NORTHEAST SITE SOLUTIONS

Turnkey Wireless Development

October 23, 2015

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Notice of Exempt Modification
790 Willis Street, Bristol CT 06010
Longitude: -72.9474
Latitude: 41.6488
T-Mobile Site#: CT11270C_L700

Members of the Siting Council:

On behalf of T-Mobile, Northeast Site Solutions (NSS) is submitting an exempt modification application to the Connecticut Siting Council for modification of existing equipment at a tower facility located at 790 Willis Street, Bristol CT 06010.

The 790 Willis Street, Bristol CT 06010 facility consists of a 130' Lattice Tower owned and operated by CL&O d/b/a Eversource. In order to accommodate technological changes and enhance system performance in the State of Connecticut, T-Mobile plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the chief elected official of the municipality in which the affected cell site is located.

As part of T-Mobile's L700 Project, T-Mobile desires to upgrade their equipment to meet the new standards of 4G technology. The new equipment will allow customers to download files and browse the internet at a high rate of speed while also allowing their phones to be compatible with the latest 4G technology.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in T-Mobile's operations at the site along with the required fee of $625.

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The changes to the facility do not constitute modifications as defined in Connecticut General Statutes significantly changed or altered. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. The overall height of the structure will be unaffected.

2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more.

4. The changes in radio frequency power density will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

For the foregoing reasons, Northeast Site Solutions (NSS) on behalf of T-Mobile, respectfully submits that the proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at 860.209.4690 with any questions you may have concerning this matter.

Sincerely,

Denise Sabo
Mobile: 860-209-4690
Fax: 413-521-0558
Office: 199 Brickyard Rd, Farmington, CT 06032
Email: denise@northeastsitesolutions.com

cc: Bristol City Hall, 111 N. Main St., Second Floor, Bristol, CT 06010, Attn: Ken Cockayne, Mayor
Structure & Property Owner-Eversource, 107 Selden Street, Berlin, CT 06037, Attn: Marco Charmella, Real Estate Management.

Exhibit A

T-MOBILE NORTHEAST LLC

SITE #: CT11270C

SITE NAME: CL&P BRISTOL

SITE ADDRESS:

2 WILLIS STREET

BRISTOL, CT 06010

WIRELESS BROADBAND FACILITY

CONSTRUCTION DRAWINGS

(702CU CONFIGURATION)

VICINITY MAP

DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

CALL BEFORE YOU DIG:

WWW.CBYD.COM

CALL 800 922 4455, OR 811

CALL THREE WORKING DAYS PRIOR TO DIGGING

SAFETY PRECAUTIONS SHALL BE IMPLEMENTED BY CONTRACTOR(S) AT ALL TRENCHING IN ACCORDANCE WITH CURRENT OSHA STANDARDS.

COLOR CODE FOR UTILITY LOCATIONS

ELECTRIC	**– RED**	**SEWER**	**– GREEN**
GAS/OIL	– YELLOW	**SURVEY**	**– PINK**
TEL/CATV	– ORANGE	PROPOSED EXCAVATION	– WHITE
WATER	– BLUE	RECLAIMED WATER	– PURPLE

GENERAL NOTES

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES. RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES.
2. THE ARCHITECT/ENGINEER HAVE MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONSTRUCT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.
3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE T-MOBILE REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF THE CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK. IN THE EVENT OF DISCREPANCIES, THE CONTRACTOR SHALL PRICE THE MORE COSTLY OR EXPENSIVE WORK, UNLESS DIRECTED IN WRITING OTHERWISE.
4. THE SCOPE OF WORK SHALL INCLUDE FURNISHING OF ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.
5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
6. THE CONTRACTOR SHALL OBTAIN AUTHORIZATION TO PROCEED WITH CONSTRUCTION PRIOR TO STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED BY THE CONSTRUCTION DRAWINGS/CONTRACT DOCUMENTS.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S/VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.
8. THE CONTRACTOR SHALL PROVIDE A FULL SET OF CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDUM OR CLARIFICATIONS AVAILABLE FOR THE USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.
9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER CONTRACT.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY PERMITS AND INSPECTIONS WHICH ARE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY, OR LOCAL GOVERNMENT AUTHORITY.
11. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC., DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.
12. THE CONTRACTOR SHALL KEEP THE GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON PROPERTY. PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.
13. THE CONTRACTOR SHALL COMPLY WITH ALL OSHA REQUIREMENTS, AS WELL AS THE LATEST EDITIONS OF ANY PERTINENT STATE SAFETY REGULATIONS.
14. THE CONTRACTOR SHALL NOTIFY THE T-MOBILE REPRESENTATIVE WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE T-MOBILE REPRESENTATIVE.
15. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC., ON THE JOB.
16. THE CONTRACTOR SHALL RETURN ALL DISTURBED AREAS TO THEIR ORIGINAL CONDITION AT THE COMPLETION OF WORK.
17. REFER TO STRUCTURAL ANALYSIS DOCUMENT ENTITLED, "STRUCTURAL ANALYSIS REPORT " PREPARED BY CENTEK ENGINEERING INC., "T-MOBILE SITE ID CT11270C", DATED SEPTEMBER 2, 2015.

PROJECT SUMMARY

PARCEL:	MAP: 06 LOT: 8A
DEED BOOK/PAGE:	277/293 (1952)
CURRENT ZONING:	R25
JURISDICTION:	CITY OF BRISTOL, CT
DISTRICT:	R25 – SINGLE FAMILY RESIDENTIAL
PROPERTY OWNER:	STEVE FLORIO 860-665-5611, STEVEN.FLORIO@NU.COM REAL ESTATE CONTACT: MICHAEL GREEN (860)-665-6926 860-947-2121 GREENMJ@NU.COM
APPLICANT:	T-MOBILE NORTHEAST, LLC. 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 (860) 692-7100
LAT./LONG.:	N 41.6488 / W -72.9474
PROJECT MANAGER	LISA LIN ALLEN NORTHEAST SITE SOLUTIONS 54 MAIN STREET STURBRIDGE, MA 01566 (508) 434-5237
ARCHITECT/ENGINEER:	ATLANTIS GROUP INC. 1340 CENTRE STREET SUITE 212 NEWTON CENTER, MA 02459 (617) 965-0789

PROJECT DESCRIPTION

T-MOBILE PROPOSES TO MODIFY THE EXISTING WIRELESS TELECOMMUNICATIONS FACILITY AS FOLLOWS:

ADDING (3) NEW ANTENNAS AND (3) NEW RRUS TO EXISTING TOWER

SHEET INDEX

T-MOBILE NORTHEAST, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX:(860) 692-7159

ATLANTIS GROUP
1340 Centre Street, Suite 212
Newton Center, MA 02459
Office: 617-965-0789
Fax: 617-213-5056

SUBMITTALS

DATE	DESCRIPTION	REVISION
08/13/15	ISSUED FOR REVIEW	A
09/25/15	FINAL CD	0

DEPT.	DATE	APP'D	REVISIONS
RFE.			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO:	CT11270C
DRAWN BY:	MS
CHECKED BY:	SM

STATE OF CONNECTICUT
HOSSEIN VAHEDI
NO. ARI. 11162
LICENSED ARCHITECT

PROFESSIONAL SEAL

SITE NUMBER
CT11270C
SITE NAME
CL&P BRISTOL
SITE ADDRESS
2 WILLIS STREET
BRISTOL, CT 06010

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

ELECTRICAL NOTES:

WORK INCLUDED

1. INCLUDE ALL LABOR, MATERIALS, EQUIPMENT, PLANT SERVICES AND ADMINISTRATIVE TASKS REQUIRED TO COMPLETE AND MAKE OPERABLE THE ELECTRICAL WORK SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
   A. PREPARE AND SUBMIT SHOP DRAWINGS, DIAGRAMS AND ILLUSTRATIONS.
   B. PROCURE ALL NECESSARY PERMITS AND APPROVALS AND PAY ALL REQUIRED FEES AND CHARGES IN CONNECTION WITH THE WORK OF THIS CONTRACT.
   C. SUBMIT AS-BUILT DRAWINGS, OPERATING AND MAINTENANCE INSTRUCTIONS AND MANUALS.
   D. EXECUTE ALL CUTTING, DRILLING, ROUGH AND FINISH PATCHING OF EXISTING OR NEWLY INSTALLED CONSTRUCTION REQUIRED FOR THE WORK OF THIS CONTRACT. FOR SLAB PENETRATIONS THROUGH POST TENSION SLABS, X-RAY EXACT AREA OF PENETRATION PRIOR TO PERFORMING WORK. COORDINATE ALL X-RAY WORK WITH BUILDING ENGINEER.
   E. PROVIDE HANGERS, SUPPORTS, FOUNDATIONS, STRUCTURAL FRAMING SUPPORTS, AND BASES FOR CONDUIT AND EQUIPMENT PROVIDED OR INSTALLED UNDER THE WORK OF HIS CONTRACT. PROVIDE COUNTER FLASHING, SLEEVES AND SEALS FOR FLOOR AND WALL PENETRATIONS.
   F. MAINTAIN ALL EXISTING ELECTRICAL SERVICES IN THE BUILDING AREAS NOT AFFECTED BY THE ALTERATION DURING THE PROGRESS OF THE WORK INCLUDING PROVIDING ALL TEMPORARY JUMPERS, CONDUITS, CAPS, PROTECTIVE DEVICES, CONNECTIONS AND EQUIPMENT REQUIRED. PROVIDE TEMPORARY LIGHT AND POWER FOR CONSTRUCTION PURPOSES.
2. IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS TO CALL FOR AN INSTALLATION THAT IS COMPLETE IN EVERY RESPECT. IT IS NOT THE INTENT TO GIVE EVERY DETAIL ON THE DRAWINGS AND IN THE SPECIFICATIONS. IF AN ITEM OF WORK IS INDICATED IN THE DRAWINGS, IT IS CONSIDERED SUFFICIENT FOR INCLUSION IN THE CONTRACT. FURNISH AND INSTALL ALL MATERIAL AND EQUIPMENT USUALLY FURNISHED OR NEEDED TO MAKE A COMPLETE INSTALLATION WHETHER OR NOT SPECIFICALLY MENTIONED IN THE CONTRACT DOCUMENTS.

GENERAL REQUIREMENTS

1. PROVIDE ALL WORK IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) AND LOCAL AND STATE ELECTRICAL CODES.
2. THE ELECTRICAL PLANS ARE DIAGRAMMATIC ONLY. REFER TO THE ARCHITECTURAL PLANS FOR THE EXACT DIMENSIONS OF THE BUILDING.
3. LOAD CALCULATIONS ARE BASED ON EXISTING BUILDING INFORMATION/DRAWINGS PROVIDED TO ENGINEERING. CONTRACTOR IS TO VERIFY ALL EXISTING RATINGS AND LOADS PRIOR TO PURCHASING OF SPECIFIED EQUIPMENT FOR COMPLIANCE TO NEC. CONTRACTOR TO NOTIFY ENGINEER OF ANY DISCREPANCIES AND REQUEST FURTHER DIRECTION BY ENGINEER.
4. EXISTING BUILDING EQUIPMENT IS NOTED ON THE DRAWINGS. NEW OR RELOCATED EQUIPMENT IS SHOWN WITH SOLID LINES. FUTURE EQUIPMENT (NOT IN THIS CONTRACT) IS DEPICTED WITH SHADED LINES. REQUEST CLARIFICATION OF DRAWINGS OR OF SPECIFICATIONS PRIOR TO PRICING OR INSTALLATION.
5. GENERAL
   A. AFTER CAREFULLY STUDYING THE DRAWINGS AND SPECIFICATIONS, AND BEFORE SUBMITTING THE PROPOSAL, MAKE A MANDATORY SITE VISIT TO ASCERTAIN CONDITIONS OF THE SITE, AND THE NATURE AND EXACT QUANTITY OF WORK TO BE PERFORMED. NO EXTRA COMPENSATION WILL BE ALLOWED FOR FAILURE TO NOTIFY THE OWNER, IN WRITING, OF ANY DISCREPANCIES THAT MAY HAVE BEEN NOTED BETWEEN THE EXISTING CONDITIONS AND THE DRAWINGS AND SPECIFICATIONS.
   B. VERIFY ALL MEASUREMENTS AT THE SITE AND BE RESPONSIBLE FOR CORRECTNESS OF SAME.
6. QUALITY, WORKMANSHIP, MATERIALS AND SAFETY
   A. PROVIDE NEW MATERIALS AND EQUIPMENT OF A DOMESTIC MANUFACTURER BY THOSE REGULARLY ENGAGED IN THE PRODUCTION AND MANUFACTURE OF SPECIFIED MATERIALS AND EQUIPMENT. WHERE UL, OR OTHER AGENCY, HAS ESTABLISHED STANDARDS FOR MATERIALS, PROVIDE MATERIALS WHICH ARE LISTED AND LABELED ACCORDINGLY. THE COMMERCIALLY STANDARD ITEMS OF EQUIPMENT AND THE SPECIFIC NAMES MENTIONED HEREIN ARE INTENDED FOR THE PROPER FUNCTIONING OF THE WORK.
   B. WORK SHALL BE PERFORMED BY WORKMEN SKILLED IN THE TRADE REQUIRED FOR THE WORK. INSTALL MATERIALS AND EQUIPMENT TO PRESENT A NEAT APPEARANCE WHEN COMPLETED AND IN ACCORDANCE WITH THE APPROVED RECOMMENDATIONS OF THE MANUFACTURER AND IN ACCORDANCE WITH CONTRACT DOCUMENTS.
   C. PROVIDE LABOR, MATERIALS, APPARATUS AND APPLIANCES ESSENTIAL TO THE FUNCTIONING OF THE SYSTEMS DESCRIBED OR INDICATED HEREIN, OR WHICH MAY BE REASONABLY IMPLIED AS ESSENTIAL WHENEVER MENTIONED IN THE CONTRACT DOCUMENT OR NOT.
   D. MAKE WRITTEN REQUESTS FOR SUPPLEMENTARY INSTRUCTIONS TO ARCHITECT/ENGINEER IN CASE OF DOUBT AS TO WORK INTENDED OR IN EVENT OF NEED FOR EXPLANATION THEREOF.
   E. PERFORMANCE AND MATERIAL REQUIREMENTS SCHEDULED OR SPECIFIED ARE MINIMUM STANDARD ACCEPTABLE. THE RIGHT TO JUDGE THE QUALITY OF EQUIPMENT THAT DEVIATES FROM THE CONTRACT DOCUMENT REMAINS SOLELY WITH ARCHITECT/ENGINEER. CONTRACT DOCUMENT OR NOT.

GUARANTEE

1. GUARANTEE MATERIALS, PARTS AND LABOR FOR WORK FOR ONE YEAR FROM THE DATE OF ISSUANCE OF OCCUPANCY PERMIT. DURING THAT PERIOD, MAKE GOOD FAULTS OR IMPERFECTIONS THAT MAY ARISE DUE TO DEFECTS OR OMISSIONS IN MATERIALS OR WORKMANSHIP WITH NO ADDITIONAL COMPENSATION AND AS DIRECTED BY ARCHITECT.

CLEANING

1. REMOVE ALL CONSTRUCTION DEBRIS RESULTING FROM THE WORK.
2. CLEAN EQUIPMENT AND SYSTEMS FOLLOWING THE COMPLETION OF THE PROJECT TO THE SATISFACTION OF THE ENGINEER.

COORDINATION AND SUPERVISION

1. CAREFULLY LAY OUT ALL WORK IN ADVANCE TO AVOID UNNECESSARY CUTTING, CHANNELING, CHASING OR DRILLING OF FLOORS, WALLS, PARTITIONS, CEILINGS OR OTHER SURFACES. WHERE SUCH WORK IS NECESSARY, HOWEVER, PATCH AND REPAIR THE WORK IN AN APPROVED MANNER BY SKILLED MECHANICS AT NO ADDITIONAL COST TO THE OWNER. RENDER FULL COOPERATION TO OTHER TRADES WHERE WORK WILL BE INSTALLED IN CLOSE PROXIMITY TO WORK OF OTHER TRADES. ASSIST IN WORKING OUT SPACE CONDITIONS. IF WORK IS INSTALLED BEFORE COORDINATION WITH OTHER TRADES, OR CAUSES INTERFERENCE, MAKE CHANGES NECESSARY TO CORRECT CONDITIONS WITHOUT EXTRA CHARGE.

SUBMITTALS

1. AS-BUILT DRAWINGS:
   A. UPON COMPLETION OF THE WORK, FURNISH TO THE OWNER "AS-BUILT" DRAWINGS.
2. SERVICE MANUALS:
   A. UPON COMPLETION OF THE WORK, FULLY INSTRUCT T-MOBILE AS TO THE OPERATION AND MAINTENANCE OF ALL MATERIAL, EQUIPMENT AND SYSTEMS.
   B. PROVIDE 3 COMPLETE BOUND SETS OF INSTRUCTIONS FOR OPERATING AND MAINTAINING ALL SYSTEMS AND EQUIPMENT.

CUTTING AND PATCHING

1. PROVIDE ALL CUTTING, DRILLING, ROUGH AND FINISH PATCHING REQUIRED TO COMPLETE THE WORK.
2. OBTAIN OWNER APPROVAL PRIOR TO CUTTING THROUGH FLOORS OR WALLS FOR PIPING OR CONDUIT.

TESTS, INSPECTION AND APPROVAL

1. BEFORE ENERGIZING ANY ELECTRICAL INSTALLATION, INSPECT EACH UNIT IN DETAIL. TIGHTEN ALL BOLTS AND CONNECTIONS (TORQUE-TIGHTEN WHERE REQUIRED) AND DETERMINE THAT ALL COMPONENTS ARE ALIGNED, AND THE EQUIPMENT IS IN SAFE, OPERATIONAL CONDITION.
2. PROVIDE THE COMPLETE ELECTRICAL SYSTEM FREE OF GROUND FAULTS AND SHORT CIRCUITS SUCH THAT THE SYSTEM WILL OPERATE SATISFACTORILY UNDER FULL LOAD CONDITIONS, WITHOUT EXCESSIVE HEATING AT ANY POINT IN THE SYSTEM.

SPECIAL REQUIREMENTS

1. DO NOT LEAVE ANY WORK INCOMPLETE NOR ANY HAZARDOUS SITUATIONS CREATED WHICH WILL AFFECT THE LIFE OR SAFETY OF THE PUBLIC AND/OR BUILDING OCCUPANTS. DO NOT INTERFERE WITH OR CUTOFF ANY OF THE EXISTING SERVICES WITHOUT THE OWNER'S WRITTEN PERMISSION.
2. WHEN NECESSARY TO TEMPORARILY DISCONNECT ANY EXISTING BUILDING UTILITIES AND SERVICE SYSTEMS, INCLUDING FEEDER OR BRANCH CIRCUITING SUPPLYING EXISTING FACILITIES, CONFER WITH THE OWNER AND ARRANGE THE PERIOD OF INTERRUPTION FOR A TIME MUTUALLY AGREED UPON. SHUTDOWN NOTE: SCHEDULE AND NOTIFY OWNER 48 HOURS PRIOR TO SHUTDOWN. ALL SHUTDOWN WORK TO BE SCHEDULED AT A TIME CONVENIENT TO OWNER.

GROUNDING

1. ROUTE ALL GROUNDING CONDUCTORS AS SHOWN ON CONDUIT/GROUNDING RISER.
2. ROUTE 500 KCMIL CU. THHN CONDUCTOR FROM THE MGB LOCATION TO BUILDING STEEL. VERIFY BUILDING STEEL IS EFFECTIVELY GROUNDED PER NEC TO THE MAIN SERVICE GROUNDING ELECTRODE CONDUCTOR (GEC).
3. MAKE ALL GROUND CONNECTIONS FROM MGB TO ELECTRICAL EQUIPMENT WITH 2 HOLE, CRIMP TYPE, BURNDY COMPRESSION TERMINATIONS, SIZED AS REQUIRED.
4. USE 1 HOLE, CRIMP TYPE, BURNDY COMPRESSIONS TERMINATIONS, SIZED AS REQUIRED, AT EQUIPMENT GROUND CONNECTIONS.
5. HIRE AN INDEPENDENT LAB TO PERFORM THE SPECIFIED OHMS TESTING. PROVIDE 4 SETS OF THE CERTIFIED DOCUMENTS TO THE OWNER FOR VERIFICATION PRIOR TO THE PROJECT COMPLETION.

RACEWAYS

1. ALL WIRING TO BE INSTALLED IN CONDUIT SYSTEMS IN ACCORDANCE WITH THE FOLLOWING:
   A. EXTERIOR FEEDERS AND CONTROL, WHERE UNDERGROUND, TO BE IN SCH 40 PVC.
   B. EXTERIOR, ABOVE GROUND POWER CONDUITS TO BE GALVANIZED RIGID STEEL (RGS).
   C. ALL TELECOMMUNICATION CONDUITS, INTERIOR/EXTERIOR, TO BE EMT.
   D. INSTALL PULL ROPES IN ALL NEW EMPTY CONDUITS INSTALLED ON THIS PROJECT.
   E. ALL TELECOM CONDUITS AND PULL BOXES INSTALLED ON THIS PROJECT TO BE LABELED "T-MOBILE". OWNER WILL PROVIDE LABELS FOR CONTRACTOR TO INSTALL.
   F. INTERIOR FEEDERS TO BE INSTALLED IN E.M.T. WITH STEEL COMPRESSION FITTINGS.
   G. MINIMUM SIZE CONDUIT TO BE ¾" TRADE SIZE UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
   H. FINAL CONNECTIONS TO MOTORS AND VIBRATING EQUIPMENT TO BE INSTALLED IN LIQUID-TIGHT FLEXIBLE METAL CONDUIT.
   I. CONDUIT TO BE RUN CONCEALED IN CEILINGS, FINISHED AREAS OR DRYWALL PARTITIONS, UNLESS OTHERWISE NOTED.
   J. THE ROUTING OF CONDUITS INDICATED ON THE DRAWINGS IS DIAGRAMMATIC. BEFORE INSTALLING ANY WORK, EXAMINE THE WORKING LAYOUTS AND SHOP DRAWINGS OF THE OTHER TRADES TO DETERMINE THE EXACT LOCATIONS AND CLEARANCES.
   K. ALL EXTERIOR MOUNTING HARDWARE TO BE GALVANIZED STEEL. COORDINATE WITH BUILDING ENGINEER PRIOR TO ATTACHING TO BUILDING STRUCTURE.

RACEWAYS CONT'D

   L. PENETRATIONS OF WALLS, FLOORS AND ROOFS, FOR THE PASSAGE OF ELECTRICAL RACEWAYS, TO BE PROPERLY SEALED AFTER INSTALLATION OF RACEWAYS SO AS TO MAINTAIN THE STRUCTURAL OR WATERPROOF INTEGRITY OF THE WALL, FLOOR OR ROOF SYSTEM TO BE PENETRATED. SEAL ALL CONDUIT PENETRATIONS THROUGH FIRE OR SMOKE RATED WALLS, CEILINGS OR SMOKE TIGHT CORRIDOR PARTITIONS TO MAINTAIN PROPER RATING OF WALL OR CEILING.
   M. PROVIDE ALL CONDUIT ENDS WITH INSULATED METALLIC GROUNDING BUSHINGS.
   N. CONDUIT TO BE SUPPORTED AT MAXIMUM DISTANCE OF 8'-0", OR AS REQUIRED BY NEC, IN HORIZONTAL AND VERTICAL DIRECTIONS.
   O. PROVIDE STAINLESS STEEL BLANK COVER PLATES FOR ALL JUNCTION BOXES AND/OR OUTLET BOXES NOT USED IN EXPOSED AREAS. PROVIDE ALL OTHER UNUSED BOXES WITH STANDARD STEEL COVER PLATES.
   P. WHERE APPLICABLE, PROVIDE ROOFTOP CONDUIT SUPPORT SYSTEM, CONFORMING TO ROOFTOP WARRANTY REQUIREMENTS, PER BUILDING.

WIRES AND CABLES

1. CONTRACTOR TO COORDINATE WITH EQUIPMENT SUPPLIER AND VENDOR FOR EXACT EQUIPMENT OVER-CURRENT PROTECTION VOLTAGE, WIRE SIZE AND PLUG CONFIGURATION, IF APPLICABLE, PRIOR TO BID.
2. ALL EQUIPMENT/DEVICES TO BE PROVIDED WITH INSULATED GROUND CONDUCTOR.
3. ALL WIRE AND CABLE TO BE 600VOLT, COPPER, WITH THWN/THHN INSULATION, EXCEPT AS NOTED.
4. WIRE FOR POWER AND LIGHTING WILL NOT BE LESS THAN NO. 12AWG. ALL WIRE NO. 8 AND LARGER TO BE STRANDED.
5. CONTROL WIRING IS NOT TO BE LESS THAN NO. 14AWG, FLEXIBLE IN SINGLE CONDUCTORS OR MULTI-CONDUCTOR CABLES. CONTROL WIRING WILL CONSIST OF MULTI-CONDUCTOR CABLES WHEREVER POSSIBLE. CABLES TO BE PROVIDED WITH AN OVERALL FLAME-RETARDANT, EXTRUDED JACKET AND RATED FOR PLENUM USE. ALL CONTROL WIRE TO BE 600VOLT RATED.
6. WIRE PREVIOUSLY PULLED INTO CONDUIT IS CONSIDERED USED AND IS NOT TO BE RE-PULLED.
7. HOME RUNS AND BRANCH CIRCUIT WIRING FOR 20A, 120V CIRCUITS:

LENGTH (FT.)	HOME RUN WIRE SIZE
0 TO 50	NO. 12
51 TO 100	NO. 10
101 TO 150	NO. 8

8. VOLTAGE DROP IS NOT TO EXCEED 3%.
9. MAKE ALL CONNECTIONS WITH UL APPROVED, SOLDERLESS, PRESSURE TYPE INSULATED CONNECTORS: SCOTCHLOK OR AND APPROVED EQUAL.

WIRING DEVICES

1. ALL RECEPTACLES INSTALLED IN THIS PROJECT TO BE GROUNDING TYPE, WITH GROUNDING PIN SLOT CONNECTED TO DEVICE GROUND SCREW FOR GROUND WIRE CONNECTION.

DISCONNECT SWITCHES AND FUSES

1. DISCONNECT SWITCHES TO BE VOLTAGE-RATED TO SUIT THE CHARACTERISTICS OF THE SYSTEM FROM WHICH THEY ARE SUPPLIED.
2. PROVIDE HEAVY-DUTY, METAL-ENCLOSED, EXTERNALLY-OPERATED DISCONNECT SWITCHES, FUSED OR UNFUSED, OF SUCH TYPE AND SIZE AS REQUIRED TO PROPERLY PROTECT OR DISCONNECT THE LOAD FOR WHICH THEY ARE INTENDED.
3. PROVIDE NEMA 1 DISCONNECT SWITCHES FOR INTERIOR INSTALLATION, NEMA 3R FOR EXTERIOR INSTALLATION.
4. DISCONNECT SWITCHES TO BE MANUFACTURED BY:
   A. GENERAL ELECTRIC COMPANY
   B. SQUARE-D
5. PROVIDE RK-1 TYPE FUSES, UNLESS NOTED OTHERWISE.

INSTALLATION

1. INSTALL DISCONNECT SWITCHES WHERE INDICATED ON DRAWINGS.
2. INSTALL FUSES IN FUSIBLE DISCONNECT SWITCHES. FUSES MUST MATCH IN TYPE AND RATING.
3. FUSES TO BE MOUNTED SO THAT THE LABELS SHOWING THEIR RATINGS CAN BE READ WITHOUT REQUIRING FUSE REMOVAL.
4. FURNISH AND DEPOSIT SPARE FUSES AT THE JOB SITE AS FOLLOWS:
   A. THREE SPARES FOR EACH TYPE AND SIZE, IN EXCESS OF 60A, USED FOR INITIAL FUSING.
   B. TEN PERCENT SPARES FOR EACH TYPE AND SIZE, UP TO AND INCLUDING 60A, USED FOR INITIAL FUSING. IN NO CASE WILL LESS THAN THREE FUSES OF ONE PARTICULAR TYPE AND SIZE BE FURNISHED.

GENERAL NOTES:

INTENT

1. THESE SPECIFICATIONS AND CONSTRUCTION DRAWINGS ACCOMPANYING THEM DESCRIBE THE WORK TO BE DONE AND THE MATERIALS TO BE FURNISHED FOR CONSTRUCTION.
2. THE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO BE FULLY EXPLANATORY AND SUPPLEMENTARY. HOWEVER, SHOULD ANYTHING BE SHOWN, INDICATED, OR SPECIFIED ON ONE AND NOT THE OTHER, IT SHALL BE DONE THE SAME AS IF SHOWN, INDICATED OR SPECIFIED IN BOTH
3. THE INTENTION OF THE DOCUMENTS IS TO INCLUDE ALL LABOR AND MATERIALS REASONABLY NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK AS STIPULATED IN THE CONTRACT.
4. THE PURPOSE OF THE SPECIFICATIONS IS TO INTERPRET THE INTENT OF THE DRAWINGS AND TO DESIGNATE THE METHOD OF THE PROCEDURE, TYPE AND QUALITY OF MATERIALS REQUIRED TO COMPLETE THE WORK.
5. MINOR DEVIATIONS FROM THE DESIGN LAYOUT ARE ANTICIPATED AND SHALL BE CONSIDERED AS PART OF THE WORK. NO CHANGES THAT ALTER THE CHARACTER OF THE WORK WILL BE MADE OR PERMITTED BY THE OWNER WITHOUT ISSUING A CHANGE ORDER.

