BELOW FINISH GRADE, COAT BACKFILLED SECTION OF POST WITH COAL TAR, AND BACKFILL WITH WELL-DRAINING GRAVEL.

2. ATTACH EACH GATE WITH 1-1/2 PAIR OF NON-LIFT-OFF TYPE, MALLEABLE IRON OR FORGING, PIN-TYPE HINGES. ASSEMBLIES SHALL ALLOW FOR 180° OF GATE TRAVEL.



CHAINLINK FENCE DETAIL (6 / A-4)
SCALE: N.T.S

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SCALE: AS SHOWN | DESIGNED BY: JC | DRAWN BY: CC

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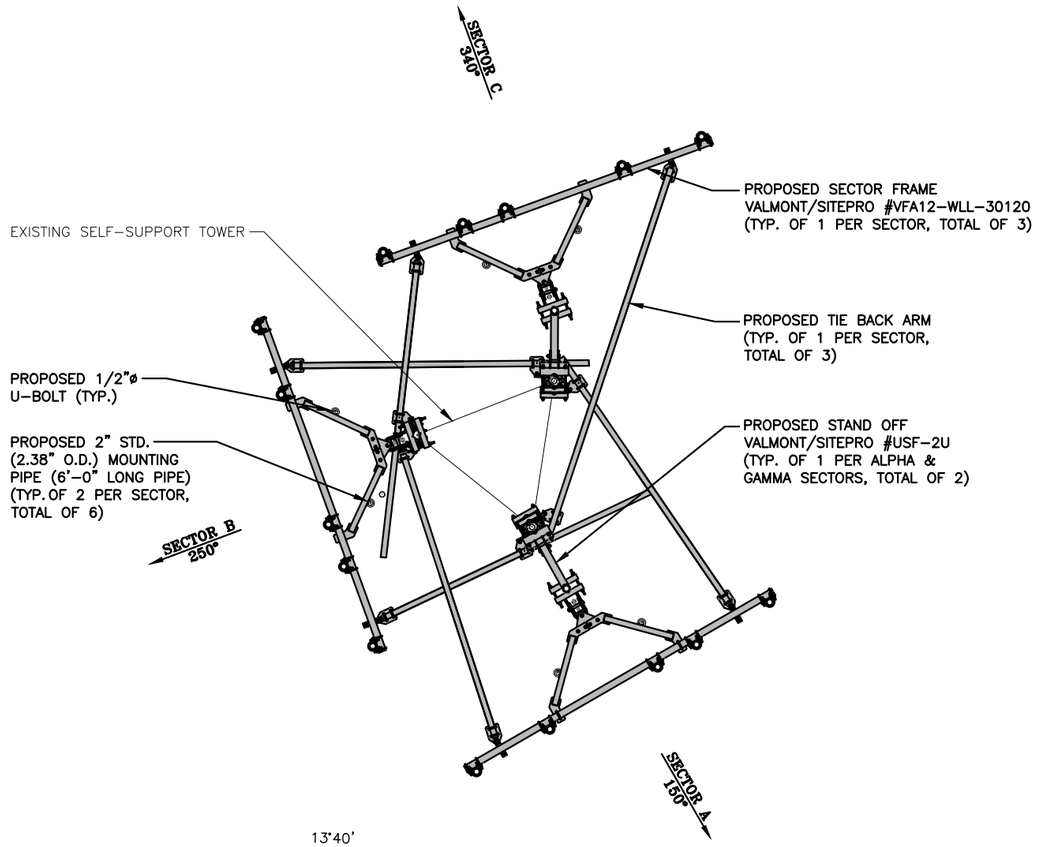
DETAILS
(NSB)

SITE NUMBER	DRAWING NUMBER	REV
CT1401	A-4	3

NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING **ANTENNA MOUNT** TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY:
HUDSON DESIGN GROUP, LLC.
DATED: NOVEMBER 5, 2020.



PROPOSED MOUNT MODIFICATIONS (1 / S-1)
SCALE: N.T.S

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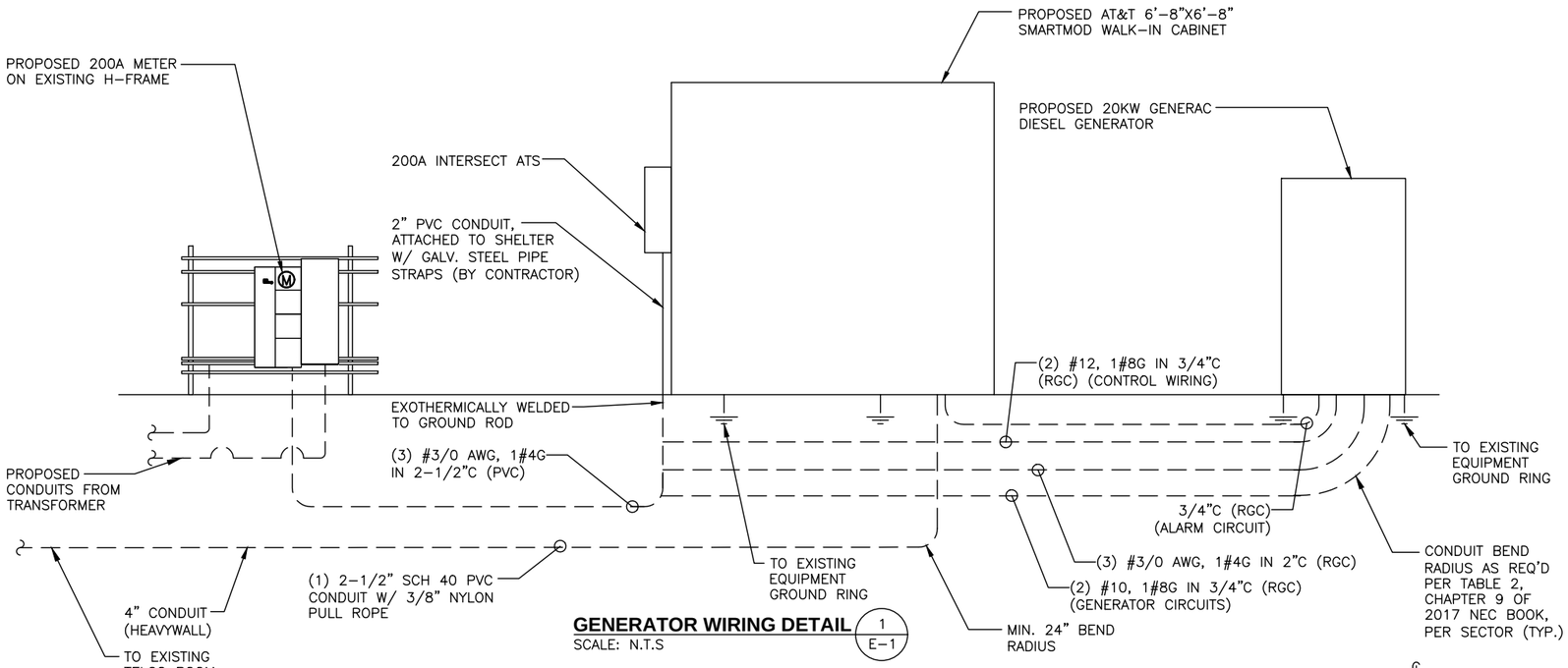
MOUNT MODIFICATION DETAILS
(NSB)

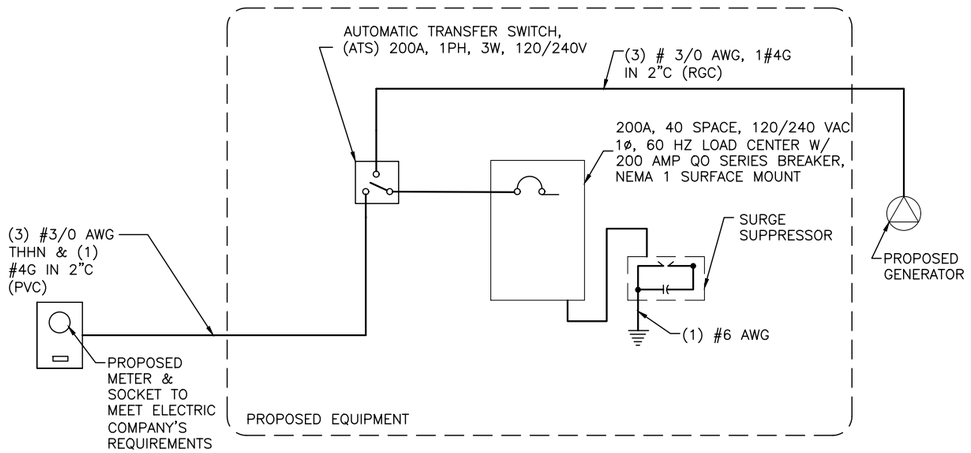
SITE NUMBER	DRAWING NUMBER	REV
CT1401	S-1	3

NOTES:

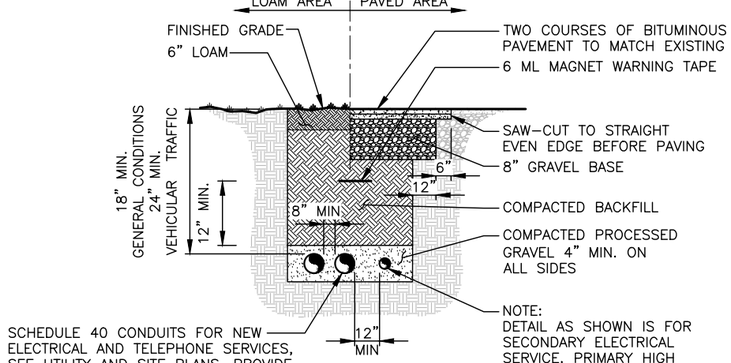
1. GROUND [ATS] TO EXISTING GROUND BAR
2. GROUND GENERATOR TO EXISTING GROUND RING WITH (2) #2 AWG GROUND WIRES.



GENERATOR WIRING DETAIL 1 / E-1
SCALE: N.T.S



TYPICAL ONE-LINE DIAGRAM 2 / E-1
SCALE: N.T.S



SCHEDULE 40 CONDUITS FOR NEW ELECTRICAL AND TELEPHONE SERVICES, SEE UTILITY AND SITE PLANS. PROVIDE APPROVED PULL BOXES AS REQUIRED AND COORDINATE INSTALLATION W/ ALL UTILITY COMPANIES FOR INTERFACING AT TERMINATION POINTS. PROVIDE FULL LENGTH PULL ROPES (TYP.)

INSTALL (2) PULL STRINGS AND CAP THE TELCO CONDUITS INSIDE THE VAULT AND MESA CABINET TO AVOID WATER/ICE FILL UP.

BURIED CONDUIT DETAIL 3 / E-1
SCALE: N.T.S

ELECTRICAL LEGEND & ABBREVIATIONS

	NEW PANEL BOARD, SURFACE MOUNTED
	EXISTING PANEL BOARD, SURFACE MOUNTED
T	DRY TYPE TRANSFORMER
M	METER
	CIRCUIT BREAKER
	NON-FUSIBLE DISCONNECT SWITCH, MOUNTED 54" A.F.F.
F	FUSIBLE DISCONNECT SWITCH, MOUNTED 54"A.F.F.
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR WITH BUILT-IN FUSES, SURFACE MOUNTED
	DUPLEX OUTLET, SURFACE MOUNTED, 20 AMPS, 125 VOLTS, SINGLE PHASE
J	JUNCTION BOX, SURFACE MOUNTED 18" A.F.F.
	EXPOSED WIRING
	HOME RUNS, MINIMUM 2#10 + 1#8G IN 3/4" CONDUIT U.O.N.
A.F.F.	ABOVE FINISHED FLOOR
U.O.N.	UNLESS OTHERWISE NOTED
WP	WEATHERPROOF
GFI	GROUND FAULT INTERRUPTER
A	AMPERE
V	VOLT
KWH	KILOWATT – HOUR
C	CONDUIT
PVC	POLYVINYL CHLORIDE
HZ	HERTZ
PH, ø	PHASE
W	WATTS
NEC	NATIONAL ELECTRIC CODE
PPC	POWER PROTECTION CABINET
UL	UNDERWRITER LABORATORIES
PTS	POWER TRANSFER SWITCH
QO	QUICK OPEN
GRC	GALVANIZED RIGID CONDUIT
G	GROUND
	GROUND
MGB	MASTER GROUND BAR — ○ MECHANICAL CONNECTION ● CADWELD CONNECTION
EGB	EQUIPMENT GROUND BAR
G	GROUND COPPER WIRE, SIZE AS NOTED
	EXPOSED WIRING
	COAXIAL CABLE
	5/8"x8" COPPER CLAD STAINLESS STEEL GROUND ROD
	● EXOTHERMIC (CAD WELD) OR ○ MECHANICAL (COMPRESSION TYPE) CONNECTION
PF	POWER FACTOR

ELECTRICAL AND GROUNDING NOTES

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATION INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
5. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
6. BURIED CONDUIT SHALL BE SCHEDULE 40 PVC.
7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THININSULATION.
8. RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE PPC AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
9. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON THIS DRAWING PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
10. WHERE CONDUIT BETWEEN BTS AND PROJECT OWNER CELL SITE PPC AND BETWEEN BTS AND PROJECT OWNER CELL SITE TELCO SERVICE CABINET ARE UNDERGROUND USE PVC, SCHEDULE 40 CONDUIT. ABOVE THE GROUND PORTION OF THESE CONDUITS SHALL BE PVC CONDUIT.
11. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
12. PPC SUPPLIED BY PROJECT OWNER.
13. GROUNDING SHALL COMPLY WITH NEC ART. 250.
14. GROUND COAXIAL CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
15. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.
16. ALL GROUND CONNECTIONS TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
17. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 6 FEET OF PROJECT OWNER EQUIPMENT OR CABINET TO MASTER GROUND BAR OR GROUNDING RING.
18. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
19. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
20. BOND ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.
21. BOND ANTENNA EGB'S AND MGB TO GROUND RING.
22. CONTRACTOR SHALL TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION. 5 OHMS MINIMUM RESISTANCE REQUIRED.
23. CONTRACTOR SHALL CONDUCT ANTENNA, COAX, AND LNA RETURN-LOSS AND DISTANCE-TO-FAULT MEASUREMENTS (SWEEP TESTS) AND RECORD RESULTS FOR PROJECT CLOSE OUT.
24. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2" 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.

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SCALE: AS SHOWN | DESIGNED BY: JC | DRAWN BY: CC

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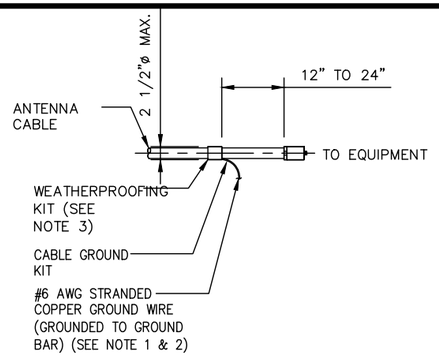
ELECTRICAL NOTES & ONE-LINE DIAGRAM (NSB)

SITE NUMBER	DRAWING NUMBER	REV.
CT1401	E-1	3

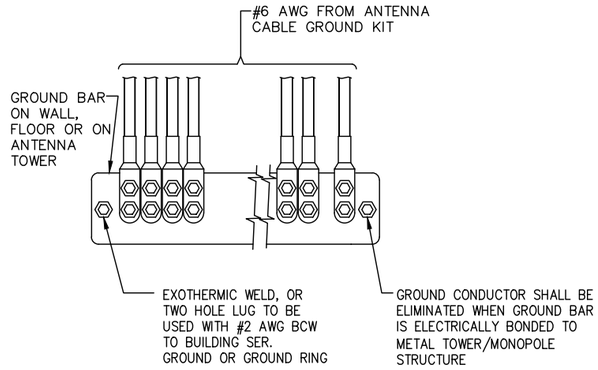


NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE SUPPLIED WITH KIT. COLD SHRINK SHALL NOT BE USED.

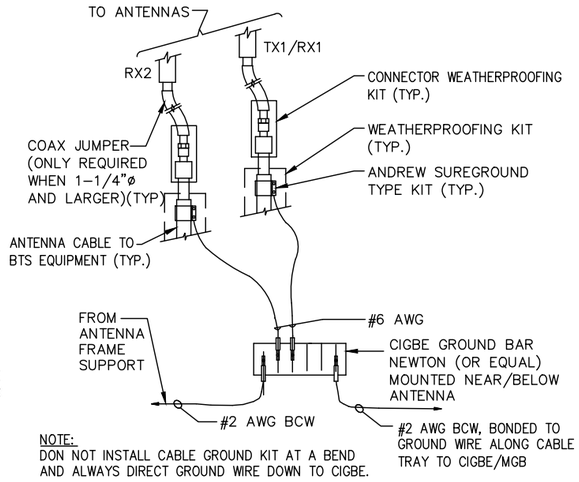
CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

SCALE: N.T.S — 1 / G-1



INSTALLATION OF GROUND WIRE TO GROUND BAR

SCALE: N.T.S — 2 / G-1



NOTE:
DON NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

INSTALLATION OF GROUND WIRE TO GROUNDING BAR TOWER

SCALE: N.T.S — 3 / G-1

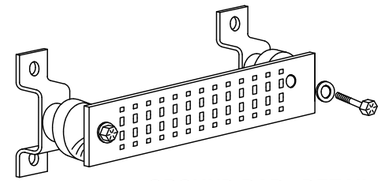
EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

SECTION "P" – SURGE PRODUCERS

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

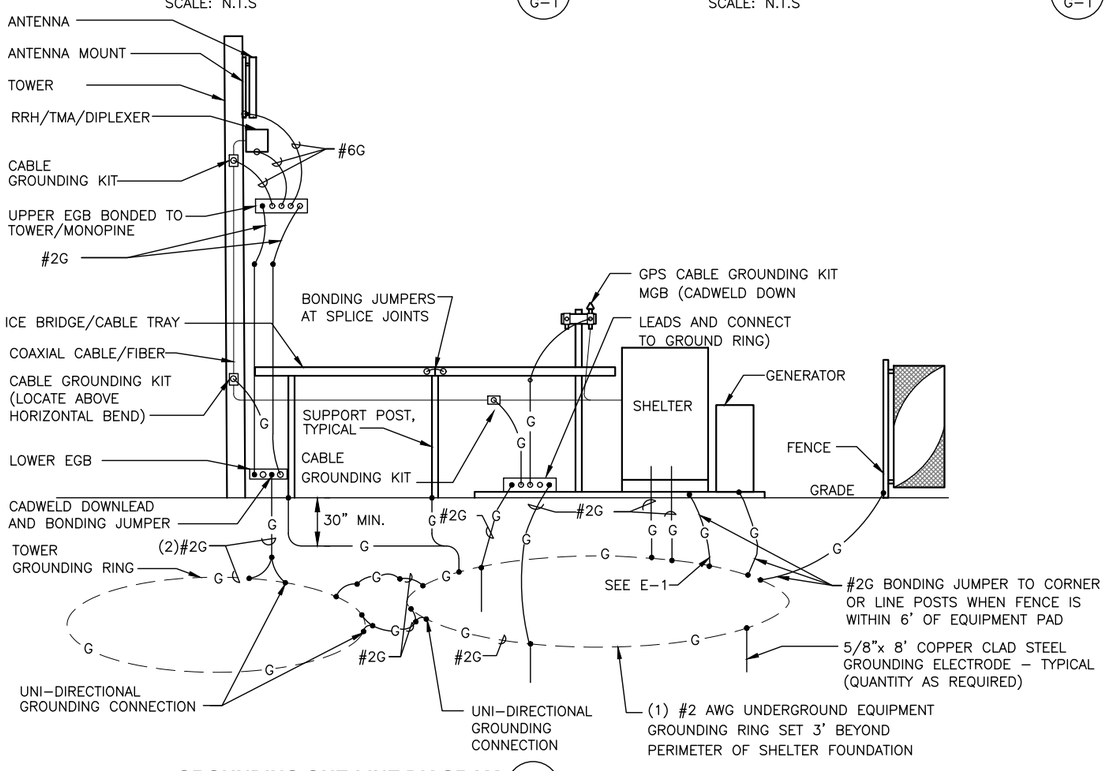
SECTION "A" – SURGE ABSORBERS

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



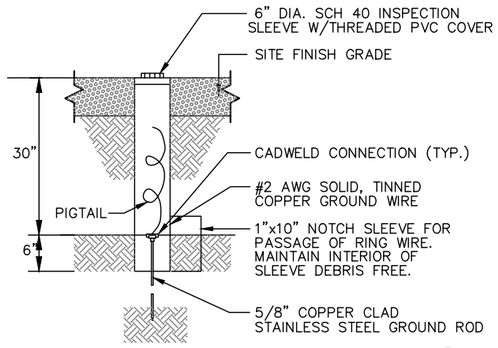
GROUND BAR - DETAIL

SCALE: N.T.S — 4 / G-1



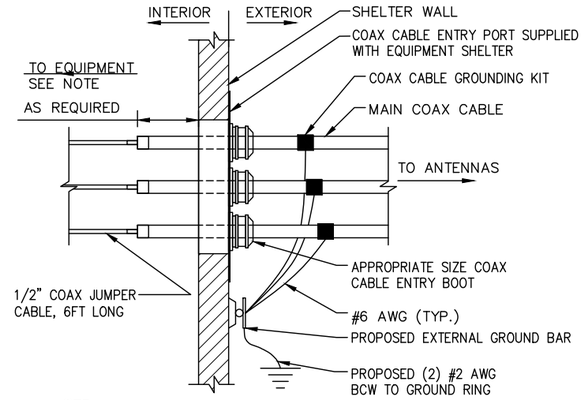
GROUNDING ONE-LINE DIAGRAM

SCALE: N.T.S — 5 / G-1



GROUND ROD TEST WELL DETAIL

SCALE: N.T.S — 6 / G-1



NOTE:
EXTEND MAIN COAXIAL CABLE AS CLOSE AS POSSIBLE TO BTS EQUIPMENT. MAX LENGTH OF BTS JUMPER IS 6 FT.

INSTALLATION OF GROUND WIRE TO GROUND BAR

SCALE: N.T.S — 7 / G-1

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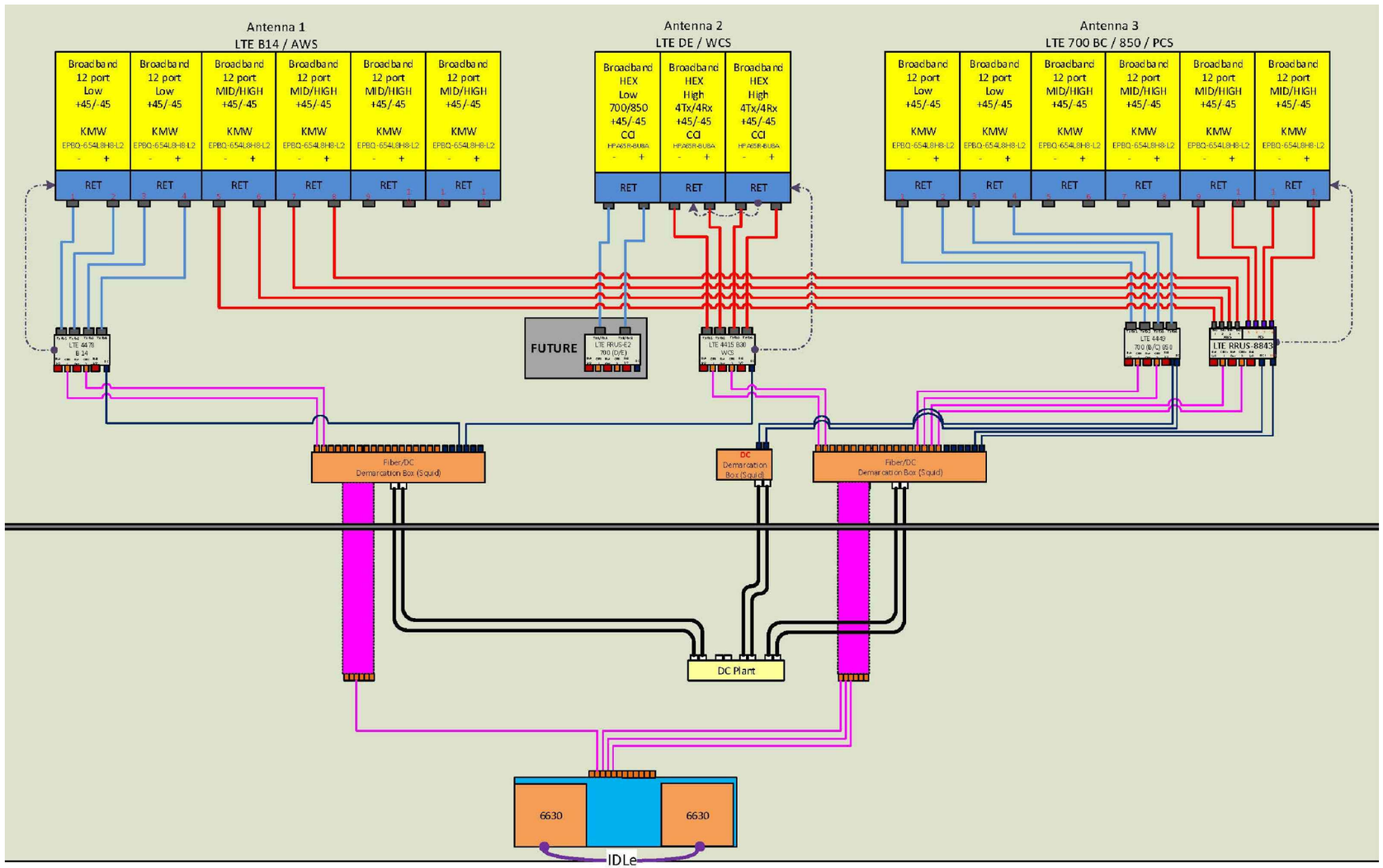
SCALE: AS SHOWN | DESIGNED BY: JC | DRAWN BY: CC

AT&T

GROUNDING DETAILS (NSB)

SITE NUMBER	DRAWING NUMBER	REV
CT1401	G-1	3



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

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

NOTE:

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

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ENFIELD, CT 06082
HARTFORD COUNTY

at&t
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
3	12/30/20	ISSUED FOR REVIEW	AR	JC	DPH
2	12/10/20	ISSUED FOR REVIEW	CC	JC	DPH
1	11/13/20	ISSUED FOR REVIEW	CC	JC	DPH
0	10/14/20	ISSUED FOR REVIEW	CC	JC	DPH

SCALE: AS SHOWN | DESIGNED BY: JC | DRAWN BY: CC

AT&T

RF PLUMBING DIAGRAM
(NSB)

SITE NUMBER	DRAWING NUMBER	REV
CT1401	RF–1	3

ATTACHMENT 3

AECOM

Submitted to
SAI Communications, Inc.
12 Industrial Way
Salem, NH 03079

Submitted by
AECOM
1255 Broad St
Suite 201
Clifton, NJ 07013
December 2, 2020

DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 160’ SELF SUPPORTING LATTICE TOWER AND FOUNDATION FOR PROPOSED ANTENNA ARRANGEMENT

Site ID : CT1401
Site Address: 293 Elm Street
Enfield, CT

60629930
SAI-106 Rev. 1

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the existing 160' self-supporting lattice tower located at 293 Elm Street in Enfield, Connecticut.

The structural analysis was conducted in accordance with the 2018 Connecticut State Building Code which includes the TIA-222-G[1] Standard, 2015 International Building Code, the 2018 Connecticut State Building Code Amendments, the AISC[2] Load Resistance Factor Design (LRFD), and the ASCE 7[3] design Code.

The antenna loading considered in the analysis consists of all the existing antennas, transmission lines and ancillary items as outlined in the Introduction Section of this report.

The proposed AT&T antenna installation is listed below:

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
Install: **(6) KMW EPBQ-654L8H8-L2 Panel Antennas** **(3) CCI HPA65R-BU8A Panel Antennas** **(3) Ericsson 4478 B14 Remote Radio Head Units** **(3) Ericsson 4415 B30 Remote Radio Head Units** **(3) Ericsson 4449 B5/B12 Remote Radio Head Units** **(3) Ericsson 8843 B2/B66A Remote Radio Head Units** **(2) Raycap Fiber/DC Squid DC6-48-60-18-8C** **(1) Raycap DC Only Squid DC6-48-60-0-8C-EV** **(3) Valmont/SitePro VFA 12-WLL-30120 Sector Frame** **(2) Valmont/Site Pro USF-2U 24" Standoff Frame** **(2) 1/2" Fiber Trunks** **(6) 1" DC Trunks**	**AT&T (Proposed)**	**@ 151'**

The results of the analysis indicate that:

1. The existing steel tower structure IS considered structurally adequate for the proposed antenna loading with the wind classification specified above.
2. The existing tower anchor bolts ARE considered structurally adequate for the proposed antenna loading with the load classification specified above.
3. The existing foundation, regarding foundation overturning and soil bearing capacity IS considered structurally adequate for the proposed antenna loading with the load classification specified above. Foundation design checks related to the flexure of the pad, beam shear and punching shear of the pad and the tower leg supported columns were NOT ASSESSED within this analysis report due to the lack of supporting information to fairly assess under the design criteria as required within the TIA-222-G design Standard.
4. The controlling structural capacity for all tower and foundation components is **98.1 %**

1. TIA = Telecommunications Industry Association Structural Standard for Antenna Supporting Structures and Antennas (Version G)

2. AISC = American Institute of Steel Construction (14th Edition)

1. EXECUTIVE SUMMARY (continued)

This analysis is based on:

1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.
2) Structural Analysis performed by All-Points Technology Corporation, on behalf of Northeast Site Solutions, LLC, project number CT411260, signed and sealed on September 29, 2017.
3) Structural analysis performed by Hudson Design Group LLC on behalf of Centerline and T-Mobile, project number CTHA029A, signed and sealed on June 6, 2019.
4) Tower existing equipment obtained from the Enfield Police department, via Self-Support Tower Inventory mapping report, performed by Eastern Communications, Inc. dated April 8, 2020, obtained via e-mail dated April 8, 2020.
5) RFDS CT1401 from AT&T dated April 16, 2020.
6) Geotechnical Evaluation Report performed by Milone & Macbroom, project number 2657-16, dated July 8, 2020.
7) Previous structural analysis performed by AECOM on behalf of AT&T, project 60629930/CT1401, signed and sealed July 22, 2020.
8) Coaxial cable orientation as specified in Section 6 of this report.
9) Antenna inventory as specified in Section 2 and 6 of this report.

This report is only valid as per the assumptions and data utilized in this report for antenna inventory, mounts and associated cables. The user of this report shall field verify the antenna, cabling and mount configurations used, as well as the physical condition of the tower members, connections and foundations. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

If you should have any questions, please contact Mike Egan at (860) 263-5817.

Sincerely,

AECOM,

Richard A. Sambor, P.E.
Senior Structural Engineer

RAS/cmc

2. INTRODUCTION

The subject tower is located at 293 Elm Street in Enfield, Connecticut. The structure is a 160' self supporting lattice tower designed and manufactured by PiROD Inc.

The structural analysis was conducted in accordance with the following:

- TIA-222-G Standard for Standard for a wind velocity range of 100 mph – 120 mph (3-second gust) and 50 mph (3-second gust) concurrent with 1.00" ice thickness, considered to increase in thickness with height.
- 2015 International Building Code with 2018 Connecticut State Building Code Amendments for a wind speed of 101 mph (3-second gust)
- 2010 AISC Load Resistance Factor Design (LRFD)
- 2010 ASCE 7 Minimum Design Loads for Buildings and Other Structures for the ice thickness referenced in the TIA-222-G Standard

The inventory together with the proposed AT&T antenna arrangement is summarized in the table below:

Antenna Type	***Carrier***	***Mount***	***Antenna Centerline Elevation***	***Cable***
(1) Lightning Rod 5/8x4'	PD (existing)	-	172'	-
(1) 8' Omni Antenna	PD (existing)	3' Side Arm	160'	(1) 7/8"
(1) HPD3-4.7NS Dish	PD (existing)	3' Side Arm	159'	(2) 7/8"
(1) HPD2-4.7NS Dish	PD (existing)	3' Side Arm	159'	(2) 7/8"
(1) SPD2-5.2NS Dish	PD (existing)	3' Side Arm	158'	(2) 1/4" LMR
(6) KMW EPBQ-654L8H8-L2 Panel Antennas (3) CCI HPA65R-BU8A Panel Antennas (3) Ericsson 4478 B14 Remote Radio Head Units (3) Ericsson 4415 B30 Remote Radio Head Units (3) Ericsson 4449 B5/B12 Remote Radio Head Units (3) Ericsson 8843 B2/B66A Remote Radio Head Units (2) Raycap Fiber/DC Squid DC6-48-60-18-8C (1) Raycap DC Only Squid DC6-48-60-0-8C-EV	**AT&T (Proposed)**	**(3) Valmont/SitePro VFA 12-WLL-30120 Sector Frame (2) Valmont/Site Pro USF-2U 24" Standoff Frame**	**151'**	**(2) 1/2" Fiber Cable (6) 1" DC Cables**

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(3) AIR32 B66a/ B2a Antennas (3) LNX 6515DS-A1M Panel Antennas (3) APXV18-206517-C Panel Antennas (3) RRUS-11 B4 RRHs (3) RRUS 11 B12 RRHs	T-Mobile (existing)	(3) PiROD 12' T-Frame	140’	(3) 1 1/4” Fiber Cables
(1) HPD2-4.7NS Dish	PD (existing)	3’ Side Arm	134’	(2) 7/8”
(1) 5830BH 20" Square Dish	PD (existing)	3’ Side Arm	134’	(2) 1/4” LMR
(1) Omni 1"x3' (BA1012-2)	PD (existing)	3’ Side Arm	117’	(1) 7/8”
(2) Omni 2"x10' (SC329-HF2LDF)	PD (existing)	(2) 3’ Side Arm	117’	(2) 7/8”
(1) 3' Yagi Antenna (SY406-SF1SNM)	PD (existing)	3’ Side Arm	90’	(1) 7/8”
(2) Yagi Antenna (SY307-SF3SNM)	PD (existing)	3’ Side Arm	90’	(2) 7/8”
(1) DB205-1	PD (existing)	6’ Side Arm	60’	(1) 1/2”
(2) Omni 2 1/2"x18'	PD (existing)	(2) 6’ Side Arm	60’	(2) 1/2”
(1) GPS (1' Omni) (10022-1)	PD (existing)	3’ Side Arm	20’	(1) 1/2”

This structural analysis of the communications tower was performed by AECOM on behalf of AT&T. The purpose of this analysis was to investigate the structural integrity of the existing tower with its existing and proposed antenna loads. This analysis was conducted to evaluate stress on the tower and the effect of forces to the foundation of the tower resulting from existing and proposed antenna arrangements.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was done in accordance with, the TIA-222-G–Structural Standard for Antenna Towers and Antenna Supporting Structures and Antennas, the 2015 International Building Code with 2018 Connecticut State Building Code Amendments and the American Institute of Steel Construction (AISC) Manual of Steel Construction – Load Resistance Factor Design (LRFD)

The structural analysis was conducted using TNX Tower version 8.0.7.2. and used the following conditions for this tower review (following the TIA-222-G Standard):

- Structure Class 3 – (Essential Communications)
  - NOTE: ASCE 7 and CT State Building Code Applied Risk Category 4 for design wind loads (see below)
- Topographic Category 1 – (No Abrupt Changes in General Topography)
- Exposure Class B - (Urban/suburban areas, wooded areas closely spaced obstructions - Wind speed-up disruptions)
- Load Conditions:
  - Two load conditions were evaluated as shown which were compared to design stresses according to AISC and TIA/EIA-222-G Standard.

Basic Wind Speed:

- TIA-222-G:
  - Enfield County: V = 101 mph (3-second gust) [Annex of TIA/EIA-222-G 2006]
- IBC 2015 w/ 2018 CT State Building Code Amendment:
  - (2015) IBC Section 1609.1.1 – Determination of Wind Loads – Exception 5 "Designs using TIA-222" applies for determination of Design Wind Load obtained as "V.ult" are to be converted to "V.asd" when applying the TIA-222-G design Standard (under Section 1609.3) for Basic Wind Speed.
  - (2018) CT State Building Code Amendment to the IBC Section 1609.3 wind loads are obtained from Appendix N of the State Building Code.
    - **V.asd = 101 mph** (3-Second Gust) Wind Design Parameter for the Town of Enfield, Connecticut for Risk Category three (III) for essential communications (Cromwell Fire/Police Department Communications).

Load Condition 1 = 101 mph (3-second gust) Wind Load (without ice) + Tower Dead Load
Load Condition 2 = 50 mph (3-second gust) Wind Load (with ice) + Ice Load + Tower Dead Load

Ice thickness used for this analysis is **1.0 inch** (assumed to start at the base of the tower) and is considered to increase in thickness with height. The initial ice thickness for design is referenced in the Annex of TIA-222-G and follows the same design criteria as the ASCE 7 Standard.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS (cont.)

Seismic event consideration factors/values for design:

- S.s = 0.176 (2018 CT State Building Code – Location Specific Value)
- S.1 = 0.065 (2018 CT State Building Code – Location Specific Value)
- Site Classification = “D”
- Seismic Design Category = “C” – (2015 International Building Code)
- F.a = 1.6 (Obtained from TIA-222-G Table 2-12 Considering above conditions)
- F.v = 2.4 (Obtained from TIA-222-G Table 2-13 Considering above conditions)

Strength Limit State Load Combinations (TIA-222-G Section 2.3.2):

The structural analysis herein has considered the following load combinations within the analysis:

1. ***1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.6 Wind load without ice***
2. 1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.0 Dead weight of ice due to factored ice thickness + 1.0 Concurrent wind load with factored ice thickness + 1.0 Load effects due to temperature
3. 1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.0 Earthquake Load

NOTE 1: The above **bolded** load combination is considered to create the governing design loads per the results of the analysis.

NOTE 2: The above “Dead Load Guy Assemblies” are not considered as part of the analysis and are considered as a value of zero.

NOTE 3: The “Load effects due to temperature” do not apply for structures that are self-sustaining (from the TIA-222-G Standard)

4. FINDINGS AND EVALUATION

The combined axial and bending stresses on the tower structure were evaluated to compare with the strength design in accordance with LRFD. The results of the analysis indicates that the existing tower structure, anchor bolts and foundation has enough capacity to support the proposed loading conditions noted herein. The results of the analysis indicates that the existing tower anchor bolts and foundation have enough capacity to support the proposed loading conditions noted herein.

