QC Development
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September 13, 2019

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

Notice of Exempt Modification – New Cingular Wireless PCS, LLC (AT&T) – CT2347
1323 King Street, Greenwich, CT 06831
N 41.07416667
W 73.69750000

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 88-foot level of the existing 100-foot Self Support Tower at 1323 King Street, Greenwich, CT. The tower and property are owned by the Town of Greenwich. AT&T now intends to remove (6) Powerwave antennas and replace them with (3) CCI HPA-65R-BUU-H6K antennas and (3) Quintel QS66512-2 antennas. AT&T also intends to add (3) Ericsson RRUS-32, (3) 4426 B66 and (3) 4415 B25 Remote Radio Units (RRU). The new antennas and RRUs will also be installed at the 88-foot level of the tower.

AT&T's use of the facility was approved by the Siting Council on July 18th, 2011. This approval included no condition(s) that could feasibly be violated by this modification, including total facility height or mounting restrictions. This modification therefore complies with the aforementioned approval.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the Honorable Peter Tesei, First Selectman of the Town of Greenwich, as local elected official and property and tower owner, as well as the Greenwich Planning & Zoning Department.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

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

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

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

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

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

6. The existing structure and its foundation can support the proposed loading.

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

Please feel free to call me at (860) 670-9068 with any questions regarding this matter. Thank you for your consideration.

Sincerely,

Mark Roberts
QC Development
Consultant for AT&T

Attachments

cc: Peter Tesei - Elected Official, Tower and Property Owner
Katie DeLuca – Director of Planning and Zoning

Power Density

Existing Loading on Tower

Carrier	# of Channels	ERP/Ch (W)	Antenna Centerline Height (ft)	Power Density (mW/cm^2)	Freq. Band (MHz**)	Limit S (mW /cm^2)	%MPE
Other Carriers*							4.67%
AT&T GSM	4	296	88	0.0633	880	0.5867	1.08%
AT&T UMTS	1	500	88	0.0267	880	0.5867	0.46%
AT&T UMTS	4	427	88	0.0913	1900	1.0000	0.91%
AT&T LTE	1	500	88	0.0267	740	0.4933	0.54%
AT&T LTE	1	500	88	0.0267	1900	1.0000	0.27%
Site Total							7.93%

*Per CSC Records (available upon request, includes calculation formulas)

** If a range of frequencies are used, such as 880-894, enter the lowest value, i.e. 880

Proposed Loading on Tower

Carrier	# of Channels	ERP/Ch (W)	Antenna Centerline Height (ft)	Power Density (mW/cm^2)	Freq. Band (MHz**)	Limit S (mW /cm^2)	%MPE
Other Carriers*							4.67%
AT&T UMTS	1	500	88	0.0267	850	0.5667	0.47%
AT&T LTE	1	1476	88	0.0789	700	0.4667	1.69%
AT&T LTE	2	4842	88	0.5179	1900	1.0000	5.18%
AT&T LTE	1	5070	88	0.2712	2100	1.0000	2.71%
AT&T LTE	1	1285	88	0.0687	2300	1.0000	0.69%
Site Total							15.42%

*Per CSC Records (available upon request, includes calculation formulas)

** If a range of frequencies are used, such as 880-894, enter the lowest value, i.e. 880

PROJECT INFORMATION

SCOPE OF WORK:	TOP – REPLACE (3) EXISTING LTE P65-XLH-RR ANTENNAS AT POSITION 2 WITH (3) 6' HEX-PORT ANTENNAS. REPLACE (3) EXISTING GSM ANTENNAS AT POSITION 3 WITH (3) 6' QUINTEL ANTENNAS. ADD (3) 1900 RRUS-4415, ADD (3) 2100 RRUS-4426, ADD (3) WCS RRUS-32, ADD (1) SQUID, (1) FIBER CABLE, (2) DC CABLES, SWAP DIPLEXERS WITH LOW BAND COMBINERS. BOTTOM – SWAP BB FOR RBS 5216, ADD XMU. POWER – SWAP GSM CABINET FOR NEW PLANT.
SITE ADDRESS:	1323 KING STREET GREENWICH, CT 06831
LATITUDE:	41° 04' 27.89" N (NAD 83)*
LONGITUDE:	73° 41' 49.85" W (NAD 83)* *PER RFDS
JURISDICTION	TOWN OF BLOOMFIELD
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
NAME OF APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE SUITE 3A ROCKY HILL, CT 06067
TOWER OWNER:	TOWN OF GREENWICH, CT

DRAWING INDEX

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THIS DOCUMENT WAS DEVELOPED TO REFLECT A SPECIFIC SITE AND ITS SITE CONDITIONS AND IS NOT TO BE USED FOR ANOTHER SITE OR WHEN OTHER CONDITIONS PERTAIN. REUSE OF THIS DOCUMENT IS AT THE SOLE RISK OF THE USER.

STRUCTURAL NOTE:

1. AS REQUIRED UNDER TIA/EIA 222H – STANDARD, SAI COMMUNICATIONS SHALL PROVIDE A STRUCTURAL ANALYSIS OF THE TOWER PREPARED BY A LICENSED CONNECTICUT STRUCTURAL ENGINEER CERTIFYING THAT, THE EXISTING TOWER AND ANY REQUIRED IMPROVEMENTS AND REINFORCEMENTS HAVE SUFFICIENT CAPACITY TO SUPPORT ALL EXISTING AND PROPOSED ANTENNAS, SUPPORTS AND APPURTENANCES AND COMPLIES WITH THE CURRENT CONNECTICUT STATE BUILDING CODE AND EIA/TIA CRITERIA. THE CONTRACTOR IS RESPONSIBLE TO CONFIRM THAT ANY IMPROVEMENTS AND REINFORCEMENTS REQUIRED BY THE STRUCTURAL ANALYSIS CERTIFICATION ARE PROPERLY INSTALLED PRIOR TO THE ADDITION OF ANTENNAS, SUPPORTS AND APPURTENANCES PROPOSED ON THESE DRAWINGS OR OTHERWISE NOTED IN THE STRUCTURAL ANALYSIS.

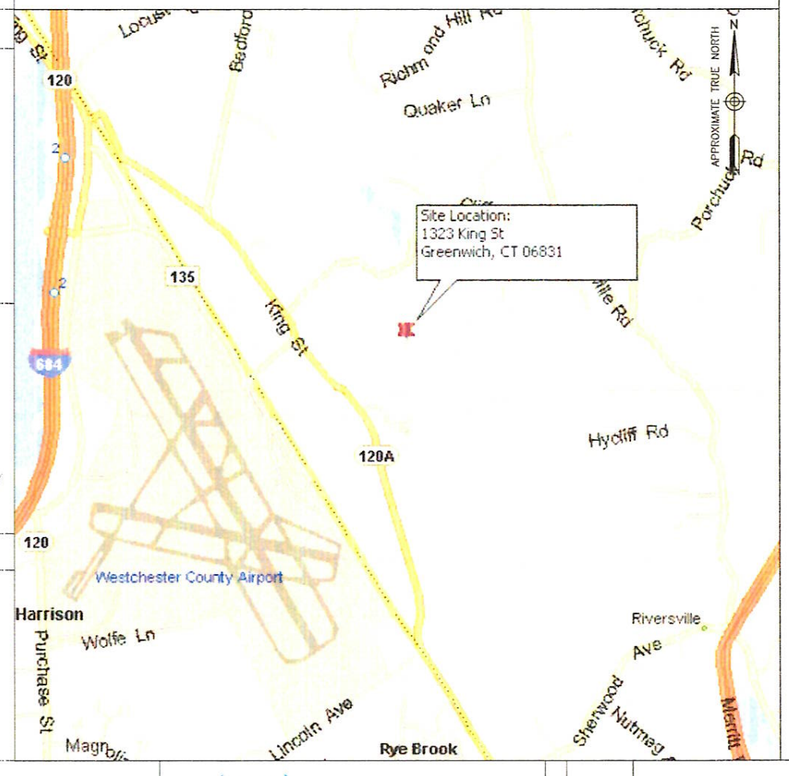
CONTACT INFORMATION

CONTACT	CONTACT	COMPANY	PHONE NO.
ENGINEERING:	DAMIAN SCHMALZ	DEWBERRY ENGINEERS INC.	(617) 531-0823
SAC:	TIM BURKS	SAI COMMUNICATIONS INC.	(860) 989-0001

SITE NAME: GREENWICH - KING STREET
SITE NUMBER: CT2347 2C / 3C / 4C
PACE NUMBER: MRCT027630 (2C) / MRCTB027636 (3C) / MRCTB027652 (4C)

VICINITY MAP

DIRECTIONS: TAKE MERRITT PARKWAY NORTH TO EXIT 27 FOR KING STREET. MAKE A RIGHT ON KING STREET AT THE END OF THE RAMP. TAKE TO (*****CLIFFDALE ROAD AND MAKE RIGHT ONTO CLIFFDALE ROAD, DRIVE AND GO DOWN THE FIRST HILL AND MAKE A RIGHT ON TO THE GOLF CART & VEHICLE ROAD, AT THE FORK. BEAR RIGHT AND DRIVE TO THE BACK, YOU WILL SEE THE MAINTENANCE BUILDING A ROAD GO DOWN TO SITE*****)
GATE COMBO: 4667



APPLICABLE BUILDING CODES AND STANDARDS

CONTRACTOR'S WORK SHALL COMPLY WITH PROJECT STANDARD NOTES, SYMBOLS AND DETAILS (SEE DRAWING INDEX FOR STANDARD NOTES AND DETAILS INCLUDED WITH TYPICAL DRAWING PACKAGE). CONTRACTOR WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

BUILDING CODE:
2018 CONNECTICUT STATE BUILDING CODE (2015 INTERNATIONAL BUILDING CODE)

ELECTRICAL CODE:
NATIONAL ELECTRICAL CODE (NEC)

CONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS.
AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, ASD, NINTH EDITION
TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-H, STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS

INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVITY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM
IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT

IEEE C62.41, RECOMMENDED PRACTICES ON SURGE VOLTAGES IN LOW VOLTAGE AC POWER CIRCUITS (FOR LOCATION CATEGORY "C3" AND "HIGH SYSTEM EXPOSURE")

TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS

ANSI T1.311, FOR TELECOM – DC POWER SYSTEMS – TELECOM, ENVIRONMENTAL PROTECTION

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

Dewberry®
Dewberry Engineers Inc.
99 SUMMER ST.
SUITE 700
BOSTON, MA 02110
PHONE: 617.695.3400
FAX: 617.695.3310

SAI
12 INDUSTRIAL WAY
SALEM, NH 03079

GREENWICH - KING STREET
SITE NO. CT2347 2C/3C/4C

1323 KING STREET
GREENWICH, CT 06831

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

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	09/09/19	FOR CONSTRUCTION	CDH	DAS	BBR
0	04/13/18	FOR CONSTRUCTION	JCM	DAS	BBR
A	02/09/18	FOR REVIEW	JCM	DAS	BBR

SCALE: AS SHOWN | DESIGNED BY: JCM | DRAWN BY: JCM

STATE OF CONNECTICUT – BRENDAN C. BYRNE – 28971 – LICENSED PROFESSIONAL ENGINEER

AT&T MOBILITY
FRAMINGHAM, MA 01701

TITLE SHEET

DEWBERRY NO.	DRAWING NUMBER	REV
50019239/50113529	T01	1

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   PROJECT MANAGEMENT – SAI
   CONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – AT&T MOBILITY
   OEM – ORIGINAL EQUIPMENT MANUFACTURER
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF PROJECT MANAGEMENT.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK.
4. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
5. DRAWINGS PROVIDED HERE ARE NOT TO SCALE UNLESS OTHERWISE NOTED AND ARE INTENDED TO SHOW OUTLINE ONLY.
6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY PROJECT MANAGEMENT.
9. CONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. CONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. CONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH PROJECT MANAGEMENT.
10. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
11. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. 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 THE CONTRACT.
14. CONTRACTOR SHALL NOTIFY DEWBERRY 48 HOURS IN ADVANCE OF POURING CONCRETE, OR BACKFILLING TRENCHES, SEALING ROOF AND WALL PENETRATIONS & POST DOWNS, FINISHING NEW WALLS OR FINAL ELECTRICAL CONNECTIONS FOR ENGINEER REVIEW.
15. CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. CONTRACTOR SHALL NOTIFY PROJECT MANAGEMENT OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
16. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY CONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
17. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
18. CONTRACTOR SHALL BE RESPONSIBLE FOR SITE SAFETY INCLUDING COMPLIANCE WITH ALL APPLICABLE OSHA STANDARDS AND RECOMMENDATIONS AND SHALL PROVIDE ALL NECESSARY SAFETY DEVICES INCLUDING PPE AND PPM AND CONSTRUCTION DEVICES USED FOR WELDING AND FIRE PREVENTION, TEMPORARY SHORING, SCAFFOLDING, TRENCH BOXES/SLOPING, BARRIERS, ETC.

SITE WORK GENERAL NOTES:

1. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
2. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE, BUT NOT BE LIMITED TO:
   A) FALL PROTECTION
   B) CONFINED SPACE
   C) ELECTRICAL SAFETY
   D) TRENCHING & EXCAVATION.
3. ALL SITE WORK SHALL BE AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.
4. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES, TOP SOIL AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
5. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, OWNER AND/OR LOCAL UTILITIES.
6. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION.
7. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE AT&T SPECIFICATION FOR SITE SIGNAGE.
8. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE TRANSMISSION EQUIPMENT AND TOWER AREAS.
9. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
10. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION. SEE SOIL COMPACTION NOTES.
11. THE AREAS OF THE OWNER'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.
12. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL JURISDICTION'S GUIDELINES FOR EROSION AND SEDIMENT CONTROL.

CONCRETE AND REINFORCING STEEL NOTES:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.
2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. A HIGHER STRENGTH (4000 PSI) MAY BE USED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
3. REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE (UNO). SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.
4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

   CONCRETE CAST AGAINST EARTH.....3 IN.
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 AND LARGER .....2 IN.
   #5 AND SMALLER & WWF.....1 1/2 IN.
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND
   SLAB AND WALL .....3/4 IN.
   BEAMS AND COLUMNS.....1 1/2 IN.

5. A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.
6. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSET/REDHEAD OR APPROVED EQUAL.
7. CONCRETE CYLINDER TEST IS NOT REQUIRED FOR SLAB ON GRADE WHEN CONCRETE IS LESS THAN 50 CUBIC YARDS (IBC 1905.6.2.3) IN THAT EVENT THE FOLLOWING RECORDS SHALL BE PROVIDED BY THE CONCRETE SUPPLIER;
   (A) RESULTS OF CONCRETE CYLINDER TESTS PERFORMED AT THE SUPPLIER'S PLANT,
   (B) CERTIFICATION OF MINIMUM COMPRESSIVE STRENGTH FOR THE CONCRETE GRADE SUPPLIED.
   FOR GREATER THAN 50 CUBIC YARDS THE GC SHALL PERFORM THE CONCRETE CYLINDER TEST.
8. AS AN ALTERNATIVE TO ITEM 7, TEST CYLINDERS SHALL BE TAKEN INITIALLY AND THEREAFTER FOR EVERY 50 YARDS OF CONCRETE FROM EACH DIFFERENT BATCH PLANT.
9. EQUIPMENT SHALL NOT BE PLACED ON NEW PADS FOR SEVEN DAYS AFTER PAD IS POURED, UNLESS IT IS VERIFIED BY CYLINDER TESTS THAT COMPRESSIVE STRENGTH HAS BEEN ATTAINED.

STRUCTURAL STEEL NOTES:

1. ALL STEEL WORK SHALL BE PAINTED OR GALVANIZED IN ACCORDANCE WITH THE DRAWINGS UNLESS NOTED OTHERWISE. STRUCTURAL STEEL SHALL BE ASTM-A-36 UNLESS OTHERWISE NOTED ON THE SITE SPECIFIC DRAWINGS. STEEL DESIGN, INSTALLATION AND BOLTING SHALL BE PERFORMED IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) "MANUAL OF STEEL CONSTRUCTION".
2. ALL WELDING SHALL BE PERFORMED USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION". PAINTED SURFACES SHALL BE TOUCHED UP.
3. BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE (3/4"Ø) CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
4. NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8" DIA ASTM A 307 BOLTS UNLESS NOTED OTHERWISE.
5. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSET/REDHEAD OR APPROVED EQUAL.
6. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ENGINEER REVIEW & APPROVAL ON PROJECTS REQUIRING STRUCTURAL STEEL.
7. ALL STRUCTURAL STEEL WORK SHALL BE DONE IN ACCORDANCE WITH AISC SPECIFICATIONS.

SOIL COMPACTION NOTES FOR SLAB ON GRADE:

1. EXCAVATE AS REQUIRED TO REMOVE TOPSOIL TO EXPOSE UNDISTURBED NATURAL SUBGRADE AND PLACE CRUSHED STONE AS REQUIRED.
2. COMPACTION CERTIFICATION: AN INSPECTION AND WRITTEN CERTIFICATION BY A QUALIFIED GEOTECHNICAL TECHNICIAN OR ENGINEER IS ACCEPTABLE. CONTACT DEWBERRY DURING CONSTRUCTION.
3. AS AN ALTERNATIVE TO INSPECTION AND WRITTEN CERTIFICATION, THE "UNDISTURBED SOIL" BASE SHALL BE COMPACTED WITH "COMPACTION EQUIPMENT", LISTED BELOW, TO AT LEAST 90% MODIFIED PROCTOR MAXIMUM DENSITY PER ASTM D 1557 METHOD C.
4. COMPACTED SUBBASE SHALL BE UNIFORM & LEVELED. PROVIDE 6" MINIMUM CRUSHED STONE OR GRAVEL COMPACTED IN 3" LIFTS ABOVE COMPACTED SOIL. GRAVEL SHALL BE NATURAL OR CRUSHED WITH 100% PASSING 1" SIEVE.
5. AS AN ALTERNATIVE TO ITEMS 2 AND 3 PROOFROLL THE SUBGRADE SOILS WITH 5 PASSES OF A MEDIUM SIZED VIBRATORY PLATE COMPACTOR (SUCH AS BOMAG BPR 30/38) OR HAND-OPERATED SINGLE DRUM VIBRATORY ROLLER (SUCH AS BOMAG BW 55E). ANY SOFT AREAS THAT ARE ENCOUNTERED SHOULD BE REMOVED AND REPLACED WITH A WELL-GRADED GRANULAR FILL, AND COMPACTED AS STATED ABOVE.

COMPACTION EQUIPMENT:

1. HAND OPERATED DOUBLE DRUM, VIBRATORY ROLLER, VIBRATORY PLATE COMPACTOR OR JUMPING JACK COMPACTOR.

CONSTRUCTION NOTES:

1. FIELD VERIFICATION:
   CONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, AT&T ANTENNA PLATFORM LOCATION AND ANTENNAS TO BE REPLACED.
2. COORDINATION OF WORK:
   CONTRACTOR SHALL COORDINATE RF WORK AND PROCEDURES WITH PROJECT MANAGEMENT.
3. CABLE LADDER RACK:
   CONTRACTOR SHALL FURNISH AND INSTALL CABLE LADDER RACK, CABLE TRAY, AND CONDUIT AS REQUIRED TO SUPPORT CABLES TO THE NEW BTS LOCATION.

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES.
2. CONTRACTOR SHALL MODIFY EXISTING CABLE TRAY SYSTEM AS REQUIRED TO SUPPORT RF AND TRANSPORT CABLING TO THE NEW BTS EQUIPMENT. CONTRACTOR SHALL SUBMIT MODIFICATIONS TO PROJECT MANAGEMENT FOR APPROVAL.
3. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED.
4. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND TELCORDIA.
5. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC AND TELCORDIA.
6. CABLES SHALL NOT BE ROUTED THROUGH LADDER-STYLE CABLE TRAY RUNGS.
7. EACH END OF EVERY POWER, POWER PHASE CONDUCTOR (I.E., HOTS), GROUNDING, AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC & OSHA, AND MATCH EXISTING INSTALLATION REQUIREMENTS.
8. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING, AND BRANCH CIRCUIT ID NUMBERS (I.E., PANELBOARD AND CIRCUIT ID'S).
9. PANELBOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS.
10. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
11. POWER, CONTROL, AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (SIZE 14 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.
12. POWER PHASE CONDUCTORS (I.E., HOTS) SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL.) PHASE CONDUCTOR COLOR CODES SHALL CONFORM WITH THE NEC & OSHA AND MATCH EXISTING INSTALLATION REQUIREMENTS.
13. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (SIZE 6 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN-2 GREEN INSULATION, CLASS B STRANDED COPPER CABLE RATED FOR 90°C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.
14. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED OUTDOORS, OR BELOW GRADE, SHALL BE SINGLE CONDUCTOR #2 AWG SOLID TINNED COPPER CABLE, UNLESS OTHERWISE SPECIFIED.
15. POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (SIZE 14 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90°C (WET AND DRY) OPERATION; WITH OUTER JACKET; LISTED OR LABELED FOR THE LOCATION USED, UNLESS OTHERWISE SPECIFIED.
16. ALL POWER AND POWER GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRENUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRENUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75°C (90°C IF AVAILABLE).
17. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.
18. NEW RACEWAY OR CABLE TRAY WILL MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
19. ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40, OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
20. ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT), OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
21. GALVANIZED STEEL INTERMEDIATE METALLIC CONDUIT (IMC) SHALL BE USED FOR OUTDOOR LOCATIONS ABOVE GRADE.
22. RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80) SHALL BE USED UNDERGROUND; DIRECT BURIED, IN AREAS OF OCCASIONAL LIGHT VEHICLE TRAFFIC OR ENCASED IN REINFORCED CONCRETE IN AREAS OF HEAVY VEHICLE TRAFFIC.
23. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
24. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SETSCREW FITTINGS ARE NOT ACCEPTABLE.
25. CABINETS, BOXES, AND WIREWAYS SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.
26. CABINETS, BOXES, AND WIREWAYS TO MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
27. WIREWAYS SHALL BE EPOXY-COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARD; SHALL BE PANDUIT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.
28. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES, AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL, SHALL MEET OR EXCEED UL 50, AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.
29. METAL RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED, OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
30. NONMETALLIC RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
31. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM PROJECT MANAGEMENT BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
32. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD AGAINST LIFE AND PROPERTY.

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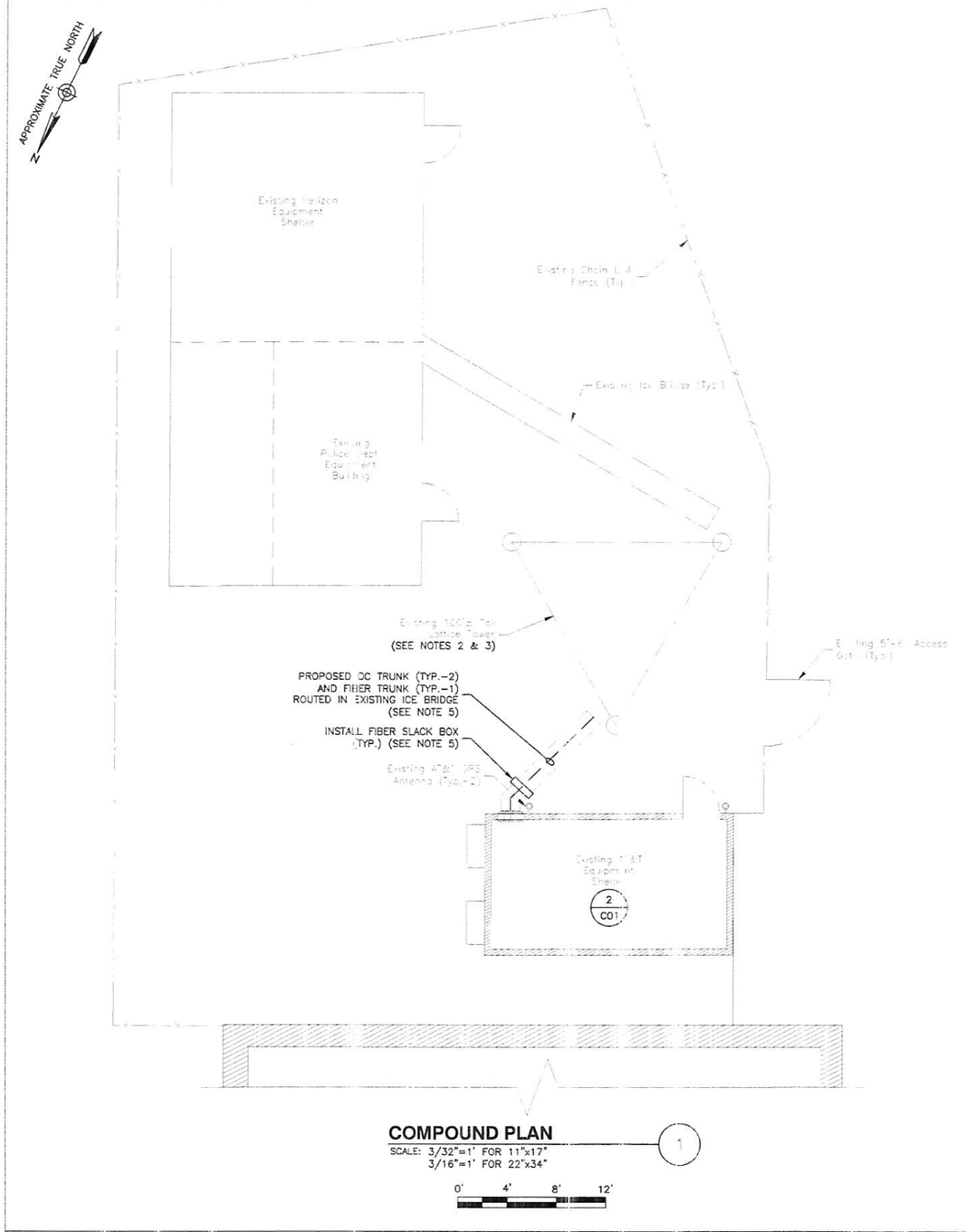
SCALE: AS SHOWN | DESIGNED BY: JCM | DRAWN BY: JCM

STATE OF CONNECTICUT
BENJAMIN B. ROSE
28971
LICENSED
PROFESSIONAL ENGINEER

AT&T MOBILITY
FRAMINGHAM, MA 01701

GENERAL NOTES

DEWBERRY NO.	DRAWING NUMBER	REV
50019239/50113529	G01	1

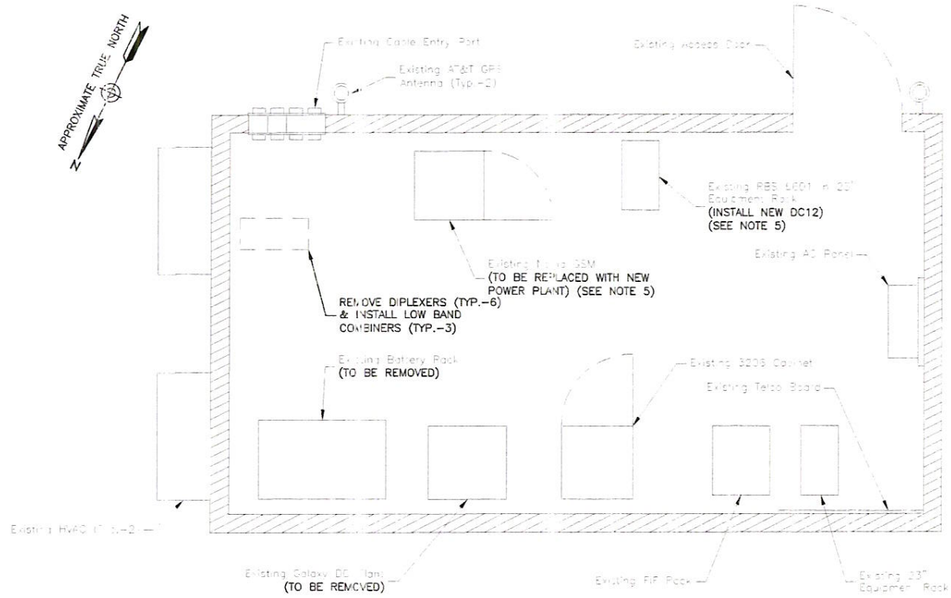


COMPOUND PLAN

1

SCALE: 3/32"=1' FOR 11"x17"
3/16"=1' FOR 22"x34"

0' 4' 8' 12'



EQUIPMENT SHELTER PLAN

2

SCALE: 1/4"=1' FOR 11"x17"
1/2"=1' FOR 22"x34"

0' 1' 2' 4'

NOTES:

1. NORTH ARROW SHOWN AS APPROXIMATE.
2. ALL PROPOSED EQUIPMENT INCLUDING ANTENNAS, COAX, SURGE ARRESTORS, RRU'S, ETC. SHALL BE MOUNTED IN ACCORDANCE WITH THE MOUNT ANALYSIS BY HUDSON DESIGN GROUP LLC DATED 09-04-19.
3. ALL EQUIPMENT TO BE INSTALLED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS REPORT BY CENTEK ENGINEERING DATED 08-19-19.
4. NOT ALL INFORMATION SHOWN FOR CLARITY.
5. EQUIPMENT MODIFICATION SCOPE

   TOP: REPLACE (3) EXISTING LTE P65-XLH-RR ANTENNAS AT POSITION 2 WITH (3) 6' HEX-PORT ANTENNAS. REPLACE (3) EXISTING GSM ANTENNAS AT POSITION 3 WITH (3) 6' QUINTEL ANTENNAS. ADD (3) 1900 RRUS-4415, ADD (3) 2100 RRUS-4426, ADD (3) WCS RRUS-32, ADD (1) SQUID, (1) FIBER CABLE, (2) DC CABLES, SWAP DIPLEXERS WITH LOW BAND COMBINERS.

   BOTTOM: SWAP BB FOR RBS 5216, ADD XMU.

   POWER: SWAP GSM CABINET FOR NEW PLANT.

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SCALE: AS SHOWN | DESIGNED BY: JCM | DRAWN BY: JCM

STATE OF CONNECTICUT · BENJAMIN B. ROSSI · 28971 · LICENSED PROFESSIONAL ENGINEER

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FRAMINGHAM, MA 01701

COMPOUND & EQUIPMENT LAYOUT

DEWBERRY NO.	DRAWING NUMBER	REV
50019239/50113529	C01	1

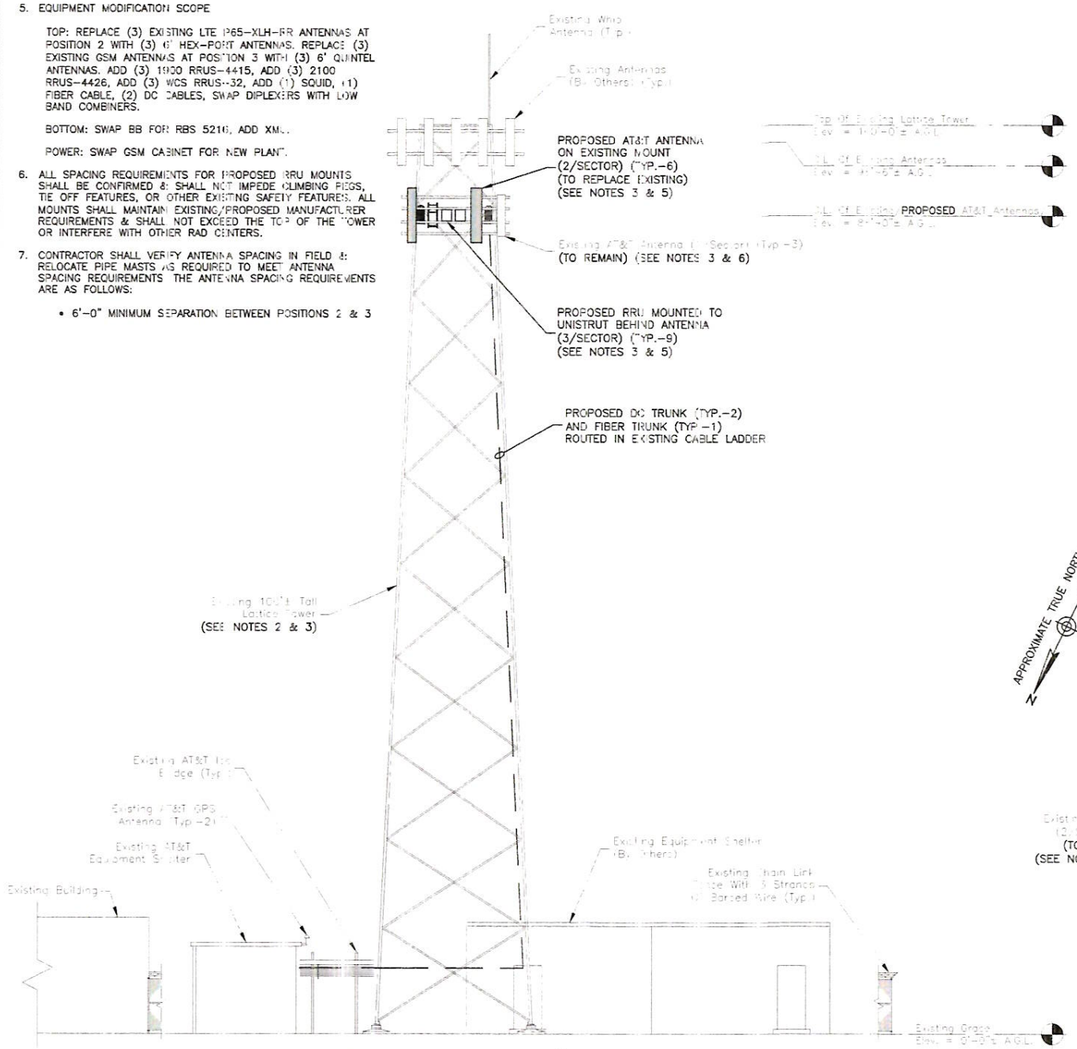
NOTES:

1. NORTH ARROW SHOWN AS APPROXIMATE.
2. ALL PROPOSED EQUIPMENT INCLUDING ANTENNAS, COAX, SURGE ARRESTORS, RRU'S, ETC. SHALL BE MOUNTED IN ACCORDANCE WITH THE MOUNT ANALYSIS BY HUDSON DESIGN GROUP LLC DATED 09-04-19.
3. ALL EQUIPMENT TO BE INSTALLED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS REPORT BY CENTEK ENGINEERING DATED 08-19-19.
4. NOT ALL INFORMATION SHOWN FOR CLARITY.
5. EQUIPMENT MODIFICATION SCOPE

   TOP: REPLACE (3) EXISTING LTE P65-XLH-RR ANTENNAS AT POSITION 2 WITH (3) 6' HEX-PORT ANTENNAS. REPLACE (3) EXISTING GSM ANTENNAS AT POSITION 3 WITH (3) 6' QUINTEL ANTENNAS. ADD (3) 1900 RRUS-4415, ADD (3) 2100 RRUS-4426, ADD (3) WCS RRUS-32, ADD (1) SQUID, (1) FIBER CABLE, (2) DC CABLES, SWAP DIPLEXERS WITH LOW BAND COMBINERS.

