Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

November 14, 2014

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

RE: **Sprint PCS-Exempt Modification – Crown Site BU: 876373**
Sprint PCS Site ID: CT33XC078
Located at: 136 Wright Road, Torrington, CT 06790

Dear Ms. Bachman:

This letter and exhibits are submitted on behalf of Sprint PCS (Sprint). Sprint is making modifications to certain existing sites in its Connecticut system in order to implement their 2.5GHz LTE technology. Please accept this letter and exhibits as notification, pursuant to § 16-50j-73 of the Regulations of Connecticut State Agencies ("R.C.S.A."), of construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In compliance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to The Honorable Elinor Carbone, Mayor for the City of Torrington, and William A. and Jill S. Jobert, John J. and Diane Wright, and James N. and Carol E. Wright, Property Owners.

Sprint plans to modify the existing wireless communications facility owned by Crown Castle and located at **136 Wright Road, Torrington, CT 06790.** Attached are a compound plan and elevation depicting the planned changes (Exhibit-1), and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration (Exhibit-2). Also included is a power density table report reflecting the modification to Sprint's operations at the site (Exhibit-3).

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") § 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in the 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 tower. Sprint's additional antennas will be located at the same elevation on the existing tower.

2. There will be no proposed modifications to the ground and no extension of boundaries.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

4. A Structural Modification Report confirming that the tower and foundation can support Sprint's proposed modifications is included as Exhibit-2.

5. The operation of the additional antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative General Power Density table report for Sprint's modified facility is included as Exhibit-3.

For the foregoing reasons, Sprint respectfully submits the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Donna Neal.

Sincerely,

Susan Vale
Real Estate Specialist

Enclosures

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc: The Honorable Elinor Carbone, Mayor
140 Main Street
Torrington, CT 06790

William A. and Jill S. Jobert
108 Springfield Drive
Advance, NC 27006

John J. and Diane Wright
100 Stage Road
Nottingham, NH 03290

James N. and Carol E. Wright
104 Wright Road
Torrington, CT 06790

Sprint

2.5 EQUIPMENT DEPLOYMENT

SITE NUMBER:

CT33XC078

SITE NAME:

LONG EDDY/WRIGHT PROPERTY

SITE ADDRESS:

136 WRIGHT RD
TORRINGTON, CT 06790

CROWN ID#: 876373

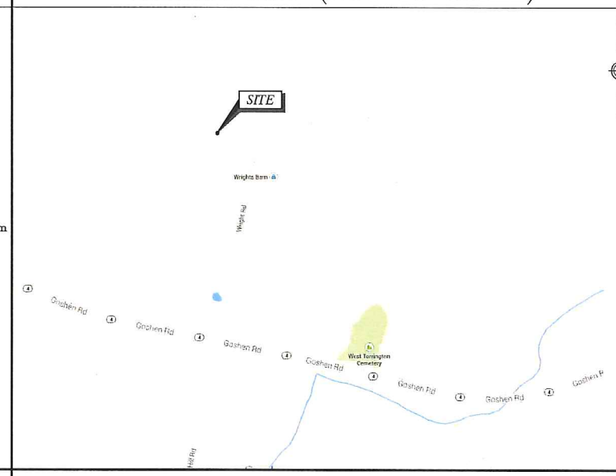
CROWN SITE NAME: LONG EDDY/WRIGHT PROPERTY

SHEET INFORMATION

SITE NUMBER:	CT33XC078
SITE NAME:	LONG EDDY/WRIGHT PROPERTY
SITE ADDRESS:	136 WRIGHT RD TORRINGTON, CT 06790
COUNTY:	LITCHFIELD
COORDINATES: (NAD 83)	41° 49' 38.34" N 73° 10' 13.87" W
GROUND ELEV:	1090'± AMSL
STRUCTURE TYPE:	MONOPOLE
STRUCTURE HEIGHT:	148'-0"± AGL
STRUCTURE RAD CENTER:	148'-0"± AGL
ZONING CLASSIFICATION:	R-WP (WATERSHED PROTECTED ZONE)
MAP-BLOCK-LOT:	214/2/5

LANDLORD:	CROWN CASTLE USA 2000 CORPORATE DRIVE CANONSBURG, PA
LOCAL POWER COMPANY:	CONNECTICUT LIGHT AND POWER CONTACT CUSTOMER SERVICE (800) 286-2000
APPLICANT:	SPRINT 6580 SPRINT PARKWAY OVERLAND PARK, KANSAS 66251
ENGINEER:	JAMES QUICKSELL (845) 567-6656 EXT. 2835 JQuicksell@tectonicengineering.com
SPRINT CM:	GARY WOOD (860) 940-9168 gary.wood@sprint.com
CROWN CM:	JASON D'AMICO (860) 209-0104 jason.d'amico@crowncastle.com
AAV:	AT&T

VICINITY MAP (NOT TO SCALE)



SHEET INDEX

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SP-2	GENERAL NOTES
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E-1	ELECTRICAL & GROUNDING PLANS
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GENERAL NOTES

1. THIS IS AN UNMANNED TELECOMMUNICATION FACILITY AND NOT FOR HUMAN HABITATION: HANDICAP ACCESS REQUIREMENTS ARE NOT REQUIRED. FACILITY HAS NO PLUMBING OR REFRIGERANTS. THIS FACILITY SHALL MEET OR EXCEED ALL FAA AND FCC REGULATOR REQUIREMENTS.
2. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE PROJECT OWNER'S REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.
3. DEVELOPMENT AND USE OF THIS SITE WILL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES.
   - 2005 STATE OF CONNECTICUT BUILDING CODE.
   - ANSI/TIA/EIA-222-F-1996.
   - NATIONAL ELECTRICAL CODE, LATEST EDITION.