The table below summarizes the critical member capacities for each tower component.

TABLE 1: Tower Component Stress vs. Capacity Summary:

Component/ (Section No.)	Existing Component Size	Controlling Component/Elevation	Percent Capacity	Pass/Fail
Tower Leg (T7)	Pirod 105217	Compression 40' –60'	**90.5 %**	**Pass**
Diagonal (T8)	L2 1/2x2 1/2x3/16	Compression 20' – 40'	**98.1 %**	**Pass**
Top Girt (T2)	1" SR	Compression 130' – 150'	**27.3 %**	**Pass**
Bottom Girt (T2)	1" SR	Compression 130' – 150'	**35.9 %**	**Pass**
Bolt Checks				
Tower Bolts	(1) 1" A325N Diagonal Bolt	Bolt Shear on connection (100' – 110')	**71.5 %**	**Pass**

TABLE 2: Foundation Summary

Foundation	Required	Computed	% Capacity	Pass/Fail
Tower Anchor Rod Capacity (TIA-222-G 4.9.9) (6) 1" dia. ASTM F1554 Gr. 105	Ratio < 1.0	0.596	59.6	**Pass**
Foundation Overturn Resistance	3606 kip*ft.	3424 kip*ft.	94.93	**Pass**
Ultimate Soil Bearing Pressure	5ksf * 0.75 Reduction = 3.75 ksf	2.4548 ksf	65.4	**Pass**

Structure Rating (Maximum from all components) =	**98.1 %**	**Pass**

4. FINDINGS AND EVALUATION (cont.)

Maximum Deformations – Proposed Condition

ANSI/TIA-222-G Section 2.8.2 - Limit State Deformations

1. A rotation of 4 degrees about the vertical axis (twist) or any horizontal axis (sway) of the structure
2. A horizontal displacement (in feet) of 3% of the height of the structure.

Load Case Description	Current		Allowable	
	Sway (degree)	Displacement (Feet)	Sway (degree)	Displacement (Feet)
Service Wind Load	0.3019	0.433	4.0	5.10

5. CONCLUSIONS AND RECOMMENDATIONS

The results of the analysis indicate that:

1. The existing steel tower structure IS considered structurally adequate for the proposed antenna loading with the wind classification specified above.

2. The existing tower anchor bolts ARE considered structurally adequate for the proposed antenna loading with the load classification specified above.

3. The existing foundation, regarding foundation overturning and soil bearing capacity IS considered structurally adequate for the proposed antenna loading with the load classification specified above. Foundation design checks related to the flexure of the pad, beam shear and punching shear of the pad and the tower leg supported columns were NOT ASSESSED within this analysis report due to the lack of supporting information to fairly assess under the design criteria as required within the TIA-222-G design Standard.

4. The controlling structural capacity for all tower and foundation components is **98.1 %**

Limitations/Assumptions:

This report is based on the following:

1. Tower inventory as listed in this report coordinated with the latest State of Connecticut Siting Council approved Decisions.

2. Tower is properly installed and maintained.

3. All members are as specified in the original design documents and are in good condition.

4. All required members are in place.

5. All bolts are in place and are properly tightened.

6. Tower is in plumb condition.

7. All member protective coatings are in good condition.

8. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.

9. Existing tower gusset connection plates were properly constructed to support original design loads and is assumed to support proposed loading conditions stated herein.

10. Foundations are in good condition without defect and were properly constructed to support original design loads as specified in the original design documents.

AECOM is not responsible for any modifications completed prior to or hereafter in which AECOM is not or was not directly involved. Modifications include but are not limited to:

A. Adding antennas
B. Removing/replacing antennas
C. Adding coaxial cables

AECOM hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact AECOM. AECOM disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

Ongoing and Periodic Inspection and Maintenance:

After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

The tower owner shall refer to TIA-222-G Section 14.2 for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. It is also recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading conditions.

6. DRAWINGS AND DATA

SEISMIC BASE SHEAR ANALYSIS

AECOM

Seismic (Vs) Base Shear Implementing TIA–222-G, IBC 2015 & Connecticut State Building Code of 2018

Calculation of Seismic Base Shear Implementing TIA-222-G, IBC 2015 & & CT State Building Code 2018.

Location: Enfield, CT -Site Class "D"

$S_{DS} = \frac{2}{3} F_A S_S$, where $S_S = 0.176$ and $F_A = 1.6$ $S_{DS} = \frac{2}{3} F_A S_S = \frac{2}{3} * 1.6 * 0.176 = 0.187$

$S_{D1} = \frac{2}{3} F_V S_1$, where $S_1 = 0.065$ and $F_V = 2.4$ $S_{D1} = \frac{2}{3} F_V S_1 = \frac{2}{3} * 2.4 * 0.065 = 0.104$

TIA-222-G SECTION 2.7 EARTHQUAKE LOADS (PROCEDURES):

1. Importance Factor "I" (tables 2-3 TIA-222-G) = 1.5 (Structure Class 3)

ANSI/TIA-222-G 2.7.7.1 (TOTAL BASE SEISMIC SHEAR (Vs)

W=DL TOWER	= 17.3	Kips	
W=Antennas/Mounts	= 5.53	Kips	
W=Cables	= 1.75	Kips	
	24.58	Kips	= WT Total = "W"

$$V_s = \frac{S_{DS} * W * I}{R} = \frac{0.187 * 24.58 kips * 1.5}{3.0} = 2.29\ kips,$$ where R = 3.0 for Lattice Tower

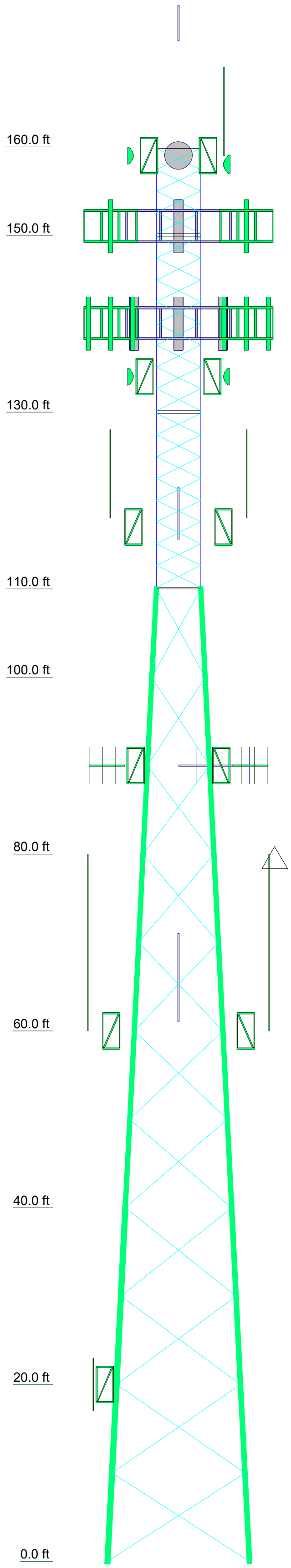
$$V_{S.min} = \frac{0.5 * S_{D1} * W * I}{R} = \frac{0.5 * 0.104 * 24.58 kips * 1.5}{3.0} = 0.639\ \ kips$$

*By visual inspection, the above "Base Shear" value when considering the following Load Combination is less that the base shear of wind on structure.

$1.2 * DL + 1.0\ E < 1.2\ DL + 1.6\ W$, (33 Kips), therefore seismic effect on structure Does NOT control Design.

TNX TOWER INPUT/OUTPUT SUMMARY

Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Bottom Girts	Face Width (ft)	# Panels @ (ft)	Weight (K)
T1	SR 1 3/4	A572-50	SR 7/8	A36	SR 1	SR 1	5	4 @ 2.41667	0.6
T2	SR 2							16 @ 2.45833	1.3
T3	SR 2 1/4		SR 1		SR 1 1/4	SR 1 1/4			1.7
T4	Pirod 105216		L2 1/2x2 1/2x3/16		L3x3x3/16	N.A.		11 @ 10	1.0
T5	Pirod 105217				N.A.		6		2.2
T6							8		2.3
T7							10		2.3
T8	Pirod 105218						12		2.8
T9			L3x3x3/16				14		3.0
							16		17.0



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4' (PD)	160	RRUS-11 B4 (T-Mobile)	140
Omni 2"x8' (PD)	159	RRUS-11 B4 (T-Mobile)	140
3' Side Mount Standoff (PD)	159	LNX 6515DS-A1M (T-Mobile)	140
3' Side Mount Standoff (PD)	159	LNX 6515DS-A1M (T-Mobile)	140
3' Side Mount Standoff (PD)	159	LNX 6515DS-A1M (T-Mobile)	140
HPD3-4.7NS (PD)	159	RRUS 11 B12 (T-Mobile)	140
HPD2-4.7NS (PD)	159	RRUS 11 B12 (T-Mobile)	140
SPD2-5.2NS (PD)	158	RRUS 11 B12 (T-Mobile)	140
VFA12-WLL-30120 (ATT)	151	APXV18-206517-C (T-Mobile)	140
VFA12-WLL-30120 (ATT)	151	APXV18-206517-C (T-Mobile)	140
VFA12-WLL-30120 (ATT)	151	APXV18-206517-C (T-Mobile)	140
RRH 4478 B14 (ATT)	151	PiROD 12' T-Frame (T-Mobile)	140
RRH 4415 B30 (ATT)	151	PiROD 12' T-Frame (T-Mobile)	140
RRH 4449 B5/B12 (ATT)	151	PiROD 12' T-Frame (T-Mobile)	140
RRH 8843 B2/B66a (ATT)	151	3' Side Mount Standoff (PD)	134
DC6-48-60-18-8C Squid (ATT)	151	3' Side Mount Standoff (PD)	134
DC6-48-60-18-8C Squid (ATT)	151	HPD2-4.7NS (PD)	134
(2) DC6-48-60-0-8C-EV Squid (ATT)	151	5830BH (20" Square Dish) (PD)	134
(2) EPBQ-654L8H8-L2 (ATT)	151	3' Side Mount Standoff (PD)	117
(2) EPBQ-654L8H8-L2 (ATT)	151	3' Side Mount Standoff (PD)	117
(2) EPBQ-654L8H8-L2 (ATT)	151	3' Side Mount Standoff (PD)	117
HPA65R-BU8A (ATT)	151	Omni 1"x3' (BA1012-2) (PD)	117
HPA65R-BU8A (ATT)	151	Omni 2"x10' (SC329-HF2LDF) (PD)	117
HPA65R-BU8A (ATT)	151	Omni 2"x10' (SC329-HF2LDF) (PD)	117
RRH 4478 B14 (ATT)	151	3' Yagi Antenna (SY406-SF1SNM) (PD)	90
RRH 4415 B30 (ATT)	151	3' Yagi Antenna (SY307-SF3SNM) (PD)	90
RRH 4449 B5/B12 (ATT)	151	3' Yagi Antenna (SY307-SF3SNM) (PD)	90
RRH 8843 B2/B66a (ATT)	151	3' Side Mount Standoff (PD)	90
RRH 4478 B14 (ATT)	151	3' Side Mount Standoff (PD)	90
RRH 4415 B30 (ATT)	151	3' Side Mount Standoff (PD)	90
RRH 4449 B5/B12 (ATT)	151	6' Side Mount Standoff (PD)	60
RRH 8843 B2/B66a (ATT)	151	Omni 2 1/2"x18' (PD)	60
USF-2U Stand-Off (ATT)	151	Omni 2 1/2"x18' (PD)	60
USF-2U Stand-Off (ATT)	151	6' Side Mount Standoff (PD)	60
AIR32 B66a/ B2a w/mount pipe (T-Mobile)	140	6' Side Mount Standoff (PD)	60
		DB205-1 (PD)	60
AIR32 B66a/ B2a w/mount pipe (T-Mobile)	140	3' Side Mount Standoff (PD)	20
		GPS (1' Omni) (10022-1) (PD)	20
AIR32 B66a/ B2a w/mount pipe (T-Mobile)	140		
RRUS-11 B4 (T-Mobile)	140		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower designed for Exposure B to the TIA-222-G Standard.
2. Tower designed for a 101 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class III.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. Weld together tower sections have flange connections.
8. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
9. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
10. Welds are fabricated with ER-70S-6 electrodes.

AECOM
1255 Broad St. Suite 201
Clifton, NJ 07013
Phone: (973) 883-8663
FAX: (973) 883-8500

Job: ***160' PiROD Tower***			
Project: ***SAI-106 Rev. 1***			
Client: AT&T	Drawn by: christina.carlos	App'd:	
Code: TIA-222-G	Date: 12/01/20	Scale: NTS	
Path:		Dwg No. E-1	

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

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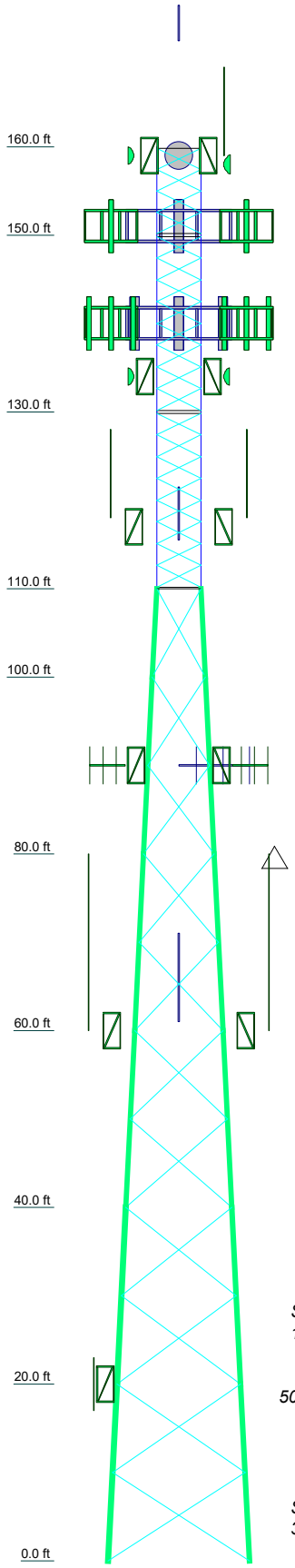
10. Welds are fabricated with ER-70S-6 electrodes.

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9
Legs	SR 1 3/4	SR 2	SR 2 1/4	Pirod 105216		Pirod 105217		Pirod 105218	
Leg Grade					A572-50				
Diagonals		SR 7/8	SR 1		L2 1/2x2 1/2x3/16				L3x3x3/16
Diagonal Grade					A36				
Top Girts		SR 1	SR 1 1/4	L3x3x3/16			N.A.		
Bottom Girts		SR 1	SR 1 1/4				N.A.		
Face Width (ft)	5			6		8	10	12	14
# Panels @ (ft)	4 @ 2.41667		16 @ 2.45833				11 @ 10		
Weight (K)	0.6	1.3	1.7	1.0	2.2	2.3	2.3	2.8	3.0



ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 243 K
SHEAR: 22 K

UPLIFT: -220 K
SHEAR: 20 K

AXIAL 166 K
SHEAR 13 K
MOMENT 1329 kip-ft

TORQUE 7 kip-ft
50 mph WIND - 1.0000 in ICE

AXIAL 31 K
SHEAR 33 K
MOMENT 3226 kip-ft

TORQUE 9 kip-ft
REACTIONS - 101 mph WIND

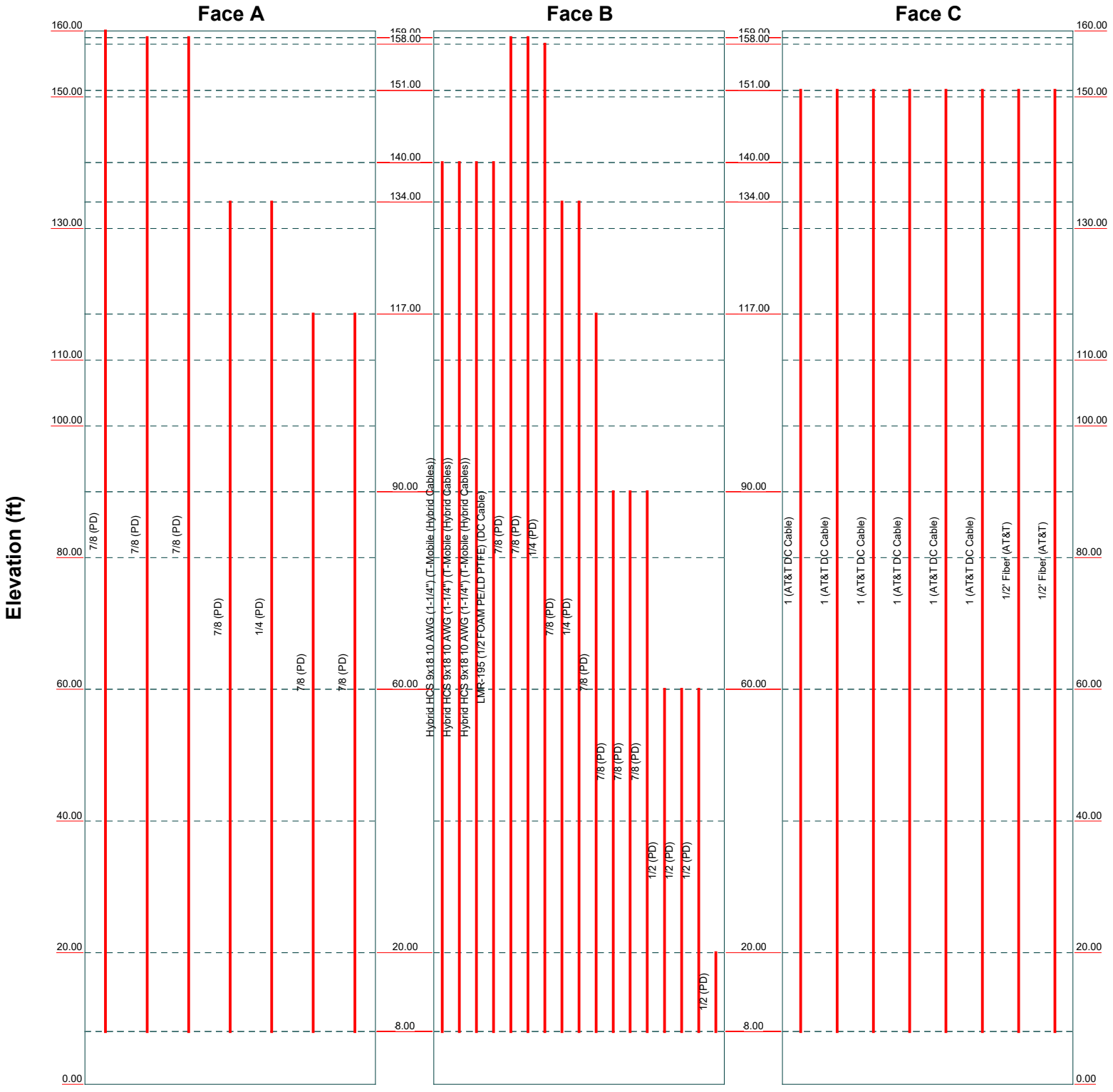
AECOM
1255 Broad St. Suite 201
Clifton, NJ 07013
Phone: (973) 883-8663
FAX: (973) 883-8500

Job: **160' PiROD Tower**			
Project: **SAI-106 Rev. 1**			
Client: AT&T	Drawn by: christina.carlos	App'd:	
Code: TIA-222-G	Date: 12/01/20	Scale: NTS	
Path:		Dwg No. E-1	

TNX TOWER FEEDLINE DISTRIBUTION CHART

Feed Line Distribution Chart
0' - 160'

Round | Flat | App In Face | App Out Face | Truss Leg



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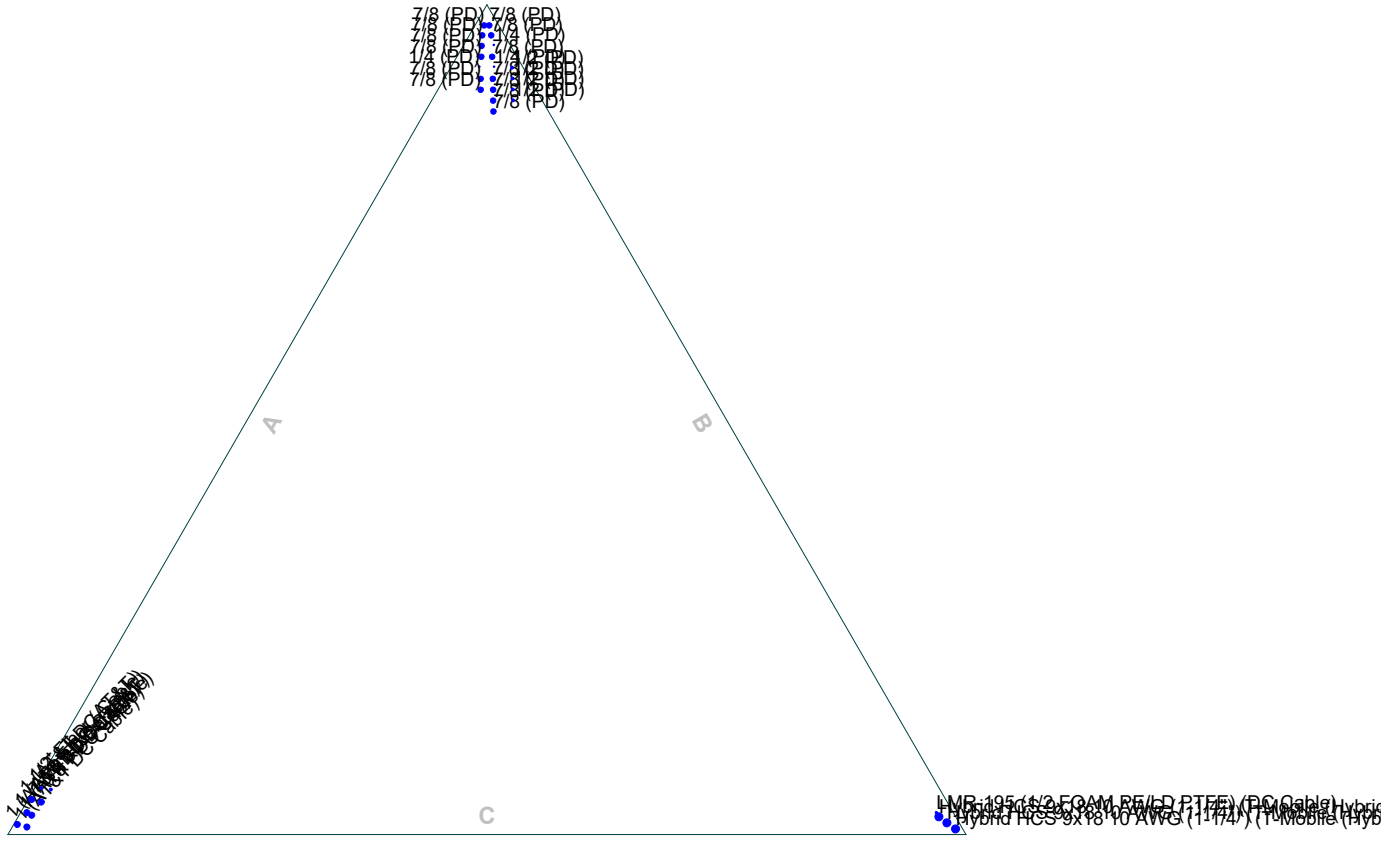
Client: AT&T	Drawn by: christina.carlos	App'd:	
Code: TIA-222-G	Date: 12/01/20	Scale: NTS	
Path:		Dwg No. E-7	

TNX TOWER FEEDLINE PLAN

Feed Line Plan

Round Flat App In Face App Out Face Truss-Leg



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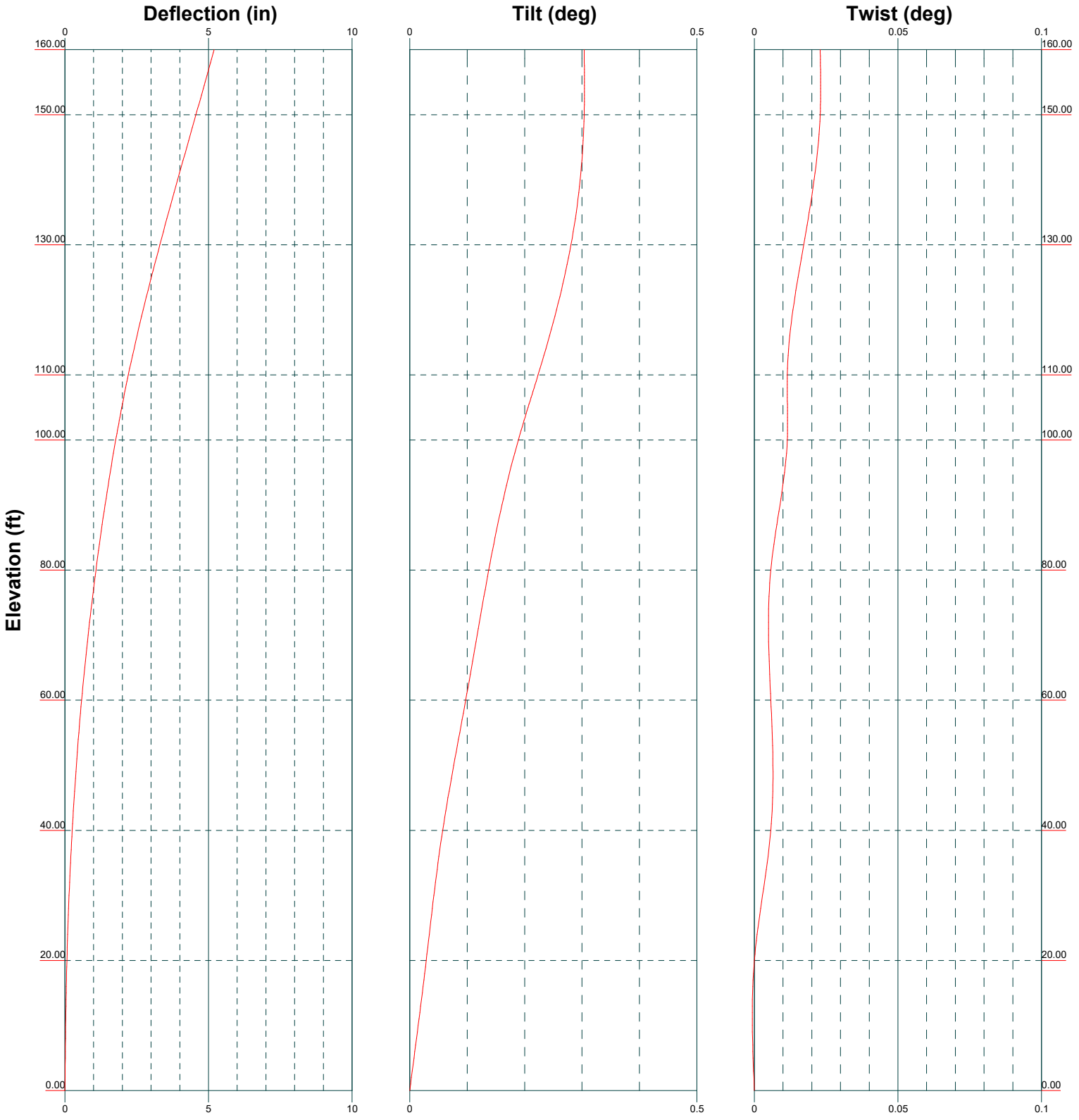
Path:		Dwg No. E-7	

TNX TOWER DEFLECTION, TILT, AND TWIST

TIA-222-G - Service - 60 mph

Maximum Values



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Job: ***160' PiROD Tower***			
Project: ***SAI-106 Rev. 1***			
Client: AT&T	Drawn by: christina.carlos		App'd:
Code: TIA-222-G	Date: 12/01/20		Scale: NTS
Path:			Dwg No. E-5

TNX TOWER DETAILED OUTPUT

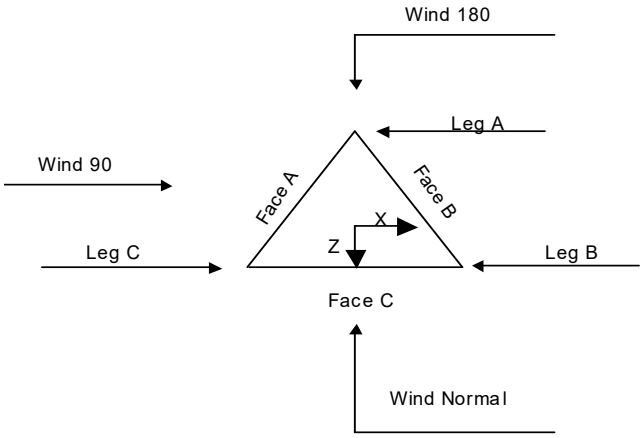
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 160.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 5.00 ft at the top and 16.00 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Basic wind speed of 101 mph.
Structure Class III.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Weld together tower sections have flange connections..
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	√ Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	√ All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	√ Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	Use Azimuth Dish Coefficients	√ Include Angle Block Shear Check
Use Special Wind Profile	Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
√ Include Bolts In Member Capacity	√ Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
√ Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
√ Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	√ Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are Known



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	160.00-150.00			5.00	1	10.00
T2	150.00-130.00			5.00	1	20.00
T3	130.00-110.00			5.00	1	20.00
T4	110.00-100.00			5.00	1	10.00
T5	100.00-80.00			6.00	1	20.00
T6	80.00-60.00			8.00	1	20.00
T7	60.00-40.00			10.00	1	20.00
T8	40.00-20.00			12.00	1	20.00
T9	20.00-0.00			14.00	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	160.00-150.00	2.42	X Brace	No	No	2.0000	2.0000
T2	150.00-130.00	2.46	X Brace	No	No	2.0000	2.0000
T3	130.00-110.00	2.46	X Brace	No	No	2.0000	2.0000
T4	110.00-100.00	10.00	X Brace	No	No	0.0000	0.0000
T5	100.00-80.00	10.00	X Brace	No	No	0.0000	0.0000
T6	80.00-60.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T7	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T8	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T9	20.00-0.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 160.00-150.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T2 150.00-130.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T3 130.00-110.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T4 110.00-100.00	Truss Leg	Pirod 105216	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 100.00-80.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 80.00-60.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T7 60.00-40.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T8 40.00-20.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T9 20.00-0.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 160.00-150.00	Solid Round	1	A36 (36 ksi)	Solid Round	1	A36 (36 ksi)
T2 150.00-130.00	Solid Round	1	A36 (36 ksi)	Solid Round	1	A36 (36 ksi)
T3 130.00-110.00	Solid Round	1 1/4	A36 (36 ksi)	Solid Round	1 1/4	A36 (36 ksi)
T4 110.00-100.00	Equal Angle	L3x3x3/16	A36 (36 ksi)	Equal Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 160.00-150.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 150.00-130.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 130.00-110.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 110.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T8 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T9 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	No	No	1	1	1	1	1	1	1	1
160.00-150.00				1	1	1	1	1	1	1
T2	No	No	1	1	1	1	1	1	1	1
150.00-130.00				1	1	1	1	1	1	1
T3	No	No	1	1	1	1	1	1	1	1
130.00-110.00				1	1	1	1	1	1	1
T4	No	No	1	1	1	1	1	1	1	1
110.00-100.00				1	1	1	1	1	1	1
T5	No	No	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T6	No	No	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T7	No	No	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T8	No	No	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T9 20.00-0.00	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Truss-Leg K Factors

Tower Elevation ft	Truss-Legs Used As Leg Members: Leg Panels	X Brace Diagonals	Z Brace Diagonals	Truss-Legs Used As Inner Members: Leg Panels	X Brace Diagonals	Z Brace Diagonals
T4 110.00-100.00	1	0.5	0.85	1	0.5	0.85
T5 100.00-80.00	1	0.5	0.85	1	0.5	0.85
T6 80.00-60.00	1	0.5	0.85	1	0.5	0.85
T7 60.00-40.00	1	0.5	0.85	1	0.5	0.85
T8 40.00-20.00	1	0.5	0.85	1	0.5	0.85
T9 20.00-0.00	1	0.5	0.85	1	0.5	0.85

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 160.00-150.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 150.00-130.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 130.00-110.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 110.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 160.00-150.00	Flange	0.6250 A325N	5	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 150.00-130.00	Flange	0.7500 A325N	5	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 130.00-110.00	Flange	1.0000 A325N	6	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 110.00-100.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T5 100.00-80.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 80.00-60.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 60.00-40.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 40.00-20.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 20.00-0.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Hybrid HCS 9x18 10 AWG (1-1/4") (T-Mobile (Hybrid Cables))	B	No	No	Ar (CaAa)	140.00 - 8.00	-0.4000	0.49	1	1	1.5400	1.5400		0.90
Hybrid HCS 9x18 10 AWG (1-1/4") (T-Mobile (Hybrid Cables))	B	No	No	Ar (CaAa)	140.00 - 8.00	-1.2500	0.48	1	1	1.5400	1.5400		0.90
Hybrid HCS 9x18 10 AWG (1-1/4") (T-Mobile (Hybrid Cables))	B	No	No	Ar (CaAa)	140.00 - 8.00	-2.0000	0.47	1	1	1.5400	1.5400		0.90
LMR-195 (1/2 FOAM PE/LD PTFE) (DC Cable) *AT&T Proposed*	B	No	No	Ar (CaAa)	140.00 - 8.00	-2.5000	0.465	1	1	0.5000	0.5000		0.02
1 (AT&T DC Cable)	C	No	No	Ar (CaAa)	151.00 - 8.00	-1.2500	0.49	1	1	1.2500	1.2500		0.58
1 (AT&T DC Cable)	C	No	No	Ar (CaAa)	151.00 - 8.00	-0.7500	0.48	1	1	1.2500	1.2500		0.58
1 (AT&T DC Cable)	C	No	No	Ar (CaAa)	151.00 - 8.00	-3.5000	0.48	1	1	1.2500	1.2500		0.58
1 (AT&T DC Cable)	C	No	No	Ar (CaAa)	151.00 - 8.00	-3.0000	0.475	1	1	1.2500	1.2500		0.58
1	C	No	No	Ar (CaAa)	151.00 -	-6.0000	0.475	1	1	1.2500	1.2500		0.58

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
(AT&T DC Cable)					8.00								
1	C	No	No	Ar (CaAa)	151.00 - 8.00	-5.5000	0.465	1	1	1.2500	1.2500		0.58
(AT&T DC Cable)													
1/2' Fiber (AT&T)	C	No	No	Ar (CaAa)	151.00 - 8.00	-8.5000	0.465	1	1	0.5800	0.5800		0.20
1/2' Fiber (AT&T)	C	No	No	Ar (CaAa)	151.00 - 8.00	-8.2500	0.455	1	1	0.5800	0.5800		0.20
* PD Cables													
7/8 (PD)	A	No	No	Ar (CaAa)	160.00 - 8.00	-1.0000	0.48	1	1	1.1100	1.1100		0.54
7/8 (PD)	B	No	No	Ar (CaAa)	159.00 - 8.00	-1.0000	-0.48	1	1	1.1100	1.1100		0.54
7/8 (PD)	A	No	No	Ar (CaAa)	159.00 - 8.00	-1.6000	0.47	1	1	1.1100	1.1100		0.54
7/8 (PD)	B	No	No	Ar (CaAa)	159.00 - 8.00	-1.6000	-0.47	1	1	1.1100	1.1100		0.54
7/8 (PD)	A	No	No	Ar (CaAa)	159.00 - 8.00	-2.5000	0.46	1	1	1.1100	1.1100		0.54
1/4 (PD)	B	No	No	Ar (CaAa)	158.00 - 8.00	-2.5000	-0.46	1	1	0.4000	0.4000		0.25
7/8 (PD)	A	No	No	Ar (CaAa)	134.00 - 8.00	-3.5000	0.45	1	1	1.1100	1.1100		0.54
7/8 (PD)	B	No	No	Ar (CaAa)	134.00 - 8.00	-3.5000	-0.45	1	1	1.1100	1.1100		0.54
1/4 (PD)	A	No	No	Ar (CaAa)	134.00 - 8.00	-4.5000	0.44	1	1	0.4000	0.4000		0.25
1/4 (PD)	B	No	No	Ar (CaAa)	134.00 - 8.00	-4.5000	-0.44	1	1	0.4000	0.4000		0.25
7/8 (PD)	A	No	No	Ar (CaAa)	117.00 - 8.00	-5.5000	0.43	1	1	1.1100	1.1100		0.54
7/8 (PD)	B	No	No	Ar (CaAa)	117.00 - 8.00	-5.5000	-0.43	1	1	1.1100	1.1100		0.54
7/8 (PD)	A	No	No	Ar (CaAa)	117.00 - 8.00	-6.5000	0.42	1	1	1.1100	1.1100		0.54
7/8 (PD)	B	No	No	Ar (CaAa)	90.00 - 8.00	-6.5000	-0.42	1	1	1.1100	1.1100		0.54
7/8 (PD)	B	No	No	Ar (CaAa)	90.00 - 8.00	-7.5000	-0.41	1	1	1.1100	1.1100		0.54
7/8 (PD)	B	No	No	Ar (CaAa)	90.00 - 8.00	-8.5000	-0.4	1	1	1.1100	1.1100		0.54
1/2 (PD)	B	No	No	Ar (CaAa)	60.00 - 8.00	-1.5000	-0.43	1	1	0.5800	0.5800		0.25
1/2 (PD)	B	No	No	Ar (CaAa)	60.00 - 8.00	-2.5000	-0.42	1	1	0.5800	0.5800		0.25
1/2 (PD)	B	No	No	Ar (CaAa)	60.00 - 8.00	-3.5000	-0.41	1	1	0.5800	0.5800		0.25
1/2 (PD)	B	No	No	Ar (CaAa)	20.00 - 8.00	-4.5000	-0.4	1	1	0.5800	0.5800		0.25