   BOTTOM: SWAP BB FOR RBS 5216, ADD XMU.

   POWER: SWAP GSM CABINET FOR NEW PLANT.
6. ALL SPACING REQUIREMENTS FOR PROPOSED RRU MOUNTS SHALL BE CONFIRMED & SHALL NOT IMPEDE CLIMBING PEGS, TIE OFF FEATURES, OR OTHER EXISTING SAFETY FEATURES. ALL MOUNTS SHALL MAINTAIN EXISTING/PROPOSED MANUFACTURER REQUIREMENTS & SHALL NOT EXCEED THE TOP OF THE TOWER OR INTERFERE WITH OTHER RAD CENTERS.
7. CONTRACTOR SHALL VERIFY ANTENNA SPACING IN FIELD & RELOCATE PIPE MASTS AS REQUIRED TO MEET ANTENNA SPACING REQUIREMENTS. THE ANTENNA SPACING REQUIREMENTS ARE AS FOLLOWS:
   - 6'-0" MINIMUM SEPARATION BETWEEN POSITIONS 2 & 3



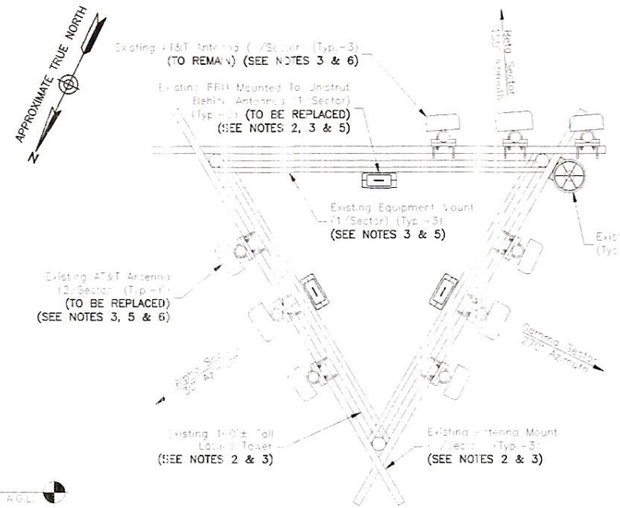
ELEVATION 1
SCALE: 1/32"=1' FOR 11"x17"
1/16"=1' FOR 22"x34"

0' 8' 16' 32'

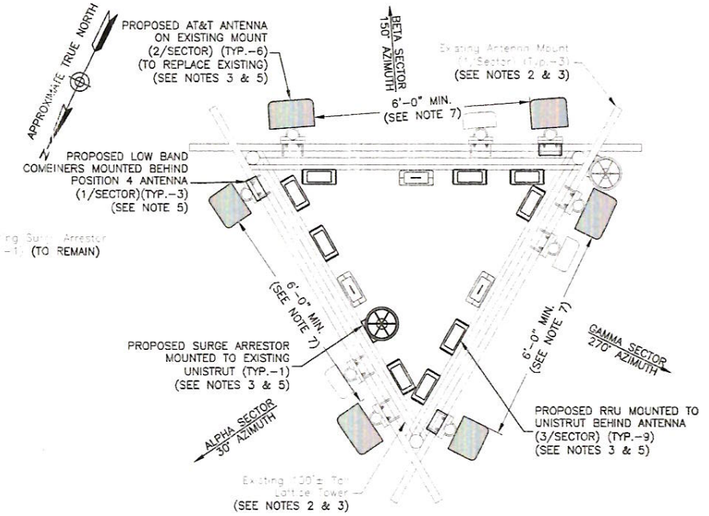
FINAL EQUIPMENT CONFIGURATION

SECTOR	BAND	ANTENNA	SIZE (INCHES) (LxWxD)	RAD. CENTER	AZIMUTH	TMA	RRU	SIZE (INCHES) (LxWxD)	COAX JUMPERS	FIBER JUMPERS
ALPHA	UMTS 850	POWERWAVE 7770	55.0x11.0x5.0	88'±	30°	(E) (2) POWERWAVE LGP 21401	-	-	E (2)	-
	LTE 700/AWS	(P) CCI HPA-65R-BUU-H6	72.0x14.8x9.0	88'±	30°	-	(E) RRUS-11 (P) RRUS 4426 B66	27.2 x 12.1 x 7.0 15.0 x 13.2 x 5.4	-	-
	-	-	-	-	-	-	(P) RRU 4415 B25 (P) RRUS-32	15.0 x 13.2 x 5.4 27.2 x 12.1 x 7.0	E (2)	E (1)
	LTE 1900/WCS	(P) QUINTEL Q566512-2	72.0x12.0x9.6	88'±	30°	-	-	-	-	-
BETA	UMTS 850	POWERWAVE 7770	55.0x11.0x5.0	88'±	150°	(E) (2) POWERWAVE LGP 21401	-	-	E (2)	-
	LTE 700/AWS	(P) CCI HPA-65R-BUU-H6	72.0x14.8x9.0	88'±	150°	-	(E) RRUS-11 (P) RRUS 4426 B66	27.2 x 12.1 x 7.0 15.0 x 13.2 x 5.4	-	-
	-	-	-	-	-	-	(P) RRU 4415 B25 (P) RRUS-32	15.0 x 13.2 x 5.4 27.2 x 12.1 x 7.0	E (2)	E (1)
	LTE 1900/WCS	(P) QUINTEL Q566512-2	72.0x12.0x9.6	88'±	150°	-	-	-	-	-
GAMMA	UMTS 850	POWERWAVE 7770	55.0x11.0x5.0	88'±	270°	(E) (2) POWERWAVE LGP 21401	-	-	E (2)	-
	LTE 700/AWS	(P) CCI HPA-65R-BUU-H6	72.0x14.8x9.0	88'±	270°	-	(E) RRUS-11 (P) RRUS 4426 B66	27.2 x 12.1 x 7.0 15.0 x 13.2 x 5.4	-	-
	-	-	-	-	-	-	(P) RRU 4415 B25 (P) RRUS-32	15.0 x 13.2 x 5.4 27.2 x 12.1 x 7.0	E (2)	E (1)
	LTE 1900/WCS	(P) QUINTEL Q566512-2	72.0x12.0x9.6	88'±	270°	-	-	-	-	-

FINAL EQUIPMENT CONFIGURATION 2
SCALE: N.T.S.



EXISTING ANTENNA LAYOUT 3
SCALE: N.T.S.



PROPOSED ANTENNA LAYOUT 4
SCALE: N.T.S.

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SCALE: AS SHOWN | DESIGNED BY: JCM | DRAWN BY: JCM

STATE OF CONNECTICUT
BENJAMIN B. ROSE
28971
LICENSED
PROFESSIONAL ENGINEER

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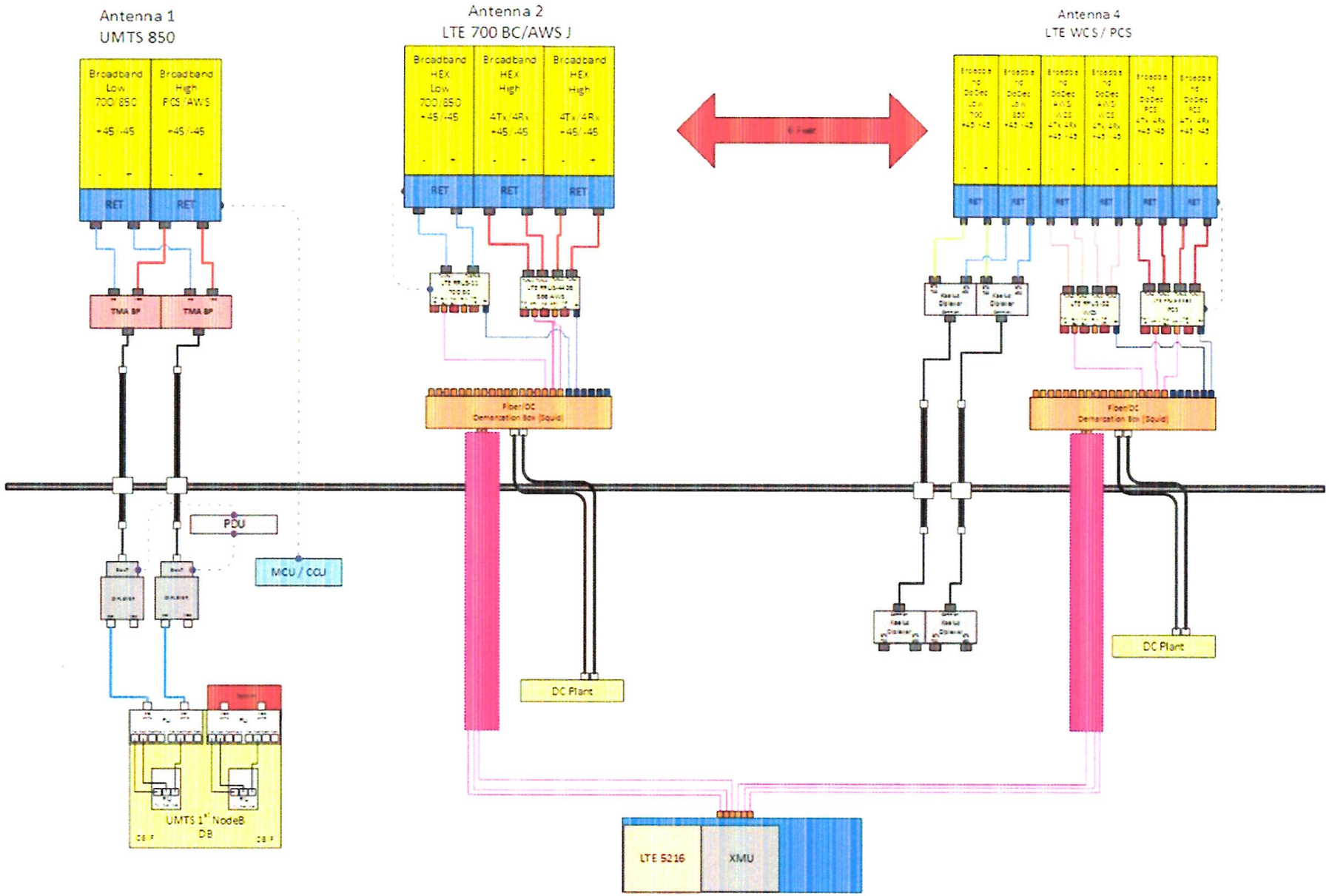
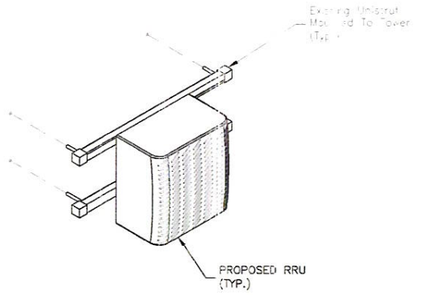
ELEVATION & ANTENNA LAYOUT

DEWBERRY NO.	DRAWING NUMBER	REV
50019239/50113529	C02	1



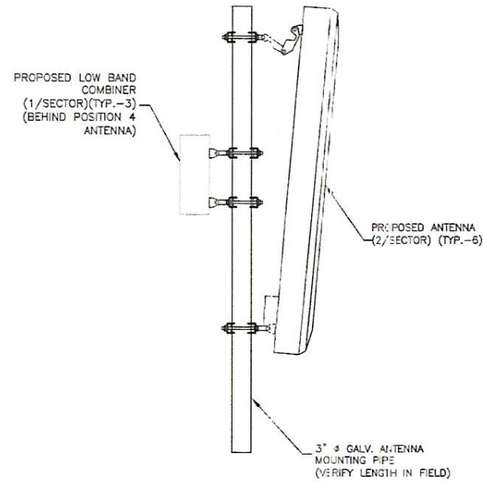
EQUIPMENT PLUMBING DIAGRAM (1)
SCALE: N.T.S.



NOTES:

1. INSTALL ALL EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. USE APPROPIATE MOUNTING HARDWARE FOR CONSTRUTION TYPE.
2. DETAIL IS SCHEMATIC. MOUNT SQUID IN SIMILAR FASHION.

REMOTE ATTACHMENT DETAIL (2)
SCALE: N.T.S.



NOTE:

1. FIELD VERIFY CONDITION OF EXISTING MOUNTING HARDWARE. REPAIR OR REPLACE AS REQUIRED.
2. REFER TO LATEST RF DATA SHEET FOR SPECIFIC ANTENNA SETTINGS & MODE.

ANTENNA MOUNT DETAIL (3)
SCALE: N.T.S.

NOTES:

1. EQUIPMENT PLUMBING DIAGRAM PER RFDS VERSION 1.00 DATED 12/01/17.
2. CONTRACTOR TO VERIFY FINAL EQUIPMENT CONFIGURATION AND SEPARATIONS WITH AT&T PRIOR TO CONSTRUCTION.

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STATE OF CONNECTICUT 28971 LICENSED PROFESSIONAL ENGINEER

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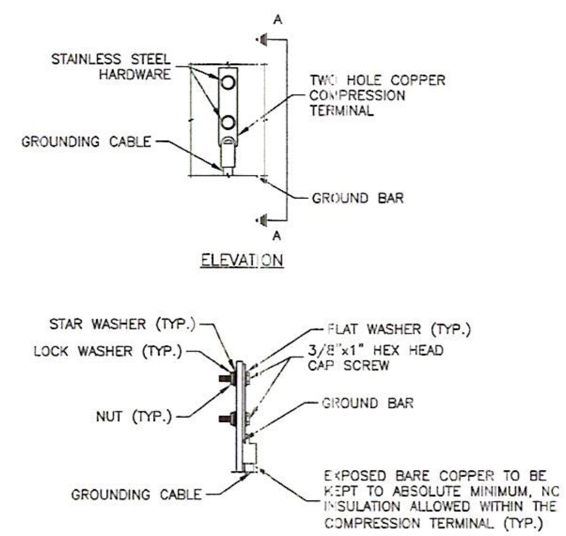
FRAMINGHAM, MA 01701

PROPOSED ELEVATION & CONSTRUCTION DETAILS

DEWBERRY NO.	DRAWING NUMBER	REV
50019239/50113529	C04	1

GROUNDING NOTES:

1. THE CONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ) THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE CONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS. ALL AVAILABLE GROUNDING ELECTRODES SHALL BE CONNECTED TOGETHER IN ACCORDANCE WITH THE NEC.
3. THE CONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS. USE OF OTHER METHODS MUST BE PRE-APPROVED BY CONTRACTOR IN WRITING.
4. THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS ON TOWER SITES AND 10 OHMS OR LESS ON ROOFTOP SITES. WHEN ADDING ELECTRODES, CONTRACTOR SHALL MAINTAIN A MINIMUM DISTANCE BETWEEN THE ADDED ELECTRODE AND ANY OTHER EXISTING ELECTRODE EQUAL TO THE BURIED LENGTH OF THE ROD. IDEALLY, CONTRACTOR SHALL STRIVE TO KEEP THE SEPARATION DISTANCE EQUAL TO TWICE THE BURIED LENGTH OF THE RODS.
5. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT.
6. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE AND UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
7. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO TRANSMISSION EQUIPMENT.
8. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED. BACK-TO-BACK CONNECTIONS ON OPPOSITE SIDES OF THE GROUND BUS ARE PERMITTED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED. IN ALL CASES, BENDS SHALL BE MADE WITH A MINIMUM BEND RADIUS OF 8 INCHES.
11. EACH INTERIOR TRANSMISSION CABINET FRAME/PLINTH SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH 6 AWG STRANDED, GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRE UNLESS NOTED OTHERWISE IN THE DETAILS. EACH OUTDOOR CABINET FRAME/PLINTH SHALL BE DIRECTLY CONNECTED TO THE BURIED GROUND RING WITH 2 AWG SOLID TIN-PLATED COPPER WIRE UNLESS NOTED OTHERWISE IN THE DETAILS.
12. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING, SHALL BE 2 AWG SOLID TIN-PLATED COPPER UNLESS OTHERWISE INDICATED.
13. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE. CONNECTIONS TO ABOVE GRADE UNITS SHALL BE MADE WITH EXOTHERMIC WELDS WHERE PRACTICAL OR WITH 2 HOLE MECHANICAL TYPE BRASS CONNECTORS WITH STAINLESS STEEL HARDWARE, INCLUDING SET SCREWS. HIGH PRESSURE CRIMP CONNECTORS MAY ONLY BE USED WITH WRITTEN PERMISSION FROM SAI COMMUNICATIONS MARKET REPRESENTATIVE.
14. EXOTHERMIC WELDS SHALL BE PERMITTED ON TOWERS ONLY WITH THE EXPRESS APPROVAL OF THE TOWER MANUFACTURER OR THE CONTRACTORS STRUCTURAL ENGINEER.
15. ALL WIRE TO WIRE GROUND CONNECTIONS TO THE INTERIOR GROUND RING SHALL BE FORMED USING HIGH PRESS CRIMPS OR SPLIT BOLT CONNECTORS WHERE INDICATED IN THE DETAILS.
16. ON ROOFTOP SITES WHERE EXOTHERMIC WELDS ARE A FIRE HAZARD COPPER COMPRESSION CAP CONNECTORS MAY BE USED FOR WIRE TO WIRE CONNECTORS. 2 HOLE MECHANICAL TYPE BRASS CONNECTORS WITH STAINLESS STEEL HARDWARE, INCLUDING SET SCREWS SHALL BE USED FOR CONNECTION TO ALL ROOFTOP TRANSMISSION EQUIPMENT AND STRUCTURAL STEEL.
17. COAX BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR USING TWO-HOLE MECHANICAL TYPE BRASS CONNECTORS AND STAINLESS STEEL HARDWARE.
18. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
19. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
20. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
21. BOND ALL METALLIC OBJECTS WITHIN 6 FT OF THE BURIED GROUND RING WITH 2 AWG SOLID TIN-PLATED COPPER GROUND CONDUCTOR. DURING EXCAVATION FOR NEW GROUND CONDUCTORS, IF EXISTING GROUND CONDUCTORS ARE ENCOUNTERED, BOND EXISTING GROUND CONDUCTORS TO NEW CONDUCTORS.
22. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT WITH LISTED BONDING FITTINGS.

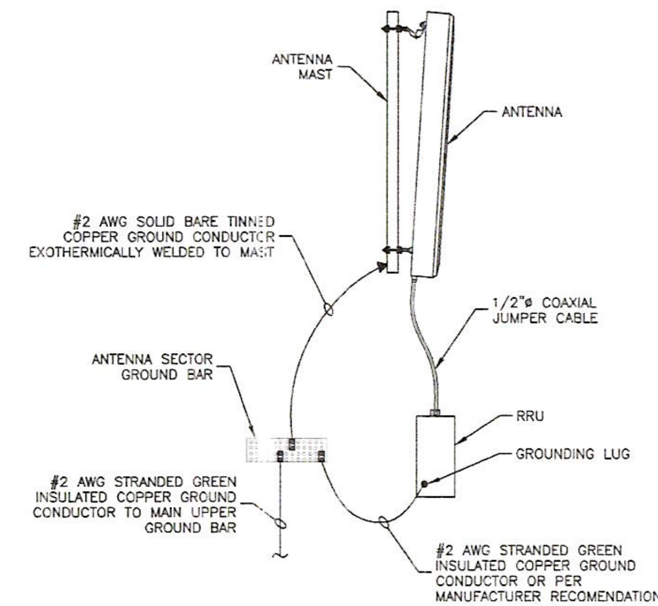


NOTES:

1. DOUBLING UP OR STACKING OF CONNECTIONS IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL (1)

SCALE: N.T.S.



NOTES:

1. VERIFY EXISTING GROUNDING SYSTEM IS INSTALLED PER AT&T STANDARDS.
2. BOND NEW EQUIPMENT INTO EXISTING GROUND SYSTEM IN ACCORDANCE WITH AT&T STANDARDS & MANUFACTURER RECOMMENDATIONS.

TYPICAL ANTENNA/RRU GROUNDING DETAIL (2)

SCALE: N.T.S

Dewberry®
Dewberry Engineers Inc.
99 SUMMER ST.
SUITE 700
BOSTON, MA 02110
PHONE: 617.695.3400
FAX: 617.695.3310

SAI
12 INDUSTRIAL WAY
SALEM, NH 03079

GREENWICH - KING STREET
SITE NO. CT2347 2C/3C/4C

1323 KING STREET
GREENWICH, CT 06831

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

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	09/09/19	FOR CONSTRUCTION	CDH	DAS	BBR
0	04/13/18	FOR CONSTRUCTION	JCM	DAS	BBR
A	02/09/18	FOR REVIEW	JCM	DAS	BBR

SCALE: AS SHOWN | DESIGNED BY: JCM | DRAWN BY: JCM

STATE OF CONNECTICUT PROFESSIONAL ENGINEER LICENSED 28971

AT&T MOBILITY
FRAMINGHAM, MA 01701

GROUNDING NOTES & DETAILS

DEWBERRY NO.	DRAWING NUMBER	REV
50019239/50113529	E01	1

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

100' Existing Rohn Lattice Tower

Site #: CT2347

Site Name: Greenwich – King Street

Project: LTE 2C-3C-4C

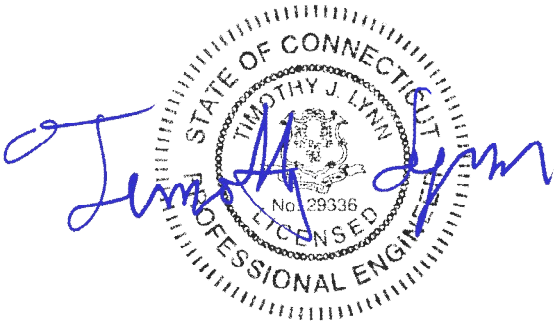
PACE #: MRCTB027630 /MRCTB027652 / MRCTB027636

PT #: 2051A0ETPP /2051A0ETZP / 2051A0ETZC

FA #: 10050949

1323 King Street
Greenwich, CT 06831

Centek Project No. 18092.00



Rev 2: August 19, 2019

Max Stress Ratio = 51.1%

Prepared for:

AT&T Mobility
500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067

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 modification proposed by AT&T on the existing lattice tower located in Greenwich, Connecticut.

The host tower is a 100-ft, three legged, lattice tower originally manufactured by ROHN eng. file no. 29307JC dated 4/23/93. The tower geometry, structure member sizes and foundation information were taken from a previous structural report prepared by Centek engineering job no. 15001.004 dated February 3, 2015.

Antenna and appurtenance inventory were taken from the aforementioned Centek structural report and a AT&T RF data sheet.

The tower consists of five (5) tapered vertical sections consisting of steel pipe legs conforming to ASTM A572 Gr. 50 and lateral bracing conforming to ASTM A572 Gr. 50 and ASTM A36. The vertical tower sections are connected by bolted flange plates with the diagonal and horizontal bracing to pipe legs consisting of bolted connections. The width of the tower face is 8-ft 6-in at the top and 17-ft 5-in at the bottom.

Antenna and Appurtenance Summary

The existing tower supports several communication antennas. The existing and proposed loads considered in the analysis consist of the following:

- UNKNOWN (Existing):
  Antenna: One (1) 8-ft Omni-directional whip antenna leg mounted with an elevation of ±100-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- VERIZON (Existing to Remain):
  Antennas: Four (4) Andrew DB844H90E-XY panel antennas, two (2) Kathrein 800-10734 panel antennas, four (4) Andrew HBXX-6516DS panel antennas, two (2) Alcatel-Lucent RRH2x40-AWS remote radio heads, two (2) Alcatel-Lucent RRH2x60-PCS remote radio heads, four (4) Andrew CBC78-DF diplexers and one (1) RFS DB-T1-6Z-8AB-0Z main distribution box mounted on two (2) 12-ft T-Frames with a RAD center elevation of ±98-ft above grade level.
  Coax Cables: Twelve (12) 7/8" ∅ coax cables and one (1) 1-5/8" ∅ fiber cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) 4-ft ∅ dish leg mounted with an elevation of ±84-ft above grade level.
  Coax Cable: One (1) EW90 cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antenna: One (1) 4-ft ∅ dish leg mounted with an elevation of ±70-ft above grade level.
  Coax Cable: One (1) EW90 cable running on a leg/face of the existing tower as specified in Section 3 of this report.

- AT&T (Existing to Remain):
  Antenna: Three (3) Powerwave 7770 panel antennas, six (6) Powerwave LGP21401 TMAs, three (3) Ericsson RRUS-11 remote radio heads and one (1) Raycap DC6-48-60-18-8F surge arrestor mounted on three (3) 12-ft Wireless Frames with a RAD center elevation of ±88-ft above grade level.
  Coax Cable: Twelve (12) 1-5/8" ∅ coax cables, one (1) fiber cable and two (2) dc control cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- **AT&T (Existing to Remove):**
  Antenna: Three (3) Powerwave 7770 panel antennas, three (3) Powerwave P65-16-XLH-RR panel antennas and six (6) Powerwave LGP21401 TMAs mounted on three (3) 12-ft Wireless Frames with a RAD center elevation of ±88-ft above grade level.
- **AT&T (Proposed):**
  Antenna: Three (3) CCI HPA-65R-BUU-H6 panel antennas, three (3) Quintel QS66512-2 panel antennas, three (3) Kaelus DBC0061F1V51-2 combiners, three (3) Ericsson 4426 B66 remote radio heads, three (3) Ericsson 4415 B25 remote radio heads, three (3) Ericsson RRUS-32 remote radio heads one (1) Raycap DC6-48-60-18-8F surge arrestor and mounted on three (3) 12-ft Wireless Frames with a RAD center elevation of ±88-ft above grade level.
  Coax Cable: One (1) fiber cable and two (2) dc control cables running on a leg/face of the existing tower as specified in Section 3 of this report.

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.
- All coax cables should be routed as specified in section 3 of this report.

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, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 1.00" radial ice on the tower structure and its components.

Basic Wind Speed:	Hartford County; v = 90-105 mph (3-second gust)	*[Annex B of TIA-222-G-2005]*
	Newington; v = 97 mph (Nominal)	*[Appendix N of the 2018 CT Building Code]*
Load Cases:	Load Case 1; 97 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2018 CT Building Code]*
	Load Case 2; 50 mph wind speed w/ 1.00" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

[1] The 2015 International Building Code as amended by the 2018 Connecticut State Building Code (CSBC).

Tower Capacity

- Calculated stresses were found to be within allowable limits. This tower was found to be at **51.1%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Diagonal (T5)	0'-0"-20'-0"	40.2%	**PASS**
Leg (T3)	40'-0"-60'-0"	51.1%	**PASS**

Foundation and Anchors

The existing foundation consists of three (3) 3-ft ∅ x 3-ft long reinforced concrete piers on a 24-ft square x 4-ft thick reinforced concrete pad bearing directly on existing sub grade. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned structural report prepared by Centek. Tower legs are connected to the foundation by means of (4) 1"∅, ASTM A354-BC anchor bolts per leg, embedded into the concrete foundation structure.

- The tower reactions developed from the governing Load Case 1 were used in the verification of the foundation:

Reactions	Vector	Proposed Base Reactions
Base	Shear	**20 kips**
	Compression	**18 kips**
	Moment	**1241 kip-ft**
Leg	Shear	**12 kips**
	Uplift	**77 kips**
	Compression	**86 kips**

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

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	32.1%	**PASS**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	TIA-222-G Section 9.4 FS[1]	Proposed Loading (FS)[1]	Result
Reinforced Concrete Mat	OM[2]	1.0	4.06	**PASS**

Note 1: FS denotes Factor of Safety
Note 2: OM denotes Overturning Moment.

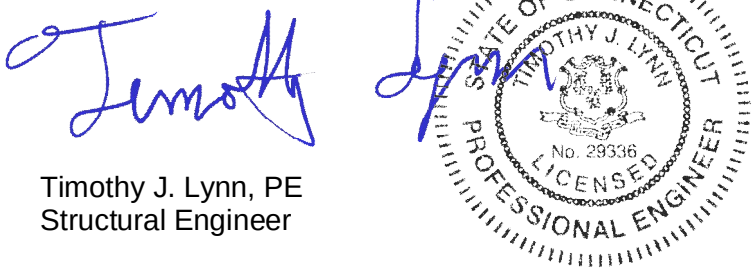
Conclusion

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 AT&T. 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:

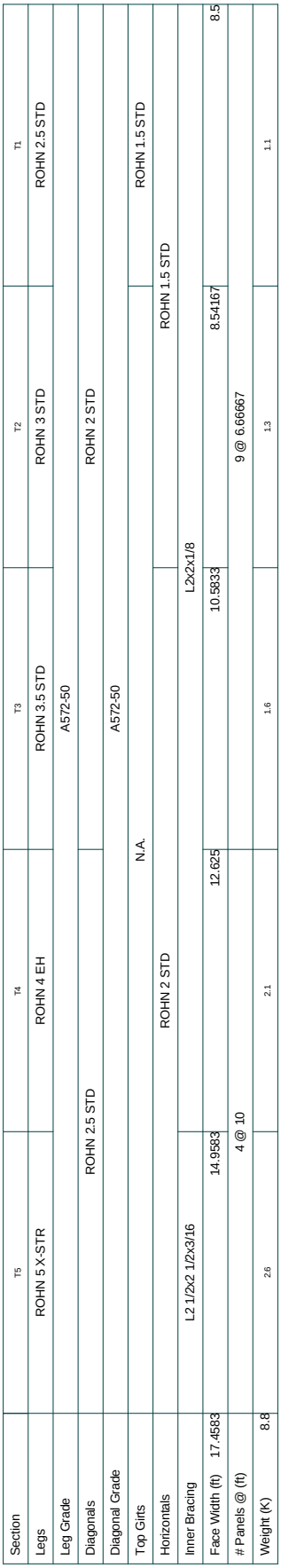
- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or 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.

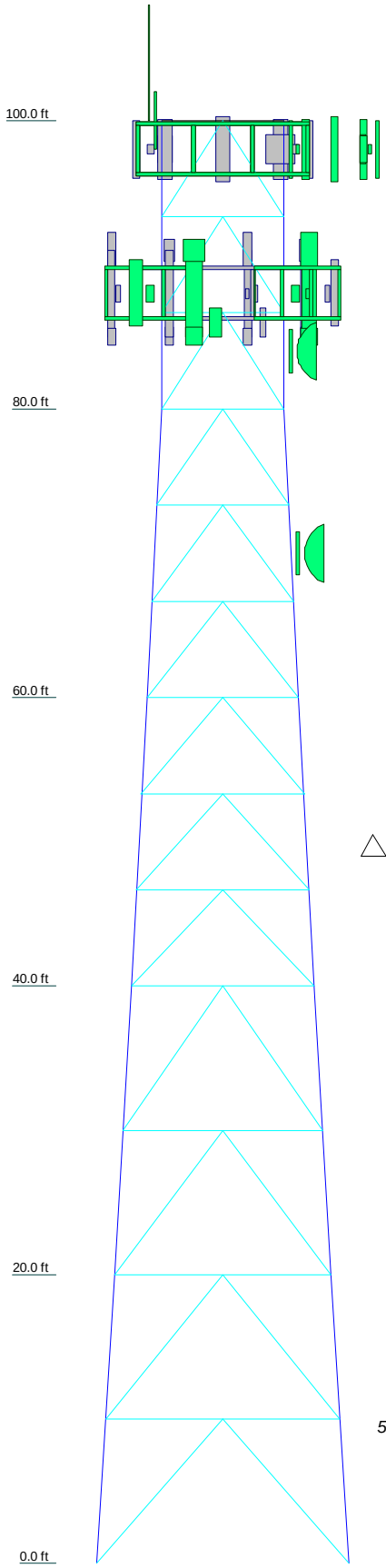
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

TnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, TnxTower, formerly ERITower, 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.