PROJECT DESCRIPTION

1. (1) NEW 2.5 EQUIPMENT RACK INSIDE EXIST MMBTS CABINET.
2. (3) NEW RFS APXVTM14-C-120 ANTENNAS.
3. (3) NEW TD-RRH8x20-25 RRH.
4. (1) NEW 1-1/4" HYBRID CABLE.
5. (3) NEW FIBER JUMPERS.

AERIAL VIEW (NOT TO SCALE)

APPROVALS

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR MODIFICATIONS.

CONSTRUCTION: _____ DATE: _____

LEASING/
SITE ACQUISITION: _____ DATE: _____

LANDLORD/
PROPERTY OWNER: _____ DATE: _____

R.F. ENGINEER: _____ DATE: _____

CALL TOLL FREE FOR CONNECTICUT
1-800-922-4455 OR DIAL 811
CALL TWO FULL WORKING DAYS IN ADVANCE TO LOCATE BURIED UTILITY PIPES AND CABLES

Sprint
2.5 EQUIPMENT DEPLOYMENT
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

CROWN CASTLE

TECTONIC
• PLANNING
• ENGINEERING
• SURVEYING
• CONSTRUCTION MANAGEMENT

TECTONIC Engineering & Surveying Consultants P.C.
1279 Route 300
Newburgh, NY 12550
Phone: (845) 567-6656
Fax: (845) 567-8703
www.tectonicengineering.com

SUBMITTALS

PROJECT NO: 7225.CT33XC078

NO	DATE	DESCRIPTION	BY
0	07/17/14	FOR COMMENT	JT
1	09/22/14	FOR CONSTRUCTION	MP

DATE	REVIEWED BY
9/22/14	SMQ

SEAL

STATE OF CONNECTICUT · JOSHUA M. QUICKSELL · No. 22038 · LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC078

SITE NAME:
LONG EDDY/WRIGHT PROPERTY

SITE ADDRESS:
136 WRIGHT RD
TORRINGTON, CT 06790

SHEET TITLE:
TITLE SHEET

SHEET NO:
T-1

DIVISION 01000–GENERAL NOTES

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.
2. THE ARCHITECT/ENGINEER HAVE MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.
3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE PROJECT OWNER'S REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK.
4. THE SCOPE OF WORK SHALL INCLUDE FURNISHING ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.
5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
6. ONCE THE CONTRACTOR HAS RECEIVED AND ACCEPTED THE NOTICE TO PROCEED, CONTRACTOR WILL CONTACT THE CROWN CASTLE CONSTRUCTION MANAGER OF RECORD (NOTED ON THE FIRST PAGE ON THIS CONSTRUCTION DRAWING) A MINIMUM OF 48 HOURS PRIOR TO WORK START. UPON ARRIVAL TO THE JOB SITE, CONTRACTOR CREW IS REQUIRED CALL 1–800–788–7011 TO NOTIFY THE CROWN CASTLE NOC WORK HAS BEGUN.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S/VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.
8. THE CONTRACTOR SHALL PROVIDE A FULL SET OF CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDUMS OR CLARIFICATIONS AVAILABLE FOR THE USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.
9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY OR LOCAL GOVERNMENT AUTHORITY.
11. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC. DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.
12. THE CONTRACTOR SHALL KEEP THE GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY. PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.
13. THE CONTRACTOR SHALL COMPLY WITH ALL PERTINENT SECTIONS OF THE BASIC STATE BUILDING CODE, LATEST EDITION, AND ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJECT. 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 THE ARCHITECT/ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR PIER DRILLING AROUND OR NEAR UTILITIES. THE CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT LIMITED TO A) FALL PROTECTION, B) CONFINED SPACE, C) ELECTRICAL SAFETY, D) TRENCHING AND EXCAVATION OF 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 THE POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK SUBJECT TO THE APPROVAL OF THE ARCHITECT/ENGINEER.
14. THE CONTRACTOR SHALL NOTIFY THE PROJECT OWNER'S REPRESENTATIVE IN WRITING WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE LESSEE/LICENSEE REPRESENTATIVE.
15. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC. ON THE JOB.
16. THE CONTRACTOR SHALL NOTIFY THE THE RF ENGINEER FOR ANTENNA AZIMUTH VERIFICATION (DURING ANTENNA INSTALLATION) PRIOR TO CONDUCTING SWEEP TESTS.
17. THE CONTRACTOR SHALL SUBMIT AT THE END OF THE PROJECT A COMPLETE SET OF AS–BUILT DRAWINGS TO THE CLIENT REPRESENTATIVE.
18. REFER TO: CONSTRUCTION STANDARDS–SPRINT DOCUMENT EXHIBIT A–STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES REV. 4.0– 02.15.2011.DOCM.
19. REFER TO: WEATHER PROOFING SPECS: EXCERPT EXH A–WIHRPRF–STD CONSTR SPECS._15720111042855492.DOCM.
20. REFER TO: COLOR CODING–SPRINT NEXTEL ANT AND LINE COLOR CODING (DRAFT) V3 09–08–11.PDF
21. REFER TO LATEST DOCUMENTATION REVISION.

DIVISION 03000–CONCRETE

1.03 APPLICABLE STANDARDS (USE LATEST EDITIONS)

A. AC1–301 – SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS.
B. ACI–347 GUIDE TO FORM WORK FOR CONCRETE.
C. ASTM C33– CONCRETE AGGREGATE
D. ASTM C94 – READY MIXED CONCRETE e. ASTM C150 – PORTLAND CEMENT.
E. ASTM C260 – AIR–ENTRAINING ADMIXTURES FOR CONCRETE
F. ASTM C309– LIQUID MEMBRANE FORMING COMPOUNDS FOR CURING CONCRETE.
H. ASTM C494 – CHEMICAL ADMIXTURES FOR CONCRETE
I. ASTM A615– DEFORMED AND PLAIN BILLET–STEEL BARS FOR CONCRETE REINFORCEMENT
J. ASTM A185– STEEL WELDED WIRE FABRIC (PLAIN) FOR CONCRETE REINFORCEMENT

1.04 QUALITY ASSURANCE

CONCRETE MATERIALS AND OPERATIONS SHALL BE TESTED AND INSPECTED BY THE ARCHITECT/ENGINEER AS DIRECTED BY THE CLIENT'S REPRESENTATIVE.