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	160.00-150.00	A	0.000	0.000	3.108	0.000	0.02
		B	0.000	0.000	2.318	0.000	0.01
		C	0.000	0.000	0.866	0.000	0.00
T2	150.00-130.00	A	0.000	0.000	7.264	0.000	0.04
		B	0.000	0.000	10.964	0.000	0.06
		C	0.000	0.000	17.320	0.000	0.08
T3	130.00-110.00	A	0.000	0.000	11.234	0.000	0.06
		B	0.000	0.000	19.277	0.000	0.10
		C	0.000	0.000	17.320	0.000	0.08
T4	110.00-100.00	A	0.000	0.000	7.060	0.000	0.03
		B	0.000	0.000	10.360	0.000	0.05
		C	0.000	0.000	8.660	0.000	0.04
T5	100.00-80.00	A	0.000	0.000	14.120	0.000	0.07
		B	0.000	0.000	24.050	0.000	0.12
		C	0.000	0.000	17.320	0.000	0.08
T6	80.00-60.00	A	0.000	0.000	14.120	0.000	0.07
		B	0.000	0.000	27.380	0.000	0.14
		C	0.000	0.000	17.320	0.000	0.08
T7	60.00-40.00	A	0.000	0.000	14.120	0.000	0.07
		B	0.000	0.000	30.860	0.000	0.16
		C	0.000	0.000	17.320	0.000	0.08
T8	40.00-20.00	A	0.000	0.000	14.120	0.000	0.07
		B	0.000	0.000	30.860	0.000	0.16
		C	0.000	0.000	17.320	0.000	0.08
T9	20.00-0.00	A	0.000	0.000	8.472	0.000	0.04
		B	0.000	0.000	19.212	0.000	0.10
		C	0.000	0.000	10.392	0.000	0.05

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	160.00-150.00	A	2.918	0.000	0.000	19.450	0.000	0.42
		B		0.000	0.000	17.493	0.000	0.36
		C		0.000	0.000	5.535	0.000	0.12
T2	150.00-130.00	A	2.889	0.000	0.000	46.550	0.000	0.99
		B		0.000	0.000	73.360	0.000	1.54
		C		0.000	0.000	109.758	0.000	2.32
T3	130.00-110.00	A	2.845	0.000	0.000	76.089	0.000	1.57
		B		0.000	0.000	125.661	0.000	2.62
		C		0.000	0.000	108.344	0.000	2.26
T4	110.00-100.00	A	2.807	0.000	0.000	46.355	0.000	0.95
		B		0.000	0.000	66.495	0.000	1.37
		C		0.000	0.000	53.568	0.000	1.11
T5	100.00-80.00	A	2.764	0.000	0.000	91.508	0.000	1.85
		B		0.000	0.000	151.187	0.000	3.08
		C		0.000	0.000	105.763	0.000	2.16
T6	80.00-60.00	A	2.695	0.000	0.000	89.587	0.000	1.78
		B		0.000	0.000	167.533	0.000	3.35
		C		0.000	0.000	103.568	0.000	2.07
T7	60.00-40.00	A	2.606	0.000	0.000	87.090	0.000	1.68
		B		0.000	0.000	197.648	0.000	3.79
		C		0.000	0.000	100.714	0.000	1.96
T8	40.00-20.00	A	2.476	0.000	0.000	83.456	0.000	1.55
		B		0.000	0.000	189.342	0.000	3.49
		C		0.000	0.000	96.561	0.000	1.80
T9	20.00-0.00	A	2.219	0.000	0.000	45.745	0.000	0.78

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		0.000	0.000	109.733	0.000	1.84
		C		0.000	0.000	52.990	0.000	0.91

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	160.00-150.00	-0.9440	-6.5459	-0.4669	-3.3952
T2	150.00-130.00	-4.8068	-1.4947	-3.6043	-1.6600
T3	130.00-110.00	-2.3044	-2.5591	-2.0415	-2.9438
T4	110.00-100.00	-1.4313	-2.5910	-0.7413	-1.4693
T5	100.00-80.00	-1.8255	-4.0291	-2.2698	-5.2134
T6	80.00-60.00	-2.1859	-5.7409	-3.5081	-9.2179
T7	60.00-40.00	-2.3827	-7.8790	-4.1516	-14.7257
T8	40.00-20.00	-2.5938	-8.7794	-4.8981	-17.7228
T9	20.00-0.00	-1.7377	-6.4467	-3.8697	-15.4640

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	6	1	150.00 - 151.00	0.6000	0.2332
T1	7	1	150.00 - 151.00	0.6000	0.2332
T1	8	1	150.00 - 151.00	0.6000	0.2332
T1	9	1	150.00 - 151.00	0.6000	0.2332
T1	10	1	150.00 - 151.00	0.6000	0.2332
T1	11	1	150.00 - 151.00	0.6000	0.2332
T1	12	1/2' Fiber	150.00 - 151.00	0.6000	0.2332
T1	13	1/2' Fiber	150.00 - 151.00	0.6000	0.2332
T1	15	7/8	150.00 - 160.00	0.6000	0.2332
T1	16	7/8	150.00 - 159.00	0.6000	0.2332
T1	17	7/8	150.00 - 159.00	0.6000	0.2332
T1	18	7/8	150.00 - 159.00	0.6000	0.2332
T1	19	7/8	150.00 - 159.00	0.6000	0.2332
T1	20	1/4	150.00 - 158.00	0.6000	0.2332
T2	1	Hybrid HCS 9x18 10 AWG	130.00 -	0.6000	0.2830

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		(1-1/4")	140.00		
T2	2	Hybrid HCS 9x18 10 AWG (1-1/4")	130.00 - 140.00	0.6000	0.2830
T2	3	Hybrid HCS 9x18 10 AWG (1-1/4")	130.00 - 140.00	0.6000	0.2830
T2	4	LMR-195 (1/2 FOAM PE/LD PTFE)	130.00 - 140.00	0.6000	0.2830
T2	6	1	130.00 - 150.00	0.6000	0.2830
T2	7	1	130.00 - 150.00	0.6000	0.2830
T2	8	1	130.00 - 150.00	0.6000	0.2830
T2	9	1	130.00 - 150.00	0.6000	0.2830
T2	10	1	130.00 - 150.00	0.6000	0.2830
T2	11	1	130.00 - 150.00	0.6000	0.2830
T2	12	1/2' Fiber	130.00 - 150.00	0.6000	0.2830
T2	13	1/2' Fiber	130.00 - 150.00	0.6000	0.2830
T2	15	7/8	130.00 - 150.00	0.6000	0.2830
T2	16	7/8	130.00 - 150.00	0.6000	0.2830
T2	17	7/8	130.00 - 150.00	0.6000	0.2830
T2	18	7/8	130.00 - 150.00	0.6000	0.2830
T2	19	7/8	130.00 - 150.00	0.6000	0.2830
T2	20	1/4	130.00 - 150.00	0.6000	0.2830
T2	21	7/8	130.00 - 134.00	0.6000	0.2830
T2	22	7/8	130.00 - 134.00	0.6000	0.2830
T2	23	1/4	130.00 - 134.00	0.6000	0.2830
T2	24	1/4	130.00 - 134.00	0.6000	0.2830
T3	1	Hybrid HCS 9x18 10 AWG (1-1/4")	110.00 - 130.00	0.6000	0.2764
T3	2	Hybrid HCS 9x18 10 AWG (1-1/4")	110.00 - 130.00	0.6000	0.2764
T3	3	Hybrid HCS 9x18 10 AWG (1-1/4")	110.00 - 130.00	0.6000	0.2764
T3	4	LMR-195 (1/2 FOAM PE/LD PTFE)	110.00 - 130.00	0.6000	0.2764
T3	6	1	110.00 - 130.00	0.6000	0.2764
T3	7	1	110.00 - 130.00	0.6000	0.2764
T3	8	1	110.00 - 130.00	0.6000	0.2764
T3	9	1	110.00 - 130.00	0.6000	0.2764
T3	10	1	110.00 - 130.00	0.6000	0.2764
T3	11	1	110.00 -	0.6000	0.2764

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T3	12	1/2' Fiber	130.00 - 110.00	0.6000	0.2764
T3	13	1/2' Fiber	130.00 - 110.00	0.6000	0.2764
T3	15	7/8	130.00 - 110.00	0.6000	0.2764
T3	16	7/8	130.00 - 110.00	0.6000	0.2764
T3	17	7/8	130.00 - 110.00	0.6000	0.2764
T3	18	7/8	130.00 - 110.00	0.6000	0.2764
T3	19	7/8	130.00 - 110.00	0.6000	0.2764
T3	20	1/4	130.00 - 110.00	0.6000	0.2764
T3	21	7/8	130.00 - 110.00	0.6000	0.2764
T3	22	7/8	130.00 - 110.00	0.6000	0.2764
T3	23	1/4	130.00 - 110.00	0.6000	0.2764
T3	24	1/4	130.00 - 110.00	0.6000	0.2764
T3	25	7/8	130.00 - 110.00	0.6000	0.2764
T3	26	7/8	117.00 - 110.00	0.6000	0.2764
T3	27	7/8	117.00 - 110.00	0.6000	0.2764
T4	1	Hybrid HCS 9x18 10 AWG (1-1/4")	117.00 - 100.00	0.6000	0.1212
T4	2	Hybrid HCS 9x18 10 AWG (1-1/4")	110.00 - 100.00	0.6000	0.1212
T4	3	Hybrid HCS 9x18 10 AWG (1-1/4")	110.00 - 100.00	0.6000	0.1212
T4	4	LMR-195 (1/2 FOAM PE/LD PTFE)	110.00 - 100.00	0.6000	0.1212
T4	6	1	110.00 - 100.00	0.6000	0.1212
T4	7	1	110.00 - 100.00	0.6000	0.1212
T4	8	1	110.00 - 100.00	0.6000	0.1212
T4	9	1	110.00 - 100.00	0.6000	0.1212
T4	10	1	110.00 - 100.00	0.6000	0.1212
T4	11	1	110.00 - 100.00	0.6000	0.1212
T4	12	1/2' Fiber	110.00 - 100.00	0.6000	0.1212
T4	13	1/2' Fiber	110.00 - 100.00	0.6000	0.1212
T4	15	7/8	110.00 - 100.00	0.6000	0.1212
T4	16	7/8	110.00 - 100.00	0.6000	0.1212
T4	17	7/8	110.00 - 100.00	0.6000	0.1212
T4	18	7/8	110.00 - 100.00	0.6000	0.1212

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			110.00		
T4	19	7/8	100.00 - 110.00	0.6000	0.1212
T4	20	1/4	100.00 - 110.00	0.6000	0.1212
T4	21	7/8	100.00 - 110.00	0.6000	0.1212
T4	22	7/8	100.00 - 110.00	0.6000	0.1212
T4	23	1/4	100.00 - 110.00	0.6000	0.1212
T4	24	1/4	100.00 - 110.00	0.6000	0.1212
T4	25	7/8	100.00 - 110.00	0.6000	0.1212
T4	26	7/8	100.00 - 110.00	0.6000	0.1212
T4	27	7/8	100.00 - 110.00	0.6000	0.1212
T5	1	Hybrid HCS 9x18 10 AWG (1-1/4")	80.00 - 100.00	0.6000	0.3050
T5	2	Hybrid HCS 9x18 10 AWG (1-1/4")	80.00 - 100.00	0.6000	0.3050
T5	3	Hybrid HCS 9x18 10 AWG (1-1/4")	80.00 - 100.00	0.6000	0.3050
T5	4	LMR-195 (1/2 FOAM PE/LD PTFE)	80.00 - 100.00	0.6000	0.3050
T5	6	1	80.00 - 100.00	0.6000	0.3050
T5	7	1	80.00 - 100.00	0.6000	0.3050
T5	8	1	80.00 - 100.00	0.6000	0.3050
T5	9	1	80.00 - 100.00	0.6000	0.3050
T5	10	1	80.00 - 100.00	0.6000	0.3050
T5	11	1	80.00 - 100.00	0.6000	0.3050
T5	12	1/2' Fiber	80.00 - 100.00	0.6000	0.3050
T5	13	1/2' Fiber	80.00 - 100.00	0.6000	0.3050
T5	15	7/8	80.00 - 100.00	0.6000	0.3050
T5	16	7/8	80.00 - 100.00	0.6000	0.3050
T5	17	7/8	80.00 - 100.00	0.6000	0.3050
T5	18	7/8	80.00 - 100.00	0.6000	0.3050
T5	19	7/8	80.00 - 100.00	0.6000	0.3050
T5	20	1/4	80.00 - 100.00	0.6000	0.3050
T5	21	7/8	80.00 - 100.00	0.6000	0.3050
T5	22	7/8	80.00 - 100.00	0.6000	0.3050
T5	23	1/4	80.00 - 100.00	0.6000	0.3050
T5	24	1/4	80.00 - 100.00	0.6000	0.3050
T5	25	7/8	80.00 - 100.00	0.6000	0.3050
T5	26	7/8	80.00 - 100.00	0.6000	0.3050
T5	27	7/8	80.00 - 100.00	0.6000	0.3050
T5	28	7/8	80.00 - 90.00	0.6000	0.3050
T5	29	7/8	80.00 - 90.00	0.6000	0.3050
T5	30	7/8	80.00 - 90.00	0.6000	0.3050
T6	1	Hybrid HCS 9x18 10 AWG (1-1/4")	60.00 - 80.00	0.6000	0.4262
T6	2	Hybrid HCS 9x18 10 AWG (1-1/4")	60.00 - 80.00	0.6000	0.4262
T6	3	Hybrid HCS 9x18 10 AWG (1-1/4")	60.00 - 80.00	0.6000	0.4262
T6	4	LMR-195 (1/2 FOAM PE/LD PTFE)	60.00 - 80.00	0.6000	0.4262
T6	6	1	60.00 - 80.00	0.6000	0.4262
T6	7	1	60.00 - 80.00	0.6000	0.4262
T6	8	1	60.00 - 80.00	0.6000	0.4262

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T6	9	1	60.00 - 80.00	0.6000	0.4262
T6	10	1	60.00 - 80.00	0.6000	0.4262
T6	11	1	60.00 - 80.00	0.6000	0.4262
T6	12	1/2' Fiber	60.00 - 80.00	0.6000	0.4262
T6	13	1/2' Fiber	60.00 - 80.00	0.6000	0.4262
T6	15	7/8	60.00 - 80.00	0.6000	0.4262
T6	16	7/8	60.00 - 80.00	0.6000	0.4262
T6	17	7/8	60.00 - 80.00	0.6000	0.4262
T6	18	7/8	60.00 - 80.00	0.6000	0.4262
T6	19	7/8	60.00 - 80.00	0.6000	0.4262
T6	20	1/4	60.00 - 80.00	0.6000	0.4262
T6	21	7/8	60.00 - 80.00	0.6000	0.4262
T6	22	7/8	60.00 - 80.00	0.6000	0.4262
T6	23	1/4	60.00 - 80.00	0.6000	0.4262
T6	24	1/4	60.00 - 80.00	0.6000	0.4262
T6	25	7/8	60.00 - 80.00	0.6000	0.4262
T6	26	7/8	60.00 - 80.00	0.6000	0.4262
T6	27	7/8	60.00 - 80.00	0.6000	0.4262
T6	28	7/8	60.00 - 80.00	0.6000	0.4262
T6	29	7/8	60.00 - 80.00	0.6000	0.4262
T6	30	7/8	60.00 - 80.00	0.6000	0.4262
T7	1	Hybrid HCS 9x18 10 AWG (1-1/4")	40.00 - 60.00	0.6000	0.5092
T7	2	Hybrid HCS 9x18 10 AWG (1-1/4")	40.00 - 60.00	0.6000	0.5092
T7	3	Hybrid HCS 9x18 10 AWG (1-1/4")	40.00 - 60.00	0.6000	0.5092
T7	4	LMR-195 (1/2 FOAM PE/LD PTFE)	40.00 - 60.00	0.6000	0.5092
T7	6	1	40.00 - 60.00	0.6000	0.5092
T7	7	1	40.00 - 60.00	0.6000	0.5092
T7	8	1	40.00 - 60.00	0.6000	0.5092
T7	9	1	40.00 - 60.00	0.6000	0.5092
T7	10	1	40.00 - 60.00	0.6000	0.5092
T7	11	1	40.00 - 60.00	0.6000	0.5092
T7	12	1/2' Fiber	40.00 - 60.00	0.6000	0.5092
T7	13	1/2' Fiber	40.00 - 60.00	0.6000	0.5092
T7	15	7/8	40.00 - 60.00	0.6000	0.5092
T7	16	7/8	40.00 - 60.00	0.6000	0.5092
T7	17	7/8	40.00 - 60.00	0.6000	0.5092
T7	18	7/8	40.00 - 60.00	0.6000	0.5092
T7	19	7/8	40.00 - 60.00	0.6000	0.5092
T7	20	1/4	40.00 - 60.00	0.6000	0.5092
T7	21	7/8	40.00 - 60.00	0.6000	0.5092
T7	22	7/8	40.00 - 60.00	0.6000	0.5092
T7	23	1/4	40.00 - 60.00	0.6000	0.5092
T7	24	1/4	40.00 - 60.00	0.6000	0.5092
T7	25	7/8	40.00 - 60.00	0.6000	0.5092
T7	26	7/8	40.00 - 60.00	0.6000	0.5092
T7	27	7/8	40.00 - 60.00	0.6000	0.5092
T7	28	7/8	40.00 - 60.00	0.6000	0.5092
T7	29	7/8	40.00 - 60.00	0.6000	0.5092
T7	30	7/8	40.00 - 60.00	0.6000	0.5092
T7	31	1/2	40.00 - 60.00	0.6000	0.5092
T7	32	1/2	40.00 - 60.00	0.6000	0.5092
T7	33	1/2	40.00 - 60.00	0.6000	0.5092
T8	1	Hybrid HCS 9x18 10 AWG (1-1/4")	20.00 - 40.00	0.6000	0.5697
T8	2	Hybrid HCS 9x18 10 AWG (1-1/4")	20.00 - 40.00	0.6000	0.5697
T8	3	Hybrid HCS 9x18 10 AWG (1-1/4")	20.00 - 40.00	0.6000	0.5697

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T8	4	LMR-195 (1/2 FOAM PE/LD PTFE)	20.00 - 40.00	0.6000	0.5697
T8	6	1	20.00 - 40.00	0.6000	0.5697
T8	7	1	20.00 - 40.00	0.6000	0.5697
T8	8	1	20.00 - 40.00	0.6000	0.5697
T8	9	1	20.00 - 40.00	0.6000	0.5697
T8	10	1	20.00 - 40.00	0.6000	0.5697
T8	11	1	20.00 - 40.00	0.6000	0.5697
T8	12	1/2' Fiber	20.00 - 40.00	0.6000	0.5697
T8	13	1/2' Fiber	20.00 - 40.00	0.6000	0.5697
T8	15	7/8	20.00 - 40.00	0.6000	0.5697
T8	16	7/8	20.00 - 40.00	0.6000	0.5697
T8	17	7/8	20.00 - 40.00	0.6000	0.5697
T8	18	7/8	20.00 - 40.00	0.6000	0.5697
T8	19	7/8	20.00 - 40.00	0.6000	0.5697
T8	20	1/4	20.00 - 40.00	0.6000	0.5697
T8	21	7/8	20.00 - 40.00	0.6000	0.5697
T8	22	7/8	20.00 - 40.00	0.6000	0.5697
T8	23	1/4	20.00 - 40.00	0.6000	0.5697
T8	24	1/4	20.00 - 40.00	0.6000	0.5697
T8	25	7/8	20.00 - 40.00	0.6000	0.5697
T8	26	7/8	20.00 - 40.00	0.6000	0.5697
T8	27	7/8	20.00 - 40.00	0.6000	0.5697
T8	28	7/8	20.00 - 40.00	0.6000	0.5697
T8	29	7/8	20.00 - 40.00	0.6000	0.5697
T8	30	7/8	20.00 - 40.00	0.6000	0.5697
T8	31	1/2	20.00 - 40.00	0.6000	0.5697
T8	32	1/2	20.00 - 40.00	0.6000	0.5697
T8	33	1/2	20.00 - 40.00	0.6000	0.5697
T9	1	Hybrid HCS 9x18 10 AWG (1-1/4")	8.00 - 20.00	0.6000	0.6000
T9	2	Hybrid HCS 9x18 10 AWG (1-1/4")	8.00 - 20.00	0.6000	0.6000
T9	3	Hybrid HCS 9x18 10 AWG (1-1/4")	8.00 - 20.00	0.6000	0.6000
T9	4	LMR-195 (1/2 FOAM PE/LD PTFE)	8.00 - 20.00	0.6000	0.6000
T9	6	1	8.00 - 20.00	0.6000	0.6000
T9	7	1	8.00 - 20.00	0.6000	0.6000
T9	8	1	8.00 - 20.00	0.6000	0.6000
T9	9	1	8.00 - 20.00	0.6000	0.6000
T9	10	1	8.00 - 20.00	0.6000	0.6000
T9	11	1	8.00 - 20.00	0.6000	0.6000
T9	12	1/2' Fiber	8.00 - 20.00	0.6000	0.6000
T9	13	1/2' Fiber	8.00 - 20.00	0.6000	0.6000
T9	15	7/8	8.00 - 20.00	0.6000	0.6000
T9	16	7/8	8.00 - 20.00	0.6000	0.6000
T9	17	7/8	8.00 - 20.00	0.6000	0.6000
T9	18	7/8	8.00 - 20.00	0.6000	0.6000
T9	19	7/8	8.00 - 20.00	0.6000	0.6000
T9	20	1/4	8.00 - 20.00	0.6000	0.6000
T9	21	7/8	8.00 - 20.00	0.6000	0.6000
T9	22	7/8	8.00 - 20.00	0.6000	0.6000
T9	23	1/4	8.00 - 20.00	0.6000	0.6000
T9	24	1/4	8.00 - 20.00	0.6000	0.6000
T9	25	7/8	8.00 - 20.00	0.6000	0.6000
T9	26	7/8	8.00 - 20.00	0.6000	0.6000
T9	27	7/8	8.00 - 20.00	0.6000	0.6000
T9	28	7/8	8.00 - 20.00	0.6000	0.6000
T9	29	7/8	8.00 - 20.00	0.6000	0.6000
T9	30	7/8	8.00 - 20.00	0.6000	0.6000
T9	31	1/2	8.00 - 20.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T9	32	1/2	8.00 - 20.00	0.6000	0.6000
T9	33	1/2	8.00 - 20.00	0.6000	0.6000
T9	34	1/2	8.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod 5/8x4'	A	From Leg	0.00	0.0000	160.00	No Ice	0.25	0.25	0.03
(PD)			0.00			1/2" Ice	0.66	0.66	0.03
			14.00			1" Ice	1.07	1.07	0.04
Omni 2"x8'	B	From Leg	3.00	0.0000	159.00	No Ice	2.00	2.00	0.02
(PD)			0.00			1/2" Ice	3.02	3.02	0.04
			5.00			1" Ice	4.04	4.04	0.05
3' Side Mount Standoff	A	From Leg	1.00	0.0000	159.00	No Ice	1.50	1.50	0.04
(PD)			0.00			1/2" Ice	2.20	2.20	0.07
			0.00			1" Ice	2.90	2.90	0.10
3' Side Mount Standoff	B	From Leg	1.00	0.0000	159.00	No Ice	1.50	1.50	0.04
(PD)			0.00			1/2" Ice	2.20	2.20	0.07
			0.00			1" Ice	2.90	2.90	0.10
3' Side Mount Standoff	C	From Leg	1.00	0.0000	159.00	No Ice	1.50	1.50	0.04
(PD)			0.00			1/2" Ice	2.20	2.20	0.07
			0.00			1" Ice	2.90	2.90	0.10
**									
PiROD 12' T-Frame	A	From Leg	2.00	0.0000	140.00	No Ice	12.20	12.20	0.36
(T-Mobile)			0.00			1/2" Ice	17.60	17.60	0.49
			0.00			1" Ice	23.00	23.00	0.62
PiROD 12' T-Frame	B	From Leg	2.00	0.0000	140.00	No Ice	12.20	12.20	0.36
(T-Mobile)			0.00			1/2" Ice	17.60	17.60	0.49
			0.00			1" Ice	23.00	23.00	0.62
PiROD 12' T-Frame	C	From Leg	2.00	0.0000	140.00	No Ice	12.20	12.20	0.36
(T-Mobile)			0.00			1/2" Ice	17.60	17.60	0.49
			0.00			1" Ice	23.00	23.00	0.62
AIR32 B66a/ B2a w/mount	A	From Leg	4.00	0.0000	140.00	No Ice	6.81	6.14	0.15
pipe			0.00			1/2" Ice	7.30	6.99	0.22
(T-Mobile)			0.00			1" Ice	7.79	7.84	0.28
AIR32 B66a/ B2a w/mount	B	From Leg	4.00	0.0000	140.00	No Ice	6.81	6.14	0.15
pipe			0.00			1/2" Ice	7.30	6.99	0.22
(T-Mobile)			0.00			1" Ice	7.79	7.84	0.28
AIR32 B66a/ B2a w/mount	C	From Leg	4.00	0.0000	140.00	No Ice	6.81	6.14	0.15
pipe			0.00			1/2" Ice	7.30	6.99	0.22
(T-Mobile)			0.00			1" Ice	7.79	7.84	0.28
RRUS-11 B4	A	From Leg	3.00	0.0000	140.00	No Ice	2.79	1.19	0.05
(T-Mobile)			0.00			1/2" Ice	3.00	1.34	0.07
			0.00			1" Ice	3.21	1.49	0.09
RRUS-11 B4	B	From Leg	3.00	0.0000	140.00	No Ice	2.79	1.19	0.05
(T-Mobile)			0.00			1/2" Ice	3.00	1.34	0.07
			0.00			1" Ice	3.21	1.49	0.09
RRUS-11 B4	C	From Leg	3.00	0.0000	140.00	No Ice	2.79	1.19	0.05
(T-Mobile)			0.00			1/2" Ice	3.00	1.34	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	3.21	1.49	0.09
LNX 6515DS-A1M	A	From Leg	4.00	0.0000	140.00	No Ice	6.87	5.18	0.04
(T-Mobile)			0.00			1/2" Ice	7.38	5.68	0.15
			0.00			1" Ice	7.89	6.17	0.25
LNX 6515DS-A1M	B	From Leg	4.00	0.0000	140.00	No Ice	6.87	5.18	0.04
(T-Mobile)			0.00			1/2" Ice	7.38	5.68	0.15
			0.00			1" Ice	7.89	6.17	0.25
LNX 6515DS-A1M	C	From Leg	4.00	0.0000	140.00	No Ice	6.87	5.18	0.04
(T-Mobile)			0.00			1/2" Ice	7.38	5.68	0.15
			0.00			1" Ice	7.89	6.17	0.25
RRUS 11 B12	A	From Leg	3.00	0.0000	140.00	No Ice	1.42	0.60	0.05
(T-Mobile)			0.00			1/2" Ice	1.58	0.71	0.07
			0.00			1" Ice	1.73	0.83	0.09
RRUS 11 B12	B	From Leg	3.00	0.0000	140.00	No Ice	1.42	0.60	0.05
(T-Mobile)			0.00			1/2" Ice	1.58	0.71	0.07
			0.00			1" Ice	1.73	0.83	0.09
RRUS 11 B12	C	From Leg	3.00	0.0000	140.00	No Ice	1.42	0.60	0.05
(T-Mobile)			0.00			1/2" Ice	1.58	0.71	0.07
			0.00			1" Ice	1.73	0.83	0.09
APXV18-206517-C	A	From Leg	4.00	0.0000	140.00	No Ice	0.94	2.04	0.03
(T-Mobile)			0.00			1/2" Ice	1.26	2.37	0.05
			0.00			1" Ice	1.58	2.71	0.08
APXV18-206517-C	B	From Leg	4.00	0.0000	140.00	No Ice	0.94	2.04	0.03
(T-Mobile)			0.00			1/2" Ice	1.26	2.37	0.05
			0.00			1" Ice	1.58	2.71	0.08
APXV18-206517-C	C	From Leg	4.00	0.0000	140.00	No Ice	0.94	2.04	0.03
(T-Mobile)			0.00			1/2" Ice	1.26	2.37	0.05
			0.00			1" Ice	1.58	2.71	0.08
**									
3' Side Mount Standoff	B	From Leg	1.50	0.0000	134.00	No Ice	1.50	1.50	0.04
(PD)			0.00			1/2" Ice	2.20	2.20	0.07
			0.00			1" Ice	2.90	2.90	0.10
3' Side Mount Standoff	C	From Leg	1.50	0.0000	134.00	No Ice	1.50	1.50	0.04
(PD)			0.00			1/2" Ice	2.20	2.20	0.07
			0.00			1" Ice	2.90	2.90	0.10
**									
3' Side Mount Standoff	A	From Leg	3.00	0.0000	117.00	No Ice	1.50	1.50	0.04
(PD)			0.00			1/2" Ice	2.20	2.20	0.07
			0.00			1" Ice	2.90	2.90	0.10
3' Side Mount Standoff	B	From Leg	3.00	0.0000	117.00	No Ice	1.50	1.50	0.04
(PD)			0.00			1/2" Ice	2.20	2.20	0.07
			0.00			1" Ice	2.90	2.90	0.10
3' Side Mount Standoff	C	From Leg	3.00	0.0000	117.00	No Ice	1.50	1.50	0.04
(PD)			0.00			1/2" Ice	2.20	2.20	0.07
			0.00			1" Ice	2.90	2.90	0.10
Omni 1"x3' (BA1012-2)	A	From Leg	6.00	0.0000	117.00	No Ice	0.30	0.30	0.01
(PD)			0.00			1/2" Ice	0.54	0.54	0.01
			1.50			1" Ice	0.78	0.78	0.02
Omni 2"x10'	B	From Leg	6.00	0.0000	117.00	No Ice	2.40	2.40	0.03
(SC329-HF2LDF)			0.00			1/2" Ice	3.63	3.63	0.05
(PD)			6.00			1" Ice	4.86	4.86	0.07
Omni 2"x10'	C	From Leg	6.00	0.0000	117.00	No Ice	2.40	2.40	0.03
(SC329-HF2LDF)			0.00			1/2" Ice	3.63	3.63	0.05
(PD)			6.00			1" Ice	4.86	4.86	0.07
**									
3' Side Mount Standoff	A	From Leg	1.50	0.0000	90.00	No Ice	1.50	1.50	0.04
(PD)			0.00			1/2" Ice	2.20	2.20	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	2.90	2.90	0.10
3' Side Mount Standoff	B	From Leg	1.50	0.0000	90.00	No Ice	1.50	1.50	0.04
(PD)			0.00			1/2" Ice	2.20	2.20	0.07
			0.00			1" Ice	2.90	2.90	0.10
3' Side Mount Standoff	C	From Leg	1.50	0.0000	90.00	No Ice	1.50	1.50	0.04
(PD)			0.00			1/2" Ice	2.20	2.20	0.07
			0.00			1" Ice	2.90	2.90	0.10
3' Yagi Antenna	A	From Leg	3.00	0.0000	90.00	No Ice	0.60	0.30	0.01
(SY406-SF1SNM)			0.00			1/2" Ice	0.81	0.41	0.04
(PD)			0.00			1" Ice	1.02	0.52	0.06
3' Yagi Antenna	B	From Leg	3.00	0.0000	90.00	No Ice	0.60	0.30	0.01
(SY307-SF3SNM)			0.00			1/2" Ice	0.81	0.41	0.04
(PD)			0.00			1" Ice	1.02	0.52	0.06
3' Yagi Antenna	C	From Leg	3.00	0.0000	90.00	No Ice	0.60	0.30	0.01
(SY307-SF3SNM)			0.00			1/2" Ice	0.81	0.41	0.04
(PD)			0.00			1" Ice	1.02	0.52	0.06
**									
6' Side Mount Standoff	A	From Leg	3.00	0.0000	60.00	No Ice	4.97	4.97	0.07
(PD)			0.00			1/2" Ice	6.12	6.12	0.13
			0.00			1" Ice	7.27	7.27	0.19
6' Side Mount Standoff	B	From Leg	3.00	0.0000	60.00	No Ice	4.97	4.97	0.07
(PD)			0.00			1/2" Ice	6.12	6.12	0.13
			0.00			1" Ice	7.27	7.27	0.19
6' Side Mount Standoff	C	From Leg	3.00	0.0000	60.00	No Ice	4.97	4.97	0.07
(PD)			0.00			1/2" Ice	6.12	6.12	0.13
			0.00			1" Ice	7.27	7.27	0.19
DB205-1	A	From Leg	6.00	0.0000	60.00	No Ice	2.40	2.40	0.03
(PD)			0.00			1/2" Ice	3.63	3.63	0.05
			6.00			1" Ice	4.86	4.86	0.07
Omni 2 1/2"x18'	B	From Leg	6.00	0.0000	60.00	No Ice	5.00	5.00	0.04
(PD)			0.00			1/2" Ice	7.03	7.03	0.08
			10.00			1" Ice	9.06	9.06	0.13
Omni 2 1/2"x18'	C	From Leg	6.00	0.0000	60.00	No Ice	5.00	5.00	0.04
(PD)			0.00			1/2" Ice	7.03	7.03	0.08
			10.00			1" Ice	9.06	9.06	0.13
**									
3' Side Mount Standoff	C	From Leg	1.50	0.0000	20.00	No Ice	1.50	1.50	0.04
(PD)			0.00			1/2" Ice	2.20	2.20	0.07
			0.00			1" Ice	2.90	2.90	0.10
GPS (1' Omni) (10022-1)	C	From Leg	3.00	0.0000	20.00	No Ice	0.21	0.21	0.01
(PD)			0.00			1/2" Ice	0.31	0.31	0.01
			0.00			1" Ice	0.41	0.41	0.01
* AT&T Proposed *									
VFA12-WLL-30120	A	From Leg	2.00	0.0000	151.00	No Ice	13.20	9.20	0.66
(AT&T)			0.00			1/2" Ice	19.50	14.60	0.80
			0.00			1" Ice	25.80	20.00	1.01
VFA12-WLL-30120	B	From Leg	2.00	0.0000	151.00	No Ice	13.20	9.20	0.66
(AT&T)			0.00			1/2" Ice	19.50	14.60	0.80
			0.00			1" Ice	25.80	20.00	1.01
VFA12-WLL-30120	C	From Leg	2.00	0.0000	151.00	No Ice	13.20	9.20	0.66
(AT&T)			0.00			1/2" Ice	19.50	14.60	0.80
			0.00			1" Ice	25.80	20.00	1.01
RRH 4478 B14	A	From Leg	3.00	0.0000	151.00	No Ice	0.92	0.53	0.06
(AT&T)			0.00			1/2" Ice	1.05	0.63	0.08
			0.00			1" Ice	1.18	0.74	0.09
RRH 4415 B30	A	From Leg	3.00	0.0000	151.00	No Ice	1.86	0.82	0.04
(AT&T)			0.00			1/2" Ice	2.12	1.01	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	2.37	1.20	0.07
RRH 4449 B5/B12	A	From Leg	3.00	0.0000	151.00	No Ice	1.97	1.40	0.07
(AT&T)			0.00			1/2" Ice	2.24	1.64	0.09
			0.00			1" Ice	2.50	1.87	0.11
RRH 8843 B2/B66a	A	From Leg	3.00	0.0000	151.00	No Ice	1.64	1.35	0.07
(AT&T)			0.00			1/2" Ice	1.88	1.58	0.09
			0.00			1" Ice	2.13	1.80	0.11
DC6-48-60-18-8C Squid	A	From Leg	3.00	0.0000	151.00	No Ice	1.88	1.50	0.02
(AT&T)			0.00			1/2" Ice	2.07	1.68	0.03
			0.00			1" Ice	2.26	1.86	0.05
DC6-48-60-18-8C Squid	B	From Leg	3.00	0.0000	151.00	No Ice	1.88	1.50	0.02
(AT&T)			0.00			1/2" Ice	2.07	1.68	0.03
			0.00			1" Ice	2.26	1.86	0.05
(2) DC6-48-60-0-8C-EV	C	From Leg	3.00	0.0000	151.00	No Ice	2.39	1.34	0.03
Squid			0.00			1/2" Ice	2.60	1.52	0.06
(AT&T)			0.00			1" Ice	2.81	1.69	0.10
(2) EPBQ-654L8H8-L2	A	From Leg	4.00	0.0000	151.00	No Ice	8.40	2.52	0.09
(AT&T)			0.00			1/2" Ice	8.89	2.95	0.18
			0.00			1" Ice	9.38	3.38	0.27
(2) EPBQ-654L8H8-L2	B	From Leg	4.00	0.0000	151.00	No Ice	8.40	2.52	0.09
(AT&T)			0.00			1/2" Ice	8.89	2.95	0.18
			0.00			1" Ice	9.38	3.38	0.27
(2) EPBQ-654L8H8-L2	C	From Leg	4.00	0.0000	151.00	No Ice	8.40	2.52	0.09
(AT&T)			0.00			1/2" Ice	8.89	2.95	0.18
			0.00			1" Ice	9.38	3.38	0.27
HPA65R-BU8A	A	From Leg	4.00	0.0000	151.00	No Ice	4.68	3.04	0.06
(AT&T)			0.00			1/2" Ice	5.13	3.48	0.12
			0.00			1" Ice	5.59	3.91	0.19
HPA65R-BU8A	B	From Leg	4.00	0.0000	151.00	No Ice	4.68	3.04	0.06
(AT&T)			0.00			1/2" Ice	5.13	3.48	0.12
			0.00			1" Ice	5.59	3.91	0.19
HPA65R-BU8A	C	From Leg	4.00	0.0000	151.00	No Ice	4.68	3.04	0.06
(AT&T)			0.00			1/2" Ice	5.13	3.48	0.12
			0.00			1" Ice	5.59	3.91	0.19
RRH 4478 B14	B	From Leg	3.00	0.0000	151.00	No Ice	0.92	0.53	0.06
(AT&T)			0.00			1/2" Ice	1.05	0.63	0.08
			0.00			1" Ice	1.18	0.74	0.09
RRH 4415 B30	B	From Leg	3.00	0.0000	151.00	No Ice	1.86	0.82	0.04
(AT&T)			0.00			1/2" Ice	2.12	1.01	0.06
			0.00			1" Ice	2.37	1.20	0.07
RRH 4449 B5/B12	B	From Leg	3.00	0.0000	151.00	No Ice	1.97	1.40	0.07
(AT&T)			0.00			1/2" Ice	2.24	1.64	0.09
			0.00			1" Ice	2.50	1.87	0.11
RRH 8843 B2/B66a	B	From Leg	3.00	0.0000	151.00	No Ice	1.64	1.35	0.07
(AT&T)			0.00			1/2" Ice	1.88	1.58	0.09
			0.00			1" Ice	2.13	1.80	0.11
RRH 4478 B14	C	From Leg	3.00	0.0000	151.00	No Ice	0.92	0.53	0.06
(AT&T)			0.00			1/2" Ice	1.05	0.63	0.08
			0.00			1" Ice	1.18	0.74	0.09
RRH 4415 B30	C	From Leg	3.00	0.0000	151.00	No Ice	1.86	0.82	0.04
(AT&T)			0.00			1/2" Ice	2.12	1.01	0.06
			0.00			1" Ice	2.37	1.20	0.07
RRH 4449 B5/B12	C	From Leg	3.00	0.0000	151.00	No Ice	1.97	1.40	0.07
(AT&T)			0.00			1/2" Ice	2.24	1.64	0.09
			0.00			1" Ice	2.50	1.87	0.11
RRH 8843 B2/B66a	C	From Leg	3.00	0.0000	151.00	No Ice	1.64	1.35	0.07
(AT&T)			0.00			1/2" Ice	1.88	1.58	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	2.13	1.80	0.11
USF-2U Stand-Off (AT&T)	A	From Leg	2.00	0.0000	151.00	No Ice	2.50	4.04	0.13
			0.00			1/2" Ice	3.15	5.03	0.16
			0.00			1" Ice	3.89	6.06	0.21
USF-2U Stand-Off (AT&T)	C	From Leg	2.00	0.0000	151.00	No Ice	2.50	4.04	0.13
			0.00			1/2" Ice	3.15	5.03	0.16
			0.00			1" Ice	3.89	6.06	0.21
***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
HPD3-4.7NS (PD)	A	Paraboloid w/o Radome	From Leg	3.00	Worst		159.00	3.28	No Ice	8.47	0.05
				0.00					1/2" Ice	8.90	0.10
				0.00					1" Ice	9.33	0.14
HPD2-4.7NS (PD)	C	Paraboloid w/o Radome	From Leg	3.00	Worst		159.00	2.00	No Ice	3.14	0.02
				0.00					1/2" Ice	3.41	0.04
				0.00					1" Ice	3.68	0.06
SPD2-5.2NS (PD)	B	Paraboloid w/o Radome	From Leg	3.00	Worst		158.00	2.17	No Ice	3.72	0.03
				0.00					1/2" Ice	4.01	0.04
				0.00					1" Ice	4.30	0.05
HPD2-4.7NS (PD)	B	Paraboloid w/o Radome	From Leg	3.00	Worst		134.00	2.00	No Ice	3.14	0.02
				0.00					1/2" Ice	3.41	0.04
				0.00					1" Ice	3.68	0.06
5830BH (20" Square Dish) (PD)	C	Paraboloid w/o Radome	From Leg	3.00	Worst		134.00	2.00	No Ice	1.67	0.01
				0.00					1/2" Ice	1.84	0.03
				0.00					1" Ice	2.01	0.05