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
8' x 3" Dia Omni	100	QS66512-2 (ATI Proposed)	88
4' x 2.875" Pipe Mount	100	7770.00 (ATI Existing)	88
Pirod 12' T-Frame Sector Mount (1) (Verizon Existing)	98	HPA-65R-BUU-H6 (ATI Proposed)	88
Pirod 12' T-Frame Sector Mount (1) (Verizon Existing)	98	QS66512-2 (ATI Proposed)	88
DB844H90-XY (Verizon Existing)	98	DBC0061F1V51-2 (ATI Proposed)	88
HBXX-6516DS (Verizon Existing)	98	DBC0061F1V51-2 (ATI Proposed)	88
800-10734 (Verizon Existing)	98	DBC0061F1V51-2 (ATI Proposed)	88
HBXX-6516DS (Verizon Existing)	98	(2) LPG21401 TMA (ATI Existing)	88
DB844H90-XY (Verizon Existing)	98	(2) LPG21401 TMA (ATI Existing)	88
DB844H90-XY (Verizon Existing)	98	(2) LPG21401 TMA (ATI Existing)	88
HBXX-6516DS (Verizon Existing)	98	RRUS-11 (ATI Existing)	88
800-10734 (Verizon Existing)	98	RRUS-11 (ATI Existing)	88
HBXX-6516DS (Verizon Existing)	98	RRUS-11 (ATI Existing)	88
DB844H90-XY (Verizon Existing)	98	4426 B66 (ATI Proposed)	88
RRH2x40-AWS (Verizon Existing)	98	4426 B66 (ATI Proposed)	88
RRH2x40-AWS (Verizon Existing)	98	4426 B66 (ATI Proposed)	88
DB-T1-6Z-8AB-0Z (Verizon Existing)	98	RRUS-32 (ATI Proposed)	88
RRH2x60-PCS (Verizon Existing)	98	RRUS-32 (ATI Proposed)	88
RRH2x60-PCS (Verizon Existing)	98	RRUS-32 (ATI Proposed)	88
(2) CBC78-DF (Verizon Existing)	98	4415 B25 (ATI Proposed)	88
(2) CBC78-DF (Verizon Existing)	98	4415 B25 (ATI Proposed)	88
P1000 Unistrut (9' Long) (ATI Existing)	88.5	4415 B25 (ATI Proposed)	88
P1000 Unistrut (9' Long) (ATI Existing)	88.5	DC6-48-60-18-8F Surge Arrestor (ATI Existing)	86
P1000 Unistrut (9' Long) (ATI Existing)	88.5	DC6-48-60-18-8F Surge Arrestor (ATI Proposed)	86
12' Frame (ATI Existing)	88	3' x 4.5" Pipe Mont	84
12' Frame (ATI Existing)	88	4 FT DISH	84
12' Frame (ATI Existing)	88	P1000 Unistrut (9' Long) (ATI Existing)	78.5
7770.00 (ATI Existing)	88	P1000 Unistrut (9' Long) (ATI Existing)	78.5
HPA-65R-BUU-H6 (ATI Proposed)	88	P1000 Unistrut (9' Long) (ATI Existing)	78.5
QS66512-2 (ATI Proposed)	88	3' x 4.5" Pipe Mont	70
7770.00 (ATI Existing)	88	4 FT DISH	70
HPA-65R-BUU-H6 (ATI Proposed)	88		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

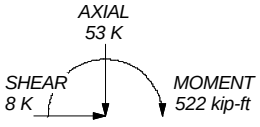
1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 51.1%

ARE FACTORED

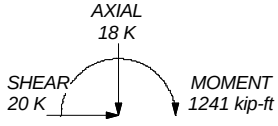
MAX. CORNER REACTIONS AT BASE:

DOWN: 86 K
SHEAR: 12 K

UPLIFT: -77 K
SHEAR: 11 K



TORQUE 3 kip-ft
50 mph WIND - 0.7500 in ICE



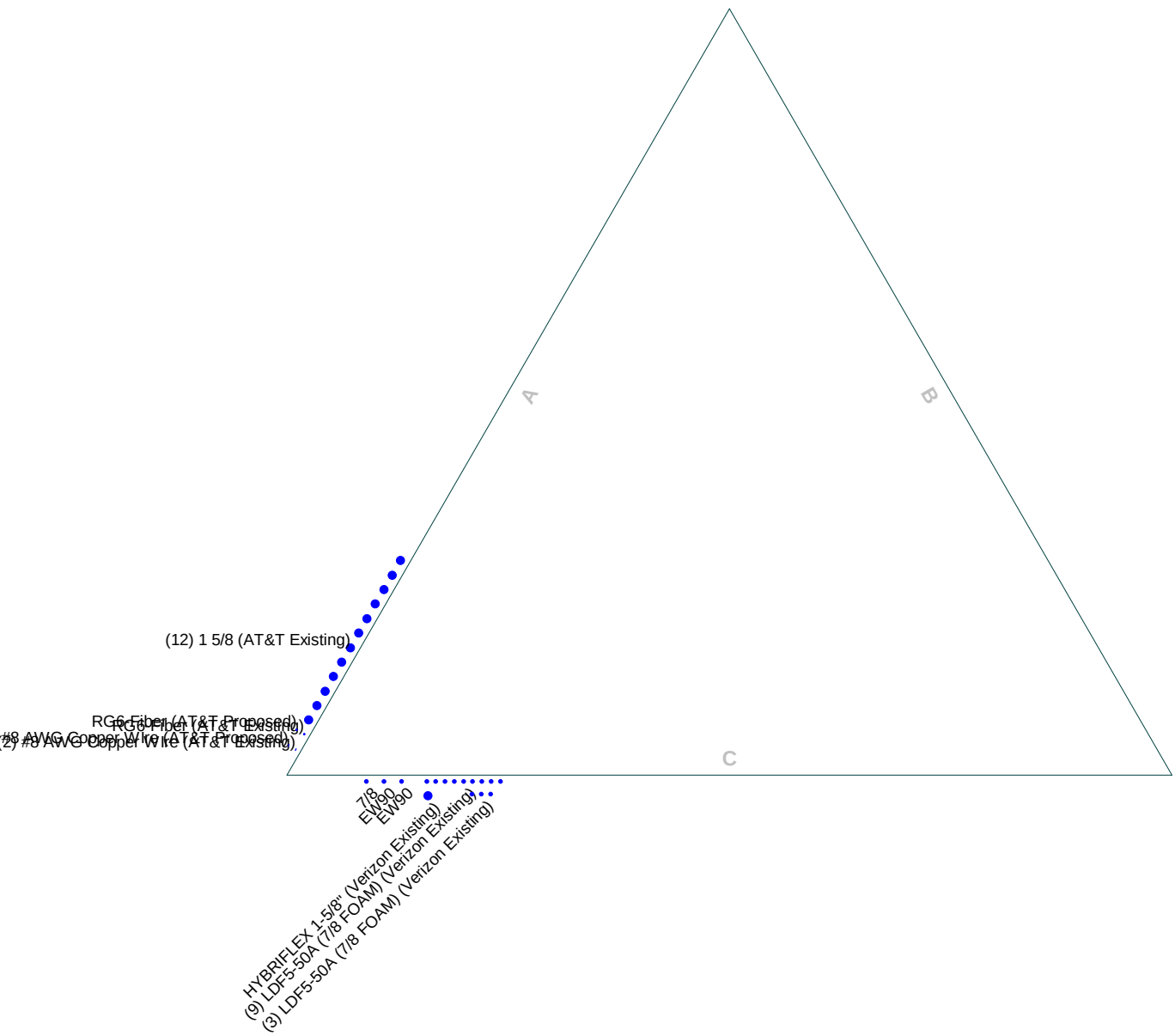
TORQUE 6 kip-ft
REACTIONS - 93 mph WIND

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

Job: **18092.00 - CT2347**			
Project: **100' Rohn Lattice Tower - 1323 King St., Greenwich, CT**			
Client: AT&T Mobility	Drawn by: TJL	App'd:	
Code: TIA-222-G	Date: 06/04/18	Scale: NTS	
Path: J:\Jobs\1809200.WI04_Structural\Backup Documentation\ERI Files\100-ft Rohn Lattice Tower.eri		Dwg No. E-1	

Feed Line Plan

Round Flat App In Face App Out Face



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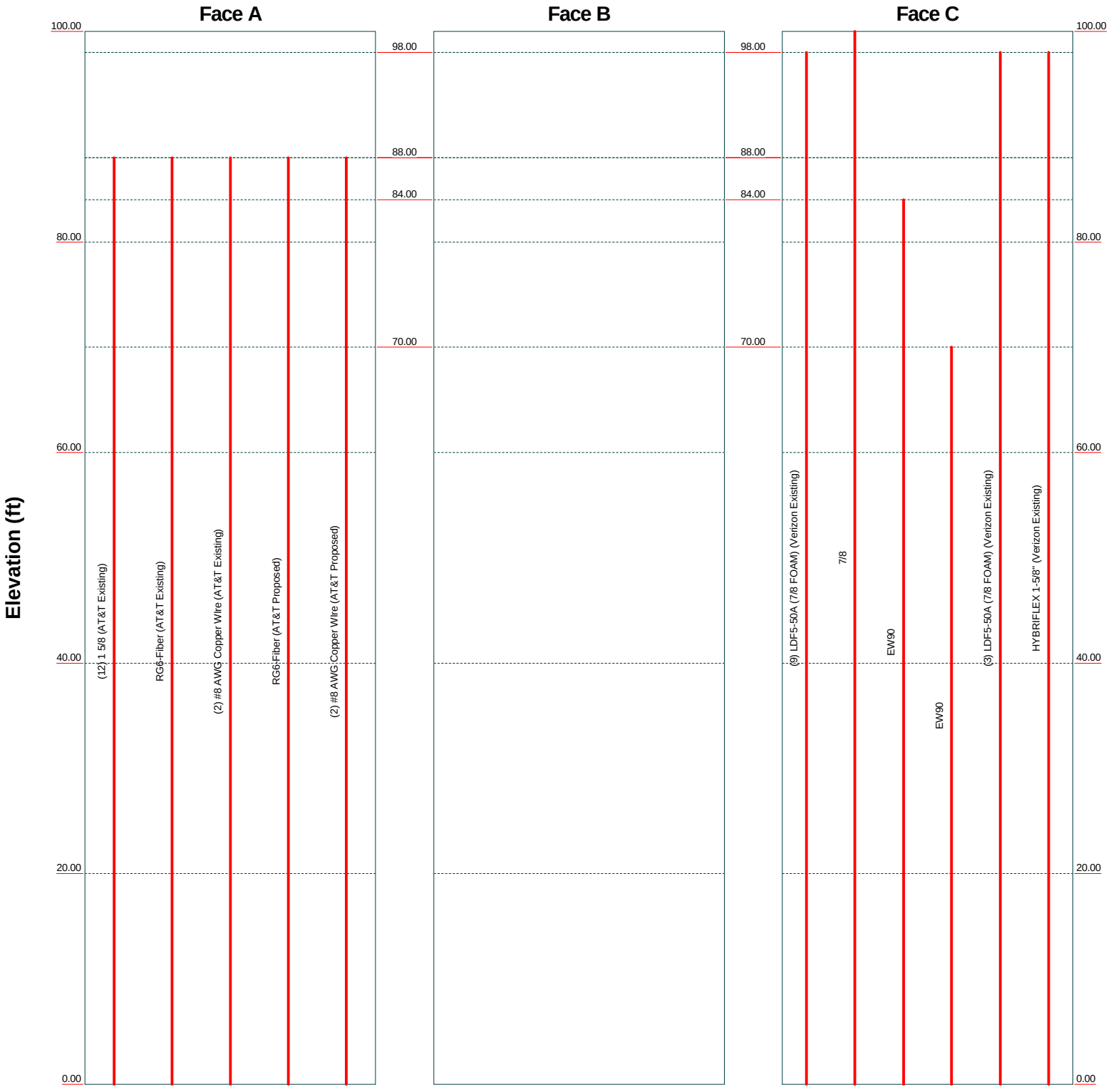
Code: TIA-222-G	Date: 06/04/18	Scale: NTS	
Path: J:\Jobs\1809200.WI\04_Structural\Backup Documentation\ERI Files\100-ft Rohn Lattice Tower.eri		Dwg No. E-7	

Feed Line Distribution Chart
0' - 100'

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



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Client: AT&T Mobility	Drawn by: TJL	App'd:
Code: TIA-222-G	Date: 06/04/18	Scale: NTS
Path: J:\Jobs\1809200.W\04_Structural\Backup Documentation\ERI Files\100-ft Rohn Lattice Tower.eri		Dwg No. E-7

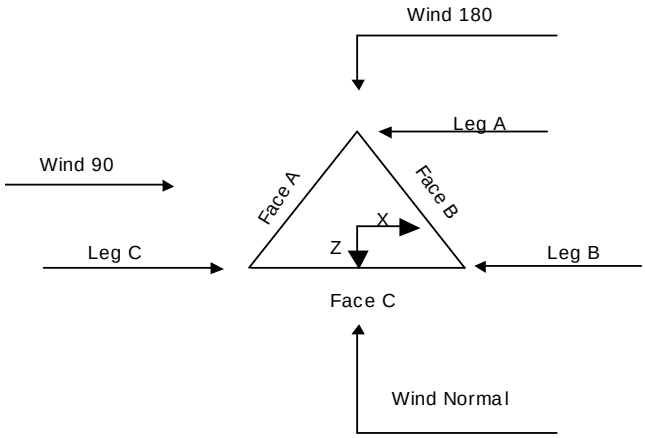
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 100.00 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 17.46 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Basic wind speed of 93 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned	√	Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area	√	SR Leg Bolts Resist Compression
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r	√	All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice		Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
√	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
√	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	100.00-80.00			8.50	1	20.00
T2	80.00-60.00			8.54	1	20.00
T3	60.00-40.00			10.58	1	20.00
T4	40.00-20.00			12.63	1	20.00
T5	20.00-0.00			14.96	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	100.00-80.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T2	80.00-60.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T3	60.00-40.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T4	40.00-20.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T5	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 100.00-80.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T2 80.00-60.00	Pipe	ROHN 3 STD	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T3 60.00-40.00	Pipe	ROHN 3.5 STD	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T4 40.00-20.00	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T5 20.00-0.00	Pipe	ROHN 5 X-STR	A572-50 (50 ksi)	Pipe	ROHN 2.5 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 100.00-80.00	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)	Single Angle		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 100.00-80.00	None	Single Angle		A36 (36 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T2 80.00-60.00	None	Solid Round		A572-50 (50 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T3 60.00-40.00	None	Single Angle		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T4 40.00-20.00	None	Single Angle		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T5 20.00-0.00	None	Single Angle		A36 (36 ksi)	Pipe	ROHN 2 STD	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 100.00-80.00	Single Angle		A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T2 80.00-60.00	Single Angle		A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T3 60.00-40.00	Single Angle		A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T4 40.00-20.00	Single Angle		A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T5 20.00-0.00	Single Angle		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	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	Double Angle Stitch Bolt Spacing Redundants in
T1 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	30.0000	30.0000	36.0000
T2 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	Yes	Yes	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T5 20.00-0.00	Yes	Yes	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		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 100.00-80.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
T2 80.00-60.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T3 60.00-40.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T4 40.00-20.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T5 20.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

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 100.00-80.00	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 80.00-60.00	Flange	0.8750 A325N	4	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T3 60.00-40.00	Flange	0.8750 A325N	4	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T4 40.00-20.00	Flange	1.0000 A325N	4	0.6250 A325N	3	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T5 20.00-0.00	Flange	1.0000 A354-BC	4	0.6250 A325N	3	0.6250 A325N	0	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
LDF5-50A (7/8 FOAM) (Verizon Existing)	C	No	Ar (CaAa)	98.00 - 0.00	1.0000	0.3	9	9	1.0900	1.0900		0.33
1 5/8 (AT&T Existing)	A	No	Ar (CaAa)	88.00 - 0.00	1.0000	-0.33	12	12	1.9800	1.9800		1.04
RG6-Fiber (AT&T Existing)	A	No	Ar (CaAa)	88.00 - 0.00	1.0000	-0.45	1	1	0.5000	0.5000		1.00
#8 AWG Copper WIre (AT&T Existing)	A	No	Ar (CaAa)	88.00 - 0.00	1.0000	-0.47	2	2	0.2500	0.1285		0.05
7/8	C	No	Ar (CaAa)	100.00 - 0.00	1.0000	0.41	1	1	1.1100	1.1100		0.54
EW90	C	No	Ar (CaAa)	84.00 - 0.00	1.0000	0.39	1	1	0.9869	0.9869		0.32
EW90	C	No	Ar (CaAa)	70.00 - 0.00	1.0000	0.37	1	1	0.9869	0.9869		0.32
LDF5-50A	C	No	Ar (CaAa)	98.00 - 0.00	4.0000	0.28	3	3	1.0900	1.0900		0.33

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
(7/8 FOAM) (Verizon Existing)												
HYBRIFLEX 1-5/8" (Verizon Existing)	C	No	Ar (CaAa)	98.00 - 0.00	4.0000	0.34	1	1	1.9800	1.9800		1.90
RG6-Fiber (AT&T Proposed)	A	No	Ar (CaAa)	88.00 - 0.00	3.0000	-0.45	1	1	0.5000	0.5000		1.00
#8 AWG Copper WIre (AT&T Proposed)	A	No	Ar (CaAa)	88.00 - 0.00	3.0000	-0.47	2	2	0.2500	0.1285		0.05

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	100.00-80.00	A	0.000	0.000	20.219	0.000	0.12
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	29.723	0.000	0.12
T2	80.00-60.00	A	0.000	0.000	50.548	0.000	0.29
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	35.301	0.000	0.14
T3	60.00-40.00	A	0.000	0.000	50.548	0.000	0.29
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	36.288	0.000	0.14
T4	40.00-20.00	A	0.000	0.000	50.548	0.000	0.29
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	36.288	0.000	0.14
T5	20.00-0.00	A	0.000	0.000	50.548	0.000	0.29
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	36.288	0.000	0.14

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	100.00-80.00	A	1.658	0.000	0.000	65.543	0.000	0.92
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	92.330	0.000	1.19
T2	80.00-60.00	A	1.617	0.000	0.000	162.720	0.000	2.26
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	111.509	0.000	1.42
T3	60.00-40.00	A	1.564	0.000	0.000	161.242	0.000	2.20
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	114.201	0.000	1.42
T4	40.00-20.00	A	1.486	0.000	0.000	159.092	0.000	2.11
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	111.979	0.000	1.34
T5	20.00-0.00	A	1.331	0.000	0.000	154.828	0.000	1.94

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	107.577	0.000	1.20

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	100.00-80.00	-5.8954	3.9605	-5.1896	3.3961
T2	80.00-60.00	-8.0553	4.3884	-7.1502	3.8785
T3	60.00-40.00	-9.2980	5.0957	-8.5020	4.6514
T4	40.00-20.00	-10.8617	5.9562	-10.2062	5.5768
T5	20.00-0.00	-12.1162	6.6472	-11.8398	6.4454

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	LDF5-50A (7/8 FOAM)	80.00 - 98.00	0.6000	0.6000
T1	2	1 5/8	80.00 - 88.00	0.6000	0.6000
T1	3	RG6-Fiber	80.00 - 88.00	0.6000	0.6000
T1	4	#8 AWG Copper WIre	80.00 - 88.00	0.6000	0.6000
T1	5	7/8	80.00 - 100.00	0.6000	0.6000
T1	6	EW90	80.00 - 84.00	0.6000	0.6000
T1	8	LDF5-50A (7/8 FOAM)	80.00 - 98.00	0.6000	0.6000
T1	9	HYBRIFLEX 1-5/8"	80.00 - 98.00	0.6000	0.6000
T1	10	RG6-Fiber	80.00 - 88.00	0.6000	0.6000
T1	11	#8 AWG Copper WIre	80.00 - 88.00	0.6000	0.6000
T2	1	LDF5-50A (7/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T2	2	1 5/8	60.00 - 80.00	0.6000	0.6000
T2	3	RG6-Fiber	60.00 - 80.00	0.6000	0.6000
T2	4	#8 AWG Copper WIre	60.00 - 80.00	0.6000	0.6000
T2	5	7/8	60.00 - 80.00	0.6000	0.6000
T2	6	EW90	60.00 - 80.00	0.6000	0.6000
T2	7	EW90	60.00 - 70.00	0.6000	0.6000
T2	8	LDF5-50A (7/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T2	9	HYBRIFLEX 1-5/8"	60.00 - 80.00	0.6000	0.6000
T2	10	RG6-Fiber	60.00 - 80.00	0.6000	0.6000
T2	11	#8 AWG Copper WIre	60.00 - 80.00	0.6000	0.6000
T3	1	LDF5-50A (7/8 FOAM)	40.00 - 60.00	0.6000	0.6000
T3	2	1 5/8	40.00 - 60.00	0.6000	0.6000
T3	3	RG6-Fiber	40.00 - 60.00	0.6000	0.6000
T3	4	#8 AWG Copper WIre	40.00 - 60.00	0.6000	0.6000
T3	5	7/8	40.00 - 60.00	0.6000	0.6000
T3	6	EW90	40.00 - 60.00	0.6000	0.6000
T3	7	EW90	40.00 - 60.00	0.6000	0.6000
T3	8	LDF5-50A (7/8 FOAM)	40.00 - 60.00	0.6000	0.6000
T3	9	HYBRIFLEX 1-5/8"	40.00 - 60.00	0.6000	0.6000
T3	10	RG6-Fiber	40.00 - 60.00	0.6000	0.6000
T3	11	#8 AWG Copper WIre	40.00 - 60.00	0.6000	0.6000
T4	1	LDF5-50A (7/8 FOAM)	20.00 - 40.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T4	2	1 5/8	20.00 - 40.00	0.6000	0.6000
T4	3	RG6-Fiber	20.00 - 40.00	0.6000	0.6000
T4	4	#8 AWG Copper WIre	20.00 - 40.00	0.6000	0.6000
T4	5	7/8	20.00 - 40.00	0.6000	0.6000
T4	6	EW90	20.00 - 40.00	0.6000	0.6000
T4	7	EW90	20.00 - 40.00	0.6000	0.6000
T4	8	LDF5-50A (7/8 FOAM)	20.00 - 40.00	0.6000	0.6000
T4	9	HYBRIFLEX 1-5/8"	20.00 - 40.00	0.6000	0.6000
T4	10	RG6-Fiber	20.00 - 40.00	0.6000	0.6000
T4	11	#8 AWG Copper WIre	20.00 - 40.00	0.6000	0.6000
T5	1	LDF5-50A (7/8 FOAM)	0.00 - 20.00	0.6000	0.6000
T5	2	1 5/8	0.00 - 20.00	0.6000	0.6000
T5	3	RG6-Fiber	0.00 - 20.00	0.6000	0.6000
T5	4	#8 AWG Copper WIre	0.00 - 20.00	0.6000	0.6000
T5	5	7/8	0.00 - 20.00	0.6000	0.6000
T5	6	EW90	0.00 - 20.00	0.6000	0.6000
T5	7	EW90	0.00 - 20.00	0.6000	0.6000
T5	8	LDF5-50A (7/8 FOAM)	0.00 - 20.00	0.6000	0.6000
T5	9	HYBRIFLEX 1-5/8"	0.00 - 20.00	0.6000	0.6000
T5	10	RG6-Fiber	0.00 - 20.00	0.6000	0.6000
T5	11	#8 AWG Copper WIre	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
8' x 3" Dia Omni	C	From Leg	1.00 0.00 4.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	2.40 3.19 3.67	2.40 3.19 3.67	0.03 0.04 0.07
4' x 2.875" Pipe Mount	C	From Leg	0.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	0.97 1.22 1.48	0.97 1.22 1.48	0.02 0.03 0.04
Pirod 12' T-Frame Sector Mount (1) (Verizon Existing)	A	None		0.0000	98.00	No Ice 1/2" Ice 1" Ice	13.60 18.40 23.20	13.60 18.40 23.20	0.47 0.60 0.73
Pirod 12' T-Frame Sector Mount (1) (Verizon Existing)	B	None		0.0000	98.00	No Ice 1/2" Ice 1" Ice	13.60 18.40 23.20	13.60 18.40 23.20	0.47 0.60 0.73
DB844H90-XY (Verizon Existing)	A	From Leg	4.00 -6.00 0.00	0.0000	98.00	No Ice 1/2" Ice 1" Ice	2.87 3.18 3.49	3.80 4.10 4.42	0.01 0.04 0.07
HBXX-6516DS (Verizon Existing)	A	From Leg	4.00 -4.00 0.00	0.0000	98.00	No Ice 1/2" Ice 1" Ice	5.42 5.76 6.11	3.28 3.61 3.94	0.04 0.07 0.11
800-10734 (Verizon Existing)	A	From Leg	4.00 0.00 0.00	0.0000	98.00	No Ice 1/2" Ice 1" Ice	5.67 6.03 6.39	2.34 2.67 3.01	0.03 0.06 0.09
HBXX-6516DS (Verizon Existing)	A	From Leg	4.00 4.00 0.00	0.0000	98.00	No Ice 1/2" Ice 1" Ice	5.42 5.76 6.11	3.28 3.61 3.94	0.04 0.07 0.11

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
DB844H90-XY	A	From Leg	4.00	0.0000	98.00	No Ice	2.87	3.80	0.01
(Verizon Existing)			6.00			1/2" Ice	3.18	4.10	0.04
			0.00			1" Ice	3.49	4.42	0.07
DB844H90-XY	B	From Leg	4.00	0.0000	98.00	No Ice	2.87	3.80	0.01
(Verizon Existing)			-6.00			1/2" Ice	3.18	4.10	0.04
			0.00			1" Ice	3.49	4.42	0.07
HBXX-6516DS	B	From Leg	4.00	0.0000	98.00	No Ice	5.42	3.28	0.04
(Verizon Existing)			-4.00			1/2" Ice	5.76	3.61	0.07
			0.00			1" Ice	6.11	3.94	0.11
800-10734	B	From Leg	4.00	0.0000	98.00	No Ice	5.67	2.34	0.03
(Verizon Existing)			0.00			1/2" Ice	6.03	2.67	0.06
			0.00			1" Ice	6.39	3.01	0.09
HBXX-6516DS	B	From Leg	4.00	0.0000	98.00	No Ice	5.42	3.28	0.04
(Verizon Existing)			4.00			1/2" Ice	5.76	3.61	0.07
			0.00			1" Ice	6.11	3.94	0.11
DB844H90-XY	B	From Leg	4.00	0.0000	98.00	No Ice	2.87	3.80	0.01
(Verizon Existing)			6.00			1/2" Ice	3.18	4.10	0.04
			0.00			1" Ice	3.49	4.42	0.07
RRH2x40-AWS	A	From Leg	4.00	0.0000	98.00	No Ice	2.16	1.42	0.04
(Verizon Existing)			-4.00			1/2" Ice	2.36	1.59	0.06
			0.00			1" Ice	2.57	1.77	0.08
RRH2x40-AWS	B	From Leg	4.00	0.0000	98.00	No Ice	2.16	1.42	0.04
(Verizon Existing)			-4.00			1/2" Ice	2.36	1.59	0.06
			0.00			1" Ice	2.57	1.77	0.08
DB-T1-6Z-8AB-0Z	A	From Leg	4.00	0.0000	98.00	No Ice	4.80	2.00	0.04
(Verizon Existing)			4.00			1/2" Ice	5.07	2.19	0.08
			0.00			1" Ice	5.35	2.39	0.12
RRH2x60-PCS	A	From Leg	4.00	0.0000	98.00	No Ice	2.15	1.35	0.06
(Verizon Existing)			-4.00			1/2" Ice	2.34	1.50	0.07
			0.00			1" Ice	2.54	1.67	0.09
RRH2x60-PCS	B	From Leg	4.00	0.0000	98.00	No Ice	2.15	1.35	0.06
(Verizon Existing)			-4.00			1/2" Ice	2.34	1.50	0.07
			0.00			1" Ice	2.54	1.67	0.09
(2) CBC78-DF	A	From Leg	4.00	0.0000	98.00	No Ice	0.39	0.17	0.01
(Verizon Existing)			0.00			1/2" Ice	0.47	0.23	0.01
			0.00			1" Ice	0.56	0.30	0.01
(2) CBC78-DF	B	From Leg	4.00	0.0000	98.00	No Ice	0.39	0.17	0.01
(Verizon Existing)			0.00			1/2" Ice	0.47	0.23	0.01
			0.00			1" Ice	0.56	0.30	0.01
12' Frame	A	From Leg	1.00	0.0000	88.00	No Ice	9.80	9.80	0.26
(AT&T Existing)			0.00			1/2" Ice	14.80	14.80	0.36
			0.00			1" Ice	19.80	19.80	0.46
12' Frame	B	From Leg	1.00	0.0000	88.00	No Ice	9.80	9.80	0.26
(AT&T Existing)			0.00			1/2" Ice	14.80	14.80	0.36
			0.00			1" Ice	19.80	19.80	0.46
12' Frame	C	From Leg	1.00	0.0000	88.00	No Ice	9.80	9.80	0.26
(AT&T Existing)			0.00			1/2" Ice	14.80	14.80	0.36
			0.00			1" Ice	19.80	19.80	0.46
P1000 Unistrut (9' Long)	A	From Face	3.00	0.0000	88.50	No Ice	1.71	0.03	0.02
(AT&T Existing)			0.00			1/2" Ice	2.42	0.05	0.03
			0.00			1" Ice	3.13	0.07	0.05
P1000 Unistrut (9' Long)	A	From Face	3.00	0.0000	78.50	No Ice	1.71	0.03	0.02
(AT&T Existing)			0.00			1/2" Ice	2.42	0.05	0.03
			0.00			1" Ice	3.13	0.07	0.05
P1000 Unistrut (9' Long)	B	From Face	3.00	0.0000	88.50	No Ice	1.71	0.03	0.02
(AT&T Existing)			0.00			1/2" Ice	2.42	0.05	0.03
			0.00			1" Ice	3.13	0.07	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
P1000 Unistrut (9' Long)	B	From Face	3.00	0.0000	78.50	No Ice	1.71	0.03	0.02
(AT&T Existing)			0.00			1/2" Ice	2.42	0.05	0.03
			0.00			1" Ice	3.13	0.07	0.05
P1000 Unistrut (9' Long)	C	From Face	3.00	0.0000	88.50	No Ice	1.71	0.03	0.02
(AT&T Existing)			0.00			1/2" Ice	2.42	0.05	0.03
			0.00			1" Ice	3.13	0.07	0.05
P1000 Unistrut (9' Long)	C	From Face	3.00	0.0000	78.50	No Ice	1.71	0.03	0.02
(AT&T Existing)			0.00			1/2" Ice	2.42	0.05	0.03
			0.00			1" Ice	3.13	0.07	0.05
7770.00	A	From Face	3.00	0.0000	88.00	No Ice	5.51	2.93	0.04
(AT&T Existing)			6.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
HPA-65R-BUU-H6	A	From Face	3.00	0.0000	88.00	No Ice	9.66	6.45	0.05
(AT&T Proposed)			2.00			1/2" Ice	10.13	6.91	0.11
			0.00			1" Ice	10.61	7.38	0.18
QS66512-2	A	From Face	3.00	0.0000	88.00	No Ice	8.13	6.80	0.11
(AT&T Proposed)			-6.00			1/2" Ice	8.59	7.27	0.17
			0.00			1" Ice	9.05	7.72	0.23
7770.00	B	From Face	3.00	0.0000	88.00	No Ice	5.51	2.93	0.04
(AT&T Existing)			6.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
HPA-65R-BUU-H6	B	From Face	3.00	0.0000	88.00	No Ice	9.66	6.45	0.05
(AT&T Proposed)			2.00			1/2" Ice	10.13	6.91	0.11
			0.00			1" Ice	10.61	7.38	0.18
QS66512-2	B	From Face	3.00	0.0000	88.00	No Ice	8.13	6.80	0.11
(AT&T Proposed)			-6.00			1/2" Ice	8.59	7.27	0.17
			0.00			1" Ice	9.05	7.72	0.23
7770.00	C	From Face	3.00	0.0000	88.00	No Ice	5.51	2.93	0.04
(AT&T Existing)			6.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
HPA-65R-BUU-H6	C	From Face	3.00	0.0000	88.00	No Ice	9.66	6.45	0.05
(AT&T Proposed)			2.00			1/2" Ice	10.13	6.91	0.11
			0.00			1" Ice	10.61	7.38	0.18
QS66512-2	C	From Face	3.00	0.0000	88.00	No Ice	8.13	6.80	0.11
(AT&T Proposed)			-6.00			1/2" Ice	8.59	7.27	0.17
			0.00			1" Ice	9.05	7.72	0.23
DBC0061F1V51-2	A	From Face	3.00	0.0000	88.00	No Ice	0.41	0.43	0.02
(AT&T Proposed)			-6.00			1/2" Ice	0.50	0.51	0.02
			0.00			1" Ice	0.59	0.61	0.03
DBC0061F1V51-2	B	From Face	3.00	0.0000	88.00	No Ice	0.41	0.43	0.02
(AT&T Proposed)			-6.00			1/2" Ice	0.50	0.51	0.02
			0.00			1" Ice	0.59	0.61	0.03
DBC0061F1V51-2	C	From Face	3.00	0.0000	88.00	No Ice	0.41	0.43	0.02
(AT&T Proposed)			-6.00			1/2" Ice	0.50	0.51	0.02
			0.00			1" Ice	0.59	0.61	0.03
(2) LPG21401 TMA	A	From Face	3.00	0.0000	88.00	No Ice	0.82	0.35	0.02
(AT&T Existing)			0.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
(2) LPG21401 TMA	B	From Face	3.00	0.0000	88.00	No Ice	0.82	0.35	0.02
(AT&T Existing)			0.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
(2) LPG21401 TMA	C	From Face	3.00	0.0000	88.00	No Ice	0.82	0.35	0.02
(AT&T Existing)			0.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
RRUS-11	A	From Face	3.00	0.0000	88.00	No Ice	2.57	1.07	0.05
(AT&T Existing)			2.00			1/2" Ice	2.76	1.21	0.07
			3.00			1" Ice	2.97	1.36	0.09

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
RRUS-11	B	From Face	3.00	0.0000	88.00	No Ice	2.57	1.07	0.05
(AT&T Existing)			2.00			1/2" Ice	2.76	1.21	0.07
			3.00			1" Ice	2.97	1.36	0.09
RRUS-11	C	From Face	3.00	0.0000	88.00	No Ice	2.57	1.07	0.05
(AT&T Existing)			2.00			1/2" Ice	2.76	1.21	0.07
			3.00			1" Ice	2.97	1.36	0.09
4426 B66	A	From Face	3.00	0.0000	88.00	No Ice	1.65	0.73	0.05
(AT&T Proposed)			2.00			1/2" Ice	1.81	0.84	0.06
			-3.00			1" Ice	1.98	0.97	0.08
4426 B66	B	From Face	3.00	0.0000	88.00	No Ice	1.65	0.73	0.05
(AT&T Proposed)			2.00			1/2" Ice	1.81	0.84	0.06
			-3.00			1" Ice	1.98	0.97	0.08
4426 B66	C	From Face	3.00	0.0000	88.00	No Ice	1.65	0.73	0.05
(AT&T Proposed)			2.00			1/2" Ice	1.81	0.84	0.06
			-3.00			1" Ice	1.98	0.97	0.08
RRUS-32	A	From Face	3.00	0.0000	88.00	No Ice	3.31	2.42	0.08
(AT&T Proposed)			-6.00			1/2" Ice	3.56	2.64	0.10
			3.00			1" Ice	3.81	2.86	0.14
RRUS-32	B	From Face	3.00	0.0000	88.00	No Ice	3.31	2.42	0.08
(AT&T Proposed)			-6.00			1/2" Ice	3.56	2.64	0.10
			3.00			1" Ice	3.81	2.86	0.14
RRUS-32	C	From Face	3.00	0.0000	88.00	No Ice	3.31	2.42	0.08
(AT&T Proposed)			-6.00			1/2" Ice	3.56	2.64	0.10
			3.00			1" Ice	3.81	2.86	0.14
4415 B25	A	From Face	3.00	0.0000	88.00	No Ice	1.64	0.68	0.04
(AT&T Proposed)			-6.00			1/2" Ice	1.80	0.79	0.06
			-3.00			1" Ice	1.97	0.91	0.07
4415 B25	B	From Face	3.00	0.0000	88.00	No Ice	1.64	0.68	0.04
(AT&T Proposed)			-6.00			1/2" Ice	1.80	0.79	0.06
			-3.00			1" Ice	1.97	0.91	0.07
4415 B25	C	From Face	3.00	0.0000	88.00	No Ice	1.64	0.68	0.04
(AT&T Proposed)			-6.00			1/2" Ice	1.80	0.79	0.06
			-3.00			1" Ice	1.97	0.91	0.07
DC6-48-60-18-8F Surge	C	From Face	0.50	0.0000	86.00	No Ice	1.91	1.91	0.02
Arrestor			0.50			1/2" Ice	2.10	2.10	0.04
(AT&T Existing)			0.00			1" Ice	2.29	2.29	0.06
DC6-48-60-18-8F Surge	B	From Face	0.50	0.0000	86.00	No Ice	1.91	1.91	0.02
Arrestor			0.50			1/2" Ice	2.10	2.10	0.04
(AT&T Proposed)			0.00			1" Ice	2.29	2.29	0.06
3' x 4.5" Pipe Mont	B	From Leg	0.50	0.0000	84.00	No Ice	0.85	0.85	0.03
			0.00			1/2" Ice	1.12	1.12	0.04
			0.00			1" Ice	1.33	1.33	0.06
3' x 4.5" Pipe Mont	B	From Leg	0.50	0.0000	70.00	No Ice	0.86	0.86	0.03
			0.00			1/2" Ice	1.12	1.12	0.04
			0.00			1" Ice	1.33	1.33	0.06