CONFLICTS

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATIONS OF ALL MEASUREMENTS AT THE SITE BEFORE ORDERING ANY MATERIALS OR DOING ANY WORK. NO EXTRA CHARGE OR COMPENSATION SHALL BE ALLOWED DUE TO DIFFERENCE BETWEEN ACTUAL DIMENSIONS AND DIMENSIONS INDICATED ON THE CONSTRUCTION DRAWINGS. ANY SUCH DISCREPANCY IN DIMENSION WHICH MAY BE FOUND SHALL BE SUBMITTED TO THE OWNER FOR CONSIDERATION BEFORE THE CONTRACTOR PROCEEDS WITH THE WORK IN THE AFFECTED AREAS.
2. THE BIDDER, IF AWARDED THE CONTRACT, WILL NOT BE ALLOWED ANY EXTRA COMPENSATION BY REASON OF ANY MATTER OR THING CONCERNING SUCH BIDDER MIGHT HAVE FULLY INFORMED THEMSELVES PRIOR TO THE BIDDING.
3. NO PLEA OF IGNORANCE OF CONDITIONS THAT EXIST, OR OF DIFFICULTIES OR CONDITIONS THAT MAY BE ENCOUNTERED, OR OF ANY OTHER RELEVANT MATTER CONCERNING THE WORK TO BE PERFORMED IN THE EXECUTION OF THE WORK WILL BE ACCEPTED AS AN EXCUSE FOR ANY FAILURE OR OMISSION ON THE PART OF THE CONTRACTOR TO FULFILL EVERY DETAIL OF ALL THE REQUIREMENTS OF THE CONTRACT DOCUMENTS GOVERNING THE WORK.

CONTRACTS AND WARRANTIES

1. CONTRACTOR IS RESPONSIBLE FOR APPLICATION AND PAYMENT OF CONTRACTOR LICENSES AND BONDS.
2. SEE MASTER CONTRACTION SERVICES AGREEMENT FOR ADDITIONAL DETAILS.

STORAGE

1. ALL MATERIALS MUST BE STORED IN A LEVEL AND DRY FASHION AND IN A MANNER THAT DOES NOT NECESSARILY OBSTRUCT THE FLOW OF OTHER WORK. ANY STORAGE METHOD MUST MEET ALL RECOMMENDATIONS OF THE ASSOCIATED MANUFACTURER.

CLEANUP

1. THE CONTRACTORS SHALL, AT ALL TIMES, KEEP THE SITE FREE FROM ACCUMULATION OF WASTE MATERIALS OR RUBBISH CAUSED BY THEIR EMPLOYEES AT WORK AND AT THE COMPLETION OF THE WORK. THEY SHALL REMOVE ALL RUBBISH FROM AND ABOUT THE BUILDING AREA, INCLUDING ALL THEIR TOOLS, SCAFFOLDING AND SURPLUS MATERIALS AND SHALL LEAVE THEIR WORK CLEAN AND READY TO USE.
2. EXTERIOR
   A. VISUALLY INSPECT EXTERIOR SURFACES AND REMOVE ALL TRACES OF SOIL, WASTE MATERIALS, SMUDGES AND OTHER FOREIGN MATTER.
   B. REMOVE ALL TRACES OF SPLASHED MATERIALS FROM ADJACENT SURFACES.
   C. IF NECESSARY, TO ACHIEVE A UNIFORM DEGREE OF CLEANLINESS, HOSE DOWN THE EXTERIOR OF THE STRUCTURE.
3. INTERIOR
   A. VISUALLY INSPECT INTERIOR SURFACE AND REMOVE ALL TRACES OF SOIL, WASTE MATERIALS, SMUDGES AND OTHER FOREIGN MATTER FROM WALLS, FLOOR, AND CEILING.
   B. REMOVE ALL TRACES OF SPLASHED MATERIALS FROM ADJACENT SURFACES.
   C. REMOVE PAINT DROPPINGS, SPOTS, STAINS, AND DIRT FROM FINISHED SURFACES.

CHANGE ORDER PROCEDURE:

1. REFER TO SECTION 17 OF SIGNED MCSA: SEE PROFESSIONAL SERVICE AGREEMENT FOR MCSA.

RELATED DOCUMENTS AND COORDINATION

1. GENERAL CARPENTRY, ELECTRICAL AND ANTENNA DRAWINGS ARE INTERRELATED. IN PERFORMANCE OF THE WORK, THE CONTRACTOR MUST REFER TO ALL DRAWINGS. ALL COORDINATION TO BE THE RESPONSIBILITY OF THE CONTRACTOR.

SHOP DRAWINGS

1. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AS REQUIRED AND LISTED IN THESE SPECIFICATIONS TO THE OWNER FOR APPROVAL.
2. ALL SHOP DRAWINGS SHALL BE REVIEWED, CHECKED AND CORRECTED BY CONTRACTOR PRIOR TO SUBMITTAL TO THE OWNER.

PRODUCTS AND SUBSTITUTIONS

1. SUBMIT 3 COPIES OF EACH REQUEST FOR SUBSTITUTION. IN EACH REQUEST, IDENTIFY THE PRODUCT OR FABRICATION OR INSTALLATION METHOD TO BE REPLACED BY THE SUBSTITUTION. INCLUDE RELATED SPECIFICATION SECTION AND DRAWING NUMBERS AND COMPLETE DOCUMENTATION SHOWING COMPLIANCE WITH THE REQUIREMENTS FOR SUBSTITUTIONS.
2. SUBMIT ALL NECESSARY PRODUCT DATA AND CUT SHEETS WHICH PROPERLY INDICATE AND DESCRIBE THE ITEMS, PRODUCTS AND MATERIALS BEING INSTALLED. THE CONTRACTOR SHALL, IF DEEMED NECESSARY BY THE OWNER, SUBMIT ACTUAL SAMPLES TO THE OWNER FOR APPROVAL IN LIEU OF CUT SHEETS.

QUALITY ASSURANCE

1. ALL WORK SHALL BE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS. THESE SHALL INCLUDE, BUT NOT BE LIMITED TO THE APPLICABLE CODES SET FORTH BY THE LOCAL GOVERNING BODY. SEE "CODE COMPLIANCE" T-1.

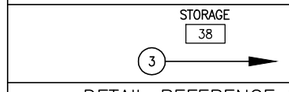
ADMINISTRATION

1. BEFORE THE COMMENCEMENT OF ANY WORK, THE CONTRACTOR WILL ASSIGN A PROJECT MANAGER WHO WILL ACT AS A SINGLE POINT OF CONTACT FOR ALL PERSONNEL INVOLVED IN THIS PROJECT. THIS PROJECT MANAGER WILL DEVELOP A MASTER SCHEDULE FOR THE PROJECT WHICH WILL BE SUBMITTED TO THE OWNER PRIOR TO THE COMMENCEMENT OF ANY WORK.
2. SUBMIT A BAR TYPE PROGRESS CHART, NOT MORE THAN 3 DAYS AFTER THE DATE ESTABLISHED FOR COMMENCEMENT OF THE WORK ON THE SCHEDULE, INDICATING A TIME BAR FOR EACH MAJOR CATEGORY OR UNIT OF WORK TO BE PERFORMED AT THE SITE, PROPERLY SEQUENCED AND COORDINATED WITH OTHER ELEMENTS OF WORK AND SHOWING COMPLETION OF THE WORK SUFFICIENTLY IN ADVANCE OF THE DATE ESTABLISHED FOR SUBSTANTIAL COMPLETION OF THE WORK.
3. PRIOR TO COMMENCING CONSTRUCTION, THE OWNER SHALL SCHEDULE AN ON-SITE MEETING WITH ALL MAJOR PARTIES. THIS WOULD INCLUDE, BUT NOT LIMITED TO, THE OWNER, PROJECT MANAGER, CONTRACTOR, LAND OWNER REPRESENTATIVE, LOCAL TELEPHONE COMPANY, TOWER ERECTION FOREMAN (IF SUBCONTRACTED).
4. CONTRACTOR SHALL BE EQUIPPED WITH SOME MEANS OF CONSTANT COMMUNICATIONS, SUCH AS A MOBILE PHONE OR A BEEPER. THIS EQUIPMENT WILL NOT BE SUPPLIED BY THE OWNER, NOR WILL WIRELESS SERVICE BE ARRANGED.
5. DURING CONSTRUCTION, CONTRACTOR MUST ENSURE THAT EMPLOYEES AND SUBCONTRACTORS WEAR HARD HATS AT ALL TIMES. CONTRACTOR WILL COMPLY WITH ALL WPCS SAFETY REQUIREMENTS IN THEIR AGREEMENT.
6. PROVIDE WRITTEN DAILY UPDATES ON SITE PROGRESS TO THE OWNER.
7. COMPLETE INVENTORY OF CONSTRUCTION MATERIALS AND EQUIPMENT IS REQUIRED PRIOR TO START OF CONSTRUCTION.
8. NOTIFY THE OWNER/PROJECT MANAGER IN WRITING NO LESS THAN 48 HOURS IN ADVANCE OF CONCRETE POURS, TOWER ERECTIONS, AND EQUIPMENT CABINET PLACEMENTS.

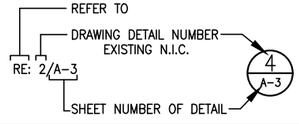
INSURANCE AND BONDS

1. CONTRACTOR, AT THEIR OWN EXPENSE, SHALL CARRY AND MAINTAIN, FOR THE DURATION OF THE PROJECT, ALL INSURANCE, AS REQUIRED AND LISTED, AND SHALL NOT COMMENCE WITH THEIR WORK UNTIL THEY HAVE PRESENTED AN ORIGINAL CERTIFICATE OF INSURANCE STATING ALL COVERAGE'S TO THE OWNER. REFER TO THE MASTER AGREEMENT FOR REQUIRED INSURANCE LIMITS.
2. THE OWNER SHALL BE NAMED AS AN ADDITIONAL INSURED ON ALL POLICIES.
3. CONTRACTOR MUST PROVIDE PROOF OF INSURANCE.

ARCHITECTURAL SYMBOLS



DETAIL REFERENCE KEY



ABBREVIATIONS

ADJ	ADJUSTABLE
AGL	ABOVE GROUND LINE
&	AND
APPROX	APPROXIMATE
@	AT
BTS	BASE TRANSMISSION STATION
CAB	CABINET
CLG	CEILING
CONC	CONCRETE
CONT	CONTINUOUS
DIA OR ø	DIAMETER
DWG	DRAWING
EA	EACH
ELEC	ELECTRICAL
ELEV	ELEVATION
EQ	EQUAL
EQUIP	EQUIPMENT
EGB	EQUIPMENT GROUND BAR
(E)	EXISTING
EXT	EXTERIOR
FF	FINISHED FLOOR
GA	GAUGE
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GRND	GROUND
LG	LONG
MAX	MAXIMUM
MECH	MECHANICAL
MW	MICROWAVE DISH
MFR	MANUFACTURER
MGB	MASTER GROUND BAR
MIN	MINIMUM
MTL	METAL
(N)	NEW
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
OC	ON CENTER
OPP	OPPOSITE
(P)	PROPOSED
PCS	PERSONAL COMMUNICATION SYSTEM
PPC	POWER PROTECTION CABINET
SF	SQUARE FOOT
SHT	SHEET
SIM	SIMILAR
SS	STAINLESS STEEL
STL	STEEL
TOC	TOP OF CONCRETE
TOM	TOP OF MASONRY
TYP	TYPICAL
VIF	VERIFY IN FIELD
UON	UNLESS OTHERWISE NOTED
WWF	WELDED WIRE FABRIC
W/	WITH

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SUBMITTALS

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RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO: CT11270C
DRAWN BY: MS
CHECKED BY: SM

STATE OF CONNECTICUT · HOSSEIN VAHEDI · NO. ARI.11162 · LICENSED ARCHITECT

PROFESSIONAL SEAL

SITE NUMBER
CT11270C
SITE NAME
CL&P BRISTOL

SITE ADDRESS
2 WILLIS STREET

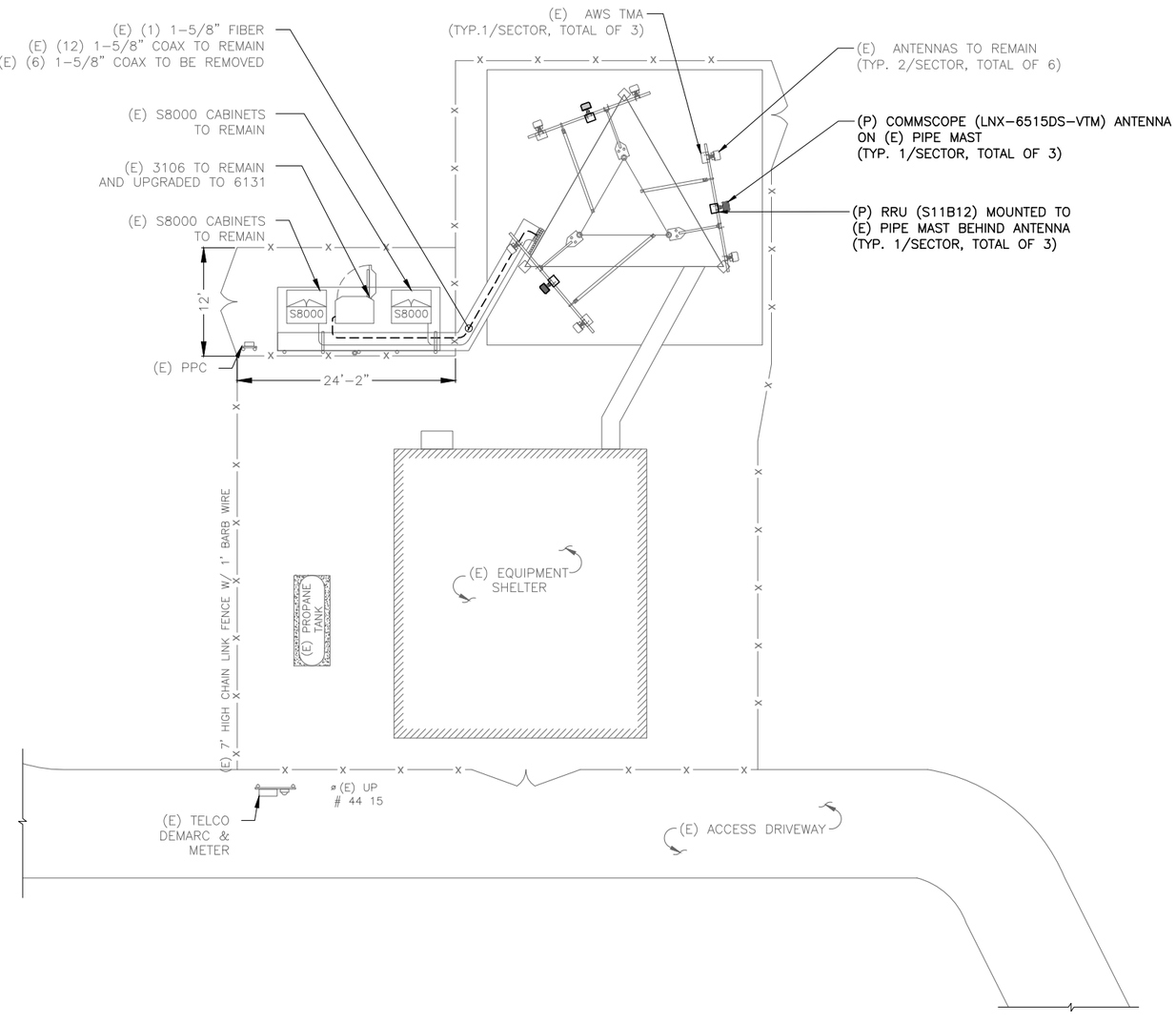
BRISTOL, CT 06010

SHEET TITLE
GENERAL AND ELECTRICAL NOTES

SHEET NUMBER
N-1

REFER TO STRUCTURAL ANALYSIS DOCUMENT ENTITLED, "STRUCTURAL ANALYSIS REPORT " PREPARED BY CENTEK ENGINEERING INC., "T-MOBILE SITE ID CT11270C", DATED SEPTEMBER 2, 2015.

1
A-2



1
A-1 COMPOUND PLAN
SCALE: 1/16" = 1'-0" (11x17)
1/8" = 1'-0" (24x36)

8 0 8 16 24

14°1'
MAGNETIC
TRUE

GENERAL SITE NOTES:

1. SITE INFORMATION WAS OBTAINED FROM A FIELD INVESTIGATION PERFORMED BY ATLANTIS GROUP, INC. CONTRACTOR TO FIELD VERIFY DIMENSIONS AS NECESSARY BEFORE CONSTRUCTION.

2. THE PROPOSED DEVELOPMENT DOES NOT INCLUDE SIGNS OF ADVERTISING.

3. THE PROPOSED DEVELOPMENT IS UNMANNED AND THEREFORE DOES NOT REQUIRE A MEANS OF WATER SUPPLY OR SEWAGE DISPOSAL.

4. NO LANDSCAPING WORK IS PROPOSED IN CONJUNCTION WITH THIS DEVELOPMENT OTHER THAN THAT WHICH IS SHOWN.

5. THE PROPOSED DEVELOPMENT DOES NOT INCLUDE OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES.

6. UTILITIES SHOWN ON PLAN ARE TAKEN FROM OWNERS RECORDS AND FIELD LOCATION OF VISIBLE SURFACE FEATURES. THE EXISTENCE, EXTENT AND EXACT HORIZONTAL AND VERTICAL LOCATIONS OF UTILITIES HAS NOT BEEN VERIFIED. ANY CONTRACTOR PERFORMING WORK ON THIS SITE MUST CONTACT CALL BEFORE YOU DIG THREE WORKING DAYS PRIOR TO COMMENCING WORK.

7. ALL OBSOLETE OR UNUSED FACILITIES SHALL BE REMOVED WITHIN 12 MONTHS OF CESSATION OF OPERATIONS.

SITE LEGEND

- SITE PROPERTY LINE
- STREET OR ROAD
- CHAIN LINK FENCE
- OPAQUE WOODEN FENCE
- BOARD ON BOARD FENCE
- DECIDUOUS TREES/SHRUBS
- EVERGREEN TREES/SHRUBS
- TREE LINE
- UTILITY POLE
- (E) EXISTING
- (N) NEW
- (P) PROPOSED
- (F) FUTURE
- PROP. LTE ANTENNA
- PROP. UMTS/GSM ANTENNA
- EX. GSM ANTENNA
- EX. UMTS ANTENNA

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CHECKED BY:	SM

STATE OF CONNECTICUT
HOSSEIN VAHEDI
NO. ARI. 11162
LICENSED ARCHITECT

PROFESSIONAL SEAL

SITE NUMBER
CT11270C
SITE NAME
CL&P BRISTOL

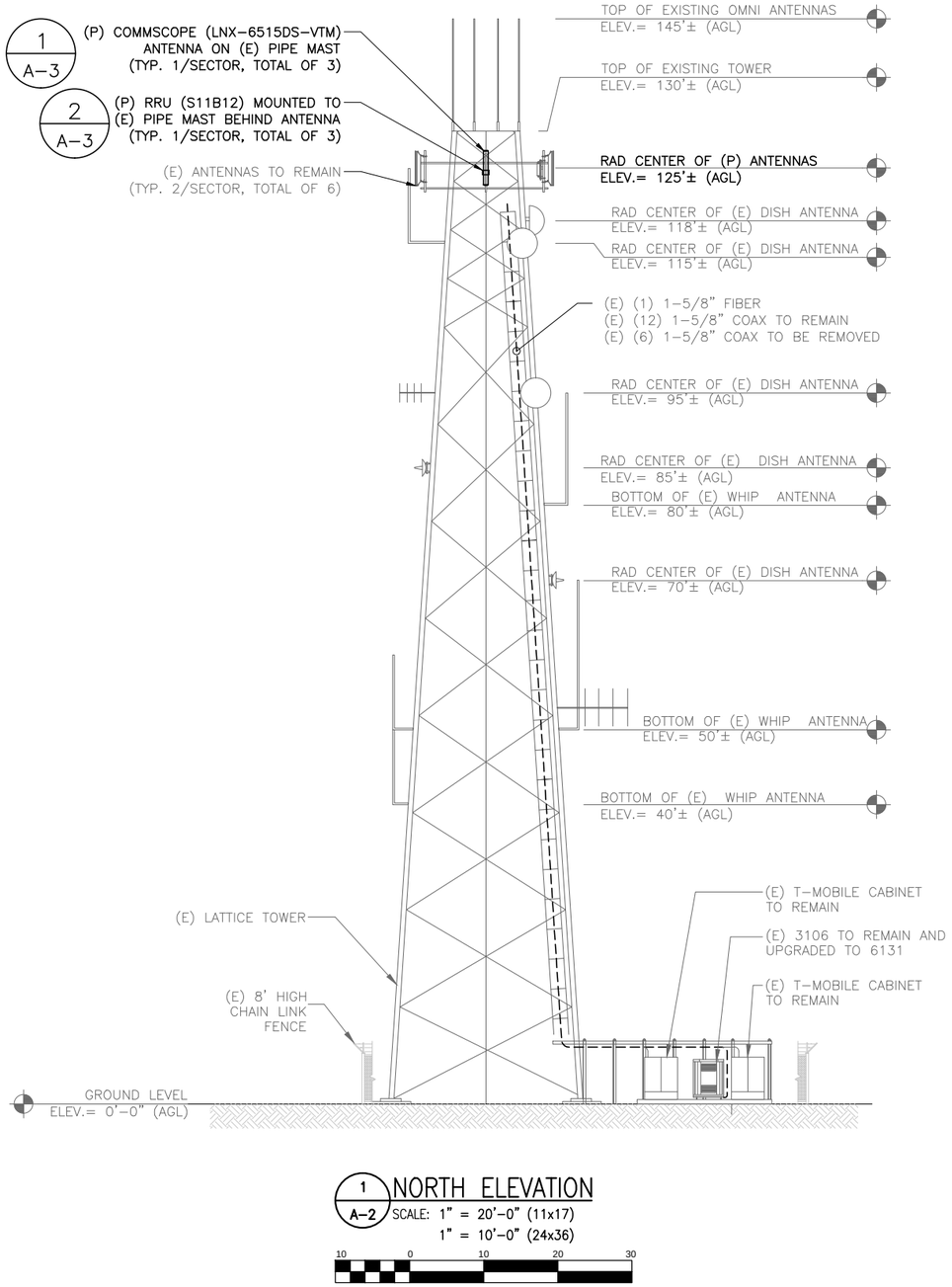
SITE ADDRESS
2 WILLIS STREET

BRISTOL, CT 06010

SHEET TITLE
SITE PLAN

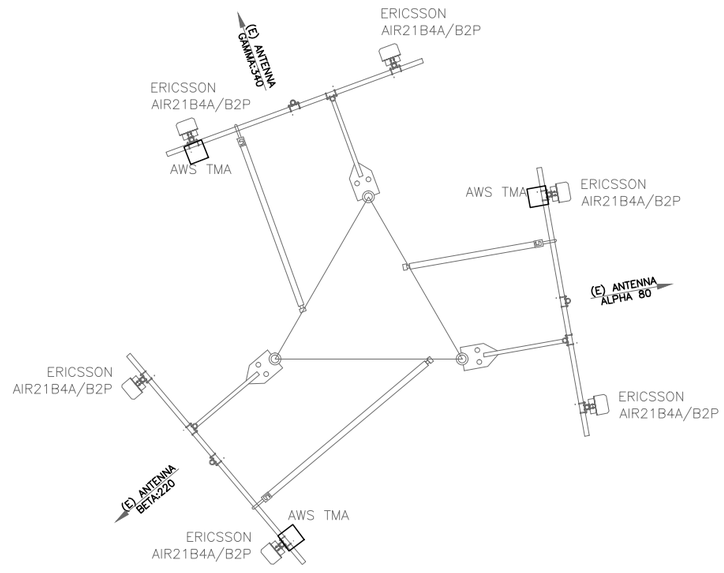
SHEET NUMBER
A-1

REFER TO STRUCTURAL ANALYSIS DOCUMENT ENTITLED, "STRUCTURAL ANALYSIS REPORT " PREPARED BY CENTEK ENGINEERING INC., "T-MOBILE SITE ID CT11270C", DATED SEPTEMBER 2, 2015.

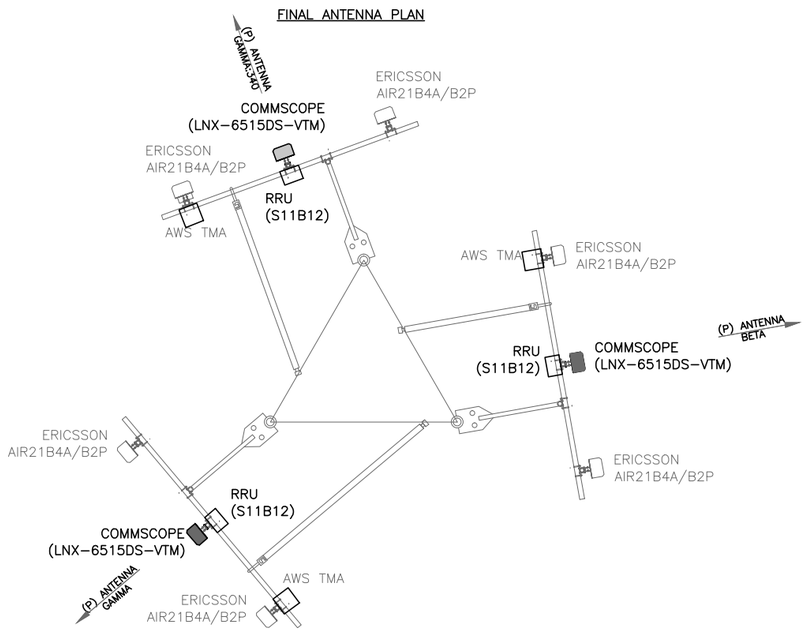


1 A-2 NORTH ELEVATION
SCALE: 1" = 20'-0" (11x17)
1" = 10'-0" (24x36)
10 0 10 20 30

EXISTING ANTENNA PLAN



FINAL ANTENNA PLAN



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STATE OF CONNECTICUT HOSSEIN VAHEDI NO. ARI. 11162 LICENSED ARCHITECT

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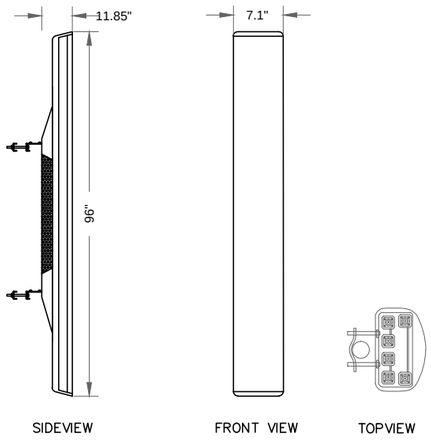
CT11270C
SITE NAME
CL&P BRISTOL
SITE ADDRESS
2 WILLIS STREET
BRISTOL, CT 06010

SHEET TITLE
ELEVATION AND ANTENNA PLAN

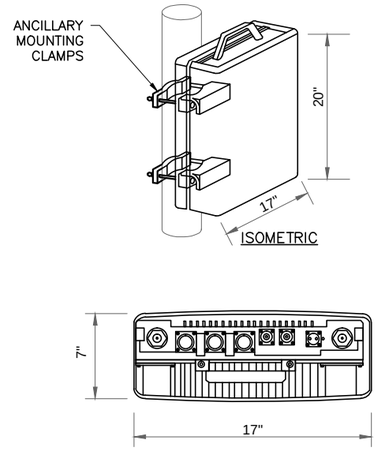
SHEET NUMBER
A-2



MANUFACTURER: COMMSCOPE
MODEL NO.: LNX-6515DS-VTM
DIMENSIONS - HxWxD, (IN) 96x11.85x7.1

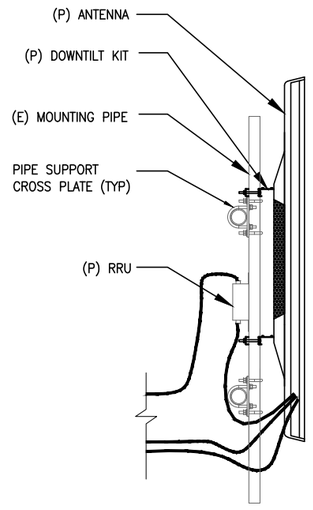
COMMSCOPE ANTENNA DETAIL (1 / A-3)

SCALE: N.T.S



RRUS 11 B12 DETAILS (2 / A-3)

SCALE: N.T.S



ANTENNA MOUNT DETAIL (3 / A-3)

SCALE: N.T.S

REFER TO STRUCTURAL ANALYSIS DOCUMENT ENTITLED, "STRUCTURAL ANALYSIS REPORT " PREPARED BY CENTEK ENGINEERING INC., "T-MOBILE SITE ID CT11270C", DATED SEPTEMBER 2, 2015.