Truss-Leg Properties

Section Designation	Area in^2	Area Ice in^2	Self Weight K	Ice Weight K	Equiv. Diameter in	Equiv. Diameter Ice in	Leg Area in^2
Pirod 105216	1998.0891	7442.2338	0.48	2.58	6.9378	25.8411	3.6816
Pirod 105217	2130.7479	7476.2794	0.59	2.54	7.3984	25.9593	5.3014
Pirod 105217	2130.7479	7415.6426	0.59	2.44	7.3984	25.7488	5.3014
Pirod 105217	2130.7479	7336.8085	0.59	2.30	7.3984	25.4750	5.3014
Pirod 105218	2263.4687	7294.0816	0.72	2.14	7.8593	25.3267	7.2158
Pirod 105218	2263.4687	7066.3308	0.72	1.79	7.8593	24.5359	7.2158

Tower Pressures - No Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	155.00	1.12	29	51.458	A	0.000	6.989	2.917	41.73	3.108	0.000
160.00-150.00					B	0.000	6.989		41.73	2.318	0.000
					C	0.000	6.989		41.73	0.866	0.000
T2	140.00	1.088	28	103.333	A	0.000	14.000	6.667	47.62	7.264	0.000
150.00-130.00					B	0.000	14.000		47.62	10.964	0.000
					C	0.000	14.000		47.62	17.320	0.000
T3	120.00	1.041	27	103.750	A	0.000	15.971	7.500	46.96	11.234	0.000
130.00-110.00					B	0.000	15.971		46.96	19.277	0.000
					C	0.000	15.971		46.96	17.320	0.000
T4	105.00	1.002	26	66.055	A	6.007	11.582	11.582	65.85	7.060	0.000
110.00-100.00					B	6.007	11.582		65.85	10.360	0.000
					C	6.007	11.582		65.85	8.660	0.000
T5	90.00	0.959	24	162.528	A	10.181	24.703	24.703	70.81	14.120	0.000
100.00-80.00					B	10.181	24.703		70.81	24.050	0.000
					C	10.181	24.703		70.81	17.320	0.000
T6 80.00-60.00	70.00	0.892	23	202.528	A	11.218	24.703	24.703	68.77	14.120	0.000
					B	11.218	24.703		68.77	27.380	0.000
					C	11.218	24.703		68.77	17.320	0.000
T7 60.00-40.00	50.00	0.811	21	242.528	A	12.394	24.703	24.703	66.59	14.120	0.000
					B	12.394	24.703		66.59	30.860	0.000
					C	12.394	24.703		66.59	17.320	0.000
T8 40.00-20.00	30.00	0.701	18	282.945	A	13.672	26.241	26.241	65.75	14.120	0.000
					B	13.672	26.241		65.75	30.860	0.000
					C	13.672	26.241		65.75	17.320	0.000
T9 20.00-0.00	10.00	0.7	18	322.945	A	18.032	26.241	26.241	59.27	8.472	0.000
					B	18.032	26.241		59.27	19.212	0.000
					C	18.032	26.241		59.27	10.392	0.000

Tower Pressure - With Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	155.00	1.12	6	2.9182	56.322	A	0.000	43.189	12.644	29.28	19.450	0.000
160.00-150.00						B	0.000	43.189		29.28	17.493	0.000
						C	0.000	43.189		29.28	5.535	0.000
T2	140.00	1.088	6	2.8887	112.962	A	0.000	80.992	25.925	32.01	46.550	0.000
150.00-130.00						B	0.000	80.992		32.01	73.360	0.000
						C	0.000	80.992		32.01	109.758	0.000
T3	120.00	1.041	6	2.8445	113.232	A	0.000	81.938	26.463	32.30	76.089	0.000
130.00-110.00						B	0.000	81.938		32.30	125.661	0.000
						C	0.000	81.938		32.30	108.344	0.000
T4	105.00	1.002	5	2.8068	70.739	A	6.007	56.160	43.140	69.39	46.355	0.000
110.00-100.00						B	6.007	56.160		69.39	66.495	0.000
						C	6.007	56.160		69.39	53.568	0.000
T5 100.00-80.00	90.00	0.959	5	2.7638	171.752	A	10.181	109.185	86.675	72.61	91.508	0.000
						B	10.181	109.185		72.61	151.187	0.000
						C	10.181	109.185		72.61	105.763	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T6 80.00-60.00	70.00	0.892	5	2.6952	211.523	A	11.218	110.161	85.972	70.83	89.587	0.000
						B	11.218	110.161		70.83	167.533	0.000
						C	11.218	110.161		70.83	103.568	0.000
T7 60.00-40.00	50.00	0.811	4	2.6061	251.226	A	12.394	110.898	85.058	68.99	87.090	0.000
						B	12.394	110.898		68.99	197.648	0.000
						C	12.394	110.898		68.99	100.714	0.000
T8 40.00-20.00	30.00	0.701	4	2.4763	291.210	A	13.672	111.648	84.563	67.48	83.456	0.000
						B	13.672	111.648		67.48	189.342	0.000
						C	13.672	111.648		67.48	96.561	0.000
T9 20.00-0.00	10.00	0.7	4	2.2186	330.350	A	18.032	108.594	81.922	64.70	45.745	0.000
						B	18.032	108.594		64.70	109.733	0.000
						C	18.032	108.594		64.70	52.990	0.000

Tower Pressure - Service

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	155.00	1.12	9	51.458	A	0.000	6.989	2.917	41.73	3.108	0.000
160.00-150.00					B	0.000	6.989		41.73	2.318	0.000
					C	0.000	6.989		41.73	0.866	0.000
T2	140.00	1.088	9	103.333	A	0.000	14.000	6.667	47.62	7.264	0.000
150.00-130.00					B	0.000	14.000		47.62	10.964	0.000
					C	0.000	14.000		47.62	17.320	0.000
T3	120.00	1.041	8	103.750	A	0.000	15.971	7.500	46.96	11.234	0.000
130.00-110.00					B	0.000	15.971		46.96	19.277	0.000
					C	0.000	15.971		46.96	17.320	0.000
T4	105.00	1.002	8	66.055	A	6.007	11.582	11.582	65.85	7.060	0.000
110.00-100.00					B	6.007	11.582		65.85	10.360	0.000
					C	6.007	11.582		65.85	8.660	0.000
T5	90.00	0.959	8	162.528	A	10.181	24.703	24.703	70.81	14.120	0.000
100.00-80.00					B	10.181	24.703		70.81	24.050	0.000
					C	10.181	24.703		70.81	17.320	0.000
T6 80.00-60.00	70.00	0.892	7	202.528	A	11.218	24.703	24.703	68.77	14.120	0.000
					B	11.218	24.703		68.77	27.380	0.000
					C	11.218	24.703		68.77	17.320	0.000
T7 60.00-40.00	50.00	0.811	6	242.528	A	12.394	24.703	24.703	66.59	14.120	0.000
					B	12.394	24.703		66.59	30.860	0.000
					C	12.394	24.703		66.59	17.320	0.000
T8 40.00-20.00	30.00	0.701	5	282.945	A	13.672	26.241	26.241	65.75	14.120	0.000
					B	13.672	26.241		65.75	30.860	0.000
					C	13.672	26.241		65.75	17.320	0.000
T9 20.00-0.00	10.00	0.7	5	322.945	A	18.032	26.241	26.241	59.27	8.472	0.000
					B	18.032	26.241		59.27	19.212	0.000
					C	18.032	26.241		59.27	10.392	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	0.60	A	0.136	2.824	29	1	1	3.958	0.36	36.34	C
160.00-150.00			B	0.136	2.824		1	1	3.958			
			C	0.136	2.824		1	1	3.958			
T2	0.17	1.27	A	0.135	2.826	28	1	1	7.927	1.03	51.61	C
150.00-130.00			B	0.135	2.826		1	1	7.927			
			C	0.135	2.826		1	1	7.927			
T3	0.23	1.65	A	0.154	2.757	27	1	1	9.071	1.21	60.66	C
130.00-110.00			B	0.154	2.757		1	1	9.071			
			C	0.154	2.757		1	1	9.071			
T4	0.13	0.99	A	0.266	2.39	26	1	1	12.831	1.01	100.69	C
110.00-100.00			B	0.266	2.39		1	1	12.831			
			C	0.266	2.39		1	1	12.831			
T5	0.27	2.22	A	0.215	2.548	24	1	1	24.439	1.99	99.42	C
100.00-80.00			B	0.215	2.548		1	1	24.439			
			C	0.215	2.548		1	1	24.439			
T6	0.29	2.27	A	0.177	2.673	23	1	1	25.320	1.99	99.71	C
80.00-60.00			B	0.177	2.673		1	1	25.320			
			C	0.177	2.673		1	1	25.320			
T7	0.30	2.32	A	0.153	2.761	21	1	1	26.421	1.94	97.03	C
60.00-40.00			B	0.153	2.761		1	1	26.421			
			C	0.153	2.761		1	1	26.421			
T8	0.30	2.76	A	0.141	2.805	18	1	1	28.543	1.79	89.26	C
40.00-20.00			B	0.141	2.805		1	1	28.543			
			C	0.141	2.805		1	1	28.543			
T9 20.00-0.00	0.18	2.96	A	0.137	2.82	18	1	1	32.894	1.76	87.78	C
			B	0.137	2.82		1	1	32.894			
			C	0.137	2.82		1	1	32.894			
Sum Weight:	1.91	17.04						OTM	938.84 kip-ft	13.08		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	0.60	A	0.136	2.824	29	0.825	1	3.958	0.36	36.34	C
160.00-150.00			B	0.136	2.824		0.825	1	3.958			
			C	0.136	2.824		0.825	1	3.958			
T2	0.17	1.27	A	0.135	2.826	28	0.825	1	7.927	1.03	51.61	C
150.00-130.00			B	0.135	2.826		0.825	1	7.927			
			C	0.135	2.826		0.825	1	7.927			
T3	0.23	1.65	A	0.154	2.757	27	0.825	1	9.071	1.21	60.66	C
130.00-110.00			B	0.154	2.757		0.825	1	9.071			
			C	0.154	2.757		0.825	1	9.071			
T4	0.13	0.99	A	0.266	2.39	26	0.825	1	11.780	0.95	95.23	C
110.00-100.00			B	0.266	2.39		0.825	1	11.780			
			C	0.266	2.39		0.825	1	11.780			
T5	0.27	2.22	A	0.215	2.548	24	0.825	1	22.657	1.89	94.69	C
100.00-80.00			B	0.215	2.548		0.825	1	22.657			
			C	0.215	2.548		0.825	1	22.657			
T6	0.29	2.27	A	0.177	2.673	23	0.825	1	23.357	1.89	94.63	C
80.00-60.00			B	0.177	2.673		0.825	1	23.357			
			C	0.177	2.673		0.825	1	23.357			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T7	0.30	2.32	A	0.153	2.761	21	0.825	1	24.252	1.84	91.76	C
60.00-40.00			B	0.153	2.761		0.825	1	24.252			
			C	0.153	2.761		0.825	1	24.252			
T8	0.30	2.76	A	0.141	2.805	18	0.825	1	26.150	1.68	84.16	C
40.00-20.00			B	0.141	2.805		0.825	1	26.150			
			C	0.141	2.805		0.825	1	26.150			
T9 20.00-0.00	0.18	2.96	A	0.137	2.82	18	0.825	1	29.738	1.62	81.03	C
			B	0.137	2.82		0.825	1	29.738			
			C	0.137	2.82		0.825	1	29.738			
Sum Weight:	1.91	17.04						OTM	907.81 kip-ft	12.49		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	0.60	A	0.136	2.824	29	0.8	1	3.958	0.36	36.34	C
160.00-150.00			B	0.136	2.824		0.8	1	3.958			
			C	0.136	2.824		0.8	1	3.958			
T2	0.17	1.27	A	0.135	2.826	28	0.8	1	7.927	1.03	51.61	C
150.00-130.00			B	0.135	2.826		0.8	1	7.927			
			C	0.135	2.826		0.8	1	7.927			
T3	0.23	1.65	A	0.154	2.757	27	0.8	1	9.071	1.21	60.66	C
130.00-110.00			B	0.154	2.757		0.8	1	9.071			
			C	0.154	2.757		0.8	1	9.071			
T4	0.13	0.99	A	0.266	2.39	26	0.8	1	11.629	0.94	94.45	C
110.00-100.00			B	0.266	2.39		0.8	1	11.629			
			C	0.266	2.39		0.8	1	11.629			
T5	0.27	2.22	A	0.215	2.548	24	0.8	1	22.403	1.88	94.02	C
100.00-80.00			B	0.215	2.548		0.8	1	22.403			
			C	0.215	2.548		0.8	1	22.403			
T6	0.29	2.27	A	0.177	2.673	23	0.8	1	23.077	1.88	93.91	C
80.00-60.00			B	0.177	2.673		0.8	1	23.077			
			C	0.177	2.673		0.8	1	23.077			
T7	0.30	2.32	A	0.153	2.761	21	0.8	1	23.942	1.82	91.01	C
60.00-40.00			B	0.153	2.761		0.8	1	23.942			
			C	0.153	2.761		0.8	1	23.942			
T8	0.30	2.76	A	0.141	2.805	18	0.8	1	25.808	1.67	83.43	C
40.00-20.00			B	0.141	2.805		0.8	1	25.808			
			C	0.141	2.805		0.8	1	25.808			
T9 20.00-0.00	0.18	2.96	A	0.137	2.82	18	0.8	1	29.288	1.60	80.06	C
			B	0.137	2.82		0.8	1	29.288			
			C	0.137	2.82		0.8	1	29.288			
Sum Weight:	1.91	17.04						OTM	903.38 kip-ft	12.40		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	0.60	A	0.136	2.824	29	0.85	1	3.958	0.36	36.34	C
160.00-150.00			B	0.136	2.824		0.85	1	3.958			
			C	0.136	2.824		0.85	1	3.958			
T2	0.17	1.27	A	0.135	2.826	28	0.85	1	7.927	1.03	51.61	C
150.00-130.00			B	0.135	2.826		0.85	1	7.927			
			C	0.135	2.826		0.85	1	7.927			
T3	0.23	1.65	A	0.154	2.757	27	0.85	1	9.071	1.21	60.66	C
130.00-110.00			B	0.154	2.757		0.85	1	9.071			
			C	0.154	2.757		0.85	1	9.071			
T4	0.13	0.99	A	0.266	2.39	26	0.85	1	11.930	0.96	96.01	C
110.00-100.00			B	0.266	2.39		0.85	1	11.930			
			C	0.266	2.39		0.85	1	11.930			
T5	0.27	2.22	A	0.215	2.548	24	0.85	1	22.912	1.91	95.37	C
100.00-80.00			B	0.215	2.548		0.85	1	22.912			
			C	0.215	2.548		0.85	1	22.912			
T6	0.29	2.27	A	0.177	2.673	23	0.85	1	23.638	1.91	95.36	C
80.00-60.00			B	0.177	2.673		0.85	1	23.638			
			C	0.177	2.673		0.85	1	23.638			
T7	0.30	2.32	A	0.153	2.761	21	0.85	1	24.562	1.85	92.51	C
60.00-40.00			B	0.153	2.761		0.85	1	24.562			
			C	0.153	2.761		0.85	1	24.562			
T8	0.30	2.76	A	0.141	2.805	18	0.85	1	26.492	1.70	84.89	C
40.00-20.00			B	0.141	2.805		0.85	1	26.492			
			C	0.141	2.805		0.85	1	26.492			
T9 20.00-0.00	0.18	2.96	A	0.137	2.82	18	0.85	1	30.189	1.64	81.99	C
			B	0.137	2.82		0.85	1	30.189			
			C	0.137	2.82		0.85	1	30.189			
Sum Weight:	1.91	17.04						OTM	912.24 kip-ft	12.57		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.90	3.32	A	0.767	1.795	6	1	1	37.148	0.40	39.67	C
160.00-150.00			B	0.767	1.795		1	1	37.148			
			C	0.767	1.795		1	1	37.148			
T2	4.85	6.27	A	0.717	1.778	6	1	1	66.678	0.92	46.17	C
150.00-130.00			B	0.717	1.778		1	1	66.678			
			C	0.717	1.778		1	1	66.678			
T3	6.45	6.71	A	0.724	1.779	6	1	1	67.851	0.99	49.69	C
130.00-110.00			B	0.724	1.779		1	1	67.851			
			C	0.724	1.779		1	1	67.851			
T4	3.43	6.72	A	0.879	1.895	5	1	1	59.262	0.61	61.39	C
110.00-100.00			B	0.879	1.895		1	1	59.262			
			C	0.879	1.895		1	1	59.262			
T5	7.09	12.98	A	0.695	1.776	5	1	1	98.351	1.25	62.28	C
100.00-80.00			B	0.695	1.776		1	1	98.351			
			C	0.695	1.776		1	1	98.351			
T6	7.19	12.91	A	0.574	1.823	5	1	1	91.360	1.32	66.08	C
80.00-60.00			B	0.574	1.823		1	1	91.360			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.574	1.823		1	1	91.360			
T7	7.43	12.73	A	0.491	1.912	4	1	1	87.810	1.37	68.26	C
60.00-40.00			B	0.491	1.912		1	1	87.810			
			C	0.491	1.912		1	1	87.810			
T8	6.83	12.77	A	0.43	2.007	4	1	1	86.231	1.24	62.11	C
40.00-20.00			B	0.43	2.007		1	1	86.231			
			C	0.43	2.007		1	1	86.231			
T9 20.00-0.00	3.53	12.12	A	0.383	2.098	4	1	1	86.357	0.99	49.56	C
			B	0.383	2.098		1	1	86.357			
			C	0.383	2.098		1	1	86.357			
Sum Weight:	47.71	86.53						OTM	694.53 kip-ft	9.09		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.90	3.32	A	0.767	1.795	6	0.825	1	37.148	0.40	39.67	C
160.00-150.00			B	0.767	1.795		0.825	1	37.148			
			C	0.767	1.795		0.825	1	37.148			
T2	4.85	6.27	A	0.717	1.778	6	0.825	1	66.678	0.92	46.17	C
150.00-130.00			B	0.717	1.778		0.825	1	66.678			
			C	0.717	1.778		0.825	1	66.678			
T3	6.45	6.71	A	0.724	1.779	6	0.825	1	67.851	0.99	49.69	C
130.00-110.00			B	0.724	1.779		0.825	1	67.851			
			C	0.724	1.779		0.825	1	67.851			
T4	3.43	6.72	A	0.879	1.895	5	0.825	1	58.211	0.60	60.47	C
110.00-100.00			B	0.879	1.895		0.825	1	58.211			
			C	0.879	1.895		0.825	1	58.211			
T5	7.09	12.98	A	0.695	1.776	5	0.825	1	96.569	1.23	61.58	C
100.00-80.00			B	0.695	1.776		0.825	1	96.569			
			C	0.695	1.776		0.825	1	96.569			
T6	7.19	12.91	A	0.574	1.823	5	0.825	1	89.397	1.31	65.34	C
80.00-60.00			B	0.574	1.823		0.825	1	89.397			
			C	0.574	1.823		0.825	1	89.397			
T7	7.43	12.73	A	0.491	1.912	4	0.825	1	85.641	1.35	67.49	C
60.00-40.00			B	0.491	1.912		0.825	1	85.641			
			C	0.491	1.912		0.825	1	85.641			
T8	6.83	12.77	A	0.43	2.007	4	0.825	1	83.839	1.23	61.34	C
40.00-20.00			B	0.43	2.007		0.825	1	83.839			
			C	0.43	2.007		0.825	1	83.839			
T9 20.00-0.00	3.53	12.12	A	0.383	2.098	4	0.825	1	83.201	0.97	48.49	C
			B	0.383	2.098		0.825	1	83.201			
			C	0.383	2.098		0.825	1	83.201			
Sum Weight:	47.71	86.53						OTM	689.81 kip-ft	9.00		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.90	3.32	A	0.767	1.795	6	0.8	1	37.148	0.40	39.67	C
160.00-150.00			B	0.767	1.795		0.8	1	37.148			
			C	0.767	1.795		0.8	1	37.148			
T2	4.85	6.27	A	0.717	1.778	6	0.8	1	66.678	0.92	46.17	C
150.00-130.00			B	0.717	1.778		0.8	1	66.678			
			C	0.717	1.778		0.8	1	66.678			
T3	6.45	6.71	A	0.724	1.779	6	0.8	1	67.851	0.99	49.69	C
130.00-110.00			B	0.724	1.779		0.8	1	67.851			
			C	0.724	1.779		0.8	1	67.851			
T4	3.43	6.72	A	0.879	1.895	5	0.8	1	58.060	0.60	60.34	C
110.00-100.00			B	0.879	1.895		0.8	1	58.060			
			C	0.879	1.895		0.8	1	58.060			
T5	7.09	12.98	A	0.695	1.776	5	0.8	1	96.315	1.23	61.48	C
100.00-80.00			B	0.695	1.776		0.8	1	96.315			
			C	0.695	1.776		0.8	1	96.315			
T6	7.19	12.91	A	0.574	1.823	5	0.8	1	89.116	1.30	65.23	C
80.00-60.00			B	0.574	1.823		0.8	1	89.116			
			C	0.574	1.823		0.8	1	89.116			
T7	7.43	12.73	A	0.491	1.912	4	0.8	1	85.331	1.35	67.37	C
60.00-40.00			B	0.491	1.912		0.8	1	85.331			
			C	0.491	1.912		0.8	1	85.331			
T8	6.83	12.77	A	0.43	2.007	4	0.8	1	83.497	1.22	61.23	C
40.00-20.00			B	0.43	2.007		0.8	1	83.497			
			C	0.43	2.007		0.8	1	83.497			
T9 20.00-0.00	3.53	12.12	A	0.383	2.098	4	0.8	1	82.750	0.97	48.34	C
			B	0.383	2.098		0.8	1	82.750			
			C	0.383	2.098		0.8	1	82.750			
Sum Weight:	47.71	86.53						OTM	689.14 kip-ft	8.99		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.90	3.32	A	0.767	1.795	6	0.85	1	37.148	0.40	39.67	C
160.00-150.00			B	0.767	1.795		0.85	1	37.148			
			C	0.767	1.795		0.85	1	37.148			
T2	4.85	6.27	A	0.717	1.778	6	0.85	1	66.678	0.92	46.17	C
150.00-130.00			B	0.717	1.778		0.85	1	66.678			
			C	0.717	1.778		0.85	1	66.678			
T3	6.45	6.71	A	0.724	1.779	6	0.85	1	67.851	0.99	49.69	C
130.00-110.00			B	0.724	1.779		0.85	1	67.851			
			C	0.724	1.779		0.85	1	67.851			
T4	3.43	6.72	A	0.879	1.895	5	0.85	1	58.361	0.61	60.60	C
110.00-100.00			B	0.879	1.895		0.85	1	58.361			
			C	0.879	1.895		0.85	1	58.361			
T5	7.09	12.98	A	0.695	1.776	5	0.85	1	96.824	1.23	61.68	C
100.00-80.00			B	0.695	1.776		0.85	1	96.824			
			C	0.695	1.776		0.85	1	96.824			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T6	7.19	12.91	A	0.574	1.823	5	0.85	1	89.677	1.31	65.44	C
80.00-60.00			B	0.574	1.823		0.85	1	89.677			
			C	0.574	1.823		0.85	1	89.677			
T7	7.43	12.73	A	0.491	1.912	4	0.85	1	85.951	1.35	67.60	C
60.00-40.00			B	0.491	1.912		0.85	1	85.951			
			C	0.491	1.912		0.85	1	85.951			
T8	6.83	12.77	A	0.43	2.007	4	0.85	1	84.180	1.23	61.45	C
40.00-20.00			B	0.43	2.007		0.85	1	84.180			
			C	0.43	2.007		0.85	1	84.180			
T9 20.00-0.00	3.53	12.12	A	0.383	2.098	4	0.85	1	83.652	0.97	48.65	C
			B	0.383	2.098		0.85	1	83.652			
			C	0.383	2.098		0.85	1	83.652			
Sum Weight:	47.71	86.53						OTM	690.49 kip-ft	9.02		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	0.60	A	0.136	2.824	9	1	1	3.958	0.11	11.15	C
160.00-150.00			B	0.136	2.824		1	1	3.958			
			C	0.136	2.824		1	1	3.958			
T2	0.17	1.27	A	0.135	2.826	9	1	1	7.927	0.32	15.84	C
150.00-130.00			B	0.135	2.826		1	1	7.927			
			C	0.135	2.826		1	1	7.927			
T3	0.23	1.65	A	0.154	2.757	8	1	1	9.071	0.37	18.61	C
130.00-110.00			B	0.154	2.757		1	1	9.071			
			C	0.154	2.757		1	1	9.071			
T4	0.13	0.99	A	0.266	2.39	8	1	1	12.831	0.31	30.90	C
110.00-100.00			B	0.266	2.39		1	1	12.831			
			C	0.266	2.39		1	1	12.831			
T5	0.27	2.22	A	0.215	2.548	8	1	1	24.439	0.61	30.51	C
100.00-80.00			B	0.215	2.548		1	1	24.439			
			C	0.215	2.548		1	1	24.439			
T6	0.29	2.27	A	0.177	2.673	7	1	1	25.320	0.61	30.60	C
80.00-60.00			B	0.177	2.673		1	1	25.320			
			C	0.177	2.673		1	1	25.320			
T7	0.30	2.32	A	0.153	2.761	6	1	1	26.421	0.60	29.78	C
60.00-40.00			B	0.153	2.761		1	1	26.421			
			C	0.153	2.761		1	1	26.421			
T8	0.30	2.76	A	0.141	2.805	5	1	1	28.543	0.55	27.39	C
40.00-20.00			B	0.141	2.805		1	1	28.543			
			C	0.141	2.805		1	1	28.543			
T9 20.00-0.00	0.18	2.96	A	0.137	2.82	5	1	1	32.894	0.54	26.94	C
			B	0.137	2.82		1	1	32.894			
			C	0.137	2.82		1	1	32.894			
Sum Weight:	1.91	17.04						OTM	288.11 kip-ft	4.01		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	0.60	A	0.136	2.824	9	0.825	1	3.958	0.11	11.15	C
160.00-150.00			B	0.136	2.824		0.825	1	3.958			
			C	0.136	2.824		0.825	1	3.958			
T2	0.17	1.27	A	0.135	2.826	9	0.825	1	7.927	0.32	15.84	C
150.00-130.00			B	0.135	2.826		0.825	1	7.927			
			C	0.135	2.826		0.825	1	7.927			
T3	0.23	1.65	A	0.154	2.757	8	0.825	1	9.071	0.37	18.61	C
130.00-110.00			B	0.154	2.757		0.825	1	9.071			
			C	0.154	2.757		0.825	1	9.071			
T4	0.13	0.99	A	0.266	2.39	8	0.825	1	11.780	0.29	29.22	C
110.00-100.00			B	0.266	2.39		0.825	1	11.780			
			C	0.266	2.39		0.825	1	11.780			
T5	0.27	2.22	A	0.215	2.548	8	0.825	1	22.657	0.58	29.06	C
100.00-80.00			B	0.215	2.548		0.825	1	22.657			
			C	0.215	2.548		0.825	1	22.657			
T6	0.29	2.27	A	0.177	2.673	7	0.825	1	23.357	0.58	29.04	C
80.00-60.00			B	0.177	2.673		0.825	1	23.357			
			C	0.177	2.673		0.825	1	23.357			
T7	0.30	2.32	A	0.153	2.761	6	0.825	1	24.252	0.56	28.16	C
60.00-40.00			B	0.153	2.761		0.825	1	24.252			
			C	0.153	2.761		0.825	1	24.252			
T8	0.30	2.76	A	0.141	2.805	5	0.825	1	26.150	0.52	25.83	C
40.00-20.00			B	0.141	2.805		0.825	1	26.150			
			C	0.141	2.805		0.825	1	26.150			
T9 20.00-0.00	0.18	2.96	A	0.137	2.82	5	0.825	1	29.738	0.50	24.87	C
			B	0.137	2.82		0.825	1	29.738			
			C	0.137	2.82		0.825	1	29.738			
Sum Weight:	1.91	17.04						OTM	278.58 kip-ft	3.83		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	0.60	A	0.136	2.824	9	0.8	1	3.958	0.11	11.15	C
160.00-150.00			B	0.136	2.824		0.8	1	3.958			
			C	0.136	2.824		0.8	1	3.958			
T2	0.17	1.27	A	0.135	2.826	9	0.8	1	7.927	0.32	15.84	C
150.00-130.00			B	0.135	2.826		0.8	1	7.927			
			C	0.135	2.826		0.8	1	7.927			
T3	0.23	1.65	A	0.154	2.757	8	0.8	1	9.071	0.37	18.61	C
130.00-110.00			B	0.154	2.757		0.8	1	9.071			
			C	0.154	2.757		0.8	1	9.071			
T4	0.13	0.99	A	0.266	2.39	8	0.8	1	11.629	0.29	28.98	C
110.00-100.00			B	0.266	2.39		0.8	1	11.629			
			C	0.266	2.39		0.8	1	11.629			
T5	0.27	2.22	A	0.215	2.548	8	0.8	1	22.403	0.58	28.85	C
100.00-80.00			B	0.215	2.548		0.8	1	22.403			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.215	2.548		0.8	1	22.403			
T6	0.29	2.27	A	0.177	2.673	7	0.8	1	23.077	0.58	28.82	C
80.00-60.00			B	0.177	2.673		0.8	1	23.077			
			C	0.177	2.673		0.8	1	23.077			
T7	0.30	2.32	A	0.153	2.761	6	0.8	1	23.942	0.56	27.93	C
60.00-40.00			B	0.153	2.761		0.8	1	23.942			
			C	0.153	2.761		0.8	1	23.942			
T8	0.30	2.76	A	0.141	2.805	5	0.8	1	25.808	0.51	25.60	C
40.00-20.00			B	0.141	2.805		0.8	1	25.808			
			C	0.141	2.805		0.8	1	25.808			
T9 20.00-0.00	0.18	2.96	A	0.137	2.82	5	0.8	1	29.288	0.49	24.57	C
			B	0.137	2.82		0.8	1	29.288			
			C	0.137	2.82		0.8	1	29.288			
Sum Weight:	1.91	17.04						OTM	277.22 kip-ft	3.81		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	0.60	A	0.136	2.824	9	0.85	1	3.958	0.11	11.15	C
160.00-150.00			B	0.136	2.824		0.85	1	3.958			
			C	0.136	2.824		0.85	1	3.958			
T2	0.17	1.27	A	0.135	2.826	9	0.85	1	7.927	0.32	15.84	C
150.00-130.00			B	0.135	2.826		0.85	1	7.927			
			C	0.135	2.826		0.85	1	7.927			
T3	0.23	1.65	A	0.154	2.757	8	0.85	1	9.071	0.37	18.61	C
130.00-110.00			B	0.154	2.757		0.85	1	9.071			
			C	0.154	2.757		0.85	1	9.071			
T4	0.13	0.99	A	0.266	2.39	8	0.85	1	11.930	0.29	29.46	C
110.00-100.00			B	0.266	2.39		0.85	1	11.930			
			C	0.266	2.39		0.85	1	11.930			
T5	0.27	2.22	A	0.215	2.548	8	0.85	1	22.912	0.59	29.27	C
100.00-80.00			B	0.215	2.548		0.85	1	22.912			
			C	0.215	2.548		0.85	1	22.912			
T6	0.29	2.27	A	0.177	2.673	7	0.85	1	23.638	0.59	29.26	C
80.00-60.00			B	0.177	2.673		0.85	1	23.638			
			C	0.177	2.673		0.85	1	23.638			
T7	0.30	2.32	A	0.153	2.761	6	0.85	1	24.562	0.57	28.39	C
60.00-40.00			B	0.153	2.761		0.85	1	24.562			
			C	0.153	2.761		0.85	1	24.562			
T8	0.30	2.76	A	0.141	2.805	5	0.85	1	26.492	0.52	26.05	C
40.00-20.00			B	0.141	2.805		0.85	1	26.492			
			C	0.141	2.805		0.85	1	26.492			
T9 20.00-0.00	0.18	2.96	A	0.137	2.82	5	0.85	1	30.189	0.50	25.16	C
			B	0.137	2.82		0.85	1	30.189			
			C	0.137	2.82		0.85	1	30.189			
Sum Weight:	1.91	17.04						OTM	279.94 kip-ft	3.86		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	12.06					
Bracing Weight	4.99					
Total Member Self-Weight	17.04			-2.29	1.67	
Total Weight	25.92			-2.29	1.67	
Wind 0 deg - No Ice		0.00	-20.66	-2000.53	1.67	-2.81
Wind 30 deg - No Ice		10.08	-17.45	-1709.79	-984.16	-4.91
Wind 45 deg - No Ice		14.19	-14.19	-1393.32	-1389.37	-5.48
Wind 60 deg - No Ice		17.31	-9.99	-983.68	-1698.15	-5.69
Wind 90 deg - No Ice		20.15	0.00	-2.29	-1969.98	-4.94
Wind 120 deg - No Ice		17.89	10.33	996.83	-1728.86	-2.87
Wind 135 deg - No Ice		14.43	14.43	1401.28	-1401.90	-1.50
Wind 150 deg - No Ice		10.08	17.45	1705.21	-984.16	-0.03
Wind 180 deg - No Ice		0.00	19.99	1960.49	1.67	2.81
Wind 210 deg - No Ice		-10.08	17.45	1705.21	987.49	4.91
Wind 225 deg - No Ice		-14.19	14.19	1388.74	1392.70	5.48
Wind 240 deg - No Ice		-17.89	10.33	996.83	1732.19	5.69
Wind 270 deg - No Ice		-20.15	0.00	-2.29	1973.31	4.94
Wind 300 deg - No Ice		-17.31	-9.99	-983.68	1701.48	2.87
Wind 315 deg - No Ice		-14.19	-14.19	-1393.32	1392.70	1.50
Wind 330 deg - No Ice		-10.08	-17.45	-1709.79	987.49	0.03
Member Ice	69.49					
Total Weight Ice	161.08			-69.32	32.60	
Wind 0 deg - Ice		0.00	-12.82	-1275.09	32.60	-2.57
Wind 30 deg - Ice		6.37	-11.03	-1110.05	-568.26	-5.25
Wind 45 deg - Ice		9.00	-9.00	-918.59	-816.67	-6.09
Wind 60 deg - Ice		11.01	-6.36	-669.51	-1006.95	-6.52
Wind 90 deg - Ice		12.74	0.00	-69.32	-1169.12	-6.04
Wind 120 deg - Ice		11.10	6.41	533.57	-1011.63	-3.95
Wind 135 deg - Ice		9.03	9.03	781.86	-818.58	-2.46
Wind 150 deg - Ice		6.37	11.03	971.40	-568.26	-0.79
Wind 180 deg - Ice		0.00	12.71	1131.05	32.60	2.57
Wind 210 deg - Ice		-6.37	11.03	971.40	633.46	5.25
Wind 225 deg - Ice		-9.00	9.00	779.95	881.87	6.09
Wind 240 deg - Ice		-11.10	6.41	533.57	1076.83	6.52
Wind 270 deg - Ice		-12.74	0.00	-69.32	1234.33	6.04
Wind 300 deg - Ice		-11.01	-6.36	-669.51	1072.16	3.95
Wind 315 deg - Ice		-9.00	-9.00	-918.59	881.87	2.46
Wind 330 deg - Ice		-6.37	-11.03	-1110.05	633.46	0.79
Total Weight	25.92			-2.29	1.67	
Wind 0 deg - Service		0.00	-6.34	-612.81	0.92	-0.86
Wind 30 deg - Service		3.09	-5.36	-523.59	-301.61	-1.51
Wind 45 deg - Service		4.36	-4.36	-426.48	-425.95	-1.68
Wind 60 deg - Service		5.31	-3.07	-300.77	-520.71	-1.74
Wind 90 deg - Service		6.18	0.00	0.40	-604.13	-1.52
Wind 120 deg - Service		5.49	3.17	307.00	-530.14	-0.88
Wind 135 deg - Service		4.43	4.43	431.12	-429.80	-0.46
Wind 150 deg - Service		3.09	5.36	524.39	-301.61	-0.01
Wind 180 deg - Service		0.00	6.13	602.73	0.92	0.86
Wind 210 deg - Service		-3.09	5.36	524.39	303.44	1.51
Wind 225 deg - Service		-4.36	4.36	427.27	427.79	1.68
Wind 240 deg - Service		-5.49	3.17	307.00	531.98	1.74
Wind 270 deg - Service		-6.18	0.00	0.40	605.97	1.52
Wind 300 deg - Service		-5.31	-3.07	-300.77	522.55	0.88
Wind 315 deg - Service		-4.36	-4.36	-426.48	427.79	0.46