3.04 SURFACE FINISHES

A. SURFACES AGAINST WHICH BACKFILL OR CONCRETE SHALL BE PLACED REQUIRE NO TREATMENT EXCEPT REPAIR OF DEFECTIVE AREAS.

B. SURFACES THAT WILL BE PERMANENTLY EXPOSED SHALL PRESENT A UNIFORM FINISH PROVIDED BY THE REMOVAL OF FINS AND THE FILLING HOLES AND OTHER IRREGULARITIES WITH DRY PACK GROUT, OR BY SACKING WITH UTILITY OR ORDINARY GROUT.

C. SURFACES THAT WOULD NORMALLY BE LEVEL AND WHICH WILL BE PERMANENTLY EXPOSED TO THE WEATHER SHALL BE SLOPED FOR DRAINAGE. UNLESS ENGINEER'S DESIGN DRAWING SPECIFIES A HORIZONTAL SURFACE OR SURFACES SUCH AS STAIR TREADS, WALLS, CURBS, AND PARAPETS SHALL BE SLOPED APPROXIMATELY 1/4" PER FOOT.

D. SURFACES THAT WILL BE COVERED BY BACKFILL OR CONCRETE SHALL BE SMOOTH SCREENED.

E. EXPOSED SLAB SURFACES SHALL BE CONSOLIDATED, SCREENED, FLOATED, AND STEEL TROWELED. HAND OR POWER–DRIVEN EQUIPMENT MAY BE USED FOR FLOATING. FLOATING SHALL BE STARTED AS SOON AS THE SCREENED SURFACE HAS ATTAINED A STIFFNESS TO PERMIT FINISHING OPERATIONS. OPERATIONS. ALL EDGES MUST HAVE A 3/4" CHAMFER.

1.04 QUALITY ASSURANCE CONCRETE MATERIALS AND OPERATIONS SHALL BE TESTED AND INSPECTED BY THE ENGINEER.

3.05 PATCHING

THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY UPON REMOVAL OF THE FORMS TO OBSERVE CONCRETE SURFACE CONDITIONS. IMPERFECTIONS SHALL BE PATCHED ACCORDING TO THE ENGINEER'S DIRECTION.

3.06 DEFECTIVE CONCRETE

THE CONTRACTOR SHALL NOTIFY OR REPLACE CONCRETE NOT CONFORMING TO REQUIRED LEVELS AND LINES, DETAILS, AND ELEVATIONS AS SPECIFIED IN ACI 301.

3.07 PROTECTION

A. IMMEDIATELY AFTER PLACEMENT. THE CONTRACTOR SHALL PROTECT THE CONCRETE FROM PREMATURE DRYING, EXCESSIVELY HOT OR COLD TEMPERATURES, AND MECHANICAL INJURY. FINISHED WORK SHALL BE PROTECTED.

B. CONCRETE SHALL BE MAINTAINED WITH MINIMAL MOISTURE LOSS AT RELATIVELY CONSTANT TEMPERATURE FOR PERIOD NECESSARY FOR HYDRATION OF CEMENT AND HARDENING OF CONCRETE.

C. ALL CONCRETE SHALL BE WATER CURED PER ACCEPTABLE PRACTICES SPECIFIED BY ACI CODE (LATEST EDITION)

DIVISION 05000 – METALS

PART 1 – GENERAL

1.01 WORK INCLUDED

A. THE WORK CONSISTS OF THE FABRICATION AND INSTALLATION OF ALL MATERIALS TO BE FURNISHED. AND WITHOUT LIMITING THE GENERALITY THEREOF, INCLUDING ALL EQUIPMENT, LABOR AND SERVICES REQUIRED FOR ALL STRUCTURAL STEEL WORK AND ALL ITEMS INCIDENTAL AS SPECIFIED AND AS SHOWN ON THE DRAWINGS:

1. STEEL FRAMING INCLUDING BEAMS, ANGLES, CHANNELS AND PLATES.
2. WELDING AND BOLTING OF ATTACHMENTS.

1.02 REFERENCE STANDARDS

A. THE WORK SHALL CONFORM TO THE CODES AND STANDARDS OF THE FOLLOWING AGENCIES AS FURTHER CITED HEREIN:

1. ASTM: AMERICAN SOCIETY FOR TESTING AND MATERIALS AS PUBLISHED IN "COMPILATION OF ASTM STANDARDS IN BUILDING CODES" OR LATEST EDITION.
2. AWS: AMERICAN WELDING SOCIETY CODE OR LATEST EDITION.
3. AISC: AMERICAN INSTITUTE OF STEEL CONSTRUCTION, "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" (LATEST EDITION).

PART 2 – PRODUCTS

2.01 MATERIALS

A. STRUCTURAL STEEL: SHALL COMPLY WITH THE REQUIREMENTS OF ASTM A36 AND A992 FOR STRUCTURAL STEEL.

ALL PROPOSED STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH AISC CODE AND ASTM SPECIFICATIONS (LATEST EDITION) ALL NEW STEEL SHALL CONFORM TO THE FOLLOWING.

1. STRUCTURAL WIDE FLANGE: ASTM A992 Fy=50KSI.
2. MISCELLANEOUS STEEL (PLATES), CHANNELS, ANGLES, ETC): ASTM A36 (Fy=36KSI).
3. STRUCTURAL TUBING: ASTM A500 Gr. B (Fy=46KSI).
4. STEEL PIPE: ASTM A53 Gr B (Fy=35KSI).

2.02 WELDING

A. ALL WELDING SHALL BE DONE BY CERTIFIED WELDERS. CERTIFICATION DOCUMENTS SHALL BE MADE AVAILABLE FOR ENGINEER'S AND/OR OWNER'S REVIEW IF REQUESTED.