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STATE OF CONNECTICUT · HOSSEIN VAHEDI · NO. ARI. 11162. · LICENSED ARCHITECT

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SITE ADDRESS
2 WILLIS STREET
BRISTOL, CT 06010

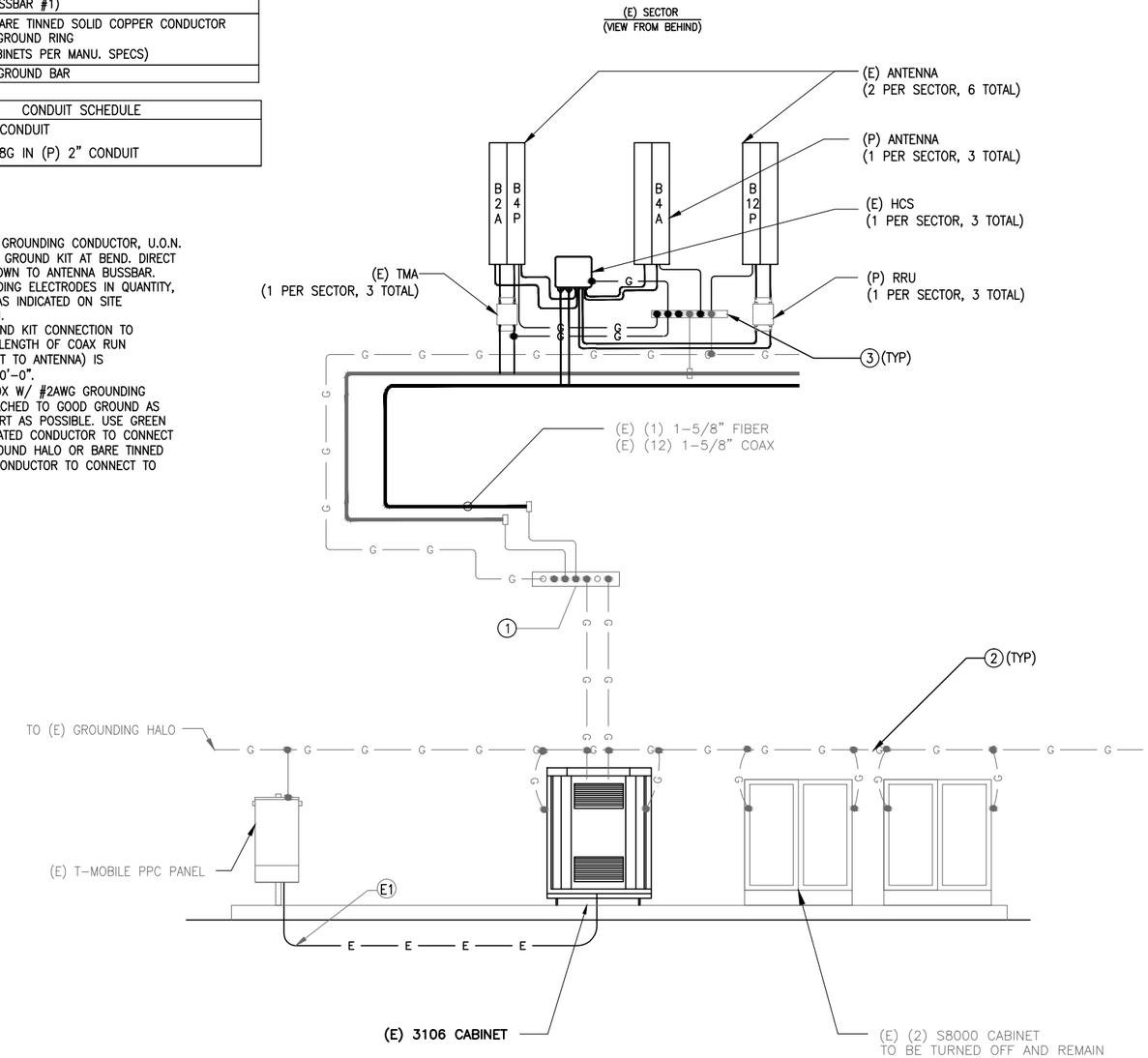
SHEET TITLE
ANTENNA DETAILS

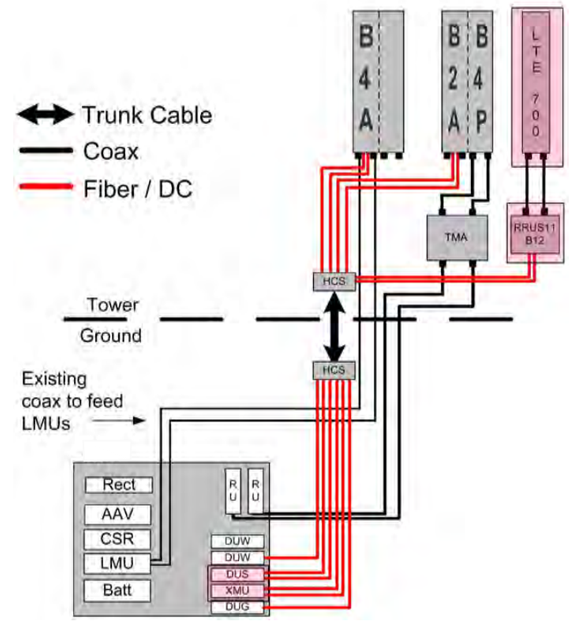
SHEET NUMBER
A-3

GROUNDING SCHEDULE	
1	(E) MGB (BUSSBAR #1)
2	(E) #2AWG BARE TINNED SOLID COPPER CONDUCTOR BONDED TO GROUND RING (GROUND CABINETS PER MANU. SPECS)
3	(E) SECTOR GROUND BAR

CONDUIT SCHEDULE	
E1	(E) POWER CONDUIT (E) 3#6+1#8G IN (P) 2" CONDUIT

NOTES:
A. PROVIDE #2AWG GROUNDING CONDUCTOR, U.O.N.
B. DO NOT INSTALL GROUND KIT AT BEND. DIRECT GROUND WIRE DOWN TO ANTENNA BUSSBAR.
C. PROVIDE GROUNDING ELECTRODES IN QUANTITY, TYPE AND SIZE AS INDICATED ON SITE GROUNDING PLAN.
D. ADD COAX GROUND KIT CONNECTION TO BUSSBAR WHEN LENGTH OF COAX RUN (FROM EQUIPMENT TO ANTENNA) IS GREATER THAN 20'-0".
E. GROUND HCS BOX W/ #2AWG GROUNDING CONDUCTOR ATTACHED TO GOOD GROUND AS DIRECT AND SHORT AS POSSIBLE. USE GREEN STRANDED INSULATED CONDUCTOR TO CONNECT TO BUSSBAR/GROUND HALO OR BARE TINNED SOLID COPPER CONDUCTOR TO CONNECT TO GROUND RING.





TRUNK FIBER NOTES:
1. IN GENERAL THIS CABLE WILL HANDLE SIMILARLY TO ⅞" COAXIAL CABLE, AND SIMILAR INSTALLATION TECHNIQUES APPLY. ALL CABLES ARE INDIVIDUALLY SERIALIZED, BE SURE TO WRITE DOWN THE CABLE SERIAL NUMBER FOR FUTURE REFERENCE.
2. THE TERMINATED FIBER ENDS (THE BROKEN OUT FIBERS PLUS CONNECTORS) HOWEVER ARE FRAGILE, AND THESE MUST BE PROTECTED DURING THE INSTALLATION PROCESS.
3. LEAVE THE PROTECTIVE TUBE AND SOCK AROUND THE FIBER TAILS AND CONNECTORS IN PLACE DURING HOISTING AND SECURING THE CABLE. REMOVE THIS ONLY JUST PRIOR TO MAKING THE FINAL CONNECTIONS TO THE OVP BOX.
4. DO NOT BEND THE FIBER ENDS (IN THE ORANGE FURCATION TUBES) TIGHTER THAN ¾" (19MM) BEND RADIUS, ELSE THERE IS A RISK OF BREAKING THE GLASS FIBERS.
5. BE SURE THAT THE LACE UP ENDS AND FIBER CONNECTORS ARE NOT DAMAGED BY ATTACHMENT OF A HOISTING GRIP OR DURING THE HOISTING PROCESS. ATTACH A HOISTING GRIP ON THE JACKETED CABLE NO LESS THAN 6 INCHES BELOW THE FIBER BREAKOUT POINT. IF A HOISTING GRIP IS NOT EASILY ATTACHED, USE A SIMPLE LINE ATTACHED BELOW THE FIBER BREAK-OUT POINT (I.E. AT THE CABLE OUTER JACKET). PREVENT THE FIBER TAILS (IN PROTECTIVE TUBE) AT THE CABLE END FROM UNDUE MOVEMENT DURING HOISTING BY SECURING THE PROTECTIVE TUBE (WITH OUTER SOCK) TO THE HOISTING LINE.
6. DURING HOISTING ENSURE THAT THERE IS A FREE PATH AND THAT THE CABLE, AND ESPECIALLY THE FIBER ENDS, WILL NOT BE SNAGGED ON TOWER MEMBERS OR OTHER OBSTACLES.
7. INSTALLATION TEMPERATURE RANGE IS -22F TO 158F (-30C TO +70C).
8. MINIMUM CABLE BEND RADII ARE 22.2" (565MM) LOADED (WITH TENSION ON THE CABLE) AND 11.1" (280MM) UNLOADED.
9. MAXIMUM CABLE TENSILE LOAD IS 3560 N (800 LB) SHORT TERM (DURING INSTALLATION) AND 1070 N (240 LB) LONG TERM.
10. COMMSCOPE NON LACE UP GRIP RECOMMENDED FOR MONOPOLE INSTALLATIONS.
11. MAXIMUM HANGER SPACING 3FT (0.9 M).

HYBRID FIBER/POWER JUMPER NOTES:
1. IN GENERAL THIS CABLE WILL HANDLE SIMILARLY TO A ⅜" COAXIAL CABLE.
2. THE TERMINATED FIBER ENDS HOWEVER ARE FRAGILE AND MUST BE PROTECTED DURING INSTALLATION. LEAVE THE PACKAGING AROUND THE FIBER ENDS IN PLACE UNTIL READY TO CONNECT THE JUMPER BETWEEN OVP AND RRU OR BBU.
3. DO NOT BEND THE FIBER BREAKOUT CABLE (BETWEEN THE MAIN CABLE AND THE FIBER CONNECTOR) TIGHTER THAN ¾" (19MM) RADIUS, ELSE THERE IS A RISK OF BREAKING THE GLASS.
4. ATTACH THE MAIN CABLE SECURELY TO THE STRUCTURE OR EQUIPMENT USING HANGERS AND/OR CABLE TIES TO PREVENT STRAIN ON CONNECTIONS FROM MOVEMENT IN WIND OR SNOW/ICE CONDITIONS.
5. ENSURE THE LC FIBER CONNECTORS ARE SEATED FIRMLY IN PANEL IN OVP OR IN EQUIPMENT.
6. INSTALLATION TEMPERATURE RANGE IS -22F TO 158F (-30C TO 70C).
7. MINIMUM CABLE BEND RADII ARE 10.3 INCH (265MM) LOADED (WITH TENSION ON THE CABLE) AND 5.2 INCH (130MM) UNLOADED.
8. MAXIMUM CABLE TENSILE LOAD IS 350 LB (1560N) SHORT TERM (DURING INSTALLATION) AND 105 LB (470N) LONG TERM.
9. STANDARD LENGTHS AVAILABLE ARE 6 FEET, 15 FEET AND 20 FEET

702CU CONFIGURATION
COAX/FIBER PLUMBING DIAGRAM

2
E-1

SCALE: N.T.S

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CONSTR.			
SITE AC.			

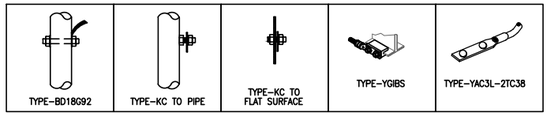
PROJECT NO:	CT11270C
DRAWN BY:	MS
CHECKED BY:	SM

STATE OF CONNECTICUT
HOSSEIN VAHEDI
NO. ARI. 11162
LICENSED ARCHITECT
PROFESSIONAL SEAL

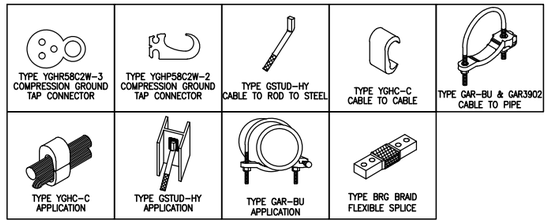
SITE NUMBER
CT11270C
SITE NAME
CL&P BRISTOL
SITE ADDRESS
2 WILLIS STREET
BRISTOL, CT 06010

SHEET TITLE
GROUNDING AND POWER DIAGRAMS

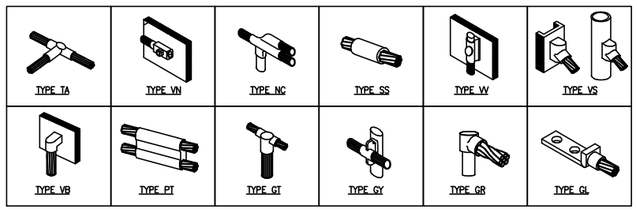
SHEET NUMBER
E-1



1 BURNDY GROUNDING DETAILS
E-3 SCALE: NTS



2 BURNDY GROUNDING PRODUCTS
E-3 SCALE: NTS

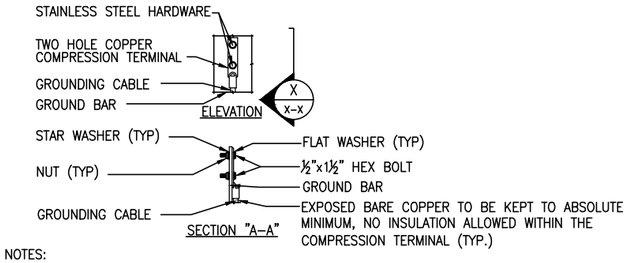


3 CADWELD GROUNDING CONNECTION PRODUCTS
E-3 SCALE: NTS

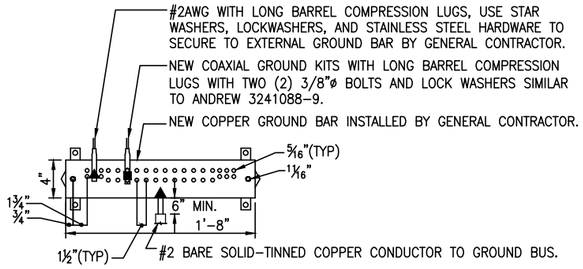
TERMINATION TYPES:
A. MECHANICAL COMPRESSION LUG
B. DOUBLE BARRELL COMPRESSION CONNECTOR
C. EXOTHERMIC TERMINATION
D. BEAM CLAMP

	SOLID #2 TINNED COPPER	#6 GROUND LEAD	#2/0 STRANDED MAIN DOWN CONDUCTOR	MASTER GRND BAR	STRUCTURAL OR TOWER STEEL	BLDG SERVICE ENTR OR GRND RING	GROUND ROD
SOLID #2 TINNED COPPER	B OR C	B OR C		C	A, C, OR D		C
#6 GROUND LEAD	B OR C			A	A, C, OR D		
#2/0 STRANDED GRNDG ELECTRODE CONDUCTOR				A	A, C, OR D	A	
MASTER GROUND BAR	C	A	A				
STRUCTURAL OR TOWER STEEL	A, C, OR D	A, C, OR D	A, C, OR D				
GROUND RING	C		C				C

7 GROUNDING TERMINATION MATRIX
E-3 SCALE: NTS

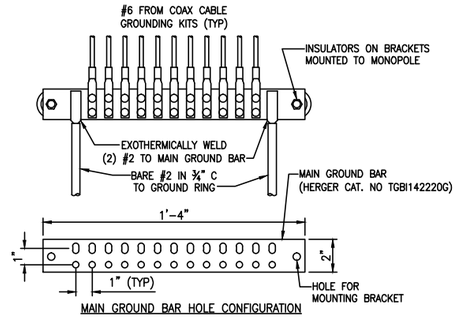


NOTES:
1. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

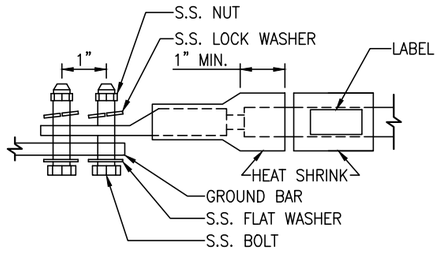


NOTES:
1. ALL HARDWARE STAINLESS STEEL COAT ALL SURFACES WITH KOPR-SHIELD BEFORE MATING.
2. FOR GROUND BOND TO STEEL ONLY: INSERT A TOOTH WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH KOPR-SHIELD.
3. ALL HOLES ARE COUNTERSUNK 1/16".

4 TYPICAL GROUND BAR CONNECTIONS DETAIL
E-3 SCALE: NTS



5 GROUND BAR DETAIL
E-3 SCALE: NTS



LUG NOTES:
1. ALL HARDWARE IS 18-8 STAINLESS STEEL, INCLUDING LOCK WASHERS.
2. ALL HARDWARE SHALL BE S.S. ⅜"ø OR LARGER.
3. FOR GROUND BOND TO STEEL ONLY: INSERT A DRAGON TOOTH WASHER BETWEEN LUG AND STEEL. COAT ALL SURFACES WITH ANTI-OXIDIZATION COMPOUND PRIOR TO MATING.

6 GROUND BAR DETAILS
E-3 SCALE: NTS

T-MOBILE NORTHEAST, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX:(860) 692-7159

ATLANTIS GROUP
1340 Centre Street, Suite 212
Newton Center, MA 02459
Office: 617-965-0789
Fax: 617-213-5056

SUBMITTALS

DATE	DESCRIPTION	REVISION
08/13/15	ISSUED FOR REVIEW	A
09/25/15	FINAL CD	0

DEPT.	DATE	APP'D	REVISIONS
RFE.			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO:	CT11270C
DRAWN BY:	MS
CHECKED BY:	SM

STATE OF CONNECTICUT · HOSSEIN VAHEDI · No. ARI.11162 · LICENSED ARCHITECT

PROFESSIONAL SEAL

SITE NUMBER
CT11270C
SITE NAME
CL&P BRISTOL
SITE ADDRESS
2 WILLIS STREET
BRISTOL, CT 06010

SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER
E-2

Exhibit B

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

130-ft Existing ROHN Lattice Tower

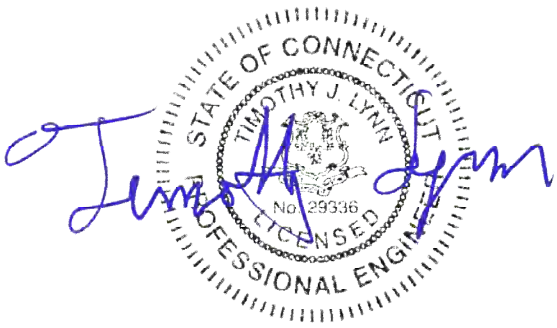
Proposed T-Mobile
Antenna Upgrade

T-Mobile Site Ref: CT11270C

2 Willis Street
Bristol, CT

CENTEK Project No. 15019.007

Date: September 2, 2015



Prepared for:
T-Mobile Towers
4 Sylvan Way
Parsippany, NJ 07054

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by T-Mobile on the existing Eversource lattice tower located in Bristol, Connecticut.

The host tower is a 130-ft three legged, tapered steel lattice tower originally designed and manufactured by ROHN file no: 060-3415 dated January 11, 2007. The tower geometry, structure member sizes and foundation system information were taken from the aforementioned ROHN design documents.

Antenna and appurtenance inventory were obtained from a previous structural analysis report prepared by Centek Engineering job no. 13103.000 dated September 16, 2013.

The existing tower consists of seven (7) tapered steel pipe leg sections conforming to ASTM A572-50. Diagonal lateral support bracing consists of steel pipe sections conforming to ASTM A572-50. The vertical tower sections are connected by bolted flange plates while the pipe legs and bracing are connected by bolted and welded gusset connections. The tower face width is 8.50-ft at the top and 22.54-ft at the bottom.

T-Mobile proposes the installation of three (3) panel antennas and three (3) remote radio heads mounted on three (3) boom gates. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

The existing and proposed loads considered in the analysis consist of the following:

- EXISTING:
  Antennas: One (1) Lightning rod leg mounted to the top of the existing tower with a base elevation of 130-ft above the existing tower base plate
- NEU (Existing):
  Antennas: Two (2) RFS PD458-1 Omni antennas, three (3) RFS PD220, one (1) DB806D-Y, (1) 12-ft x 3in. ∅ Omni antenna, one (1) 21-ft x3in. ∅ Omni antenna and one (1) Sinclair SC229-SFXSN Omni antenna pipe mounted with a base elevation of 130-ft above the existing tower base.
  Coax Cables: Ten (10) 7/8" ∅ coax cables
- NEU (Existing):
  Antennas: One (1) Dish mount assembly, one (1) 6ft-8in. x 4in. pipe mount and one (1) 6-ft ∅ Microwave Dish with a RAD center elevation of 117-ft above the existing tower base.
  Coax Cables: One (1) E60 Elliptical coax cable.
- NEU (Existing):
  Antennas: Two (2) Celwave 1142-2B Omni antennas on two (2) 4-ft side arms with base elevations of 115-ft and 113-ft above the existing tower base plate
  Coax Cables: One (1) 1/2" ∅ and one (1) 7/8" ∅ coax cables.

- NEU (Existing):
  Antennas: One (1) Dish mount assembly, one (1) 6ft-8in. x 4in. pipe mount and one (1) 6-ft ∅ Microwave Dish with RAD center elevation of 107-ft above the existing tower base plate
  Coax Cables: One (1) E65 elliptical ∅ coax cable.
- CSP TROOP H (Existing):
  Antennas: Two (2) Kathrein AP11-850/105N panel antennas on one (1) 4-ft side arm with RAD center elevations of 105-ft and 104-ft above the existing tower base plate
  Coax Cables: Two (2) 7/8" ∅ coax cables.
- NEU (Reserved):
  Antennas: One (1) Dish mount assembly, one (1) 6ft-8in. x 4in. pipe mount and one (1) 6-ft ∅ Microwave Dish with RAD center elevation of 99-ft above the existing tower base plate
  Coax Cables: One (1) E65 elliptical ∅ coax cable.
- NEU (Existing):
  Antennas: One (1) Andrew/Decibel DB205-A Dipole antenna on (1) 4-ft side arm with a RAD center elevation of 98-ft above the existing tower base.
  Coax Cables: One (1) 7/8" ∅ coax cable.
- NEU (Existing):
  Antennas: One (1) Dish mount assembly, one (1) 6ft-8in. x 4in. pipe mount and one (1) 8-ft ∅ Microwave Dish with a RAD center elevation of 96-ft above the existing tower base plate
  Coax Cables: One (1) E60 elliptical ∅ coax cable.
- NEU (Existing):
  Antennas: One (1) Dish mount assembly, one (1) 6ft-8in. x 4in. pipe mount and one (1) 8-ft ∅ Microwave Dish with a RAD center elevation of 86-ft above the existing tower base plate
  Coax Cables: One (1) E60 elliptical ∅ coax cable.
- NEU (Existing):
  Antennas: One (1) Celwave 1142-2B Omni antenna mounted on (1) 4-ft side arm with a base elevation of 84-ft above the existing tower base plate.
  Coax Cables: One (1) 1/2" ∅ coax cable.
- NEU (Existing):
  Antennas: One (1) 2-ft YAGI antenna pipe mounted with a RAD center elevation of 84-ft above the existing tower base plate.
  Coax Cables: One (1) 7/8" ∅ coax cable.

- CT Transit Authority (Existing):
  Antennas: Three (3) 20-ft x 3in. ∅ Omni antennas [(1)] (one TX upright, two RX inverted) and one (1) Tower Top Amplifier (TTA) mounted to Leg A on (1) 10-ft T-Arm (Valmont P/N EUSF-10-24) with an elevation of 75-ft above the existing tower base.
  Antennas: Three (3) 20-ft x 3in. ∅ Omni antennas [(1)] (one TX upright, two RX inverted) and one (1) Tower Top Amplifier (TTA) mounted to Leg B on (1) 10-ft T-Arm (Valmont P/N EUSF-10-24) with an elevation of 70-ft above the existing tower base.
  Coax Cables: Six (6) 1-5/8" ∅ and two (2) 1/2" ∅ coax cables routed within a waveguide ladder to be located on Tower Face B, adjacent to Leg B. Refer to feed-line plan within Section 3 of this report for location.
- NEU (Existing):
  Antennas: One (1) Dish mount assembly, one (1) 5ft-8in. x 4in. pipe mount and one (1) 4-ft ∅ Microwave Dish with a RAD center elevation of 71-ft above the existing tower base plate
  Coax Cables: One (1) E65 elliptical ∅ coax cable.
- NEU (Existing):
  Antennas: (1) Diamond X-500A Omni antenna mounted on one (1) 4-ft side arm with a base elevation of 65-ft above the existing tower base.
  Coax Cables: None/Disconnected.
- NEU (Existing):
  Antennas: One (1) Andrew/Decibel DB212-1 Dipole antenna mounted on one (1) 3-ft side arm with a RAD center elevation of 58-ft above the existing tower base.
  Coax Cables: One (1) 1/2" ∅ coax cable.
- NEU (Existing):
  Antennas: One (1) Andrew/Decibel DB212-1 Dipole antenna mounted on one (1) 4-ft side arm with a RAD center elevation of 54-ft above the existing tower base.
  Coax Cables: One (1) 1/2" ∅ coax cable.
- NEU (Existing):
  Antennas: One (1) DB230-2B Yagi antenna mounted on one (1) 4-ft side arm with a RAD center elevation of 46-ft above the existing tower base.
  Coax Cables: One (1) 1/2" ∅ coax cable.
- NEU (Existing):
  Antennas: One (1) DB222-C 2-Bay Dipole antenna mounted on one (1) 4-ft side arm with a base elevation of 43-ft above the existing tower base.
  Coax Cables: One (1) 1/2" ∅ coax cable.
- NEU (Existing):
  Antennas: One (1) set of Wind Speed cups mounted to the tower leg with a RAD center elevation of 42-ft above the existing tower base.
  Coax Cables: N/A

- T-MOBILE (Existing to Remain):
  Antennas: Six (6) Ericsson AIR21 panel antennas and three (3) TMA's mounted on (3) existing 10-ft ROHN boom gates with a RAD center elevation of 125-ft above the existing tower base.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables and one (1) 1-5/8" ∅ fiber cable running on a face of the tower on a cable ladder as specified in Section 3 of this report.
- T-MOBILE (Existing to Remove):
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on a face of the tower on a cable ladder as specified in Section 3 of this report.
- **T-MOBILE (Proposed):**
  Antennas: Three (3) Andrew LNX-6515DS panel antennas and three (3) Ericsson RRUS-11 remote radio heads mounted on (3) existing 10-ft ROHN boom gates with a RAD center elevation of 125-ft above the existing tower base.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower legs, and the model assumes that the leg members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for 85mph basic wind speed (fastest mile) with no ice and 85mph with ½ inch accumulative ice to determine stresses in members as per guidelines of Northeast Utilities Substation Standard (NU SUB-090), TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice tower structure and its components.

Basic Wind Speed:	Hartford; v = 80 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	NU SUB-090; v = 85 mph (fastest mile)	*[Northeast Utilities Substation Standard 090]*
	Bristol; v = 95 mph (3 second gust) equivalent to v = 77.5 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	NU–SUB-090 wind speed controls	
Load Cases:	Load Case 1; 85 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation. This load case typically controls the design.	*[Northeast Utilities Substation Standard 090]*
	Load Case 2; 85 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. This load case typically controls the design of lattice towers.	*[Northeast Utilities Substation Standard 090]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

The tower deflection was evaluated with a wind velocity of 85 mph concurrent with 0.5" ice to determine twist (rotation) and sway (deflection) in accordance with NU SUB-90 requirements.

- Calculated stresses were found to be within allowable limits. In Load Case 2, per tnxTower "Section Capacity Table", this tower was found to be at **84.5%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T6)	20'-0"-40'-0"	80.5%	**PASS**
Diagonal (T4)	60'-0"-80'-0"	84.5%	**PASS**
Horizontal (T5)	40'-0"-60'-0"	62.1%	**PASS**

- The tower combined deflection is **0.4632 degrees**.

Deflection Criteria	Proposed (degrees)	Allowable (degrees)	Result
Sway (Tilt)	0.4484	0.5	**n/a**
Twist	0.1164	0.5	**n/a**
Combined	0.4632	0.5	**PASS**

Foundation and Anchors

The existing foundation system consists of one (1) 31-ft square x 4-ft thick reinforced concrete pad bearing on the existing sub grade. The existing foundation geometry and sub-grade properties were obtained from the aforementioned ROHN design documents. The tower legs are connected to the foundation with (8) 1.00"∅, ASTM F1554-105 (Fu = 125ksi) anchor bolts per leg.

- The tower reactions developed from the governing Load Case 2 were used in the verification of the foundation and anchor bolts:

Load Effect	Proposed Tower Reactions
Leg Shear	30 kips
Leg Compression	220 kips
Leg Tension	177 kips
Base Moment	3978 ft-kips
Base Shear	51 kips

- The anchor bolts were found to be within allowable limits.