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 330 deg - Service		-3.09	-5.36	-523.59	303.44	0.01

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 45 deg - No Ice
7	0.9 Dead+1.6 Wind 45 deg - No Ice
8	1.2 Dead+1.6 Wind 60 deg - No Ice
9	0.9 Dead+1.6 Wind 60 deg - No Ice
10	1.2 Dead+1.6 Wind 90 deg - No Ice
11	0.9 Dead+1.6 Wind 90 deg - No Ice
12	1.2 Dead+1.6 Wind 120 deg - No Ice
13	0.9 Dead+1.6 Wind 120 deg - No Ice
14	1.2 Dead+1.6 Wind 135 deg - No Ice
15	0.9 Dead+1.6 Wind 135 deg - No Ice
16	1.2 Dead+1.6 Wind 150 deg - No Ice
17	0.9 Dead+1.6 Wind 150 deg - No Ice
18	1.2 Dead+1.6 Wind 180 deg - No Ice
19	0.9 Dead+1.6 Wind 180 deg - No Ice
20	1.2 Dead+1.6 Wind 210 deg - No Ice
21	0.9 Dead+1.6 Wind 210 deg - No Ice
22	1.2 Dead+1.6 Wind 225 deg - No Ice
23	0.9 Dead+1.6 Wind 225 deg - No Ice
24	1.2 Dead+1.6 Wind 240 deg - No Ice
25	0.9 Dead+1.6 Wind 240 deg - No Ice
26	1.2 Dead+1.6 Wind 270 deg - No Ice
27	0.9 Dead+1.6 Wind 270 deg - No Ice
28	1.2 Dead+1.6 Wind 300 deg - No Ice
29	0.9 Dead+1.6 Wind 300 deg - No Ice
30	1.2 Dead+1.6 Wind 315 deg - No Ice
31	0.9 Dead+1.6 Wind 315 deg - No Ice
32	1.2 Dead+1.6 Wind 330 deg - No Ice
33	0.9 Dead+1.6 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	160 - 150	Leg	Max Tension	29	3.19	-0.02	-0.05
			Max. Compression	35	-8.59	-0.01	0.15
			Max. Mx	26	-2.86	-0.88	-0.05
			Max. My	2	-3.40	-0.02	-0.91
			Max. Vy	26	-2.71	0.46	-0.04
			Max. Vx	2	-3.18	-0.03	0.48
		Diagonal	Max Tension	28	1.79	0.00	0.00
			Max. Compression	12	-1.80	0.00	0.00
			Max. Mx	35	-0.07	-0.01	-0.00
			Max. My	48	-0.17	-0.01	0.00
			Max. Vy	49	0.03	-0.01	-0.00
			Max. Vx	48	0.00	0.00	0.00
		Top Girt	Max Tension	19	0.12	0.00	0.00
			Max. Compression	2	-0.14	0.00	0.00
			Max. Mx	34	-0.07	0.05	0.00
			Max. My	22	0.02	0.00	0.00
			Max. Vy	34	0.04	0.00	0.00
			Max. Vx	22	-0.00	0.00	0.00
		Bottom Girt	Max Tension	8	0.35	0.00	0.00
			Max. Compression	3	-0.33	0.00	0.00
			Max. Mx	34	0.06	0.05	0.00
			Max. My	22	0.11	0.00	0.00
			Max. Vy	34	0.04	0.00	0.00
			Max. Vx	22	-0.00	0.00	0.00
T2	150 - 130	Leg	Max Tension	29	49.08	-0.58	-0.34
			Max. Compression	24	-54.85	0.23	-0.15
			Max. Mx	26	-5.65	0.91	-0.17
			Max. My	2	-6.29	-0.05	1.01
			Max. Vy	26	-5.06	0.22	-0.08
			Max. Vx	2	-5.80	-0.01	0.27
		Diagonal	Max Tension	20	5.38	0.00	0.00
			Max. Compression	4	-5.40	0.00	0.00
			Max. Mx	45	1.87	-0.02	0.00
			Max. My	6	-4.50	-0.00	-0.00
			Max. Vy	45	0.03	-0.02	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Top Girt	Max Tension	12	0.90	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	18	-0.90	0.00	0.00
			Max. Mx	34	0.01	0.05	0.00
			Max. My	22	-0.24	0.00	0.00
			Max. Vy	34	0.04	0.00	0.00
			Max. Vx	22	-0.00	0.00	0.00
		Bottom Girt	Max Tension	28	1.20	0.00	0.00
			Max. Compression	24	-1.18	0.00	0.00
			Max. Mx	34	0.09	0.05	0.00
			Max. My	22	0.38	0.00	0.00
			Max. Vy	34	0.04	0.00	0.00
			Max. Vx	22	-0.00	0.00	0.00
T3	130 - 110	Leg	Max Tension	29	113.71	0.44	0.26
			Max. Compression	24	-121.34	1.54	-0.93
			Max. Mx	12	-121.01	-1.55	-0.90
			Max. My	2	-121.24	-0.03	1.80
			Max. Vy	28	-6.50	1.52	0.88
			Max. Vx	18	7.51	0.03	-1.75
		Diagonal	Max Tension	4	5.81	0.00	0.00
			Max. Compression	4	-5.89	0.00	0.00
			Max. Mx	46	1.76	-0.02	0.00
			Max. My	6	-5.47	-0.00	-0.00
			Max. Vy	35	0.03	-0.02	-0.00
			Max. Vx	6	-0.00	0.00	0.00
		Top Girt	Max Tension	12	0.92	0.00	0.00
			Max. Compression	8	-0.91	0.00	0.00
			Max. Mx	34	0.06	0.06	0.00
			Max. My	22	-0.28	0.00	0.00
			Max. Vy	34	-0.05	0.00	0.00
			Max. Vx	22	-0.00	0.00	0.00
		Bottom Girt	Max Tension	28	0.74	0.00	0.00
			Max. Compression	24	-0.78	0.00	0.00
			Max. Mx	34	-0.03	0.06	0.00
			Max. My	22	0.14	0.00	0.00
			Max. Vy	34	-0.05	0.00	0.00
			Max. Vx	22	-0.00	0.00	0.00
T4	110 - 100	Leg	Max Tension	29	112.93	-1.76	-0.01
			Max. Compression	24	-119.64	5.31	-0.01
			Max. Mx	28	112.34	-5.77	-0.01
			Max. My	26	-4.16	-0.27	-11.05
			Max. Vy	18	0.52	-5.77	-0.04
			Max. Vx	26	1.18	-0.27	-11.05
		Diagonal	Max Tension	27	6.54	0.10	-0.01
			Max. Compression	26	-6.99	0.00	0.00
			Max. Mx	28	4.78	0.12	0.01
			Max. My	20	-3.41	-0.09	-0.04
			Max. Vy	48	0.05	0.08	0.01
			Max. Vx	20	0.01	0.00	0.00
		Top Girt	Max Tension	28	1.69	0.00	0.00
			Max. Compression	25	-1.54	0.00	0.00
			Max. Mx	40	-0.18	-0.09	0.00
			Max. My	38	0.05	0.00	0.00
			Max. Vy	40	-0.07	0.00	0.00
			Max. Vx	38	0.00	0.00	0.00
T5	100 - 80	Leg	Max Tension	29	139.01	-6.42	-0.01
			Max. Compression	2	-148.51	5.35	0.01
			Max. Mx	24	-137.60	6.65	-0.02
			Max. My	26	-5.11	-0.27	-11.05
			Max. Vy	24	0.31	6.65	-0.02
			Max. Vx	26	-0.85	-0.27	-11.05
		Diagonal	Max Tension	24	4.93	0.00	0.00
			Max. Compression	7	-5.29	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	35	2.50	0.11	-0.01
			Max. My	45	0.25	0.09	-0.02
			Max. Vy	48	0.06	0.10	0.02
			Max. Vx	36	-0.01	0.00	0.00
T6	80 - 60	Leg	Max Tension	29	159.16	-5.14	-0.01
			Max. Compression	2	-171.46	5.13	0.01
			Max. Mx	28	148.34	-5.49	-0.01
			Max. My	26	-5.92	-0.08	-5.65
			Max. Vy	18	-0.16	-5.49	-0.02
			Max. Vx	26	-0.24	-0.01	-5.54
		Diagonal	Max Tension	20	4.23	0.00	0.00
			Max. Compression	20	-4.67	0.00	0.00
			Max. Mx	35	1.40	0.12	-0.02
			Max. My	46	0.03	0.09	-0.02
			Max. Vy	48	0.08	0.12	0.02
			Max. Vx	46	-0.01	0.00	0.00
T7	60 - 40	Leg	Max Tension	29	179.24	-4.69	-0.01
			Max. Compression	2	-194.53	4.65	0.00
			Max. Mx	2	-182.41	5.13	0.01
			Max. My	26	-7.48	-0.06	-5.43
			Max. Vy	18	-0.41	-5.09	-0.01
			Max. Vx	16	-0.31	0.03	-4.43
		Diagonal	Max Tension	21	4.71	0.00	0.00
			Max. Compression	20	-5.14	0.00	0.00
			Max. Mx	48	1.38	0.15	0.02
			Max. My	45	0.55	0.12	-0.02
			Max. Vy	48	0.09	0.15	0.02
			Max. Vx	46	-0.01	0.00	0.00
T8	40 - 20	Leg	Max Tension	29	198.16	-4.64	-0.00
			Max. Compression	2	-216.61	5.12	0.01
			Max. Mx	2	-216.61	5.12	0.01
			Max. My	26	-8.19	0.01	-4.59
			Max. Vy	43	0.39	-3.83	-0.05
			Max. Vx	26	-0.17	0.01	-4.59
		Diagonal	Max Tension	21	4.85	0.00	0.00
			Max. Compression	20	-5.19	0.00	0.00
			Max. Mx	48	1.54	0.17	-0.02
			Max. My	38	-1.75	0.15	0.02
			Max. Vy	48	0.10	0.17	0.02
			Max. Vx	46	-0.01	0.00	0.00
T9	20 - 0	Leg	Max Tension	29	215.26	-4.27	-0.00
			Max. Compression	2	-236.88	0.00	-0.00
			Max. Mx	2	-227.02	5.12	0.01
			Max. My	32	-9.79	-0.25	7.57
			Max. Vy	43	-0.59	-3.83	-0.05
			Max. Vx	26	-0.87	-0.25	-7.57
		Diagonal	Max Tension	7	6.00	0.00	0.00
			Max. Compression	24	-6.52	0.00	0.00
			Max. Mx	48	0.31	0.20	-0.03
			Max. My	47	-1.83	0.16	-0.03
			Max. Vy	49	0.11	0.20	0.02
			Max. Vx	47	-0.01	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	24	243.03	19.08	-11.39
	Max. H_x	24	243.03	19.08	-11.39
	Max. H_z	9	-220.24	-17.45	10.46
	Min. Vert	9	-220.24	-17.45	10.46
	Min. H_x	9	-220.24	-17.45	10.46
	Min. H_z	24	243.03	19.08	-11.39
Leg B	Max. Vert	12	242.77	-19.15	-11.25
	Max. H_x	29	-220.43	17.54	10.32
	Max. H_z	29	-220.43	17.54	10.32
	Min. Vert	29	-220.43	17.54	10.32
	Min. H_x	12	242.77	-19.15	-11.25
	Min. H_z	12	242.77	-19.15	-11.25
Leg A	Max. Vert	2	243.20	-0.16	22.22
	Max. H_x	25	-108.14	0.84	-10.19
	Max. H_z	2	243.20	-0.16	22.22
	Min. Vert	19	-220.11	0.16	-20.34
	Min. H_x	11	7.93	-0.77	0.57
	Min. H_z	19	-220.11	0.16	-20.34

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	25.92	-0.00	-0.00	-2.29	1.67	-0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	31.11	0.00	-33.06	-3226.19	2.04	-4.53
0.9 Dead+1.6 Wind 0 deg - No Ice	23.33	0.00	-33.06	-3218.63	1.53	-4.52
1.2 Dead+1.6 Wind 30 deg - No Ice	31.11	16.12	-27.93	-2757.34	-1588.30	-7.84
0.9 Dead+1.6 Wind 30 deg - No Ice	23.33	16.12	-27.93	-2750.90	-1585.48	-7.84
1.2 Dead+1.6 Wind 45 deg - No Ice	31.11	22.70	-22.71	-2246.85	-2242.01	-8.78
0.9 Dead+1.6 Wind 45 deg - No Ice	23.33	22.71	-22.71	-2241.46	-2237.82	-8.77
1.2 Dead+1.6 Wind 60 deg - No Ice	31.11	27.69	-15.99	-1586.03	-2740.19	-9.13
0.9 Dead+1.6 Wind 60 deg - No Ice	23.33	27.69	-15.99	-1582.02	-2734.95	-9.12
1.2 Dead+1.6 Wind 90 deg - No Ice	31.11	32.25	0.00	-2.80	-3178.66	-7.97
0.9 Dead+1.6 Wind 90 deg - No Ice	23.33	32.25	0.00	-2.10	-3172.53	-7.97
1.2 Dead+1.6 Wind 120 deg - No Ice	31.11	28.63	16.53	1608.93	-2789.55	-4.60
0.9 Dead+1.6 Wind 120 deg - No Ice	23.33	28.63	16.53	1606.19	-2784.11	-4.60
1.2 Dead+1.6 Wind 135 deg - No Ice	31.11	23.09	23.09	2261.42	-2262.17	-2.37
0.9 Dead+1.6 Wind 135 deg - No Ice	23.33	23.09	23.09	2257.26	-2257.86	-2.37
1.2 Dead+1.6 Wind 150 deg - No Ice	31.11	16.12	27.93	2751.80	-1588.31	0.00
0.9 Dead+1.6 Wind 150 deg - No Ice	23.33	16.12	27.93	2746.74	-1585.51	-0.00

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.6 Wind 180 deg - No Ice	31.11	0.00	31.97	3163.68	2.05	4.53
0.9 Dead+1.6 Wind 180 deg - No Ice	23.33	0.00	31.97	3157.75	1.54	4.52
1.2 Dead+1.6 Wind 210 deg - No Ice	31.11	-16.12	27.93	2751.78	1592.40	7.84
0.9 Dead+1.6 Wind 210 deg - No Ice	23.33	-16.12	27.93	2746.72	1588.57	7.84
1.2 Dead+1.6 Wind 225 deg - No Ice	31.11	-22.71	22.71	2241.26	2246.09	8.78
0.9 Dead+1.6 Wind 225 deg - No Ice	23.33	-22.70	22.70	2237.11	2240.78	8.77
1.2 Dead+1.6 Wind 240 deg - No Ice	31.11	-28.63	16.53	1608.91	2793.61	9.13
0.9 Dead+1.6 Wind 240 deg - No Ice	23.33	-28.63	16.53	1606.18	2787.15	9.12
1.2 Dead+1.6 Wind 270 deg - No Ice	31.11	-32.25	0.00	-2.80	3182.70	7.97
0.9 Dead+1.6 Wind 270 deg - No Ice	23.33	-32.25	0.00	-2.10	3175.55	7.97
1.2 Dead+1.6 Wind 300 deg - No Ice	31.11	-27.69	-15.99	-1586.00	2744.24	4.60
0.9 Dead+1.6 Wind 300 deg - No Ice	23.33	-27.69	-15.99	-1581.99	2737.98	4.60
1.2 Dead+1.6 Wind 315 deg - No Ice	31.11	-22.70	-22.71	-2246.82	2246.07	2.37
0.9 Dead+1.6 Wind 315 deg - No Ice	23.33	-22.71	-22.71	-2241.44	2240.87	2.37
1.2 Dead+1.6 Wind 330 deg - No Ice	31.11	-16.12	-27.93	-2757.32	1592.37	-0.00
0.9 Dead+1.6 Wind 330 deg - No Ice	23.33	-16.12	-27.93	-2750.88	1588.54	0.00
1.2 Dead+1.0 Ice+1.0 Temp	166.26	0.00	0.00	-72.04	34.58	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	166.26	0.00	-12.81	-1325.79	34.64	-2.74
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	166.26	6.37	-11.03	-1154.38	-590.20	-5.50
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	166.26	9.00	-9.00	-955.32	-848.52	-6.37
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	166.26	11.01	-6.36	-696.33	-1046.39	-6.80
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	166.26	12.74	0.00	-72.17	-1214.91	-6.27
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	166.26	11.10	6.41	554.58	-1051.05	-4.07
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	166.26	9.03	9.03	812.74	-850.39	-2.50
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	166.26	6.37	11.03	1010.01	-590.15	-0.76
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	166.26	0.00	12.71	1176.06	34.64	2.74
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	166.26	-6.37	11.03	1010.02	659.42	5.50
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	166.26	-9.00	9.00	810.94	917.72	6.37
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	166.26	-11.10	6.41	554.57	1120.31	6.80
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	166.26	-12.74	0.00	-72.14	1284.14	6.27
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	166.26	-11.01	-6.36	-696.30	1115.62	4.06

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	166.26	-9.00	-9.00	-955.30	917.74	2.50
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	166.26	-6.37	-11.03	-1154.36	659.43	0.76
Dead+Wind 0 deg - Service	25.92	0.00	-6.34	-619.74	1.68	-0.87
Dead+Wind 30 deg - Service	25.92	3.09	-5.36	-529.93	-302.94	-1.51
Dead+Wind 45 deg - Service	25.92	4.35	-4.35	-432.14	-428.16	-1.69
Dead+Wind 60 deg - Service	25.92	5.31	-3.07	-305.56	-523.58	-1.75
Dead+Wind 90 deg - Service	25.92	6.18	0.00	-2.31	-607.57	-1.52
Dead+Wind 120 deg - Service	25.92	5.49	3.17	306.42	-533.04	-0.88
Dead+Wind 135 deg - Service	25.92	4.43	4.43	431.40	-432.02	-0.46
Dead+Wind 150 deg - Service	25.92	3.09	5.36	525.32	-302.94	-0.01
Dead+Wind 180 deg - Service	25.92	0.00	6.13	604.21	1.68	0.87
Dead+Wind 210 deg - Service	25.92	-3.09	5.36	525.32	306.31	1.51
Dead+Wind 225 deg - Service	25.92	-4.35	4.35	427.53	431.52	1.69
Dead+Wind 240 deg - Service	25.92	-5.49	3.17	306.42	536.40	1.75
Dead+Wind 270 deg - Service	25.92	-6.18	0.00	-2.30	610.93	1.52
Dead+Wind 300 deg - Service	25.92	-5.31	-3.07	-305.56	526.94	0.88
Dead+Wind 315 deg - Service	25.92	-4.35	-4.35	-432.14	431.52	0.46
Dead+Wind 330 deg - Service	25.92	-3.09	-5.36	-529.93	306.31	0.01

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-25.92	0.00	0.00	25.92	0.00	0.000%
2	0.00	-31.11	-33.06	-0.00	31.11	33.06	0.004%
3	0.00	-23.33	-33.06	-0.00	23.33	33.06	0.006%
4	16.12	-31.11	-27.93	-16.12	31.11	27.93	0.004%
5	16.12	-23.33	-27.93	-16.12	23.33	27.93	0.004%
6	22.71	-31.11	-22.71	-22.70	31.11	22.71	0.005%
7	22.71	-23.33	-22.71	-22.71	23.33	22.71	0.004%
8	27.69	-31.11	-15.99	-27.69	31.11	15.99	0.005%
9	27.69	-23.33	-15.99	-27.69	23.33	15.99	0.004%
10	32.25	-31.11	0.00	-32.25	31.11	-0.00	0.004%
11	32.25	-23.33	0.00	-32.25	23.33	-0.00	0.004%
12	28.63	-31.11	16.53	-28.63	31.11	-16.53	0.004%
13	28.63	-23.33	16.53	-28.63	23.33	-16.53	0.006%
14	23.09	-31.11	23.09	-23.09	31.11	-23.09	0.004%
15	23.09	-23.33	23.09	-23.09	23.33	-23.09	0.007%
16	16.12	-31.11	27.93	-16.12	31.11	-27.93	0.004%
17	16.12	-23.33	27.93	-16.12	23.33	-27.93	0.004%
18	0.00	-31.11	31.98	-0.00	31.11	-31.97	0.005%
19	0.00	-23.33	31.98	-0.00	23.33	-31.97	0.004%
20	-16.12	-31.11	27.93	16.12	31.11	-27.93	0.004%
21	-16.12	-23.33	27.93	16.12	23.33	-27.93	0.004%
22	-22.71	-31.11	22.71	22.71	31.11	-22.71	0.004%
23	-22.71	-23.33	22.71	22.70	23.33	-22.70	0.007%
24	-28.63	-31.11	16.53	28.63	31.11	-16.53	0.004%
25	-28.63	-23.33	16.53	28.63	23.33	-16.53	0.006%
26	-32.25	-31.11	0.00	32.25	31.11	-0.00	0.004%
27	-32.25	-23.33	0.00	32.25	23.33	-0.00	0.004%
28	-27.69	-31.11	-15.99	27.69	31.11	15.99	0.005%
29	-27.69	-23.33	-15.99	27.69	23.33	15.99	0.004%
30	-22.71	-31.11	-22.71	22.70	31.11	22.71	0.005%
31	-22.71	-23.33	-22.71	22.71	23.33	22.71	0.004%
32	-16.12	-31.11	-27.93	16.12	31.11	27.93	0.004%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
33	-16.12	-23.33	-27.93	16.12	23.33	27.93	0.004%
34	0.00	-166.26	0.00	-0.00	166.26	-0.00	0.000%
35	0.00	-166.26	-12.82	-0.00	166.26	12.81	0.001%
36	6.37	-166.26	-11.03	-6.37	166.26	11.03	0.001%
37	9.00	-166.26	-9.00	-9.00	166.26	9.00	0.001%
38	11.01	-166.26	-6.36	-11.01	166.26	6.36	0.001%
39	12.74	-166.26	0.00	-12.74	166.26	-0.00	0.001%
40	11.10	-166.26	6.41	-11.10	166.26	-6.41	0.001%
41	9.03	-166.26	9.03	-9.03	166.26	-9.03	0.001%
42	6.37	-166.26	11.03	-6.37	166.26	-11.03	0.001%
43	0.00	-166.26	12.71	-0.00	166.26	-12.71	0.001%
44	-6.37	-166.26	11.03	6.37	166.26	-11.03	0.001%
45	-9.00	-166.26	9.00	9.00	166.26	-9.00	0.001%
46	-11.10	-166.26	6.41	11.10	166.26	-6.41	0.001%
47	-12.74	-166.26	0.00	12.74	166.26	-0.00	0.001%
48	-11.01	-166.26	-6.36	11.01	166.26	6.36	0.001%
49	-9.00	-166.26	-9.00	9.00	166.26	9.00	0.001%
50	-6.37	-166.26	-11.03	6.37	166.26	11.03	0.001%
51	0.00	-25.92	-6.34	-0.00	25.92	6.34	0.001%
52	3.09	-25.92	-5.36	-3.09	25.92	5.36	0.001%
53	4.36	-25.92	-4.36	-4.35	25.92	4.35	0.001%
54	5.31	-25.92	-3.07	-5.31	25.92	3.07	0.001%
55	6.18	-25.92	0.00	-6.18	25.92	-0.00	0.001%
56	5.49	-25.92	3.17	-5.49	25.92	-3.17	0.001%
57	4.43	-25.92	4.43	-4.43	25.92	-4.43	0.001%
58	3.09	-25.92	5.36	-3.09	25.92	-5.36	0.001%
59	0.00	-25.92	6.13	-0.00	25.92	-6.13	0.001%
60	-3.09	-25.92	5.36	3.09	25.92	-5.36	0.001%
61	-4.36	-25.92	4.36	4.35	25.92	-4.35	0.001%
62	-5.49	-25.92	3.17	5.49	25.92	-3.17	0.001%
63	-6.18	-25.92	0.00	6.18	25.92	-0.00	0.001%
64	-5.31	-25.92	-3.07	5.31	25.92	3.07	0.001%
65	-4.36	-25.92	-4.36	4.35	25.92	4.35	0.001%
66	-3.09	-25.92	-5.36	3.09	25.92	5.36	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	14	0.00004747	0.00009564
3	Yes	13	0.00006836	0.00013349
4	Yes	14	0.00005425	0.00010881
5	Yes	14	0.00000001	0.00008066
6	Yes	14	0.00005854	0.00011719
7	Yes	14	0.00004406	0.00008857
8	Yes	14	0.00006023	0.00012051
9	Yes	14	0.00004562	0.00009166
10	Yes	14	0.00005428	0.00010889
11	Yes	14	0.00000001	0.00008071
12	Yes	14	0.00004747	0.00009565
13	Yes	13	0.00006836	0.00013350
14	Yes	14	0.00004958	0.00009974
15	Yes	13	0.00007248	0.00014130
16	Yes	14	0.00005428	0.00010888
17	Yes	14	0.00000001	0.00008070

18	Yes	14	0.00006024	0.00012052
19	Yes	14	0.00004562	0.00009167
20	Yes	14	0.00005426	0.00010882
21	Yes	14	0.00000001	0.00008066
22	Yes	14	0.00004961	0.00009978
23	Yes	13	0.00007253	0.00014136
24	Yes	14	0.00004747	0.00009564
25	Yes	13	0.00006836	0.00013349
26	Yes	14	0.00005429	0.00010887
27	Yes	14	0.00000001	0.00008070
28	Yes	14	0.00006025	0.00012050
29	Yes	14	0.00004563	0.00009166
30	Yes	14	0.00005856	0.00011721
31	Yes	14	0.00004408	0.00008859
32	Yes	14	0.00005428	0.00010886
33	Yes	14	0.00000001	0.00008069
34	Yes	13	0.00000001	0.00008747
35	Yes	16	0.00000001	0.00012153
36	Yes	16	0.00000001	0.00012201
37	Yes	16	0.00000001	0.00012258
38	Yes	16	0.00000001	0.00012247
39	Yes	16	0.00000001	0.00011947
40	Yes	16	0.00000001	0.00011657
41	Yes	16	0.00000001	0.00011679
42	Yes	16	0.00000001	0.00011805
43	Yes	16	0.00000001	0.00012038
44	Yes	16	0.00000001	0.00011985
45	Yes	16	0.00000001	0.00011944
46	Yes	16	0.00000001	0.00011989
47	Yes	16	0.00000001	0.00012309
48	Yes	16	0.00000001	0.00012547
49	Yes	16	0.00000001	0.00012510
50	Yes	16	0.00000001	0.00012387
51	Yes	14	0.00000001	0.00008434
52	Yes	14	0.00000001	0.00008663
53	Yes	14	0.00000001	0.00008821
54	Yes	14	0.00000001	0.00008888
55	Yes	14	0.00000001	0.00008667
56	Yes	14	0.00000001	0.00008434
57	Yes	14	0.00000001	0.00008504
58	Yes	14	0.00000001	0.00008667
59	Yes	14	0.00000001	0.00008889
60	Yes	14	0.00000001	0.00008665
61	Yes	14	0.00000001	0.00008507
62	Yes	14	0.00000001	0.00008435
63	Yes	14	0.00000001	0.00008669
64	Yes	14	0.00000001	0.00008889
65	Yes	14	0.00000001	0.00008824
66	Yes	14	0.00000001	0.00008668

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	160 - 150	5.199	51	0.3019	0.0244
T2	150 - 130	4.563	51	0.3010	0.0225
T3	130 - 110	3.306	51	0.2795	0.0161
T4	110 - 100	2.208	51	0.2242	0.0126
T5	100 - 80	1.770	51	0.1863	0.0102

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T6	80 - 60	1.080	51	0.1383	0.0072
T7	60 - 40	0.580	51	0.0948	0.0049
T8	40 - 20	0.254	51	0.0544	0.0031
T9	20 - 0	0.069	51	0.0265	0.0014

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	Lightning Rod 5/8x4'	51	5.199	0.3019	0.0244	308341
159.00	HPD3-4.7NS	51	5.136	0.3020	0.0243	308341
158.00	SPD2-5.2NS	51	5.072	0.3020	0.0241	308341
151.00	VFA12-WLL-30120	51	4.627	0.3012	0.0228	211388
140.00	PiROD 12' T-Frame	51	3.926	0.2941	0.0194	70963
134.00	HPD2-4.7NS	51	3.550	0.2863	0.0173	38850
117.00	3' Side Mount Standoff	51	2.562	0.2479	0.0138	16936
90.00	3' Side Mount Standoff	51	1.398	0.1588	0.0084	22157
60.00	6' Side Mount Standoff	51	0.580	0.0948	0.0049	26413
20.00	3' Side Mount Standoff	51	0.069	0.0265	0.0014	35305

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	160 - 150	27.063	2	1.5705	0.1276
T2	150 - 130	23.757	2	1.5659	0.1176
T3	130 - 110	17.209	2	1.4556	0.0841
T4	110 - 100	11.491	2	1.1672	0.0656
T5	100 - 80	9.212	2	0.9695	0.0533
T6	80 - 60	5.623	2	0.7198	0.0374
T7	60 - 40	3.021	2	0.4936	0.0254
T8	40 - 20	1.322	2	0.2832	0.0161
T9	20 - 0	0.358	2	0.1381	0.0071

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	Lightning Rod 5/8x4'	2	27.063	1.5705	0.1276	63547
159.00	HPD3-4.7NS	2	26.733	1.5706	0.1268	63547
158.00	SPD2-5.2NS	2	26.403	1.5707	0.1260	63547
151.00	VFA12-WLL-30120	2	24.088	1.5674	0.1189	44152
140.00	PiROD 12' T-Frame	2	20.440	1.5309	0.1010	14004
134.00	HPD2-4.7NS	2	18.483	1.4908	0.0903	7553
117.00	3' Side Mount Standoff	2	13.336	1.2906	0.0719	3258
90.00	3' Side Mount Standoff	2	7.277	0.8265	0.0441	4236

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
60.00	6' Side Mount Standoff	2	3.021	0.4936	0.0254	5078
20.00	3' Side Mount Standoff	2	0.358	0.1381	0.0071	6789

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	160	Leg	A325N	0.6250	5	0.01	20.71	0.000 ✔	1	Bolt Tension
T2	150	Leg	A325N	0.7500	5	0.64	29.82	0.021 ✔	1	Bolt Tension
T3	130	Leg	A325N	1.0000	6	8.18	53.01	0.154 ✔	1	Bolt Tension
T4	110	Leg	A325N	1.0000	6	18.82	53.01	0.355 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	6.54	9.14	0.715 ✔	1	Member Block Shear
		Top Girt	A325N	1.0000	1	1.69	10.16	0.167 ✔	1	Member Block Shear
T5	100	Leg	A325N	1.0000	6	21.52	53.01	0.406 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	4.93	9.14	0.540 ✔	1	Member Block Shear
T6	80	Leg	A325N	1.0000	6	24.86	53.01	0.469 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	4.23	9.14	0.462 ✔	1	Member Block Shear
T7	60	Leg	A325N	1.0000	6	28.20	53.01	0.532 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	4.71	9.14	0.515 ✔	1	Member Block Shear
T8	40	Leg	A325N	1.0000	6	31.53	53.01	0.595 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	4.85	9.14	0.531 ✔	1	Member Block Shear
T9	20	Leg	A325N	1.0000	6	34.56	53.01	0.652 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	6.00	10.16	0.590 ✔	1	Member Block Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	160 - 150	1 3/4	10.00	2.42	66.3 K=1.00	2.4053	-8.59	78.50	0.109 [1] ✔
T2	150 - 130	2	20.00	2.46	59.0 K=1.00	3.1416	-54.85	109.60	0.500 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T3	130 - 110	2 1/4	20.00	2.46	52.4 K=1.00	3.9761	-121.34	146.33	0.829 [1]
T4	110 - 100	Pirod 105216	10.02	10.02	45.4 K=1.00	3.6816	-119.64	142.49	0.840 [1]
T5	100 - 80	Pirod 105217	20.03	10.02	37.8 K=1.00	5.3014	-148.51	214.86	0.691 [1]
T6	80 - 60	Pirod 105217	20.03	10.02	37.8 K=1.00	5.3014	-171.46	214.86	0.798 [1]
T7	60 - 40	Pirod 105217	20.03	10.02	37.8 K=1.00	5.3014	-194.53	214.86	0.905 [1]
T8	40 - 20	Pirod 105218	20.03	10.02	32.4 K=1.00	7.2158	-216.61	300.68	0.720 [1]
T9	20 - 0	Pirod 105218	20.03	10.02	32.4 K=1.00	7.2158	-236.88	300.68	0.788 [1]

[1] P_u / ϕP_n controls

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T4	110 - 100	0.5	1.48	121.0	165.67	0.1963	1.18	3.29	0.358
T5	100 - 80	0.5	1.47	120.0	238.57	0.1963	0.86	3.34	0.257
T6	80 - 60	0.5	1.47	120.0	238.57	0.1963	0.24	3.34	0.072
T7	60 - 40	0.5	1.47	120.0	238.57	0.1963	0.41	3.34	0.122
T8	40 - 20	0.5	1.46	119.0	324.71	0.1963	0.39	3.38	0.116
T9	20 - 0	0.5	1.46	119.0	324.71	0.1963	0.87	3.38	0.259

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	160 - 150	7/8	5.55	2.70	147.9 K=1.00	0.6013	-1.80	6.21	0.289 [1]
T2	150 - 130	7/8	5.57	2.69	147.7 K=1.00	0.6013	-5.40	6.22	0.868 [1]
T3	130 - 110	1	5.57	2.68	128.7 K=1.00	0.7854	-5.89	10.64	0.553 [1]
T4	110 - 100	L2 1/2x2 1/2x3/16	11.42	5.19	125.8	0.9020	-6.99	12.70	0.550 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T5	100 - 80	L2 1/2x2 1/2x3/16	11.93	5.59	135.5 K=1.00	0.9020	-5.29	11.09	0.477 [1]
T6	80 - 60	L2 1/2x2 1/2x3/16	13.80	6.54	158.4 K=1.00	0.9020	-4.67	8.12	0.576 [1]
T7	60 - 40	L2 1/2x2 1/2x3/16	15.24	7.29	176.7 K=1.00	0.9020	-5.14	6.52	0.788 [1]
T8	40 - 20	L2 1/2x2 1/2x3/16	16.80	8.09	196.1 K=1.00	0.9020	-5.19	5.30	0.981 [1]
T9	20 - 0	L3x3x3/16	18.45	8.93	179.7 K=1.00	1.0900	-6.52	7.62	0.856 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	160 - 150	1	5.00	4.85	233.0 K=1.00	0.7854	-0.14	3.27	0.042 [1]
T2	150 - 130	KL/R > 200 (C) - 4 1	5.00	4.83	232.0 K=1.00	0.7854	-0.90	3.30	0.273 [1]
T3	130 - 110	KL/R > 200 (C) - 37 1 1/4	5.00	4.81	184.8 K=1.00	1.2272	-0.91	8.12	0.112 [1]
T4	110 - 100	L3x3x3/16	5.00	4.00	80.5 K=1.00	1.0900	-1.54	24.53	0.063 [1]

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	160 - 150	1	5.00	4.85	233.0 K=1.00	0.7854	-0.33	3.27	0.102 [1]
T2	150 - 130	KL/R > 200 (C) - 7 1	5.00	4.83	232.0 K=1.00	0.7854	-1.18	3.30	0.359 [1]
T3	130 - 110	KL/R > 200 (C) - 41 1 1/4	5.00	4.81	184.8 K=1.00	1.2272	-0.78	8.12	0.096 [1]

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	160 - 150	1 3/4	10.00	2.42	66.3	2.4053	3.19	108.24	0.029 [1] ✔
T2	150 - 130	2	20.00	2.46	59.0	3.1416	49.08	141.37	0.347 [1] ✔
T3	130 - 110	2 1/4	20.00	2.46	52.4	3.9761	113.71	178.92	0.636 [1] ✔
T4	110 - 100	Pirod 105216	10.02	10.02	45.4	3.6816	112.93	165.67	0.682 [1] ✔
T5	100 - 80	Pirod 105217	20.03	10.02	37.8	5.3014	138.96	238.57	0.583 [1] ✔
T6	80 - 60	Pirod 105217	20.03	10.02	37.8	5.3014	159.16	238.57	0.667 [1] ✔
T7	60 - 40	Pirod 105217	20.03	10.02	37.8	5.3014	179.24	238.57	0.751 [1] ✔
T8	40 - 20	Pirod 105218	20.03	10.02	32.4	7.2158	198.16	324.71	0.610 [1] ✔
T9	20 - 0	Pirod 105218	20.03	10.02	32.4	7.2158	215.26	324.71	0.663 [1] ✔

[1] P_u / ϕP_n controls

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T4	110 - 100	0.5	1.48	121.0	165.67	0.1963	1.18	3.29	0.358 ✔
T5	100 - 80	0.5	1.47	120.0	238.57	0.1963	0.86	3.34	0.257 ✔
T6	80 - 60	0.5	1.47	120.0	238.57	0.1963	0.24	3.34	0.072 ✔
T7	60 - 40	0.5	1.47	120.0	238.57	0.1963	0.41	3.34	0.122 ✔
T8	40 - 20	0.5	1.46	119.0	324.71	0.1963	0.39	3.38	0.116 ✔
T9	20 - 0	0.5	1.46	119.0	324.71	0.1963	0.87	3.38	0.259 ✔

Diagonal Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	160 - 150	7/8	5.55	2.70	147.9	0.6013	1.79	19.48	0.092 [1] ✔
T2	150 - 130	7/8	5.57	2.69	147.7	0.6013	5.38	19.48	0.276 [1] ✔
T3	130 - 110	1	5.57	2.68	128.7	0.7854	5.81	25.45	0.228 [1] ✔
T4	110 - 100	L2 1/2x2 1/2x3/16	11.42	5.19	80.1	0.5183	6.54	22.55	0.290 [1] ✔
T5	100 - 80	L2 1/2x2 1/2x3/16	11.93	5.59	86.2	0.5183	4.93	22.55	0.219 [1] ✔
T6	80 - 60	L2 1/2x2 1/2x3/16	13.80	6.54	100.8	0.5183	4.23	22.55	0.187 [1] ✔
T7	60 - 40	L2 1/2x2 1/2x3/16	15.24	7.29	112.4	0.5183	4.71	22.55	0.209 [1] ✔
T8	40 - 20	L2 1/2x2 1/2x3/16	16.80	8.09	124.8	0.5183	4.85	22.55	0.215 [1] ✔
T9	20 - 0	L3x3x3/16	18.45	8.93	114.1	0.6593	6.00	28.68	0.209 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	160 - 150	1	5.00	4.85	233.0	0.7854	0.12	25.45	0.005 [1] ✔
T2	150 - 130	1	5.00	4.83	232.0	0.7854	0.90	25.45	0.036 [1] ✔
T3	130 - 110	1 1/4	5.00	4.81	184.8	1.2272	0.92	39.76	0.023 [1] ✔
T4	110 - 100	L3x3x3/16	5.00	4.00	51.1	0.6593	1.69	28.68	0.059 [1] ✔