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	B	Paraboloid w/o Radome	From Leg	1.00 0.00 0.00	0.0000		84.00	4.00	No Ice 1/2" Ice 1" Ice	12.56 13.09 13.62	0.17 0.24 0.30
4 FT DISH	B	Paraboloid w/o Radome	From Leg	1.00 0.00 0.00	0.0000		70.00	4.00	No Ice 1/2" Ice 1" Ice	12.56 13.09 13.62	0.17 0.24 0.30

Tower Pressures - No Ice

G_H = 0.850

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	90.00	1.238	23	175.208	A	0.000	22.647	9.583	42.32	20.219	0.000
100.00-80.00					B	0.000	22.647		42.32	0.000	0.000
					C	0.000	22.647		42.32	29.723	0.000
T2 80.00-60.00	70.00	1.174	22	197.091	A	0.000	25.514	11.687	45.81	50.548	0.000
					B	0.000	25.514		45.81	0.000	0.000
					C	0.000	25.514		45.81	35.301	0.000
T3 60.00-40.00	50.00	1.094	21	238.758	A	0.000	30.192	13.356	44.24	50.548	0.000
					B	0.000	30.192		44.24	0.000	0.000
					C	0.000	30.192		44.24	36.288	0.000
T4 40.00-20.00	30.00	0.982	18	283.346	A	0.000	31.623	15.034	47.54	50.548	0.000
					B	0.000	31.623		47.54	0.000	0.000
					C	0.000	31.623		47.54	36.288	0.000
T5 20.00-0.00	10.00	0.85	16	333.456	A	0.000	36.782	18.592	50.55	50.548	0.000
					B	0.000	36.782		50.55	0.000	0.000
					C	0.000	36.782		50.55	36.288	0.000

Tower Pressure - With Ice

G_H = 0.850

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G 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 100.00-80.00	90.00	1.238	7	1.6583	180.736	A	0.000	53.318	20.639	38.71	65.543	0.000
						B	0.000	53.318		38.71	0.000	0.000
						C	0.000	53.318		38.71	92.330	0.000
T2 80.00-60.00	70.00	1.174	6	1.6171	202.488	A	0.000	56.590	22.487	39.74	162.720	0.000
						B	0.000	56.590		39.74	0.000	0.000
						C	0.000	56.590		39.74	111.509	0.000
T3 60.00-40.00	50.00	1.094	6	1.5636	243.977	A	0.000	62.802	23.799	37.89	161.242	0.000
						B	0.000	62.802		37.89	0.000	0.000
						C	0.000	62.802		37.89	114.201	0.000
T4 40.00-20.00	30.00	0.982	5	1.4858	288.307	A	0.000	59.803	24.962	41.74	159.092	0.000
						B	0.000	59.803		41.74	0.000	0.000
						C	0.000	59.803		41.74	111.979	0.000
T5 20.00-0.00	10.00	0.85	5	1.3312	337.902	A	0.000	63.694	27.489	43.16	154.828	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						B	0.000	63.694		43.16	0.000	0.000
						C	0.000	63.694		43.16	107.577	0.000

Tower Pressure - Service

G_H = 0.850

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	90.00	1.238	10	175.208	A	0.000	22.647	9.583	42.32	20.219	0.000
100.00-80.00					B	0.000	22.647		42.32	0.000	0.000
					C	0.000	22.647		42.32	29.723	0.000
T2 80.00-60.00	70.00	1.174	9	197.091	A	0.000	25.514	11.687	45.81	50.548	0.000
					B	0.000	25.514		45.81	0.000	0.000
					C	0.000	25.514		45.81	35.301	0.000
T3 60.00-40.00	50.00	1.094	9	238.758	A	0.000	30.192	13.356	44.24	50.548	0.000
					B	0.000	30.192		44.24	0.000	0.000
					C	0.000	30.192		44.24	36.288	0.000
T4 40.00-20.00	30.00	0.982	8	283.346	A	0.000	31.623	15.034	47.54	50.548	0.000
					B	0.000	31.623		47.54	0.000	0.000
					C	0.000	31.623		47.54	36.288	0.000
T5 20.00-0.00	10.00	0.85	7	333.456	A	0.000	36.782	18.592	50.55	50.548	0.000
					B	0.000	36.782		50.55	0.000	0.000
					C	0.000	36.782		50.55	36.288	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.23	1.14	A	0.129	2.849	23	1	1	12.813	1.32	65.81	C
100.00-80.00			B	0.129	2.849		1	1	12.813			
			C	0.129	2.849		1	1	12.813			
T2	0.43	1.30	A	0.129	2.849	22	1	1	14.435	1.74	86.99	C
80.00-60.00			B	0.129	2.849		1	1	14.435			
			C	0.129	2.849		1	1	14.435			
T3	0.43	1.59	A	0.126	2.86	21	1	1	17.048	1.76	88.24	C
60.00-40.00			B	0.126	2.86		1	1	17.048			
			C	0.126	2.86		1	1	17.048			
T4	0.43	2.11	A	0.112	2.918	18	1	1	17.661	1.63	81.42	C
40.00-20.00			B	0.112	2.918		1	1	17.661			
			C	0.112	2.918		1	1	17.661			
T5 20.00-0.00	0.43	2.65	A	0.11	2.923	16	1	1	20.028	1.50	75.22	C
			B	0.11	2.923		1	1	20.028			
			C	0.11	2.923		1	1	20.028			
Sum Weight:	1.97	8.79						OTM	392.38 kip-ft	7.95		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.23	1.14	A	0.129	2.849	23	0.825	1	12.813	1.32	65.81	C
100.00-80.00			B	0.129	2.849		0.825	1	12.813			
			C	0.129	2.849		0.825	1	12.813			
T2	0.43	1.30	A	0.129	2.849	22	0.825	1	14.435	1.74	86.99	C
80.00-60.00			B	0.129	2.849		0.825	1	14.435			
			C	0.129	2.849		0.825	1	14.435			
T3	0.43	1.59	A	0.126	2.86	21	0.825	1	17.048	1.76	88.24	C
60.00-40.00			B	0.126	2.86		0.825	1	17.048			
			C	0.126	2.86		0.825	1	17.048			
T4	0.43	2.11	A	0.112	2.918	18	0.825	1	17.661	1.63	81.42	C
40.00-20.00			B	0.112	2.918		0.825	1	17.661			
			C	0.112	2.918		0.825	1	17.661			
T5 20.00-0.00	0.43	2.65	A	0.11	2.923	16	0.825	1	20.028	1.50	75.22	C
			B	0.11	2.923		0.825	1	20.028			
			C	0.11	2.923		0.825	1	20.028			
Sum Weight:	1.97	8.79						OTM	392.38 kip-ft	7.95		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.23	1.14	A	0.129	2.849	23	0.8	1	12.813	1.32	65.81	C
100.00-80.00			B	0.129	2.849		0.8	1	12.813			
			C	0.129	2.849		0.8	1	12.813			
T2	0.43	1.30	A	0.129	2.849	22	0.8	1	14.435	1.74	86.99	C
80.00-60.00			B	0.129	2.849		0.8	1	14.435			
			C	0.129	2.849		0.8	1	14.435			
T3	0.43	1.59	A	0.126	2.86	21	0.8	1	17.048	1.76	88.24	C
60.00-40.00			B	0.126	2.86		0.8	1	17.048			
			C	0.126	2.86		0.8	1	17.048			
T4	0.43	2.11	A	0.112	2.918	18	0.8	1	17.661	1.63	81.42	C
40.00-20.00			B	0.112	2.918		0.8	1	17.661			
			C	0.112	2.918		0.8	1	17.661			
T5 20.00-0.00	0.43	2.65	A	0.11	2.923	16	0.8	1	20.028	1.50	75.22	C
			B	0.11	2.923		0.8	1	20.028			
			C	0.11	2.923		0.8	1	20.028			
Sum Weight:	1.97	8.79						OTM	392.38 kip-ft	7.95		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.23	1.14	A	0.129	2.849	23	0.85	1	12.813	1.32	65.81	C
100.00-80.00			B	0.129	2.849		0.85	1	12.813			
			C	0.129	2.849		0.85	1	12.813			
T2	0.43	1.30	A	0.129	2.849	22	0.85	1	14.435	1.74	86.99	C
80.00-60.00			B	0.129	2.849		0.85	1	14.435			
			C	0.129	2.849		0.85	1	14.435			
T3	0.43	1.59	A	0.126	2.86	21	0.85	1	17.048	1.76	88.24	C
60.00-40.00			B	0.126	2.86		0.85	1	17.048			
			C	0.126	2.86		0.85	1	17.048			
T4	0.43	2.11	A	0.112	2.918	18	0.85	1	17.661	1.63	81.42	C
40.00-20.00			B	0.112	2.918		0.85	1	17.661			
			C	0.112	2.918		0.85	1	17.661			
T5 20.00-0.00	0.43	2.65	A	0.11	2.923	16	0.85	1	20.028	1.50	75.22	C
			B	0.11	2.923		0.85	1	20.028			
			C	0.11	2.923		0.85	1	20.028			
Sum Weight:	1.97	8.79						OTM	392.38 kip-ft	7.95		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	2.12	3.76	A	0.295	2.309	7	1	1	31.851	0.96	48.16	C
100.00-80.00			B	0.295	2.309		1	1	31.851			
			C	0.295	2.309		1	1	31.851			
T2	3.68	4.03	A	0.279	2.352	6	1	1	33.547	1.32	66.08	C
80.00-60.00			B	0.279	2.352		1	1	33.547			
			C	0.279	2.352		1	1	33.547			
T3	3.62	4.63	A	0.257	2.415	6	1	1	36.856	1.29	64.30	C
60.00-40.00			B	0.257	2.415		1	1	36.856			
			C	0.257	2.415		1	1	36.856			
T4	3.46	4.80	A	0.207	2.571	5	1	1	34.436	1.14	57.04	C
40.00-20.00			B	0.207	2.571		1	1	34.436			
			C	0.207	2.571		1	1	34.436			
T5 20.00-0.00	3.14	5.33	A	0.189	2.635	5	1	1	36.469	1.00	49.82	C
			B	0.189	2.635		1	1	36.469			
			C	0.189	2.635		1	1	36.469			
Sum Weight:	16.01	22.54						OTM	287.70 kip-ft	5.71		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	2.12	3.76	A	0.295	2.309	7	0.825	1	31.851	0.96	48.16	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
100.00-80.00			B	0.295	2.309		0.825	1	31.851			
			C	0.295	2.309		0.825	1	31.851			
T2	3.68	4.03	A	0.279	2.352	6	0.825	1	33.547	1.32	66.08	C
80.00-60.00			B	0.279	2.352		0.825	1	33.547			
			C	0.279	2.352		0.825	1	33.547			
T3	3.62	4.63	A	0.257	2.415	6	0.825	1	36.856	1.29	64.30	C
60.00-40.00			B	0.257	2.415		0.825	1	36.856			
			C	0.257	2.415		0.825	1	36.856			
T4	3.46	4.80	A	0.207	2.571	5	0.825	1	34.436	1.14	57.04	C
40.00-20.00			B	0.207	2.571		0.825	1	34.436			
			C	0.207	2.571		0.825	1	34.436			
T5 20.00-0.00	3.14	5.33	A	0.189	2.635	5	0.825	1	36.469	1.00	49.82	C
			B	0.189	2.635		0.825	1	36.469			
			C	0.189	2.635		0.825	1	36.469			
Sum Weight:	16.01	22.54						OTM	287.70 kip-ft	5.71		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	2.12	3.76	A	0.295	2.309	7	0.8	1	31.851	0.96	48.16	C
100.00-80.00			B	0.295	2.309		0.8	1	31.851			
			C	0.295	2.309		0.8	1	31.851			
T2	3.68	4.03	A	0.279	2.352	6	0.8	1	33.547	1.32	66.08	C
80.00-60.00			B	0.279	2.352		0.8	1	33.547			
			C	0.279	2.352		0.8	1	33.547			
T3	3.62	4.63	A	0.257	2.415	6	0.8	1	36.856	1.29	64.30	C
60.00-40.00			B	0.257	2.415		0.8	1	36.856			
			C	0.257	2.415		0.8	1	36.856			
T4	3.46	4.80	A	0.207	2.571	5	0.8	1	34.436	1.14	57.04	C
40.00-20.00			B	0.207	2.571		0.8	1	34.436			
			C	0.207	2.571		0.8	1	34.436			
T5 20.00-0.00	3.14	5.33	A	0.189	2.635	5	0.8	1	36.469	1.00	49.82	C
			B	0.189	2.635		0.8	1	36.469			
			C	0.189	2.635		0.8	1	36.469			
Sum Weight:	16.01	22.54						OTM	287.70 kip-ft	5.71		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	2.12	3.76	A	0.295	2.309	7	0.85	1	31.851	0.96	48.16	C
100.00-80.00			B	0.295	2.309		0.85	1	31.851			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.295	2.309		0.85	1	31.851			
T2	3.68	4.03	A	0.279	2.352	6	0.85	1	33.547	1.32	66.08	C
80.00-60.00			B	0.279	2.352		0.85	1	33.547			
			C	0.279	2.352		0.85	1	33.547			
T3	3.62	4.63	A	0.257	2.415	6	0.85	1	36.856	1.29	64.30	C
60.00-40.00			B	0.257	2.415		0.85	1	36.856			
			C	0.257	2.415		0.85	1	36.856			
T4	3.46	4.80	A	0.207	2.571	5	0.85	1	34.436	1.14	57.04	C
40.00-20.00			B	0.207	2.571		0.85	1	34.436			
			C	0.207	2.571		0.85	1	34.436			
T5 20.00-0.00	3.14	5.33	A	0.189	2.635	5	0.85	1	36.469	1.00	49.82	C
			B	0.189	2.635		0.85	1	36.469			
			C	0.189	2.635		0.85	1	36.469			
Sum Weight:	16.01	22.54						OTM	287.70 kip-ft	5.71		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.23	1.14	A	0.129	2.849	10	1	1	12.813	0.55	27.39	C
100.00-80.00			B	0.129	2.849		1	1	12.813			
			C	0.129	2.849		1	1	12.813			
T2	0.43	1.30	A	0.129	2.849	9	1	1	14.435	0.72	36.21	C
80.00-60.00			B	0.129	2.849		1	1	14.435			
			C	0.129	2.849		1	1	14.435			
T3	0.43	1.59	A	0.126	2.86	9	1	1	17.048	0.73	36.73	C
60.00-40.00			B	0.126	2.86		1	1	17.048			
			C	0.126	2.86		1	1	17.048			
T4	0.43	2.11	A	0.112	2.918	8	1	1	17.661	0.68	33.89	C
40.00-20.00			B	0.112	2.918		1	1	17.661			
			C	0.112	2.918		1	1	17.661			
T5 20.00-0.00	0.43	2.65	A	0.11	2.923	7	1	1	20.028	0.63	31.31	C
			B	0.11	2.923		1	1	20.028			
			C	0.11	2.923		1	1	20.028			
Sum Weight:	1.97	8.79						OTM	163.32 kip-ft	3.31		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.23	1.14	A	0.129	2.849	10	0.825	1	12.813	0.55	27.39	C
100.00-80.00			B	0.129	2.849		0.825	1	12.813			
			C	0.129	2.849		0.825	1	12.813			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T2	0.43	1.30	A	0.129	2.849	9	0.825	1	14.435	0.72	36.21	C
80.00-60.00			B	0.129	2.849		0.825	1	14.435			
			C	0.129	2.849		0.825	1	14.435			
T3	0.43	1.59	A	0.126	2.86	9	0.825	1	17.048	0.73	36.73	C
60.00-40.00			B	0.126	2.86		0.825	1	17.048			
			C	0.126	2.86		0.825	1	17.048			
T4	0.43	2.11	A	0.112	2.918	8	0.825	1	17.661	0.68	33.89	C
40.00-20.00			B	0.112	2.918		0.825	1	17.661			
			C	0.112	2.918		0.825	1	17.661			
T5 20.00-0.00	0.43	2.65	A	0.11	2.923	7	0.825	1	20.028	0.63	31.31	C
			B	0.11	2.923		0.825	1	20.028			
			C	0.11	2.923		0.825	1	20.028			
Sum Weight:	1.97	8.79						OTM	163.32 kip-ft	3.31		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.23	1.14	A	0.129	2.849	10	0.8	1	12.813	0.55	27.39	C
100.00-80.00			B	0.129	2.849		0.8	1	12.813			
			C	0.129	2.849		0.8	1	12.813			
T2	0.43	1.30	A	0.129	2.849	9	0.8	1	14.435	0.72	36.21	C
80.00-60.00			B	0.129	2.849		0.8	1	14.435			
			C	0.129	2.849		0.8	1	14.435			
T3	0.43	1.59	A	0.126	2.86	9	0.8	1	17.048	0.73	36.73	C
60.00-40.00			B	0.126	2.86		0.8	1	17.048			
			C	0.126	2.86		0.8	1	17.048			
T4	0.43	2.11	A	0.112	2.918	8	0.8	1	17.661	0.68	33.89	C
40.00-20.00			B	0.112	2.918		0.8	1	17.661			
			C	0.112	2.918		0.8	1	17.661			
T5 20.00-0.00	0.43	2.65	A	0.11	2.923	7	0.8	1	20.028	0.63	31.31	C
			B	0.11	2.923		0.8	1	20.028			
			C	0.11	2.923		0.8	1	20.028			
Sum Weight:	1.97	8.79						OTM	163.32 kip-ft	3.31		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.23	1.14	A	0.129	2.849	10	0.85	1	12.813	0.55	27.39	C
100.00-80.00			B	0.129	2.849		0.85	1	12.813			
			C	0.129	2.849		0.85	1	12.813			
T2	0.43	1.30	A	0.129	2.849	9	0.85	1	14.435	0.72	36.21	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
80.00-60.00			B	0.129	2.849		0.85	1	14.435			
			C	0.129	2.849		0.85	1	14.435			
T3	0.43	1.59	A	0.126	2.86	9	0.85	1	17.048	0.73	36.73	C
60.00-40.00			B	0.126	2.86		0.85	1	17.048			
			C	0.126	2.86		0.85	1	17.048			
T4	0.43	2.11	A	0.112	2.918	8	0.85	1	17.661	0.68	33.89	C
40.00-20.00			B	0.112	2.918		0.85	1	17.661			
			C	0.112	2.918		0.85	1	17.661			
T5 20.00-0.00	0.43	2.65	A	0.11	2.923	7	0.85	1	20.028	0.63	31.31	C
			B	0.11	2.923		0.85	1	20.028			
			C	0.11	2.923		0.85	1	20.028			
Sum Weight:	1.97	8.79						OTM	163.32 kip-ft	3.31		

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	3.50					
Bracing Weight	5.28					
Total Member Self-Weight	8.79			4.56	5.86	
Total Weight	15.03			4.56	5.86	
Wind 0 deg - No Ice		-0.70	-12.25	-776.95	60.94	-2.47
Wind 30 deg - No Ice		5.84	-10.28	-646.55	-360.17	-0.64
Wind 45 deg - No Ice		8.44	-8.32	-521.05	-526.91	0.29
Wind 60 deg - No Ice		10.32	-5.90	-367.50	-646.19	1.33
Wind 90 deg - No Ice		12.03	0.09	12.96	-756.22	2.77
Wind 120 deg - No Ice		10.53	6.19	401.41	-663.52	2.71
Wind 135 deg - No Ice		8.58	8.66	558.55	-540.05	2.34
Wind 150 deg - No Ice		6.09	10.56	678.34	-382.46	1.93
Wind 180 deg - No Ice		0.15	12.05	770.86	-6.96	1.38
Wind 210 deg - No Ice		-5.83	10.29	656.10	371.12	0.64
Wind 225 deg - No Ice		-8.71	8.18	519.05	559.32	-0.18
Wind 240 deg - No Ice		-10.77	5.52	347.61	692.20	-0.25
Wind 270 deg - No Ice		-12.25	-0.45	-31.90	785.21	-1.21
Wind 300 deg - No Ice		-10.74	-6.31	-401.50	691.17	-2.71
Wind 315 deg - No Ice		-8.91	-8.71	-552.65	577.19	-3.33
Wind 330 deg - No Ice		-6.52	-10.57	-670.16	427.10	-3.49
Member Ice	13.76					
Total Weight Ice	50.36			38.01	63.12	
Wind 0 deg - Ice		-0.23	-7.70	-430.82	81.10	-2.68
Wind 30 deg - Ice		3.76	-6.56	-359.63	-163.40	-1.31
Wind 45 deg - Ice		5.38	-5.33	-284.72	-262.13	-0.49
Wind 60 deg - Ice		6.58	-3.78	-190.38	-335.02	0.40
Wind 90 deg - Ice		7.63	0.03	40.63	-399.55	1.95
Wind 120 deg - Ice		6.65	3.87	274.31	-340.59	2.73
Wind 135 deg - Ice		5.42	5.45	369.88	-266.26	2.83
Wind 150 deg - Ice		3.84	6.65	442.97	-170.49	2.78
Wind 180 deg - Ice		0.05	7.63	501.84	59.04	2.33
Wind 210 deg - Ice		-3.75	6.56	435.79	289.39	1.31
Wind 225 deg - Ice		-5.46	5.29	357.08	395.17	0.53
Wind 240 deg - Ice		-6.72	3.65	256.85	472.54	-0.04

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 270 deg - Ice		-7.70	-0.15	26.15	531.47	-1.44
Wind 300 deg - Ice		-6.71	-3.91	-201.33	472.07	-2.73
Wind 315 deg - Ice		-5.53	-5.46	-294.92	400.86	-3.15
Wind 330 deg - Ice		-3.98	-6.66	-367.26	307.56	-3.29
Total Weight	15.03			4.56	5.86	
Wind 0 deg - Service		-0.29	-5.10	-325.67	19.15	-1.03
Wind 30 deg - Service		2.43	-4.28	-271.39	-156.12	-0.27
Wind 45 deg - Service		3.51	-3.46	-219.15	-225.53	0.12
Wind 60 deg - Service		4.30	-2.45	-155.24	-275.17	0.56
Wind 90 deg - Service		5.01	0.04	3.12	-320.97	1.15
Wind 120 deg - Service		4.38	2.57	164.81	-282.39	1.13
Wind 135 deg - Service		3.57	3.61	230.21	-231.00	0.97
Wind 150 deg - Service		2.54	4.39	280.07	-165.40	0.81
Wind 180 deg - Service		0.06	5.02	318.58	-9.11	0.57
Wind 210 deg - Service		-2.43	4.28	270.81	148.27	0.27
Wind 225 deg - Service		-3.62	3.40	213.77	226.60	-0.08
Wind 240 deg - Service		-4.48	2.30	142.41	281.91	-0.10
Wind 270 deg - Service		-5.10	-0.19	-15.55	320.62	-0.51
Wind 300 deg - Service		-4.47	-2.62	-169.39	281.48	-1.13
Wind 315 deg - Service		-3.71	-3.62	-232.31	234.03	-1.38
Wind 330 deg - Service		-2.71	-4.40	-281.22	171.57	-1.45

Load Combinations

Comb. No.	*Description*
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 45 deg - No Ice
7	0.9 Dead+1.6 Wind 45 deg - No Ice
8	1.2 Dead+1.6 Wind 60 deg - No Ice
9	0.9 Dead+1.6 Wind 60 deg - No Ice
10	1.2 Dead+1.6 Wind 90 deg - No Ice
11	0.9 Dead+1.6 Wind 90 deg - No Ice
12	1.2 Dead+1.6 Wind 120 deg - No Ice
13	0.9 Dead+1.6 Wind 120 deg - No Ice
14	1.2 Dead+1.6 Wind 135 deg - No Ice
15	0.9 Dead+1.6 Wind 135 deg - No Ice
16	1.2 Dead+1.6 Wind 150 deg - No Ice
17	0.9 Dead+1.6 Wind 150 deg - No Ice
18	1.2 Dead+1.6 Wind 180 deg - No Ice
19	0.9 Dead+1.6 Wind 180 deg - No Ice
20	1.2 Dead+1.6 Wind 210 deg - No Ice
21	0.9 Dead+1.6 Wind 210 deg - No Ice
22	1.2 Dead+1.6 Wind 225 deg - No Ice
23	0.9 Dead+1.6 Wind 225 deg - No Ice
24	1.2 Dead+1.6 Wind 240 deg - No Ice
25	0.9 Dead+1.6 Wind 240 deg - No Ice
26	1.2 Dead+1.6 Wind 270 deg - No Ice
27	0.9 Dead+1.6 Wind 270 deg - No Ice
28	1.2 Dead+1.6 Wind 300 deg - No Ice
29	0.9 Dead+1.6 Wind 300 deg - No Ice
30	1.2 Dead+1.6 Wind 315 deg - No Ice

Comb. No.	Description
31	0.9 Dead+1.6 Wind 315 deg - No Ice
32	1.2 Dead+1.6 Wind 330 deg - No Ice
33	0.9 Dead+1.6 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	100 - 80	Leg	Max Tension	19	3.93	-0.45	0.00
			Max. Compression	12	-7.63	0.01	0.00
			Max. Mx	18	-0.86	1.06	0.15
			Max. My	28	-0.92	0.34	1.37
			Max. Vy	28	0.85	-0.52	0.07
			Max. Vx	32	-0.90	0.06	0.57
		Diagonal	Max Tension	17	5.55	0.00	0.00
			Max. Compression	16	-5.62	0.00	0.00
			Max. Mx	44	1.42	0.05	0.00
			Max. My	46	-0.12	0.00	0.00
			Max. Vy	44	0.03	0.00	0.00
			Max. Vx	46	0.00	0.00	0.00
		Horizontal	Max Tension	30	3.13	0.00	0.00
			Max. Compression	15	-3.06	-0.01	-0.00
			Max. Mx	38	0.15	-0.03	-0.00
			Max. My	28	-0.48	-0.01	-0.01
			Max. Vy	38	-0.03	-0.03	-0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	28	0.00	-0.01	-0.01
		Top Girt	Max Tension	30	0.86	-0.01	0.00
			Max. Compression	14	-0.86	-0.01	-0.00
			Max. Mx	37	-0.04	-0.03	-0.00
			Max. My	2	0.18	-0.01	0.00
			Max. Vy	37	0.03	-0.03	-0.00
			Max. Vx	2	-0.00	0.00	0.00
		Inner Bracing	Max Tension	14	0.01	0.00	0.00
			Max. Compression	14	-0.01	0.00	0.00
			Max. Mx	34	0.00	-0.03	0.00
			Max. My	43	-0.00	0.00	0.00
			Max. Vy	34	0.02	0.00	0.00
			Max. Vx	43	0.00	0.00	0.00
T2	80 - 60	Leg	Max Tension	29	23.22	-0.19	0.02
			Max. Compression	12	-28.04	0.06	-0.02
			Max. Mx	24	6.70	0.26	0.09
			Max. My	24	-20.47	0.14	-0.24
			Max. Vy	28	0.14	-0.19	0.02
			Max. Vx	32	0.14	0.03	0.20
		Diagonal	Max Tension	17	5.12	0.00	0.00
			Max. Compression	16	-5.20	0.00	0.00
			Max. Mx	47	1.56	0.07	0.00
			Max. My	46	-0.14	0.00	0.00
			Max. Vy	47	-0.03	0.00	0.00
			Max. Vx	46	-0.00	0.00	0.00
		Horizontal	Max Tension	32	3.21	0.00	0.00
			Max. Compression	17	-3.19	-0.01	-0.00
			Max. Mx	43	0.26	-0.04	-0.00
			Max. My	28	-0.28	-0.02	-0.01
			Max. Vy	43	-0.03	-0.04	-0.00
			Max. Vx	28	0.00	-0.02	-0.01
		Inner Bracing	Max Tension	13	0.00	0.00	0.00
			Max. Compression	48	-0.01	0.00	0.00
			Max. Mx	34	-0.00	-0.03	0.00
			Max. My	46	-0.00	0.00	-0.00
			Max. Vy	34	0.03	0.00	0.00
			Max. Vx	46	0.00	0.00	0.00
T3	60 - 40	Leg	Max Tension	29	42.09	-0.10	0.02
			Max. Compression	2	-47.33	0.16	0.02
			Max. Mx	28	41.21	-0.17	0.03
			Max. My	32	-5.39	-0.01	0.19
			Max. Vy	8	0.05	-0.17	-0.00
			Max. Vx	32	-0.07	-0.01	0.19
		Diagonal	Max Tension	17	4.98	0.00	0.00
			Max. Compression	16	-5.08	0.00	0.00
			Max. Mx	47	1.65	0.09	0.00
			Max. My	46	-0.21	0.00	0.00
			Max. Vy	47	-0.04	0.00	0.00
			Max. Vx	46	-0.00	0.00	0.00
		Horizontal	Max Tension	16	3.40	-0.02	-0.00
			Max. Compression	17	-3.39	-0.02	-0.00
			Max. Mx	43	0.37	-0.07	-0.00
			Max. My	28	-0.44	-0.04	-0.01
			Max. Vy	43	-0.05	-0.07	-0.00
			Max. Vx	28	0.00	-0.04	-0.01
		Inner Bracing	Max Tension	13	0.00	0.00	0.00
			Max. Compression	48	-0.01	0.00	0.00
			Max. Mx	34	-0.00	-0.05	0.00
			Max. My	46	-0.00	0.00	-0.00
			Max. Vy	34	0.03	0.00	0.00
			Max. Vx	46	-0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T4	40 - 20	Leg	Max Tension	29	56.12	-0.21	0.04
			Max. Compression	2	-62.32	0.16	0.03
			Max. Mx	8	43.33	-0.22	0.00
			Max. My	32	-6.17	-0.01	0.26
			Max. Vy	8	0.07	-0.22	0.00
			Max. Vx	16	0.09	-0.02	-0.25
		Diagonal	Max Tension	17	5.76	0.00	0.00
			Max. Compression	10	-5.91	0.00	0.00
			Max. Mx	47	2.01	0.17	0.00
			Max. My	28	-0.12	0.00	0.00
			Max. Vy	47	-0.06	0.00	0.00
			Max. Vx	28	-0.00	0.00	0.00
		Horizontal	Max Tension	10	3.47	0.00	0.00
			Max. Compression	11	-3.47	-0.02	-0.00
			Max. Mx	48	0.48	-0.08	-0.00
			Max. My	28	-0.73	-0.04	-0.01
			Max. Vy	48	-0.05	-0.08	-0.00
			Max. Vx	28	0.00	-0.04	-0.01
		Inner Bracing	Max Tension	3	0.00	0.00	0.00
			Max. Compression	38	-0.01	0.00	0.00
			Max. Mx	34	-0.01	-0.06	0.00
			Max. My	46	-0.01	0.00	-0.00
			Max. Vy	34	0.03	0.00	0.00
			Max. Vx	46	0.00	0.00	0.00
T5	20 - 0	Leg	Max Tension	29	70.84	-0.37	0.04
			Max. Compression	2	-78.63	0.00	0.00
			Max. Mx	28	62.55	-0.37	0.04
			Max. My	32	-8.10	-0.02	0.39
			Max. Vy	8	-0.10	-0.37	-0.00
			Max. Vx	32	0.12	-0.02	0.39
		Diagonal	Max Tension	11	5.56	0.00	0.00
			Max. Compression	10	-5.77	0.00	0.00
			Max. Mx	39	2.34	0.20	0.00
			Max. My	28	-0.28	0.00	0.00
			Max. Vy	39	0.06	0.00	0.00
			Max. Vx	28	-0.00	0.00	0.00
		Horizontal	Max Tension	10	3.71	0.00	0.00
			Max. Compression	11	-3.69	-0.03	-0.00
			Max. Mx	48	-0.66	-0.08	-0.00
			Max. My	28	-0.79	-0.05	-0.01
			Max. Vy	48	0.05	-0.08	-0.00
			Max. Vx	28	0.00	-0.05	-0.01
		Inner Bracing	Max Tension	1	0.00	0.00	0.00
			Max. Compression	38	-0.01	0.00	0.00
			Max. Mx	34	-0.01	-0.10	0.00
			Max. My	46	-0.01	0.00	-0.00
			Max. Vy	34	-0.05	0.00	0.00
			Max. Vx	46	-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	24	85.20	9.96	-5.65
	Max. H_x	24	85.20	9.96	-5.65
	Max. H_z	7	-69.29	-8.40	5.40

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. Vert	9	-72.02	-9.01	5.11
	Min. H_x	9	-72.02	-9.01	5.11
	Min. H_z	22	82.18	9.34	-5.90
Leg B	Max. Vert	12	85.69	-10.09	-5.66
	Max. H_x	29	-77.48	9.51	5.34
	Max. H_z	31	-75.11	8.99	5.57
	Min. Vert	29	-77.48	9.51	5.34
	Min. H_x	12	85.69	-10.09	-5.66
	Min. H_z	14	82.77	-9.48	-5.90
Leg A	Max. Vert	2	85.91	-0.06	11.59
	Max. H_x	27	8.10	1.91	0.83
	Max. H_z	2	85.91	-0.06	11.59
	Min. Vert	19	-74.38	0.05	-10.53
	Min. H_x	10	4.76	-1.81	0.44
	Min. H_z	19	-74.38	0.05	-10.53

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	15.03	0.00	0.00	4.56	5.86	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	18.03	-1.11	-19.59	-1207.98	95.31	-3.95
0.9 Dead+1.6 Wind 0 deg - No Ice	13.53	-1.11	-19.59	-1208.85	93.51	-3.95
1.2 Dead+1.6 Wind 30 deg - No Ice	18.03	9.34	-16.45	-1004.22	-560.06	-1.03
0.9 Dead+1.6 Wind 30 deg - No Ice	13.53	9.34	-16.45	-1005.17	-561.59	-1.03
1.2 Dead+1.6 Wind 45 deg - No Ice	18.03	13.50	-13.31	-809.28	-819.21	0.47
0.9 Dead+1.6 Wind 45 deg - No Ice	13.53	13.50	-13.31	-810.32	-820.63	0.47
1.2 Dead+1.6 Wind 60 deg - No Ice	18.03	16.52	-9.43	-571.28	-1004.17	2.14
0.9 Dead+1.6 Wind 60 deg - No Ice	13.53	16.52	-9.43	-572.41	-1005.51	2.14
1.2 Dead+1.6 Wind 90 deg - No Ice	18.03	19.25	0.15	18.95	-1175.29	4.43
0.9 Dead+1.6 Wind 90 deg - No Ice	13.53	19.25	0.15	17.57	-1176.56	4.43
1.2 Dead+1.6 Wind 120 deg - No Ice	18.03	16.85	9.90	621.99	-1031.94	4.35
0.9 Dead+1.6 Wind 120 deg - No Ice	13.53	16.85	9.90	620.37	-1033.28	4.35
1.2 Dead+1.6 Wind 135 deg - No Ice	18.03	13.74	13.86	865.74	-840.28	3.75
0.9 Dead+1.6 Wind 135 deg - No Ice	13.53	13.74	13.86	864.02	-841.68	3.74
1.2 Dead+1.6 Wind 150 deg - No Ice	18.03	9.75	16.89	1051.52	-595.80	3.10
0.9 Dead+1.6 Wind 150 deg - No Ice	13.53	9.75	16.89	1049.72	-597.31	3.10
1.2 Dead+1.6 Wind 180 deg - No Ice	18.03	0.24	19.28	1194.57	-13.51	2.21
0.9 Dead+1.6 Wind 180 deg -	13.53	0.24	19.28	1192.71	-15.26	2.21