B. WELDING ELECTRODES FOR MANUAL SHIELDED METAL ARC WELDING SHALL CONFORM TO ASTM 1–233, E70 SERIES. BARE ELECTRODES AND GRANULAR FLUX USED IN THE SUBMERGED ARC PROCESS SHALL CONFORM TO AISC SPECIFICATIONS.

C. FIELD WELDING SHALL BE DONE AS PER AWS D1.1 REQUIREMENTS VISUAL INSPECTION IS ACCEPTABLE.

D. STUD WELDING SHALL BE ACCOMPLISHED BY CAPACITOR DISCHARGE (CD) WELDING TECHNIQUE USING CAPACITOR DISCHARGE STUD WELDER.

E. PROVIDE STUD FASTENERS OF MATERIALS AND SIZES SHOWN ON DRAWINGS OR AS RECOMMENDED BY THE MANUFACTURER FOR STRUCTURAL LOADINGS REQUIRED.

F. FOLLOW MANUFACTURERS SPECIFICATIONS AND INSTRUCTIONS TO PROPERLY SELECT AND INSTALL STUD WELDS.

2.03 BOLTING

A. BOLTS SHALL BE CONFORMING TO ASTM A35 HIGH STRENGTH HOT DIP GALVANIZED WITH ASTM A153 HEAVY HEX TYPE NUTS.

B. BOLTS SHALL BE 3/4" (MINIMUM) CONFORMING TO ASTM A325, HOT DIP GALVANIZED, ASTM A153 NUTS SHALL BE HEAVY HEX TYPE.

C. ALL CONNECTIONS SHALL BE 2 BOLTS MINIMUM.

D. EXCEPT WHERE SHOWN, ALL BEAM TO BEAM AND BEAM TO COLUMN CONNECTIONS TO BE DOUBLE ANGLED CONNECTIONS WITH HIGH STRENGTH BOLTS (THREADS EXCLUDED FROM SHEAR PLANE) AND HARDENED WASHERS.

E. STANDARD, OVERSIZED OR HORIZONTAL SHORT SLOTTED HOLES.

F. SNUG–TIGHT STRENGTH BEARING BOLTS MAY BE USED IN STANDARD HOLES CONFORMING TO ACIS, USING THE TURN OF THE NUT METHOD.

H. FULLY–TENSIONED HIGH STRENGTH (SLIP CRITICAL) SHALL BE USED IN OVERSIZED SLOT HOLES (RESPECTIVE OF SLOT ORIENTATION).

I. ALL BRACED CONNECTION, MOMENT CONNECTION AND CONNECTIONS NOTED AS "SLIP CRITICAL" SHALL BE BE SLIP CRITICAL JOINTS WITH CLASS A SURFACE CONDITIONS, UNLESS OTHERWISE NOTED.

J. EPOXY ANCHOR ASSEMBLIES SHALL BE AS MANUFACTURED BY HILTI OR ENGINEER APPROVED EQUAL, AS FOLLOWS:

BASE MATERIAL	ANCHOR SYSTEM
CONCRETE	HILTI HIT–HY 200
HOLLOW & GROUTED CMU OR BRICK	HILTI HIT–HY 70

2.04 FABRICATION

A. FABRICATION OF STEEL SHALL CONFORM TO THE AISC AND AWS

2.05 FINISH

A. STRUCTURAL STEEL EXPOSED TO WEATHER SHALL BE HOT–DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. (LATEST EDITION) UNLESS OTHERWISE NOTED.

2.06 PROTECTION

A. UPON COMPLETION OF ERECTION, INSPECT ALL GALVANIZED STEEL AND PAINT ANY FIELD CUTS, WELDS OR GALVANIZED BREAKS WITH (2) COATS OF ZINC–RICH COLD GALVANIZING PAINT.

PART 3 – ERECTION

A. PROVIDE ALL ERECTION, EQUIPMENT, BRACING, PLANKING, FIELD BOLTS, NUTS, WASHERS, DRIFT PINS, AND SIMILAR MATERIALS WHICH DO NOT FORM A PART OF THE COMPLETED CONSTRUCTION, BUT ARE NECESSARY FOR ITS PROPER ERECTION.

B. ERECT AND ANCHOR ALL STRUCTURAL STEEL IN ACCORDANCE WITH AISC REFERENCE STANDARDS. ALL WORK SHALL BE ACCURATELY SET TO ESTABLISHED SUITABLE ATTACHMENTS TO THE CONSTRUCTION OF THE BUILDING

C. TEMPORARY BRACING, GUYING, AND SUPPORT SHALL BE PROVIDED TO KEEP THE STRUCTURE SET AND ALIGNED AT ALL TIMES DURING CONSTRUCTION, AND TO PREVENT DANGER TO PERSONS AND PROPERTY. CHECK ALL TEMPORARY LOADS AND STAY WITHIN SAFE CAPACITY OF ALL BUILDING COMPONENTS.

Sprint

2.5 EQUIPMENT DEPLOYMENT
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

CROWN CASTLE

TECTONIC • PLANNING • ENGINEERING • SURVEYING • CONSTRUCTION MANAGEMENT

TECTONIC Engineering & Surveying Consultants P.C.