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	160 - 150	1	5.00	4.85	233.0	0.7854	0.35	25.45	0.014 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	150 - 130	1	5.00	4.83	232.0	0.7854	1.20	25.45	0.047 [1] ✔
T3	130 - 110	1 1/4	5.00	4.81	184.8	1.2272	0.74	39.76	0.019 [1] ✔

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	160 - 150	Leg	1 3/4	3	-8.59	78.50	10.9	Pass
		Diagonal	7/8	12	-1.80	6.21	28.9	Pass
		Top Girt	1	4	-0.14	3.27	4.2	Pass
		Bottom Girt	1	7	-0.33	3.27	10.2	Pass
T2	150 - 130	Leg	2	34	-54.85	109.60	50.0	Pass
		Diagonal	7/8	47	-5.40	6.22	86.8	Pass
		Top Girt	1	37	-0.90	3.30	27.3	Pass
		Bottom Girt	1	41	-1.18	3.30	35.9	Pass
T3	130 - 110	Leg	2 1/4	91	-121.34	146.33	82.9	Pass
		Diagonal	1	104	-5.89	10.64	55.3	Pass
		Top Girt	1 1/4	95	-0.91	8.12	11.2	Pass
		Bottom Girt	1 1/4	98	-0.78	8.12	9.6	Pass
T4	110 - 100	Leg	Pirod 105216	148	-119.64	142.49	84.0	Pass
		Diagonal	L2 1/2x2 1/2x3/16	159	-6.99	12.70	55.0	Pass
							71.5 (b)	
		Top Girt	L3x3x3/16	152	-1.54	24.53	6.3	Pass
							16.7 (b)	
T5	100 - 80	Leg	Pirod 105217	162	-148.51	214.86	69.1	Pass
		Diagonal	L2 1/2x2 1/2x3/16	173	-5.29	11.09	47.7	Pass
							54.0 (b)	
T6	80 - 60	Leg	Pirod 105217	177	-171.46	214.86	79.8	Pass
		Diagonal	L2 1/2x2 1/2x3/16	183	-4.67	8.12	57.6	Pass
T7	60 - 40	Leg	Pirod 105217	192	-194.53	214.86	90.5	Pass
		Diagonal	L2 1/2x2 1/2x3/16	198	-5.14	6.52	78.8	Pass
T8	40 - 20	Leg	Pirod 105218	207	-216.61	300.68	72.0	Pass
		Diagonal	L2 1/2x2 1/2x3/16	213	-5.19	5.30	98.1	Pass
T9	20 - 0	Leg	Pirod 105218	222	-236.88	300.68	78.8	Pass
		Diagonal	L3x3x3/16	228	-6.52	7.62	85.6	Pass
							Summary	
						Leg (T7)	90.5	Pass
						Diagonal (T8)	98.1	Pass
						Top Girt (T2)	27.3	Pass
						Bottom Girt (T2)	35.9	Pass
						Bolt Checks	71.5	Pass
						RATING =	**98.1**	**Pass**

ANCHOR BOLT EVALUATION

ANCHOR BOLT ANALYSIS

Input Data

Tower Reactions:

Uplift:	Uplift := 220·kips	*user input*
Shear:	Shear := 22·kips	*user input*
Compression:	Compression := 243·kips	*user input*

Anchor Bolt Data:

Use ASTM F1554

Number of Anchor Bolts = N	N := 6	*user input*	
Bolt Ultimate Strength:	F_u := 150·ksi	*user input*	
Bolt Yield Strength:	Fy := 105·ksi	*user input*	
Bolt Modulus:	E := 29000·ksi	*user input*	
Thickness of Anchor Bolts	D := 1in	*user input*	
Threads per Inch:	n := 8	*user input*	
Coefficient of Friction:	μ := 0.55	*user input*	(for baseplate with grout ASCE 10-15)
Length from top of pier to bottom of leveling nut:	L_{ar} := 2.5in	*user input*	(assumed single level nut to plate pt.)
Bolt Modulus:	E := 29000·ksi	*user input*	

Anchor Bolt Section Properties:

Gross Area of Bolt:

$$A_g := \frac{\pi}{4} \cdot D^2 \qquad A_g = 0.79 \cdot in^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 \qquad A_n = 0.61 \cdot in^2$$

Net Diameter:

$$D_n := D - \frac{0.9743 in}{n} \qquad D_n = 0.88 \cdot in$$

Radius of Gyration of Bolt:

$$r := \frac{D_n}{4} \qquad r = 0.22 \cdot in$$

Plastic Section Modulus of Bolt:

$$Z_x := \frac{D_n^3}{6} \qquad Z_x = 0.11 \cdot in^3$$

Forces:

Tension Force:

$$T_u := \frac{Uplift}{N}$$

$$T_u = 36.67 \cdot kip \qquad T_{ub} := T_u$$

Shear Force:

$$V_u := \frac{Shear}{N}$$

$$V_u = 3.67 \cdot kip \qquad V_{ub} := V_u$$

Resistance Factor for Flexure (ANSI/TIA-222-G 4.7):

$$\phi_f := 0.9$$

Resistance Factor for Anchor Bolt (ANSI/TIA-222-G 4.5.4.2):

$$\phi_b := 0.80$$

Resistance Factor for Tension (ANSI/TIA-222-G 4.9.6.1):

$$\phi_t := 0.75$$

Resistance Factor for Shear (ANSI/TIA-222-G 4.9.6.3):

$$\phi_v := 0.75$$

ANSI/TIA-222-G 4.7.1 Flexural Members:

Nominal Flexure Strength, Mn:

$M_n := Fy \cdot Z_x$

$M_n = 0.99 \cdot ft \cdot kip$

$\phi_f \cdot M_n = 0.89 \cdot ft \cdot kip$

Applied Moment due to Shear (worst case lever arm), Mu:

$M_u := L_{ar} \cdot V_u$

$M_u = 0.76 \cdot ft \cdot kip$

Flexure Check:

$FlexureCheck := if(M_u \le \phi_f \cdot M_n, "OK", "NO GOOD")$

FlexureCheck = "OK"

$$\frac{M_u}{\phi_f \cdot M_n} = 85.93 \cdot \%$$

ANSI/TIA-222-G 4.9.6.1 Tensile Strength:

Design Tensile Strength, Rnt:

$R_{nt} := F_u \cdot A_n$

$R_{nt} = 90.86 \cdot ft \cdot kip$

$\phi_t \cdot R_{nt} = 68.15 \cdot ft \cdot kip$

Tension Check:

$TensionCheck := if(T_u \le \phi_t \cdot R_{nt}, "OK", "NO GOOD")$

TensionCheck = "OK"

$$\frac{T_u}{\phi_t \cdot R_{nt}} = 53.81 \cdot \%$$

ANSI/TIA-222-G 4.9.6.3 Design Shear Strength:

Design Shear Strength, Rnv:

$R_{nv} := 0.45 \cdot F_u \cdot A_g$

$R_{nv} = 53.01 \cdot ft \cdot kip$

$\phi_v \cdot R_{nv} = 39.76 \cdot ft \cdot kip$

Shear Check:

$ShearCheck := if(V_u \le \phi_v \cdot R_{nv}, "OK", "NO GOOD")$

ShearCheck = "OK"

$$\frac{V_u}{\phi_v \cdot R_{nv}} = 9.22 \cdot \%$$

ANSI/TIA-222-G 4.9.6.4 Combined Shear and Tension:

$$\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt})}\right]^2 \le 1$$

$$\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt})}\right]^2 = 0.3$$

Combined Shear and Tension Check:

$$\text{ShearAndTensionCheck} := \text{if}\left[\left[\frac{V_{ub}}{(\phi_v \cdot R_{nv})}\right]^2 + \left[\frac{T_{ub}}{(\phi_t \cdot R_{nt})}\right]^2 \le 1, \text{"OK"}, \text{"NO GOOD"}\right]$$

ShearAndTensionCheck = "OK"

ANSI/TIA-222-G 4.9.9 Anchor Rods (Capacity):

$$\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{\phi_b \cdot P_n} \le 1$$

$\eta := 0.55$ *user input from ANSI/TIA-222-G 4.9.9*

$$\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{\phi_b \cdot F_u \cdot A_n} = 0.596$$

Capacity Check:

$$\text{CapacityCheck} := \text{if}\left[\frac{\left[T_u + \left(\frac{V_u}{\eta}\right)\right]}{\phi_b \cdot F_u \cdot A_n} \le 1, \text{"OK"}, \text{"NO GOOD"}\right]$$

CapacityCheck = "OK"

FOUNDATION EVALUATION

PIER AND MAT FOUNDATION ANALYSIS - 3 PIERS

TOWER FORCES:

Moment Caused by Tower	$M_t := 3226 \cdot kip \cdot ft$
Shear at Base of Tower	$S_t := 33 \cdot kip$
Max Compressive Force	$C_t := 243 \cdot kip$
Max Uplift	$U_t := 220 \cdot kip$
Height of Tower	$H_t := 160 \cdot ft$
Width of Tower at Base	$W_t := 16.0 \cdot ft$
Weight of Tower	$WT_t := 1.0 \cdot kip$

NOTE: Weight of Tower is incorporated into the other loads listed above and is therefore set equal to one for programming.

FOOTING DIMENSIONS:

Width of Footing	$W_f := 23.5 \cdot ft$
Overall Depth of Footing	$D_f := 5.5ft$
Length of Pier	$L_p := 4.5 \cdot ft$
Extension of Pier Above Grade	$L_{pag} := 0.5 \cdot ft$
Diameter of Pier	$d_p := 3.5 \cdot ft$
Thickness of Footing	$T_f := 1.5 \cdot ft$
Reinforement Cover:	$Cvr := 3in$

MATERIAL PROPERTIES:

Compressive Strength of Concrete	$f'c := 3000 \cdot psi$	Unit Weight of Soil	$\gamma_s := 125 \cdot pcf$
Yield Strength of Steel Reinforcement	$fy := 60000 \cdot psi$	Unit Weight of Concrete	$\gamma_c := 150 \cdot pcf$
Internal Friction Angle of Soil	$\phi_s := 34.0 \cdot deg$	Depth to Neglect	$n := 0.5 \cdot ft$
Allowable Bearing Capacity	$q_s := 5000 \cdot psf$	Cohesion of Clay Type Soil	$c := 0 \cdot ksf$
		Note: Use 0 for Sandy Soil	

Allowable bearing capacity obtained from Geotechnical Report 2657-16 Geo Report 07.08.20 S&S FINAL.pdf (pg 7)

Ultimate Bearing Capacity $R_s := 2 \cdot q_s$

Coefficient of Lateral Soil Pressure $K_p := \frac{1 + \sin(\phi_s)}{1 - \sin(\phi_s)}$ $K_p = 3.5371$

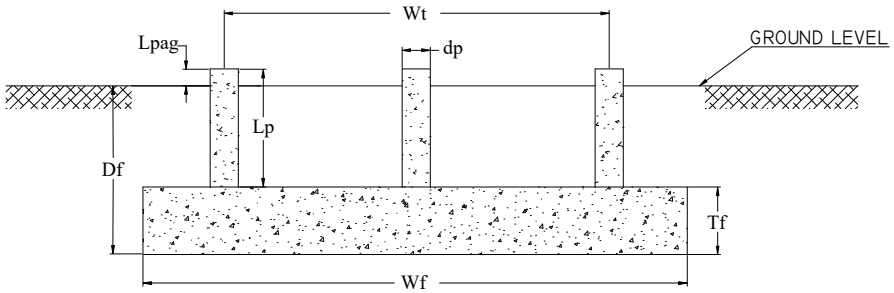
What is Position of Center of Tower with respect to Center of Pad?

1=Offset
2=Not Offset

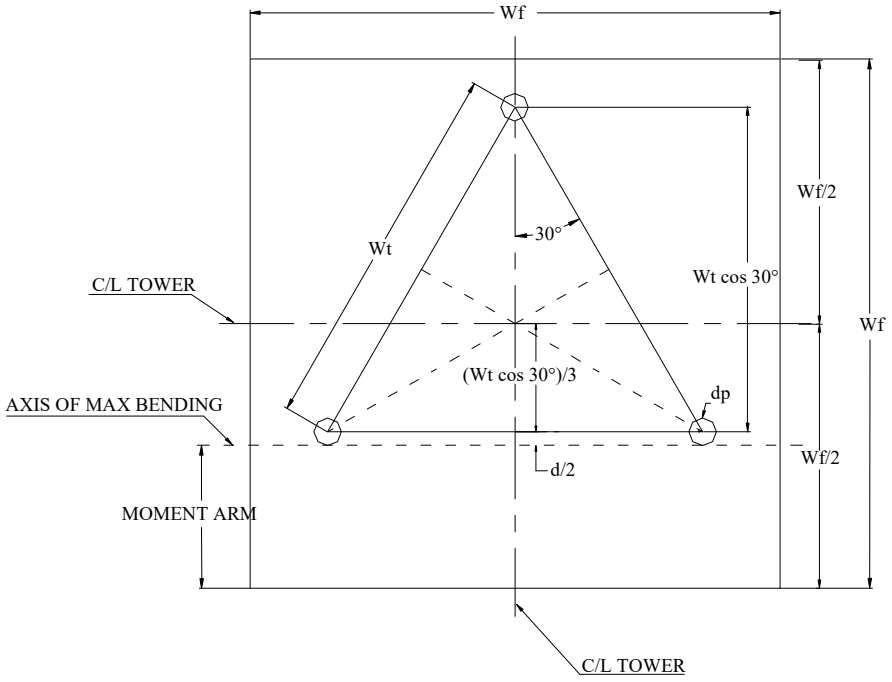
$Pos_{tower} := 2$

				Page	of
Job	160' Self-Support Lattice Tower - Enfield, CT	Project No.	SAI-106 Rev. 1	Sheet 2	of 4
Description	Foundation Analysis (TIA-222-G)	Computed by	CMC	Date	12/02/20
		Checked by		Date	

FOUNDATION OVERVIEW



ELEVATION



PLAN

STABILITY OF FOOTING

NOTE: Recduction factor is implemented as 0.75 for pull-out/uplift of foundation.
Reduction factor shall be applied to Overturning Moment in this case

Passive Pressure:

$P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p}$ $\quad P_{pn} = 0.2211 \cdot ksf$

$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p}$ $\quad P_{pt} = 1.7686 \cdot ksf$

$P_{top} := if[n < (D_f - T_f), P_{pt}, P_{pn}]$ $\quad P_{top} = 1.7686 \cdot ksf$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p}$ $\quad P_{bot} = 2.4318 \cdot ksf$

$P_{ave} := \frac{P_{top} + P_{bot}}{2}$ $\quad P_{ave} = 2.1002 \cdot ksf$

Shear:

$T_{pp} := if[n < (D_f - T_f), T_f, (D_f - n)]$ $\quad T_{pp} = 1.5 \cdot ft$

$A_{pp} := W_f \cdot T_{pp}$ $\quad A_{pp} = 35.25 \cdot ft^2$

Ultimate Shear:

$S_u := P_{ave} \cdot A_{pp}$ $\quad S_u = 74.0311 \cdot kip$

Weight of Concrete Pad:

$WT_c := (W_f^2 \cdot T_f) \cdot \gamma_c$ $\quad WT_c = 124.2562 \cdot kip$

Weight of Soil: above Footing:

$WT_{s1} := W_f^2 (|D_f - T_f|) \cdot \gamma_s$ $\quad WT_{s1} = 276.125 \cdot kip$

Weight of Soil Wedge at back face:

$WT_{s2} := \left[\frac{(D_f - n)^2 \cdot \tan(\phi_s)}{2} \cdot W_f \right] \cdot \gamma_s$ $\quad WT_{s2} = 24.7671 \cdot kip$

Distance to center of Tower Leg from Edge of Footing:

$X_{t1} := \frac{W_f}{2} - \frac{W_t \cdot \cos(30 \cdot deg)}{2}$ $\qquad X_{t2} := \frac{W_f}{2} - \frac{W_t \cdot \cos(30 \cdot deg)}{3}$

$X_t := if(Pos_{tower} = 1, X_{t1}, X_{t2})$ $\quad X_t = 7.1312 \cdot ft$

Additional Offset of Footing:

$X_{off1} := \frac{W_f}{2} - \left(\frac{W_t \cdot \cos(30 \cdot deg)}{3} + X_t \right)$ $\quad X_{off2} := 0$

$X_{off} := if(Pos_{tower} = 1, X_{off1}, X_{off2})$ $\quad X_{off} = 0 \cdot ft$

Resisting Moment:

$M_r := 0.9(WT_c + WT_{s1}) \cdot \frac{W_f}{2} + 0.9 WT_t \cdot \left(\frac{W_f}{2} - X_{off} \right) + 0.9 S_u \cdot \frac{T_{pp}}{3} + 0.9 WT_{s2} \cdot \left(W_f + \frac{T_{pp} \cdot \tan(\phi_s)}{3} \right)$

$\phi_{OT} := 0.75$ ***TIA-222-G REDUCTION FACTOR*** $\quad M_r = 4809.2626 \cdot kip \cdot ft$

Overturning Moment:

$M_{ot} := M_t + S_t \cdot (L_p + T_f) + WT_t \cdot X_{off}$ $\quad M_{ot} = 3424 \cdot kip \cdot ft$

Overturn Ratio (%):

$Ratio_{Stability} := \frac{M_{ot}}{M_r \cdot \phi_{OT}}$ $\quad Ratio_{Stability} = 94.93 \cdot \%$

$StabilityCheck := if(M_r \cdot \phi_{OT} > M_{ot}, "Okay", "No Good")$ $\quad StabilityCheck = "Okay"$

BEARING PRESSURE CHECK:

Pressure Applied:

$LOAD_{tot} := 1.2WT_c + 1.2WT_{s1} + WT_t$ $\quad LOAD_{tot} = 481.4575 \cdot kip$

$A_{mat} := W_f^{\,2}$ $\quad A_{mat} = 552.25 \cdot ft^2$

$S := \frac{W_f^{\,3}}{6}$ $\quad S = 2162.9792 \cdot ft^3$

$P_{max} := \frac{LOAD_{tot}}{A_{mat}} + \frac{M_{ot}}{S}$ $\quad P_{max} = 2.4548 \cdot ksf$

$P_{min} := \frac{LOAD_{tot}}{A_{mat}} - \frac{M_{ot}}{S}$ $\quad P_{min} = -0.7112 \cdot ksf$

$MaxPressure := if\left(P_{max} < 0.75R_s, \text{"Okay"}, \text{"No Good"}\right)$ $\quad MaxPressure = \text{"Okay"}$

$MinPressure := if\left[\left(P_{min} \geq 0\right) \cdot \left(P_{min} < 0.75 \cdot R_s\right), \text{"Okay"}, \text{"No Good"}\right]$ $\quad MinPressure = \text{"No Good"}$

Distance to Resultant of Pressure Distribution:

$X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3}$ $\quad X_p = 6.0737 \cdot ft$

Distance to Kern:

$X_k := \frac{W_f}{3}$ $\quad X_k = 7.8333 \cdot ft$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity:

$e := \frac{M_{ot}}{LOAD_{tot}}$ $\quad e = 7.1117$

Adjusted Soil Pressure:

$q_a := \frac{2 \cdot LOAD_{tot}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e\right)}$ $\quad q_a = 2.9447 \cdot ksf$

Revised Maximum:

$q_{max} := if\left(X_p < X_k, q_a, P_{max}\right)$ $\quad q_{max} = 2.9447 \cdot ksf$

$PressureCheck := if\left(q_{max} < 0.75 \cdot R_s, \text{"Okay"}, \text{"No Good"}\right)$ $\quad PressureCheck = \text{"Okay"}$

Note: Existing foundation pad and pier reinforcement not available at the time of this Structural Analysis and therefore, can not be assessed with proposed antenna loading based on this missing information. Calculations for Punching Shear, Beam Shear, Pad Flexure and (column) Foundation leg piers are omitted from this analysis.

About AECOM

AECOM (NYSE: ACM) is a global provider of professional technical and management support services to a broad range of markets, including transportation, facilities, environmental, energy, water and government. With approximately 45,000 employees around the world, AECOM is a leader in all of the key markets that it serves. AECOM provides a blend of global reach, local knowledge, innovation, and collaborative technical excellence in delivering solutions that enhance and sustain the world's built, natural, and social environments. A Fortune 500 company, AECOM serves clients in more than 100 countries and has annual revenue in excess of $6 billion.

More information on AECOM and its services can be found at www.aecom.com.

ATTACHMENT 4

HUDSON Design Group LLC

May 1, 2020
November 5, 2020 (Rev.1)
November 16, 2020 (Rev.2)

SAI Communications
12 Industrial Way
Salem NH, 03079

RE:		
	Site Number:	CT1401 (NSB)
	FA Number:	14563480
	PACE Number:	MRCTB032121
	PT Number:	2151A0GPC6
	Site Name:	ENFIELD CT
	Site Address:	293 Elm Street Enfield, CT 06082

To Whom It May Concern:

Hudson Design Group LLC (HDG) has been authorized by SAI Communications to perform a mount analysis on the new AT&T antenna/RRH mounts to determine their capability of supporting the following additional loading:

- **(6) EPBQ-654L8H8-L2 Antennas (96.0"x21.0"x6.3" – Wt. = 97 lbs. /each)**
- **(3) HPA65R-BU8A Antennas (96.0"x11.7"x7.6" – Wt. = 54 lbs. /each)**
- **(3) B14 4478 RRH's (18.1"x13.4"x8.3" – Wt. = 60 lbs. /each)**
- **(3) B5/B12 4449 RRH's (17.9"x13.2"x9.5" – Wt. = 71 lbs. /each)**
- **(3) B2/B66A 8843 RRH's (14.9"x13.2"x10.9" – Wt. = 72 lbs. /each)**
- **(3) 4415 B30 RRH's (16.5"x13.4"x5.9" – Wt. = 46 lbs. /each)**
- **(3) Squid Surge Arrestor (24.0"x9.7" Φ – Wt. = 33 lbs. /each)**

**Proposed equipment shown in bold.*

Assembly drawings prepared by SitePro1, P/N VFA12-WLL-30120, dated January 25, 2017, and P/N USF-2U dated February 1, 2011 were used to perform this analysis.

Mount Analysis Methods:

- This analysis was conducted in accordance with EIA/TIA-222-H, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, the International Building Code 2015, with 2018 Connecticut State Building Code, 2015 Edition, and AT&T Mount Technical Directive – R13.
- HDG considers this mount to be asymmetrical and has applied wind loads in 30 degree increments all around the mount. Per TIA-222-H and Appendix N of the Connecticut State Building Code, the max basic wind speed for this site is equal to 130 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 2.01 in was used for this analysis.
- HDG considers this site to be exposure category B; tower is located in an urban/suburban or wooded area with numerous closely spaced obstructions.
- HDG considers this site to be topographic category 1; tower is located on flat terrain or the bottom of a hill or ridge.
- HDG considers this site to have a spectral response acceleration parameter at short periods, S_S, of 0.176 and a spectral response acceleration parameter at a period of 1 second, S_1, of 0.065.
- The mount has been analyzed with load combinations consisting of 250 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 1.
- The mount has been analyzed with load combinations consisting of a 250 lbs live load in a worst case location on the mount.

Based on our evaluation, we have determined that the (3) New SitePro1 VFA12-WLL-30120 mounts, (2) New SitePro1 USF-2U standoff **ARE CAPABLE** of supporting the proposed installation.

	Component	Controlling Load Case	Stress Ratio	Pass/Fail
New Mount Rating	141	LC26	98%	**PASS**

Reference Documents:

- Assembly drawings prepared by SitePro1, P/N VFA12-WLL-30120, dated January 25, 2017.
- Assembly drawings prepared by SitePro1, P/N USF-2U, dated February 1, 2011.

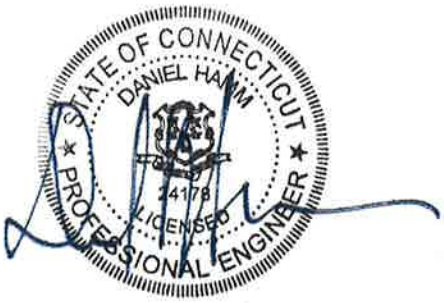
This determination was based on the following limitations and assumptions:

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

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

Respectfully Submitted,
Hudson Design Group LLC

Michael Cabral
Vice President



Daniel P. Hamm, PE
Principal

HUDSON
Design Group LLC

Wind & Ice
Calculations

Date: 11/16/2020
Project Name: ENFIELD CAPACITY
Project No.: CT1401
Designed By: ID **Checked By:** MSC

HUDSON Design Group LLC

2.6.5.2 Velocity Pressure Coeff:

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

z=	151	(ft)
z_g=	1200	(ft)
α=	7.0	

K_z= 1.112

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

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}= #DIV/0!

K_h=	#DIV/0!	
K_c=	0.9	(from Table 2-4)
K_t=		(from Table 2-5)
f=		(from Table 2-5)
z=	151	
z_s=	160	(Mean elevation of base of structure above sea level)
H=		(Ht. of the crest above surrounding terrain)
K_{zt}=	1.00	(from 2.6.6.2.1)
K_e=	0.99	(from 2.6.8)

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

Category= **1**

2.6.10 Design Ice Thickness

Max Ice Thickness = t_i =	1.50	in
Importance Factor = I=	1.15	(from Table 2-3)
K_{iz} =	1.16	(from Sec. 2.6.10)

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

t_{iz} = 2.01 in

Date: 11/16/2020
Project Name: ENFIELD CAPACITY
Project No.: CT1401
Designed By: ID Checked By: MSC

HUDSON Design Group LLC

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=	185	G_h=	0.85

2.6.9.2 Guyed Masts G_h= 0.85

2.6.9.3 Pole Structures G_h= 1.1

2.6.9 Appurtenances G_h= 1.0

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

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

2.6.11.2 Design Wind Force on Appurtenances

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

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

q_z=	**45.43**	K_z=	1.112	(from 2.6.5.2)
$q_{z\ (ice)}$=	**6.72**	K_{zt}=	1.0	(from 2.6.6.2.1)
$q_{z\ (30)}$=	**2.42**	K_s=	1.0	(from 2.6.7)
		K_e=	0.99	(from 2.6.8)
		K_d=	0.95	(from Table 2-2)
		V_{max}=	130	mph (Ultimate Wind Speed)
		$V_{max\ (ice)}$=	50	mph
		V_{30}=	30	mph

Table 2-2

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

Date: 11/16/2020
Project Name: ENFIELD CAPACITY
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Determine Ca:

Table 2-9

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

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

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

Ice Thickness = 2.01 in **Angle =** 0 (deg) **Equivalent Angle =** 180 (deg)

Appurtenances	Height	Width	Depth	Flat Area	Aspect Ratio	Ca	Force (lbs)	Force (lbs) (w/ Ice)	Force (lbs) (30 mph)
EPBQ-654L8H8-L2 Antenna	96.0	21.0	6.3	14.00	4.57	1.29	822	151	44
HPA65R-BU8A Antenna	96.0	11.7	7.6	7.80	8.21	1.44	510	106	27
B14 4478 RRH	18.1	8.3	13.4	1.04	2.18	1.20	57	15	3
4415 B30 RRH	17.9	9.5	13.4	1.18	1.88	1.20	64	17	3
B2/B66A 8843 RRH	14.9	10.9	13.2	1.13	1.37	1.20	61	16	3
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.90	1.20	64	16	3
Surge Arrestor	24.0	9.7	9.7	1.62	2.47	0.70	51	13	3
2" Pipe	2.4	12.0		0.20	0.20	1.20	11	6	1
2-1/2" Pipe	2.9	12.0		0.24	0.24	1.20	13	6	1
3/4" Round Bar	0.8	12.0		0.06	0.06	1.20	2	4	0
5/8" Round Bar	0.6	12.0		0.05	0.05	1.20	3	4	0
PL 3-1/2X5/8	0.6	12.0		0.05	0.05	1.20	3	4	0
PL 11-1/4X5/8	0.6	12.0		0.05	0.05	1.20	3	4	0
HSS 3x3	3.0	12.0		0.25	0.25	1.25	14	7	1

Date: 11/16/2020
Project Name: ENFIELD CAPACITY
Project No.: CT1401
Designed By: ID Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle =	30	(deg)	Ice Thickness =	2.01	in.	Equivalent Angle =	210	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Aspect Ratio	Aspect Ratio	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
EPBQ-654L8H8-L2 Antenna	96.0	21.0	6.3	14.00	4.20	4.57	15.24	1.29	1.67	822	320	696
HPA65R-BU8A Antenna	96.0	11.7	7.6	7.80	5.07	8.21	12.63	1.44	1.59	510	365	474
B14 4478 RRH	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	57	92	66
4415 B30 RRH	17.9	9.5	13.4	1.18	1.67	1.88	1.34	1.20	1.20	64	91	71
B2/B66A 8843 RRH	14.9	10.9	13.2	1.13	1.37	1.37	1.13	1.20	1.20	61	74	65
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	64	89	70

WIND LOADS WITH ICE:

EPBQ-654L8H8-L2 Antenna	100.0	25.0	10.3	17.38	7.17	4.00	9.69	1.27	1.49	148	72	129
HPA65R-BU8A Antenna	100.0	15.7	11.6	10.92	8.07	6.36	8.61	1.37	1.45	101	79	95
B14 4478 RRH	22.1	12.3	17.4	1.89	2.67	1.80	1.27	1.20	1.20	15	22	17
4415 B30 RRH	21.9	13.5	17.4	2.06	2.65	1.62	1.26	1.20	1.20	17	21	18
B2/B66A 8843 RRH	18.9	14.9	17.2	1.96	2.26	1.27	1.10	1.20	1.20	16	18	16
B5/B12 4449 RRH	21.9	13.4	17.2	2.04	2.62	1.63	1.27	1.20	1.20	16	21	18

WIND LOADS AT 30 MPH:

EPBQ-654L8H8-L2 Antenna	96.0	21.0	6.3	14.00	4.20	4.57	15.24	1.29	1.67	44	17	37
HPA65R-BU8A Antenna	96.0	11.7	7.6	7.80	5.07	8.21	12.63	1.44	1.59	27	19	25
B14 4478 RRH	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	3	5	3
4415 B30 RRH	17.9	9.5	13.4	1.18	1.67	1.88	1.34	1.20	1.20	3	5	4
B2/B66A 8843 RRH	14.9	10.9	13.2	1.13	1.37	1.37	1.13	1.20	1.20	3	4	3
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	3	5	4

Date: 11/16/2020
Project Name: ENFIELD CAPACITY
Project No.: CT1401
Designed By: ID Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle = 60 (deg) | Ice Thickness = 2.01 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)
EPBQ-654L8H8-L2 Antenna	96.0	21.0	6.3	14.00	4.20	4.57	15.24	1.29	1.67	822	320	445
HPA65R-BU8A Antenna	96.0	11.7	7.6	7.80	5.07	8.21	12.63	1.44	1.59	510	365	402
B14 4478 RRH	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	57	92	83
4415 B30 RRH	17.9	9.5	13.4	1.18	1.67	1.88	1.34	1.20	1.20	64	91	84
B2/B66A 8843 RRH	14.9	10.9	13.2	1.13	1.37	1.37	1.13	1.20	1.20	61	74	71
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	64	89	83

WIND LOADS WITH ICE:

EPBQ-654L8H8-L2 Antenna	100.0	25.0	10.3	17.38	7.17	4.00	9.69	1.27	1.49	148	72	91
HPA65R-BU8A Antenna	100.0	15.7	11.6	10.92	8.07	6.36	8.61	1.37	1.45	101	79	84
B14 4478 RRH	22.1	12.3	17.4	1.89	2.67	1.80	1.27	1.20	1.20	15	22	20
4415 B30 RRH	21.9	13.5	17.4	2.06	2.65	1.62	1.26	1.20	1.20	17	21	20
B2/B66A 8843 RRH	18.9	14.9	17.2	1.96	2.26	1.27	1.10	1.20	1.20	16	18	18
B5/B12 4449 RRH	21.9	13.4	17.2	2.04	2.62	1.63	1.27	1.20	1.20	16	21	20

WIND LOADS AT 30 MPH:

EPBQ-654L8H8-L2 Antenna	96.0	21.0	6.3	14.00	4.20	4.57	15.24	1.29	1.67	44	17	24
HPA65R-BU8A Antenna	96.0	11.7	7.6	7.80	5.07	8.21	12.63	1.44	1.59	27	19	21
B14 4478 RRH	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	3	5	4
4415 B30 RRH	17.9	9.5	13.4	1.18	1.67	1.88	1.34	1.20	1.20	3	5	4
B2/B66A 8843 RRH	14.9	10.9	13.2	1.13	1.37	1.37	1.13	1.20	1.20	3	4	4
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	3	5	4

Date: 11/16/2020
Project Name: ENFIELD CAPACITY
Project No.: CT1401
Designed By: ID Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle =	90	(deg)	Ice Thickness =	2.01	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)
EPBQ-654L8H8-L2 Antenna	96.0	21.0	6.3	14.00	4.20	4.57	15.24	1.29	1.67	822	320	320
HPA65R-BU8A Antenna	96.0	11.7	7.6	7.80	5.07	8.21	12.63	1.44	1.59	510	365	365
B14 4478 RRH	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	57	92	92
4415 B30 RRH	17.9	9.5	13.4	1.18	1.67	1.88	1.34	1.20	1.20	64	91	91
B2/B66A 8843 RRH	14.9	10.9	13.2	1.13	1.37	1.37	1.13	1.20	1.20	61	74	74
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	64	89	89
WIND LOADS WITH ICE:												
EPBQ-654L8H8-L2 Antenna	100.0	25.0	10.3	17.38	7.17	4.00	9.69	1.27	1.49	148	72	72
HPA65R-BU8A Antenna	100.0	15.7	11.6	10.92	8.07	6.36	8.61	1.37	1.45	101	79	79
B14 4478 RRH	22.1	12.3	17.4	1.89	2.67	1.80	1.27	1.20	1.20	15	22	22
4415 B30 RRH	21.9	13.5	17.4	2.06	2.65	1.62	1.26	1.20	1.20	17	21	21
B2/B66A 8843 RRH	18.9	14.9	17.2	1.96	2.26	1.27	1.10	1.20	1.20	16	18	18
B5/B12 4449 RRH	21.9	13.4	17.2	2.04	2.62	1.63	1.27	1.20	1.20	16	21	21
WIND LOADS AT 30 MPH:												
EPBQ-654L8H8-L2 Antenna	96.0	21.0	6.3	14.00	4.20	4.57	15.24	1.29	1.67	44	17	17
HPA65R-BU8A Antenna	96.0	11.7	7.6	7.80	5.07	8.21	12.63	1.44	1.59	27	19	19
B14 4478 RRH	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	3	5	5
4415 B30 RRH	17.9	9.5	13.4	1.18	1.67	1.88	1.34	1.20	1.20	3	5	5
B2/B66A 8843 RRH	14.9	10.9	13.2	1.13	1.37	1.37	1.13	1.20	1.20	3	4	4
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	3	5	5

Date: 11/16/2020
Project Name: ENFIELD CAPACITY
Project No.: CT1401
Designed By: ID Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle = 120 (deg) | Ice Thickness = 2.01 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)
EPBQ-654L8H8-L2 Antenna	96.0	21.0	6.3	14.00	4.20	4.57	15.24	1.29	1.67	822	320	445
HPA65R-BU8A Antenna	96.0	11.7	7.6	7.80	5.07	8.21	12.63	1.44	1.59	510	365	402
B14 4478 RRH	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	57	92	83
4415 B30 RRH	17.9	9.5	13.4	1.18	1.67	1.88	1.34	1.20	1.20	64	91	84
B2/B66A 8843 RRH	14.9	10.9	13.2	1.13	1.37	1.37	1.13	1.20	1.20	61	74	71
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	64	89	83
WIND LOADS WITH ICE:												
EPBQ-654L8H8-L2 Antenna	100.0	25.0	10.3	17.38	7.17	4.00	9.69	1.27	1.49	148	72	91
HPA65R-BU8A Antenna	100.0	15.7	11.6	10.92	8.07	6.36	8.61	1.37	1.45	101	79	84
B14 4478 RRH	22.1	12.3	17.4	1.89	2.67	1.80	1.27	1.20	1.20	15	22	20
4415 B30 RRH	21.9	13.5	17.4	2.06	2.65	1.62	1.26	1.20	1.20	17	21	20
B2/B66A 8843 RRH	18.9	14.9	17.2	1.96	2.26	1.27	1.10	1.20	1.20	16	18	18
B5/B12 4449 RRH	21.9	13.4	17.2	2.04	2.62	1.63	1.27	1.20	1.20	16	21	20
WIND LOADS AT 30 MPH:												
EPBQ-654L8H8-L2 Antenna	96.0	21.0	6.3	14.00	4.20	4.57	15.24	1.29	1.67	44	17	24
HPA65R-BU8A Antenna	96.0	11.7	7.6	7.80	5.07	8.21	12.63	1.44	1.59	27	19	21
B14 4478 RRH	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	3	5	4
4415 B30 RRH	17.9	9.5	13.4	1.18	1.67	1.88	1.34	1.20	1.20	3	5	4
B2/B66A 8843 RRH	14.9	10.9	13.2	1.13	1.37	1.37	1.13	1.20	1.20	3	4	4
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	3	5	4

Date: 11/16/2020
Project Name: ENFIELD CAPACITY
Project No.: CT1401
Designed By: ID Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle =	150	(deg)	Ice Thickness =	2.01	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)
EPBQ-654L8H8-L2 Antenna	96.0	21.0	6.3	14.00	4.20	4.57	15.24	1.29	1.67	822	320	696
HPA65R-BU8A Antenna	96.0	11.7	7.6	7.80	5.07	8.21	12.63	1.44	1.59	510	365	474
B14 4478 RRH	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	57	92	66
4415 B30 RRH	17.9	9.5	13.4	1.18	1.67	1.88	1.34	1.20	1.20	64	91	71
B2/B66A 8843 RRH	14.9	10.9	13.2	1.13	1.37	1.37	1.13	1.20	1.20	61	74	65
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	64	89	70