Tower Section	Component	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Combined Tension and Shear	47.8%	**PASS**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	IBC 2003/2005 CT State Building Code Section 3108.4.2 (FS)[4]	Proposed Loading (FS)[3]	Result
Reinforced Concrete Pad	Overturning	2.00	2.25	**PASS**

Note 3: FS denotes Factor of Safety

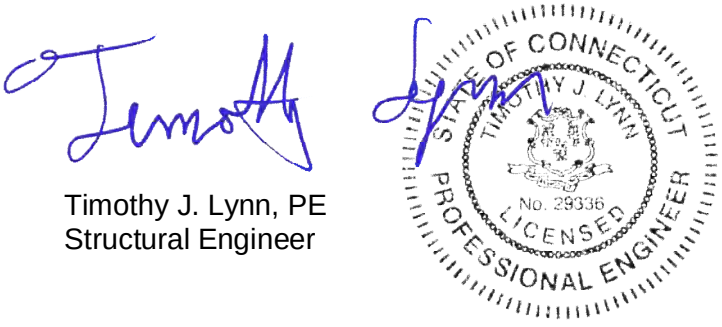
Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

The analysis is based, in part, on the information provided to this office by T-Mobile. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

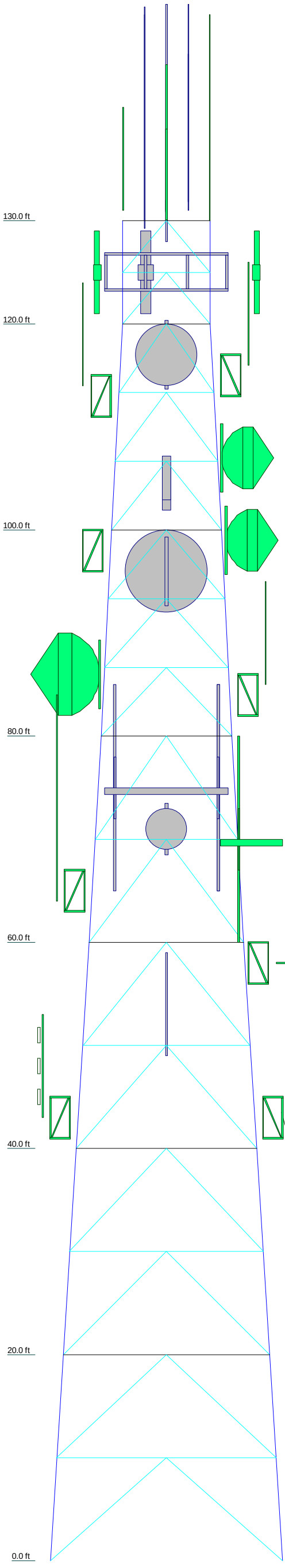
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly RISA Tower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

Section	T1	T2	T3	T4	T5	T6	T7
Legs	ROHN 2.5 STD	ROHN 3 STD	ROHN 4 STD	ROHN 5 STD	ROHN 5 EH	ROHN 6 EHS	ROHN 6 EH
Leg Grade	A572-50						
Diagonals	ROHN 2.5 STD			ROHN 2.5 X-STR		ROHN 3 STD	
Diagonal Grade	A572-50						
Top Girts	ROHN 1.5 STD		ROHN 2 STD		ROHN 2.5 STD		
Horizontals	ROHN 1.5 STD		ROHN 2 STD		ROHN 2.5 STD		
Inner Bracing	L2x2x1/8				L2 1/2x2 1/2x3/16	L3x3x3/16	L3 1/2x3 1/2x1/4
Face Width (ft)	8.5	8.54167	10.625	12.7083	14.9583	17.5417	20.0417
# Panels @ (ft)	2 @ 5	6 @ 6.66667	8 @ 10				
Weight (K)	0.6	1.7	2.0	2.4	2.9	3.5	4.1



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
DB806D-Y (NEU)	132	6 FT DISH	99
PD220 (NEU)	131	ROHN 4-ft Side Arm (NEU)	98
PD458-1 (NEU)	131	DB205-A (NEU)	98
PD220 (NEU)	131	6'8"x4" Pipe Mount (NEU)	96
PD220 (NEU)	130	8 FT DISH	96
12' x 3" Dia Omni (NEU)	130	Dish Mount Assy (NEU)	96
PD458-1 (NEU)	130	PAD8-59AW	86
Lightning Rod	130	6'8"x4" Pipe Mount (NEU)	86
SRL-229 (NEU)	130	Dish Mount Assy (NEU)	86
21' x 3" Dia Omni (NEU)	130	2' Yagi (NEU)	84
LNX-6515DS (T-Mobile - Proposed)	125	1142-2B (NEU)	84
LNX-6515DS (T-Mobile - Proposed)	125	ROHN 4-ft Side Arm (NEU)	84
LNX-6515DS (T-Mobile - Proposed)	125	Valmont T-Arm (1) (CT - Transit)	75
RRUS-11 (T-Mobile - Proposed)	125	TTA 12"x6"x4" (CT - Transit)	75
RRUS-11 (T-Mobile - Proposed)	125	20' x 3" Dia Omni (CT - Transit)	75
RRUS-11 (T-Mobile - Proposed)	125	20' x 3" Dia Omni (CT - Transit)	75
AIR21 (T-Mobile - Existing)	125	20' x 3" Dia Omni (CT - Transit)	75
AIR21 (T-Mobile - Existing)	125	6'x2" Pipe Mount (CT - Transit)	75
AIR21 (T-Mobile - Existing)	125	6'x2" Pipe Mount (CT - Transit)	75
AIR21 (T-Mobile - Existing)	125	4 FT DISH	71
AIR21 (T-Mobile - Existing)	125	Dish Mount Assy (NEU)	71
AIR21 (T-Mobile - Existing)	125	5'0"x4.5" Pipe Mount (NEU)	71
TMA 10"x8"x3" (T-Mobile - Existing)	125	20' x 3" Dia Omni (CT - Transit)	70
TMA 10"x8"x3" (T-Mobile - Existing)	125	20' x 3" Dia Omni (CT - Transit)	70
TMA 10"x8"x3" (T-Mobile - Existing)	125	20' x 3" Dia Omni (CT - Transit)	70
Rohn 6'x10' Boom Gate (3) (T-Mobile - Existing)	125	6'x2" Pipe Mount (CT - Transit)	70
6'8"x4" Pipe Mount (NEU)	117	6'x2" Pipe Mount (CT - Transit)	70
Dish Mount Assy (NEU)	117	TTA 12"x6"x4" (CT - Transit)	70
PA6-59	117	Valmont T-Arm (1) (CT - Transit)	70
1142-2B (NEU)	115	Diamond X-500A (NEU)	65
ROHN 4-ft Side Arm (NEU)	115	ROHN 4-ft Side Arm (NEU)	65
ROHN 4-ft Side Arm (NEU)	113	DB212-1 (NEU)	58
1142-2B (NEU)	113	3' Side arm (NEU)	58
6'8"x4" Pipe Mount (NEU)	107	DB212-1 (NEU)	54
Dish Mount Assy (NEU)	107	ROHN 4-ft Side Arm (NEU)	54
6 FT DISH	107	DB230-2B (NEU)	46
AP11-850/105N (CSP - Troop H)	105	DB222-C (NEU)	43
ROHN 4-ft Side Arm (NEU)	104	ROHN 4-ft Side Arm (NEU)	43
AP11-850/105N (CSP - Troop H)	104	ROHN 4-ft Side Arm (NEU)	43
6'8"x4" Pipe Mount (NEU)	99	Wind speed cups	42
Dish Mount Assy (NEU)	99		

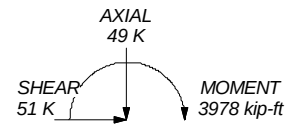
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi			

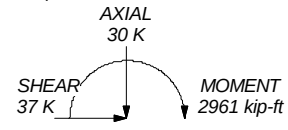
TOWER DESIGN NOTES

1. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 85 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 85 mph wind.
4. Weld together tower sections have flange connections.
5. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
6. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
7. Welds are fabricated with ER-70S-6 electrodes.
8. TOWER RATING: 84.5%

MAX. CORNER REACTIONS AT BASE:
DOWN: 220 K
UPLIFT: -177 K
SHEAR: 30 K



TORQUE 38 kip-ft
85 mph WIND - 0.5000 in ICE



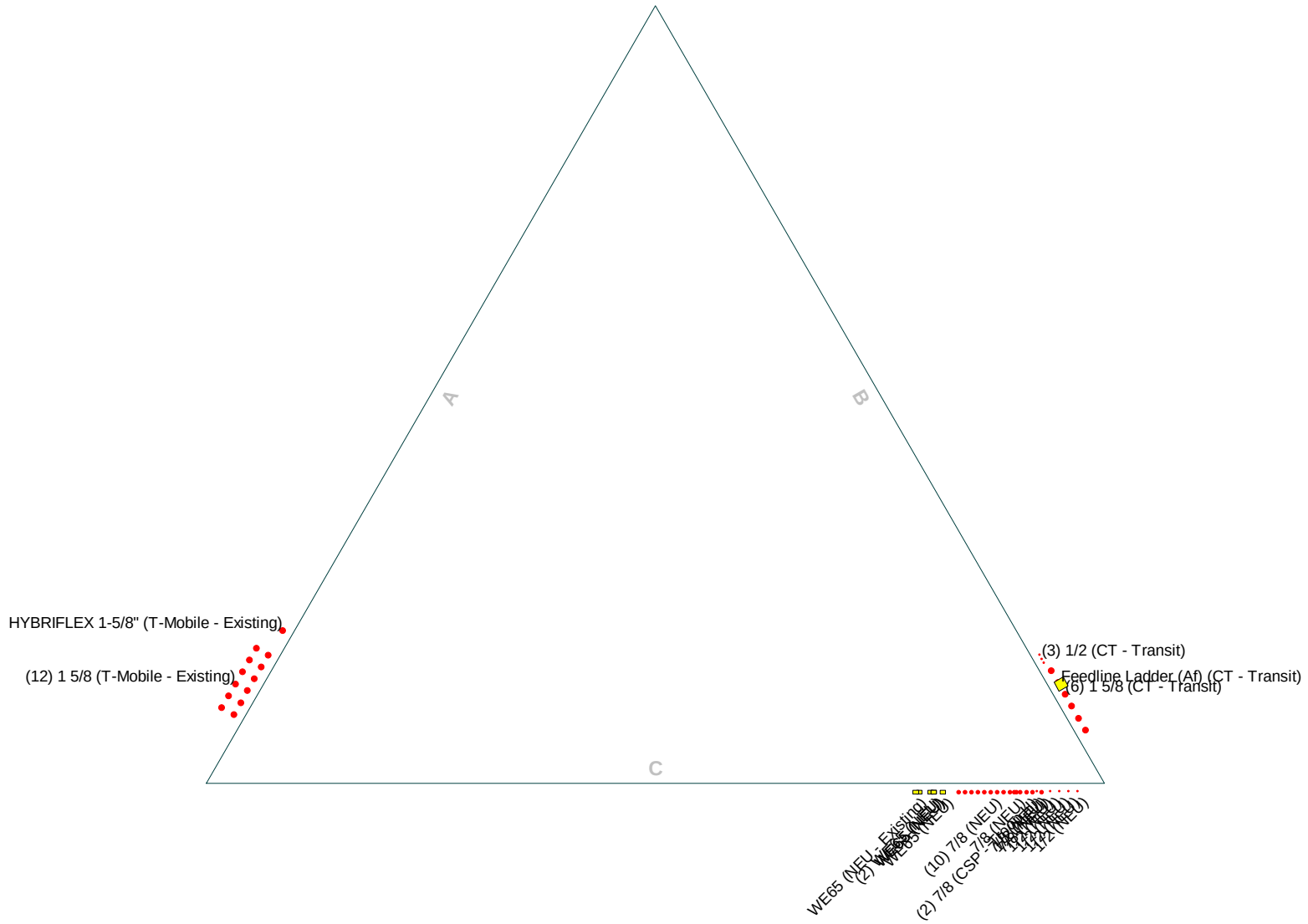
TORQUE 25 kip-ft
REACTIONS - 85 mph WIND

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job:	***15019.007 - CT11270C***		
Project:	***130-ft ROHN SSMW Tower, Willis Street, Bristol, CT***		
Client: T-Mobile	Drawn by: TJL	App'd:	
Code: TIA/EIA-222-F	Date: 09/02/15	Scale: NTS	
Path: J:\Jobs\1501900.WI\007 - CT11270C\Backup Documentation\ERI Files\130-ft ROHN SSMW Lattice Bristol.eri		Dwg No. E-1	

Feedline Plan

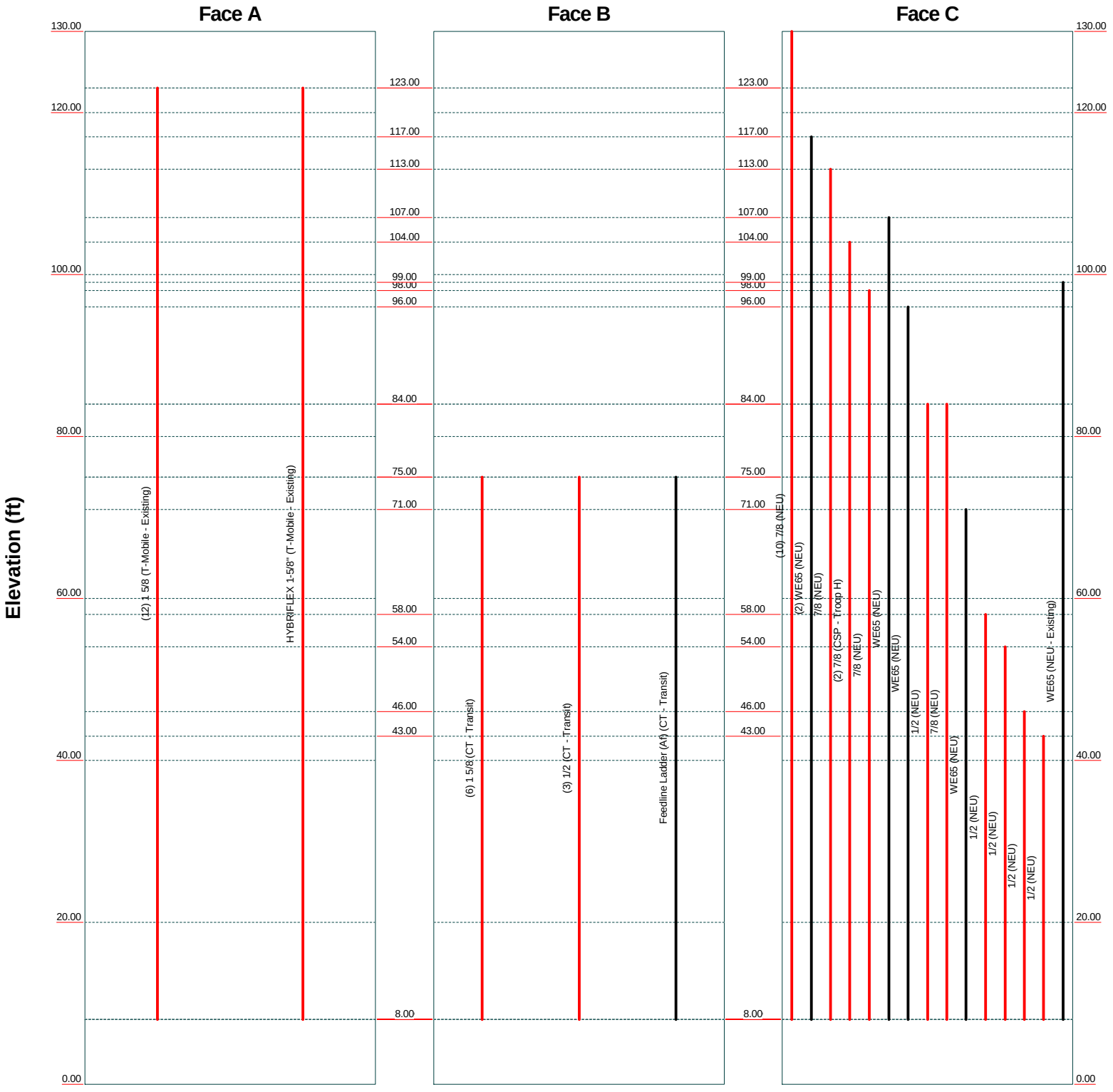
Round Flat App In Face App Out Face



Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: ***15019.007 - CT11270C***		
	Project: ***130-ft ROHN SSMW Tower, Willis Street, Bristol, CT***		
	Client: T-Mobile	Drawn by: TJL	App'd:
	Code: TIA/EIA-222-F	Date: 09/02/15	Scale: NTS
	Path: J:\Jobs\15001-15500\15019.007 - CT11270C\Backup Documentation\ERI Files\130-ft ROHN SSMW Lattice Bristol.eri		Dwg No. E-7

Feedline Distribution Chart
0' - 130'

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



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Job: **15019.007 - CT11270C**		
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Code: TIA/EIA-222-F	Date: 09/02/15	Scale: NTS
Path: J:\Jobs\15001-15500\15007 - CT11270C\Backup Documentation\ER Files\130-ft ROHN SSMW Lattice Bristol.eri		Dwg No. E-7

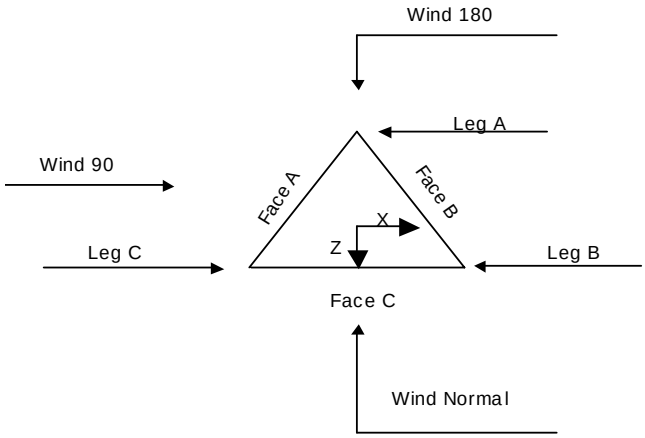
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 130.00 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 8.50 ft at the top and 22.54 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 85 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 85 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 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	√ Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
Use Code Safety Factors - Guys	Retension Guys To Initial Tension	√ All Leg Panels Have Same Allowable
Escalate Ice	Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
√ Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Poles
Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	130.00-120.00			8.50	1	10.00
T2	120.00-100.00			8.54	1	20.00
T3	100.00-80.00			10.63	1	20.00
T4	80.00-60.00			12.71	1	20.00
T5	60.00-40.00			14.96	1	20.00
T6	40.00-20.00			17.54	1	20.00
T7	20.00-0.00			20.04	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	130.00-120.00	5.00	K Brace Down	No	Yes	0.0000	0.0000
T2	120.00-100.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T3	100.00-80.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T4	80.00-60.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T5	60.00-40.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T6	40.00-20.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T7	20.00-0.00	10.00	K Brace Down	No	Yes	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 130.00-120.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T2 120.00-100.00	Pipe	ROHN 3 STD	A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T3 100.00-80.00	Pipe	ROHN 4 STD	A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T4 80.00-60.00	Pipe	ROHN 5 STD	A572-50 (50 ksi)	Pipe	ROHN 2.5 X-STR	A572-50 (50 ksi)
T5 60.00-40.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T6 40.00-20.00	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T7 20.00-0.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 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 130.00-120.00	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)
T2 120.00-100.00	Pipe	ROHN 2 STD	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)
T3 100.00-80.00	Pipe	ROHN 2 STD	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)
T4 80.00-60.00	Pipe	ROHN 2 STD	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)
T5 60.00-40.00	Pipe	ROHN 2 STD	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)
T6 40.00-20.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)
T7 20.00-0.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 130.00-120.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T2 120.00-100.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T3 100.00-80.00	None	Flat Bar		A36	Pipe	ROHN 2 STD	A572-50

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T4 80.00-60.00	None	Flat Bar		(36 ksi) A36 (36 ksi)	Pipe	ROHN 2 STD	(50 ksi) A572-50 (50 ksi)
T5 60.00-40.00	None	Flat Bar		(36 ksi) A36 (36 ksi)	Pipe	ROHN 2 STD	(50 ksi) A572-50 (50 ksi)
T6 40.00-20.00	None	Flat Bar		(36 ksi) A36 (36 ksi)	Pipe	ROHN 2.5 STD	(50 ksi) A572-50 (50 ksi)
T7 20.00-0.00	None	Flat Bar		(36 ksi) A36 (36 ksi)	Pipe	ROHN 2.5 STD	(50 ksi) A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T1 130.00-120.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T2 120.00-100.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T3 100.00-80.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T4 80.00-60.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T5 60.00-40.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 40.00-20.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T7 20.00-0.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	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
T1 130.00-120.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T2 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T3 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T4 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T5 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T6 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T7 20.00-0.00	0.00	0.0000	A36	1.02	1	1	36.0000	36.0000

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft^2	in					in	in
			(36 ksi)					

Tower Section Geometry *(cont'd)*

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Single Diags X	K Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
ft															
T1	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
130.00-120.00				1	1	1	1	1	1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1	1	1	1	1	1
T7 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	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)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 130.00-120.00	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 120.00-100.00	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
T3 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
T4 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
T5 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
T6 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
T7 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 130.00-120.00	Flange	0.7500 A325N	4	0.6250 A325N	3	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T2 120.00-100.00	Flange	0.8750 A325N	4	0.6250 A325N	3	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T3 100.00-80.00	Flange	1.0000 A325N	4	0.6250 A325N	3	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T4 80.00-60.00	Flange	1.0000 A325N	4	0.6250 A325N	3	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T5 60.00-40.00	Flange	1.0000 A325N	6	0.6250 A325N	3	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T6 40.00-20.00	Flange	1.0000 A325N	6	0.6250 A325N	3	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T7 20.00-0.00	Flange	1.0000 F1554-105	8	0.6250 A325N	3	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 (T-Mobile - Existing)	A	Yes	Ar (CfAe)	123.00 - 8.00	2.0000	-0.38	12	6	1.9800	1.9800		1.04
7/8 (NEU)	C	Yes	Ar (CfAe)	130.00 - 8.00	2.0000	-0.37	10	10	0.7500 1.0000	1.1100		0.54
WE65 (NEU)	C	Yes	Af (CfAe)	117.00 - 8.00	2.0000	-0.3	2	2	1.5836	1.5836	5.1284	0.53
7/8 (NEU)	C	Yes	Ar (CfAe)	113.00 - 8.00	2.0000	-0.4	1	1	0.7500 1.0000	1.1100		0.54
7/8 (CSP - Troop H)	C	Yes	Ar (CfAe)	104.00 - 8.00	2.0000	-0.41	2	2	0.7500 1.0000	1.1100		0.54
7/8 (NEU)	C	Yes	Ar (CfAe)	98.00 - 8.00	2.0000	-0.42	1	1	0.7500 1.0000	1.1100		0.54
WE65 (NEU)	C	Yes	Af (CfAe)	107.00 - 8.00	2.0000	-0.32	1	1	0.7500 1.0000	1.5836	5.1284	0.53
WE65 (NEU)	C	Yes	Af (CfAe)	96.00 - 8.00	2.0000	-0.31	1	1	0.7500 1.0000	1.5836	5.1284	0.53
1/2 (NEU)	C	Yes	Ar (CfAe)	84.00 - 8.00	2.0000	-0.425	1	1	0.7500 1.0000	0.5800		0.25
7/8 (NEU)	C	Yes	Ar (CfAe)	84.00 - 8.00	2.0000	-0.43	1	1	1.1100	1.1100		0.54
WE65 (NEU)	C	Yes	Af (CfAe)	71.00 - 8.00	2.0000	-0.31	1	1	0.7500 1.0000	1.5836	5.1284	0.53
1/2 (NEU)	C	Yes	Ar (CfAe)	58.00 - 8.00	2.0000	-0.44	1	1	0.7500 1.0000	0.5800		0.25
1/2 (NEU)	C	Yes	Ar (CfAe)	54.00 - 8.00	2.0000	-0.47	1	1	0.5800	0.5800		0.25
1/2 (NEU)	C	Yes	Ar (CfAe)	46.00 - 8.00	2.0000	-0.46	1	1	0.5800	0.5800		0.25
1/2	C	Yes	Ar (CfAe)	43.00 - 8.00	2.0000	-0.45	1	1	0.5800	0.5800		0.25

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
(NEU) 1 5/8 (CT - Transit)	B	Yes	Ar (CfAe)	75.00 - 8.00	2.0000	0.4	6	6	1.9800	1.9800		1.04
1/2 (CT - Transit)	B	Yes	Ar (CfAe)	75.00 - 8.00	2.0000	0.345	3	3	0.7500 1.0000	0.5800		0.25
Feedline Ladder (Af) (CT - Transit)	B	No	Af (CfAe)	75.00 - 8.00	2.0000	0.38	1	1	3.0000	3.0000	12.0000	8.40
HYBRIFLEX 1-5/8" (T-Mobile - Existing)	A	Yes	Ar (CfAe)	123.00 - 8.00	2.0000	-0.31	1	1	1.0000	1.9800		1.90
WE65 (NEU - Existing)	C	Yes	Af (CfAe)	99.00 - 8.00	2.0000	-0.29	1	1	0.7500 1.0000	1.5836	5.1284	0.53

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
T1	130.00-120.00	A	3.465	0.000	0.000	0.000	0.04
		B	0.000	0.000	0.000	0.000	0.00
		C	9.250	0.000	0.000	0.000	0.05
T2	120.00-100.00	A	23.100	0.000	0.000	0.000	0.29
		B	0.000	0.000	0.000	0.000	0.00
		C	20.442	5.411	0.000	0.000	0.14
T3	100.00-80.00	A	23.100	0.000	0.000	0.000	0.29
		B	0.000	0.000	0.000	0.000	0.00
		C	26.278	12.537	0.000	0.000	0.20
T4	80.00-60.00	A	23.100	0.000	0.000	0.000	0.29
		B	17.025	3.750	0.000	0.000	0.23
		C	28.717	14.648	0.000	0.000	0.23
T5	60.00-40.00	A	23.100	0.000	0.000	0.000	0.29
		B	22.700	5.000	0.000	0.000	0.31
		C	30.698	15.836	0.000	0.000	0.24
T6	40.00-20.00	A	23.100	0.000	0.000	0.000	0.29
		B	22.700	5.000	0.000	0.000	0.31
		C	32.583	15.836	0.000	0.000	0.25
T7	20.00-0.00	A	13.860	0.000	0.000	0.000	0.17
		B	13.620	3.000	0.000	0.000	0.18
		C	19.550	9.501	0.000	0.000	0.15

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	130.00-120.00	A	0.500	5.215	0.000	0.000	0.000	0.10
		B		0.000	0.000	0.000	0.000	0.00
		C		1.758	13.950	0.000	0.000	0.17
T2	120.00-100.00	A	0.500	34.767	0.000	0.000	0.000	0.68
		B		0.000	0.000	0.000	0.000	0.00
		C		6.506	36.208	0.000	0.000	0.45

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
T3	100.00-80.00	A	0.500	34.767	0.000	0.000	0.000	0.68
		B		0.000	0.000	0.000	0.000	0.00
		C		14.945	48.814	0.000	0.000	0.65
T4	80.00-60.00	A	0.500	34.767	0.000	0.000	0.000	0.68
		B		24.325	7.908	0.000	0.000	0.44
		C		20.217	51.815	0.000	0.000	0.72
T5	60.00-40.00	A	0.500	34.767	0.000	0.000	0.000	0.68
		B		32.433	10.544	0.000	0.000	0.59
		C		25.615	53.502	0.000	0.000	0.77
T6	40.00-20.00	A	0.500	34.767	0.000	0.000	0.000	0.68
		B		32.433	10.544	0.000	0.000	0.59
		C		30.750	53.502	0.000	0.000	0.81
T7	20.00-0.00	A	0.500	20.860	0.000	0.000	0.000	0.41
		B		19.460	6.327	0.000	0.000	0.35
		C		18.450	32.101	0.000	0.000	0.49

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	130.00-120.00	A	0.321	0.704	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.857	2.121	0.000	0.000
T2	120.00-100.00	A	2.078	4.291	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	2.326	5.413	0.000	0.000
T3	100.00-80.00	A	1.927	3.985	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	3.239	7.612	0.000	0.000
T4	80.00-60.00	A	1.405	2.901	0.000	0.000
		B	1.036	2.307	0.000	0.000
		C	2.638	6.267	0.000	0.000
T5	60.00-40.00	A	1.502	2.999	0.000	0.000
		B	1.476	3.180	0.000	0.000
		C	3.025	7.112	0.000	0.000
T6	40.00-20.00	A	1.521	2.995	0.000	0.000
		B	1.495	3.176	0.000	0.000
		C	3.188	7.545	0.000	0.000
T7	20.00-0.00	A	0.879	1.733	0.000	0.000
		B	0.864	1.838	0.000	0.000
		C	1.843	4.365	0.000	0.000

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	130.00-120.00	3.3650	6.5083	3.2135	6.3383
T2	120.00-100.00	-1.2082	9.3931	-1.4838	9.5221
T3	100.00-80.00	2.5622	12.6136	2.1092	12.7184
T4	80.00-60.00	12.3322	17.3823	12.5240	17.9936

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T5	60.00-40.00	16.6701	20.0495	17.6465	21.2000
T6	40.00-20.00	18.1641	21.4007	20.1307	23.3478
T7	20.00-0.00	13.9064	16.3732	15.9117	18.4352

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	A	From Leg	0.00 0.00 0.00	2.0000	130.00	No Ice 1/2" Ice	1.00 2.02	1.00 2.02	0.04 0.05
PD220 (NEU)	A	From Leg	0.00 0.00 10.00	0.0000	131.00	No Ice 1/2" Ice	3.08 5.30	3.08 5.30	0.02 0.05
PD458-1 (NEU)	B	From Face	0.00 0.00 8.00	0.0000	131.00	No Ice 1/2" Ice	2.88 4.34	2.88 4.34	0.02 0.05
PD220 (NEU)	B	From Face	0.00 0.00 10.00	0.0000	131.00	No Ice 1/2" Ice	3.08 5.30	3.08 5.30	0.02 0.05
PD220 (NEU)	B	From Leg	0.00 0.00 10.00	0.0000	130.00	No Ice 1/2" Ice	3.08 5.30	3.08 5.30	0.02 0.05
12' x 3" Dia Omni (NEU)	C	From Leg	0.00 0.00 6.00	0.0000	130.00	No Ice 1/2" Ice	3.60 4.83	3.60 4.83	0.04 0.06
PD458-1 (NEU)	C	From Face	0.00 0.00 8.00	0.0000	130.00	No Ice 1/2" Ice	2.88 4.34	2.88 4.34	0.02 0.05
DB806D-Y (NEU)	C	From Face	0.00 0.00 2.50	0.0000	132.00	No Ice 1/2" Ice	2.21 3.12	2.21 3.12	0.03 0.04
SRL-229 (NEU)	A	From Face	0.00 0.00 10.00	0.0000	130.00	No Ice 1/2" Ice	6.45 8.63	6.45 8.63	0.03 0.07
21' x 3" Dia Omni (NEU)	A	From Face	0.00 0.00 10.00	0.0000	130.00	No Ice 1/2" Ice	6.30 8.43	6.30 8.43	0.05 0.10
LNX-6515DS (T-Mobile - Proposed)	A	From Leg	4.00 -2.00 0.00	0.0000	125.00	No Ice 1/2" Ice	11.45 12.06	7.70 8.29	0.06 0.12
LNX-6515DS (T-Mobile - Proposed)	B	From Leg	4.00 -2.00 0.00	0.0000	125.00	No Ice 1/2" Ice	11.45 12.06	7.70 8.29	0.06 0.12
LNX-6515DS (T-Mobile - Proposed)	C	From Leg	4.00 -2.00 0.00	0.0000	125.00	No Ice 1/2" Ice	11.45 12.06	7.70 8.29	0.06 0.12
RRUS-11 (T-Mobile - Proposed)	A	From Leg	4.00 -2.00 0.00	0.0000	125.00	No Ice 1/2" Ice	2.99 3.23	1.25 1.41	0.05 0.07
RRUS-11	B	From Leg	4.00	0.0000	125.00	No Ice	2.99	1.25	0.05