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
No Ice						
1.2 Dead+1.6 Wind 210 deg - No Ice	18.03	-9.32	16.46	1015.87	572.91	1.03
0.9 Dead+1.6 Wind 210 deg - No Ice	13.53	-9.32	16.46	1014.08	570.92	1.03
1.2 Dead+1.6 Wind 225 deg - No Ice	18.03	-13.93	13.08	802.43	866.43	-0.30
0.9 Dead+1.6 Wind 225 deg - No Ice	13.53	-13.93	13.08	800.73	864.32	-0.30
1.2 Dead+1.6 Wind 240 deg - No Ice	18.03	-17.23	8.83	535.75	1073.19	-0.41
0.9 Dead+1.6 Wind 240 deg - No Ice	13.53	-17.23	8.83	534.16	1070.99	-0.40
1.2 Dead+1.6 Wind 270 deg - No Ice	18.03	-19.61	-0.73	-52.95	1217.04	-1.95
0.9 Dead+1.6 Wind 270 deg - No Ice	13.53	-19.61	-0.73	-54.30	1214.78	-1.95
1.2 Dead+1.6 Wind 300 deg - No Ice	18.03	-17.18	-10.09	-625.79	1071.55	-4.35
0.9 Dead+1.6 Wind 300 deg - No Ice	13.53	-17.18	-10.09	-626.90	1069.35	-4.35
1.2 Dead+1.6 Wind 315 deg - No Ice	18.03	-14.26	-13.93	-859.94	895.08	-5.33
0.9 Dead+1.6 Wind 315 deg - No Ice	13.53	-14.26	-13.93	-860.95	892.95	-5.33
1.2 Dead+1.6 Wind 330 deg - No Ice	18.03	-10.43	-16.91	-1042.07	662.63	-5.59
0.9 Dead+1.6 Wind 330 deg - No Ice	13.53	-10.43	-16.91	-1043.01	660.60	-5.58
1.2 Dead+1.0 Ice+1.0 Temp	53.36	0.00	0.00	39.05	64.47	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	53.36	-0.23	-7.70	-412.46	82.59	-2.72
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	53.36	3.76	-6.56	-343.54	-153.31	-1.33
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	53.36	5.38	-5.33	-271.38	-248.47	-0.50
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	53.36	6.58	-3.78	-180.63	-318.61	0.40
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	53.36	7.63	0.03	41.73	-380.83	1.97
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	53.36	6.65	3.87	266.76	-324.20	2.77
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	53.36	5.42	5.45	358.73	-252.62	2.87
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	53.36	3.84	6.65	429.06	-160.44	2.82
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	53.36	0.05	7.63	485.60	60.42	2.36
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	53.36	-3.75	6.56	421.85	282.10	1.33
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	53.36	-5.46	5.29	345.87	384.34	0.54
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	53.36	-6.72	3.65	249.21	458.98	-0.05
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	53.36	-7.70	-0.15	27.17	515.58	-1.46
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	53.36	-6.71	-3.91	-191.63	458.51	-2.77
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	53.36	-5.53	-5.46	-281.64	390.06	-3.20
1.2 Dead+1.0 Wind 330	53.36	-3.98	-6.66	-351.21	300.37	-3.33

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
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	15.03	-0.29	-5.10	-311.02	28.82	-1.03
Dead+Wind 30 deg - Service	15.03	2.43	-4.28	-258.02	-141.62	-0.27
Dead+Wind 45 deg - Service	15.03	3.51	-3.46	-207.33	-209.02	0.12
Dead+Wind 60 deg - Service	15.03	4.30	-2.45	-145.43	-257.12	0.56
Dead+Wind 90 deg - Service	15.03	5.01	0.04	8.07	-301.62	1.15
Dead+Wind 120 deg - Service	15.03	4.38	2.57	164.90	-264.34	1.13
Dead+Wind 135 deg - Service	15.03	3.57	3.61	228.29	-214.50	0.97
Dead+Wind 150 deg - Service	15.03	2.54	4.39	276.60	-150.92	0.81
Dead+Wind 180 deg - Service	15.03	0.06	5.02	313.80	0.52	0.58
Dead+Wind 210 deg - Service	15.03	-2.43	4.28	267.33	153.02	0.27
Dead+Wind 225 deg - Service	15.03	-3.62	3.40	211.82	229.36	-0.08
Dead+Wind 240 deg - Service	15.03	-4.48	2.30	142.47	283.13	-0.10
Dead+Wind 270 deg - Service	15.03	-5.10	-0.19	-10.63	320.54	-0.51
Dead+Wind 300 deg - Service	15.03	-4.47	-2.62	-159.61	282.70	-1.13
Dead+Wind 315 deg - Service	15.03	-3.71	-3.62	-220.50	236.81	-1.39
Dead+Wind 330 deg - Service	15.03	-2.71	-4.40	-267.87	176.36	-1.45

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	-15.03	0.00	0.00	15.03	0.00	0.000%
2	-1.11	-18.03	-19.59	1.11	18.03	19.59	0.000%
3	-1.11	-13.53	-19.59	1.11	13.53	19.59	0.000%
4	9.34	-18.03	-16.45	-9.34	18.03	16.45	0.000%
5	9.34	-13.53	-16.45	-9.34	13.53	16.45	0.000%
6	13.50	-18.03	-13.31	-13.50	18.03	13.31	0.000%
7	13.50	-13.53	-13.31	-13.50	13.53	13.31	0.000%
8	16.52	-18.03	-9.43	-16.52	18.03	9.43	0.000%
9	16.52	-13.53	-9.43	-16.52	13.53	9.43	0.000%
10	19.25	-18.03	0.15	-19.25	18.03	-0.15	0.000%
11	19.25	-13.53	0.15	-19.25	13.53	-0.15	0.000%
12	16.85	-18.03	9.90	-16.85	18.03	-9.90	0.000%
13	16.85	-13.53	9.90	-16.85	13.53	-9.90	0.000%
14	13.74	-18.03	13.86	-13.74	18.03	-13.86	0.000%
15	13.74	-13.53	13.86	-13.74	13.53	-13.86	0.000%
16	9.75	-18.03	16.89	-9.75	18.03	-16.89	0.000%
17	9.75	-13.53	16.89	-9.75	13.53	-16.89	0.000%
18	0.24	-18.03	19.28	-0.24	18.03	-19.28	0.000%
19	0.24	-13.53	19.28	-0.24	13.53	-19.28	0.000%
20	-9.32	-18.03	16.46	9.32	18.03	-16.46	0.000%
21	-9.32	-13.53	16.46	9.32	13.53	-16.46	0.000%
22	-13.93	-18.03	13.08	13.93	18.03	-13.08	0.000%
23	-13.93	-13.53	13.08	13.93	13.53	-13.08	0.000%
24	-17.23	-18.03	8.83	17.23	18.03	-8.83	0.000%
25	-17.23	-13.53	8.83	17.23	13.53	-8.83	0.000%
26	-19.61	-18.03	-0.73	19.61	18.03	0.73	0.000%
27	-19.61	-13.53	-0.73	19.61	13.53	0.73	0.000%
28	-17.18	-18.03	-10.09	17.18	18.03	10.09	0.000%
29	-17.18	-13.53	-10.09	17.18	13.53	10.09	0.000%
30	-14.26	-18.03	-13.93	14.26	18.03	13.93	0.000%
31	-14.26	-13.53	-13.93	14.26	13.53	13.93	0.000%
32	-10.43	-18.03	-16.91	10.43	18.03	16.91	0.000%
33	-10.43	-13.53	-16.91	10.43	13.53	16.91	0.000%
34	0.00	-53.36	0.00	0.00	53.36	0.00	0.000%
35	-0.23	-53.36	-7.70	0.23	53.36	7.70	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
36	3.76	-53.36	-6.56	-3.76	53.36	6.56	0.000%
37	5.38	-53.36	-5.33	-5.38	53.36	5.33	0.000%
38	6.58	-53.36	-3.78	-6.58	53.36	3.78	0.000%
39	7.63	-53.36	0.03	-7.63	53.36	-0.03	0.000%
40	6.65	-53.36	3.87	-6.65	53.36	-3.87	0.000%
41	5.42	-53.36	5.45	-5.42	53.36	-5.45	0.000%
42	3.84	-53.36	6.65	-3.84	53.36	-6.65	0.000%
43	0.05	-53.36	7.63	-0.05	53.36	-7.63	0.000%
44	-3.75	-53.36	6.56	3.75	53.36	-6.56	0.000%
45	-5.46	-53.36	5.29	5.46	53.36	-5.29	0.000%
46	-6.72	-53.36	3.65	6.72	53.36	-3.65	0.000%
47	-7.70	-53.36	-0.15	7.70	53.36	0.15	0.000%
48	-6.71	-53.36	-3.91	6.71	53.36	3.91	0.000%
49	-5.53	-53.36	-5.46	5.53	53.36	5.46	0.000%
50	-3.98	-53.36	-6.66	3.98	53.36	6.66	0.000%
51	-0.29	-15.03	-5.10	0.29	15.03	5.10	0.000%
52	2.43	-15.03	-4.28	-2.43	15.03	4.28	0.000%
53	3.51	-15.03	-3.46	-3.51	15.03	3.46	0.000%
54	4.30	-15.03	-2.45	-4.30	15.03	2.45	0.000%
55	5.01	-15.03	0.04	-5.01	15.03	-0.04	0.000%
56	4.38	-15.03	2.57	-4.38	15.03	-2.57	0.000%
57	3.57	-15.03	3.61	-3.57	15.03	-3.61	0.000%
58	2.54	-15.03	4.39	-2.54	15.03	-4.39	0.000%
59	0.06	-15.03	5.02	-0.06	15.03	-5.02	0.000%
60	-2.43	-15.03	4.28	2.43	15.03	-4.28	0.000%
61	-3.62	-15.03	3.40	3.62	15.03	-3.40	0.000%
62	-4.48	-15.03	2.30	4.48	15.03	-2.30	0.000%
63	-5.10	-15.03	-0.19	5.10	15.03	0.19	0.000%
64	-4.47	-15.03	-2.62	4.47	15.03	2.62	0.000%
65	-3.71	-15.03	-3.62	3.71	15.03	3.62	0.000%
66	-2.71	-15.03	-4.40	2.71	15.03	4.40	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
51	Yes	4	0.00000001	0.00000001
52	Yes	4	0.00000001	0.00000001
53	Yes	4	0.00000001	0.00000001
54	Yes	4	0.00000001	0.00000001
55	Yes	4	0.00000001	0.00000001
56	Yes	4	0.00000001	0.00000001
57	Yes	4	0.00000001	0.00000001
58	Yes	4	0.00000001	0.00000001
59	Yes	4	0.00000001	0.00000001
60	Yes	4	0.00000001	0.00000001
61	Yes	4	0.00000001	0.00000001
62	Yes	4	0.00000001	0.00000001
63	Yes	4	0.00000001	0.00000001
64	Yes	4	0.00000001	0.00000001
65	Yes	4	0.00000001	0.00000001
66	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	100 - 80	0.854	65	0.0679	0.0140
T2	80 - 60	0.561	64	0.0651	0.0077
T3	60 - 40	0.302	64	0.0501	0.0025
T4	40 - 20	0.124	64	0.0288	0.0016
T5	20 - 0	0.033	65	0.0127	0.0009

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
100.00	8' x 3" Dia Omni	65	0.854	0.0679	0.0140	547120
98.00	Pirod 12' T-Frame Sector Mount (1)	65	0.825	0.0679	0.0133	547120
88.50	P1000 Unistrut (9' Long)	65	0.684	0.0673	0.0104	237879
88.00	12' Frame	65	0.677	0.0673	0.0102	227967
86.00	DC6-48-60-18-8F Surge Arrestor	65	0.647	0.0669	0.0096	195401
84.00	4 FT DISH	65	0.618	0.0664	0.0090	170944
78.50	P1000 Unistrut (9' Long)	64	0.540	0.0644	0.0073	122656
70.00	4 FT DISH	64	0.424	0.0589	0.0049	75407

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	100 - 80	3.302	30	0.2624	0.0537
T2	80 - 60	2.163	30	0.2513	0.0297
T3	60 - 40	1.160	30	0.1936	0.0098
T4	40 - 20	0.475	30	0.1106	0.0062
T5	20 - 0	0.128	30	0.0486	0.0035

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
100.00	8' x 3" Dia Omni	30	3.302	0.2624	0.0537	155564
98.00	Pirod 12' T-Frame Sector Mount (1)	30	3.186	0.2623	0.0513	155564
88.50	P1000 Unistrut (9' Long)	30	2.640	0.2600	0.0399	67637
88.00	12' Frame	30	2.611	0.2597	0.0393	64818
86.00	DC6-48-60-18-8F Surge Arrestor	30	2.498	0.2583	0.0369	55559
84.00	4 FT DISH	30	2.386	0.2565	0.0345	48599
78.50	P1000 Unistrut (9' Long)	30	2.081	0.2487	0.0279	33776
70.00	4 FT DISH	30	1.632	0.2283	0.0188	19990

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	100	Leg	A325N	0.7500	4	0.98	29.82	0.033 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	1.87	12.43	0.151 ✔	1	Bolt Shear

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
		Horizontal	A325N	0.6250	2	1.56	12.43	0.126 ✔	1	Bolt Shear
		Top Girt	A325N	0.6250	2	0.43	12.43	0.035 ✔	1	Bolt Shear
T2	80	Leg	A325N	0.8750	4	5.81	40.59	0.143 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	1.73	12.43	0.140 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	1.61	12.43	0.129 ✔	1	Bolt Shear
T3	60	Leg	A325N	0.8750	4	10.52	40.59	0.259 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	1.69	12.43	0.136 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	1.70	12.43	0.137 ✔	1	Bolt Shear
T4	40	Leg	A325N	1.0000	4	14.03	53.01	0.265 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	1.97	12.43	0.159 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	1.73	12.43	0.140 ✔	1	Bolt Shear
T5	20	Leg	A354-BC	1.0000	4	17.71	55.22	0.321 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	1.92	12.43	0.155 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	1.86	12.43	0.149 ✔	1	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $P_u / \phi P_n$
T1	100 - 80	ROHN 2.5 STD	20.00	6.67	84.4 K=1.00	1.7040	-7.63	45.53	0.168 [1] ✔
T2	80 - 60	ROHN 3 STD	20.03	6.68	68.9 K=1.00	2.2285	-28.04	70.89	0.396 [1] ✔
T3	60 - 40	ROHN 3.5 STD	20.03	6.68	60.0 K=1.00	2.6795	-47.33	92.71	0.511 [1] ✔
T4	40 - 20	ROHN 4 EH	20.05	10.02	81.4 K=1.00	4.4074	-62.32	122.11	0.510 [1] ✔
T5	20 - 0	ROHN 5 X-STR	20.05	10.03	65.4 K=1.00	6.1120	-78.63	201.13	0.391 [1] ✔

[1] $P_u / \phi P_n$ controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	100 - 80	ROHN 2 STD	7.92	7.70	117.3 K=1.00	1.0745	-5.62	17.64	0.319 [1] ✔
T2	80 - 60	ROHN 2 STD	8.51	8.28	126.2 K=1.00	1.0745	-5.20	15.24	0.341 [1] ✔
T3	60 - 40	ROHN 2 STD	9.18	8.94	136.3 K=1.00	1.0745	-5.01	13.07	0.384 [1] ✔
T4	40 - 20	ROHN 2.5 STD	12.49	12.18	154.3 K=1.00	1.7040	-5.91	16.18	0.366 [1] ✔
T5	20 - 0	ROHN 2.5 STD	13.28	12.93	163.7 K=1.00	1.7040	-5.77	14.36	0.402 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	100 - 80	ROHN 1.5 STD	8.53	4.14	79.9 K=1.00	0.7995	-3.06	22.56	0.136 [1] ✔
T2	80 - 60	ROHN 1.5 STD	9.90	4.81	92.6 K=1.00	0.7995	-3.19	19.21	0.166 [1] ✔
T3	60 - 40	ROHN 2 STD	11.94	5.81	88.5 K=1.00	1.0745	-3.39	27.27	0.124 [1] ✔
T4	40 - 20	ROHN 2 STD	13.79	6.71	102.3 K=1.00	1.0745	-3.47	22.51	0.154 [1] ✔
T5	20 - 0	ROHN 2 STD	16.21	7.87	120.0 K=1.00	1.0745	-3.69	16.85	0.219 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	100 - 80	ROHN 1.5 STD	8.50	4.13	79.6 K=1.00	0.7995	-0.86	22.63	0.038 [1] ✔

[1] P_u / ϕP_n controls

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	100 - 80	L2x2x1/8	4.25	4.25	128.3 K=1.00	0.4844	-0.01	6.56	0.002 [1] ✔
T2	80 - 60	L2x2x1/8	4.95	4.95	149.5 K=1.00	0.4844	-0.01	4.90	0.001 [1] ✔
T3	60 - 40	L2x2x1/8	5.97	5.97	180.3 K=1.00	0.4844	-0.01	3.37	0.002 [1] ✔
T4	40 - 20	L2x2x1/8	6.90	6.90	208.2 K=1.00	0.4844	-0.01	2.53	0.003 [1] ✔
T5	20 - 0	L2 1/2x2 1/2x3/16	8.10	8.10	196.5 K=1.00	0.9020	-0.01	5.28	0.002 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	100 - 80	ROHN 2.5 STD	20.00	6.67	84.4	1.7040	3.93	76.68	0.051 [1] ✔
T2	80 - 60	ROHN 3 STD	20.03	6.68	68.9	2.2285	23.22	100.28	0.232 [1] ✔
T3	60 - 40	ROHN 3.5 STD	20.03	6.68	60.0	2.6795	42.09	120.58	0.349 [1] ✔
T4	40 - 20	ROHN 4 EH	20.05	10.02	81.4	4.4074	56.12	198.34	0.283 [1] ✔
T5	20 - 0	ROHN 5 X-STR	20.05	10.03	65.4	6.1120	70.84	275.04	0.258 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	100 - 80	ROHN 2 STD	7.92	7.70	117.3	1.0745	5.55	48.35	0.115 [1] ✔
T2	80 - 60	ROHN 2 STD	8.51	8.28	126.2	1.0745	5.12	48.35	0.106 [1] ✔
T3	60 - 40	ROHN 2 STD	8.73	8.49	129.4	1.0745	4.98	48.35	0.103 [1] ✔
T4	40 - 20	ROHN 2.5 STD	12.15	11.84	150.0	1.7040	5.76	76.68	0.075 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T5	20 - 0	ROHN 2.5 STD	13.28	12.93	163.7	1.7040	5.56	76.68	0.073 [1]

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	100 - 80	ROHN 1.5 STD	8.53	4.14	79.9	0.7995	3.13	35.98	0.087 [1]
T2	80 - 60	ROHN 1.5 STD	9.90	4.81	92.6	0.7995	3.21	35.98	0.089 [1]
T3	60 - 40	ROHN 2 STD	11.94	5.81	88.5	1.0745	3.40	48.35	0.070 [1]
T4	40 - 20	ROHN 2 STD	13.79	6.71	102.3	1.0745	3.47	48.35	0.072 [1]
T5	20 - 0	ROHN 2 STD	16.21	7.87	120.0	1.0745	3.71	48.35	0.077 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	100 - 80	ROHN 1.5 STD	8.50	4.13	79.6	0.7995	0.86	35.98	0.024 [1]

[1] P_u / ϕP_n controls

Inner Bracing Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	100 - 80	L2x2x1/8	4.25	4.25	81.4	0.4844	0.01	15.69	0.001 [1]
T2	80 - 60	L2x2x1/8	4.27	4.27	81.8	0.4844	0.00	15.69	0.000 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T3	60 - 40	L2x2x1/8	5.29	5.29	101.4	0.4844	0.00	15.69	0.000 [1] ✔
T4	40 - 20	L2x2x1/8	6.31	6.31	121.0	0.4844	0.00	15.69	0.000 [1] ✔

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	100 - 80	Leg	ROHN 2.5 STD	2	-7.63	45.53	16.8	Pass
T2	80 - 60	Leg	ROHN 3 STD	41	-28.04	70.89	39.6	Pass
T3	60 - 40	Leg	ROHN 3.5 STD	81	-47.33	92.71	51.1	Pass
T4	40 - 20	Leg	ROHN 4 EH	120	-62.32	122.11	51.0	Pass
T5	20 - 0	Leg	ROHN 5 X-STR	147	-78.63	201.13	39.1	Pass
T1	100 - 80	Diagonal	ROHN 2 STD	11	-5.62	17.64	31.9	Pass
T2	80 - 60	Diagonal	ROHN 2 STD	47	-5.20	15.24	34.1	Pass
T3	60 - 40	Diagonal	ROHN 2 STD	86	-5.01	13.07	38.4	Pass
T4	40 - 20	Diagonal	ROHN 2.5 STD	123	-5.91	16.18	36.6	Pass
T5	20 - 0	Diagonal	ROHN 2.5 STD	150	-5.77	14.36	40.2	Pass
T1	100 - 80	Horizontal	ROHN 1.5 STD	10	-3.06	22.56	13.6	Pass
T2	80 - 60	Horizontal	ROHN 1.5 STD	46	-3.19	19.21	16.6	Pass
T3	60 - 40	Horizontal	ROHN 2 STD	85	-3.39	27.27	12.4 13.7 (b)	Pass
T4	40 - 20	Horizontal	ROHN 2 STD	121	-3.47	22.51	15.4	Pass
T5	20 - 0	Horizontal	ROHN 2 STD	148	-3.69	16.85	21.9	Pass
T1	100 - 80	Top Girt	ROHN 1.5 STD	5	-0.86	22.63	3.8	Pass
T1	100 - 80	Inner Bracing	L2x2x1/8	16	-0.00	6.53	0.5	Pass
T2	80 - 60	Inner Bracing	L2x2x1/8	52	-0.01	4.90	0.5	Pass
T3	60 - 40	Inner Bracing	L2x2x1/8	91	-0.01	3.37	0.6	Pass
T4	40 - 20	Inner Bracing	L2x2x1/8	131	-0.01	2.53	0.7	Pass
T5	20 - 0	Inner Bracing	L2 1/2x2 1/2x3/16	157	-0.01	5.28	0.5	Pass
							Summary	
						Leg (T3)	51.1	Pass
						Diagonal (T5)	40.2	Pass
						Horizontal (T5)	21.9	Pass
						Top Girt (T1)	3.8	Pass
						Inner Bracing (T4)	0.7	Pass
						Bolt Checks	32.1	Pass
						RATING =	**51.1**	**Pass**

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Subject:	FOUNDATION ANALYSIS
Location:	Greenwich, CT
Rev. 0: 6/4/18	Prepared by: T.J.L. Checked by: C.F.C. Job No. 18092.00

Pier and Mat Foundation Analysis:

Input Data:

Tower Data

Overturning Moment =	$OM := 1241 \cdot ft \cdot kips$	(User Input from tnxTower)	
Shear Force =	$S_t := 20 \cdot kip$	(User Input from tnxTower)	
Axial Force =	$WT_t := 18 \cdot kip$	(User Input from tnxTower)	
Max Compression Force =	$C_t := 86 \cdot kip$	(User Input from tnxTower)	
Max Uplift Force =	$U_t := 77 \cdot kip$	(User Input from tnxTower)	
Tower Height =	$H_t := 100 \cdot ft$	(User Input)	
Tower Width =	$W_t := 17.45 \cdot ft$	(User Input)	
Tower Position on Foundation (1=offset, 2=centered) =	$Pos_t := 2$	(User Input)	

Footing Data:

Overall Depth of Footing =	$D_f := 6.5 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 3.0 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 0.5 \cdot ft$	(User Input)	
Diameter of Pier =	$d_p := 3.0 \cdot ft$	(User Input)	
Thickness of Footing =	$T_f := 4.0 \cdot ft$	(User Input)	
Width of Footing =	$W_f := 24.0 \cdot ft$	(User Input)	

Material Properties:

Concrete Compressive Strength =	$f_c := 3000 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 15 \cdot deg$	(User Input)	
Allowable Soil Bearing Capacity =	$q_s := 8000 \cdot psf$	(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)	

Pier Reinforcement:

Bar Size =	$BS_{pier} := 8$	(User Input)	
Bar Diameter =	$d_{bpier} := 1.0 \cdot in$	(User Input)	
Number of Bars =	$NB_{pier} := 12$	(User Input)	
Clear Cover of Reinforcement =	$Cvr_{pier} := 3 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Diameter of Tie =	$d_{Tie} := 4 \cdot in$	(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 =	$NB_{top} := 25$	(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 =	$NB_{bot} := 25$	(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:

Pier Reinforcement Bar Area = $A_{bpier} := \frac{\pi \cdot d_{bpier}^2}{4} = 0.785 \cdot in^2$

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 = $K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 1.698$

Load Factor = $LF := 1$

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

$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p} = 0.425 \cdot ksf$

$P_{top} := if[n < (D_f - T_f), P_{pt}, P_{pn}] = 0.425 \cdot ksf$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 1.104 \cdot ksf$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 0.764 \cdot ksf$

$T_p := if[n < (D_f - T_f), T_f, (D_f - n)] = 4 \cdot ft$

$A_p := W_f \cdot T_p = 96 \cdot ft^2$

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 73.371 \cdot kip$

Weight of Concrete = $WT_c := \left[\left(W_f^2 \cdot T_f\right) + (3) \cdot \left(\frac{d_p^2 \cdot \pi}{4} L_p\right)\right] \cdot \gamma_c = 355.143 \cdot kip$

Weight of Soil Above Footing = $WT_{s1} := \left[\left[W_f^2 - (3) \cdot \left(\frac{d_p^2 \cdot \pi}{4}\right)\right] \cdot \left(\left|L_p - L_{pag} - n\right|\right)\right] \cdot \gamma_s = 138.7 \cdot kip$

Weight of Soil Wedge at Back Face = $WT_{s2} := \left[\frac{(D_f - n)^2 \cdot \tan(\Phi_s)}{2} \cdot W_f\right] \cdot \gamma_s = 13.585 \cdot kip$

Foundation has undercut toe per Fred A. Nudd dwg 96-4992-1

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

$X_t := if(Pos_t = 1, X_{t1}, X_{t2}) = 6.963$

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

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

Total Weight = $WT_{tot} := 0.9WT_c + 0.75WT_{s1} = 423.7 \cdot kip$

Resisting Moment = $M_r := (WT_{tot}) \cdot \frac{W_f}{2} + 0.9WT_t \cdot \left(\frac{W_f}{2} - X_{off}\right) + 0.75\left(S_u \cdot \frac{T_p}{3}\right) + 0.75WT_{s2} \cdot \left[W_f + \frac{(D_f - n) \cdot \tan(\Phi_s)}{3}\right] = 5602 \cdot kip \cdot ft$

Overturning Moment = $M_{ot} := OM + S_t \cdot (L_p + T_f) = 1381 \cdot kip \cdot ft$

Foundation has undercut toe per Fred A. Nudd dwg 96-4992-1

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 4.06$

Factor of Safety Required = $FS_{req} := 1$ $OverTurning\_Moment\_Check := if(FS \geq FS_{req}, "Okay", "No Good")$

OverTurning_Moment_Check = "Okay"

Shear Capacity in Pier:

Shear Resistance of Pier = $S_p := \frac{P_{ave} \cdot A_p + \mu \cdot WT_{tot}}{FS_{req}} = 264.014 \cdot kips$

$Shear\_Check := if(S_p > S_t, "Okay", "No Good")$

$Shear\_Check = "Okay"$

Bearing Pressure Caused by Footing:

Total Load = $Load_{tot} := WT_c + WT_{s1} + WT_t = 512 \cdot kip$

Area of the Mat = $A_{mat} := W_f^{\,2} = 576$

Section Modulus of Mat = $S := \frac{W_f^{\,3}}{6} = 2304 \cdot ft^3$

Maximum Pressure in Mat = $P_{max} := \frac{Load_{tot}}{A_{mat}} + \frac{M_{ot}}{S} = 1.488 \cdot ksf$

$Max\_Pressure\_Check := if(P_{max} < 0.75q_s, "Okay", "No Good")$

$Max\_Pressure\_Check = "Okay"$

Minimum Pressure in Mat = $P_{min} := \frac{Load_{tot}}{A_{mat}} - \frac{M_{ot}}{S} = 0.289 \cdot ksf$

$Min\_Pressure\_Check := if\left[(P_{min} \geq 0) \cdot (P_{min} < 0.75q_s), "Okay", "No Good"\right]$

$Min\_Pressure\_Check = "Okay"$

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3} = 9.93$

Distance to Kern = $X_k := \frac{W_f}{6} = 4$

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

Eccentricity = $e := \frac{M_{ot}}{Load_{tot}} = 2.698$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot Load_{tot}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e\right)} = 1.528 \cdot ksf$

$q_{adj} := if(P_{min} < 0, P_a, P_{max}) = 1.488 \cdot ksf$

$Pressure\_Check := if(q_{adj} < 0.75q_s, "Okay", "No Good")$

$Pressure\_Check = "Okay"$

Concrete Bearing Capacity:

Strength Reduction Factor = $\Phi_c := 0.65$ (ACI-2008 9.3.2.2)

Bearing Strength Between Pier and Pad = $P_b := \Phi_c \cdot 0.85 \cdot f_c \cdot \frac{\pi \cdot d_p^2}{4} = 1.687 \times 10^3 \cdot kips$ (ACI-2008 10.14)

$Bearing\_Check := if(P_b > LF \cdot C_t, "Okay", "No Good")$

Bearing_Check = "Okay"

Shear Strength of Concrete:

Beam Shear: (Critical section located at a distance d from the face of Pier) (ACI 11.3.1.1)

$\phi_c := 0.85$ (ACI 9.3.2.5)

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

$FL := LF \cdot \frac{C_t}{W_f^2} = 0.149 \cdot ksf$

$V_{req} := FL \cdot (X_t - .5 \cdot d_p - d) \cdot W_f = 6.398 \cdot kips$

$V_{Avail} := \phi_c \cdot 2 \cdot \sqrt{f_c \cdot psi} \cdot W_f \cdot d = 1183 \cdot kip$ (ACI-2008 11.2.1.1)

$Beam\_Shear\_Check := if(V_{req} < V_{Avail}, "Okay", "No Good")$

Beam_Shear_Check = "Okay"

Punching Shear: (Critical Section Located at a distance of d/2 from the face of pier) (ACI 11.11.1.2)

Critical Perimeter of Punching Shear = $b_o := (d_p + d) \cdot \pi = 21$

Area Included Inside Perimeter = $A_{bo} := \frac{\pi \cdot (d_p + d)^2}{4} = 35$

Required Shear Strength = $V_{req} := FL \cdot (W_f^2 - A_{bo}) = 81 \cdot kips$

Available Shear Strength = $V_{Avail} := \phi_c \cdot 4 \cdot \sqrt{f_c \cdot psi} \cdot b_o \cdot d = 2068.4 \cdot kip$ (ACI-2008 11.11.2.1)

$Punching\_Shear\_Check := if(V_{req} < V_{Avail}, "Okay", "No Good")$

Punching_Shear_Check = "Okay"

Steel Reinforcement in Pad:

Required Reinforcement for Bending:

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

Maximum Moment in Pad = $M_{max} := 700 \cdot kip \cdot ft$ (User Input)

Design Moment = $M_n := \frac{LF \cdot M_{max}}{\phi_m} = 777.778 \cdot kips \cdot ft$

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

(ACI-200810.2.7.3)

$b_{eff} := W_t \cdot \cos(30 \cdot deg) + d_p = 217.346 \cdot in$

$A_s := \frac{M_n}{(f_y \cdot d)} = 3.525 \cdot in^2$

$a := \frac{A_s \cdot f_y}{\beta \cdot f_c \cdot b_{eff}} = 0.382 \cdot in$

$A_s := \frac{M_n}{f_y \cdot \left(d - \frac{a}{2}\right)} = 3.541 \cdot in^2$

$\rho := \frac{A_s}{b_{eff} d} = 0.00443 \cdot in$

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:

$$As := if\left(\rho \geq \rho_{sh}, A_s, \rho_{sh} \cdot \frac{b_{eff}}{2} \cdot d\right) = 8.6 \cdot in^2$$

$$As_{prov} := A_{bbot} \cdot NB_{bot} = 15 \cdot in^2$$

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

Pad_Reinforcement_Bot = "Okay"

Check top Bars:

$$As := if\left(\rho \geq \rho_{sh}, A_s, \rho_{sh} \cdot \frac{b_{eff}}{2} \cdot d\right) = 8.6 \cdot in^2$$

$$As_{prov} := A_{btop} \cdot NB_{top} = 15 \cdot in^2$$

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

Pad_Reinforcement_Top = "Okay"

Developement Length Pad Reinforcement:

Bar Spacing =

$$B_{sPad} := \frac{W_f - 2 \cdot Cvr_{pad} - NB_{bot} \cdot d_{bbot}}{NB_{bot} - 1} = 10.84 \cdot in$$

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 =

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

$$L_{dbt} := \frac{3 \cdot f_y \alpha_{pad} \cdot \beta_{pad} \cdot \gamma_{pad} \cdot \lambda_{pad}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \frac{c + k_{tr}}{d_{bbot}}} \cdot d_{bbot} = 21 \cdot in$$

Minimum Development Length =

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

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

Available Length in Pad =

$$L_{Pad} := \frac{W_f}{2} - \frac{W_t}{2} - Cvr_{pad} = 36.3 \cdot in$$

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

Lpad_Check = "Okay"

Steel Reinforcement in Pier:

Area of Pier = $A_p := \frac{\pi \cdot d_p^2}{4} = 1017.88 \cdot in^2$

$A_{smin} := 0.01 \cdot 0.5 \cdot A_p = 5.09 \cdot in^2$ (ACI-2008 10.8.4 & 10.9.1)