1279 Route 300
Newburgh, NY 12550

Phone: (845) 567–6656
Fax: (845) 567–8703

www.tectonicengineering.com

SUBMITTALS

PROJECT NO: 7225.CT33XC078

NO	DATE	DESCRIPTION	BY
0	07/17/14	FOR COMMENT	JT
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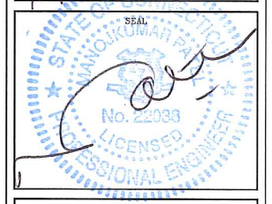
SEAL



SITE NUMBER:
CT33XC078

SITE NAME:
LONG EDDY/WRIGHT PROPERTY

SITE ADDRESS:
136 WRIGHT RD
TORRINGTON, CT 06790

SHEET TITLE:
GENERAL NOTES

SHEET NO:
SP–1

DIVISION 13000–SPECIAL CONSTRUCTION ANTENNA INSTALLATION

PART 1 – GENERAL

1.01 WORK INCLUDED

A. ANTENNAS AND HYBRIFLEX CABLES ARE FURNISHED BY CLIENT'S REPRESENTATIVE UNDER SEPARATE CONTRACT. THE CONTRACTOR SHALL ASSIST ANTENNA INSTALLATION CONTRACTOR IN TERMS OF COORDINATION AND SITE ACCESS. ERECTION SUBCONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPERTY.

B. INSTALL ANTENNAS AS INDICATED ON DRAWINGS AND CLIENT'S REPRESENTATIVE SPECIFICATIONS.

C. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS.

D. INSTALL FURNISHED GALVANIZED STEEL OR ALUMINUM WAVEGUIDE AND PROVIDE PRINTOUT OF THAT RESULT

F. INSTALL HYBRIFLEX CABLES AND TERMINATIONS BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTORS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURER'S REQUIREMENTS.

G. ANTENNA AND HYBRIFLEX CABLE GROUNDING:

1. ALL EXTERIOR #6 GREEN GROUND WIRE DAISY CHAIN CONNECTIONS ARE TO BE WEATHER SEALED WITH ANDREWS CONNECTOR/SPLICE WEATHERPROOFING KIT TYPE 3221213 OR EQUIVALENT.

2. ALL HYBRIFLEX CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF HYBRIFLEX CABLE (NOT WITHIN BENDS). 1.02 RELATED WORK FURNISH THE FOLLOWING WORK AS SPECIFIED UNDER CONSTRUCTION DOCUMENTS, BUT COORDINATE WITH QOTHER TRADES PRIOR TO BID:

   1. FLASHING OF OPENING INTO OUTSIDE WALLS.
   2. SEALING AND CAULKING ALL OPENINGS.
   3. PAINTING.
   4. CUTTING AND PATCHING.

1.03 REQUIREMENTS OF REGULATOR AGENCIES

A. FURNISH U.L. LISTED EQUIPMENT WHERE SUCH LABEL IS AVAILABLE. INSTALL IN CONFORMANCE WITH U.L. STANDARDS WHERE APPLICABLE.

B. INSTALL ANTENNA, ANTENNA CABLES, GROUNDING SYSTEM IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS IN EFFECT AT PROJECT LOCATION AND RECOMMENDATIONS OF STATE AND LOCAL BUILDING CODES HAVING JURISDICTION OVER SPECIFIC PORTIONS OF WORK. THIS WORK INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING:

1. EIA – ELECTRONIC INDUSTRIES ASSOCIATION RS–22. STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES.

2. FAA – FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULAR AC 70/7480–IH, CONSTRUCTION MARKING AND LIGHTING.

3. FCC – FEDERAL COMMUNICATION COMMISSION RULES AND REGULATIONS FORM 715, OBSTRUCTION MARKING AND LIGHTING SPECIFICATION FOR ANTENNA STRUCTURES

4. AISC – AMERICAN INSTITUTE OF STEEL CONSTRUCTION FOR STRUCTURAL JOINTS USING ASTM 1325 OR A490 BOLTS.

5. NEC – NATIONAL ELECTRIC CODE – ON TOWER LIGHTING KITS.

6. UL – UNDERWRITER'S LABORATORIES APPROVED ELECTRICAL PRODUCTS.

7. IN ALL CASES, PART 77 OF THE FAA RULES AND PARTS 17 AND 22 OF THE FCC RULES ARE APPLICABLE AND IN THE EVENT OF CONFLICT, SUPERSEDE ANY OTHER STANDARDS OR SPECIFICATIONS.

8. LIFE SAFETY CODE NFPA, LATEST EDITION.

DIVISION 13000–EARTHWORK

PART 1 GENERAL

1.01 WORK INCLUDED: REFER TO SURVEY AND SITE PLAN FOR WORK INCLUDED.

1.02 RELATED WORK

A. CONSTRUCTION OF EQUIPMENT FOUNDATIONS
B. INSTALLATION OF ANTENNA SYSTEM

PART 2 PRODUCTS

2.01 MATERIALS

A. ROAD AND SITE MATERIALS; FILL MATERIAL SHALL BE ACCEPTABLE, SELECT FILL SHALL BE IN ACCORDANCE WITH LOCAL DEPARTMENT OF HIGHWAY AND PUBLIC TRANSPORTATION STANDARD SPECIFICATIONS.

B. SOIL STERILIZER SHALL BE EPA REGISTERED OF LIQUID COMPOSITION AND OF PRE–EMERGENCE DESIGN.

C. SOIL STABILIZER FABRIC SHALL BE MIRAFI OR EQUAL – 600X AT ACCESS ROAD AND COMPOUND.

D. GRAVEL FILL; WELL GRADED, HARD, DURABLE, NATURAL SAND AND GRAVEL, FREE FROM ICE AND SNOW, ROOTS, SOD RUBBISH, AND OTHER DELETERIOUS OR ORGANIC MATTER.

MATERIAL SHALL CONFORM TO THE FOLLOWING GRADATION REQUIREMENTS.

GRAVEL FILL TO BE PLACED IN LIFTS OF 9" MAXIMUM THICKNESS AND 90 % DENSITY. COMPACTED TO 95

E. NO FILL OR EMBANKMENT MATERIALS SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OF EMBANKMENT

2.02 EQUIPMENT

A. COMPACTION SHALL BE ACCOMPLISHED BY MECHANICAL MEANS. LARGER AREAS SHALL BE COMPACTED BY SHEEPS FOOT, VIBRATORY OR RUBBER TIED ROLLERS WEIGHING AT LEAST FIVE TONS. SMALLER AREAS SHALL BE COMPACTED BY POWER–DRIVER, HAND HELD TAMPERS.