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
(T-Mobile - Proposed)			-2.00 0.00			1/2" Ice	3.23	1.41	0.07
RRUS-11	C	From Leg	4.00	0.0000	125.00	No Ice	2.99	1.25	0.05
(T-Mobile - Proposed)			-2.00 0.00			1/2" Ice	3.23	1.41	0.07
AIR21	A	From Leg	4.00	0.0000	125.00	No Ice	6.53	4.36	0.08
(T-Mobile - Existing)			-5.00 0.00			1/2" Ice	6.98	4.77	0.12
AIR21	B	From Leg	4.00	0.0000	125.00	No Ice	6.53	4.36	0.08
(T-Mobile - Existing)			-5.00 0.00			1/2" Ice	6.98	4.77	0.12
AIR21	C	From Leg	4.00	0.0000	125.00	No Ice	6.53	4.36	0.08
(T-Mobile - Existing)			-5.00 0.00			1/2" Ice	6.98	4.77	0.12
AIR21	A	From Leg	4.00	0.0000	125.00	No Ice	6.53	4.36	0.08
(T-Mobile - Existing)			5.00 0.00			1/2" Ice	6.98	4.77	0.12
AIR21	B	From Leg	4.00	0.0000	125.00	No Ice	6.53	4.36	0.08
(T-Mobile - Existing)			5.00 0.00			1/2" Ice	6.98	4.77	0.12
AIR21	C	From Leg	4.00	0.0000	125.00	No Ice	6.53	4.36	0.08
(T-Mobile - Existing)			5.00 0.00			1/2" Ice	6.98	4.77	0.12
TMA 10"x8"x3"	A	From Leg	4.00	0.0000	125.00	No Ice	0.78	0.29	0.02
(T-Mobile - Existing)			0.00 0.00			1/2" Ice	0.90	0.38	0.02
TMA 10"x8"x3"	B	From Leg	4.00	0.0000	125.00	No Ice	0.78	0.29	0.02
(T-Mobile - Existing)			0.00 0.00			1/2" Ice	0.90	0.38	0.02
TMA 10"x8"x3"	C	From Leg	4.00	0.0000	125.00	No Ice	0.78	0.29	0.02
(T-Mobile - Existing)			0.00 0.00			1/2" Ice	0.90	0.38	0.02
Rohn 6'x10' Boom Gate (3)	A	From Leg	4.00	0.0000	125.00	No Ice	47.40	47.40	1.62
(T-Mobile - Existing)			0.00 0.00			1/2" Ice	56.40	56.40	2.01
6'8"x4" Pipe Mount	A	From Leg	0.50	0.0000	117.00	No Ice	2.60	2.60	0.07
(NEU)			0.00 0.00			1/2" Ice	3.01	3.01	0.09
Dish Mount Assy	A	None		0.0000	117.00	No Ice	24.00	24.00	0.42
(NEU)						1/2" Ice	30.00	30.00	0.97
1142-2B	C	From Leg	4.00	0.0000	113.00	No Ice	1.12	1.12	0.01
(NEU)			0.00 6.00			1/2" Ice	2.54	2.54	0.02
ROHN 4-ft Side Arm	C	From Leg	2.00	0.0000	113.00	No Ice	5.28	5.28	0.07
(NEU)			0.00 0.00			1/2" Ice	7.88	7.88	0.08
1142-2B	B	From Leg	4.00	0.0000	115.00	No Ice	1.12	1.12	0.01
(NEU)			0.00 6.00			1/2" Ice	2.54	2.54	0.02
ROHN 4-ft Side Arm	B	From Leg	2.00	0.0000	115.00	No Ice	5.28	5.28	0.07
(NEU)			0.00 0.00			1/2" Ice	7.88	7.88	0.08
AP11-850/105N	A	From Leg	4.00	0.0000	104.00	No Ice	4.96	2.25	0.01
(CSP - Troop H)			0.00 0.00			1/2" Ice	5.36	2.57	0.04
AP11-850/105N	A	From Leg	4.00	0.0000	105.00	No Ice	4.96	2.25	0.01
(CSP - Troop H)			0.00			1/2" Ice	5.36	2.57	0.04

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
			0.00						
ROHN 4-ft Side Arm	A	From Leg	2.00	0.0000	104.00	No Ice	5.28	5.28	0.07
(NEU)			0.00			1/2" Ice	7.88	7.88	0.08
			0.00						
6'8"x4" Pipe Mount	B	From Leg	0.50	0.0000	107.00	No Ice	2.60	2.60	0.07
(NEU)			0.00			1/2" Ice	3.01	3.01	0.09
			0.00						
Dish Mount Assy	B	None		0.0000	107.00	No Ice	24.00	24.00	0.42
(NEU)						1/2" Ice	30.00	30.00	0.97
ROHN 4-ft Side Arm	C	From Leg	2.00	0.0000	98.00	No Ice	5.28	5.28	0.07
(NEU)			0.00			1/2" Ice	7.88	7.88	0.08
			0.00						
DB205-A	C	From Leg	4.00	0.0000	98.00	No Ice	1.20	1.20	0.04
(NEU)			0.00			1/2" Ice	2.16	2.16	0.05
			9.00						
2' Yagi	A	From Leg	3.50	0.0000	84.00	No Ice	2.08	2.08	0.03
(NEU)			0.00			1/2" Ice	3.79	3.79	0.05
			0.00						
6'8"x4" Pipe Mount	A	From Leg	0.50	0.0000	96.00	No Ice	2.60	2.60	0.07
(NEU)			0.00			1/2" Ice	3.01	3.01	0.09
			0.00						
Dish Mount Assy	A	None		0.0000	96.00	No Ice	24.00	24.00	0.42
(NEU)						1/2" Ice	30.00	30.00	0.97
6'8"x4" Pipe Mount	C	From Leg	0.50	0.0000	86.00	No Ice	2.60	2.60	0.07
(NEU)			0.00			1/2" Ice	3.01	3.01	0.09
			0.00						
Dish Mount Assy	C	None		0.0000	86.00	No Ice	24.00	24.00	0.42
(NEU)						1/2" Ice	30.00	30.00	0.97
1142-2B	B	From Leg	4.00	0.0000	84.00	No Ice	1.12	1.12	0.01
(NEU)			0.00			1/2" Ice	2.54	2.54	0.02
			6.00						
ROHN 4-ft Side Arm	B	From Leg	2.00	0.0000	84.00	No Ice	5.28	5.28	0.07
(NEU)			0.00			1/2" Ice	7.88	7.88	0.08
			0.00						
5'0"x4.5" Pipe Mount	A	From Leg	0.50	0.0000	71.00	No Ice	1.76	1.76	0.05
(NEU)			0.00			1/2" Ice	2.08	2.08	0.07
			0.00						
Dish Mount Assy	A	None		0.0000	71.00	No Ice	24.00	24.00	0.42
(NEU)						1/2" Ice	30.00	30.00	0.97
Diamond X-500A	C	From Leg	4.00	0.0000	65.00	No Ice	5.40	5.40	0.05
(NEU)			0.00			1/2" Ice	7.23	7.23	0.09
			9.00						
ROHN 4-ft Side Arm	C	From Leg	2.00	0.0000	65.00	No Ice	5.28	5.28	0.07
(NEU)			0.00			1/2" Ice	7.88	7.88	0.08
			0.00						
DB212-1	B	From Leg	3.50	0.0000	58.00	No Ice	4.40	4.40	0.03
(NEU)			0.00			1/2" Ice	8.42	8.42	0.07
			0.00						
3' Side arm	B	From Leg	1.50	0.0000	58.00	No Ice	5.90	5.90	0.13
(NEU)			0.00			1/2" Ice	6.60	6.60	0.15
			0.00						
DB212-1	A	From Leg	4.00	0.0000	54.00	No Ice	4.40	4.40	0.03
(NEU)			0.00			1/2" Ice	8.42	8.42	0.07
			0.00						
ROHN 4-ft Side Arm	A	From Leg	2.00	0.0000	54.00	No Ice	5.28	5.28	0.07
(NEU)			0.00			1/2" Ice	7.88	7.88	0.08
			0.00						

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
DB230-2B	B	From Leg	4.00 0.00 0.00	0.0000	46.00	No Ice 1/2" Ice	2.10 3.78	2.10 3.78	0.10 0.14
(NEU)									
ROHN 4-ft Side Arm	B	From Leg	2.00 0.00 0.00	0.0000	43.00	No Ice 1/2" Ice	5.28 7.88	5.28 7.88	0.07 0.08
(NEU)									
DB222-C	C	From Leg	4.00 0.00 5.00	0.0000	43.00	No Ice 1/2" Ice	1.60 2.88	1.60 2.88	0.02 0.02
(NEU)									
ROHN 4-ft Side Arm	C	From Leg	2.00 0.00 0.00	0.0000	43.00	No Ice 1/2" Ice	5.28 7.88	5.28 7.88	0.07 0.08
(NEU)									
Wind speed cups	B	From Leg	4.00 0.00 0.00	0.0000	42.00	No Ice 1/2" Ice	1.80 2.25	1.80 2.25	0.04 0.05
Valmont T-Arm (1)	A	From Leg	1.50 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice	10.54 14.45	10.54 14.45	0.34 0.41
(CT - Transit)									
TTA 12"x6"x4"	A	From Leg	3.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice	0.70 0.82	0.47 0.57	0.02 0.02
(CT - Transit)									
TTA 12"x6"x4"	B	From Leg	3.00 0.00 0.00	0.0000	70.00	No Ice 1/2" Ice	0.70 0.82	0.47 0.57	0.02 0.02
(CT - Transit)									
Valmont T-Arm (1)	B	From Leg	1.50 0.00 0.00	0.0000	70.00	No Ice 1/2" Ice	10.54 14.45	10.54 14.45	0.34 0.41
(CT - Transit)									
20' x 3" Dia Omni	A	From Leg	3.00 5.00 0.00	10.0000	75.00	No Ice 1/2" Ice	6.00 8.03	6.00 8.03	0.05 0.09
(CT - Transit)									
20' x 3" Dia Omni	A	From Leg	3.00 5.00 0.00	-10.0000	75.00	No Ice 1/2" Ice	6.00 8.03	6.00 8.03	0.05 0.09
(CT - Transit)									
20' x 3" Dia Omni	A	From Leg	3.00 -5.00 0.00	-10.0000	75.00	No Ice 1/2" Ice	6.00 8.03	6.00 8.03	0.05 0.09
(CT - Transit)									
20' x 3" Dia Omni	B	From Leg	3.00 5.00 0.00	10.0000	70.00	No Ice 1/2" Ice	6.00 8.03	6.00 8.03	0.05 0.09
(CT - Transit)									
20' x 3" Dia Omni	B	From Leg	3.00 5.00 0.00	-10.0000	70.00	No Ice 1/2" Ice	6.00 8.03	6.00 8.03	0.05 0.09
(CT - Transit)									
20' x 3" Dia Omni	B	From Leg	3.00 -5.00 0.00	-10.0000	70.00	No Ice 1/2" Ice	6.00 8.03	6.00 8.03	0.05 0.09
(CT - Transit)									
6'x2" Pipe Mount	A	From Leg	3.00 5.00 0.00	0.0000	75.00	No Ice 1/2" Ice	1.20 1.80	1.20 1.80	0.02 0.03
(CT - Transit)									
6'x2" Pipe Mount	A	From Leg	3.00 -5.00 0.00	0.0000	75.00	No Ice 1/2" Ice	1.20 1.80	1.20 1.80	0.02 0.03
(CT - Transit)									
6'x2" Pipe Mount	B	From Leg	3.00 5.00 0.00	0.0000	70.00	No Ice 1/2" Ice	1.20 1.80	1.20 1.80	0.02 0.03
(CT - Transit)									
6'x2" Pipe Mount	B	From Leg	3.00 -5.00 0.00	0.0000	70.00	No Ice 1/2" Ice	1.20 1.80	1.20 1.80	0.02 0.03
(CT - Transit)									

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
6'8"x4" Pipe Mount (NEU)	B	From Leg	0.50 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice	2.60 3.01	2.60 3.01	0.07 0.09
Dish Mount Assy (NEU)	B	None		0.0000	99.00	No Ice 1/2" Ice	24.00 30.00	24.00 30.00	0.42 0.97

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
4 FT DISH	A	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		71.00	4.00	No Ice 1/2" Ice	12.57 13.10	0.14 0.28
PAD8-59AW	C	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		86.00	8.00	No Ice 1/2" Ice	50.27 51.29	0.29 0.55
8 FT DISH	A	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		96.00	8.00	No Ice 1/2" Ice	50.27 51.32	0.47 1.01
6 FT DISH	B	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		107.00	6.00	No Ice 1/2" Ice	28.27 29.05	0.14 0.29
PA6-59	A	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		117.00	6.00	No Ice 1/2" Ice	28.27 29.05	0.09 0.24
6 FT DISH	B	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		99.00	6.00	No Ice 1/2" Ice	28.27 29.05	0.14 0.29

Tower Pressures - No Ice

G_H = 1.143

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1	125.00	1.463	27	87.604	A	0.000	15.612	4.792	30.69	0.000	0.000
130.00-120.00					B	0.000	12.468		38.43	0.000	0.000
					C	0.000	20.861		22.97	0.000	0.000
T2	110.00	1.411	26	197.508	A	0.000	49.636	11.688	23.55	0.000	0.000
120.00-100.00					B	0.000	28.614		40.85	0.000	0.000
					C	5.411	46.731		22.42	0.000	0.000
T3	90.00	1.332	25	240.843	A	0.000	55.218	15.027	27.21	0.000	0.000

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
100.00-80.00					B	0.000	34.045		44.14	0.000	0.000
					C	12.537	57.085		21.58	0.000	0.000
T4 80.00-60.00	70.00	1.24	23	285.953	A	0.000	56.798	18.582	32.72	0.000	0.000
					B	3.750	51.092		33.88	0.000	0.000
					C	14.648	61.182		24.51	0.000	0.000
T5 60.00-40.00	50.00	1.126	21	334.291	A	0.000	61.048	18.595	30.46	0.000	0.000
					B	5.000	60.674		28.31	0.000	0.000
					C	15.836	67.123		22.41	0.000	0.000
T6 40.00-20.00	30.00	1	18	386.897	A	0.000	67.987	22.141	32.57	0.000	0.000
					B	5.000	67.613		30.49	0.000	0.000
					C	15.836	75.803		24.16	0.000	0.000
T7 20.00-0.00	10.00	1	18	436.897	A	0.000	61.638	22.141	35.92	0.000	0.000
					B	3.000	61.413		34.37	0.000	0.000
					C	9.501	66.364		29.18	0.000	0.000

Tower Pressure - With Ice

G_H = 1.143

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	125.00	1.463	27	0.5000	88.438	A	0.000	22.153	6.458	29.15	0.000	0.000
130.00-120.00						B	0.000	17.642		36.61	0.000	0.000
						C	13.950	17.280		20.68	0.000	0.000
T2	110.00	1.411	26	0.5000	199.177	A	0.000	68.706	15.027	21.87	0.000	0.000
120.00-100.00						B	0.000	38.231		39.31	0.000	0.000
						C	36.208	39.324		19.90	0.000	0.000
T3 100.00-80.00	90.00	1.332	25	0.5000	242.512	A	0.000	75.258	18.366	24.40	0.000	0.000
						B	0.000	44.477		41.29	0.000	0.000
						C	48.814	51.810		18.25	0.000	0.000
T4 80.00-60.00	70.00	1.24	23	0.5000	287.622	A	0.000	76.428	21.923	28.68	0.000	0.000
						B	7.908	66.580		29.43	0.000	0.000
						C	51.815	58.512		19.87	0.000	0.000
T5 60.00-40.00	50.00	1.126	21	0.5000	335.961	A	0.000	81.330	21.937	26.97	0.000	0.000
						B	10.544	78.816		24.55	0.000	0.000
						C	53.502	68.065		18.05	0.000	0.000
T6 40.00-20.00	30.00	1	18	0.5000	388.566	A	0.000	88.980	25.483	28.64	0.000	0.000
						B	10.544	86.466		26.27	0.000	0.000
						C	53.502	80.414		19.03	0.000	0.000
T7 20.00-0.00	10.00	1	18	0.5000	438.566	A	0.000	79.302	25.483	32.13	0.000	0.000
						B	6.327	77.797		30.29	0.000	0.000
						C	32.101	74.259		23.96	0.000	0.000

Tower Pressure - Service

G_H = 1.143

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	125.00	1.463	27	87.604	A	0.000	15.612	4.792	30.69	0.000	0.000
130.00-120.00					B	0.000	12.468		38.43	0.000	0.000
					C	0.000	20.861		22.97	0.000	0.000
T2	110.00	1.411	26	197.508	A	0.000	49.636	11.688	23.55	0.000	0.000
120.00-100.00					B	0.000	28.614		40.85	0.000	0.000
					C	5.411	46.731		22.42	0.000	0.000
T3	90.00	1.332	25	240.843	A	0.000	55.218	15.027	27.21	0.000	0.000
100.00-80.00					B	0.000	34.045		44.14	0.000	0.000
					C	12.537	57.085		21.58	0.000	0.000
T4 80.00-60.00	70.00	1.24	23	285.953	A	0.000	56.798	18.582	32.72	0.000	0.000
					B	3.750	51.092		33.88	0.000	0.000
					C	14.648	61.182		24.51	0.000	0.000
T5 60.00-40.00	50.00	1.126	21	334.291	A	0.000	61.048	18.595	30.46	0.000	0.000
					B	5.000	60.674		28.31	0.000	0.000
					C	15.836	67.123		22.41	0.000	0.000
T6 40.00-20.00	30.00	1	18	386.897	A	0.000	67.987	22.141	32.57	0.000	0.000
					B	5.000	67.613		30.49	0.000	0.000
					C	15.836	75.803		24.16	0.000	0.000
T7 20.00-0.00	10.00	1	18	436.897	A	0.000	61.638	22.141	35.92	0.000	0.000
					B	3.000	61.413		34.37	0.000	0.000
					C	9.501	66.364		29.18	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.10	0.64	A	0.178	2.67	0.586	1	1	9.152	0.96	95.61	C
130.00-120.00			B	0.142	2.8	0.58	1	1	7.235			
			C	0.238	2.474	0.599	1	1	12.494			
T2	0.43	1.70	A	0.251	2.434	0.602	1	1	29.891	2.41	120.46	C
120.00-100.00			B	0.145	2.79	0.581	1	1	16.617			
			C	0.264	2.396	0.606	1	1	33.708			
T3	0.49	2.04	A	0.229	2.501	0.597	1	1	32.954	3.11	155.59	C
100.00-80.00			B	0.141	2.804	0.58	1	1	19.753			
			C	0.289	2.325	0.613	1	1	47.508			
T4	0.74	2.37	A	0.199	2.601	0.59	1	1	33.518	3.24	162.19	C
80.00-60.00			B	0.192	2.624	0.589	1	1	33.831			
			C	0.265	2.393	0.606	1	1	51.716			
T5	0.84	2.93	A	0.183	2.655	0.587	1	1	35.836	3.27	163.48	C
60.00-40.00			B	0.196	2.608	0.59	1	1	40.779			
			C	0.248	2.443	0.601	1	1	56.204			
T6	0.85	3.48	A	0.176	2.679	0.586	1	1	39.823	3.21	160.34	C
40.00-20.00			B	0.188	2.638	0.588	1	1	44.754			
			C	0.237	2.478	0.599	1	1	61.212			
T7 20.00-0.00	0.51	4.15	A	0.141	2.805	0.58	1	1	35.759	2.75	137.33	C
			B	0.147	2.781	0.581	1	1	38.686			
			C	0.174	2.686	0.585	1	1	48.350			
Sum Weight:	3.95	17.31						OTM	1178.80 kip-ft	18.94		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.10	0.64	A	0.178	2.67	0.586	0.825	1	9.152	0.96	95.61	C
130.00-120.00			B	0.142	2.8	0.58	0.825	1	7.235			
			C	0.238	2.474	0.599	0.825	1	12.494			
T2	0.43	1.70	A	0.251	2.434	0.602	0.825	1	29.891	2.34	117.08	C
120.00-100.00			B	0.145	2.79	0.581	0.825	1	16.617			
			C	0.264	2.396	0.606	0.825	1	32.761			
T3	0.49	2.04	A	0.229	2.501	0.597	0.825	1	32.954	2.97	148.40	C
100.00-80.00			B	0.141	2.804	0.58	0.825	1	19.753			
			C	0.289	2.325	0.613	0.825	1	45.314			
T4	0.74	2.37	A	0.199	2.601	0.59	0.825	1	33.518	3.08	154.15	C
80.00-60.00			B	0.192	2.624	0.589	0.825	1	33.175			
			C	0.265	2.393	0.606	0.825	1	49.153			
T5	0.84	2.93	A	0.183	2.655	0.587	0.825	1	35.836	3.11	155.42	C
60.00-40.00			B	0.196	2.608	0.59	0.825	1	39.904			
			C	0.248	2.443	0.601	0.825	1	53.433			
T6	0.85	3.48	A	0.176	2.679	0.586	0.825	1	39.823	3.06	153.09	C
40.00-20.00			B	0.188	2.638	0.588	0.825	1	43.879			
			C	0.237	2.478	0.599	0.825	1	58.441			
T7 20.00-0.00	0.51	4.15	A	0.141	2.805	0.58	0.825	1	35.759	2.65	132.61	C
			B	0.147	2.781	0.581	0.825	1	38.161			
			C	0.174	2.686	0.585	0.825	1	46.687			
Sum Weight:	3.95	17.31						OTM	1133.81 kip-ft	18.17		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.10	0.64	A	0.178	2.67	0.586	0.8	1	9.152	0.96	95.61	C
130.00-120.00			B	0.142	2.8	0.58	0.8	1	7.235			
			C	0.238	2.474	0.599	0.8	1	12.494			
T2	0.43	1.70	A	0.251	2.434	0.602	0.8	1	29.891	2.33	116.59	C
120.00-100.00			B	0.145	2.79	0.581	0.8	1	16.617			
			C	0.264	2.396	0.606	0.8	1	32.626			
T3	0.49	2.04	A	0.229	2.501	0.597	0.8	1	32.954	2.95	147.37	C
100.00-80.00			B	0.141	2.804	0.58	0.8	1	19.753			
			C	0.289	2.325	0.613	0.8	1	45.000			
T4	0.74	2.37	A	0.199	2.601	0.59	0.8	1	33.518	3.06	153.00	C
80.00-60.00			B	0.192	2.624	0.589	0.8	1	33.081			
			C	0.265	2.393	0.606	0.8	1	48.786			
T5	0.84	2.93	A	0.183	2.655	0.587	0.8	1	35.836	3.09	154.26	C
60.00-40.00			B	0.196	2.608	0.59	0.8	1	39.779			
			C	0.248	2.443	0.601	0.8	1	53.037			
T6	0.85	3.48	A	0.176	2.679	0.586	0.8	1	39.823	3.04	152.05	C
40.00-20.00			B	0.188	2.638	0.588	0.8	1	43.754			
			C	0.237	2.478	0.599	0.8	1	58.045			
T7 20.00-0.00	0.51	4.15	A	0.141	2.805	0.58	0.8	1	35.759	2.64	131.93	C
			B	0.147	2.781	0.581	0.8	1	38.086			
			C	0.174	2.686	0.585	0.8	1	46.449			
Sum Weight:	3.95	17.31						OTM	1127.38 kip-ft	18.06		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.10	0.64	A	0.178	2.67	0.586	0.85	1	9.152	0.96	95.61	C
130.00-120.00			B	0.142	2.8	0.58	0.85	1	7.235			
			C	0.238	2.474	0.599	0.85	1	12.494			
T2	0.43	1.70	A	0.251	2.434	0.602	0.85	1	29.891	2.35	117.56	C
120.00-100.00			B	0.145	2.79	0.581	0.85	1	16.617			
			C	0.264	2.396	0.606	0.85	1	32.897			
T3	0.49	2.04	A	0.229	2.501	0.597	0.85	1	32.954	2.99	149.43	C
100.00-80.00			B	0.141	2.804	0.58	0.85	1	19.753			
			C	0.289	2.325	0.613	0.85	1	45.627			
T4	0.74	2.37	A	0.199	2.601	0.59	0.85	1	33.518	3.11	155.30	C
80.00-60.00			B	0.192	2.624	0.589	0.85	1	33.269			
			C	0.265	2.393	0.606	0.85	1	49.519			
T5	0.84	2.93	A	0.183	2.655	0.587	0.85	1	35.836	3.13	156.57	C
60.00-40.00			B	0.196	2.608	0.59	0.85	1	40.029			
			C	0.248	2.443	0.601	0.85	1	53.829			
T6	0.85	3.48	A	0.176	2.679	0.586	0.85	1	39.823	3.08	154.12	C
40.00-20.00			B	0.188	2.638	0.588	0.85	1	44.004			
			C	0.237	2.478	0.599	0.85	1	58.837			
T7 20.00-0.00	0.51	4.15	A	0.141	2.805	0.58	0.85	1	35.759	2.67	133.28	C
			B	0.147	2.781	0.581	0.85	1	38.236			
			C	0.174	2.686	0.585	0.85	1	46.924			
Sum Weight:	3.95	17.31						OTM	1140.23 kip-ft	18.28		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.27	0.97	A	0.25	2.436	0.602	1	1	13.336	1.67	166.71	C
130.00-120.00			B	0.199	2.598	0.59	1	1	10.414			
			C	0.353	2.164	0.634	1	1	24.898			
T2	1.13	2.38	A	0.345	2.183	0.631	1	1	43.332	3.86	193.24	C
120.00-100.00			B	0.192	2.623	0.589	1	1	22.510			
			C	0.379	2.107	0.643	1	1	61.507			
T3	1.33	2.84	A	0.31	2.269	0.619	1	1	46.593	4.75	237.59	C
100.00-80.00			B	0.183	2.652	0.587	1	1	26.115			
			C	0.415	2.035	0.658	1	1	82.895			
T4	1.84	3.12	A	0.266	2.391	0.606	1	1	46.316	4.92	246.20	C
80.00-60.00			B	0.259	2.411	0.604	1	1	48.137			
			C	0.384	2.097	0.645	1	1	89.557			
T5	2.04	3.81	A	0.242	2.461	0.6	1	1	48.789	4.95	247.26	C
60.00-40.00			B	0.266	2.39	0.606	1	1	58.313			
			C	0.362	2.144	0.637	1	1	96.845			
T6	2.08	4.52	A	0.229	2.502	0.597	1	1	53.099	4.81	240.64	C
40.00-20.00			B	0.25	2.439	0.602	1	1	62.579			
			C	0.345	2.184	0.631	1	1	104.209			
T7 20.00-0.00	1.25	5.29	A	0.181	2.661	0.587	1	1	46.524	3.99	199.39	C
			B	0.192	2.624	0.589	1	1	52.131			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
Sum Weight:	9.92	22.92	C	0.243	2.46	0.6	1	1 OTM	76.657 1837.40 kip-ft	28.95		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.27	0.97	A	0.25	2.436	0.602	0.825	1	13.336	1.50	150.37	C
130.00-120.00			B	0.199	2.598	0.59	0.825	1	10.414			
			C	0.353	2.164	0.634	0.825	1	22.457			
T2	1.13	2.38	A	0.345	2.183	0.631	0.825	1	43.332	3.47	173.33	C
120.00-100.00			B	0.192	2.623	0.589	0.825	1	22.510			
			C	0.379	2.107	0.643	0.825	1	55.170			
T3	1.33	2.84	A	0.31	2.269	0.619	0.825	1	46.593	4.26	213.11	C
100.00-80.00			B	0.183	2.652	0.587	0.825	1	26.115			
			C	0.415	2.035	0.658	0.825	1	74.353			
T4	1.84	3.12	A	0.266	2.391	0.606	0.825	1	46.316	4.43	221.28	C
80.00-60.00			B	0.259	2.411	0.604	0.825	1	46.753			
			C	0.384	2.097	0.645	0.825	1	80.490			
T5	2.04	3.81	A	0.242	2.461	0.6	0.825	1	48.789	4.47	223.36	C
60.00-40.00			B	0.266	2.39	0.606	0.825	1	56.468			
			C	0.362	2.144	0.637	0.825	1	87.482			
T6	2.08	4.52	A	0.229	2.502	0.597	0.825	1	53.099	4.38	219.02	C
40.00-20.00			B	0.25	2.439	0.602	0.825	1	60.734			
			C	0.345	2.184	0.631	0.825	1	94.846			
T7 20.00-0.00	1.25	5.29	A	0.181	2.661	0.587	0.825	1	46.524	3.70	184.78	C
			B	0.192	2.624	0.589	0.825	1	51.024			
			C	0.243	2.46	0.6	0.825	1	71.039			
Sum Weight:	9.92	22.92						OTM	1654.40 kip-ft	26.20		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.27	0.97	A	0.25	2.436	0.602	0.8	1	13.336	1.48	148.03	C
130.00-120.00			B	0.199	2.598	0.59	0.8	1	10.414			
			C	0.353	2.164	0.634	0.8	1	22.108			
T2	1.13	2.38	A	0.345	2.183	0.631	0.8	1	43.332	3.41	170.49	C
120.00-100.00			B	0.192	2.623	0.589	0.8	1	22.510			
			C	0.379	2.107	0.643	0.8	1	54.265			
T3	1.33	2.84	A	0.31	2.269	0.619	0.8	1	46.593	4.19	209.61	C
100.00-80.00			B	0.183	2.652	0.587	0.8	1	26.115			
			C	0.415	2.035	0.658	0.8	1	73.132			
T4	1.84	3.12	A	0.266	2.391	0.606	0.8	1	46.316	4.35	217.72	C
80.00-60.00			B	0.259	2.411	0.604	0.8	1	46.555			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	0.384	2.097	0.645	0.8	1	79.194			
T5	2.04	3.81	A	0.242	2.461	0.6	0.8	1	48.789	4.40	219.94	C
60.00-40.00			B	0.266	2.39	0.606	0.8	1	56.204			
			C	0.362	2.144	0.637	0.8	1	86.144			
T6	2.08	4.52	A	0.229	2.502	0.597	0.8	1	53.099	4.32	215.93	C
40.00-20.00			B	0.25	2.439	0.602	0.8	1	60.470			
			C	0.345	2.184	0.631	0.8	1	93.509			
T7 20.00-0.00	1.25	5.29	A	0.181	2.661	0.587	0.8	1	46.524	3.65	182.69	C
			B	0.192	2.624	0.589	0.8	1	50.865			
			C	0.243	2.46	0.6	0.8	1	70.236			
Sum Weight:	9.92	22.92						OTM	1628.25 kip-ft	25.81		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.27	0.97	A	0.25	2.436	0.602	0.85	1	13.336	1.53	152.70	C
130.00-120.00			B	0.199	2.598	0.59	0.85	1	10.414			
			C	0.353	2.164	0.634	0.85	1	22.806			
T2	1.13	2.38	A	0.345	2.183	0.631	0.85	1	43.332	3.52	176.18	C
120.00-100.00			B	0.192	2.623	0.589	0.85	1	22.510			
			C	0.379	2.107	0.643	0.85	1	56.076			
T3	1.33	2.84	A	0.31	2.269	0.619	0.85	1	46.593	4.33	216.60	C
100.00-80.00			B	0.183	2.652	0.587	0.85	1	26.115			
			C	0.415	2.035	0.658	0.85	1	75.573			
T4	1.84	3.12	A	0.266	2.391	0.606	0.85	1	46.316	4.50	224.84	C
80.00-60.00			B	0.259	2.411	0.604	0.85	1	46.950			
			C	0.384	2.097	0.645	0.85	1	81.785			
T5	2.04	3.81	A	0.242	2.461	0.6	0.85	1	48.789	4.54	226.77	C
60.00-40.00			B	0.266	2.39	0.606	0.85	1	56.731			
			C	0.362	2.144	0.637	0.85	1	88.819			
T6	2.08	4.52	A	0.229	2.502	0.597	0.85	1	53.099	4.44	222.11	C
40.00-20.00			B	0.25	2.439	0.602	0.85	1	60.997			
			C	0.345	2.184	0.631	0.85	1	96.184			
T7 20.00-0.00	1.25	5.29	A	0.181	2.661	0.587	0.85	1	46.524	3.74	186.87	C
			B	0.192	2.624	0.589	0.85	1	51.182			
			C	0.243	2.46	0.6	0.85	1	71.841			
Sum Weight:	9.92	22.92						OTM	1680.54 kip-ft	26.59		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.10	0.64	A	0.178	2.67	0.586	1	1	9.152	0.96	95.61	C
130.00-120.00			B	0.142	2.8	0.58	1	1	7.235			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	0.238	2.474	0.599	1	1	12.494			
T2	0.43	1.70	A	0.251	2.434	0.602	1	1	29.891	2.41	120.46	C
120.00-100.00			B	0.145	2.79	0.581	1	1	16.617			
			C	0.264	2.396	0.606	1	1	33.708			
T3	0.49	2.04	A	0.229	2.501	0.597	1	1	32.954	3.11	155.59	C
100.00-80.00			B	0.141	2.804	0.58	1	1	19.753			
			C	0.289	2.325	0.613	1	1	47.508			
T4	0.74	2.37	A	0.199	2.601	0.59	1	1	33.518	3.24	162.19	C
80.00-60.00			B	0.192	2.624	0.589	1	1	33.831			
			C	0.265	2.393	0.606	1	1	51.716			
T5	0.84	2.93	A	0.183	2.655	0.587	1	1	35.836	3.27	163.48	C
60.00-40.00			B	0.196	2.608	0.59	1	1	40.779			
			C	0.248	2.443	0.601	1	1	56.204			
T6	0.85	3.48	A	0.176	2.679	0.586	1	1	39.823	3.21	160.34	C
40.00-20.00			B	0.188	2.638	0.588	1	1	44.754			
			C	0.237	2.478	0.599	1	1	61.212			
T7 20.00-0.00	0.51	4.15	A	0.141	2.805	0.58	1	1	35.759	2.75	137.33	C
			B	0.147	2.781	0.581	1	1	38.686			
			C	0.174	2.686	0.585	1	1	48.350			
Sum Weight:	3.95	17.31						OTM	1178.80 kip-ft	18.94		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.10	0.64	A	0.178	2.67	0.586	0.825	1	9.152	0.96	95.61	C
130.00-120.00			B	0.142	2.8	0.58	0.825	1	7.235			
			C	0.238	2.474	0.599	0.825	1	12.494			
T2	0.43	1.70	A	0.251	2.434	0.602	0.825	1	29.891	2.34	117.08	C
120.00-100.00			B	0.145	2.79	0.581	0.825	1	16.617			
			C	0.264	2.396	0.606	0.825	1	32.761			
T3	0.49	2.04	A	0.229	2.501	0.597	0.825	1	32.954	2.97	148.40	C
100.00-80.00			B	0.141	2.804	0.58	0.825	1	19.753			
			C	0.289	2.325	0.613	0.825	1	45.314			
T4	0.74	2.37	A	0.199	2.601	0.59	0.825	1	33.518	3.08	154.15	C
80.00-60.00			B	0.192	2.624	0.589	0.825	1	33.175			
			C	0.265	2.393	0.606	0.825	1	49.153			
T5	0.84	2.93	A	0.183	2.655	0.587	0.825	1	35.836	3.11	155.42	C
60.00-40.00			B	0.196	2.608	0.59	0.825	1	39.904			
			C	0.248	2.443	0.601	0.825	1	53.433			
T6	0.85	3.48	A	0.176	2.679	0.586	0.825	1	39.823	3.06	153.09	C
40.00-20.00			B	0.188	2.638	0.588	0.825	1	43.879			
			C	0.237	2.478	0.599	0.825	1	58.441			
T7 20.00-0.00	0.51	4.15	A	0.141	2.805	0.58	0.825	1	35.759	2.65	132.61	C
			B	0.147	2.781	0.581	0.825	1	38.161			
			C	0.174	2.686	0.585	0.825	1	46.687			
Sum Weight:	3.95	17.31						OTM	1133.81 kip-ft	18.17		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.10	0.64	A	0.178	2.67	0.586	0.8	1	9.152	0.96	95.61	C
130.00-120.00			B	0.142	2.8	0.58	0.8	1	7.235			
			C	0.238	2.474	0.599	0.8	1	12.494			
T2	0.43	1.70	A	0.251	2.434	0.602	0.8	1	29.891	2.33	116.59	C
120.00-100.00			B	0.145	2.79	0.581	0.8	1	16.617			
			C	0.264	2.396	0.606	0.8	1	32.626			
T3	0.49	2.04	A	0.229	2.501	0.597	0.8	1	32.954	2.95	147.37	C
100.00-80.00			B	0.141	2.804	0.58	0.8	1	19.753			
			C	0.289	2.325	0.613	0.8	1	45.000			
T4	0.74	2.37	A	0.199	2.601	0.59	0.8	1	33.518	3.06	153.00	C
80.00-60.00			B	0.192	2.624	0.589	0.8	1	33.081			
			C	0.265	2.393	0.606	0.8	1	48.786			
T5	0.84	2.93	A	0.183	2.655	0.587	0.8	1	35.836	3.09	154.26	C
60.00-40.00			B	0.196	2.608	0.59	0.8	1	39.779			
			C	0.248	2.443	0.601	0.8	1	53.037			
T6	0.85	3.48	A	0.176	2.679	0.586	0.8	1	39.823	3.04	152.05	C
40.00-20.00			B	0.188	2.638	0.588	0.8	1	43.754			
			C	0.237	2.478	0.599	0.8	1	58.045			
T7 20.00-0.00	0.51	4.15	A	0.141	2.805	0.58	0.8	1	35.759	2.64	131.93	C
			B	0.147	2.781	0.581	0.8	1	38.086			
			C	0.174	2.686	0.585	0.8	1	46.449			
Sum Weight:	3.95	17.31						OTM	1127.38 kip-ft	18.06		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.10	0.64	A	0.178	2.67	0.586	0.85	1	9.152	0.96	95.61	C
130.00-120.00			B	0.142	2.8	0.58	0.85	1	7.235			
			C	0.238	2.474	0.599	0.85	1	12.494			
T2	0.43	1.70	A	0.251	2.434	0.602	0.85	1	29.891	2.35	117.56	C
120.00-100.00			B	0.145	2.79	0.581	0.85	1	16.617			
			C	0.264	2.396	0.606	0.85	1	32.897			
T3	0.49	2.04	A	0.229	2.501	0.597	0.85	1	32.954	2.99	149.43	C
100.00-80.00			B	0.141	2.804	0.58	0.85	1	19.753			
			C	0.289	2.325	0.613	0.85	1	45.627			
T4	0.74	2.37	A	0.199	2.601	0.59	0.85	1	33.518	3.11	155.30	C
80.00-60.00			B	0.192	2.624	0.589	0.85	1	33.269			
			C	0.265	2.393	0.606	0.85	1	49.519			
T5	0.84	2.93	A	0.183	2.655	0.587	0.85	1	35.836	3.13	156.57	C
60.00-40.00			B	0.196	2.608	0.59	0.85	1	40.029			
			C	0.248	2.443	0.601	0.85	1	53.829			
T6	0.85	3.48	A	0.176	2.679	0.586	0.85	1	39.823	3.08	154.12	C
40.00-20.00			B	0.188	2.638	0.588	0.85	1	44.004			
			C	0.237	2.478	0.599	0.85	1	58.837			
T7 20.00-0.00	0.51	4.15	A	0.141	2.805	0.58	0.85	1	35.759	2.67	133.28	C
			B	0.147	2.781	0.581	0.85	1	38.236			
			C	0.174	2.686	0.585	0.85	1	46.924			
Sum Weight:	3.95	17.31						OTM	1140.23	18.28		