WIND LOADS WITH ICE:

EPBQ-654L8H8-L2 Antenna	100.0	25.0	10.3	17.38	7.17	4.00	9.69	1.27	1.49	148	72	129
HPA65R-BU8A Antenna	100.0	15.7	11.6	10.92	8.07	6.36	8.61	1.37	1.45	101	79	95
B14 4478 RRH	22.1	12.3	17.4	1.89	2.67	1.80	1.27	1.20	1.20	15	22	17
4415 B30 RRH	21.9	13.5	17.4	2.06	2.65	1.62	1.26	1.20	1.20	17	21	18
B2/B66A 8843 RRH	18.9	14.9	17.2	1.96	2.26	1.27	1.10	1.20	1.20	16	18	16
B5/B12 4449 RRH	21.9	13.4	17.2	2.04	2.62	1.63	1.27	1.20	1.20	16	21	18

WIND LOADS AT 30 MPH:

EPBQ-654L8H8-L2 Antenna	96.0	21.0	6.3	14.00	4.20	4.57	15.24	1.29	1.67	44	17	37
HPA65R-BU8A Antenna	96.0	11.7	7.6	7.80	5.07	8.21	12.63	1.44	1.59	27	19	25
B14 4478 RRH	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	3	5	3
4415 B30 RRH	17.9	9.5	13.4	1.18	1.67	1.88	1.34	1.20	1.20	3	5	4
B2/B66A 8843 RRH	14.9	10.9	13.2	1.13	1.37	1.37	1.13	1.20	1.20	3	4	3
B5/B12 4449 RRH	17.9	9.4	13.2	1.17	1.64	1.90	1.36	1.20	1.20	3	5	4

Date: 11/16/2020
Project Name: ENFIELD CAPACITY
Project No.: CT1401
Designed By: ID **Checked By:** MSC

HUDSON Design Group LLC

ICE WEIGHT CALCULATIONS

Thickness of ice: 2.01 in.
Density of ice: 56 pcf

EPBQ-654L8H8-L2 Antenna

Weight of ice based on total radial SF area:

Height (in):	96.0	
Width (in):	21.0	
Depth (in):	6.3	
Total weight of ice on object:		470 lbs
Weight of object:	86.0 lbs	
Combined weight of ice and object:		556 lbs

HPA65R-BU8A Antenna

Weight of ice based on total radial SF area:

Height (in):	96.0	
Width (in):	11.7	
Depth (in):	7.6	
Total weight of ice on object:		314 lbs
Weight of object:	54.0 lbs	
Combined weight of ice and object:		368 lbs

B14 4478 RRH

Weight of ice based on total radial SF area:

Height (in):	18.1	
Width (in):	13.4	
Depth (in):	8.3	
Total weight of ice on object:		66 lbs
Weight of object:	60.0 lbs	
Combined weight of ice and object:		126 lbs

B5/B12 4449 RRH

Weight of ice based on total radial SF area:

Height (in):	17.9	
Width (in):	13.2	
Depth (in):	9.4	
Total weight of ice on object:		67 lbs
Weight of object:	73.0 lbs	
Combined weight of ice and object:		140 lbs

B2/B66A 8843 RRH

Weight of ice based on total radial SF area:

Height (in):	14.9	
Width (in):	13.2	
Depth (in):	10.9	
Total weight of ice on object:		58 lbs
Weight of object:	72.0 lbs	
Combined weight of ice and object:		130 lbs

4415 B30 RRH

Weight of ice based on total radial SF area:

Height (in):	16.5	
Width (in):	13.4	
Depth (in):	5.9	
Total weight of ice on object:		56 lbs
Weight of object:	46.0 lbs	
Combined weight of ice and object:		102 lbs

Squid Surge Arrestor

Weight of ice based on total radial SF area:

Depth (in):	24.0	
Diameter(in):	9.7	
Total weight of ice on object:		58 lbs
Weight of object:	33 lbs	
Combined weight of ice and object:		91 lbs

8843 B2/B66A RRH

Weight of ice based on total radial SF area:

Height (in):	14.9	
Width (in):	13.2	
Depth (in):	10.9	
Total weight of ice on object:		58 lbs
Weight of object:	72.0 lbs	
Combined weight of ice and object:		130 lbs

5/8" Round Bar

Per foot weight of ice:

diameter (in):	0.75	
Per foot weight of ice on object:		7 plf

3/4" Round Bar

Per foot weight of ice:

diameter (in):	0.75	
Per foot weight of ice on object:		7 plf

PL 3-1/2x5/8

Weight of ice based on total radial SF area:

Height (in):	3.5	
Width (in):	0.625	
Per foot weight of ice on object:		14 plf

2-1/2" pipe

Per foot weight of ice:

diameter (in):	2.88	
Per foot weight of ice on object:		12 plf

3" Pipe

Per foot weight of ice:

diameter (in):	3.5	
Per foot weight of ice on object:		14 plf

2" pipe

Per foot weight of ice:

diameter (in):	2.38	
Per foot weight of ice on object:		11 plf

HSS 3x3

Weight of ice based on total radial SF area:

Height (in):	3	
Width (in):	3	
Per foot weight of ice on object:		15 plf

PL 11-1/4x5/8

Weight of ice based on total radial SF area:

Height (in):	11.25	
Width (in):	0.625	
Per foot weight of ice on object:		33 plf

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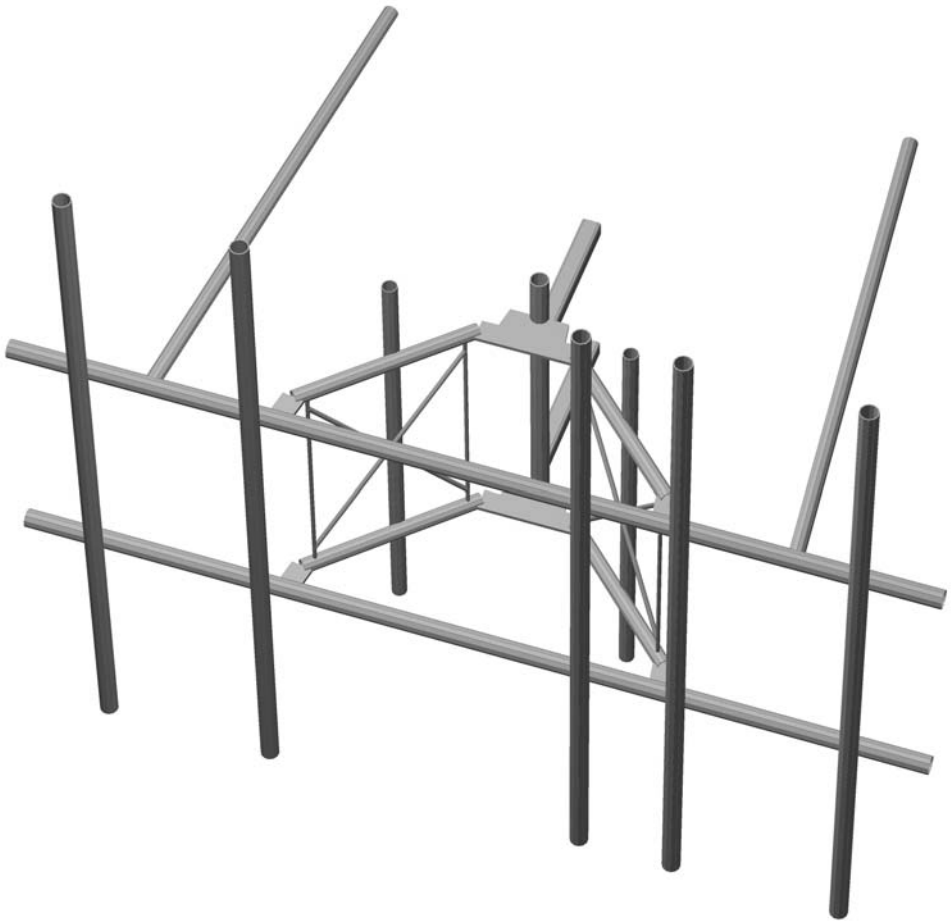
Mount Calculations
(Proposed Conditions)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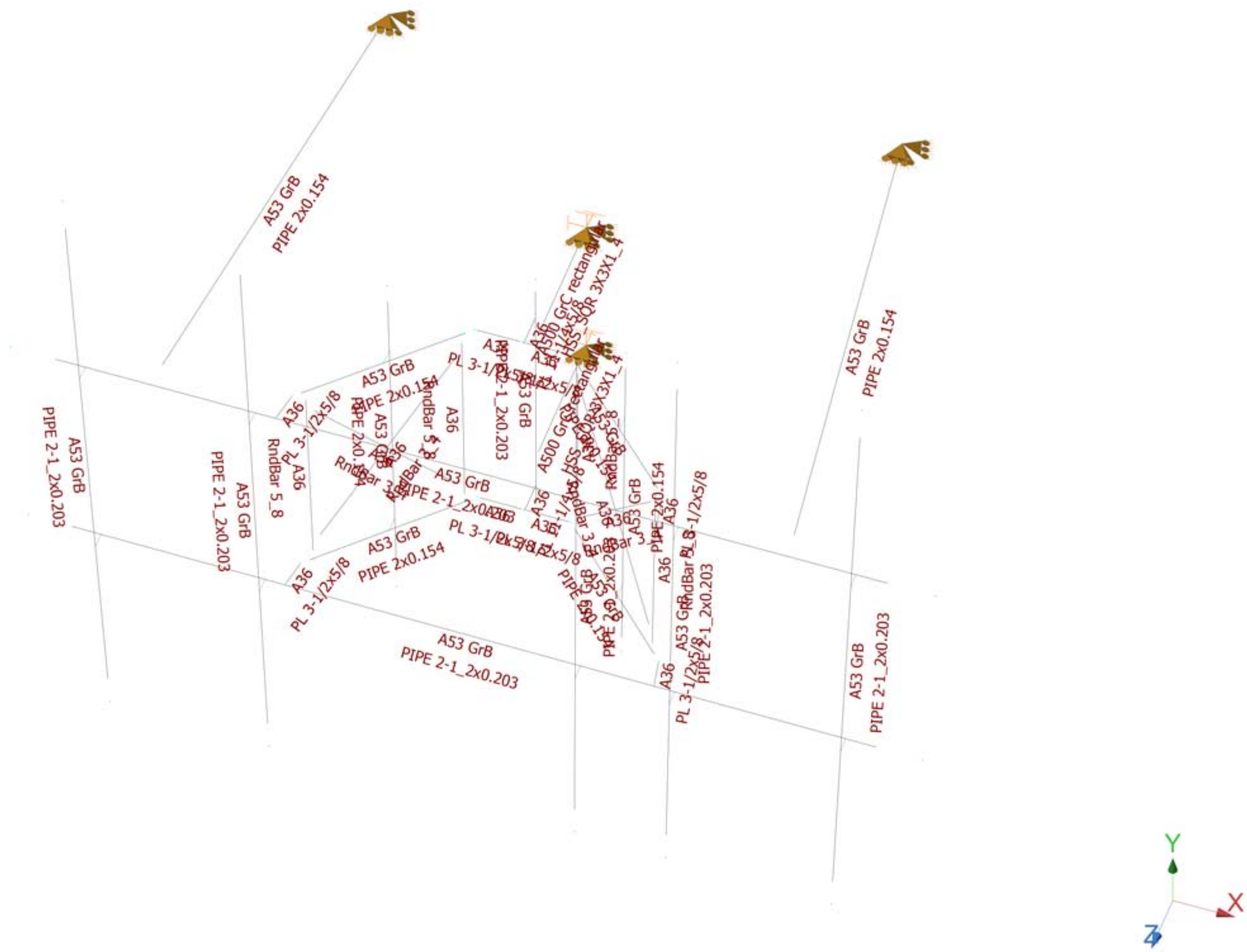

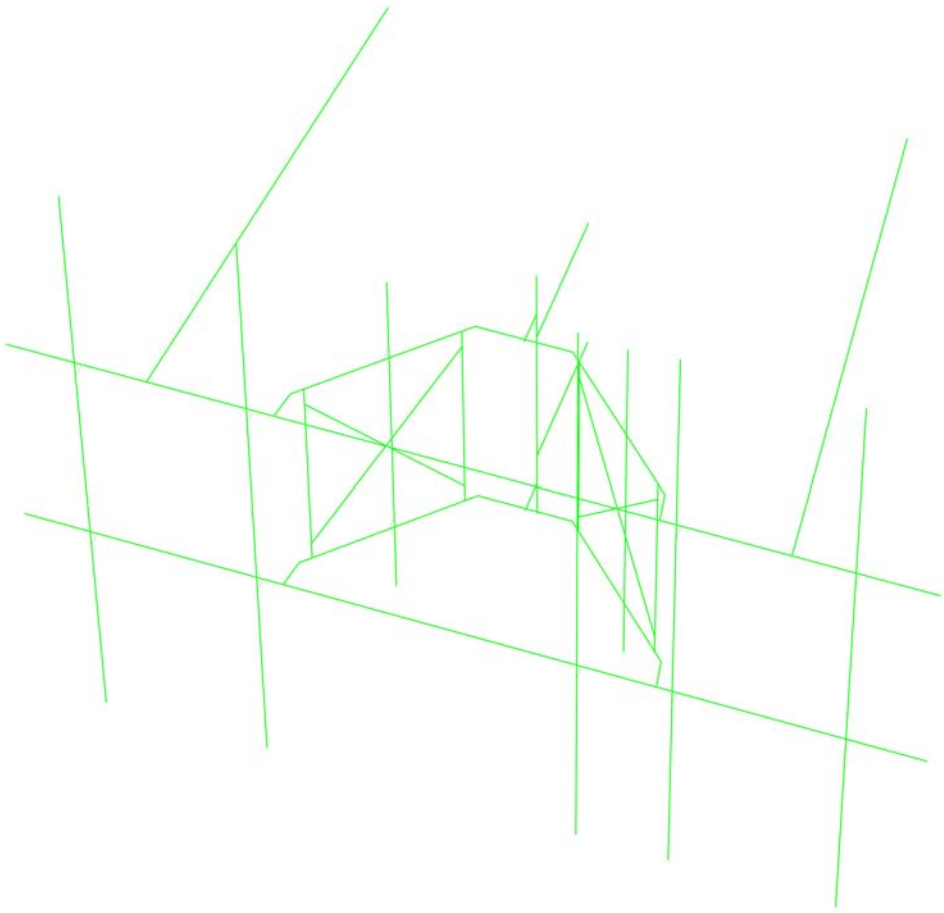
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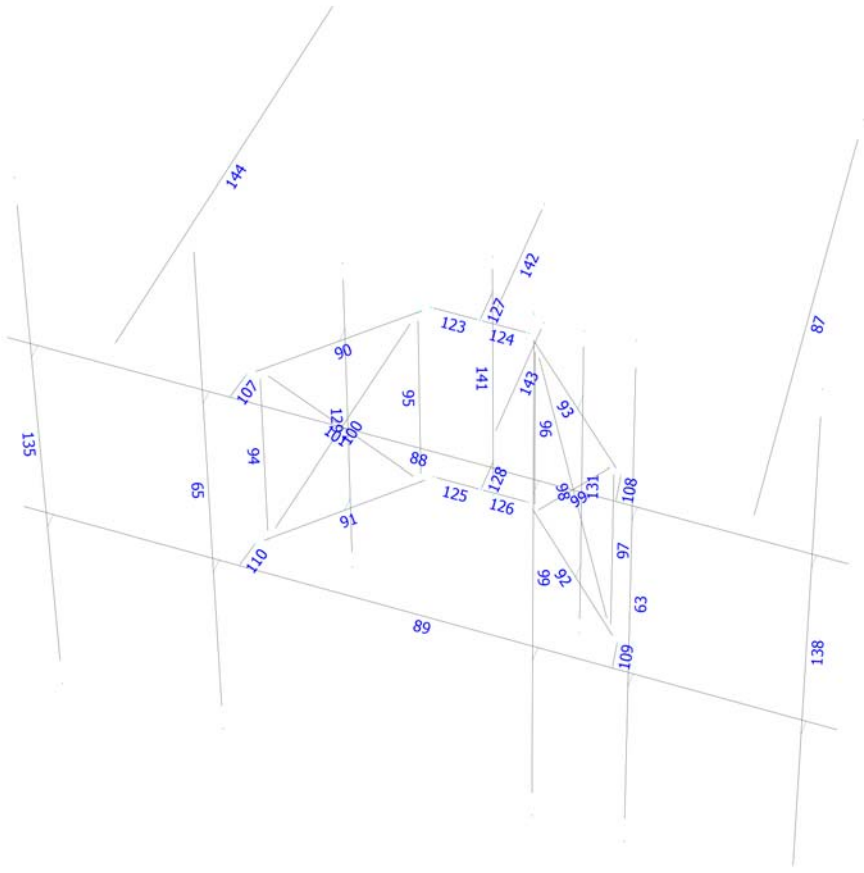
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Load data

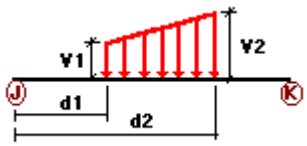
GLOSSARY

Comb : Indicates if load condition is a load combination

Load Conditions

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

Distributed force on members



Condition	Member	Dir1	Val1 [Kip/ft]	Val2 [Kip/ft]	Dist1 [ft]	%	Dist2 [ft]	%
Wo	63	z	-0.01	0.00	0.00	No	0.00	No
	65	z	-0.01	0.00	0.00	No	0.00	No
	87	z	-0.008	0.00	0.00	No	0.00	No
	88	z	-0.01	0.00	0.00	No	0.00	No
	89	z	-0.01	0.00	0.00	No	0.00	No
	90	z	-0.008	0.00	0.00	No	0.00	No
	91	z	-0.008	0.00	0.00	No	0.00	No
	92	z	-0.008	0.00	0.00	No	0.00	No
	93	z	-0.008	0.00	0.00	No	0.00	No
	94	z	-0.002	0.00	0.00	No	0.00	No
	95	z	-0.002	0.00	0.00	No	0.00	No
	96	z	-0.002	0.00	0.00	No	0.00	No
	97	z	-0.002	0.00	0.00	No	0.00	No
	98	z	-0.002	0.00	0.00	No	0.00	No
	99	z	-0.002	0.00	0.00	No	0.00	No
	100	z	-0.002	0.00	0.00	No	0.00	No
	101	z	-0.002	0.00	0.00	No	0.00	No
	107	z	-0.002	0.00	0.00	No	0.00	No
	109	z	-0.002	0.00	0.00	No	0.00	No
	110	z	-0.002	0.00	0.00	No	0.00	No
	123	z	-0.002	0.00	0.00	No	0.00	No
	124	z	-0.002	0.00	0.00	No	0.00	No
	125	z	-0.002	0.00	0.00	No	0.00	No
	126	z	-0.002	0.00	0.00	No	0.00	No
	127	z	-0.002	0.00	0.00	No	0.00	No
	128	z	-0.002	0.00	0.00	No	0.00	No
	129	z	-0.008	0.00	0.00	No	0.00	No
	131	z	-0.008	0.00	0.00	No	0.00	No
	141	z	-0.01	0.00	0.00	No	0.00	No
	142	z	-0.014	0.00	0.00	No	0.00	No
	143	z	-0.014	0.00	0.00	No	0.00	No
	144	z	-0.008	0.00	0.00	No	0.00	No
W30	63	z	-0.01	0.00	0.00	No	0.00	No
	65	z	-0.01	0.00	0.00	No	0.00	No
	66	z	-0.01	0.00	0.00	No	0.00	No
	87	z	-0.008	0.00	0.00	No	0.00	No
	88	z	-0.01	0.00	0.00	No	0.00	No
	89	z	-0.01	0.00	0.00	No	0.00	No
	90	z	-0.008	0.00	0.00	No	0.00	No
	91	z	-0.008	0.00	0.00	No	0.00	No
	92	z	-0.008	0.00	0.00	No	0.00	No
	93	z	-0.008	0.00	0.00	No	0.00	No
	94	z	-0.002	0.00	0.00	No	0.00	No
	95	z	-0.002	0.00	0.00	No	0.00	No
	96	z	-0.002	0.00	0.00	No	0.00	No
	97	z	-0.002	0.00	0.00	No	0.00	No
	98	z	-0.002	0.00	0.00	No	0.00	No
	99	z	-0.002	0.00	0.00	No	0.00	No
	100	z	-0.002	0.00	0.00	No	0.00	No
	101	z	-0.002	0.00	0.00	No	0.00	No
	107	z	-0.002	0.00	0.00	No	0.00	No
	109	z	-0.002	0.00	0.00	No	0.00	No
	110	z	-0.002	0.00	0.00	No	0.00	No
	123	z	-0.002	0.00	0.00	No	0.00	No
	124	z	-0.002	0.00	0.00	No	0.00	No
	125	z	-0.002	0.00	0.00	No	0.00	No
	126	z	-0.002	0.00	0.00	No	0.00	No
	127	z	-0.002	0.00	0.00	No	0.00	No
	128	z	-0.002	0.00	0.00	No	0.00	No
	129	z	-0.008	0.00	0.00	No	0.00	No

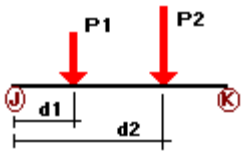
	131	z	-0.008	0.00	0.00	No	0.00	No
	135	z	-0.01	0.00	0.00	No	0.00	No
	138	z	-0.01	0.00	0.00	No	0.00	No
	141	z	-0.01	0.00	0.00	No	0.00	No
	142	z	-0.014	0.00	0.00	No	0.00	No
	143	z	-0.014	0.00	0.00	No	0.00	No
	144	z	-0.008	0.00	0.00	No	0.00	No
W60	63	x	-0.01	0.00	0.00	No	0.00	No
	65	x	-0.01	0.00	0.00	No	0.00	No
	66	x	-0.01	0.00	0.00	No	0.00	No
	87	x	-0.008	0.00	0.00	No	0.00	No
	88	x	-0.01	0.00	0.00	No	0.00	No
	89	x	-0.01	0.00	0.00	No	0.00	No
	90	x	-0.008	0.00	0.00	No	0.00	No
	91	x	-0.008	0.00	0.00	No	0.00	No
	92	x	-0.008	0.00	0.00	No	0.00	No
	93	x	-0.008	0.00	0.00	No	0.00	No
	94	x	-0.002	0.00	0.00	No	0.00	No
	95	x	-0.002	0.00	0.00	No	0.00	No
	96	x	-0.002	0.00	0.00	No	0.00	No
	97	x	-0.002	0.00	0.00	No	0.00	No
	98	x	-0.002	0.00	0.00	No	0.00	No
	99	x	-0.002	0.00	0.00	No	0.00	No
	100	x	-0.002	0.00	0.00	No	0.00	No
	101	x	-0.002	0.00	0.00	No	0.00	No
	107	x	-0.002	0.00	0.00	No	0.00	No
	109	x	-0.002	0.00	0.00	No	0.00	No
	110	x	-0.002	0.00	0.00	No	0.00	No
	123	x	-0.002	0.00	0.00	No	0.00	No
	124	x	-0.002	0.00	0.00	No	0.00	No
	125	x	-0.002	0.00	0.00	No	0.00	No
	126	x	-0.002	0.00	0.00	No	0.00	No
	127	x	-0.002	0.00	0.00	No	0.00	No
	128	x	-0.002	0.00	0.00	No	0.00	No
	129	x	-0.008	0.00	0.00	No	0.00	No
	131	x	-0.008	0.00	0.00	No	0.00	No
	135	x	-0.01	0.00	0.00	No	0.00	No
	138	x	-0.01	0.00	0.00	No	0.00	No
	141	x	-0.01	0.00	0.00	No	0.00	No
	142	x	-0.014	0.00	0.00	No	0.00	No
	143	x	-0.014	0.00	0.00	No	0.00	No
	144	x	-0.008	0.00	0.00	No	0.00	No
W90	63	x	-0.01	0.00	0.00	No	0.00	No
	65	x	-0.01	0.00	0.00	No	0.00	No
	66	x	-0.01	0.00	0.00	No	0.00	No
	87	x	-0.008	0.00	0.00	No	0.00	No
	90	x	-0.008	0.00	0.00	No	0.00	No
	91	x	-0.008	0.00	0.00	No	0.00	No
	92	x	-0.008	0.00	0.00	No	0.00	No
	93	x	-0.008	0.00	0.00	No	0.00	No
	94	x	-0.002	0.00	0.00	No	0.00	No
	95	x	-0.002	0.00	0.00	No	0.00	No
	96	x	-0.002	0.00	0.00	No	0.00	No
	97	x	-0.002	0.00	0.00	No	0.00	No
	98	x	-0.002	0.00	0.00	No	0.00	No
	99	x	-0.002	0.00	0.00	No	0.00	No
	100	x	-0.002	0.00	0.00	No	0.00	No
	101	x	-0.002	0.00	0.00	No	0.00	No
	107	x	-0.002	0.00	0.00	No	0.00	No
	109	x	-0.002	0.00	0.00	No	0.00	No

	110	x	-0.002	0.00	0.00	No	0.00	No
	123	x	-0.002	0.00	0.00	No	0.00	No
	124	x	-0.002	0.00	0.00	No	0.00	No
	125	x	-0.002	0.00	0.00	No	0.00	No
	126	x	-0.002	0.00	0.00	No	0.00	No
	127	x	-0.002	0.00	0.00	No	0.00	No
	128	x	-0.002	0.00	0.00	No	0.00	No
	129	x	-0.008	0.00	0.00	No	0.00	No
	131	x	-0.008	0.00	0.00	No	0.00	No
	135	x	-0.01	0.00	0.00	No	0.00	No
	138	x	-0.01	0.00	0.00	No	0.00	No
	141	x	-0.01	0.00	0.00	No	0.00	No
	142	x	-0.014	0.00	0.00	No	0.00	No
	143	x	-0.014	0.00	0.00	No	0.00	No
	144	x	-0.008	0.00	0.00	No	0.00	No
W120	63	x	-0.01	0.00	0.00	No	0.00	No
	65	x	-0.01	0.00	0.00	No	0.00	No
	66	x	-0.01	0.00	0.00	No	0.00	No
	87	x	-0.008	0.00	0.00	No	0.00	No
	88	x	-0.01	0.00	0.00	No	0.00	No
	89	x	-0.01	0.00	0.00	No	0.00	No
	90	x	-0.008	0.00	0.00	No	0.00	No
	91	x	-0.008	0.00	0.00	No	0.00	No
	92	x	-0.008	0.00	0.00	No	0.00	No
	93	x	-0.008	0.00	0.00	No	0.00	No
	94	x	-0.002	0.00	0.00	No	0.00	No
	95	x	-0.002	0.00	0.00	No	0.00	No
	96	x	-0.002	0.00	0.00	No	0.00	No
	97	x	-0.002	0.00	0.00	No	0.00	No
	98	x	-0.002	0.00	0.00	No	0.00	No
	99	x	-0.002	0.00	0.00	No	0.00	No
	100	x	-0.002	0.00	0.00	No	0.00	No
	101	x	-0.002	0.00	0.00	No	0.00	No
	107	x	-0.002	0.00	0.00	No	0.00	No
	109	x	-0.002	0.00	0.00	No	0.00	No
	110	x	-0.002	0.00	0.00	No	0.00	No
	123	x	-0.002	0.00	0.00	No	0.00	No
	124	x	-0.002	0.00	0.00	No	0.00	No
	125	x	-0.002	0.00	0.00	No	0.00	No
	126	x	-0.002	0.00	0.00	No	0.00	No
	127	x	-0.002	0.00	0.00	No	0.00	No
	128	x	-0.002	0.00	0.00	No	0.00	No
	129	x	-0.008	0.00	0.00	No	0.00	No
	131	x	-0.008	0.00	0.00	No	0.00	No
	135	x	-0.01	0.00	0.00	No	0.00	No
	138	x	-0.01	0.00	0.00	No	0.00	No
	141	x	-0.01	0.00	0.00	No	0.00	No
	142	x	-0.014	0.00	0.00	No	0.00	No
	143	x	-0.014	0.00	0.00	No	0.00	No
	144	x	-0.008	0.00	0.00	No	0.00	No
W150	63	z	0.01	0.00	0.00	No	0.00	No
	65	z	0.01	0.00	0.00	No	0.00	No
	66	z	0.01	0.00	0.00	No	0.00	No
	87	z	0.008	0.00	0.00	No	0.00	No
	88	z	0.01	0.00	0.00	No	0.00	No
	89	z	0.01	0.00	0.00	No	0.00	No
	90	z	0.008	0.00	0.00	No	0.00	No
	91	z	0.008	0.00	0.00	No	0.00	No
	92	z	0.008	0.00	0.00	No	0.00	No
	93	z	0.008	0.00	0.00	No	0.00	No

	94	z	0.002	0.00	0.00	No	0.00	No
	95	z	0.002	0.00	0.00	No	0.00	No
	96	z	0.002	0.00	0.00	No	0.00	No
	97	z	0.002	0.00	0.00	No	0.00	No
	98	z	0.002	0.00	0.00	No	0.00	No
	99	z	0.002	0.00	0.00	No	0.00	No
	100	z	0.002	0.00	0.00	No	0.00	No
	101	z	0.002	0.00	0.00	No	0.00	No
	107	z	0.002	0.00	0.00	No	0.00	No
	109	z	0.002	0.00	0.00	No	0.00	No
	110	z	0.002	0.00	0.00	No	0.00	No
	123	z	0.002	0.00	0.00	No	0.00	No
	124	z	0.002	0.00	0.00	No	0.00	No
	125	z	0.002	0.00	0.00	No	0.00	No
	126	z	0.002	0.00	0.00	No	0.00	No
	127	z	0.002	0.00	0.00	No	0.00	No
	128	z	0.002	0.00	0.00	No	0.00	No
	129	z	0.008	0.00	0.00	No	0.00	No
	131	z	0.008	0.00	0.00	No	0.00	No
	135	z	0.01	0.00	0.00	No	0.00	No
	138	z	0.01	0.00	0.00	No	0.00	No
	141	z	0.01	0.00	0.00	No	0.00	No
	142	z	0.014	0.00	0.00	No	0.00	No
	143	z	0.014	0.00	0.00	No	0.00	No
	144	z	0.008	0.00	0.00	No	0.00	No
Di	63	y	-0.012	0.00	0.00	No	0.00	No
	65	y	-0.012	0.00	0.00	No	0.00	No
	66	y	-0.012	0.00	0.00	No	0.00	No
	87	y	-0.011	0.00	0.00	No	0.00	No
	88	y	-0.012	0.00	0.00	No	0.00	No
	89	y	-0.012	0.00	0.00	No	0.00	No
	90	y	-0.011	0.00	0.00	No	0.00	No
	91	y	-0.011	0.00	0.00	No	0.00	No
	92	y	-0.011	0.00	0.00	No	0.00	No
	93	y	-0.011	0.00	0.00	No	0.00	No
	94	y	-0.007	0.00	0.00	No	0.00	No
	95	y	-0.007	0.00	0.00	No	0.00	No
	96	y	-0.007	0.00	0.00	No	0.00	No
	97	y	-0.007	0.00	0.00	No	0.00	No
	98	y	-0.007	0.00	0.00	No	0.00	No
	99	y	-0.007	0.00	0.00	No	0.00	No
	100	y	-0.007	0.00	0.00	No	0.00	No
	101	y	-0.007	0.00	0.00	No	0.00	No
	107	y	-0.014	0.00	0.00	No	0.00	No
	108	y	-0.014	0.00	0.00	No	0.00	No
	109	y	-0.014	0.00	0.00	No	0.00	No
	110	y	-0.014	0.00	0.00	No	0.00	No
	123	y	-0.014	0.00	0.00	No	0.00	No
	124	y	-0.014	0.00	0.00	No	0.00	No
	125	y	-0.014	0.00	0.00	No	0.00	No
	126	y	-0.014	0.00	0.00	No	0.00	No
	127	y	-0.033	0.00	0.00	No	0.00	No
	128	y	-0.033	0.00	0.00	No	0.00	No
	129	y	-0.011	0.00	0.00	No	0.00	No
	131	y	-0.011	0.00	0.00	No	0.00	No
	135	y	-0.012	0.00	0.00	No	0.00	No
	138	y	-0.012	0.00	0.00	No	0.00	No
	141	y	-0.012	0.00	0.00	No	0.00	No
	142	y	-0.015	0.00	0.00	No	0.00	No
	143	y	-0.015	0.00	0.00	No	0.00	No

	144	y	-0.011	0.00	0.00	No	0.00	No

Concentrated forces on members



Condition	Member	Dir1	Value1 [Kip]	Dist1 [ft]	%
D	66	y	-0.027	0.50	No
		y	-0.027	7.50	No
	129	y	-0.033	20.00	Yes
		y	-0.073	80.00	Yes
		y	-0.072	80.00	Yes
	131	y	-0.053	20.00	Yes
		y	-0.046	80.00	Yes
		y	-0.06	80.00	Yes
	135	y	-0.044	0.50	No
		y	-0.044	7.50	No
	138	y	-0.044	0.50	No
		y	-0.044	7.50	No
Wo	66	z	-0.256	0.50	No
		z	-0.256	7.50	No
	129	z	-0.143	20.00	Yes
		z	-0.061	80.00	Yes
		z	-0.064	80.00	Yes
	131	z	-0.051	20.00	Yes
		z	-0.057	80.00	Yes
		z	-0.064	80.00	Yes
	135	z	-0.411	0.50	No
		z	-0.411	7.50	No
	138	z	-0.411	0.50	No
		z	-0.411	7.50	No
W30	66	3	-0.238	0.50	No
		3	-0.238	7.50	No
	129	3	-0.122	20.00	Yes
		3	-0.07	80.00	Yes
	131	3	-0.051	20.00	Yes
		3	-0.071	80.00	Yes
	135	3	-0.349	0.50	No
		3	-0.349	7.50	No
	138	3	-0.349	0.50	No
		3	-0.349	7.50	No
W60	66	3	-0.201	0.50	No
		3	-0.201	7.50	No
	129	3	-0.08	20.00	Yes
		3	-0.083	80.00	Yes
	131	3	-0.051	20.00	Yes
		3	-0.084	80.00	Yes
	135	3	-0.223	0.50	No
		3	-0.223	7.50	No
	138	3	-0.223	0.50	No
		3	-0.223	7.50	No

W90	66	x	-0.183	0.50	No
		x	-0.183	7.50	No
	129	x	-0.058	20.00	Yes
		x	-0.089	80.00	Yes
	131	x	-0.051	20.00	Yes
		x	-0.092	80.00	Yes
	135	x	-0.16	0.50	No
		x	-0.16	7.50	No
	138	x	-0.16	0.50	No
		x	-0.16	7.50	No
W120	66	2	-0.201	0.50	No
		2	-0.201	7.50	No
	129	2	-0.08	20.00	Yes
		2	-0.083	80.00	Yes
	131	2	-0.051	20.00	Yes
		2	-0.084	80.00	Yes
	135	2	-0.223	0.50	No
		2	-0.223	7.50	No
	138	2	-0.223	0.50	No
		2	-0.223	7.50	No
W150	66	2	-0.238	0.50	No
		2	-0.238	7.50	No
	129	2	-0.122	20.00	Yes
		2	-0.07	80.00	Yes
	131	2	-0.051	20.00	Yes
		2	-0.071	80.00	Yes
	135	2	-0.349	0.50	No
		2	-0.349	7.50	No
	138	2	-0.349	0.50	No
		2	-0.349	7.50	No
Di	66	y	-0.157	0.50	No
		y	-0.157	7.50	No
	129	y	-0.058	20.00	Yes
		y	-0.067	80.00	Yes
		y	-0.058	80.00	Yes
	131	y	-0.092	20.00	Yes
		y	-0.056	80.00	Yes
		y	-0.066	80.00	Yes
	135	y	-0.235	0.50	No
		y	-0.235	7.50	No
	138	y	-0.235	0.50	No
		y	-0.235	7.50	No
WI0	66	z	-0.053	0.50	No
		z	-0.053	7.50	No
	129	z	-0.031	20.00	Yes
		z	-0.016	80.00	Yes
	131	z	-0.013	20.00	Yes
		z	-0.017	80.00	Yes
	135	z	-0.076	0.50	No
		z	-0.076	7.50	No
	138	z	-0.076	0.50	No
		z	-0.076	7.50	No
WI30	66	3	-0.048	0.50	No
		3	-0.048	7.50	No
	129	3	-0.027	20.00	Yes
		3	-0.018	80.00	Yes
	131	3	-0.013	20.00	Yes
		3	-0.018	80.00	Yes
	135	3	-0.065	0.50	No
		3	-0.065	7.50	No

	138	3	-0.065	0.50	No
		3	-0.065	7.50	No
WI60	66	3	-0.043	0.50	No
		3	-0.043	7.50	No
	129	3	-0.02	20.00	Yes
		3	-0.02	80.00	Yes
	131	3	-0.013	20.00	Yes
		3	-0.02	80.00	Yes
	135	3	-0.046	0.50	No
		3	-0.046	7.50	No
	138	3	-0.046	0.50	No
		3	-0.046	7.50	No
WI90	66	x	-0.04	0.50	No
		x	-0.04	7.50	No
	129	x	-0.016	20.00	Yes
		x	-0.021	80.00	Yes
	131	x	-0.013	20.00	Yes
		x	-0.022	80.00	Yes
	135	x	-0.036	0.50	No
		x	-0.036	7.50	No
	138	x	-0.036	0.50	No
		x	-0.036	7.50	No
WI120	66	2	-0.043	0.50	No
		2	-0.043	7.50	No
	129	2	-0.02	20.00	Yes
		2	-0.02	80.00	Yes
	131	2	-0.013	20.00	Yes
		2	-0.02	80.00	Yes
	135	2	-0.046	0.50	No
		2	-0.046	7.50	No
	138	2	-0.046	0.50	No
		2	-0.046	7.50	No
WI150	66	2	-0.048	0.50	No
		2	-0.048	7.50	No
	129	2	-0.027	20.00	Yes
		2	-0.018	80.00	Yes
	131	2	-0.013	20.00	Yes
		2	-0.018	80.00	Yes
	135	2	-0.065	0.50	No
		2	-0.065	7.50	No
	138	2	-0.065	0.50	No
		2	-0.065	7.50	No
WL0	66	z	-0.014	0.50	No
		z	-0.014	7.50	No
	129	z	-0.008	20.00	Yes
		z	-0.003	80.00	Yes
		z	-0.003	80.00	Yes
	131	z	-0.003	20.00	Yes
		z	-0.003	80.00	Yes
		z	-0.003	80.00	Yes
	135	z	-0.022	0.50	No
		z	-0.022	7.50	No
	138	z	-0.022	0.50	No
		z	-0.022	7.50	No
WL30	66	3	-0.013	0.50	No
		3	-0.013	7.50	No
	129	3	-0.006	20.00	Yes
		3	-0.004	80.00	Yes
	131	3	-0.003	20.00	Yes
		3	-0.004	80.00	Yes