B. PRIOR TO OTHER EXCAVATION AND CONSTRUCTION EFFORTS GRUB ORGANIC MATERIAL TO A MINIMUM OF 6" BELOW ORIGINAL GROUND LEVEL.

C. UNLESS OTHERWISE INSTRUCTED BY CLIENT'S REPRESENTATIVE. REMOVE TREES, BRUSH AND DEBRIS FROM THE PROPERTY TO AN AUTHORIZED DISPOSAL LOCATION.

D. PRIOR TO PLACEMENT OF FILL OR BASE MATERIALS, ROLL THE SOIL.

E. WHERE UNSTABLE SOIL CONDITIONS ARE ENCOUNTERED, LINE THE GRUBBED AREAS WITH STABILIZER MAT PRIOR TO PLACEMENT OF FILL OR BASE MATERIAL.

3.03 INSTALLATION

A. THE SITE AND TURNAROUND AREAS SHALL BE AT THE SUB–BASE COURSE ELEVATION PRIOR TO FORMING FOUNDATIONS. GRADE OR FILL THE SITE AND ACCESS ROAD AS REQUIRED TO PRODUCE EVEN DISTRIBUTION OF SPOILS RESULTING FROM FOUNDATION EXCAVATIONS. THE RESULTING GRADE SHALL CORRESPOND WITH SAID SUB–BASE COURSE, ELEVATIONS ARE TO BE CALCULATED FORM FINISHED GRADES OR SLOPES INDICATED.

B. THE ACCESS ROAD SHALL BE BROUGHT TO BASE COURSE ELEVATION PRIOR TO FOUNDATION CONSTRUCTION.

C. DO NOT CREATE DEPRESSIONS WHERE WATER MAY POND.

D. THE CONTRACT INCLUDES ALL NECESSARY GRADING, BANKING, DITCHING AND COMPLETE SURFACE COURSE FOR ACCESS ROAD. ALL ROADS OR ROUTES UTILIZED FOR ACCESS TO PUBLIC THOROUGHFARE IS INCLUDED IN SCOPE OF WORK UNLESS OTHERWISE INDICATED.

E. WHEN IMPROVING AN EXISTING ACCESS ROAD, GRADE THE EXISTING ROAD TO REMOVE ANY ORGANIC MATTER AND SMOOTH THE SURFACE BEFORE PLACING FILL OR STONE.

F. PLACE FILL OR STONE IN 3" MAXIMUM LIFTS AND COMPACT BEFORE PLACING NEXT LIFT.

G. THE FINISH GRADE, INCLUDING TOP SURFACE COURSE, SHALL EXTEND A MINIMUM OF 12" BEYOND THE SITE FENCE AND SHALL COVER THE AREA AS INDICATED.

H. RIPRAP SHALL BE APPLIED TO THE SIDE SLOPES OF ALL FENCED AREAS, PARKING AREAS AND TO ALL OTHER SLOPES GREATER THAN 2:1.

I. RIPRAP SHALL BE APPLIED TO THE SIDES OF DITCHES OR DRAINAGE SWALES AS INDICATED ON PLANS.

J. RIPRAP ENTIRE DITCH FOR 6'–0" IN ALL DIRECTIONS AT CULVERT OPENINGS.

K. SEED, FERTILIZER AND STRAW COVER SHALL BE APPLIED TO ALL OTHER DISTURBED AREAS AND DITCHES, DRAINAGE, SWALES, NOT OTHERWISE RIP–RAPPED.

L. UNDER NO CIRCUMSTANCES SHALL DITCHES, SWALES OR CULVERTS BE PLACED SO THEY DIRECT WATER TOWARDS, OR PERMIT STANDING WATER IMMEDIATELY ADJACENT TO SITE. IF OWNER DESIGNS OR IF DESIGN ELEVATIONS CONFLICT WITH THIS GUIDANCE ADVISE THE OWNER IMMEDIATELY.

M. IF A DITCH LIES WITH SLOPE GREATER THAN TEN PERCENT, MOUND DIVERSIONARY HEADWALL IN THE DITCH AT CULVERT ENTRANCES. RIP–RAP THE UPSTREAM SIDE OF THE HEADWALL AS WELL AS THE DITCH FOR 6'–0" ABOVE THE CULVERT.

N. IF A DITCH LIES WITH SLOPES GREATER THAN TEN PERCENT, MOUND DIVERSIONARY HEADWALLS IN THE DITCH FOR 6'–0" ABOVE THE CULVERT ENTRANCE.

O. SEED AND FERTILIZER SHALL BE APPLIED TO SURFACE CONDITIONS WHICH WILL ENCOURAGE ROOTING. RAKE AREAS TO BE SEEDED TO EVEN THE SURFACE AND TO LOOSEN THE SOIL.

P. SOW SEED IN TWO DIRECTIONS IN TWICE THE QUANTITY RECOMMENDED BY THE SEED PRODUCER.

Q. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE GROWTH OF SEEDED AND LANDSCAPED AREAS BY WATERING UP TO THE POINT OF RELEASE FROM THE CONTRACT. CONTINUE TO REWORK BARE AREAS UNTIL COMPLETE COVERAGE IS OBTAINED.

3.04 FIELD QUALITY CONTROL

A. COMPACTION SHALL BE D–1557 FOR SITE WORK AND 95 % MAXIMUM DENSITY UNDER SLAB AREAS. AREAS OF SETTLEMENT WILL BE EXCAVATED AND REFILLED AT CONTRACTOR'S EXPENSE. REQUIRED. USE OF EROSION CONTROL MESH OR MULCH NET SHALL BE AN ACCEPTABLE ALTERNATIVE.