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
									kip-ft			

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	6.50					
Bracing Weight	10.80					
Total Member Self-Weight	17.31			-4.92	-10.48	
Total Weight	30.42			-4.92	-10.48	
Wind 0 deg - No Ice		-0.00	-37.17	-3019.63	-10.30	24.89
Wind 30 deg - No Ice		18.17	-31.62	-2582.24	-1489.96	22.60
Wind 45 deg - No Ice		25.62	-25.74	-2104.69	-2098.33	19.22
Wind 60 deg - No Ice		31.29	-18.14	-1486.40	-2562.07	14.51
Wind 90 deg - No Ice		36.35	0.00	-4.74	-2969.76	3.19
Wind 120 deg - No Ice		32.06	18.59	1502.59	-2606.79	-8.87
Wind 135 deg - No Ice		25.63	25.74	2095.12	-2098.60	-14.93
Wind 150 deg - No Ice		18.18	31.62	2572.59	-1490.28	-19.41
Wind 180 deg - No Ice		0.00	36.29	2958.37	-10.67	-24.04
Wind 210 deg - No Ice		-18.17	31.62	2572.40	1469.00	-22.60
Wind 225 deg - No Ice		-25.62	25.74	2094.85	2077.37	-19.22
Wind 240 deg - No Ice		-32.05	18.59	1502.27	2585.63	-16.02
Wind 270 deg - No Ice		-36.35	-0.00	-5.11	2948.80	-3.19
Wind 300 deg - No Ice		-31.29	-18.15	-1486.72	2541.29	9.52
Wind 315 deg - No Ice		-25.63	-25.74	-2104.96	2077.63	14.93
Wind 330 deg - No Ice		-18.18	-31.62	-2582.43	1469.32	19.41
Member Ice	5.61					
Total Weight Ice	48.97			7.71	-20.60	
Wind 0 deg - Ice		-0.00	-51.19	-4052.94	-20.41	38.38
Wind 30 deg - Ice		24.33	-42.29	-3372.97	-1963.63	37.98
Wind 45 deg - Ice		34.13	-34.25	-2734.06	-2750.08	34.28
Wind 60 deg - Ice		41.46	-24.02	-1917.87	-3340.95	28.18
Wind 90 deg - Ice		48.66	0.00	7.91	-3907.00	13.06
Wind 120 deg - Ice		44.19	25.60	2038.20	-3522.27	-5.05
Wind 135 deg - Ice		34.13	34.25	2749.76	-2750.36	-16.58
Wind 150 deg - Ice		24.33	42.29	3388.59	-1963.97	-24.91
Wind 180 deg - Ice		0.00	48.04	3859.22	-20.80	-35.62
Wind 210 deg - Ice		-24.33	42.29	3388.39	1922.43	-37.98
Wind 225 deg - Ice		-34.13	34.25	2749.48	2708.88	-34.28
Wind 240 deg - Ice		-44.18	25.59	2037.87	3480.87	-33.33
Wind 270 deg - Ice		-48.66	-0.00	7.52	3865.80	-13.06
Wind 300 deg - Ice		-41.46	-24.02	-1918.21	3299.94	7.44
Wind 315 deg - Ice		-34.13	-34.25	-2734.34	2709.15	16.58
Wind 330 deg - Ice		-24.33	-42.29	-3373.17	1922.77	24.91
Total Weight	30.42			-4.92	-10.48	
Wind 0 deg - Service		-0.00	-37.17	-3032.61	-6.18	24.89
Wind 30 deg - Service		18.17	-31.62	-2595.22	-1485.85	22.60
Wind 45 deg - Service		25.62	-25.74	-2117.67	-2094.22	19.22
Wind 60 deg - Service		31.29	-18.14	-1499.38	-2557.95	14.51
Wind 90 deg - Service		36.35	0.00	-17.72	-2965.65	3.19
Wind 120 deg - Service		32.06	18.59	1489.61	-2602.67	-8.87
Wind 135 deg - Service		25.63	25.74	2082.14	-2094.48	-14.93
Wind 150 deg - Service		18.18	31.62	2559.61	-1486.17	-19.41
Wind 180 deg - Service		0.00	36.29	2945.39	-6.55	-24.04

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 210 deg - Service		-18.17	31.62	2559.42	1473.11	-22.60
Wind 225 deg - Service		-25.62	25.74	2081.87	2081.48	-19.22
Wind 240 deg - Service		-32.05	18.59	1489.29	2589.75	-16.02
Wind 270 deg - Service		-36.35	-0.00	-18.09	2952.91	-3.19
Wind 300 deg - Service		-31.29	-18.15	-1499.70	2545.40	9.52
Wind 315 deg - Service		-25.63	-25.74	-2117.94	2081.75	14.93
Wind 330 deg - Service		-18.18	-31.62	-2595.41	1473.43	19.41

Load Combinations

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

Comb. No.	Description
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	130 - 120	Leg	Max Tension	32	2.82	-0.33	-0.14
			Max. Compression	19	-7.13	0.32	-0.04
			Max. Mx	27	-0.78	-0.34	0.04
			Max. My	23	-3.94	-0.01	0.45
			Max. Vy	27	-1.33	0.07	-0.00
			Max. Vx	23	2.33	0.01	-0.14
		Diagonal	Max Tension	29	4.25	0.00	0.00
			Max. Compression	29	-4.35	0.00	0.00
			Max. Mx	20	4.03	0.02	0.00
			Max. My	32	-0.09	0.00	-0.00
			Max. Vy	20	-0.01	0.00	0.00
			Max. Vx	32	0.00	0.00	0.00
		Horizontal	Max Tension	22	3.21	-0.01	0.00
			Max. Compression	30	-3.18	0.00	0.00
			Max. Mx	32	0.10	-0.01	-0.01
			Max. My	22	-1.75	-0.01	-0.01
			Max. Vy	32	-0.01	-0.01	-0.01
			Max. Vx	22	0.00	-0.01	-0.01
		Top Girt	Max Tension	22	0.75	-0.01	0.00
			Max. Compression	30	-0.73	-0.01	-0.00
			Max. Mx	32	-0.38	-0.01	-0.00
			Max. My	32	-0.31	-0.01	-0.00
			Max. Vy	32	-0.01	-0.01	-0.00
			Max. Vx	32	0.00	-0.01	-0.00
		Inner Bracing	Max Tension	30	0.01	0.00	0.00
			Max. Compression	30	-0.01	0.00	0.00
			Max. Mx	18	-0.00	-0.01	0.00
			Max. My	19	0.00	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
T2	120 - 100	Leg	Max Tension	22	19.21	-0.05	0.01
			Max. Compression	19	-27.64	0.50	-0.01
			Max. Mx	27	2.78	0.78	0.06
			Max. My	23	-4.75	-0.02	-1.05
			Max. Vy	32	0.57	-0.05	-0.01
			Max. Vx	28	-0.82	0.01	0.06
		Diagonal	Max Tension	26	7.48	0.00	0.00
			Max. Compression	26	-7.64	0.00	0.00
			Max. Mx	20	6.67	0.04	0.00
			Max. My	19	0.02	0.00	-0.00
			Max. Vy	20	-0.02	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
		Horizontal	Max Tension	26	4.72	-0.02	0.00
			Max. Compression	25	-4.78	-0.03	-0.00
			Max. Mx	22	0.23	-0.04	-0.01
			Max. My	27	-0.75	-0.04	-0.01
			Max. Vy	22	-0.02	-0.04	-0.01

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	27	0.00	-0.04	-0.01
		Top Girt	Max Tension	32	3.39	-0.01	0.00
			Max. Compression	24	-3.69	-0.02	-0.00
			Max. Mx	32	-1.68	-0.03	-0.01
			Max. My	24	-0.52	-0.01	0.01
			Max. Vy	32	-0.02	-0.03	-0.01
			Max. Vx	24	-0.00	-0.01	0.01
		Inner Bracing	Max Tension	24	0.06	0.00	0.00
			Max. Compression	24	-0.06	0.00	0.00
			Max. Mx	18	-0.00	-0.01	0.00
			Max. My	19	0.00	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	24	0.00	0.00	0.00
T3	100 - 80	Leg	Max Tension	22	46.81	-0.17	-0.16
			Max. Compression	19	-62.06	0.72	-0.11
			Max. Mx	27	22.93	1.06	0.03
			Max. My	31	-7.48	-0.05	1.40
			Max. Vy	27	-0.91	-0.56	0.01
			Max. Vx	26	-1.12	-0.02	-0.30
		Diagonal	Max Tension	26	10.12	0.00	0.00
			Max. Compression	26	-10.30	0.00	0.00
			Max. Mx	20	9.85	0.06	0.00
			Max. My	19	0.49	0.00	-0.00
			Max. Vy	20	-0.03	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
		Horizontal	Max Tension	26	6.98	-0.03	0.00
			Max. Compression	26	-6.93	-0.03	0.00
			Max. Mx	32	0.60	-0.05	-0.02
			Max. My	24	0.25	-0.01	0.02
			Max. Vy	32	-0.02	-0.05	-0.02
			Max. Vx	30	-0.00	-0.01	0.02
		Top Girt	Max Tension	33	5.90	-0.02	0.00
			Max. Compression	25	-5.98	-0.03	-0.00
			Max. Mx	22	-0.16	-0.04	-0.01
			Max. My	30	1.27	-0.01	0.01
			Max. Vy	22	-0.02	-0.04	-0.01
			Max. Vx	30	-0.00	-0.01	0.01
		Inner Bracing	Max Tension	25	0.10	0.00	0.00
			Max. Compression	25	-0.10	0.00	0.00
			Max. Mx	18	-0.00	-0.02	0.00
			Max. My	24	0.00	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	24	0.00	0.00	0.00
T4	80 - 60	Leg	Max Tension	32	73.66	-0.87	-0.23
			Max. Compression	19	-95.23	0.82	0.03
			Max. Mx	27	53.95	-0.90	-0.04
			Max. My	31	-10.14	-0.05	1.43
			Max. Vy	27	0.69	-0.90	-0.04
			Max. Vx	20	-1.05	-0.02	-0.67
		Diagonal	Max Tension	26	15.08	0.00	0.00
			Max. Compression	26	-15.34	0.00	0.00
			Max. Mx	26	15.08	0.11	0.00
			Max. My	19	0.22	0.00	-0.00
			Max. Vy	26	0.04	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
		Horizontal	Max Tension	26	9.03	-0.04	0.00
			Max. Compression	26	-9.12	-0.04	0.00
			Max. Mx	22	0.85	-0.07	-0.02
			Max. My	24	0.39	-0.01	0.02
			Max. Vy	22	-0.03	-0.07	-0.02
			Max. Vx	30	-0.00	-0.01	0.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Top Girt	Max Tension	26	7.57	-0.03	0.00
			Max. Compression	25	-7.60	-0.04	-0.00
			Max. Mx	32	-1.32	-0.06	-0.02
			Max. My	24	0.10	-0.01	0.02
			Max. Vy	32	-0.03	-0.06	-0.02
			Max. Vx	24	-0.00	-0.01	0.02
		Inner Bracing	Max Tension	25	0.13	0.00	0.00
			Max. Compression	25	-0.13	0.00	0.00
			Max. Mx	18	-0.00	-0.02	0.00
			Max. My	24	0.00	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	24	0.00	0.00	0.00
T5	60 - 40	Leg	Max Tension	22	107.31	-0.65	-0.09
			Max. Compression	19	-134.44	0.65	-0.20
			Max. Mx	32	90.08	-0.69	-0.10
			Max. My	21	-42.02	0.10	-0.85
			Max. Vy	32	-0.23	-0.46	0.21
			Max. Vx	28	0.38	-0.03	0.59
		Diagonal	Max Tension	26	13.83	0.00	0.00
			Max. Compression	26	-14.12	0.00	0.00
			Max. Mx	26	13.78	0.15	0.00
			Max. My	19	0.94	0.00	-0.00
			Max. Vy	26	-0.04	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
		Horizontal	Max Tension	26	9.14	-0.05	-0.00
			Max. Compression	26	-9.17	-0.05	-0.00
			Max. Mx	22	1.22	-0.07	-0.01
			Max. My	30	0.35	-0.03	0.02
			Max. Vy	22	-0.03	-0.07	-0.01
			Max. Vx	30	-0.00	-0.03	0.02
		Top Girt	Max Tension	26	8.71	-0.04	0.00
			Max. Compression	26	-8.84	-0.04	0.00
			Max. Mx	22	-0.81	-0.06	-0.02
			Max. My	30	0.69	-0.02	0.02
			Max. Vy	22	-0.03	-0.06	-0.02
			Max. Vx	24	-0.00	-0.02	0.02
		Inner Bracing	Max Tension	26	0.15	0.00	0.00
			Max. Compression	26	-0.15	0.00	0.00
			Max. Mx	18	-0.01	-0.04	0.00
			Max. My	24	-0.00	0.00	-0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
T6	40 - 20	Leg	Max Tension	22	137.11	-0.57	-0.10
			Max. Compression	24	-170.74	0.30	-0.04
			Max. Mx	19	-152.40	0.66	-0.09
			Max. My	21	-46.97	0.10	-0.85
			Max. Vy	19	0.11	0.66	-0.09
			Max. Vx	30	0.18	-0.36	0.85
		Diagonal	Max Tension	34	13.72	0.00	0.00
			Max. Compression	34	-14.11	0.00	0.00
			Max. Mx	26	13.44	0.18	0.00
			Max. My	19	1.11	0.00	-0.00
			Max. Vy	26	-0.05	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
		Horizontal	Max Tension	34	9.68	0.00	0.00
			Max. Compression	34	-9.64	-0.09	-0.00
			Max. Mx	22	1.54	-0.13	-0.02
			Max. My	30	-0.09	-0.05	0.02
			Max. Vy	22	-0.05	-0.13	-0.02
			Max. Vx	19	-0.00	-0.05	0.02
		Top Girt	Max Tension	34	9.48	-0.08	-0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	34	-9.49	-0.08	-0.00
			Max. Mx	22	-0.75	-0.12	-0.02
			Max. My	30	0.00	-0.04	0.02
			Max. Vy	22	-0.05	-0.12	-0.02
			Max. Vx	30	-0.00	-0.04	0.02
		Inner Bracing	Max Tension	34	0.16	0.00	0.00
			Max. Compression	34	-0.16	0.00	0.00
			Max. Mx	18	-0.01	-0.07	0.00
			Max. My	30	0.15	0.00	-0.00
			Max. Vy	18	0.03	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
T7	20 - 0	Leg	Max Tension	27	164.61	-0.24	0.06
			Max. Compression	24	-205.04	-0.00	-0.00
			Max. Mx	19	-187.54	1.33	-0.05
			Max. My	20	-15.32	0.50	-0.82
			Max. Vy	19	0.21	1.33	-0.05
			Max. Vx	20	-0.20	0.50	-0.81
		Diagonal	Max Tension	34	13.23	0.00	0.00
			Max. Compression	34	-13.73	0.00	0.00
			Max. Mx	34	13.05	0.21	0.00
			Max. My	19	1.11	0.00	-0.00
			Max. Vy	34	-0.06	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
		Horizontal	Max Tension	34	10.04	0.00	0.00
			Max. Compression	34	-9.80	-0.08	-0.00
			Max. Mx	27	1.82	-0.11	-0.02
			Max. My	19	1.64	-0.05	0.02
			Max. Vy	27	-0.05	-0.11	-0.02
			Max. Vx	19	-0.00	-0.05	0.02
		Top Girt	Max Tension	34	9.77	-0.10	-0.00
			Max. Compression	34	-9.79	-0.10	-0.00
			Max. Mx	22	-1.00	-0.13	-0.02
			Max. My	30	-0.25	-0.07	0.02
			Max. Vy	22	-0.05	-0.13	-0.02
			Max. Vx	19	-0.00	-0.07	0.02
		Inner Bracing	Max Tension	34	0.17	0.00	0.00
			Max. Compression	34	-0.17	0.00	0.00
			Max. Mx	18	-0.01	-0.13	0.00
			Max. My	30	0.16	0.00	-0.00
			Max. Vy	18	0.05	0.00	0.00
			Max. Vx	30	-0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	30	218.22	26.62	-14.39
	Max. H_x	30	218.22	26.62	-14.39
	Max. H_z	21	-171.61	-21.63	12.94
	Min. Vert	22	-176.84	-22.80	12.34
	Min. H_x	22	-176.84	-22.80	12.34
	Min. H_z	30	218.22	26.62	-14.39
Leg B	Max. Vert	24	220.07	-26.16	-15.26
	Max. H_x	32	-175.02	22.32	13.12
	Max. H_z	33	-169.80	20.96	14.06
	Min. Vert	32	-175.02	22.32	13.12

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg A	Min. H_x	24	220.07	-26.16	-15.26
	Min. H_z	25	204.67	-23.31	-15.35
	Max. Vert	19	219.23	0.98	30.34
	Max. H_x	31	15.94	4.49	1.42
	Max. H_z	19	219.23	0.98	30.34
	Min. Vert	27	-177.19	-0.91	-25.99
	Min. H_x	24	-85.72	-4.56	-13.14
	Min. H_z	27	-177.19	-0.91	-25.99

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	30.42	0.00	0.00	-4.93	-10.48	-0.00
Dead+Wind 0 deg - No Ice	30.42	-0.00	-37.17	-2961.40	-10.33	24.90
Dead+Wind 30 deg - No Ice	30.42	18.17	-31.62	-2533.75	-1461.97	22.58
Dead+Wind 45 deg - No Ice	30.42	25.62	-25.74	-2065.37	-2058.99	19.19
Dead+Wind 60 deg - No Ice	30.42	31.29	-18.14	-1458.80	-2514.20	14.47
Dead+Wind 90 deg - No Ice	30.42	36.35	0.00	-4.78	-2913.74	3.13
Dead+Wind 120 deg - No Ice	30.42	32.06	18.59	1473.40	-2556.34	-8.93
Dead+Wind 135 deg - No Ice	30.42	25.63	25.74	2055.71	-2059.27	-14.98
Dead+Wind 150 deg - No Ice	30.42	18.18	31.62	2524.02	-1462.31	-19.46
Dead+Wind 180 deg - No Ice	30.42	0.00	36.29	2903.05	-10.71	-24.06
Dead+Wind 210 deg - No Ice	30.42	-18.17	31.62	2523.85	1440.94	-22.58
Dead+Wind 225 deg - No Ice	30.42	-25.62	25.74	2055.47	2037.98	-19.19
Dead+Wind 240 deg - No Ice	30.42	-32.05	18.59	1473.10	2535.15	-15.98
Dead+Wind 270 deg - No Ice	30.42	-36.35	-0.00	-5.15	2892.75	-3.13
Dead+Wind 300 deg - No Ice	30.42	-31.29	-18.15	-1459.14	2493.39	9.59
Dead+Wind 315 deg - No Ice	30.42	-25.63	-25.74	-2065.66	2038.25	14.98
Dead+Wind 330 deg - No Ice	30.42	-18.18	-31.62	-2533.96	1441.27	19.45
Dead+Ice+Temp	48.97	0.00	0.00	7.68	-20.60	-0.00
Dead+Wind 0 deg+Ice+Temp	48.97	-0.00	-51.19	-3961.03	-20.48	38.42
Dead+Wind 30 deg+Ice+Temp	48.97	24.33	-42.29	-3300.19	-1921.64	37.98
Dead+Wind 45 deg+Ice+Temp	48.97	34.13	-34.25	-2675.56	-2691.59	34.26
Dead+Wind 60 deg+Ice+Temp	48.97	41.46	-24.02	-1877.18	-3270.43	28.14
Dead+Wind 90 deg+Ice+Temp	48.97	48.66	0.00	7.85	-3822.93	12.99
Dead+Wind 120 deg+Ice+Temp	48.97	44.19	25.60	1992.15	-3442.65	-5.14
Dead+Wind 135 deg+Ice+Temp	48.97	34.13	34.25	2691.16	-2691.87	-16.66
Dead+Wind 150 deg+Ice+Temp	48.97	24.33	42.29	3315.70	-1921.99	-24.98
Dead+Wind 180 deg+Ice+Temp	48.97	0.00	48.04	3777.70	-20.88	-35.65
Dead+Wind 210 deg+Ice+Temp	48.97	-24.33	42.29	3315.54	1880.30	-37.97
Dead+Wind 225 deg+Ice+Temp	48.97	-34.13	34.25	2690.79	2650.17	-34.26
Dead+Wind 240 deg+Ice+Temp	48.97	-44.18	25.59	1991.86	3401.15	-33.29
Dead+Wind 270 deg+Ice+Temp	48.97	-48.66	-0.00	7.46	3781.66	-12.99
Dead+Wind 300 deg+Ice+Temp	48.97	-41.46	-24.02	-1877.55	3229.33	7.51
Dead+Wind 315 deg+Ice+Temp	48.97	-34.13	-34.25	-2675.88	2650.56	16.66
Dead+Wind 330 deg+Ice+Temp	48.97	-24.33	-42.29	-3300.42	1880.65	24.98
Dead+Wind 0 deg - Service	30.42	-0.00	-37.17	-2961.40	-10.33	24.90
Dead+Wind 30 deg - Service	30.42	18.17	-31.62	-2533.75	-1461.97	22.58
Dead+Wind 45 deg - Service	30.42	25.62	-25.74	-2065.37	-2058.99	19.19
Dead+Wind 60 deg - Service	30.42	31.29	-18.14	-1458.80	-2514.20	14.47
Dead+Wind 90 deg - Service	30.42	36.35	0.00	-4.78	-2913.74	3.13
Dead+Wind 120 deg - Service	30.42	32.06	18.59	1473.40	-2556.34	-8.93
Dead+Wind 135 deg - Service	30.42	25.63	25.74	2055.71	-2059.27	-14.98
Dead+Wind 150 deg - Service	30.42	18.18	31.62	2524.02	-1462.31	-19.46
Dead+Wind 180 deg - Service	30.42	0.00	36.29	2903.05	-10.71	-24.06