	135	3	-0.019	0.50	No
		3	-0.019	7.50	No
	138	3	-0.019	0.50	No
		3	-0.019	7.50	No
WL60	66	3	-0.011	0.50	No
		3	-0.011	7.50	No
	129	3	-0.004	20.00	Yes
		3	-0.004	80.00	Yes
	131	3	-0.003	20.00	Yes
		3	-0.004	80.00	Yes
	135	3	-0.012	0.50	No
		3	-0.012	7.50	No
	138	3	-0.012	0.50	No
		3	-0.012	7.50	No
WL90	66	x	-0.01	0.50	No
		x	-0.01	7.50	No
	129	x	-0.003	20.00	Yes
		x	-0.005	80.00	Yes
	131	x	-0.003	20.00	Yes
		x	-0.005	80.00	Yes
	135	x	-0.009	0.50	No
		x	-0.009	7.50	No
	138	x	-0.009	0.50	No
		x	-0.009	7.50	No
WL120	66	2	-0.011	0.50	No
		2	-0.011	7.50	No
	129	2	-0.004	20.00	Yes
		2	-0.004	80.00	Yes
	131	2	-0.003	20.00	Yes
		2	-0.004	80.00	Yes
	135	2	-0.012	0.50	No
		2	-0.012	7.50	No
	138	2	-0.012	0.50	No
		2	-0.012	7.50	No
WL150	66	2	-0.013	0.50	No
		2	-0.013	7.50	No
	129	2	-0.006	20.00	Yes
		2	-0.004	80.00	Yes
	131	2	-0.003	20.00	Yes
		2	-0.004	80.00	Yes
	135	2	-0.019	0.50	No
		2	-0.019	7.50	No
	138	2	-0.019	0.50	No
		2	-0.019	7.50	No
LL1	88	y	-0.25	50.00	Yes
LL2	88	y	-0.25	100.00	Yes
LL3	88	y	-0.25	0.00	Yes
LLa1	138	y	-0.25	5.00	No
LLa2	66	y	-0.25	5.00	No
LLa3	135	y	-0.25	5.00	No

Self weight multipliers for load conditions

Condition	Description	Self weight multiplier Comb.	MultX	MultY	MultZ
D	Dead Load	No	0.00	-1.00	0.00
Wo	Wind Load (NO ICE)	No	0.00	0.00	0.00
W30	WL 30deg	No	0.00	0.00	0.00
W60	WL 60deg	No	0.00	0.00	0.00
W90	WL 90deg	No	0.00	0.00	0.00
W120	WL 120deg	No	0.00	0.00	0.00
W150	WL 150deg	No	0.00	0.00	0.00
Di	Ice Load	No	0.00	0.00	0.00
WI0	WL ICE 0deg	No	0.00	0.00	0.00
WI30	WL ICE 30deg	No	0.00	0.00	0.00
WI60	WL ICE 60deg	No	0.00	0.00	0.00
WI90	WL ICE 90deg	No	0.00	0.00	0.00
WI120	WL ICE 120deg	No	0.00	0.00	0.00
WI150	WL ICE 150deg	No	0.00	0.00	0.00
WL0	WL 30 mph 0deg	No	0.00	0.00	0.00
WL30	WL 30 mph 30deg	No	0.00	0.00	0.00
WL60	WL 30 mph 60deg	No	0.00	0.00	0.00
WL90	WL 30 mph 90deg	No	0.00	0.00	0.00
WL120	WL 30 mph 120deg	No	0.00	0.00	0.00
WL150	WL 30 mph 150deg	No	0.00	0.00	0.00
LL1	250 lb Live Load Center of Mount	No	0.00	0.00	0.00
LL2	250 lb Live Load Right End of Mount	No	0.00	0.00	0.00
LL3	250 lb Live Load Left End of Mount	No	0.00	0.00	0.00
LLa1	250 lb Live Load Antenna 1	No	0.00	0.00	0.00
LLa2	250 lb Live Load Antenna 2	No	0.00	0.00	0.00
LLa3	250 lb Live Load Antenna 3	No	0.00	0.00	0.00
LLa4	250 lb Live Load Antenna 4	No	0.00	0.00	0.00

Earthquake (Dynamic analysis only)

Condition	a/g	Ang. [Deg]	Damp. [%]
D	0.00	0.00	0.00
Wo	0.00	0.00	0.00
W30	0.00	0.00	0.00
W60	0.00	0.00	0.00
W90	0.00	0.00	0.00
W120	0.00	0.00	0.00
W150	0.00	0.00	0.00
Di	0.00	0.00	0.00
WI0	0.00	0.00	0.00
WI30	0.00	0.00	0.00
WI60	0.00	0.00	0.00
WI90	0.00	0.00	0.00
WI120	0.00	0.00	0.00
WI150	0.00	0.00	0.00
WL0	0.00	0.00	0.00
WL30	0.00	0.00	0.00
WL60	0.00	0.00	0.00
WL90	0.00	0.00	0.00
WL120	0.00	0.00	0.00
WL150	0.00	0.00	0.00
LL1	0.00	0.00	0.00
LL2	0.00	0.00	0.00
LL3	0.00	0.00	0.00

LLa1	0.00	0.00	0.00
LLa2	0.00	0.00	0.00
LLa3	0.00	0.00	0.00
LLa4	0.00	0.00	0.00

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Steel Code Check

Report: Summary - Group by member

Load conditions to be included in design :

LC1=1.2D+Wo
LC2=1.2D+W30
LC3=1.2D+W60
LC4=1.2D+W90
LC5=1.2D+W120
LC6=1.2D+W150
LC7=1.2D-Wo
LC8=1.2D-W30
LC9=1.2D-W60
LC10=1.2D-W90
LC11=1.2D-W120
LC12=1.2D-W150
LC13=0.9D+Wo
LC14=0.9D+W30
LC15=0.9D+W60
LC16=0.9D+W90
LC17=0.9D+W120
LC18=0.9D+W150
LC19=0.9D-Wo
LC20=0.9D-W30
LC21=0.9D-W60
LC22=0.9D-W90
LC23=0.9D-W120
LC24=0.9D-W150
LC25=1.2D+Di+WI0
LC26=1.2D+Di+WI30
LC27=1.2D+Di+WI60
LC28=1.2D+Di+WI90
LC29=1.2D+Di+WI120
LC30=1.2D+Di+WI150
LC31=1.2D+Di-WI0
LC32=1.2D+Di-WI30
LC33=1.2D+Di-WI60
LC34=1.2D+Di-WI90
LC35=1.2D+Di-WI120
LC36=1.2D+Di-WI150
LC38=1.2D+1.5LL1
LC39=1.2D+1.5LL2
LC40=1.2D+1.5LL3
LC41=1.2D+WL0+1.5LLa1
LC42=1.2D+WL30+1.5LLa1
LC43=1.2D+WL60+1.5LLa1
LC44=1.2D+WL90+1.5LLa1
LC45=1.2D+WL120+1.5LLa1
LC46=1.2D+WL150+1.5LLa1
LC47=1.2D-WL0+1.5LLa1
LC48=1.2D-WL30+1.5LLa1
LC49=1.2D-WL60+1.5LLa1
LC50=1.2D-WL90+1.5LLa1
LC51=1.2D-WL120+1.5LLa1
LC52=1.2D-WL150+1.5LLa1
LC53=1.2D+WL0+1.5LLa2
LC54=1.2D+WL30+1.5LLa2

LC55=1.2D+WL60+1.5LLa2
LC56=1.2D+WL90+1.5LLa2
LC57=1.2D+WL120+1.5LLa2
LC58=1.2D+WL150+1.5LLa2
LC59=1.2D-WL0+1.5LLa2
LC60=1.2D-WL30+1.5LLa2
LC61=1.2D-WL60+1.5LLa2
LC62=1.2D-WL90+1.5LLa2
LC63=1.2D-WL120+1.5LLa2
LC64=1.2D-WL150+1.5LLa2
LC65=1.2D+WL0+1.5LLa3
LC66=1.2D+WL30+1.5LLa3
LC67=1.2D+WL60+1.5LLa3
LC68=1.2D+WL90+1.5LLa3
LC69=1.2D+WL120+1.5LLa3
LC70=1.2D+WL150+1.5LLa3
LC71=1.2D-WL0+1.5LLa3
LC72=1.2D-WL30+1.5LLa3
LC73=1.2D-WL60+1.5LLa3
LC74=1.2D-WL90+1.5LLa3
LC75=1.2D-WL120+1.5LLa3
LC76=1.2D-WL150+1.5LLa3
LC77=1.2D+WL0+1.5LLa4
LC78=1.2D+WL30+1.5LLa4
LC79=1.2D+WL60+1.5LLa4
LC80=1.2D+WL90+1.5LLa4
LC81=1.2D+WL120+1.5LLa4
LC82=1.2D+WL150+1.5LLa4
LC83=1.2D-WL0+1.5LLa4
LC84=1.2D-WL30+1.5LLa4
LC85=1.2D-WL60+1.5LLa4
LC86=1.2D-WL90+1.5LLa4
LC87=1.2D-WL120+1.5LLa4
LC88=1.2D-WL150+1.5LLa4

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	HSS_SQR 3X3X1_4	**142**	LC36 at 0.00%	**0.62**	**OK**	Eq. H1-1b
		143	LC28 at 0.00%	0.57	OK	Eq. H1-1b
	PIPE 2-1_2x0.203	**63**	LC34 at 33.33%	0.17	OK	Eq. H1-1b
		65	LC26 at 33.33%	0.17	OK	Eq. H1-1b
		66	LC7 at 31.25%	0.40	OK	Eq. H1-1b
		88	LC11 at 28.75%	0.44	OK	Eq. H1-1b
		89	LC12 at 28.91%	0.31	OK	Eq. H1-1b
		135	LC7 at 31.25%	0.64	OK	Eq. H1-1b
		138	LC7 at 31.25%	0.64	OK	Eq. H1-1b
		141	LC26 at 26.25%	**0.98**	**OK**	Eq. H1-1b
	PIPE 2x0.154	**87**	LC24 at 100.00%	0.11	OK	Sec. E1
		90	LC36 at 93.75%	0.41	OK	Eq. H1-1b
		91	LC25 at 93.75%	0.37	OK	Eq. H1-1b
		92	LC25 at 93.75%	0.39	OK	Eq. H1-1b
		93	LC26 at 93.75%	**0.45**	**OK**	Eq. H1-1b
		129	LC36 at 20.83%	0.10	OK	Eq. H1-1b
		131	LC26 at 20.83%	0.11	OK	Eq. H1-1b
		144	LC14 at 100.00%	0.10	OK	Sec. E1
	PL 11-1/4x5/8	**127**	LC36 at 100.00%	**0.44**	**OK**	Eq. H1-1b
		128	LC31 at 100.00%	0.30	OK	Eq. H1-1b
	PL 3-1/2x5/8	**107**	LC36 at 100.00%	0.35	OK	Eq. H1-1b
		108	LC26 at 100.00%	0.41	OK	Eq. H1-1b
		109	LC31 at 100.00%	0.55	OK	Eq. H1-1b
		110	LC31 at 100.00%	0.45	OK	Eq. H1-1b

	123	LC26 at 100.00%	0.73	OK	Eq. H1-1b
	124	LC32 at 0.00%	**0.83**	**OK**	Eq. H1-1b
	125	LC26 at 100.00%	0.67	OK	Eq. H1-1b
	126	LC36 at 0.00%	0.77	OK	Eq. H1-1b
RndBar 3_4	**98**	LC28 at 0.00%	**0.39**	**OK**	Eq. H1-1a
	99	LC25 at 0.00%	0.29	OK	Eq. H1-1b
	100	LC35 at 0.00%	0.33	OK	Eq. H1-1a
	101	LC25 at 100.00%	0.25	OK	Eq. H1-1b
RndBar 5_8	**94**	LC25 at 87.50%	0.72	OK	Eq. H1-1a
	95	LC30 at 87.50%	0.71	OK	Eq. H1-1a
	96	LC32 at 87.50%	0.83	OK	Eq. H1-1a
	97	LC25 at 87.50%	**0.84**	**OK**	Eq. H1-1a

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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
142	0.00	0.00	0.00	0
143	-0.6362	0.00	0.4783	0
144	0.00	-3.3333	0.00	0
145	-0.6362	-3.3333	0.4783	0
146	0.6362	-3.3333	0.4783	0
147	0.6362	0.00	0.4783	0
156	4.1458	0.00	2.63	0
157	3.50	0.00	-4.25	0
158	-6.00	0.00	2.63	0
159	6.00	0.00	2.63	0
160	-6.00	-3.3333	2.63	0
161	6.00	-3.3333	2.63	0
162	-2.4126	0.00	2.2374	0
163	-2.4126	-3.3333	2.2374	0
164	2.4126	-3.3333	2.2374	0
165	2.4126	0.00	2.2374	0
166	-2.2835	0.00	2.1096	0
167	-2.2835	-3.3333	2.1096	0
168	-0.7653	0.00	0.6062	0
169	-0.7653	-3.3333	0.6062	0
170	0.7653	0.00	0.6062	0
171	0.7653	-3.3333	0.6062	0

172	2.2835	0.00	2.1096	0
173	2.2835	-3.3333	2.1096	0
176	-2.75	-6.6667	2.83	0
177	-2.75	3.3333	2.83	0
180	2.75	-6.6667	2.83	0
181	2.75	3.3333	2.83	0
184	-2.4792	0.00	2.63	0
185	2.4792	0.00	2.63	0
186	2.4792	-3.3333	2.63	0
187	-2.4792	-3.3333	2.63	0
188	1.50	-6.6667	2.83	0
189	1.50	3.3333	2.83	0
194	-2.75	3.33E-06	2.83	0
195	-2.75	3.33E-06	2.63	0
196	2.75	3.33E-06	2.63	0
197	2.75	3.33E-06	2.83	0
198	1.50	3.33E-06	2.83	0
199	1.50	3.33E-06	2.63	0
201	-2.75	-3.3333	2.83	0
202	-2.75	-3.3333	2.63	0
203	1.50	-3.3333	2.83	0
204	1.50	-3.3333	2.63	0
205	2.75	-3.3333	2.63	0
206	2.75	-3.3333	2.83	0
208	0.00	0.00	0.4783	0
209	0.00	-3.3333	0.4783	0
210	-1.5244	0.00	1.3579	0
211	-1.5244	-3.3333	1.3579	0
212	-1.5244	1.25	1.1579	0
213	-1.5244	-4.75	1.1579	0
214	1.5889	0.00	1.4218	0
215	1.5889	-3.3333	1.4218	0
216	1.5889	1.25	1.2218	0
217	1.5889	-4.75	1.2218	0
218	-5.00	-6.6667	2.83	0
219	-5.00	3.3333	2.83	0
220	-5.00	0.00	2.63	0
221	-5.00	-3.3333	2.63	0
222	-5.00	3.33E-06	2.83	0
223	-5.00	-3.3333	2.83	0
224	5.00	-6.6667	2.83	0
225	5.00	3.3333	2.83	0
226	5.00	0.00	2.63	0
227	5.00	-3.3333	2.63	0
228	5.00	3.33E-06	2.83	0
229	5.00	-3.3333	2.83	0
231	-1.5244	0.00	1.1579	0
232	1.5889	0.00	1.2218	0
233	1.5889	-3.3333	1.2218	0
234	-1.5244	-3.3333	1.1579	0
235	0.00	0.68	0.00	0
236	0.00	-4.0133	0.00	0
237	0.00	-0.50	0.00	0
238	0.00	-2.8333	0.00	0
239	0.00	-0.50	-2.00	0
240	0.00	-2.8333	-2.00	0
241	-3.50	0.00	-4.25	0
242	-4.1458	0.00	2.63	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
157	1	1	1	0	0	0
239	1	1	1	1	1	1
240	1	1	1	1	1	1
241	1	1	1	0	0	0

Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	lg factor
63	181	180		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
65	177	176		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
66	189	188		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
87	156	157		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
88	158	159		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
89	160	161		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
90	162	143		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
91	163	145		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
92	164	146		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
93	165	147		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
94	166	167		RndBar 5_8	A36	0.00	0.00	0.00
95	168	169		RndBar 5_8	A36	0.00	0.00	0.00
96	170	171		RndBar 5_8	A36	0.00	0.00	0.00
97	172	173		RndBar 5_8	A36	0.00	0.00	0.00
98	170	173		RndBar 3_4	A36	0.00	0.00	0.00
99	171	172		RndBar 3_4	A36	0.00	0.00	0.00
100	167	168		RndBar 3_4	A36	0.00	0.00	0.00
101	166	169		RndBar 3_4	A36	0.00	0.00	0.00
107	162	184		PL 3-1/2x5/8	A36	0.00	0.00	0.00
108	165	185		PL 3-1/2x5/8	A36	0.00	0.00	0.00
109	164	186		PL 3-1/2x5/8	A36	0.00	0.00	0.00
110	163	187		PL 3-1/2x5/8	A36	0.00	0.00	0.00
123	143	208		PL 3-1/2x5/8	A36	0.00	0.00	0.00
124	208	147		PL 3-1/2x5/8	A36	0.00	0.00	0.00
125	145	209		PL 3-1/2x5/8	A36	0.00	0.00	0.00
126	209	146		PL 3-1/2x5/8	A36	0.00	0.00	0.00
127	208	142		PL 11-1/4x5/8	A36	11.25	9.25	0.00
128	209	144		PL 11-1/4x5/8	A36	11.25	9.25	0.00
129	212	213		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
131	216	217		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
135	219	218		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
138	225	224		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
141	236	235		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
142	239	237		HSS_SQR 3X3X1_4	A500 GrC rectangular	0.00	0.00	0.00
143	240	238		HSS_SQR 3X3X1_4	A500 GrC rectangular	0.00	0.00	0.00
144	242	241		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00

Orientation of local axes

Member	Rotation [Deg]	Axes23	NX	NY	NZ
63	315.00	0	0.00	0.00	0.00
65	315.00	0	0.00	0.00	0.00
66	315.00	0	0.00	0.00	0.00
94	0.00	2	0.00	0.00	1.00
95	0.00	2	0.00	0.00	1.00
96	0.00	2	0.00	0.00	1.00
97	0.00	2	0.00	0.00	1.00
107	90.00	0	0.00	0.00	0.00
108	90.00	0	0.00	0.00	0.00
109	90.00	0	0.00	0.00	0.00
110	90.00	0	0.00	0.00	0.00
123	90.00	0	0.00	0.00	0.00
124	90.00	0	0.00	0.00	0.00
125	90.00	0	0.00	0.00	0.00
126	90.00	0	0.00	0.00	0.00
127	90.00	0	0.00	0.00	0.00
128	90.00	0	0.00	0.00	0.00
129	315.00	0	0.00	0.00	0.00
131	315.00	0	0.00	0.00	0.00
135	315.00	0	0.00	0.00	0.00
138	315.00	0	0.00	0.00	0.00

Rigid end offsets

Member	DJX [in]	DJY [in]	DJZ [in]	DKX [in]	DKY [in]	DKZ [in]
98	0.00	-3.50	0.00	0.00	3.50	0.00
99	0.00	3.50	0.00	0.00	-3.50	0.00
100	0.00	3.50	0.00	0.00	-3.50	0.00
101	0.00	-3.50	0.00	0.00	3.50	0.00
127	0.00	-0.625	0.00	0.00	-0.625	0.00
128	0.00	-0.625	0.00	0.00	-0.625	0.00

Hinges

	Node-J				Node-K						
Member	M33	M22	V3	V2	M33	M22	V3	V2	TOR	AXL	Axial rigidity
87	1	1	0	0	0	0	0	0	0	0	Full
99	0	0	0	0	0	0	0	0	0	0	Tension only
101	0	0	0	0	0	0	0	0	0	0	Tension only
107	1	1	0	0	0	0	0	0	0	0	Full
108	1	1	0	0	0	0	0	0	0	0	Full
109	1	1	0	0	0	0	0	0	0	0	Full
110	1	1	0	0	0	0	0	0	0	0	Full
144	1	1	0	0	0	0	0	0	0	0	Full

ATTACHMENT 5

C Squared Systems, LLC
65 Dartmouth Drive
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Calculated Radio Frequency Exposure

CT1401
293 Elm Street
Enfield, CT 06082

November 17, 2020

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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed installation of AT&T Mobility antenna arrays on the existing lattice tower located at 293 Elm Street in Monroe, CT. The coordinates of the tower are 41-59-51.80 N, 72-33-10.83 W. T-Mobile and the town of Enfield are already located on the existing tower. AT&T Mobility is proposing to:

1) Install nine (9) multi-band antennas (three per sector) to support the AT&T LTE network and the FirstNet National Public Safety Broadband Network ("NPSBN").

This report uses the planned antenna configuration for AT&T Mobility[1] to derive the resulting % MPE, once the proposed installation has been completed.

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

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

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

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

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

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

[1] As referenced to AT&T's preliminary Radio Frequency Design Sheet dated 04/16/2020.

3. RF Exposure Calculation Methods

The power density calculation results were generated using the following formula as outlined in FCC bulletin OET 65, and Connecticut Siting Council recommendations:

$$\text{Power Density} = \left(\frac{1.6^2 \times 1.64 \times \text{ERP}}{4\pi \times R^2}\right) \text{X Off Beam Loss}$$

Where:

ERP = Effective Radiated Power

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

H = Horizontal Distance from antenna

V = Vertical Distance from radiation center of antenna

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

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

4. Calculation Results

Table 1 below outlines the cumulative power density information for the AT&T equipment at the site as well as the existing T-Mobile installation. The proposed antennas are directional in nature; therefore, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the tower. Please refer to Attachment C for the vertical pattern of the proposed AT&T. The calculated results for AT&T and T-Mobile antennas in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antennas.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm^2)	Limit	% MPE
T-Mobile	140	629.5	2	592	0.0024	0.4197	0.56%
T-Mobile	140	731	2	649	0.0026	0.4873	0.53%
T-Mobile	140	1900	2	2057	0.0082	1.0000	0.82%
T-Mobile	140	2100	2	2308	0.0092	1.0000	0.92%
T-Mobile	140	2100	2	1167	0.0047	1.0000	0.47%
AT&T	151	722	1	1730	0.0030	0.4813	0.61%
AT&T	151	739	1	3794	0.0065	0.4927	1.32%
AT&T	151	763	1	3794	0.0065	0.5087	1.28%
AT&T	151	885	1	4066	0.0070	0.5900	1.18%
AT&T	151	1900	1	5743	0.0098	1.0000	0.98%
AT&T	151	2100	1	8614	0.0147	1.0000	1.47%
AT&T	151	2300	1	6513	0.0111	1.0000	1.11%
						Total	**11.27%**

Table 1: Carrier Information[2][3]

[2] T-Mobile information is based upon the EBI Consulting Radio Frequency Emissions Analysis Report dated May 29, 2019.
[3] Information for the Town of Enfield antennas was not available and therefore not included in this report.

5. Conclusion

The above analysis concludes that RF exposure at ground level from the proposed site will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Using conservative calculation methods, the highest expected percent of Maximum Permissible Exposure at ground level is **11.27% of the FCC General Population/Uncontrolled limit**.

As noted previously, the calculated % MPE levels are more conservative (higher) than the actual signal levels will be from the finished modifications.

6. Statement of Certification

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

Report Prepared By: Marc Salas
RF Engineer
C Squared Systems, LLC

November 16, 2020
Date

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

November 17, 2020
Date

Attachment A: References

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

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

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

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

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

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

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

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

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

Table 2: FCC Limits for Maximum Permissible Exposure (MPE)

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

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

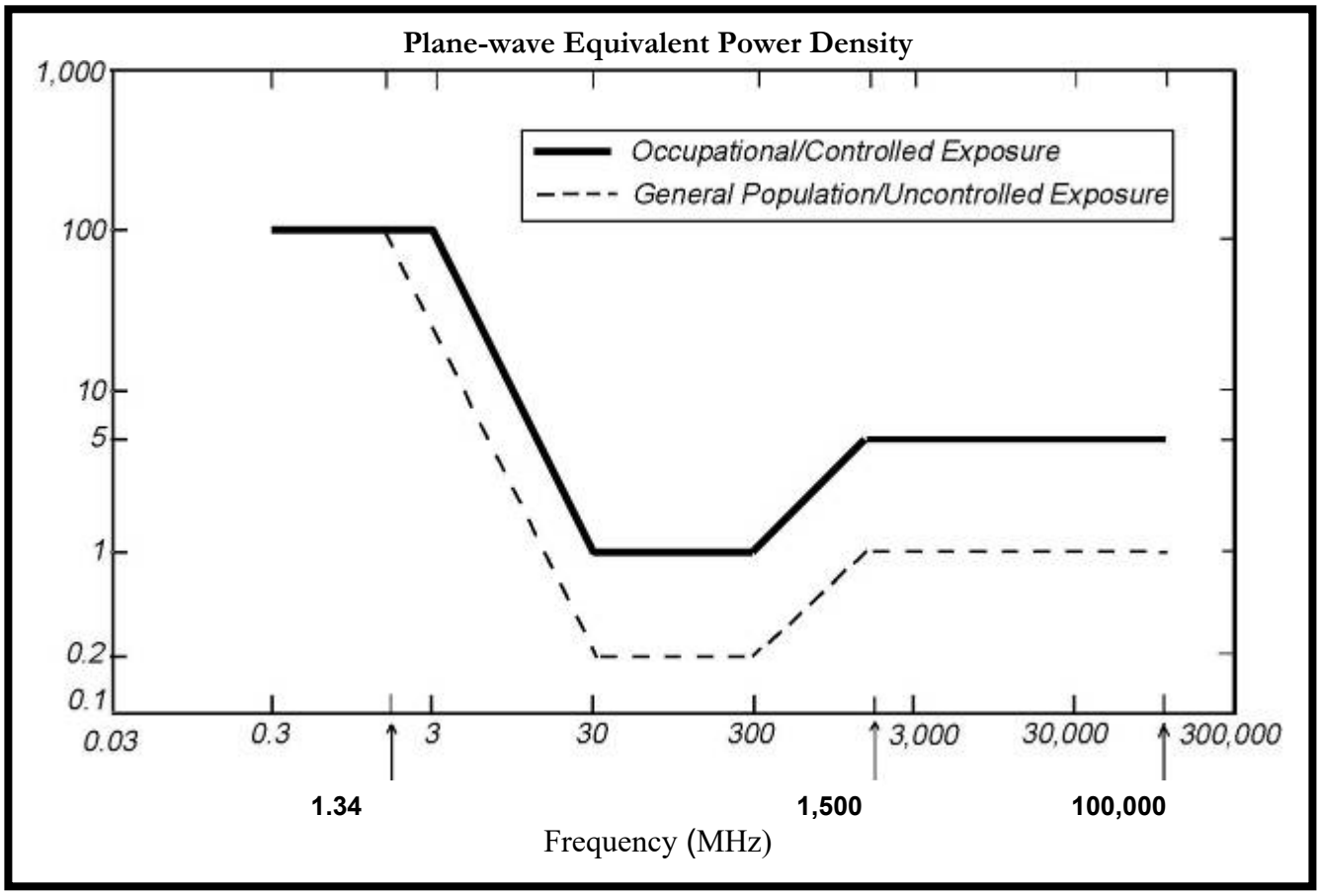
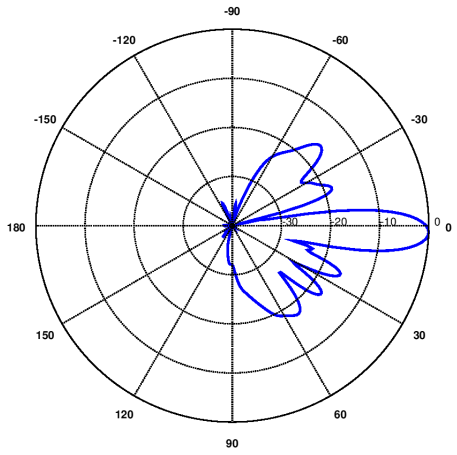


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

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

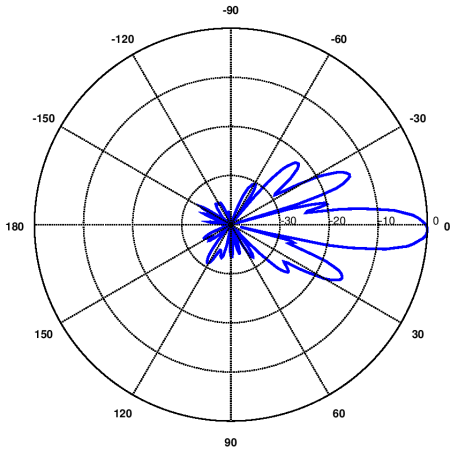
722 MHz

Manufacturer:	CCI
Model #:	HPA65R-BU8A
Frequency Band:	698-806 MHz
Gain:	15.3 dBi
Vertical Beamwidth:	10.1°
Horizontal Beamwidth:	65°
Polarization:	±45°
Dimensions (L x W x D):	96.0 × 11.7 × 7.7 in.



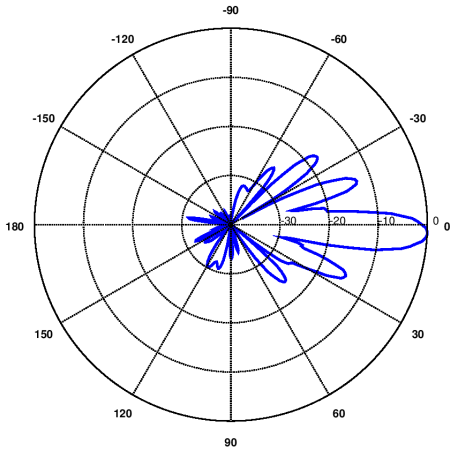
739/763 MHz

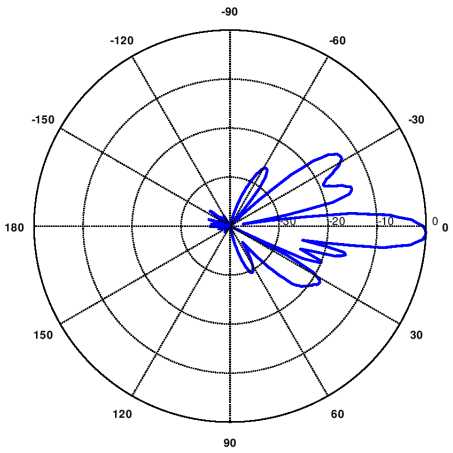
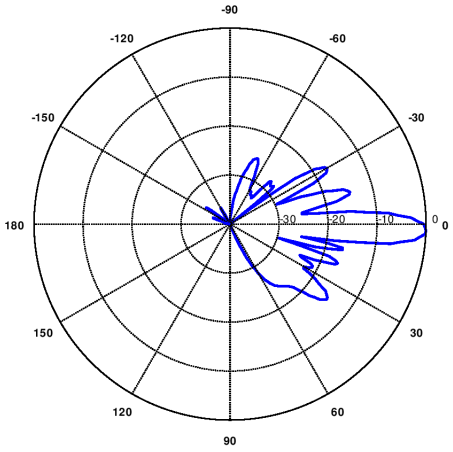
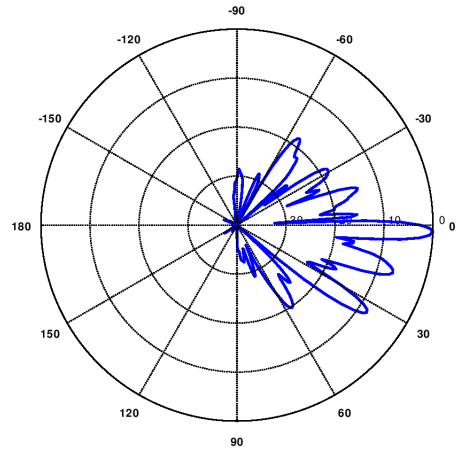
Manufacturer:	KMW
Model #:	EPBQ-654L8H8
Frequency Band:	698-806 MHz
Gain:	15.9 dBi
Vertical Beamwidth:	9.3°
Horizontal Beamwidth:	67°
Polarization:	±45°
Dimensions (L x W x D):	96.0 × 21.0 × 6.3 in



885 MHz

Manufacturer:	KMW
Model #:	EPBQ-654L8H8
Frequency Band:	806-894 MHz
Gain:	16.2 dBi
Vertical Beamwidth:	8.7°
Horizontal Beamwidth:	66°
Polarization:	±45°
Dimensions (L x W x D):	96.0 × 21.0 × 6.3 in



1900 MHz Manufacturer: KMW Model #: EPBQ-654L8H8 Frequency Band: 1910-2180 MHz Gain: 17.7 dBi Vertical Beamwidth: 7.4° Horizontal Beamwidth: 60° Polarization: ±45° Dimensions (L x W x D): 96.0 × 21.0 × 6.3 in	
2100 MHz Manufacturer: KMW Model #: EPBQ-654L8H8 Frequency Band: 1910-2180 MHz Gain: 17.7 dBi Vertical Beamwidth: 7.4° Horizontal Beamwidth: 60° Polarization: ±45° Dimensions (L x W x D): 96.0 × 21.0 × 6.3 in	
2300 MHz Manufacturer: CCI Model #: HPA65R-BU8A Frequency Band: 2305-2360 MHz Gain: 17.7 dBi Vertical Beamwidth: 4.5° Horizontal Beamwidth: 60° Polarization: ±45° Dimensions (L x W x D): 96.0 × 11.7 × 7.7 in.	

ATTACHMENT 6

FedEx Shipment Receipt

Address Information

Ship to:	**Ship from:**
Town of Enfield	Lucia Chiocchio, Esq.
Public Safety Complx	Cuddy & Feder LLP
820 Enfield St	445 Hamilton Avenue
	Suite 1400
ENFIELD, CT	White Plains, NY
06082	10601
US	US
914-761-1300	9147611300

Shipment Information:
Tracking no.: 773368936428
Ship date: 04/07/2021
Estimated shipping charges: 17.81 USD

Package Information
Pricing option: FedEx Standard Rate
Service type: Priority Overnight
Package type: FedEx Box
Number of packages: 1
Total weight: 3 LBS
Declared Value: 0.00 USD
Special Services: No signature required
Pickup/Drop-off: Use an already scheduled pickup at my location

Billing Information:
Bill transportation to: CuddyFeder-963
Your reference: 1844-3632
P.O. no.:
Invoice no.:
Department no.:

Thank you for shipping online with FedEx ShipManager at fedex.com.

Please Note

FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim. Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental, consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss. Maximum for items of extraordinary value is $1000, e.g., jewelry, precious metals, negotiable instruments and other items listed in our Service Guide. Written claims must be filed within strict time limits; Consult the applicable FedEx Service Guide for details.
The estimated shipping charge may be different than the actual charges for your shipment. Differences may occur based on actual weight, dimensions, and other factors. Consult the applicable FedEx Service Guide or the FedEx Rate Sheets for details on how shipping charges are calculated.

FedEx. Shipment Receipt

Address Information

Ship to:	**Ship from:**
Mayor Michael Ludwick	Lucia Chiocchio, Esq.
ATTN:Christopher Bromson,Town Mgr	Cuddy & Feder LLP
Enfield Town Hall	445 Hamilton Avenue
820 Enfield Street	Suite 1400
ENFIELD, CT	White Plains, NY
06082	10601
US	US
860-253-6300	9147611300

Shipment Information:
Tracking no.: 773368739546
Ship date: 04/07/2021
Estimated shipping charges: 17.81 USD

Package Information
Pricing option: FedEx Standard Rate
Service type: Priority Overnight
Package type: FedEx Box
Number of packages: 1
Total weight: 3 LBS
Declared Value: 0.00 USD
Special Services: No signature required
Pickup/Drop-off: Use an already scheduled pickup at my location

Billing Information:
Bill transportation to: CuddyFeder-963
Your reference: 1844-3632
P.O. no.:
Invoice no.:
Department no.:

Thank you for shipping online with FedEx ShipManager at fedex.com.

Please Note

FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim. Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental, consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss. Maximum for items of extraordinary value is $1000, e.g., jewelry, precious metals, negotiable instruments and other items listed in our Service Guide. Written claims must be filed within strict time limits; Consult the applicable FedEx Service Guide for details.
The estimated shipping charge may be different than the actual charges for your shipment. Differences may occur based on actual weight, dimensions, and other factors. Consult the applicable FedEx Service Guide or the FedEx Rate Sheets for details on how shipping charges are calculated.

FedEx. Shipment Receipt

Address Information

Ship to:	**Ship from:**
Jennifer Pacacha,Asst. Town Planner	Lucia Chiocchio, Esq.
Enfield Town Hall	Cuddy & Feder LLP
820 Enfield Street	445 Hamilton Avenue Suite 1400
ENFIELD, CT 06082 US	White Plains, NY 10601 US
860-253-6368	9147611300

Shipment Information:
Tracking no.: 773368812932
Ship date: 04/07/2021
Estimated shipping charges: 17.81 USD

Package Information
Pricing option: FedEx Standard Rate
Service type: Priority Overnight
Package type: FedEx Box
Number of packages: 1
Total weight: 3 LBS
Declared Value: 0.00 USD
Special Services: No signature required
Pickup/Drop-off: Use an already scheduled pickup at my location

Billing Information:
Bill transportation to: CuddyFeder-963
Your reference: 1844-3632
P.O. no.:
Invoice no.:
Department no.:

Thank you for shipping online with FedEx ShipManager at fedex.com.

Please Note

FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim. Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental, consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss. Maximum for items of extraordinary value is $1000, e.g., jewelry, precious metals, negotiable instruments and other items listed in our Service Guide. Written claims must be filed within strict time limits; Consult the applicable FedEx Service Guide for details.
The estimated shipping charge may be different than the actual charges for your shipment. Differences may occur based on actual weight, dimensions, and other factors. Consult the applicable FedEx Service Guide or the FedEx Rate Sheets for details on how shipping charges are calculated.