B. THE COMPACTION TEST RESULTS SHALL BE AVAILABLE PRIOR TO THE CONCRETE POUR.

3.05 PROTECTION

A. PROTECT SEEDED AREAS FORM EROSION BY SPREADING STRAW TO A UNIFORM LOOSE DEPTH OF 1"–2". STAKE AND TIE DOWN AS REQUIRED. USE OF EROSION CONTROL MESH OR MULCH NET SHALL BE AN ACCEPTABLE ALTERNATIVE.

B. ALL TREES PLACED IN CONJUNCTION WITH A LANDSCAPE CONTRACT SHALL BE WRAPPED, TIED WITH HOSE PROTECTED WIRE AND SECURED TO STAKES EXTENDING 2'–0" INTO THE GROUND ON FOUR SIDES OF THE TREE.

C. ALL EXPOSED AREAS SHALL BE PROTECTED AGAINST WASHOUTS AND SOIL EROSION. STRAW BALES SHALL BE PLACED AT THE INLET APPROACH TO ALL NEW OR EXISTING CULVERTS. REFER TO DETAILS ON DRAWINGS

SYMBOLS	ABBREVIATIONS
— — — G — — — G —	GROUND WIRE
— — — E — — — E —	ELECTRIC
— — — T — — — T —	TELEPHONE
—OHW—OHW—OHW—OHW—OHW—	OVERHEAD WIRE
——— — — ———	PROPERTY LINE
—x———x———x———	CHAIN LINK FENCE
A–1	ANTENNA MARK
(E)	EXISTING
(P)	PROPOSED DETAIL
DET # / SHT #	REFERENCE
	SURFACE ELEVATION

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SUBMITTALS

PROJECT NO: 7225.CT33XC078

NO	DATE	DESCRIPTION	BY
0	07/17/14	FOR COMMENT	JT
1	09/22/14	FOR CONSTRUCTION	MP

DATE	REVIEWED BY
9/22/14	JMG

SEAL
STATE OF CONNECTICUT
MANOJKUMAR GOHIL
No. 22038
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC078

SITE NAME:
LONG EDDY/WRIGHT PROPERTY

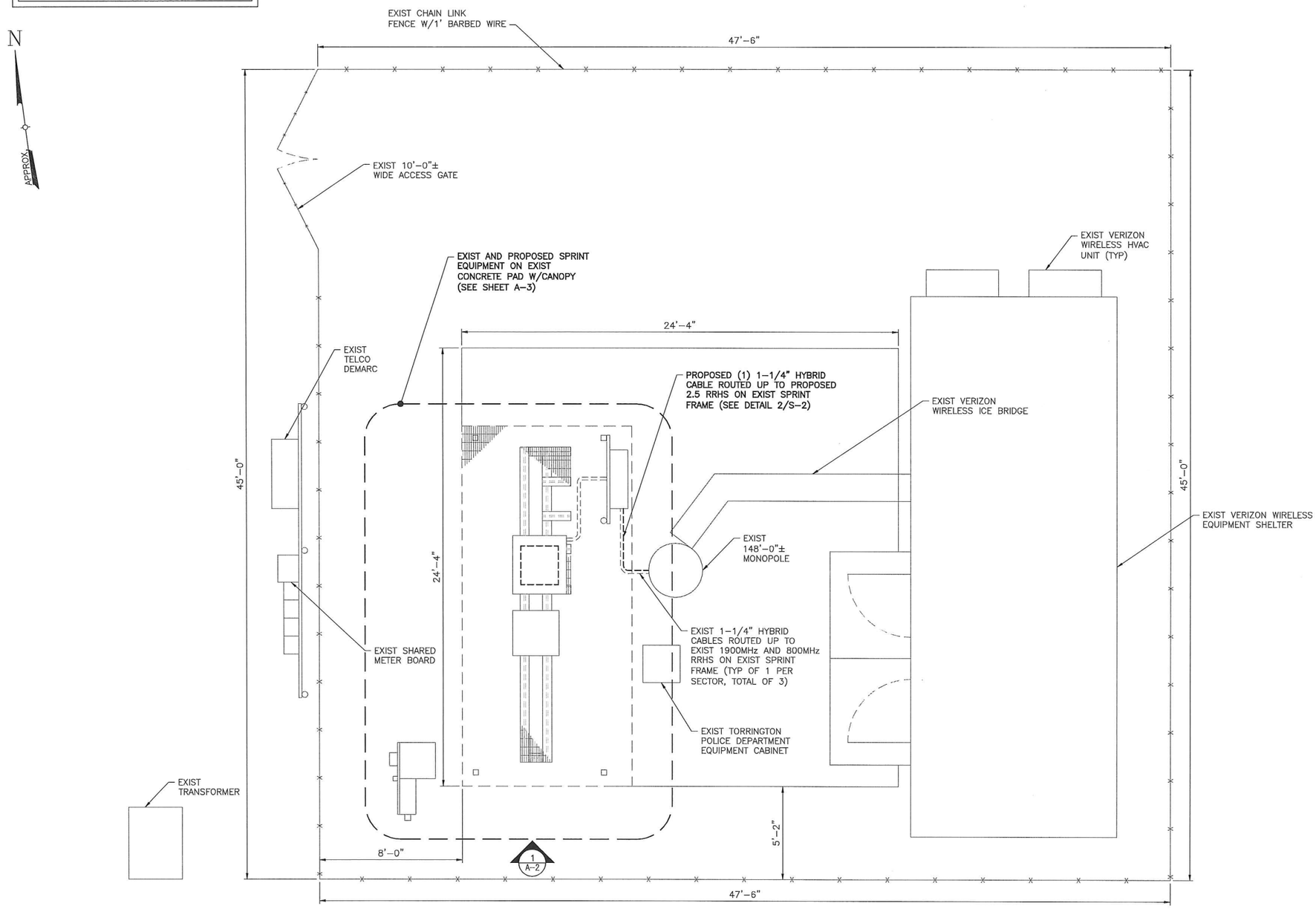
SITE ADDRESS:
136 WRIGHT RD
TORRINGTON, CT 06790

SHEET TITLE:
GENERAL NOTES

SHEET NO:
SP–2

NORTH NOTE:

NORTH SHOWN HAS BEEN ESTABLISHED USING THE USGS QUADRANGLE 7.5 MINUTE MAPS AND IS APPROXIMATE. VERIFY TRUE NORTH PRIOR TO INSTALLATION OF ANTENNAS.