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
Dead+Wind 210 deg - Service	30.42	-18.17	31.62	2523.85	1440.94	-22.58
Dead+Wind 225 deg - Service	30.42	-25.62	25.74	2055.47	2037.98	-19.19
Dead+Wind 240 deg - Service	30.42	-32.05	18.59	1473.10	2535.15	-15.98
Dead+Wind 270 deg - Service	30.42	-36.35	-0.00	-5.15	2892.75	-3.13
Dead+Wind 300 deg - Service	30.42	-31.29	-18.15	-1459.14	2493.39	9.59
Dead+Wind 315 deg - Service	30.42	-25.63	-25.74	-2065.66	2038.25	14.98
Dead+Wind 330 deg - Service	30.42	-18.18	-31.62	-2533.96	1441.27	19.45

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	-30.42	0.00	0.00	30.42	0.00	0.000%
2	-0.00	-30.42	-37.17	0.00	30.42	37.17	0.000%
3	18.17	-30.42	-31.62	-18.17	30.42	31.62	0.000%
4	25.62	-30.42	-25.74	-25.62	30.42	25.74	0.000%
5	31.29	-30.42	-18.14	-31.29	30.42	18.14	0.000%
6	36.35	-30.42	0.00	-36.35	30.42	-0.00	0.000%
7	32.06	-30.42	18.59	-32.06	30.42	-18.59	0.000%
8	25.63	-30.42	25.74	-25.63	30.42	-25.74	0.000%
9	18.18	-30.42	31.62	-18.18	30.42	-31.62	0.000%
10	0.00	-30.42	36.29	-0.00	30.42	-36.29	0.000%
11	-18.17	-30.42	31.62	18.17	30.42	-31.62	0.000%
12	-25.62	-30.42	25.74	25.62	30.42	-25.74	0.000%
13	-32.05	-30.42	18.59	32.05	30.42	-18.59	0.000%
14	-36.35	-30.42	-0.00	36.35	30.42	0.00	0.000%
15	-31.29	-30.42	-18.15	31.29	30.42	18.15	0.000%
16	-25.63	-30.42	-25.74	25.63	30.42	25.74	0.000%
17	-18.18	-30.42	-31.62	18.18	30.42	31.62	0.000%
18	0.00	-48.97	0.00	0.00	48.97	0.00	0.000%
19	-0.00	-48.97	-51.19	0.00	48.97	51.19	0.000%
20	24.33	-48.97	-42.29	-24.33	48.97	42.29	0.000%
21	34.13	-48.97	-34.25	-34.13	48.97	34.25	0.000%
22	41.46	-48.97	-24.02	-41.46	48.97	24.02	0.000%
23	48.66	-48.97	0.00	-48.66	48.97	-0.00	0.000%
24	44.19	-48.97	25.60	-44.19	48.97	-25.60	0.000%
25	34.13	-48.97	34.25	-34.13	48.97	-34.25	0.000%
26	24.33	-48.97	42.29	-24.33	48.97	-42.29	0.000%
27	0.00	-48.97	48.04	-0.00	48.97	-48.04	0.000%
28	-24.33	-48.97	42.29	24.33	48.97	-42.29	0.000%
29	-34.13	-48.97	34.25	34.13	48.97	-34.25	0.000%
30	-44.18	-48.97	25.59	44.18	48.97	-25.59	0.000%
31	-48.66	-48.97	-0.00	48.66	48.97	0.00	0.000%
32	-41.46	-48.97	-24.02	41.46	48.97	24.02	0.000%
33	-34.13	-48.97	-34.25	34.13	48.97	34.25	0.000%
34	-24.33	-48.97	-42.29	24.33	48.97	42.29	0.000%
35	-0.00	-30.42	-37.17	0.00	30.42	37.17	0.000%
36	18.17	-30.42	-31.62	-18.17	30.42	31.62	0.000%
37	25.62	-30.42	-25.74	-25.62	30.42	25.74	0.000%
38	31.29	-30.42	-18.14	-31.29	30.42	18.14	0.000%
39	36.35	-30.42	0.00	-36.35	30.42	-0.00	0.000%
40	32.06	-30.42	18.59	-32.06	30.42	-18.59	0.000%
41	25.63	-30.42	25.74	-25.63	30.42	-25.74	0.000%
42	18.18	-30.42	31.62	-18.18	30.42	-31.62	0.000%
43	0.00	-30.42	36.29	-0.00	30.42	-36.29	0.000%
44	-18.17	-30.42	31.62	18.17	30.42	-31.62	0.000%
45	-25.62	-30.42	25.74	25.62	30.42	-25.74	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
46	-32.05	-30.42	18.59	32.05	30.42	-18.59	0.000%
47	-36.35	-30.42	-0.00	36.35	30.42	0.00	0.000%
48	-31.29	-30.42	-18.15	31.29	30.42	18.15	0.000%
49	-25.63	-30.42	-25.74	25.63	30.42	25.74	0.000%
50	-18.18	-30.42	-31.62	18.18	30.42	31.62	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00000001
17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000001
20	Yes	4	0.00000001	0.00000001
21	Yes	4	0.00000001	0.00000001
22	Yes	4	0.00000001	0.00000001
23	Yes	4	0.00000001	0.00000001
24	Yes	4	0.00000001	0.00000001
25	Yes	4	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00000001
29	Yes	4	0.00000001	0.00000001
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000001
32	Yes	4	0.00000001	0.00000001
33	Yes	4	0.00000001	0.00000001
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001

47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	130 - 120	5.339	35	0.3411	0.1070
T2	120 - 100	4.616	35	0.3348	0.0951
T3	100 - 80	3.253	35	0.2957	0.0614
T4	80 - 60	2.072	35	0.2361	0.0382
T5	60 - 40	1.177	35	0.1696	0.0258
T6	40 - 20	0.537	35	0.1109	0.0163
T7	20 - 0	0.159	35	0.0508	0.0079

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
132.00	DB806D-Y	35	5.339	0.3411	0.1070	85231
131.00	PD220	35	5.339	0.3411	0.1070	85231
130.00	Lightning Rod	35	5.339	0.3411	0.1070	85231
125.00	LNX-6515DS	35	4.976	0.3387	0.1014	85231
117.00	PA6-59	35	4.404	0.3312	0.0906	40198
115.00	1142-2B	35	4.263	0.3282	0.0874	38489
113.00	1142-2B	35	4.124	0.3249	0.0840	37054
107.00	6 FT DISH	35	3.715	0.3128	0.0733	33326
105.00	AP11-850/105N	35	3.581	0.3082	0.0698	32244
104.00	AP11-850/105N	35	3.515	0.3059	0.0680	31721
99.00	6 FT DISH	35	3.189	0.2931	0.0600	27893
98.00	ROHN 4-ft Side Arm	35	3.125	0.2904	0.0586	26799
96.00	8 FT DISH	35	2.999	0.2849	0.0559	24600
86.00	PAD8-59AW	35	2.399	0.2554	0.0441	17116
84.00	2' Yagi	35	2.287	0.2490	0.0420	16139
75.00	Valmont T-Arm (1)	35	1.821	0.2194	0.0347	15644
71.00	4 FT DISH	35	1.634	0.2058	0.0321	16726
70.00	TTA 12"x6"x4"	35	1.589	0.2024	0.0316	17021
65.00	Diamond X-500A	35	1.375	0.1857	0.0287	18663
58.00	DB212-1	35	1.102	0.1634	0.0251	20230
54.00	DB212-1	35	0.959	0.1514	0.0233	19721
46.00	DB230-2B	35	0.702	0.1284	0.0194	18599
43.00	ROHN 4-ft Side Arm	35	0.617	0.1197	0.0178	18218
42.00	Wind speed cups	35	0.589	0.1168	0.0173	18111

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	130 - 120	7.038	19	0.4484	0.1164
T2	120 - 100	6.089	19	0.4394	0.1016
T3	100 - 80	4.301	19	0.3882	0.0668
T4	80 - 60	2.752	19	0.3100	0.0468
T5	60 - 40	1.575	24	0.2233	0.0388
T6	40 - 20	0.726	24	0.1469	0.0249
T7	20 - 0	0.218	19	0.0677	0.0122

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
132.00	DB806D-Y	19	7.038	0.4484	0.1164	64283
131.00	PD220	19	7.038	0.4484	0.1164	64283
130.00	Lightning Rod	19	7.038	0.4484	0.1164	64283
125.00	LNX-6515DS	19	6.561	0.4448	0.1094	64283
117.00	PA6-59	19	5.810	0.4346	0.0963	30321
115.00	1142-2B	19	5.625	0.4308	0.0925	29034
113.00	1142-2B	19	5.443	0.4264	0.0886	27953
107.00	6 FT DISH	19	4.906	0.4106	0.0782	25144
105.00	AP11-850/105N	19	4.730	0.4046	0.0748	24329
104.00	AP11-850/105N	19	4.643	0.4015	0.0731	23935
99.00	6 FT DISH	19	4.216	0.3848	0.0653	21107
98.00	ROHN 4-ft Side Arm	19	4.133	0.3813	0.0639	20306
96.00	8 FT DISH	19	3.967	0.3741	0.0616	18693
86.00	PAD8-59AW	19	3.181	0.3352	0.0517	13139
84.00	2' Yagi	19	3.034	0.3270	0.0500	12405
75.00	Valmont T-Arm (1)	19	2.422	0.2881	0.0451	12089
71.00	4 FT DISH	24	2.177	0.2704	0.0436	12962
70.00	TTA 12"x6"x4"	24	2.118	0.2660	0.0433	13201
65.00	Diamond X-500A	24	1.837	0.2442	0.0413	14538
58.00	DB212-1	24	1.476	0.2152	0.0377	15791
54.00	DB212-1	24	1.287	0.1996	0.0351	15320
46.00	DB230-2B	24	0.946	0.1697	0.0293	14309
43.00	ROHN 4-ft Side Arm	24	0.832	0.1584	0.0270	13971
42.00	Wind speed cups	24	0.796	0.1546	0.0263	13875

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	130	Leg	A325N	0.7500	4	0.72	19.44	0.037 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	1.45	6.44	0.225 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	1.60	6.44	0.249 ✔	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	0.37	6.44	0.058 ✔	1.333	Bolt Shear
T2	120	Leg	A325N	0.8750	4	4.80	26.46	0.181 ✔	1.333	Bolt Tension

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
		Diagonal	A325N	0.6250	3	2.55	6.44	0.395 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	2.39	6.44	0.371 ✔	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	1.85	6.44	0.286 ✔	1.333	Bolt Shear
T3	100	Leg	A325N	1.0000	4	11.70	34.56	0.339 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	3.43	6.44	0.533 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	3.49	6.44	0.542 ✔	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	2.99	6.44	0.464 ✔	1.333	Bolt Shear
T4	80	Leg	A325N	1.0000	4	18.39	34.56	0.532 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	5.11	6.44	0.794 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	4.56	6.44	0.708 ✔	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	3.80	6.44	0.590 ✔	1.333	Bolt Shear
T5	60	Leg	A325N	1.0000	6	17.89	34.56	0.518 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	4.71	6.44	0.731 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	4.58	6.44	0.711 ✔	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	4.42	6.44	0.686 ✔	1.333	Bolt Shear
T6	40	Leg	A325N	1.0000	6	22.85	34.56	0.661 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	4.70	6.44	0.730 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	4.84	6.44	0.751 ✔	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	4.75	6.44	0.737 ✔	1.333	Bolt Shear
T7	20	Leg	F1554-105	1.0000	8	20.58	32.40	0.635 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	4.58	6.44	0.710 ✔	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	5.02	6.44	0.779 ✔	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	4.90	6.44	0.760 ✔	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T1	130 - 120	ROHN 2.5 STD	10.00	5.00	63.3 K=1.00	22.141	1.7040	-7.13	37.73	0.189 ✔
T2	120 - 100	ROHN 3 STD	20.04	6.68	68.9 K=1.00	21.145	2.2285	-27.64	47.12	0.587 ✔
T3	100 - 80	ROHN 4 STD	20.04	6.68	53.1 K=1.00	23.861	3.1741	-62.06	75.74	0.819 ✔
T4	80 - 60	ROHN 5 STD	20.04	10.02	64.0 K=1.00	22.016	4.2999	-95.23	94.67	1.006 ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T5	60 - 40	ROHN 5 EH	20.06	10.03	65.4 K=1.00	21.769	6.1120	-134.44	133.05	1.010 ✔
T6	40 - 20	ROHN 6 EHS	20.05	10.03	54.1 K=1.00	23.705	6.7133	-170.74	159.14	1.073 ✔
T7	20 - 0	ROHN 6 EH	20.05	10.03	54.8 K=1.00	23.583	8.4049	-205.04	198.21	1.034 ✔

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	130 - 120	ROHN 2 STD	6.58	6.39	97.4 K=1.00	15.294	1.0745	-4.35	16.43	0.265 ✔
T2	120 - 100	ROHN 2.5 STD	8.53	8.29	105.0 K=1.00	13.518	1.7040	-7.64	23.04	0.332 ✔
T3	100 - 80	ROHN 2.5 STD	9.21	8.94	113.2 K=1.00	11.646	1.7040	-10.21	19.85	0.515 ✔
T4	80 - 60	ROHN 2.5 X-STR	12.49	12.10	157.2 K=1.00	6.043	2.2535	-15.34	13.62	1.126 ✔
T5	60 - 40	ROHN 3 STD	13.31	12.96	133.6 K=1.00	8.365	2.2285	-14.10	18.64	0.756 ✔
T6	40 - 20	ROHN 3 STD	14.16	13.77	142.0 K=1.00	7.403	2.2285	-13.92	16.50	0.844 ✔
T7	20 - 0	ROHN 3 STD	15.07	14.70	151.6 K=1.00	6.495	2.2285	-13.58	14.47	0.938 ✔

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	130 - 120	ROHN 1.5 STD	8.52	4.14	79.8 K=1.00	19.051	0.7995	-3.18	15.23	0.209 ✔
T2	120 - 100	ROHN 2 STD	9.93	4.82	73.5 K=1.00	20.285	1.0745	-4.78	21.80	0.219 ✔
T3	100 - 80	ROHN 2 STD	12.01	5.82	88.7 K=1.00	17.212	1.0745	-6.93	18.50	0.375 ✔
T4	80 - 60	ROHN 2 STD	13.83	6.68	101.9 K=1.00	14.260	1.0745	-9.12	15.32	0.595 ✔
T5	60 - 40	ROHN 2 STD	16.25	7.89	120.3 K=1.00	10.313	1.0745	-9.17	11.08	0.827 ✔
T6	40 - 20	ROHN 2.5 STD	18.79	9.12	115.5 K=1.00	11.192	1.7040	-9.64	19.07	0.505 ✔
T7	20 - 0	ROHN 2.5 STD	21.29	10.37	131.3 K=1.00	8.656	1.7040	-9.80	14.75	0.664 ✔

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	130 - 120	ROHN 1.5 STD	8.50	4.13	79.6 K=1.00	19.091	0.7995	-0.73	15.26	0.048 ✔
T2	120 - 100	ROHN 2 STD	8.54	4.15	63.3 K=1.00	22.149	1.0745	-3.69	23.80	0.155 ✔
T3	100 - 80	ROHN 2 STD	10.63	5.17	78.8 K=1.00	19.258	1.0745	-5.98	20.69	0.289 ✔
T4	80 - 60	ROHN 2 STD	12.71	6.17	94.0 K=1.00	16.062	1.0745	-7.60	17.26	0.441 ✔
T5	60 - 40	ROHN 2 STD	14.96	7.25	110.5 K=1.00	12.233	1.0745	-8.84	13.14	0.672 ✔
T6	40 - 20	ROHN 2.5 STD	17.54	8.54	108.2 K=1.00	12.766	1.7040	-9.49	21.75	0.436 ✔
T7	20 - 0	ROHN 2.5 STD	20.04	9.74	123.4 K=1.00	9.802	1.7040	-9.79	16.70	0.586 ✔

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	130 - 120	L2x2x1/8	4.25	4.25	128.3 K=1.00	9.074	0.4844	-0.01	4.39	0.003 ✔
T2	120 - 100	L2x2x1/8	4.27	4.27	128.9 K=1.00	8.985	0.4844	-0.06	4.35	0.015 ✔
T3	100 - 80	L2x2x1/8	5.31	5.31	160.4 K=1.00	5.807	0.4844	-0.10	2.81	0.037 ✔
T4	80 - 60	L2x2x1/8	6.35	6.35	191.8 K=1.00	4.059	0.4844	-0.13	1.97	0.067 ✔
T5	60 - 40	L2 1/2x2 1/2x3/16	7.48	7.48	181.3 K=1.00	4.542	0.9020	-0.15	4.10	0.037 ✔
T6	40 - 20	L3x3x3/16	8.77	8.77	176.6 K=1.00	4.789	1.0900	-0.16	5.22	0.032 ✔
T7	20 - 0	L3 1/2x3 1/2x1/4	10.02	10.02	173.3 K=1.00	4.974	1.6900	-0.17	8.41	0.020 ✔

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	130 - 120	ROHN 2.5 STD	10.00	5.00	63.3	30.000	1.7040	2.89	51.12	0.056 ✔
T2	120 - 100	ROHN 3 STD	20.04	6.68	68.9	30.000	2.2285	19.21	66.85	0.287 ✔
T3	100 - 80	ROHN 4 STD	20.04	6.68	53.1	30.000	3.1741	46.81	95.22	0.492 ✔
T4	80 - 60	ROHN 5 STD	20.04	10.02	64.0	30.000	4.2999	73.55	129.00	0.570 ✔
T5	60 - 40	ROHN 5 EH	20.06	10.03	65.4	30.000	6.1120	107.31	183.36	0.585 ✔
T6	40 - 20	ROHN 6 EHS	20.05	10.03	54.1	30.000	6.7133	137.11	201.40	0.681 ✔
T7	20 - 0	ROHN 6 EH	20.05	10.03	54.8	30.000	8.4049	164.61	252.15	0.653 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	130 - 120	ROHN 2 STD	6.58	6.39	97.4	30.000	1.0745	4.25	32.24	0.132 ✔
T2	120 - 100	ROHN 2.5 STD	8.53	8.29	105.0	30.000	1.7040	7.48	51.12	0.146 ✔
T3	100 - 80	ROHN 2.5 STD	8.98	8.70	110.2	30.000	1.7040	10.12	51.12	0.198 ✔
T4	80 - 60	ROHN 2.5 X-STR	12.49	12.10	157.2	30.000	2.2535	15.08	67.61	0.223 ✔
T5	60 - 40	ROHN 3 STD	12.89	12.54	129.3	30.000	2.2285	13.83	66.85	0.207 ✔
T6	40 - 20	ROHN 3 STD	13.73	13.34	137.5	30.000	2.2285	13.72	66.85	0.205 ✔
T7	20 - 0	ROHN 3 STD	14.61	14.24	146.9	30.000	2.2285	13.23	66.85	0.198 ✔

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	130 - 120	ROHN 1.5 STD	8.52	4.14	79.8	30.000	0.7995	3.21	23.98	0.134 ✔
T2	120 - 100	ROHN 2 STD	9.93	4.82	73.5	30.000	1.0745	4.72	32.24	0.146 ✔
T3	100 - 80	ROHN 2 STD	12.01	5.82	88.7	30.000	1.0745	6.98	32.24	0.217 ✔
T4	80 - 60	ROHN 2 STD	13.83	6.68	101.9	30.000	1.0745	9.03	32.24	0.280

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T5	60 - 40	ROHN 2 STD	16.25	7.89	120.3	30.000	1.0745	9.14	32.24	0.284 ✔
T6	40 - 20	ROHN 2.5 STD	18.79	9.12	115.5	30.000	1.7040	9.68	51.12	0.189 ✔
T7	20 - 0	ROHN 2.5 STD	21.29	10.37	131.3	30.000	1.7040	10.04	51.12	0.196 ✔

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	130 - 120	ROHN 1.5 STD	8.50	4.13	79.6	30.000	0.7995	0.75	23.98	0.031 ✔
T2	120 - 100	ROHN 2 STD	8.54	4.15	63.3	30.000	1.0745	3.39	32.24	0.105 ✔
T3	100 - 80	ROHN 2 STD	10.63	5.17	78.8	30.000	1.0745	5.90	32.24	0.183 ✔
T4	80 - 60	ROHN 2 STD	12.71	6.17	94.0	30.000	1.0745	7.57	32.24	0.235 ✔
T5	60 - 40	ROHN 2 STD	14.96	7.25	110.5	30.000	1.0745	8.71	32.24	0.270 ✔
T6	40 - 20	ROHN 2.5 STD	17.54	8.54	108.2	30.000	1.7040	9.48	51.12	0.186 ✔
T7	20 - 0	ROHN 2.5 STD	20.04	9.74	123.4	30.000	1.7040	9.77	51.12	0.191 ✔

Inner Bracing Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	130 - 120	L2x2x1/8	4.25	4.25	81.4	21.600	0.4844	0.01	10.46	0.001 ✔
T2	120 - 100	L2x2x1/8	4.27	4.27	81.8	21.600	0.4844	0.06	10.46	0.006 ✔
T3	100 - 80	L2x2x1/8	5.31	5.31	101.8	21.600	0.4844	0.10	10.46	0.010 ✔
T4	80 - 60	L2x2x1/8	6.35	6.35	121.8	21.600	0.4844	0.13	10.46	0.013 ✔
T5	60 - 40	L2 1/2x2 1/2x3/16	7.48	7.48	115.4	21.600	0.9020	0.15	19.48	0.008 ✔
T6	40 - 20	L3x3x3/16	8.77	8.77	112.1	21.600	1.0900	0.16	23.54	0.007 ✔
T7	20 - 0	L3 1/2x3 1/2x1/4	10.02	10.02	110.3	21.600	1.6900	0.17	36.50	0.005 ✔

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	K	K	

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	130 - 120	Leg	ROHN 2.5 STD	3	-7.13	50.29	14.2	Pass
T2	120 - 100	Leg	ROHN 3 STD	30	-27.64	62.81	44.0	Pass
T3	100 - 80	Leg	ROHN 4 STD	69	-62.06	100.96	61.5	Pass
T4	80 - 60	Leg	ROHN 5 STD	108	-95.23	126.19	75.5	Pass
T5	60 - 40	Leg	ROHN 5 EH	135	-134.44	177.35	75.8	Pass
T6	40 - 20	Leg	ROHN 6 EHS	161	-170.74	212.13	80.5	Pass
T7	20 - 0	Leg	ROHN 6 EH	188	-205.04	264.22	77.6	Pass
T1	130 - 120	Diagonal	ROHN 2 STD	15	-4.35	21.91	19.8	Pass
T2	120 - 100	Diagonal	ROHN 2.5 STD	38	-7.64	30.71	24.9	Pass
							29.6 (b)	
T3	100 - 80	Diagonal	ROHN 2.5 STD	77	-10.21	26.45	38.6	Pass
							40.0 (b)	
T4	80 - 60	Diagonal	ROHN 2.5 X-STR	116	-15.34	18.15	84.5	Pass
T5	60 - 40	Diagonal	ROHN 3 STD	143	-14.10	24.85	56.7	Pass
T6	40 - 20	Diagonal	ROHN 3 STD	171	-13.92	21.99	63.3	Pass
T7	20 - 0	Diagonal	ROHN 3 STD	198	-13.58	19.29	70.4	Pass
T1	130 - 120	Horizontal	ROHN 1.5 STD	13	-3.18	20.30	15.7	Pass
							18.7 (b)	
T2	120 - 100	Horizontal	ROHN 2 STD	37	-4.78	29.06	16.5	Pass
							27.8 (b)	
T3	100 - 80	Horizontal	ROHN 2 STD	76	-6.93	24.65	28.1	Pass
							40.6 (b)	
T4	80 - 60	Horizontal	ROHN 2 STD	115	-9.12	20.43	44.6	Pass
							53.1 (b)	
T5	60 - 40	Horizontal	ROHN 2 STD	142	-9.17	14.77	62.1	Pass
T6	40 - 20	Horizontal	ROHN 2.5 STD	169	-9.64	25.42	37.9	Pass
							56.3 (b)	
T7	20 - 0	Horizontal	ROHN 2.5 STD	196	-9.80	19.66	49.8	Pass
							58.4 (b)	
T1	130 - 120	Top Girt	ROHN 1.5 STD	6	-0.73	20.34	3.6	Pass
							4.3 (b)	
T2	120 - 100	Top Girt	ROHN 2 STD	32	-3.69	31.73	11.6	Pass
							21.5 (b)	
T3	100 - 80	Top Girt	ROHN 2 STD	71	-5.98	27.58	21.7	Pass
							34.8 (b)	
T4	80 - 60	Top Girt	ROHN 2 STD	110	-7.60	23.01	33.1	Pass
							44.3 (b)	
T5	60 - 40	Top Girt	ROHN 2 STD	137	-8.84	17.52	50.4	Pass
							51.5 (b)	
T6	40 - 20	Top Girt	ROHN 2.5 STD	164	-9.49	29.00	32.7	Pass
							55.3 (b)	
T7	20 - 0	Top Girt	ROHN 2.5 STD	191	-9.79	22.27	44.0	Pass
							57.0 (b)	
T1	130 - 120	Inner Bracing	L2x2x1/8	26	-0.01	5.86	0.2	Pass
T2	120 - 100	Inner Bracing	L2x2x1/8	65	-0.06	5.80	1.1	Pass
T3	100 - 80	Inner Bracing	L2x2x1/8	103	-0.10	3.75	2.8	Pass
T4	80 - 60	Inner Bracing	L2x2x1/8	130	-0.13	2.62	5.0	Pass
T5	60 - 40	Inner Bracing	L2 1/2x2 1/2x3/16	157	-0.15	5.46	2.8	Pass
T6	40 - 20	Inner Bracing	L3x3x3/16	185	-0.16	6.96	2.4	Pass
T7	20 - 0	Inner Bracing	L3 1/2x3 1/2x1/4	211	-0.17	11.21	1.5	Pass
							Summary	

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
						Leg (T6)	80.5	Pass
						Diagonal (T4)	84.5	Pass
						Horizontal (T5)	62.1	Pass
						Top Girt (T7)	57.0	Pass
						Inner Bracing (T4)	5.0	Pass
						Bolt Checks	59.5	Pass
						RATING =	**84.5**	**Pass**

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Subject:	Anchor Bolt Analysis
Location:	Bristol, CT
Rev. 0: 9/2/15	Prepared by: T.J.L. Checked by: C.F.C. Job No. 15019.007

Tower Anchor Bolt Analysis

Max Leg Reactions:

Uplift = $Uplift := 177 \cdot kips$ (User Input)

Shear = $Shear := 30 \cdot kips$ (User Input)

Compression = $Compression := 220 \cdot kips$ (User Input)

Anchor Bolt Data:

Use ASTM F1554-105

Number of Anchor Bolts = $N := 8$ (User Input)

Bolt Ultimate Strength = $F_u := 125ksi$ (User Input)

Bolt Yield Strength = $F_y := 105ksi$ (User Input)

Diameter of Bolts = $D := 1.0in$ (User Input)

Threads per Inch = $n := 8$ (User Input)

Coefficient of Friction = $\mu := 0.55$ (User Input) (ASCE 10-97 pg. 23)

Anchor Bolt Area:

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.974 \cdot in}{n} \right)^2 = 0.606 \cdot in^2$ (ASCE 10-97 Eq. 7.4-3)

Check Anchor Bolt Area:

Based on the ASCE 10-97 Design of Latticed Steel Transmission Structures

Required Area = $A_{s1} := \frac{Uplift}{F_y} + \frac{Shear}{\mu \cdot .85 \cdot F_y} = 2.3 \cdot in^2$ (ASCE 10-97 Eq. 7.4-2)

$A_{s2} := \left[\frac{Shear - (0.3 \cdot Compression)}{\mu \cdot .85 \cdot F_y} \right] = -0.733 \cdot in^2$ (ASCE 10-97 Eq. 7.4-4)

Provided Area = $A_{sprovided} := A_n \cdot N = 4.8 \cdot in^2$

$Condition1 := if\left(\frac{A_{s1}}{A_{sprovided}} \le 1.00, "OK", "Overstressed" \right)$

Condition1 = "OK"

$Condition2 := if\left(\frac{A_{s2}}{A_{sprovided}} \le 1.00, "OK", "Overstressed" \right)$

Condition2 = "OK"

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Subject:	FOUNDATION ANALYSIS
Location:	Bristol, CT
Rev. 0: 9/2/15	Prepared by: T.J.L. Checked by: C.F.C. Job No. 15019.007

Mat Foundation Analysis:

Input Data:

Tower Data

Overturning Moment =	$OM := 3978 \cdot ft \cdot kips$	(User Input from tnxTower)	
Shear Force =	$S_t := 51 \cdot kip$	(User Input from tnxTower)	
Axial Force =	$WT_t := 49 \cdot kip$	(User Input from tnxTower)	
Max Compression Force =	$C_t := 220 \cdot kip$	(User Input from tnxTower)	
Max Uplift Force =	$U_t := 177 \cdot kip$	(User Input from tnxTower)	
Tower Height =	$H_t := 130 \cdot ft$	(User Input)	
Tower Width =	$W_t := 17.3 \cdot ft$	(User Input)	
Tower Position on Foundation (1=offset, 2=centered) =	$Pos_t := 2$	(User Input)	

Footing Data:

Overall Depth of Footing =	$D_f := 3.5 \cdot ft$	(User Input)	
Thickness of Footing =	$T_f := 4.0 \cdot ft$	(User Input)	
Width of Footing =	$W_f := 31.0 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 0 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 0 \cdot ft$	(User Input)	
Diameter of Pier =	$d_p := 0 \cdot ft$	(User Input)	

Material Properties:

Concrete Compressive Strength =	$f_c := 4000 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 34 \cdot deg$	(User Input)	
Allowable Soil Bearing Capacity =	$q_s := 6000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 100 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Foundation Bouyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	$Z := 2$	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	

Pad Reinforcement:

Bar Size =	$BS_{top} := 7$	(User Input)	(Top of Pad)
Bar Diameter =	$d_{btop} := 0.875 \cdot in$	(User Input)	(Top of Pad)
Number of Bars =	$NB_{top} := 32$	(User Input)	(Top of Pad)
Bar Size =	$BS_{bot} := 7$	(User Input)	(Bottom of Pad)
Bar Diameter =	$d_{bbot} := 0.875 \cdot in$	(User Input)	(Bottom of Pad)
Number of Bars =	$NB_{bot} := 32$	(User Input)	(Bottom of Pad)
Clear Cover of Reinforcement =	$Cvr_{pad} := 3.0 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)