$A_{sprov} := NB_{pier} \cdot A_{bpier} = 9.42 \cdot in^2$

$Steel\_Area\_Check := if(A_{sprov} > A_{smin}, "Okay", "No Good")$

Steel_Area_Check = "Okay"

Bar Spacing In Pier = $B_{sPier} := \frac{d_p \cdot \pi}{NB_{pier}} - d_{bpier} = 8.425 \cdot in$

Diameter of Reinforcement Cage = $Diam_{cage} := d_p - 2 \cdot Cvr_{pier} = 30 \cdot in$

Maximum Moment in Pier = $M_p := S_t \cdot (L_p) \cdot LF = 720 \cdot in \cdot kips$

Pier Check evaluated from outside program and results are listed below;

$(D \;\; N \;\; n \;\; P_u \;\; M_{xu}) := \left(d_p \cdot 12 \;\; NB_{pier} \;\; BS_{pier} \;\; \frac{C_t \cdot 1.333}{kips} \;\; \frac{M_p}{in \cdot kips}\right)$

$(D \;\; N \;\; n \;\; P_u \;\; M_{xu}) = (36 \;\; 12 \;\; 8 \;\; 114.638 \;\; 720)$

$(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho) := (0 \;\; 0 \;\; 0 \;\; 0)$

$(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho) := \phi P'_n(D, N, n, P_u, M_{xu})^T$

$(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho) = (1.345 \times 10^3 \;\; 8.445 \times 10^3 \;\; -33.079 \;\; 9.314 \times 10^{-3})$

$Axial\_Load\_Check := if(\phi P_n \geq P_u, "Okay", "No Good")$

Axial_Load_Check = "Okay"

$Bending\_Check := if(\phi M_{xn} \geq M_{xu}, "Okay", "No Good")$

Bending_Check = "Okay"

Development Length Pier Reinforcement:

Available Length in Foundation:

$L_{pier} := L_p - Cvr_{pier} = 33 \cdot in$

$L_{pad} := T_f - Cvr_{pad} = 45 \cdot in$

Tension: (ACI-2008 12.2.3)

Spacing or Cover Dimension =

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

Transverse Reinforcement =

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

$L_{dbt} := \frac{3 \cdot f_y \cdot \alpha_{pier} \cdot \beta_{pier} \cdot \gamma_{pier} \cdot \lambda_{pier}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \left(\frac{c + k_{tr}}{d_{bpier}}\right)} \cdot d_{bpier} = 27.39 \cdot in$

Minimum Development Length =

$L_{dh} := \frac{1200 \cdot d_{bpier}}{\sqrt{\frac{f_c}{psi}}} \cdot .7 = 15.336 \cdot in$ (ACI 12.2.1)

Pier reinforcement bars are standard 90 degree hooks and therefore developement in the pad is computed as follows:

$L_{db} := \max\left(L_{dbt}, L_{dbmin}\right) = 27.386 \cdot in$

$L_{tension\_Check} := if\left(L_{pier} + L_{pad} > L_{dbt}, "Okay", "No Good"\right)$

$L_{tension\_Check} = "Okay"$

Compression: (ACI-2008 12.3.2)

$L_{dbc1} := \frac{.02 \cdot d_{bpier} \cdot f_y}{\sqrt{f_c \cdot psi}} = 21.909 \cdot in$

$L_{dbmin} := 0.0003 \cdot \frac{in^2}{lb} \cdot \left(d_{bpier} \cdot f_y\right) = 18 \cdot in$

$L_{dbc} := if\left(L_{dbc1} \geq L_{dbmin}, L_{dbc1}, L_{dbmin}\right) = 21.909 \cdot in$

$L_{compression\_Check} := if\left(L_{pier} + L_{pad} > L_{dbc}, "Okay", "No Good"\right)$

$L_{compression\_Check} = "Okay"$

Section 1 - RFDS GENERAL INFORMATION

RFDS NAME:	CTL02347	DATE:	11/28/2017	RF DESIGN ENG:	Md Mateen	RF PERF ENG:		RFDS PROGRAM TYPE:	2018 LTE Next Carrier
ISSUE:	Bronze Standard	Approved? (Y/N):	Yes	RF DESIGN PHONE:		RF PERF PHONE:		RFDS TECHNOLOGY:	LTE
REVISION:	Preliminary	RF MANAGER:	John Benedetto	RF DESIGN EMAIL:	MM093O@ATT.COM	RF PERF EMAIL:		STATE/STATUS:	Preliminary/Approved
INITIATIVE / PROJECT:	LTE 2C WCS, LTE 3C 1900 A3-A4 & E, LTE 4C AWS J.					RFDS VERSION	1.00	RFDS ID:	2102432
						GSM FREQUENCY:		Created By: mm093q	Updated By: mm093q
						UMTS FREQUENCY:	850	Created: 11/28/2017	Updated: 12/1/2017
						LTE FREQUENCY:	700,1900,AWS,WCS		
						IPLAN JOB # 1:	NER-RCTB-12-04531	PRD || SUB GRP #1:	LTE Next Carrier || LTE 2C
						IPLAN JOB # 2:	NER-RCTB-17-08170	PRD || SUB GRP #2:	LTE Next Carrier || LTE 3C
						IPLAN JOB # 3:	NER-RCTB-17-08181	PRD || SUB GRP #3:	LTE Next Carrier || LTE 4C
						IPLAN JOB # 4:		PRD || SUB GRP #4	
						IPLAN JOB # 5:		PRD || SUB GRP #5	
						IPLAN JOB # 6:		PRD || SUB GRP #6	
						IPLAN JOB # 7:		PRD || SUB GRP #7	
						IPLAN JOB # 8:		PRD || SUB GRP #8	

Section 2 - LOCATION INFORMATION

USID:	88306	FA LOCATION CODE:	10050949	LOCATION NAME:	GREENWICH - KING STREET	ORACLE PRJT # 1:	2051A0ETPP	PACE JOB #1:	MRCTB027630
REGION:	NORTHEAST	MARKET CLUSTER:	NEW ENGLAND	MARKET:	CONNECTICUT	ORACLE PRJT # 2:	2051A0ETZP	PACE JOB #2:	MRCTB027652
ADDRESS:	1323 KING STREET	CITY:	GREENWICH	STATE:	CT	ORACLE PRJT # 3:	2051A0ETZC	PACE JOB #3:	MRCTB027636
ZIP CODE:	06831	COUNTY:	FAIRFIELD	LONG (DEC. DEG.):	-73.6971810	ORACLE PRJT # 4:		PACE JOB #4:	
LATITUDE (D-M-S):	41d 4m 27.8904s	LONGITUDE (D-M-S):	-73d -41m -49.8516s	LAT (DEC. DEG.):	41.0744140	ORACLE PRJT # 5:		PACE JOB #5:	
						ORACLE PRJT # 6:		PACE JOB #6:	
						ORACLE PRJT # 7:		PACE JOB #7:	
						ORACLE PRJT # 8:		PACE JOB #8:	
						BORDER CELL WITH CONTOUR COORD:		SEARCH RING NAME:	
						AM STUDY REQ'D (Y/N):	No	SEARCH RING ID:	
						FREQ COORD:		BTA:	MSA / RSA:
						OPS DISTRICT:	CT-South	LAC(GSM):	
						OPS ZONE:	NE_CT_S_FRFD_W_CS	LAC(UMTS):	05989
						RF DISTRICT:	NPO Triage	BSC(GSM):	
						RF ZONE:	Hotseat	RNC(UMTS):	BRPTCT04CRBR06
						PARENT NAME(GSM):		MME POOL ID(LTE):	FF01
						PARENT NAME(UMTS):	BRIDGEPORT RNC06 ERICSSON 3820		

DIRECTIONS, ACCESS AND EQUIPMENT LOCATION:

MERRITT PARKWAY NORTH TO EXIT 27 KING STREET MAKE RIGHT ON KING STREET AT THE END OF THE RAMP. TAKE TO (*****CLIFFDALE ROAD AND MAKE RIGHT ONTO CLIFFDALE ROAD, DRIVE AND GO DOWN THE FIRST HILL AND MAKE A RIGHT ON TO THE GOLF CART & VEHICLE ROAD, AT THE Y BEAR RIGHT AND DRIVE TO THE BACK, YOU WILL SEE THE MAINTENANCE BLUIDING A ROAD GO DOWN TO SITE *****) ADDRESS:75 CLIFFDALE ROAD,GREENWICH, CONNECTICUT, 06830 ACCESS: CONTACT: SECURITY: NO ISSUES POWER COMPANY: NORTHEAST UTILITIES (800) 286-2000 FIRE: (203) 622-3950 POLICE: (203) 622-8000 T-1 CIRCUIT NUMBERS DHXV // 508215 & DHXV // 508216 GSM DHXV //508221 & DHXV// 508223 UMTS BELL ATLANTIC (1800) AND (914) (24-HR REPAIR)

GATE COMBO: 4667

ADDRESS:75 CLIFFDALE ROAD,GREENWICH, CONNECTICUT, 06830

ACCESS:
CONTACT:

SECURITY: NO ISSUES

POWER COMPANY: NORTHEAST UTILITIES (800) 286-2000
FIRE: (203) 622-3950

POLICE: (203) 622-8000

T-1 CIRCUIT NUMBERS DHXV // 508215 & DHXV // 508216 GSM

Section 3 - LICENSE COVERAGE/FILING INFORMATION

CGSA - NO FILING TRIGGERED (Yes/No):	No	CGSA LOSS:		PCS REDUCED - UPS ZIP:		CGSA CALL SIGNS:	z_KNLB312,z_KNLB312,z_KNLB312,z_KNLB312,z_KNLB312,z_KNLB312
CGSA - MINOR FILING NEEDED (Yes/No):	No	CGSA EXT AGMT NEEDED:		PCS POPS REDUCED:			
CGSA - MAJOR FILING NEEDED (Yes/No):	Yes	CGSA SCORECARD UPDATED:					

Section 4 - TOWER/REGULATORY INFORMATION

STRUCTURE AT&T OWNED?:	No	GROUND ELEVATION (ft):		STRUCTURE TYPE:	SELF SUPPORT	MARKET LOCATION 700 MHz Band:	
ADDITIONAL REGULATORY?:	No	HEIGHT OVERALL (ft):	107.00	FCC ASR NUMBER:	1202508	MARKET LOCATION 850 MHz Band:	
SUB-LEASE RIGHTS?:	No	STRUCTURE HEIGHT (ft):	102.00			MARKET LOCATION 1900 MHz Band:	
LIGHTING TYPE:	NOT REQUIRED					MARKET LOCATION AWS Band:	
						MARKET LOCATION WCS Band:	
						MARKET LOCATION Future Band:	

Section 5 - E-911 INFORMATION - existing

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:
SECTOR A E-911	CONNECTICUT STATE POLICE-G TROOP	1319		INTRADO_MIAMI		0		
SECTOR B	CONNECTICUT STATE POLICE-G TROOP	1319		INTRADO_MIAMI		0		
SECTOR C	GREENWICH POLICE DEPARTMENT	1344		INTRADO_MIAMI		0		
SECTOR D								
SECTOR E								
SECTOR F								
OMNI								

Section 5 - E-911 INFORMATION - final

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:
SECTOR A E-911	CONNECTICUT STATE POLICE-G TROOP	1319		INTRADO_MIAMI		0		
SECTOR B	CONNECTICUT STATE POLICE-G TROOP	1319		INTRADO_MIAMI		0		
SECTOR C	GREENWICH POLICE DEPARTMENT	1344		INTRADO_MIAMI		0		
SECTOR D								
SECTOR E								
SECTOR F								
OMNI								

Section 6 - RBS GENERAL INFORMATION - existing

	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS
RBS ID:	200910	246907	360173
CTS COMMON ID:	CTU2347	CTV2347	CTL02347
CELL ID / BCF:	CTU2347	CTU2347	CTL02347
BTA/TID:	321V	321U	321L
4-9 DIGIT SITE ID:	2347	2347	2347
COW OR TOY?:	No	No	No
CELL SITE TYPE:	SECTORIZED	SECTORIZED	SECTORIZED
SITE TYPE:	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL
BTS LOCATION ID:	INTERNAL	INTERNAL	INTERNAL
BASE STATION TYPE:	BASE	OVERLAY	BASE
EQUIPMENT NAME:	GREENWICH - KING STREET	GREENWICH - KING ST	GREENWICH - KING STREET
DISASTER PRIORITY:	1	1	3

Section 6 - RBS GENERAL INFORMATION - final

	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS
RBS ID:	200910	246907	360173
CTS COMMON ID:	CTU2347	CTV2347	CTL02347
CELL ID / BCF:	CTU2347	CTU2347	CTL02347
BTA/TID:	321V	321U	321L
4-9 DIGIT SITE ID:	2347	2347	2347
COW OR TOY?:	No	No	No
CELL SITE TYPE:	SECTORIZED	SECTORIZED	SECTORIZED
SITE TYPE:	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL
BTS LOCATION ID:	INTERNAL	INTERNAL	INTERNAL
BASE STATION TYPE:	BASE	OVERLAY	BASE
EQUIPMENT NAME:	GREENWICH - KING STREET	GREENWICH - KING ST	GREENWICH - KING STREET
DISASTER PRIORITY:	1	1	3

Section 7 - RBS SPECIFIC INFORMATION - existing

	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS
RAC:			
EQUIPMENT VENDOR:	ERICSSON	ERICSSON	ERICSSON
EQUIPMENT TYPE:	3206 INDOOR	3206 INDOOR	6601 INDOOR MU
BASEBAND CONFIGURATION:			
LOCATION:			
CABINET LOCATION:			
MARKET STATE CODE:			CT
AGPS:	Yes	Yes	Yes
NODE B NUMBER:	0	0	2347

Section 7 - RBS SPECIFIC INFORMATION - final

	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS
RAC:			
EQUIPMENT VENDOR:	ERICSSON	ERICSSON	ERICSSON
EQUIPMENT TYPE:	3206 INDOOR	3206 INDOOR	6601 INDOOR MU
BASEBAND CONFIGURATION:			1x6601 / 1x5216 / 1xXMU03
LOCATION:			
CABINET LOCATION:			
MARKET STATE CODE:			CT
AGPS:	Yes	Yes	Yes
NODE B NUMBER:	0	0	2347

Section 8 - RBS/SECTOR ASSOCIATION - existing

	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS
CTS Common ID	CTU2347	CTV2347	CTL02347
Soft Sector IDs	CTU23477	CTV23471	CTL02347_7A_1
	CTU23478	CTV23472	CTL02347_7B_1
	CTU23479	CTV23473	CTL02347_7C_1

Section 8 - RBS/SECTOR ASSOCIATION - final

	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS
CTS Common ID	CTU2347	CTV2347	CTL02347
Soft Sector IDs		CTV23471	CTL02347_2A_2
		CTV23472	CTL02347_2B_2
		CTV23473	CTL02347_2C_2
			CTL02347_3A_1
			CTL02347_3B_1
			CTL02347_3C_1
			CTL02347_7A_1
			CTL02347_7B_1
			CTL02347_7C_1
			CTL02347_9A_1
			CTL02347_9A_2
			CTL02347_9B_1
			CTL02347_9B_2
			CTL02347_9C_1
			CTL02347_9C_2

Section 9 - SOFT SECTOR ID - existing

	UMTS 1ST 850	UMTS 1ST 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS	LTE 4TH 1900	LTE 4TH AWS
USEID (excluding Hard Sector)	88306.850.3G.1	88306.1900.3G.1					
SECTOR A SOFT SECTOR ID	CTV23471	CTU23477	CTL02347_7A_1				
SECTOR B	CTV23472	CTU23478	CTL02347_7B_1				
SECTOR C	CTV23473	CTU23479	CTL02347_7C_1				
SECTOR D							
SECTOR E							
SECTOR F							
OMNI							

Section 9 - SOFT SECTOR ID - final

	UMTS 1ST 850	UMTS 1ST 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS	LTE 4TH 1900	LTE 4TH AWS
USEID (excluding Hard Sector)	88306.850.3G.1						
SECTOR A SOFT SECTOR ID	CTV23471		CTL02347_7A_1	CTL02347_9A_1	CTL02347_3A_1	CTL02347_9A_2	CTL02347_2A_2
SECTOR B	CTV23472		CTL02347_7B_1	CTL02347_9B_1	CTL02347_3B_1	CTL02347_9B_2	CTL02347_2B_2
SECTOR C	CTV23473		CTL02347_7C_1	CTL02347_9C_1	CTL02347_3C_1	CTL02347_9C_2	CTL02347_2C_2
SECTOR D							
SECTOR E							
SECTOR F							
OMNI							

Section 9 - Cell Number - existing

	UMTS 1ST 850	UMTS 1ST 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS	LTE 4TH 1900	LTE 4TH AWS
USEID (excluding Hard Sector)	88306.850.3G.1	88306.1900.3G.1					
SECTOR A CELL NUMBER			15				
SECTOR B			16				
SECTOR C			17				
SECTOR D							
SECTOR E							
SECTOR F							
OMNI							

Section 9 - Cell Number - final

	UMTS 1ST 850	UMTS 1ST 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS	LTE 4TH 1900	LTE 4TH AWS
USEID (excluding Hard Sector)	88306.850.3G.1						
SECTOR A CELL NUMBER			15	8	149	178	192
SECTOR B			16	9	150	179	193
SECTOR C			17	10	151	180	194
SECTOR D							
SECTOR E							
SECTOR F							
OMNI							

Section 10 - CID/SAC - existing

	UMTS 1ST 850	UMTS 1ST 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS	LTE 4TH 1900	LTE 4TH AWS
SECTOR A CID/SAC	23471	23477					
SECTOR B	23472	23478					
SECTOR C	23473	23479					
SECTOR D							
SECTOR E							
SECTOR F							
OMNI							

Section 10 - CID/SAC - final

	UMTS 1ST 850	UMTS 1ST 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS	LTE 4TH 1900	LTE 4TH AWS
SECTOR A CID/SAC	23471						
SECTOR B	23472						
SECTOR C	23473						
SECTOR D							
SECTOR E							
SECTOR F							
OMNI							

Section 11 - CURRENT RADIO COUNTS existing

Section 12 - CURRENT T1 COUNTS existing

Section 13 - NEW/PROPOSED RADIO COUNTS

Section 14 - NEW/PROPOSED T1 COUNTS

Section 15A - CURRENT TOWER CONFIGURATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	7770		P65-16-XLH-RR		7770									
ANTENNA VENDOR	Powerwave		Powerwave		Powerwave									
ANTENNA SIZE (H x W x D)	55X11X5		72X12X6		55X11X5									
ANTENNA WEIGHT	35		64		35									
AZIMUTH	30		30		30									
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	90		90		90									
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0		0		0									
FEEDER AMOUNT	2				2									
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)	2	Kathrein 860-10025		Internal	2	Kathrein 860-10025								
SURGE ARRESTOR (QTY/MODEL)			1	DC Fiber Squid										
DIPLEXER (QTY/MODEL)	2	Powerwave / LGP 13519			2	Powerwave / LGP 13519								
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Powerwave 7070		LTE RRH										
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	Powerwave LGP 21401			2	Powerwave LGP 21401								
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860			2	Polyphaser 1000860								
PDU FOR TMAS (QTY/MODEL)	1	LGP 12104			1	LGP 12104								
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
REPEATER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	RRUS-11										
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)														
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1														
Local Market Note 2														
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 1			CTV23471	CTV23471		UMTS 850	7770.00.850.10	13.5		10	None	Commscope 1-5/8 (850)	108.027659									
ANTENNA POSITION 2	PORT 1			CTL02347_7A_1	CTL02347_7A_1		LTE 700	RR_716MHz_06 DT	14.8		6	TOP	FIBER	0									
	PORT 3			CTL02347_7A_1	CTL02347_7A_1			RR_716MHz_06 DT	14.8		6	TOP											
ANTENNA POSITION 3	PORT 1					Decom	GSM 850	7770.00.850.10	13.5		10	None	Commscope 1-5/8 (850)	118.030213						146.55			

Section 15B - CURRENT TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	7770		P65-16-XLH-RR		7770									
ANTENNA VENDOR	Powerwave		Powerwave		Powerwave									
ANTENNA SIZE (H x W x D)	55X11X5		72X12X6		55X11X5									
ANTENNA WEIGHT	35		64		35									
AZIMUTH	150		150		150									
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	90		90		90									
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0		0		0									
FEEDER AMOUNT	2				2									
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)	2	Kathrein 860-10025		Internal	2	Kathrein 860-10025								
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)	2	Powerwave / LGP 13519			2	Powerwave / LGP 13519								
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)				LTE RRH										
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	Powerwave LGP 21401			2	Powerwave LGP 21401								
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860			2	Polyphaser 1000860								
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
REPEATER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	RRUS-11										
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)														
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1														
Local Market Note 2														
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 1			CTV23472	CTV23472		UMTS 850	7770.00.850.10	13.5		10	None	Commscope 1-5/8 (850)	108.027659									
ANTENNA POSITION 2	PORT 1			CTL02347_7B_1	CTL02347_7B_1		LTE 700	RR_716MHz_08 DT	14.8		8	TOP	FIBER	0									
	PORT 3			CTL02347_7B_1	CTL02347_7B_1		LTE 700	RR_716MHz_08 DT	14.8		8	TOP	FIBER	0									
ANTENNA POSITION 3	PORT 1					Decom	GSM 850	7770.00.850.10	13.5		10	None	Commscope 1-5/8 (850)	118.030213						146.55			

Section 15C - CURRENT TOWER CONFIGURATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	7770		P65-16-XLH-RR		7770									
ANTENNA VENDOR	Powerwave		Powerwave		Powerwave									
ANTENNA SIZE (H x W x D)	55X11X5		72X12X6		55X11X5									
ANTENNA WEIGHT	35		64		35									
AZIMUTH	150		270		150									
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	90		90		90									
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0		0		0									
FEEDER AMOUNT	2				2									
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)	2	Kathrein 860-10025		Internal	2	Kathrein 860-10025								
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)	2	Powerwave / LGP 13519			2	Powerwave / LGP 13519								
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)				LTE RRH										
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	Powerwave LGP 21401			2	Powerwave LGP 21401								
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860			2	Polyphaser 1000860								
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
REPEATER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	RRUS-11										
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)														
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1														
Local Market Note 2														
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 1			CTV23473	CTV23473		UMTS 850	7770.00.850.10	13.5		10	None	Commscope 1-5/8 (850)	108.027659									
ANTENNA POSITION 2	PORT 1			CTL02347_7C_1	CTL02347_7C_1		LTE 700	RR_716MHz_02 DT	14.8		2	TOP	FIBER	0									
	PORT 3			CTL02347_7C_1	CTL02347_7C_1		LTE 700	RR_716MHz_02 DT	14.8		2	TOP	FIBER	0									
ANTENNA POSITION 3	PORT 1					Decom	GSM 850	7770.00.850.10	13.5		10	None	Commscope 1-5/8 (850)	118.030213						146.55			

Section 16A - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
Existing Antenna?							
ANTENNA MAKE - MODEL		HPA-65R-BUU-H6		QS66512-2			
ANTENNA VENDOR		CCI		Quintel			
ANTENNA SIZE (H x W x D)		72X14.8X9		72X12X9.6			
ANTENNA WEIGHT		51		111			
AZIMUTH		30		30			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)		90		90			
ANTENNA TIP HEIGHT		93		93			
MECHANICAL DOWNTILT		0		0			
FEEDER AMOUNT				Fiber + 2 Coax			
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	Internal			Internal			
SURGE ARRESTOR (QTY/MODEL)				1 DC Fiber Squid			
DIPLEXER (QTY/MODEL)				2 DBC0061F1V51-2			
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)	LTE RRH			LTE RRH			
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)							
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)				1 4415 B25			
RRH - AWS band (QTY/MODEL)		1 4426 B66					
RRH - WCS band (QTY/MODEL)				1 RRUS-32			
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	LTE 2C WCS, LTE 3C 1900 A3-A4-E, LTE 4C AWS : Replace the existing LTE Ant with a Hex port ant on POs2, Add AWS radio, Replace GSM ant on po3 with 12 port Ant and install on Pos4, Add PCS and WCS radio, Add 1 DC Fiber Squid, Repalce TMA and Diplexers with LBC , Replace BB with 5216 + Add XMU.						
Local Market Note 2							
Local Market Note 3	1*5216+1*XMU						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (AtoII)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 2	PORT 3		88306.A.AWS.4G.4	CTL02347_2A_2	CTL02347_2A_2		LTE AWS	H6_2170MHz_02 DT	17.24	30	2	TOP	FIBER	0						5070.2572		4	
ANTENNA POSITION 4	PORT 3		88306.A.WCS.4G.1	CTL02347_3A_1	CTL02347_3A_1		LTE WCS	2_2355MHz_03 DT	16.7	30	3	TOP	FIBER	0						1285.2866		8	
	PORT 4		88306.A.1900.4G.1	CTL02347_9A_1	CTL02347_9A_1		LTE 1900	2_1930MHz_02 DT	16	30	2	TOP	FIBER	0						4842.058		8	
	PORT 7		88306.A.1900.4G.2	CTL02347_9A_2	CTL02347_9A_2		LTE 1900	2_1930MHz_02 DT	16	30	2	TOP	FIBER	0						4842.058		8	

Section 16B - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
Existing Antenna?							
ANTENNA MAKE - MODEL		HPA-65R-BUU-H6		QS66512-2			
ANTENNA VENDOR		CCI		Quintel			
ANTENNA SIZE (H x W x D)		72X14.8X9		72X12X9.6			
ANTENNA WEIGHT		51		111			
AZIMUTH		150		150			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)		90		90			
ANTENNA TIP HEIGHT		93		93			
MECHANICAL DOWNTILT		0		0			
FEEDER AMOUNT				Fiber + 2 Coax			
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)		Internal		Internal			
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)				2 DBC0061F1V51-2			
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)		LTE RRH		LTE RRH			
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)							
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)				1 4415 B25			
RRH - AWS band (QTY/MODEL)		1 4426 B66					
RRH - WCS band (QTY/MODEL)				1 RRUS-32			
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	LTE 2C WCS, LTE 3C 1900 A3-A4-E, LTE 4C AWS : Replace the existing LTE Ant with a Hex port ant on POs2, Add AWS radio, Replace GSM ant on po3 with 12 port Ant and install on Pos4, Add PCS and WCS radio, Add 1 DC Fiber Squid, Repalce TMA and Diplexers with LBC , Replace BB with 5216 + Add XMU.						
Local Market Note 2							
Local Market Note 3	1*5216+1*XMU						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 2	PORT 3		88306.B.AWS.4G.4	CTL02347_2B_2	CTL02347_2B_2		LTE AWS	H6_2170MHz_04DT	17.3	150	4	TOP	FIBER	0						5070.2572		12	
ANTENNA POSITION 4	PORT 3		88306.B.WCS.4G.1	CTL02347_3B_1	CTL02347_3B_1		LTE WCS	2_2355MHz_03DT	16.7	150	3	TOP	FIBER	0						1285.2866		16	
	PORT 4		88306.B.1900.4G.1	CTL02347_9B_1	CTL02347_9B_1		LTE 1900	2_1930MHz_04DT	15.6	150	4	TOP	FIBER	0						4842.058		16	
	PORT 7		88306.B.1900.4G.2	CTL02347_9B_2	CTL02347_9B_2		LTE 1900	2_1930MHz_04DT	15.6	150	4	TOP	FIBER	0						4842.058		16	

Section 16C - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
Existing Antenna?							
ANTENNA MAKE - MODEL		HPA-65R-BUU-H6		QS66512-2			
ANTENNA VENDOR		CCI		Quintel			
ANTENNA SIZE (H x W x D)		72X14.8X9		72X12X9.6			
ANTENNA WEIGHT		51		111			
AZIMUTH		270		270			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)		90		90			
ANTENNA TIP HEIGHT		93		93			
MECHANICAL DOWNTILT		0		0			
FEEDER AMOUNT				Fiber + 2 Coax			
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)		Internal		Internal			
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)				2 DBC0061F1V51-2			
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)		LTE RRH		LTE RRH			
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)							
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)				1 4415 B25			
RRH - AWS band (QTY/MODEL)		1 4426 B66					
RRH - WCS band (QTY/MODEL)				1 RRUS-32			
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	LTE 2C WCS, LTE 3C 1900 A3-A4-E, LTE 4C AWS : Replace the existing LTE Ant with a Hex port ant on POs2, Add AWS radio, Replace GSM ant on po3 with 12 port Ant and install on Pos4, Add PCS and WCS radio, Add 1 DC Fiber Squid, Repalce TMA and Diplexers with LBC , Replace BB with 5216 + Add XMU.						
Local Market Note 2							
Local Market Note 3	1*5216+1*XMU						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 2	PORT 3		88306.C.AWS.4G.4	CTL02347_2C_2	CTL02347_2C_2		LTE AWS	H6_2170MHz_04DT	17.3	270	4	TOP	FIBER	0						5070.2572		20	
ANTENNA POSITION 4	PORT 3		88306.C.WCS.4G.1	CTL02347_3C_1	CTL02347_3C_1		LTE WCS	2_2355MHz_03DT	16.7	270	3	TOP	FIBER	0						1285.2866		24	
	PORT 4		88306.C.1900.4G.1	CTL02347_9C_1	CTL02347_9C_1		LTE 1900	2_1930MHz_04DT	15.6	270	4	TOP	FIBER	0						4842.058		24	
	PORT 7		88306.C.1900.4G.2	CTL02347_9C_2	CTL02347_9C_2		LTE 1900	2_1930MHz_04DT	15.6	270	4	TOP	FIBER	0						4842.058		24	

Section 16.5A - SCOPING TOWER CONFIGURATION - SECTOR A (OR OMNI)

Section 17A - FINAL TOWER CONFIGURATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	7770		HPA-65R-BUU-H6				QS66512-2							
ANTENNA VENDOR	Powerwave		CCI				Quintel							
ANTENNA SIZE (H x W x D)	55X11X5		72X14.8X9				72X12X9.6							
ANTENNA WEIGHT	35		51				111							
AZIMUTH	30		30				30							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	90		90				90							
ANTENNA TIP HEIGHT			93				93							
MECHANICAL DOWNTILT	0		0				0							
FEEDER AMOUNT	2						Fiber + 2 Coax							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)	2	Kathrein 860-10025		Internal				Internal						
SURGE ARRESTOR (QTY/MODEL)			1	DC Fiber Squid			1	DC Fiber Squid						
DIPLEXER (QTY/MODEL)	2	Powerwave / LGP 13519					2	DBC0061F1V51-2						
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Powerwave 7070		LTE RRH				LTE RRH						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	Powerwave LGP 21401												
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860												
PDU FOR TMAS (QTY/MODEL)	1	LGP 12104												
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
REPEATER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	RRUS-11										
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							1	4415 B25						
RRH - AWS band (QTY/MODEL)			1	4426 B66										
RRH - WCS band (QTY/MODEL)							1	RRUS-32						
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	LTE 2C WCS, LTE 3C 1900 A3-A4-E, LTE 4C AWS : Replace the existing LTE Ant with a Hex port ant on POs2, Add AWS radio, Replace GSM ant on po3 with 12 port Ant and install on Pos4, Add PCS and WCS radio, Add 1 DC Fiber Squid, Repalce TMA and Diplexers with LBC , Replace BB with 5216 + Add XMU.													
Local Market Note 2														
Local Market Note 3	1*5216+1*XMU													

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RX/AT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	**PORT 1**	88306.A.850.3G.1		CTV23471	CTV23471		UMTS 850	7770.00.850.10	13.5	30	10	None	Commscope 1-5/8 (850)	108.027659								1	
ANTENNA POSITION 2	**PORT 1**	88306.A.700.4G.1	88306.A.700.4G.1	CTL02347_7A_1	CTL02347_7A_1		LTE 700	H6_719MHz_06DT	14.08	30	6	TOP	FIBER	0						1475.7065		3	
	PORT 3	88306.A.AWS.4G.tmp4	88306.A.AWS.4G.4	CTL02347_2A_2	CTL02347_2A_2		LTE AWS	H6_2170MHz_02DT	17.24	30	2	TOP	FIBER	0						5070.2572		4	
ANTENNA POSITION 4	**PORT 3**	88306.A.WCS.4G.tmp1	88306.A.WCS.4G.1	CTL02347_3A_1	CTL02347_3A_1		LTE WCS	2_2355MHz_03DT	16.7	30	3	TOP	FIBER	0						1285.2866		8	
	PORT 4	88306.A.1900.4G.tmp1	88306.A.1900.4G.1	CTL02347_9A_1	CTL02347_9A_1		LTE 1900	2_1930MHz_02DT	16	30	2	TOP	FIBER	0						4842.058		8	
	PORT 7	88306.A.1900.4G.tmp4	88306.A.1900.4G.2	CTL02347_9A_2	CTL02347_9A_2		LTE 1900	2_1930MHz_02DT	16	30	2	TOP	FIBER	0						4842.058		8	

Section 17B - FINAL TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	7770	HPA-65R-BUU-H6		QS66512-2			
ANTENNA VENDOR	Powerwave	CCI		Quintel			
ANTENNA SIZE (H x W x D)	55X11X5	72X14.8X9		72X12X9.6			
ANTENNA WEIGHT	35	51		111			
AZIMUTH	150	150		150			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	90	90		90			
ANTENNA TIP HEIGHT		93		93			
MECHANICAL DOWNTILT	0	0		0			
FEEDER AMOUNT	2			Fiber + 2 Coax			
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	2 Kathrein 860-10025	Internal		Internal			
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)	2 Powerwave / LGP 13519			2 DBC0061F1V51-2			
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)		LTE RRH		LTE RRH			
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	2 Powerwave LGP 21401						
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2 Polyphaser 1000860						
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)		1 RRUS-11					
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)				1 4415 B25			
RRH - AWS band (QTY/MODEL)		1 4426 B66					
RRH - WCS band (QTY/MODEL)				1 RRUS-32			
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	LTE 2C WCS, LTE 3C 1900 A3-A4-E, LTE 4C AWS : Replace the existing LTE Ant with a Hex port ant on POs2, Add AWS radio, Replace GSM ant on po3 with 12 port Ant and install on Pos4, Add PCS and WCS radio, Add 1 DC Fiber Squid, Repalce TMA and Diplexers with LBC , Replace BB with 5216 + Add XMU.						
Local Market Note 2							
Local Market Note 3	1*5216+1*XMU						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RX/AT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	**PORT 1**	88306.B.850.3G.1		CTV23472	CTV23472		UMTS 850	7770.00.850.10	13.5	150	10	None	Commscope 1-5/8 (850)	108.027659								9	
ANTENNA POSITION 2	**PORT 1**	88306.B.700.4G.1	88306.B.700.4G.1	CTL02347_7B_1	CTL02347_7B_1		LTE 700	H6_719MHz_08DT	13.97	150	8	TOP	FIBER	0						1475.7065		11	
	PORT 3	88306.B.AWS.4G.tmp4	88306.B.AWS.4G.4	CTL02347_2B_2	CTL02347_2B_2		LTE AWS	H6_2170MHz_04DT	17.3	150	4	TOP	FIBER	0						5070.2572		12	
ANTENNA POSITION 4	**PORT 3**	88306.B.WCS.4G.tmp1	88306.B.WCS.4G.1	CTL02347_3B_1	CTL02347_3B_1		LTE WCS	2_2355MHz_03DT	16.7	150	3	TOP	FIBER	0						1285.2866		16	
	PORT 4	88306.B.1900.4G.tmp1	88306.B.1900.4G.1	CTL02347_9B_1	CTL02347_9B_1		LTE 1900	2_1930MHz_04DT	15.6	150	4	TOP	FIBER	0						4842.058		16	
	PORT 7	88306.B.1900.4G.tmp4	88306.B.1900.4G.2	CTL02347_9B_2	CTL02347_9B_2		LTE 1900	2_1930MHz_04DT	15.6	150	4	TOP	FIBER	0						4842.058		16	

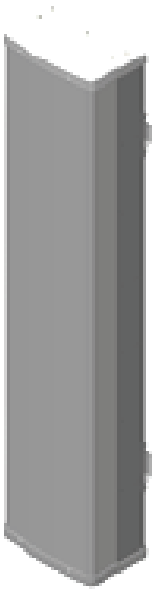
Section 17C - FINAL TOWER CONFIGURATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	7770	HPA-65R-BUU-H6		QS66512-2			
ANTENNA VENDOR	Powerwave	CCI		Quintel			
ANTENNA SIZE (H x W x D)	55X11X5	72X14.8X9		72X12X9.6			
ANTENNA WEIGHT	35	51		111			
AZIMUTH	150	270		270			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	90	90		90			
ANTENNA TIP HEIGHT		93		93			
MECHANICAL DOWNTILT	0	0		0			
FEEDER AMOUNT	2			Fiber + 2 Coax			
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	2 Kathrein 860-10025	Internal		Internal			
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)	2 Powerwave / LGP 13519			2 DBC0061F1V51-2			
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)		LTE RRH		LTE RRH			
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	2 Powerwave LGP 21401						
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2 Polyphaser 1000860						
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)		1 RRUS-11					
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)				1 4415 B25			
RRH - AWS band (QTY/MODEL)		1 4426 B66					
RRH - WCS band (QTY/MODEL)				1 RRUS-32			
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	LTE 2C WCS, LTE 3C 1900 A3-A4-E, LTE 4C AWS : Replace the existing LTE Ant with a Hex port ant on POs2, Add AWS radio, Replace GSM ant on po3 with 12 port Ant and install on Pos4, Add PCS and WCS radio, Add 1 DC Fiber Squid, Repalce TMA and Diplexers with LBC , Replace BB with 5216 + Add XMU.						
Local Market Note 2							
Local Market Note 3	1*5216+1*XMU						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RX/AT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	**PORT 1**	88306.C.850.3G.1		CTV23473	CTV23473		UMTS 850	7770.00.850.10	13.5	150	10	None	Commscope 1-5/8 (850)	108.027659								17	
ANTENNA POSITION 2	**PORT 1**	88306.C.700.4G.1	88306.C.700.4G.1	CTL02347_7C_1	CTL02347_7C_1		LTE 700	H6_719MHz_02 DT	14.28	270	2	TOP	FIBER	0						1475.7065		19	
	PORT 3	88306.C.AWS.4G.tmp4	88306.C.AWS.4G.4	CTL02347_2C_2	CTL02347_2C_2		LTE AWS	H6_2170MHz_04 DT	17.3	270	4	TOP	FIBER	0						5070.2572		20	
ANTENNA POSITION 4	**PORT 3**	88306.C.WCS.4G.tmp1	88306.C.WCS.4G.1	CTL02347_3C_1	CTL02347_3C_1		LTE WCS	2_2355MHz_03 DT	16.7	270	3	TOP	FIBER	0						1285.2866		24	
	PORT 4	88306.C.1900.4G.tmp1	88306.C.1900.4G.1	CTL02347_9C_1	CTL02347_9C_1		LTE 1900	2_1930MHz_04 DT	15.6	270	4	TOP	FIBER	0						4842.058		24	
	PORT 7	88306.C.1900.4G.tmp4	88306.C.1900.4G.2	CTL02347_9C_2	CTL02347_9C_2		LTE 1900	2_1930MHz_04 DT	15.6	270	4	TOP	FIBER	0						4842.058		24	

HexPort Multi-Band Antenna

Model HPA-65R-BUU-H6



The CCI Hexport Multi-Band Antenna Array is an industry first 6-port antenna with full WCS Band Coverage. With four high band ports and two low band ports, our hexport antenna is ready for 4X4 high band MIMO.

Modern networks demand high performance, consequently CCI has incorporated several new and innovative design techniques to provide an antenna with excellent side-lobe performance, sharp elevation beams, and high front to back ratio.

Multiple networks can now be connected to a single antenna, reducing tower loading and leasing expense, while decreasing deployment time and installation cost.

Full band capability for 700 MHz , Cellular 850 MHz, PCS 1900 MHz, AWS 1710/2170 MHz and WCS 2300 MHz coverage in a single enclosure.

Hexport Multi-Band Antenna Array

Benefits

- **Includes WCS Band**
- **Reduces tower loading**
- **Frees up space for tower mounted E-nodes**
- **Single radome with six ports**
- **All Band design simplifies radio assignments**
- **Sharp elevation beam eases network planning**

Features

- High Band Ports include WCS Band
- Four High Band ports with two Low Band ports in one antenna
- Sharp elevation beam
- Excellent elevation side-lobe performance
- Excellent MIMO performance due to array spacing
- Excellent PIM Performance
- A multi-network solution in one radome

Applications

- 4x4 MIMO on High Band and 2x2 MIMO on Low Band
- Adding additional capacity without adding additional antennas
- Adding WCS Band without increasing antenna count

ISO 9001:2008
Quality Management Systems
Système de Qualité
www.ca.sgs.com

HexPort Multi-Band Antenna

Model HPA-65R-BUU-H6

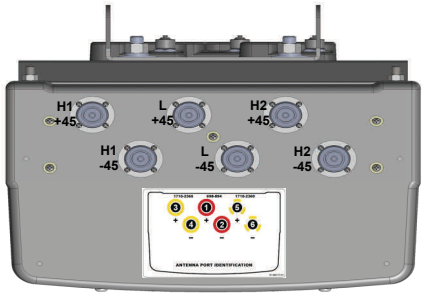
HPA-65R Multi-Band Antenna

Electrical Specifications

Frequency Range	2 X Low Band Ports which cover the full range from 698-894 MHz		4 X High Band Ports which cover the full range from 1710-2360 MHz			
	698-806 MHz	824-894 MHz	1850-1990 MHz	1710-1755/2110-2170 MHz		2305-2360 MHz
Gain	14.1 dBi	14.8 dBi	16.9 dBi	16.3 dBi	17.2 dBi	17.4 dBi
Azimuth Beamwidth (-3dB)	66°	65°	61°	66°	62°	57°
Elevation Beamwidth (-3dB)	12.5°	10.5°	5.7°	6.3°	5.1°	4.5°
Electrical Downtilt	0° to 10°	0° to 10°	0° to 8°	0° to 8°	0° to 8°	0° to 8°
Elevation Sidelobes (1st Upper)	< -17 dB	< -19 dB	< -19 dB	< -18 dB	< -18 dB	< -17 dB
Front-to-Back Ratio @180°	> 30 dB	> 30 dB	> 30 dB	> 30 dB	> 30 dB	> 30 dB
Front-to-Back Ratio over ± 20°	> 30 dB	> 30 dB	> 30 dB	> 30 dB	> 30 dB	> 30 dB
Cross-Polar Discrimination (at Peak)	> 25 dB	> 20 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
Cross-Polar Discrimination (at ± 60°)	> 17 dB	> 14 dB	> 17 dB	> 17 dB	> 17 dB	> 17 dB
Cross-Polar Port-to-Port Isolation	> 25 dB	> 25 dB	> 26 dB	> 25 dB	> 26 dB	> 26 dB
VSWR	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1
Passive Intermodulation (2x20W)	≤ -150dBc	≤ -150dBc	≤ -150dBc	≤ -150dBc	≤ -150dBc	≤ -150dBc
Input Power	500 Watts CW	500 Watts CW	300 Watts CW	300 Watts CW	300 Watts CW	300 Watts CW
Polarization	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°
Input Impedance	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms
Lightning Protection	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground

Mechanical Specifications

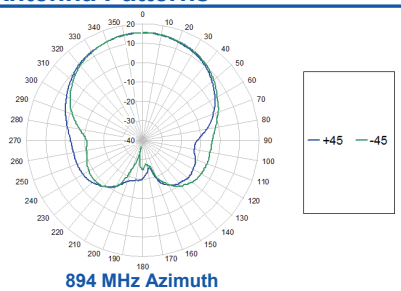
Dimensions (LxWxD)	72.0 x 14.8 x 9.0 inches (1828 x 376 x 229 mm)
Survival Wind Speed	> 150 mph
Front Wind Load	247 lbs (1099 N) @ 100 mph (161 kph)
Side Wind Load	165 lbs (735 N) @ 100 mph (161 kph)
Equivalent Flat Plate Area	9.7 ft^2 (0.90 m^2)
Weight (without Mounting)	51 lbs (23 kg)
RET System Weight	5.0 lbs (2.3 kg)
Connector	6; 7-16 DIN female long neck
Mounting Pole	2-5 inches (5-12 cm)



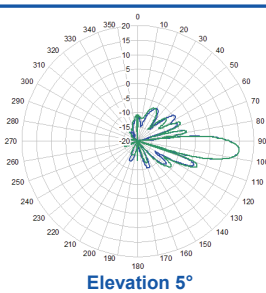
Bottom View

Rear View

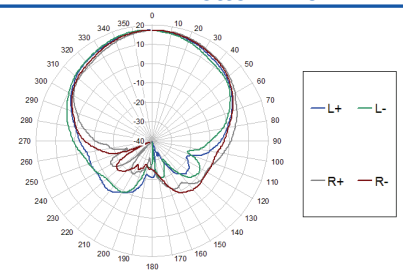
Antenna Patterns*



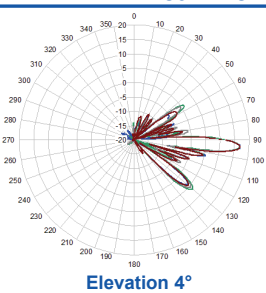
894 MHz Azimuth



Elevation 5°



1920 MHz Azimuth



Elevation 4°

*Typical antenna patterns. For detail information on antenna pattern, please contact us at info@cciproducts.com. All specifications are subject to change without notice.

Quintel®
New Dimensions in Wireless™

QS66512-2

6ft 65° XXX MultiServ™ 12-Port Antenna

2x698-806*MHz / 2x824-894MHz / 4x1850-1990MHz / 4x1695-1780+2110-2400MHz

MultiServ

- Provides 12 antenna Ports in a slim-line form factor
- Optimized Azimuth patterns for Min Inter-Sector Interference
- Industry leading Minimal Wind-Load design
- 700, 850, PCS, AWS & WCS bands in one antenna
- AISG & 3GPP compliant internal remote electrical tilt (RET)
- AWS & PCS Cross band PIM >159dBc

The Quintel MultiServ™ Multiband 12 Port Antenna with patented QTilt™ technology uniquely delivers four independent services in a single slim-line antenna. This enables existing antenna network sites to be upgraded constraint free to add new services such as LTE for 700, 850, PCS, AWS and WCS bands with the replacement of one antenna. The QS66512-2 also provides 4x1695-1780+2110-2400MHz & 4x1850-1990MHz ports as two side-by-side (CLA-2X) arrays, each set of 4 ports having independent tilt for connection to 2T4R/4T4R services.

Electrical Characteristics	2x Ports 1&2	2x Ports 3&4	4x Ports 5-8			4 Ports 9-12
Operating Frequency (MHz	698-806*	824-894	1695-1780 and 2110-2400			1850-1990
	698-806	824-894	1695-1780	2110-2180	2300-2400	1850-1990
Azimuth beamwidth[1]	67°	64°	68°	63°	58°	69°
Elevation beamwidth[1]	12°	10°	6.5°	5.5°	4.5°	5.5°
Gain[1] (dBi)	13.2	13.5	16.2	16.5	17.0	16.0
Polarization	±45°	±45°		±45° ±45°		±45° ±45°
Electrical down-tilt range	2°-10°	2°-10°		2° – 7°		2° – 7°
Upper SLL (20° > mainbeam)[1]	-17dB	-19dB	-18dB	-18B	-18dB	-16dB
Front to Back Ratio(180°±10°)[1]	≥27dB	≥29dB	≥28dB	≥28dB	≥28dB	≥27dB
Port to Port isolation[1]	≥28dB	≥30dB	≥30dB	≥30dB	≥30dB	≥30dB
Return loss (VSWR)	14dB(1.5)	14dB(1.5)	14dB(1.5)	14dB(1.5)	14dB (1.5)	14dB(1.5)
X Polar Discrimination (at 0°)	>18dB	>16dB	>20dB	>20dB	>18dB	>20dB
Max Power handling (per any port)	500 watts	500 watts		250 watts		250 watts
Total Composite Power (all ports)				1750 watts		
PIM (3rd Order) (2x43dBm)	>153dBc	>153dBc		>153dBc		>153dBc
XBand PIM (3rd Order) (2x43dBm)				>159dBc		

[1] *Typical Performance across frequency and Downtilt. *Products Ordered after Jan 2016 will be 698-806MHz*

Mechanical Characteristics	
Dimensions	L 72"(1828mm) x W 12"(304mm) x D 9.6"(245mm)
Weight (excl mounting brackets)	111lbs (50.3kg)
No. of Connectors	12x 4.3-10.0 DIN Female Long Neck
Max Wind Speed	150mph (67m/s)
Equivalent Flat Plate Area	2.96ft² (0.275m²)
Wind Load @160km/h (45m/s)	Front: 587N (132 lbs), Side: 382N (86 lbs)
Operating Temperature	-40°C to +65°C

Fully Integrated RET Characteristics	
AISG Standards	V1.1,V 2.0 and 3GPP
Factory Default	AISG 2.0
Surge immunity	IEC 61000-4-5:2005 4KV(AISG PIN)
Device Type	SRET Type 1
AISG Data rate	9.6 kbps
No of connectors	1in/1out.
Connector type	IEC 60130-9 (Ed 3.0)
MTBF	36,000 Operational moves

All specifications are subject to change without notice. Please contact your Quintel representative for complete information.

DBC0061F1V51-2

DIPLEXER 700/850

Designed to combine 700 and 850 technologies, the Kaelus DBC0061 provides excellent insertion loss and passive intermodulation performance. Suitable for outdoor or indoor environments.

FEATURES

- Combines 700 and 850 BTS into one feeder
- Covers 700MHz US Public Safety Bands
- Very low insertion losses
- Designed for low passive intermodulation
- Wall ,pole or rack mounting
- DC/AISG bypass field settable

TECHNICAL SPECIFICATIONS

BAND NAME	700	850
Passband	698 - 798MHz	824 - 894MHz
Insertion loss	0.25dB typical 698-793MHz 0.35dB typical 793-798MHz	0.25dB typical
Return loss	20dB minimum 698-798MHz 24dB typical 746-787MHz	24dB typical
Maximum input power	300W (average) / 3kW (PEP)	300W (average) / 3kW (PEP)
Phase linearity over any 10MHz	< 10º	
Group delay variation over any 10MHz	15ns typical	8ns typical
Isolation port to port	50dB minimum 698-793MHz and 824-894MHz 35dB minimum 793-798MHz	

ELECTRICAL	
Impedance	50Ohms
Intermodulation products	-155dBc maximum all ports with 2 x 20W carriers

DC / AISG	
A field selectable DC/AISG path is achieved via mechanical links on a IEC60130-9, 8-pin female connector (see electrical block diagram).	
Passband	0 – 3MHz
Insertion loss, single DC/AISG pass	1dB maximum
Return loss, single DC/AISG pass	12dB minimum
Insertion loss, two DC/AISG pass	4.5dB typical
Return loss, two DC/AISG pass	9dB typical
Input voltage range	± 31V
DC current rating	2A continuous, 4A peak

ENVIRONMENTAL	
For further details of environmental compliance, please contact Kaelus.	
Temperature range	-40ºC to +65ºC | -40ºF to +149ºF
Ingress protection	IP67
Altitude	3000m | 10,000ft maximum
Lightning protection	RF port: ±5kA maximum (8/20us), IEC61312-1
MTBF	>1,000,000 hours
Compliance	ETSI EN 300 019 class 4.1, RoHS

MECHANICAL	
Dimensions H x D x W (single unit)	203 x 158 x 81mm | 8 x 6.2 x 3.2in
Dimensions H x D x W (twin unit)	203 x 158 x 164mm | 8 x 6.2 x 6.45in
Weight	4.3kg | 9.5lbs (single unit) 8.3kg | 18.3lbs (dual unit)
Finish	Painted, light grey (RAL7035)
Connectors	DIN 7-16 (F) x 3 long neck (single unit) x 6 long neck (dual unit)
Mounting	Pole/wall bracket supplied with two metal clamps for 45-178 mm diameter poles

ORDERING INFORMATION

PART NUMBER	DESCRIPTION
DBC0061F1V51-1	DIPLEXER 700/850 ,DC SWITCH
DBC0061F1V51-2	DIPLEXER X2 700/850 ,DC SWITCH
DBC0061F1V51-6R	DIPLEXER X6 700/850 ,DC SWITCH, 19" RACK MOUNTING,23" OPTIONAL

RRUS 32 B30

PRELIMINARY

- WCS A+B blocks
  - TX = 2350 – 2360 MHz
  - RX = 2305 – 2315 MHz
- RF output 4 x 25 Watts
- 4T4R FDD
- 10 MHz IBW for LTE
- CPRI 2 ports x 10 Gbps
- Dimensions (incl. feet and sunshield)
  - Height: 26.7” (678 mm)
  - Width: 12.1” (306 mm)
  - Depth: 6.7” (171 mm)
- Weight, excl. mounting hardware
  - 60 lbs (23 kg)

RRUS 4415 B25

- B25
  - TX = 1930 – 1995 MHz
  - RX = 1850 – 1915 MHz
- CPRI 2 ports x 2.5/4.9/9.8/10.1 Gbps. Install 1 SFP and connect 1 fiber pair to the RRUS 4415 during initial install.
- Only use Ericsson supplied and approved SFPs RDH10265/25
- 2 external alarm inputs
- Max wind load @ 50m/sec = 260N
- Breaker size = 25A, DC Power Consumption = 670 W (for dimensioning)
- 200mm horizontal separation required for side by side mounting
- 200mm separation required from antenna backplane to radio
- 400mm vertical outdoor/indoor separation required between 2 radios
- 500mm vertical separation below antenna
- Min, Max DC cable size from squid to radio = 10,8 AWG
  - Adapter is required for 2-wire connection
  - Shielded DC cable is required
- Ground cable size = 2AWG
- Dimensions (incl. handles, feet and sunshield, w/o fan unit)
  - Height: 14.96” (380 mm)
  - Width: 13.19” (335 mm)
  - Depth: 5.39” (137 mm)
- Weight, excl. mounting hardware = 44 lbs (20 kg)

RADIO 4426

- 4TX/4RX
- Up to 4x60W
- Up to 90 MHz IBW
  - 20 MHz IBW for LTE1.4/3MHz carriers
- Up to 8 carriers WCDMA
- Up to 6 carriers LTE in MIMO
- 2x 2.5/4.9/9.8/10.1 Gbps CPRI
- 19 liter, 22 kg
  - HxWxD: 380x335x147.4 mm
- -48 VDC
- AISG TMA & RET support
- 2 external alarm
- Optional fan for increased site flexibility
- IP 65, -40 to +55˚C
- Smaller and more efficient multi band configurations

Optional FAN

April 6, 2018
September 4, 2019 (Rev.1)

SAI Communications
12 Industrial Way
Salem NH, 03079

RE:		
	Site Number:	CT2347 (LTE 2C/3C/4C)
	FA Number:	10050949
	PACE Number:	MRCTB027630
	PT Number:	2051A0ETPP
	Site Name:	GREENWICH-KING STREET
	Site Address:	1323 King Street Greenwich, CT 06831

To Whom It May Concern:

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

- (3) 7770 Antennas (55.0"x11.0"x5.0" - Wt. = 35 lbs. /each)
- (3) RRUS-11 RRH's (19.7"x17.0"x7.2" – Wt. = 51 lbs. /each) (Tower Mount)
- (6) LGP21401 TMA's (14.4"x9.0"x2.7" – Wt. = 19 lbs. /each)
- (1) Squid Surge Arrestor (24.0"x9.7" Φ – Wt. = 33 lbs.) (Tower Mount)
- **(3) HPA-65R-BUU-H6 Antennas (72.0"x14.8"x7.4" – Wt. = 51 lbs. /each)**
- **(3) QS66512-2 Antennas (72.0"x12.0"x9.6" – Wt. = 111 lbs. /each)**
- **(3) RRUS-32 RRH's (27.2"x12.1"x7.0" – Wt. = 60 lbs. /each) (Tower Mount)**
- **(3) 4426 B66 RRH's (14.9"x13.2"x5.8" – Wt. = 49 lbs. /each) (Tower Mount)**
- **(3) 4415 B25 RRH's (16.5"x13.4"x5.9" – Wt. = 46 lbs. /each) (Tower Mount)**
- **(1) Squid Surge Arrestor (24.0"x9.7" Φ – Wt. = 33 lbs.) (Tower Mount)**

**Proposed equipment shown in bold*

No original structural design documents or fabrication drawings were available for the existing mounts. HDG's subconsultant, ProVertic LLC, conducted a survey climb and mapping of the existing AT&T antenna mounts on March 21, 2018.

Mount Analysis Methods:

- This analysis was conducted in accordance with EIA/TIA-222-H, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, the International Building Code 2015 with 2018 Connecticut State Building Code, and AT&T Mount Technical Directive – R13.
- HDG considers this mount to be asymmetrical and has applied wind loads in 30 degree increments all around the mount. Per TIA-222-H and Appendix N of the Connecticut State Building Code, the max basic wind speed for this site is equal to 116 mph with a max basic wind speed with ice of 50 mph and a max ice thickness of 1.0 in. An escalated ice thickness of 1.11 in was used for this analysis.
- HDG considers this site to be exposure category C; tower is located near large, flat, open, terrain/grasslands.
- HDG considers this site to be topographic category 1; tower is located on flat terrain or the bottom of a hill or ridge.
- The mount has been analyzed with load combinations consisting of 250 lbs live load using a service wind speed of 30 mph wind on the worst case antenna. Analysis performed on each antenna pipe to determine worst case location; worst case location was antenna position 3.
- The mount has been analyzed with load combinations consisting of a 250 lbs live load in a worst case location on the mount.
- The existing mount is secured to the existing tower with U-Bolts. The connection is considered OK by visual inspection.

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

	Component	Controlling Load Case	Stress Ratio	Pass/Fail
Existing (LTE 2C/3C/4C) Mount Rating	5	LC40	75%	**PASS**

Reference Documents:

- Mount mapping report prepared by ProVertic LLC.

This determination was based on the following limitations and assumptions:

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

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

Respectfully Submitted,
Hudson Design Group LLC

Michael Cabral
Vice President

Daniel P. Hamm, PE
Principal

FIELD PHOTOS:






p: 978.557.5553 f: 978.336.5586 a: 45 Beechwood Drive, N. Andover, MA 01845
p: 203.208.3919 f: 203.234.6398 a: 110 Washington Avenue, 4th Floor, North Haven CT 06473

p: 978.557.5553 f: 978.336.5586 a: 45 Beechwood Drive, N. Andover, MA 01845
p: 203.208.3919 f: 203.234.6398 a: 110 Washington Avenue, 4th Floor, North Haven CT 06473

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Wind & Ice
Calculations

Date: 9/4/2019
Project Name: GREENWICH-KING STREET
Project No.: CT2347
Designed By: RL **Checked By:** MSC

HUDSON Design Group LLC

2.6.5.2 Velocity Pressure Coeff:

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

		z=	92 (ft)
		z_g=	900 (ft)
K_z=	**1.244**	α=	9.5

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

Table 2-4

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

2.6.6.2 Topographic Factor:

Table 2-5

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

$K_{zt} = [1+(K_c K_t/K_h)]^2$ $K_h = e^{(f*z/H)}$

K_{zt}=	**1**	K_h=	1
		K_c=	1 (from Table 2-4)
(If Category 1 then K_{zt} =1.0)		K_t=	0 (from Table 2-5)
		f=	0 (from Table 2-5)
Category=	1	z=	92
		z_s=	400 (Mean elevation of base of structure above sea level)
		H=	0 (Ht. of the crest above surrounding terrain)
		K_{zt}=	1.00 (from 2.6.6.2.1)
		K_e=	0.99 (from 2.6.8)

2.6.10 Design Ice Thickness

Max Ice Thickness =		t_i =	1.00 in
Importance Factor =		I=	1.0 (from Table 2-3)
		K_{iz} =	1.11 (from Sec. 2.6.10)

$t_{iz} = t_i * I * K_{iz} * (K_{zt})^{0.35}$ t_{iz} = 1.11 in

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HUDSON Design Group LLC

2.6.9 Gust Effect Factor

2.6.9.1 Self Supporting Lattice Structures

G_h = 1.0 Latticed Structures > 600 ft

G_h = 0.85 Latticed Structures 450 ft or less

G_h = 0.85 + 0.15 [h/150 - 3.0] h= ht. of structure

h=	107	G_h=	0.85

2.6.9.2 Guyed Masts G_h= 0.85

2.6.9.3 Pole Structures G_h= 1.1

2.6.9 Appurtenances G_h= 1.0

2.6.9.4 Structures Supported on Other Structures

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

G_h=	1.35	Gh=	1.00

2.6.11.2 Design Wind Force on Appurtenances

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

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

		K_z=	1.244	(from 2.6.5.2)
		K_{zt}=	1.0	(from 2.6.6.2.1)
		K_s=	1.0	(from 2.6.7)
q_z=	35.89	K_e=	0.99	(from 2.6.8)
$q_{z\,(ice)}$=	6.67	K_d=	0.85	(from Table 2-2)
$q_{z\,(30)}$=	2.40	V_{max}=	116	mph (Ultimate Wind Speed)
		$V_{max\,(ice)}$=	50	mph
		V_{30}=	30	mph

Table 2-2

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

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Determine Ca:

Table 2-9

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

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

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

Ice Thickness = **1.11** in | Angle = 0 (deg) | Equivalent Angle = 180 (deg)

Appurtenances	Height	Width	Depth	Flat Area	Aspect Ratio	Ca	Force (lbs)	Force (lbs) (w/ Ice)	Force (lbs) (30 mph)
7770 Antenna	55.0	11.0	5.0	4.20	5.00	1.31	198	46	13
HPA-65R-BUU-H6 Antenna	72.0	14.8	7.4	7.40	4.86	1.31	347	76	23
QS66512-2 Antenna	72.0	12.0	9.6	6.00	6.00	1.36	292	66	20
RRUS-11 RRH	19.7	17.0	7.2	2.33	1.16	1.20	100	23	7
RRUS-32 RRH	27.2	12.1	7.0	2.29	2.25	1.20	98	23	7
4426 B66 RRH	14.9	13.2	5.8	1.37	1.13	1.20	59	15	4
4415 B25 RRH	16.5	13.4	5.9	1.54	1.23	1.20	66	16	4
LGP21401 TMA	14.4	2.7	9.0	0.27	5.33	1.33	13	5	1
Surge Arrestor	24.0	9.7	9.7	1.62	2.47	0.70	41	10	3
2" Pipe	2.4	12.0		0.20	0.20	1.20	9	4	1

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Designed By: RL Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle =	30	(deg)	Ice Thickness =	1.11	in.	Equivalent Angle =	210	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Aspect Ratio	Aspect Ratio	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	198	105	175
HPA-65R-BUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	347	198	309
QS66512-2 Antenna	72.0	12.0	9.6	6.00	4.80	6.00	7.50	1.36	1.42	292	244	280
RRUS-11 RRH	19.7	17.0	7.2	2.33	0.99	1.16	2.74	1.20	1.21	100	43	86
RRUS-32 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	98	60	89
4426 B66 RRH	14.9	13.2	5.8	1.37	0.60	1.13	2.57	1.20	1.20	59	26	51
4415 B25 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	66	29	57
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	13	39	19

WIND LOADS WITH ICE:

7770 Antenna	57.2	13.2	7.2	5.25	2.87	4.33	7.93	1.28	1.43	45	27	40
HPA-65R-BUU-H6 Antenna	74.2	17.0	9.6	8.77	4.96	4.36	7.72	1.28	1.42	75	47	68
QS66512-2 Antenna	74.2	14.2	11.8	7.33	6.09	5.22	6.28	1.32	1.37	65	56	62
RRUS-11 RRH	21.9	19.2	9.4	2.92	1.43	1.14	2.33	1.20	1.20	23	11	20
RRUS-32 RRH	29.4	14.3	9.2	2.92	1.88	2.05	3.19	1.20	1.23	23	15	21
4426 B66 RRH	17.1	15.4	8.0	1.83	0.95	1.11	2.14	1.20	1.20	15	8	13
4415 B25 RRH	18.7	15.6	8.1	2.03	1.05	1.20	2.31	1.20	1.20	16	8	14
LGP21401 TMA	16.6	4.9	11.2	0.57	1.29	3.38	1.48	1.24	1.20	5	10	6

WIND LOADS AT 30 MPH:

7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	13	7	12
HPA-65R-BUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	23	13	21
QS66512-2 Antenna	72.0	12.0	9.6	6.00	4.80	6.00	7.50	1.36	1.42	20	16	19
RRUS-11 RRH	19.7	17.0	7.2	2.33	0.99	1.16	2.74	1.20	1.21	7	3	6
RRUS-32 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	6
4426 B66 RRH	14.9	13.2	5.8	1.37	0.60	1.13	2.57	1.20	1.20	4	2	3
4415 B25 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	4	2	4
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	3	1

Date: 9/4/2019
Project Name: GREENWICH-KING STREET
Project No.: CT2347
Designed By: RL Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle =	60	(deg)	Ice Thickness =	1.11	in.	Equivalent Angle =	240	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	198	105	128
HPA-65R-BUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	347	198	235
QS66512-2 Antenna	72.0	12.0	9.6	6.00	4.80	6.00	7.50	1.36	1.42	292	244	256
RRUS-11 RRH	19.7	17.0	7.2	2.33	0.99	1.16	2.74	1.20	1.21	100	43	57
RRUS-32 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	98	60	70
4426 B66 RRH	14.9	13.2	5.8	1.37	0.60	1.13	2.57	1.20	1.20	59	26	34
4415 B25 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	66	29	39
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	13	39	32

WIND LOADS WITH ICE:

7770 Antenna	57.2	13.2	7.2	5.25	2.87	4.33	7.93	1.28	1.43	45	27	32
HPA-65R-BUU-H6 Antenna	74.2	17.0	9.6	8.77	4.96	4.36	7.72	1.28	1.42	75	47	54
QS66512-2 Antenna	74.2	14.2	11.8	7.33	6.09	5.22	6.28	1.32	1.37	65	56	58
RRUS-11 RRH	21.9	19.2	9.4	2.92	1.43	1.14	2.33	1.20	1.20	23	11	14
RRUS-32 RRH	29.4	14.3	9.2	2.92	1.88	2.05	3.19	1.20	1.23	23	15	17
4426 B66 RRH	17.1	15.4	8.0	1.83	0.95	1.11	2.14	1.20	1.20	15	8	9
4415 B25 RRH	18.7	15.6	8.1	2.03	1.05	1.20	2.31	1.20	1.20	16	8	10
LGP21401 TMA	16.6	4.9	11.2	0.57	1.29	3.38	1.48	1.24	1.20	5	10	9

WIND LOADS AT 30 MPH:

7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	13	7	9
HPA-65R-BUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	23	13	16
QS66512-2 Antenna	72.0	12.0	9.6	6.00	4.80	6.00	7.50	1.36	1.42	20	16	17
RRUS-11 RRH	19.7	17.0	7.2	2.33	0.99	1.16	2.74	1.20	1.21	7	3	4
RRUS-32 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	5
4426 B66 RRH	14.9	13.2	5.8	1.37	0.60	1.13	2.57	1.20	1.20	4	2	2
4415 B25 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	4	2	3
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	3	2

Date: 9/4/2019
Project Name: GREENWICH-KING STREET
Project No.: CT2347
Designed By: RL Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle =	90	(deg)	Ice Thickness =	1.11	in.	Equivalent Angle =	270	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	198	105	105
HPA-65R-BUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	347	198	198
QS66512-2 Antenna	72.0	12.0	9.6	6.00	4.80	6.00	7.50	1.36	1.42	292	244	244
RRUS-11 RRH	19.7	17.0	7.2	2.33	0.99	1.16	2.74	1.20	1.21	100	43	43
RRUS-32 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	98	60	60
4426 B66 RRH	14.9	13.2	5.8	1.37	0.60	1.13	2.57	1.20	1.20	59	26	26
4415 B25 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	66	29	29
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	13	39	39

WIND LOADS WITH ICE:

7770 Antenna	57.2	13.2	7.2	5.25	2.87	4.33	7.93	1.28	1.43	45	27	27
HPA-65R-BUU-H6 Antenna	74.2	17.0	9.6	8.77	4.96	4.36	7.72	1.28	1.42	75	47	47
QS66512-2 Antenna	74.2	14.2	11.8	7.33	6.09	5.22	6.28	1.32	1.37	65	56	56
RRUS-11 RRH	21.9	19.2	9.4	2.92	1.43	1.14	2.33	1.20	1.20	23	11	11
RRUS-32 RRH	29.4	14.3	9.2	2.92	1.88	2.05	3.19	1.20	1.23	23	15	15
4426 B66 RRH	17.1	15.4	8.0	1.83	0.95	1.11	2.14	1.20	1.20	15	8	8
4415 B25 RRH	18.7	15.6	8.1	2.03	1.05	1.20	2.31	1.20	1.20	16	8	8
LGP21401 TMA	16.6	4.9	11.2	0.57	1.29	3.38	1.48	1.24	1.20	5	10	10

WIND LOADS AT 30 MPH:

7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	13	7	7
HPA-65R-BUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	23	13	13
QS66512-2 Antenna	72.0	12.0	9.6	6.00	4.80	6.00	7.50	1.36	1.42	20	16	16
RRUS-11 RRH	19.7	17.0	7.2	2.33	0.99	1.16	2.74	1.20	1.21	7	3	3
RRUS-32 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	4
4426 B66 RRH	14.9	13.2	5.8	1.37	0.60	1.13	2.57	1.20	1.20	4	2	2
4415 B25 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	4	2	2
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	3	3