Calculated Factors:

Pad Top Reinforcement Bar Area =

$$A_{btop} := \frac{\pi \cdot d_{btop}^{2}}{4} = 0.601 \cdot in^2$$

Pad Bottom Reinforcement Bar Area =

$$A_{bbot} := \frac{\pi \cdot d_{bbot}^{2}}{4} = 0.601 \cdot in^2$$

Coefficient of Lateral Soil Pressure =

$$K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3.537$$

Load Factor =

$$LF := \begin{cases} 1.333 & \text{if } H_t \le 700 \cdot ft \\ 1.7 & \text{if } H_t \ge 1200 \cdot ft \\ 1.333 + \left(\frac{H_t - 700ft}{1200ft - 700ft} \right) \cdot 0.4 & \text{otherwise} \end{cases} = 1.333$$

Stability of Footing:

Adjusted Concrete Unit Weight = $\gamma_c := if(Bouyancy = 1, \gamma_{conc} - 62.4pcf, \gamma_{conc}) = 150 \cdot pcf$

Adjusted Soil Unit Weight = $\gamma_s := if(Bouyancy = 1, \gamma_{soil} - 62.4pcf, \gamma_{soil}) = 100 \cdot pcf$

Passive Pressure = $P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0 \cdot ksf$

$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p} = -0.177 \cdot ksf$

$P_{top} := if[n < (D_f - T_f), P_{pt}, P_{pn}] = 0 \cdot ksf$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 1.238 \cdot ksf$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 0.619 \cdot ksf$

$T_p := if[n < (D_f - T_f), T_f, (D_f - n)] = 3.5$

$A_p := W_f \cdot T_p = 108.5$

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 67.161 \cdot kip$

Weight of Concrete Pad = $WT_{pad} := \left(W_f^2 \cdot T_f\right) \cdot \gamma_c = 576.6 \cdot kip$

Weight of Concrete Piers = $WT_{pier} := 3 \cdot \left[\left(L_p \cdot \frac{d_p^2 \cdot \pi}{4}\right) \cdot \gamma_c\right] = 0 \cdot kip$

Total Weight of Concrete = $WT_c := WT_{pad} + WT_{pier} = 577 \cdot kip$

Weight of Soil Above Footing = $WT_{s1} := \left(W_f^2 - 3 \cdot \frac{d_p^2 \cdot \pi}{4}\right) \cdot (L_p - L_{pag}) \cdot \gamma_s = 0 \cdot kip$

Weight of Soil Back Face = $WT_{s2} := \left[\frac{\tan(\Phi_s) \cdot (D_f)^2}{2} \cdot W_f\right] \cdot \gamma_s = 13 \cdot kip$

Tower Offset = $X_{t1} := \left[\frac{W_f}{2} - \frac{(W_t \cdot \cos(30 \cdot deg))}{2}\right]$ $X_{t2} := \frac{W_f}{2} - \frac{(W_t \cdot \cos(30 \cdot deg))}{3}$

$X_t := if(Pos_t, X_{t1}, X_{t2}) = 8.009$

$X_{off} := \frac{W_f}{2} - \left[\frac{(W_t \cdot \cos(30 \cdot deg))}{3} + X_t\right] = 2.497$

Resisting Moment = $M_r := (WT_c + WT_{s1}) \cdot \frac{W_f}{2} + S_u \cdot \frac{T_f}{3} + WT_{s2} \cdot \left[W_f + \frac{\tan(\Phi_s) \cdot (L_p - L_{pag})}{3}\right] = 9424 \cdot kip$

Overturning Moment = $M_{ot} := OM + S_t \cdot (L_p + T_f) = 4182 \cdot kip \cdot ft$

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 2.25$

Factor of Safety Required = $FS_{req} := 2$

$OverTurning\_Moment\_Check := if(FS \geq FS_{req}, "Okay", "No Good")$

OverTurning_Moment_Check = "Okay"

Bearing Pressure Caused by Footing:

Total Load = $Load_{tot} := WT_c + WT_{s1} + WT_t = 626 \cdot kip$

Area of the Mat = $A_{mat} := W_f^{\,2} = 961$

Section Modulus of Mat = $S := \frac{W_f^{\,3}}{6} = 4965.17 \cdot ft^3$

Maximum Pressure in Mat = $P_{max} := \frac{Load_{tot}}{A_{mat}} + \frac{M_{ot}}{S} = 1.493 \cdot ksf$

$Max\_Pressure\_Check := if\left(P_{max} < q_s, "Okay", "No Good"\right)$

$Max\_Pressure\_Check = "Okay"$

Minimum Pressure in Mat = $P_{min} := \frac{Load_{tot}}{A_{mat}} - \frac{M_{ot}}{S} = -0.191 \cdot ksf$

$Min\_Pressure\_Check := if\left[\left(P_{min} \geq 0\right) \cdot \left(P_{min} < q_s\right), "Okay", "No Good"\right]$

$Min\_Pressure\_Check = "No Good"$

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3} = 9.16$

Distance to Kern = $X_k := \frac{W_f}{6} = 5.167$

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

Eccentricity = $e := \frac{M_{ot}}{Load_{tot}} = 6.685$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot Load_{tot}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e\right)} = 1.526 \cdot ksf$

$q_{adj} := if\left(P_{min} < 0, P_a, P_{max}\right) = 1.526 \cdot ksf$

$Pressure\_Check := if\left(q_{adj} < q_s, "Okay", "No Good"\right)$

$Pressure\_Check = "Okay"$

Steel Reinforcement in Pad:

Required Reinforcement for Bending:

Strength Reduction Factor = $\phi_m := .90$ (ACI-2008 9.3.2.1)

$$M_{nT} := LF\cdot\left[U_t\cdot\left(W_t\cdot\sin(60\cdot deg) - \frac{d_p}{2}\right) + S_t\cdot\left(D_f + L_{pag}\right)\right] - WT_t\cdot X_{off} = 3651\cdot ft\cdot k$$

$$M_{nS} := -1\cdot\left[\frac{1}{2}\cdot\left(\frac{W_f}{2} + \frac{W_t}{3}\cdot\cos(30\cdot deg) - \frac{d_p}{2}\right)^2\cdot W_t\cdot\left[\gamma_s\cdot\left(T_p - T_f\right)\right] + WT_{s2}\cdot\left[\frac{W_f}{2} + \frac{W_t}{3}\cdot\cos(30\cdot deg) - \frac{d_p}{2} + \left(D_f - n\right)\cdot\tan\left(\Phi_s\right)\right]\right] = -1$$

$$M_{nC} := -1\cdot\left[\frac{1}{2}\cdot\left(\frac{W_f}{2} + \frac{W_t}{3}\cdot\cos(30\cdot deg) - \frac{d_p}{2}\right)^2\cdot W_t\cdot\left(\gamma_c\cdot T_f\right)\right]$$

Design Moment = $M_n := \frac{M_{nT} + M_{nS} + M_{nC}}{\phi_m} = 1510.69\cdot kips\cdot ft$

$$\beta := \begin{cases} 0.85 & \text{if } 2500\cdot psi \le f_c \le 4000\cdot psi \\ 0.65 & \text{if } f_c > 8000\cdot psi \\ \left[0.85 - \left[\frac{\left(\frac{f_c}{psi} - 4000\right)}{1000}\right]\cdot 0.5\right] & \text{otherwise} \end{cases} = 0.85$$ (ACI-200810.2.7.3)

$b_{eff} := W_t\cdot\cos(30\cdot deg) + d_p = 179.787\cdot in$

$d := T_f - Cvr_{pad} - d_{bbot} = 44.125\cdot in$

$A_s := \frac{M_n}{\left(f_y\cdot d\right)} = 6.847\cdot in^2$

$a := \frac{A_s\cdot f_y}{\beta\cdot f_c\cdot b_{eff}} = 0.672\cdot in$

$A_s := \frac{M_n}{f_y\cdot\left(d - \frac{a}{2}\right)} = 6.9\cdot in^2$

$\rho := \frac{A_s}{b_{eff}\cdot d} = 0.00087$

Required Reinforcement for Temperature and Shrinkage:

$$\rho_{sh} := \begin{cases} .0018 & \text{if } f_y \geq 60000\cdot psi \\ .0020 & \text{otherwise} \end{cases} = 0.0018 \qquad \text{(ACI -2008 7.12.2.1)}$$

Check Bottom Bars:

$$As := \begin{cases} \rho\cdot W_f\cdot d & \text{if } \rho > \frac{\rho_{sh}}{2} \\ \rho_{sh}\cdot W_f\cdot \frac{d}{2} & \text{otherwise} \end{cases} = 14.773\cdot in^2$$

$$As_{prov} := A_{bbot}\cdot NB_{bot} = 19.2\cdot in^2$$

$$Pad\_Reinforcement\_Bot := if\left(As_{prov} > As, "Okay", "No Good"\right)$$

Pad_Reinforcement_Bot = "Okay"

$$As := \rho_{sh}\cdot\left(W_f\cdot T_f\right) = 32.1\cdot in^2$$

$$As_{prov} := A_{btop}\cdot NB_{top} + A_{bbot}\cdot NB_{bot} = 38.5\cdot in^2$$

$$Pad\_Reinforcement := if\left(As_{prov} > As, "Okay", "No Good"\right)$$

Pad_Reinforcement = "Okay"

Developement Length Pad Reinforcement:

Bar Spacing =

$$B_{sPad} := \frac{W_f - 2\cdot Cvr_{pad} - NB_{bot}\cdot d_{bbot}}{NB_{bot} - 1} = 10.9\cdot in$$

Spacing or Cover Dimension =

$$c := if\left(Cvr_{pad} < \frac{B_{sPad}}{2}, Cvr_{pad}, \frac{B_{sPad}}{2}\right) = 3\cdot in$$

Transverse Reinforcement Index =

$$k_{tr} := 0 \qquad \text{(ACI-2008 12.2.3)}$$

$$L_{dbt} := \frac{3\cdot f_y\,\alpha_{pad}\cdot\beta_{pad}\cdot\gamma_{pad}\cdot\lambda_{pad}}{40\cdot\sqrt{f_c\cdot psi}\cdot\frac{c + k_{tr}}{d_{bbot}}}\cdot d_{bbot} = 18.2\cdot in$$

Minimum Development Length =

$$L_{dbmin} := 12\cdot in \qquad \text{(ACI-2008 12.2.1)}$$

$$L_{dbtCheck} := if\left(L_{dbt} \geq L_{dbmin}, "Use\ L.dbt", "Use\ L.dbmin"\right) = "Use\ L.dbt"$$

Available Length in Pad =

$$L_{Pad} := \frac{W_f}{2} - \frac{W_t}{2} - Cvr_{pad} = 79.2\cdot in$$

$$Lpad\_Check := if\left(L_{Pad} > L_{dbt}, "Okay", "No Good"\right)$$

Lpad_Check = "Okay"

Network Modernization RFDS v3.0

Site ID	**CT11270C**	**Latitude**	41.64880
		Longitude	-72.94740
Site Name	CL&P Bristol	**Site Type**	Structure (Non-Building)
Address	2 Willis Street, Bristol, CT 06010	**Site Class**	Utility Lattice Tower
Market	CONNECTICUT	**Landlord**	CL&P

Configuration
702CU

Approvals	
Market RF	
Market Development	

RFDS Revision	
RFDS Final	X

Date 07/30/2013

Work Order #	

NOC# (888) 218-6664

Site Information

Existing Configuration					Proposed Configuration			
1	2	3	4	Cabinet #	1	2	3	4
GSM/UMTS/LTE	GSM	GSM		Technology	GSM/UMTS/LTE	GSM	GSM	
3106	S8000	S8000		Cabinet type	3106	S8000	S8000	
				CBU				
2				DUW30	2			
1				DUL20				
1				DUG20	1			
				DUS41	1			
				RBS6601				
				dTRU/TRX				
6				RU22 B4	6			
				RUS01 B2				
				RUS01 B4				

	Relocate cabinet
	Add cabinet
	Swap cabinet
	Remove cabinet
	Make cabinet dark

Scope of Work

Swap DUL with DUS41

ALPHA - Scope of Work

x	Add new mount	x	Add RRU
	Relocate antenna		Swap existing RRU
x	Add antenna		Remove RRU
	Swap antenna		Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA		Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Add a B12 passive antenna. Add RRUS at antenna. Use spare fiber for LTE 700.

BETA - Scope of Work

x	Add new mount	x	Add RRU
	Relocate antenna		Swap existing RRU
x	Add antenna		Remove RRU
	Swap antenna		Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA		Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Add a B12 passive antenna. Add RRUS at antenna. Use spare fiber for LTE 700.

GAMMA - Scope of Work

x	Add new mount	x	Add RRU
	Relocate antenna		Swap existing RRU
x	Add antenna		Remove RRU
	Swap antenna		Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA		Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Add a B12 passive antenna. Add RRUS at antenna. Use spare fiber for LTE 700.

DELTA - Scope of Work

	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
	Add antenna		Remove RRU
	Swap antenna		Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA		Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Network Modernization RFDS v3.0

Site ID	**CT11270C**	**Latitude**	41.64880
		Longitude	-72.94740
Site Name	CL&P Bristol	**Site Type**	Structure (Non-Building)
Address	2 Willis Street, Bristol, CT 06010	**Site Class**	Utility Lattice Tower
Market	CONNECTICUT	**Landlord**	CL&P

Configuration
702CU

Approvals	
Market RF	
Market Development	

RFDS Revision	
RFDS Final	X

Date 07/30/2013

ALPHA (view from behind)

Existing Configuration					Proposed Configuration			
X			X	Mount	X	x		X
GSM/UMTS / UMTS			LTE	Technology	GSM/UMTS / UMTS	LTE		LTE
B2 / B4			B4	Band	B2 / B4	B12		B4
A / P			A	Active/Passive	A / P	P		A
Quad pole			Quad pole	Ant. Type	Quad pole	Dual pole		Quad pole
AIR21 B2A/B4P			AIR21 B4A/B2P	Ant. Model	AIR21 B2A/B4P	LNX-6515DS-VTM		AIR21 B4A/B2P
Ericsson			Ericsson	Ant. Vendor	Ericsson	Commscope		Ericsson
125			125	Ant. Height	125	125		125
80			80	Azimuth	80	80		80
Yes / Yes			Yes	RET deployed	Yes / Yes	Yes		Yes
4 / 7			7	E-Tilt	4 / 7	2		7
2 / 2			2	M-Tilt	2 / 2	0		2
1 / dd B4				TMA # / TMA Type	1 / dd B4			
				RRU # / RRU Type		1 / RUS11_B		
2 (LMU) / 2				Used Coax #	2 (LMU) / 2			
1-5/8" / 1-5/8"				Coax Type	1-5/8" / 1-5/8"			
150				Coax Length (ft)	150			
2			2	Fiber (CPRI) #	2	2		2
				Splitter #				
				Combiner #				
				Combiner Type				

x	Add new mount	x	Add RRU
	Relocate antenna		Swap existing RRU
x	Add antenna		Remove RRU
	Swap antenna		Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA		Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Scope of work

Add a B12 passive antenna. Add RRUS at antenna. Use spare fiber for LTE 700.

BETA (view from behind)

Existing Configuration					Proposed Configuration			
X			X	Mount	X	x		X
GSM/UMTS / UMTS			LTE	Technology	GSM/UMTS / UMTS	LTE		LTE
B2 / B4			B4	Band	B2 / B4	B12		B4
A / P			A	Active/Passive	A / P	P		A
Quad pole			Quad pole	Ant. Type	Quad pole	Dual pole		Quad pole
AIR21 B2A/B4P			AIR21 B4A/B2P	Ant. Model	AIR21 B2A/B4P	LNX-6515DS-VTM		AIR21 B4A/B2P
Ericsson			Ericsson	Ant. Vendor	Ericsson	Commscope		Ericsson
125			125	Ant. Height	125	125		125
220			220	Azimuth	220	220		220
Yes / Yes			Yes	RET deployed	Yes / Yes	Yes		Yes
3 / 3			4	E-Tilt	3 / 3	2		4
2 / 2			2	M-Tilt	2 / 2	0		2
1 / dd B4				TMA # / TMA Type	1 / dd B4			
				RRU # / RRU Type		1 / RUS11_B		
2 (LMU) / 2				Used Coax #	2 (LMU) / 2			
1-5/8" / 1-5/8"				Coax Type	1-5/8" / 1-5/8"			
150				Coax Length (ft)	150			
2			2	Fiber (CPRI) #	2	2		2
				Splitter #				
				Combiner #				
				Combiner Type				

x	Add new mount	x	Add RRU
	Relocate antenna		Swap existing RRU
x	Add antenna		Remove RRU
	Swap antenna		Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA		Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Scope of work

Add a B12 passive antenna. Add RRUS at antenna. Use spare fiber for LTE 700.

Network Modernization RFDS v3.0

T-Mobile

Site ID	**CT11270C**	**Latitude**	41.64880
		Longitude	-72.94740
Site Name	CL&P Bristol	**Site Type**	Structure (Non-Building)
Address	2 Willis Street, Bristol, CT 06010	**Site Class**	Utility Lattice Tower
Market	CONNECTICUT	**Landlord**	CL&P

Configuration
702CU

Approvals	
Market RF	
Market Development	

RFDS Revision	
RFDS Final	X

Date 07/30/2013

GAMMA (view from behind)

Existing Configuration					Proposed Configuration				
X			X		X	x		X	
GSM/UMTS / UMTS			LTE	Technology	GSM/UMTS / UMTS	LTE		LTE	
B2 / B4			B4	Band	B2 / B4	B12		B4	
A / P			A	Active/Passive	A / P	P		A	
Quad pole			Quad pole	Ant. Type	Quad pole	Dual pole		Quad pole	
AIR21 B2A/B4P			AIR21 B4A/B2P	Ant. Model	AIR21 B2A/B4P	LNX-6515DS-VTM		AIR21 B4A/B2P	
Ericsson			Ericsson	Ant. Vendor	Ericsson	Commscope		Ericsson	
125			125	Ant. Height	125	125		125	
340			340	Azimuth	340	340		340	
Yes / Yes			Yes	RET deployed	Yes / Yes	Yes		Yes	
5 / 5			6	E-Tilt	5 / 5	2		6	
2 / 2			2	M-Tilt	2 / 2	0		2	
1				TMA #	1				
dd B4				TMA Type	dd B4				
				RRU #		1			
				RRU Type		RUS11_B			
2 (LMU) / 2				Used Coax #	2 (LMU) / 2				
1-5/8" / 1-5/8"				Coax Type	1-5/8" / 1-5/8"				
150				Coax Length (ft)	150				
2			2	Fiber (CPRI) #	2	2		2	
				Splitter #					
				Combiner #					
				Combiner Type					

x	Add new mount	x	Add RRU
	Relocate antenna		Swap existing RRU
x	Add antenna		Remove RRU
	Swap antenna		Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA		Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Scope of work

Add a B12 passive antenna. Add RRUS at antenna. Use spare fiber for LTE 700.

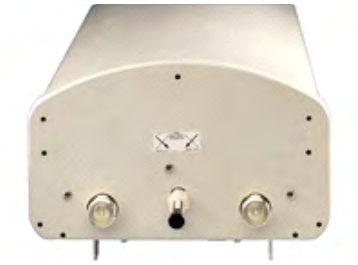
DELTA (view from behind)

Existing Configuration					Proposed Configuration				
				Technology					
				Band					
				Active/Passive					
				Ant. Type					
				Ant. Model					
				Ant. Vendor					
				Ant. Height					
				Azimuth					
				RET deployed					
				E-Tilt					
				M-Tilt					
				TMA #					
				TMA Type					
				RRU #					
				RRU Type					
				Used Coax #					
				Coax Type					
				Coax Length (ft)					
				Fiber (CPRI) #					
				Splitter #					
				Combiner #					
				Combiner Type					

	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
	Add antenna		Remove RRU
	Swap antenna		Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA		Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Scope of work

Product Specifications



LNX-6515DS-VTM

Andrew® Antenna, 698–896 MHz, 65° horizontal beamwidth, RET compatible

- Excellent choice to maximize both coverage and capacity in suburban and rural applications
- Fully compatible with Andrew remote electrical tilt system for greater OpEx savings
- Exceptional horizontal pattern roll-off and strong front-to-back ratio
- Extended bandwidth allows one antenna to serve multiple frequency allocations
- Great solution to maximize network coverage and capacity
- The RF connectors are designed for IP67 rating and the radome for IP56 rating
- The values presented on this datasheet have been calculated based on N-P-BASTA White Paper version 9.6 by the NGMN Alliance

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**
Gain by all Beam Tilts, average, dBi	16.6	16.9
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3
Gain by Beam Tilt, average, dBi	0 ° | 16.6 4 ° | 16.6 8 ° | 16.4	0 ° | 17.0 4 ° | 17.0 8 ° | 16.8
Beamwidth, Horizontal, degrees	65	64
Beamwidth, Horizontal Tolerance, degrees	±1	±0.9
Beamwidth, Vertical, degrees	9.7	8.6
Beamwidth, Vertical Tolerance, degrees	±0.6	±0.4
Beam Tilt, degrees	0–8	0–8
USLS, dB	18	18
Front-to-Back Total Power at 180° ± 30°, dB	25	23
CPR at Boresight, dB	24	27
CPR at Sector, dB	15	13
Isolation, dB	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153
Input Power per Port, maximum, watts	400	400
Polarization	±45°	±45°
Impedance	50 ohm	50 ohm

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol®
Band	Single band
Brand	DualPol® | Teletilt®
Operating Frequency Band	698 – 896 MHz
Number of Ports, all types	2

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum

Product Specifications

LNX-6515DS-VTM

Radome Material	Fiberglass, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	2
Wind Loading, maximum	878.0 N @ 150 km/h 197.4 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	181.0 mm | 7.1 in
Length	2449.0 mm | 96.4 in
Width	301.0 mm | 11.9 in
Net Weight	22.8 kg | 50.3 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 1.1 Actuator	LNX-6515DS-R2M
Model with Factory Installed AISG 2.0 Actuator	LNX-6515DS-A1M
RET System	Teletilt®

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Included Products

DB380-3 — Pipe Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Used for wide panel antennas. Includes three clamp sets.

DB5083D — Downtilt Mounting Kit for 2.4"-4.5" (60-115 mm) OD round members. Consists of two DB5083 heavy-duty, galvanized steel downtilt mounting brackets. This kit is compatible with the DB380-3 pipe mount for panel antennas with three mounting points.

RRUS 11

Frequency (AT&T)
- ✓ Band 12 (Lower 700 MHz)
- ✓ Band 4 (AWS, 17/2100 MHz) — 2Q2011

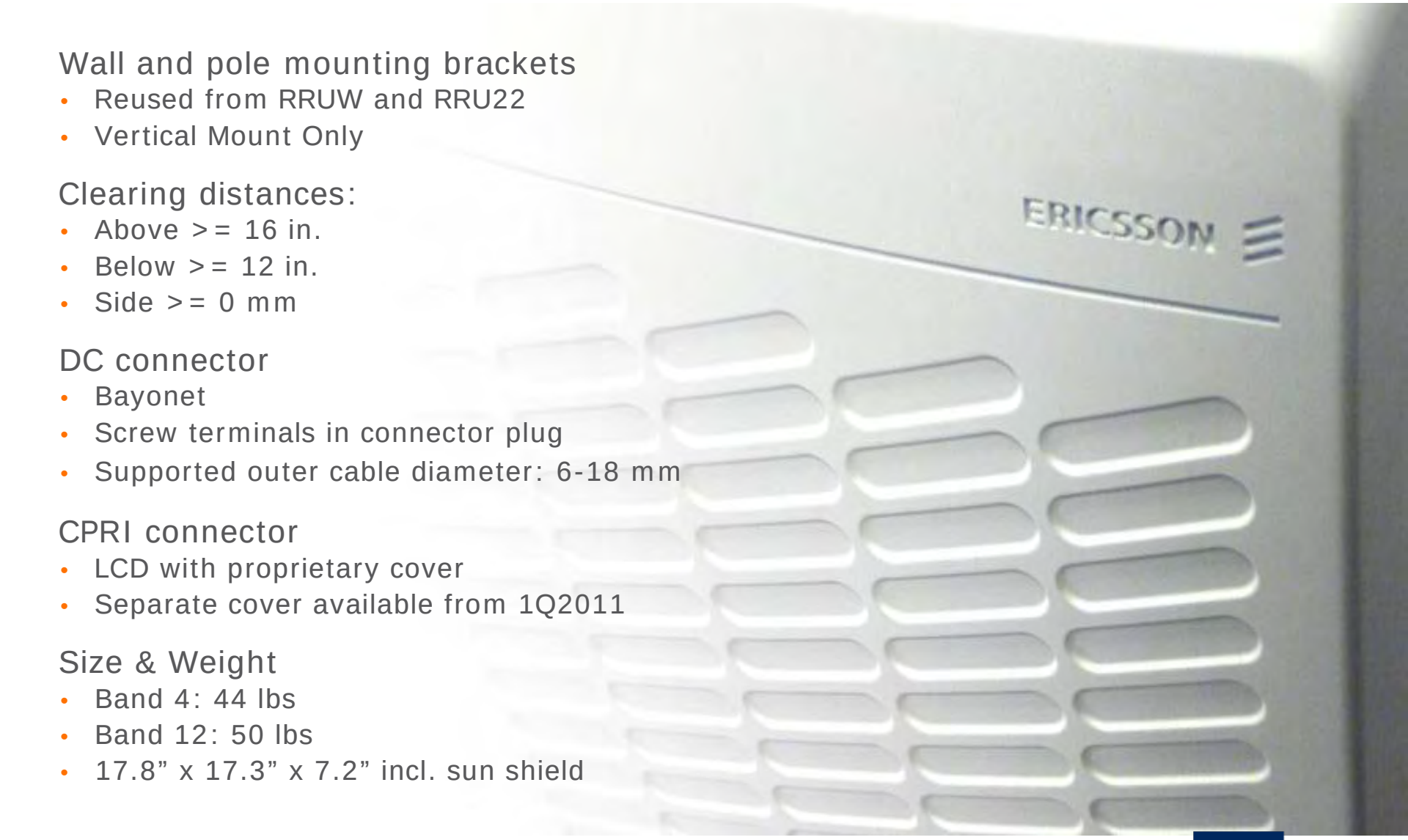
RF Characteristics
- ✓ Output power: 2x30 Watts
- ✓ 2x2 MIMO Capable
- ✓ IBW of 20 MHz
- ✓ Rx Sens.: Better than -105 dBm (5 MHz)

RET/TMA Support
- ✓ AISG 2.0 Compatible
- ✓ Via RET Port and Centre Conductor
- ✓ Cascading
- ✓ 30 VDC Bias

Environmental
- ✓ Self Convection
- ✓ Temperature -40 to 131 F

Power
- ✓ Input voltage: -48 VDC or AC (exemption)
- ✓ Fuse size: 13 – 32 A
  - Recommended: 25 A
- ✓ Power Consumption:
  - Typical 200 Watts
  - Max 310 Watts
  - Excl. RET and TMA load

RRUS 11 Mechanics



Wall and pole mounting brackets
- Reused from RRUW and RRU22
- Vertical Mount Only

Clearing distances:
- Above >= 16 in.
- Below >= 12 in.
- Side >= 0 mm

DC connector
- Bayonet
- Screw terminals in connector plug
- Supported outer cable diameter: 6-18 mm

CPRI connector
- LCD with proprietary cover
- Separate cover available from 1Q2011

Size & Weight
- Band 4: 44 lbs
- Band 12: 50 lbs
- 17.8” x 17.3” x 7.2” incl. sun shield

Exhibit C

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11270C

CL&P Bristol
2 Willis Street
Bristol, CT 06010

September 30, 2015

EBI Project Number: 6215004928

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	7.32 %

EBI Consulting
environmental | engineering | due diligence

September 30, 2015

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CT11270C – CL&P Bristol**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **2 Willis Street, Bristol, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 700 MHz Band is approximately 467 $\mu W/cm^2$, and the general population exposure limit for the PCS and AWS bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **2 Willis Street, Bristol, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 GSM / UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel

2) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

5) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

6) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

7) The antennas used in this modeling are the **Ericsson AIR21 (B4A/B2P** & **B2A/B4P)** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 (B4A/B2P** & **B2A/B4P)** have a maximum gain of **15.9 dBd** at their main lobe. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antenna mounting height centerline of the proposed antennas is **125 feet** above ground level (AGL).

9) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculations were done with respect to uncontrolled / general public threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	125	Height (AGL):	125	Height (AGL):	125
Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)
Channel Count	2	Channel Count	2	# PCS Channels:	2
Total TX Power:	120	Total TX Power:	120	# AWS Channels:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A1 MPE%	1.19	Antenna B1 MPE%	1.19	Antenna C1 MPE%	1.19
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	125	Height (AGL):	125	Height (AGL):	125
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power:	120	Total TX Power:	120	Total TX Power:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A2 MPE%	1.19	Antenna B2 MPE%	1.19	Antenna C2 MPE%	1.19
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	125	Height (AGL):	125	Height (AGL):	125
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power:	30	Total TX Power:	30	Total TX Power:	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.47	Antenna B3 MPE%	0.47	Antenna C3 MPE%	0.47

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**2.84 %**
Amateur Radio	0.01 %
CL&P	4.47 %
Site Total MPE %:	**7.32 %**

T-Mobile Sector 1 Total:	2.84 %
T-Mobile Sector 2 Total:	2.84 %
T-Mobile Sector 3 Total:	2.84 %
Site Total:	7.32 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile 2100 MHz (AWS) LTE	**2**	**2334.27**	**125**	**11.85**	**2100**	**1000**	**1.19 %**
T-Mobile 700 MHz LTE	**1**	**865.21**	**125**	**2.20**	**700**	**467**	**0.47 %**
T-Mobile 1900 MHz (PCS) GSM/UMTS	**2**	**1167.14**	**125**	**5.93**	**1900**	**1000**	**0.59 %**
T-Mobile 2100 MHz (AWS) UMTS	**2**	**1167.14**	**125**	**5.93**	**2100**	**1000**	**0.59 %**
						Total:	**2.84%**

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Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector 1:	2.84 %
Sector 2:	2.84 %
Sector 3 :	2.84 %
T-Mobile Per Sector Maximum:	2.84 %
Site Total:	7.32 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **7.32%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

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