Date: 9/4/2019
Project Name: GREENWICH-KING STREET
Project No.: CT2347
Designed By: RL Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle =	120	(deg)	Ice Thickness =	1.11	in.	Equivalent Angle =	300	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	198	105	128
HPA-65R-BUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	347	198	235
QS66512-2 Antenna	72.0	12.0	9.6	6.00	4.80	6.00	7.50	1.36	1.42	292	244	256
RRUS-11 RRH	19.7	17.0	7.2	2.33	0.99	1.16	2.74	1.20	1.21	100	43	57
RRUS-32 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	98	60	70
4426 B66 RRH	14.9	13.2	5.8	1.37	0.60	1.13	2.57	1.20	1.20	59	26	34
4415 B25 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	66	29	39
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	13	39	32

WIND LOADS WITH ICE:

7770 Antenna	57.2	13.2	7.2	5.25	2.87	4.33	7.93	1.28	1.43	45	27	32
HPA-65R-BUU-H6 Antenna	74.2	17.0	9.6	8.77	4.96	4.36	7.72	1.28	1.42	75	47	54
QS66512-2 Antenna	74.2	14.2	11.8	7.33	6.09	5.22	6.28	1.32	1.37	65	56	58
RRUS-11 RRH	21.9	19.2	9.4	2.92	1.43	1.14	2.33	1.20	1.20	23	11	14
RRUS-32 RRH	29.4	14.3	9.2	2.92	1.88	2.05	3.19	1.20	1.23	23	15	17
4426 B66 RRH	17.1	15.4	8.0	1.83	0.95	1.11	2.14	1.20	1.20	15	8	9
4415 B25 RRH	18.7	15.6	8.1	2.03	1.05	1.20	2.31	1.20	1.20	16	8	10
LGP21401 TMA	16.6	4.9	11.2	0.57	1.29	3.38	1.48	1.24	1.20	5	10	9

WIND LOADS AT 30 MPH:

7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	13	7	9
HPA-65R-BUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	23	13	16
QS66512-2 Antenna	72.0	12.0	9.6	6.00	4.80	6.00	7.50	1.36	1.42	20	16	17
RRUS-11 RRH	19.7	17.0	7.2	2.33	0.99	1.16	2.74	1.20	1.21	7	3	4
RRUS-32 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	5
4426 B66 RRH	14.9	13.2	5.8	1.37	0.60	1.13	2.57	1.20	1.20	4	2	2
4415 B25 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	4	2	3
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	3	2

Date: 9/4/2019
Project Name: GREENWICH-KING STREET
Project No.: CT2347
Designed By: RL Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle =	150	(deg)	Ice Thickness =	1.11	in.	Equivalent Angle =	330	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	198	105	175
HPA-65R-BUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	347	198	309
QS66512-2 Antenna	72.0	12.0	9.6	6.00	4.80	6.00	7.50	1.36	1.42	292	244	280
RRUS-11 RRH	19.7	17.0	7.2	2.33	0.99	1.16	2.74	1.20	1.21	100	43	86
RRUS-32 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	98	60	89
4426 B66 RRH	14.9	13.2	5.8	1.37	0.60	1.13	2.57	1.20	1.20	59	26	51
4415 B25 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	66	29	57
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	13	39	19

WIND LOADS WITH ICE:

7770 Antenna	57.2	13.2	7.2	5.25	2.87	4.33	7.93	1.28	1.43	45	27	40
HPA-65R-BUU-H6 Antenna	74.2	17.0	9.6	8.77	4.96	4.36	7.72	1.28	1.42	75	47	68
QS66512-2 Antenna	74.2	14.2	11.8	7.33	6.09	5.22	6.28	1.32	1.37	65	56	62
RRUS-11 RRH	21.9	19.2	9.4	2.92	1.43	1.14	2.33	1.20	1.20	23	11	20
RRUS-32 RRH	29.4	14.3	9.2	2.92	1.88	2.05	3.19	1.20	1.23	23	15	21
4426 B66 RRH	17.1	15.4	8.0	1.83	0.95	1.11	2.14	1.20	1.20	15	8	13
4415 B25 RRH	18.7	15.6	8.1	2.03	1.05	1.20	2.31	1.20	1.20	16	8	14
LGP21401 TMA	16.6	4.9	11.2	0.57	1.29	3.38	1.48	1.24	1.20	5	10	6

WIND LOADS AT 30 MPH:

7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	13	7	12
HPA-65R-BUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	23	13	21
QS66512-2 Antenna	72.0	12.0	9.6	6.00	4.80	6.00	7.50	1.36	1.42	20	16	19
RRUS-11 RRH	19.7	17.0	7.2	2.33	0.99	1.16	2.74	1.20	1.21	7	3	6
RRUS-32 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	6
4426 B66 RRH	14.9	13.2	5.8	1.37	0.60	1.13	2.57	1.20	1.20	4	2	3
4415 B25 RRH	16.5	13.4	5.9	1.54	0.68	1.23	2.80	1.20	1.21	4	2	4
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	3	1

Date: 9/4/2019
Project Name: GREENWICH-KING STREET
Project No.: CT2347
Designed By: RL **Checked By:** MSC

HUDSON Design Group LLC

ICE WEIGHT CALCULATIONS

Thickness of ice: 1.11 in.
Density of ice: 56 pcf

7770 Antenna

Weight of ice based on total radial SF area:

Height (in):	55.0	
Width (in):	11.0	
Depth (in):	5.0	
Total weight of ice on object:		82 lbs
Weight of object:	35.0 lbs	
Combined weight of ice and object:		117 lbs

HPA-65R-BUU-H6 Antenna

Weight of ice based on total radial SF area:

Height (in):	72.0	
Width (in):	14.8	
Depth (in):	7.4	
Total weight of ice on object:		144 lbs
Weight of object:	51.0 lbs	
Combined weight of ice and object:		195 lbs

QS66512-2 Antenna

Weight of ice based on total radial SF area:

Height (in):	72.0	
Width (in):	12.0	
Depth (in):	9.6	
Total weight of ice on object:		134 lbs
Weight of object:	111.0 lbs	
Combined weight of ice and object:		245 lbs

RRUS-11 RRH

Weight of ice based on total radial SF area:

Height (in):	19.7	
Width (in):	17.0	
Depth (in):	7.2	
Total weight of ice on object:		44 lbs
Weight of object:	51.0 lbs	
Combined weight of ice and object:		95 lbs

RRUS-32 RRH

Weight of ice based on total radial SF area:

Height (in):	27.2	
Width (in):	12.1	
Depth (in):	7.0	
Total weight of ice on object:		46 lbs
Weight of object:	60.0 lbs	
Combined weight of ice and object:		106 lbs

4426 B66 RRH

Weight of ice based on total radial SF area:

Height (in):	14.9	
Width (in):	13.2	
Depth (in):	5.8	
Total weight of ice on object:		26 lbs
Weight of object:	49.0 lbs	
Combined weight of ice and object:		75 lbs

4415 B25 RRH

Weight of ice based on total radial SF area:

Height (in):	16.5	
Width (in):	13.4	
Depth (in):	5.9	
Total weight of ice on object:		29 lbs
Weight of object:	46.0 lbs	
Combined weight of ice and object:		75 lbs

LGP21401 TMA

Weight of ice based on total radial SF area:

Height (in):	14.4	
Width (in):	2.7	
Depth (in):	9.0	
Total weight of ice on object:		17 lbs
Weight of object:	19.0 lbs	
Combined weight of ice and object:		36 lbs

Squid Surge Arrestor

Weight of ice based on total radial SF area:

Depth (in):	24.0	
Diameter(in):	9.7	
Total weight of ice on object:		29 lbs
Weight of object:	33 lbs	
Combined weight of ice and object:		62 lbs

2" pipe

Per foot weight of ice:

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

HUDSON
Design Group LLC

Mount Calculations
(Existing Conditions)

Bentley

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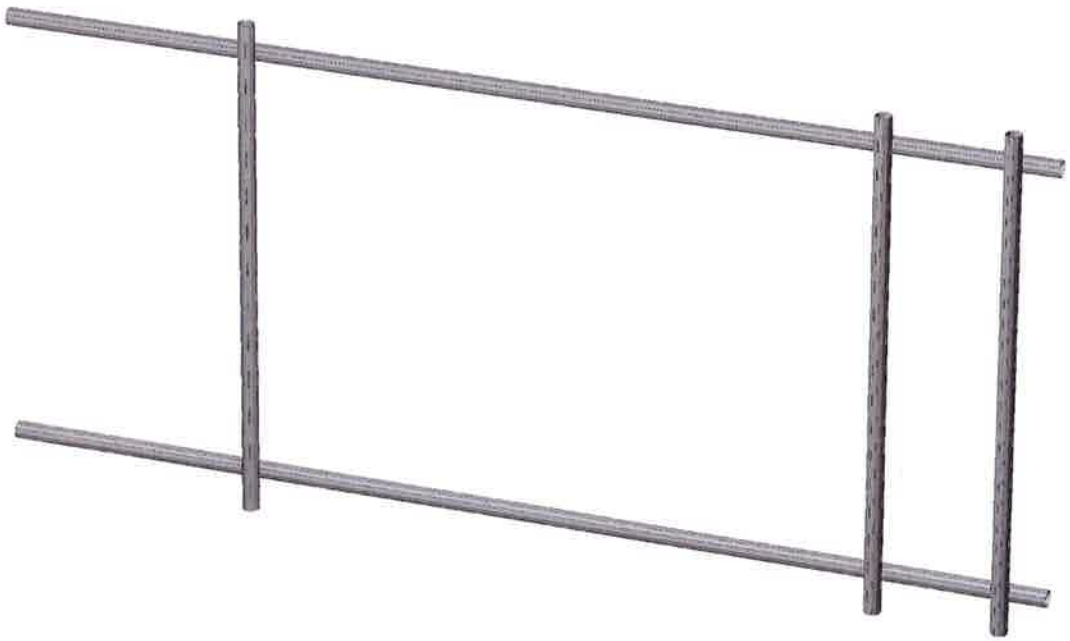

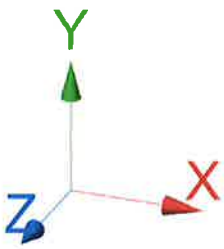

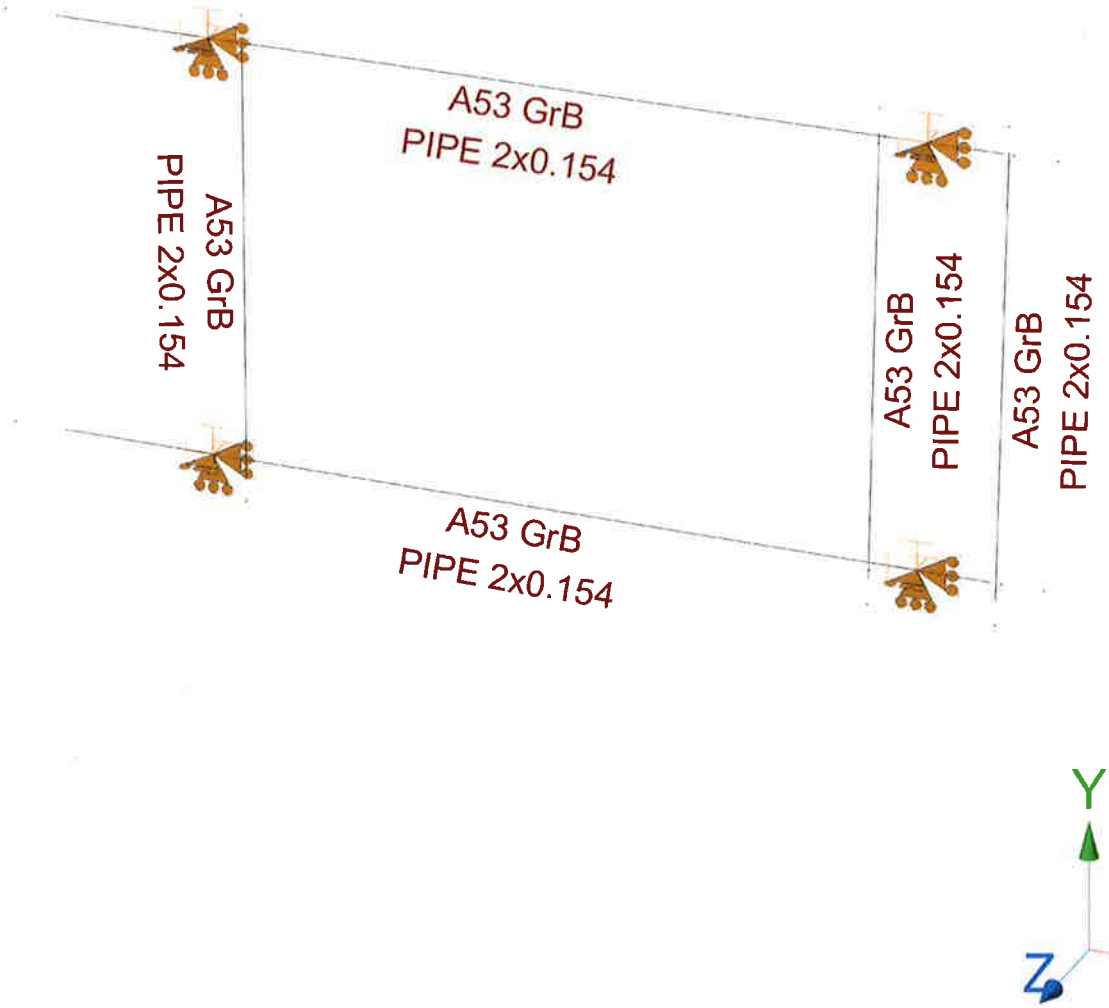
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PIPE 2x0.154
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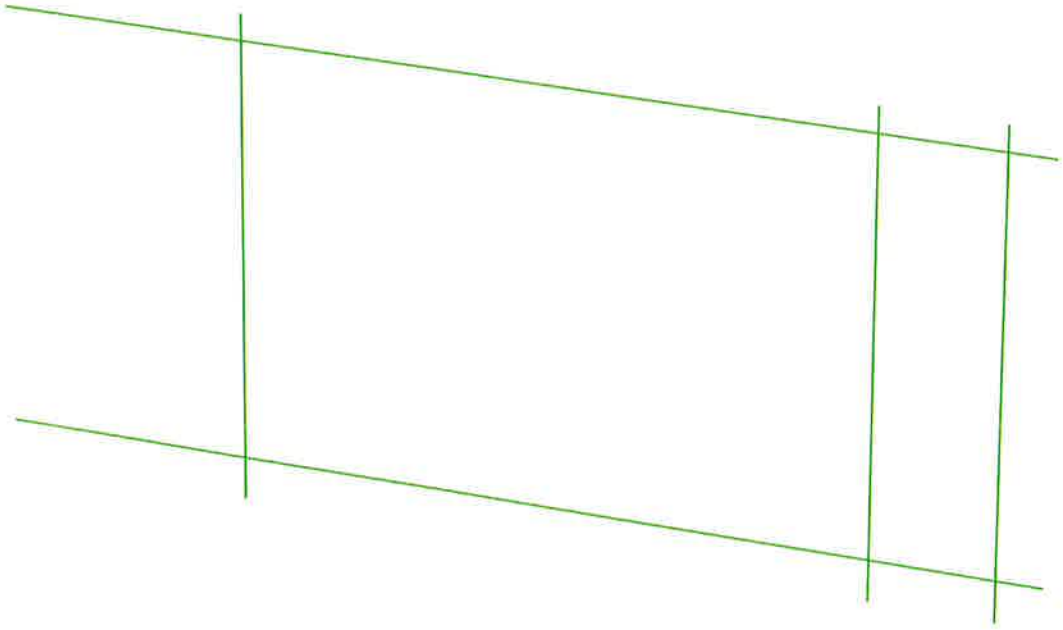
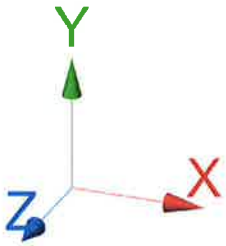
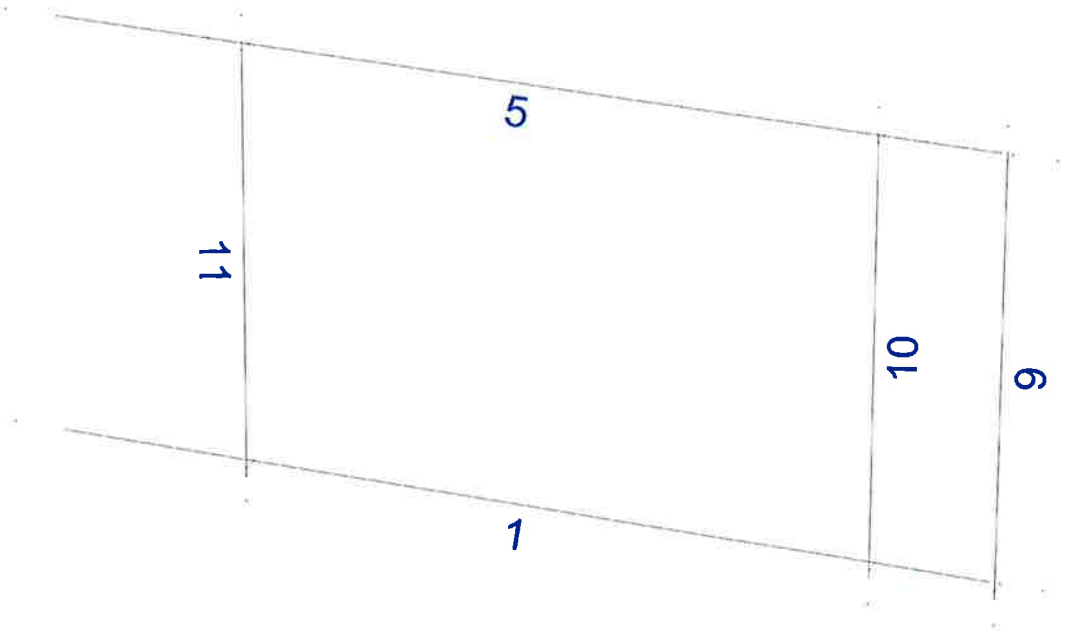
Y
X
Z

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



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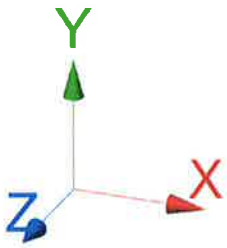
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Bentley

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Load data

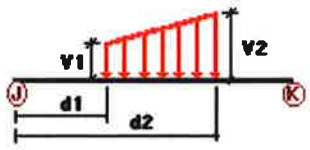
GLOSSARY

Comb : Indicates if load condition is a load combination

Load Conditions

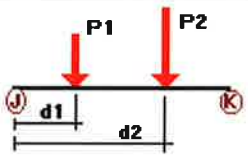
Condition	Description	Comb.	Category
D	Dead Load	No	DL
Wo	Wind Load (NO ICE)	No	WIND
W30	WL 30deg	No	WIND
W60	WL 60deg	No	WIND
W90	WL 90deg	No	WIND
W120	WL 120deg	No	WIND
W150	WL 150deg	No	WIND
Di	Ice Load	No	LL
WI0	WL ICE 0deg	No	WIND
WI30	WL ICE 30deg	No	WIND
WI60	WL ICE 60deg	No	WIND
WI90	WL ICE 90deg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

Distributed force on members



Condition	Member	Dir1	Val1 [Kip/ft]	Val2 [Kip/ft]	Dist1 [ft]	%	Dist2 [ft]	%
Wo	1	z	-0.009	-0.009	0.00	No	100.00	Yes
	5	z	-0.009	-0.009	0.00	No	100.00	Yes
W30	1	z	-0.009	-0.009	0.00	No	100.00	Yes
	5	z	-0.009	-0.009	0.00	No	100.00	Yes
	9	z	-0.009	-0.009	0.00	No	100.00	Yes
	10	z	-0.009	-0.009	0.00	No	100.00	Yes
	11	z	-0.009	-0.009	0.00	No	100.00	Yes
W60	1	x	-0.009	-0.009	0.00	No	100.00	Yes
	5	x	-0.009	-0.009	0.00	No	100.00	Yes
	9	x	-0.009	-0.009	0.00	No	100.00	Yes
	10	x	-0.009	-0.009	0.00	No	100.00	Yes
	11	x	-0.009	-0.009	0.00	No	100.00	Yes
W90	9	x	-0.009	-0.009	0.00	No	100.00	Yes
	10	x	-0.009	-0.009	0.00	No	100.00	Yes
	11	x	-0.009	-0.009	0.00	No	100.00	Yes
W120	1	x	-0.009	-0.009	0.00	No	100.00	Yes
	5	x	-0.009	-0.009	0.00	No	100.00	Yes
	9	x	-0.009	-0.009	0.00	No	100.00	Yes
	10	x	-0.009	-0.009	0.00	No	100.00	Yes
	11	x	-0.009	-0.009	0.00	No	100.00	Yes
W150	1	z	0.009	0.009	0.00	No	100.00	Yes
	5	z	0.009	0.009	0.00	No	100.00	Yes
	9	z	0.009	0.009	0.00	No	100.00	Yes
	10	z	0.009	0.009	0.00	No	100.00	Yes
	11	z	0.009	0.009	0.00	No	100.00	Yes
Di	1	y	-0.005	-0.005	0.00	No	100.00	Yes
	5	y	-0.005	-0.005	0.00	No	100.00	Yes
	9	y	-0.005	-0.005	0.00	No	100.00	Yes
	10	y	-0.005	-0.005	0.00	No	100.00	Yes
	11	y	-0.005	-0.005	0.00	No	100.00	Yes

Concentrated forces on members



Condition	Member	Dir1	Value1 [Kip]	Dist1 [ft]	%
D	9	y	-0.018	1.00	No
		y	-0.018	5.00	No
		y	-0.038	3.00	No
	10	y	-0.026	0.50	No
		y	-0.026	5.50	No
	11	y	-0.056	0.50	No
		y	-0.056	5.50	No
Wo	9	z	-0.099	1.00	No
		z	-0.099	5.00	No
	10	z	-0.174	0.50	No
		z	-0.174	5.50	No
	11	z	-0.146	0.50	No
		z	-0.146	5.50	No
W30	9	3	-0.088	1.00	No
		3	-0.088	5.00	No

		3	-0.019	3.00	No
	10	3	-0.155	0.50	No
		3	-0.155	5.50	No
	11	3	-0.14	0.50	No
		3	-0.14	5.50	No
W60	9	3	-0.065	1.00	No
		3	-0.065	5.00	No
		3	-0.032	3.00	No
	10	3	-0.118	0.50	No
		3	-0.118	5.50	No
	11	3	-0.129	0.50	No
		3	-0.129	5.50	No
W90	9	x	-0.053	1.00	No
		x	-0.053	5.00	No
		x	-0.039	3.00	No
	10	x	-0.099	0.50	No
		x	-0.099	5.50	No
	11	x	-0.123	0.50	No
		x	-0.123	5.50	No
W120	9	2	-0.065	1.00	No
		2	-0.065	5.00	No
		2	-0.032	3.00	No
	10	2	-0.118	0.50	No
		2	-0.118	5.50	No
	11	2	-0.129	0.50	No
		2	-0.129	5.50	No
W150	9	2	-0.088	1.00	No
		2	-0.088	5.00	No
		2	-0.019	3.00	No
	10	2	-0.155	0.50	No
		2	-0.155	5.50	No
	11	2	-0.14	0.50	No
		2	-0.14	5.50	No
Di	9	y	-0.041	1.00	No
		y	-0.041	5.00	No
		y	-0.034	3.00	No
	10	y	-0.072	0.50	No
		y	-0.072	5.50	No
	11	y	-0.077	0.50	No
		y	-0.077	5.50	No
WI0	9	z	-0.023	1.00	No
		z	-0.023	5.00	No
	10	z	-0.039	0.50	No
		z	-0.039	5.50	No
	11	z	-0.034	0.50	No
		z	-0.034	5.50	No
WI30	9	3	-0.021	1.00	No
		3	-0.021	5.00	No
		3	-0.006	3.00	No
	10	3	-0.035	0.50	No
		3	-0.035	5.50	No
	11	3	-0.032	0.50	No
		3	-0.032	5.50	No
WI60	9	3	-0.016	1.00	No
		3	-0.016	5.00	No
		3	-0.009	3.00	No
	10	3	-0.028	0.50	No
		3	-0.028	5.50	No
	11	3	-0.029	0.50	No
		3	-0.029	5.50	No

WI90	9	x	-0.014	1.00	No
		x	-0.014	5.00	No
		x	-0.01	3.00	No
	10	x	-0.024	0.50	No
		x	-0.024	5.50	No
	11	x	-0.028	0.50	No
		x	-0.028	5.50	No
WI120	9	2	-0.016	1.00	No
		2	-0.016	5.00	No
		2	-0.009	3.00	No
	10	2	-0.028	0.50	No
		2	-0.028	5.50	No
	11	2	-0.029	0.50	No
		2	-0.029	5.50	No
WI150	9	2	-0.021	1.00	No
		2	-0.021	5.00	No
		2	-0.006	3.00	No
	10	2	-0.035	0.50	No
		2	-0.035	5.50	No
	11	2	-0.032	0.50	No
		2	-0.032	5.50	No
WL0	9	z	-0.007	1.00	No
		z	-0.007	5.00	No
	10	z	-0.012	0.50	No
		z	-0.012	5.50	No
	11	z	-0.01	0.50	No
		z	-0.01	5.50	No
WL30	9	3	-0.006	1.00	No
		3	-0.006	5.00	No
		3	-0.001	3.00	No
	10	3	-0.011	0.50	No
		3	-0.011	5.50	No
	11	3	-0.01	0.50	No
		3	-0.01	5.50	No
WL60	9	3	-0.005	1.00	No
		3	-0.005	5.00	No
		3	-0.002	3.00	No
	10	3	-0.008	0.50	No
		3	-0.008	5.50	No
	11	3	-0.009	0.50	No
		3	-0.009	5.50	No
WL90	9	x	-0.004	1.00	No
		x	-0.004	5.00	No
		x	-0.003	3.00	No
	10	x	-0.007	0.50	No
		x	-0.007	5.50	No
	11	x	-0.009	0.50	No
		x	-0.009	5.50	No
WL120	9	2	-0.005	1.00	No
		2	-0.005	5.00	No
		2	-0.002	3.00	No
	10	2	-0.008	0.50	No
		2	-0.008	5.50	No
	11	2	-0.009	0.50	No
		2	-0.009	5.50	No
WL150	**9**	**2**	**-0.006**	**1.00**	**No**
		2	**-0.006**	**5.00**	**No**
		2	**-0.001**	**3.00**	**No**
	10	**2**	**-0.011**	**0.50**	**No**
		2	**-0.011**	**5.50**	**No**

	11	2	-0.01	0.50	No
		2	-0.01	5.50	No
LL1	5	y	-0.25	50.00	Yes
LL2	5	y	-0.25	100.00	Yes
	9	y	-0.50	50.00	Yes
LL3	5	y	-0.25	0.00	Yes
LLa1	9	y	-0.25	50.00	Yes
LLa2	10	y	-0.25	50.00	Yes
LLa3	11	y	-0.25	50.00	Yes

Self weight multipliers for load conditions

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

Earthquake (Dynamic analysis only)

Condition	a/g	Ang. [Deg]	Damp. [%]
D	0.00	0.00	0.00
Wo	0.00	0.00	0.00
W30	0.00	0.00	0.00
W60	0.00	0.00	0.00
W90	0.00	0.00	0.00
W120	0.00	0.00	0.00

W150	0.00	0.00	0.00
Di	0.00	0.00	0.00
WI0	0.00	0.00	0.00
WI30	0.00	0.00	0.00
WI60	0.00	0.00	0.00
WI90	0.00	0.00	0.00
WI120	0.00	0.00	0.00
WI150	0.00	0.00	0.00
WL0	0.00	0.00	0.00
WL30	0.00	0.00	0.00
WL60	0.00	0.00	0.00
WL90	0.00	0.00	0.00
WL120	0.00	0.00	0.00
WL150	0.00	0.00	0.00
LL1	0.00	0.00	0.00
LL2	0.00	0.00	0.00
LL3	0.00	0.00	0.00
LLa1	0.00	0.00	0.00
LLa2	0.00	0.00	0.00
LLa3	0.00	0.00	0.00

Bentley

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Steel Code Check

Report: Summary - Group by member

Load conditions to be included in design :

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

LC54=1.2D+WL30+1.5LLa2
LC55=1.2D+WL60+1.5LLa2
LC56=1.2D+WL90+1.5LLa2
LC57=1.2D+WL120+1.5LLa2
LC58=1.2D+WL150+1.5LLa2
LC59=1.2D-WL0+1.5LLa2
LC60=1.2D-WL30+1.5LLa2
LC61=1.2D-WL60+1.5LLa2
LC62=1.2D-WL90+1.5LLa2
LC63=1.2D-WL120+1.5LLa2
LC64=1.2D-WL150+1.5LLa2
LC65=1.2D+WL0+1.5LLa3
LC66=1.2D+WL30+1.5LLa3
LC67=1.2D+WL60+1.5LLa3
LC68=1.2D+WL90+1.5LLa3
LC69=1.2D+WL120+1.5LLa3
LC70=1.2D+WL150+1.5LLa3
LC71=1.2D-WL0+1.5LLa3
LC72=1.2D-WL30+1.5LLa3
LC73=1.2D-WL60+1.5LLa3
LC74=1.2D-WL90+1.5LLa3
LC75=1.2D-WL120+1.5LLa3
LC76=1.2D-WL150+1.5LLa3

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	PIPE 2x0.154	**1**	LC39 at 88.54%	0.42	OK	Eq. H1-1b
		5	LC40 at 19.79%	**0.75**	**OK**	Sec. F1
		9	LC39 at 8.33%	0.20	OK	Eq. H1-1b
		10	LC38 at 8.33%	0.08	OK	Eq. H1-1b
		11	LC38 at 8.33%	0.10	OK	Eq. H1-1b

Bentley

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Geometry data

GLOSSARY

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

Nodes

Node	X [ft]	Y [ft]	Z [ft]	Rigid Floor
1	0.00	0.00	0.00	0
2	12.50	0.00	0.00	0
3	2.50	0.00	0.00	0
11	0.00	5.167	0.00	0
12	12.50	5.167	0.00	0
23	3.00	-0.4165	0.20	0
24	10.50	5.5835	0.20	0
25	10.50	-0.4165	0.20	0
26	12.00	5.5835	0.20	0
27	12.00	-0.4165	0.20	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
3	1	1	1	1	1	1

Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	lg factor
1	1	2		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
5	11	12		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
9	26	27		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
10	24	25		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
11	22	23		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00

Orientation of local axes

Member	Rotation [Deg]	Axes23	NX	NY	NZ
9	315.00	0	0.00	0.00	0.00
10	315.00	0	0.00	0.00	0.00
11	315.00	0	0.00	0.00	0.00

Google Maps

1323 King St

GREENWICH, CT

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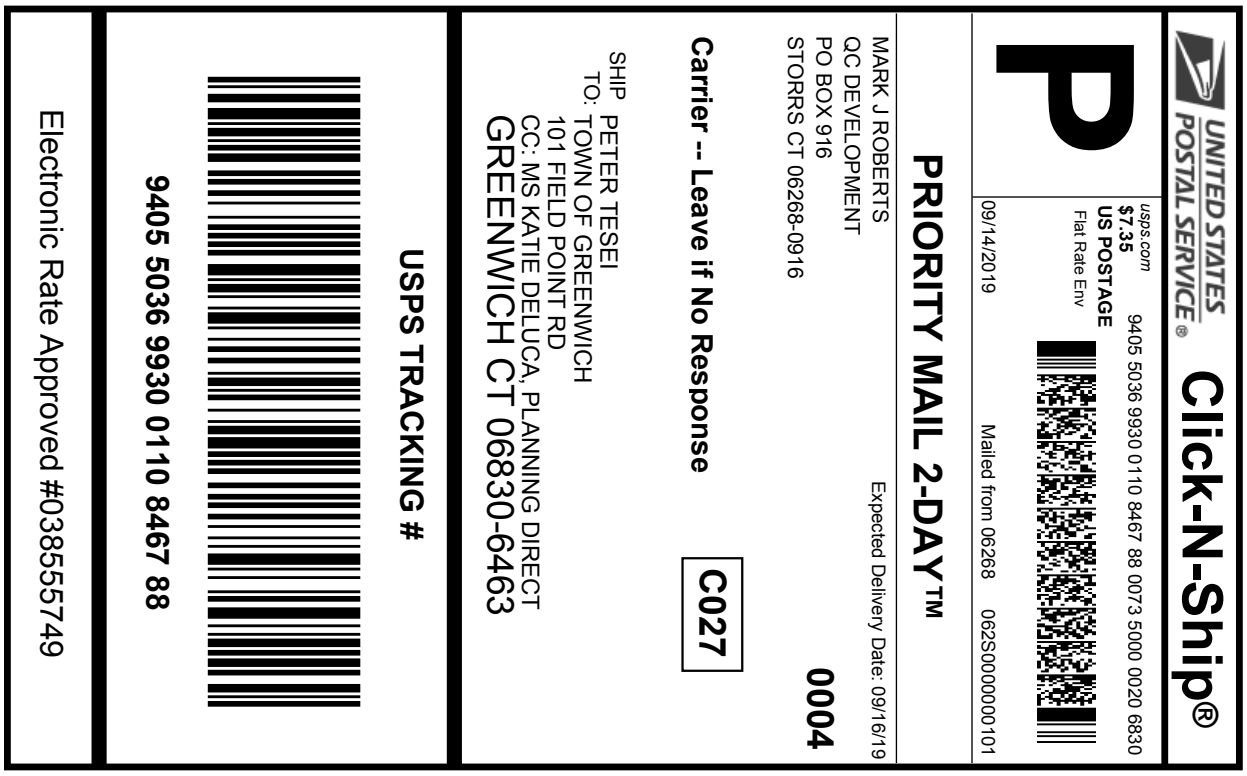

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Trans. #:	472505666
Print Date:	09/14/2019
Ship Date:	09/14/2019
Expected Delivery Date:	09/16/2019

Priority Mail® Postage:	**$7.35**
Total	**$7.35**

From: MARK J ROBERTS
QC DEVELOPMENT
PO BOX 916
STORRS CT 06268-0916

To: PETER TESEI
TOWN OF GREENWICH
101 FIELD POINT RD
CC: MS KATIE DELUCA, PLANNING DIRECT
GREENWICH CT 06830-6463

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