1 / A-1 SITE PLAN

SCALE: 3/8" = 1'-0"

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1	09/22/14	FOR CONSTRUCTION	MP

DATE	REVIEWED BY
9/22/14	DMQ

SEAL

STATE OF CONNECTICUT
ANOOKUMAR M. PATEL
No. 22038
LICENSED PROFESSIONAL ENGINEER

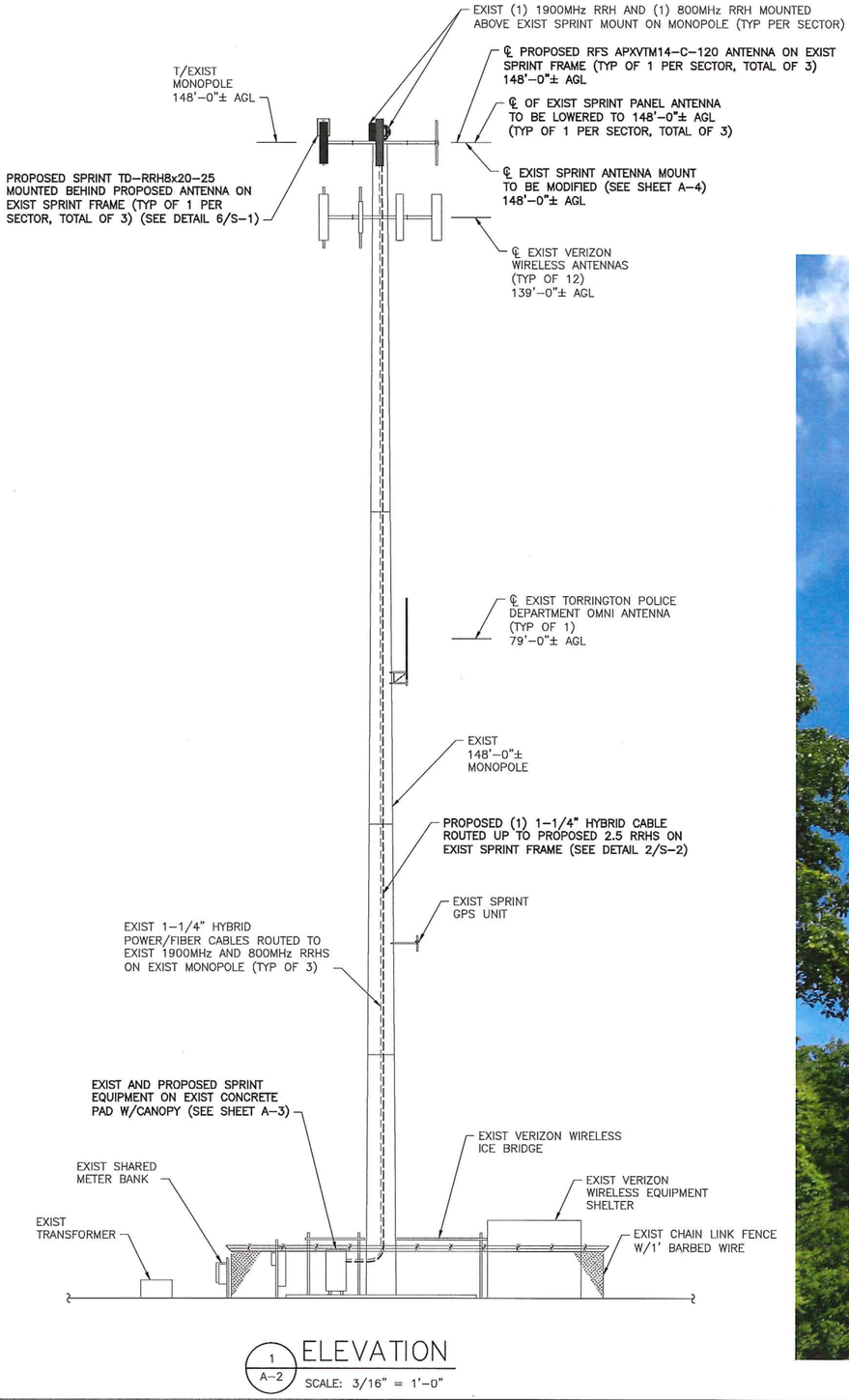
SITE NUMBER:
CT33XC078

SITE NAME:
LONG EDDY/WRIGHT PROPERTY

SITE ADDRESS:
136 WRIGHT RD
TORRINGTON, CT 06790

SHEET TITLE:
SITE PLAN

SHEET NO:
A-1



1 / A-2 ELEVATION

SCALE: 3/16" = 1'-0"

THE EXISTING MONOPOLE SHALL BE ANALYZED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT (TO BE COORDINATED BY OTHERS).

THE EXISTING MOUNT HAS BEEN ANALYZED BY TECTONIC ENGINEERING AND FOUND TO BE ADEQUATE TO SUPPORT THE PROPOSED SPRINT UPGRADE ONCE THE PROPOSED MODIFICATIONS HAVE BEEN COMPLETED AS DETAILED IN THE STRUCTURAL ANALYSIS EVALUATION LETTER DATED 09/22/14, REV 1.

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DATE	REVIEWED BY
9/22/14	JMQ

SEAL

STATE OF CONNECTICUT
MANOJKUMAR R. MEHTA
No. 22038
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC078

SITE NAME:
LONG EDDY/WRIGHT PROPERTY

SITE ADDRESS:
136 WRIGHT RD
TORRINGTON, CT 06790

SHEET TITLE:
ELEVATION

SHEET NO:
A-2

NORTH NOTE:

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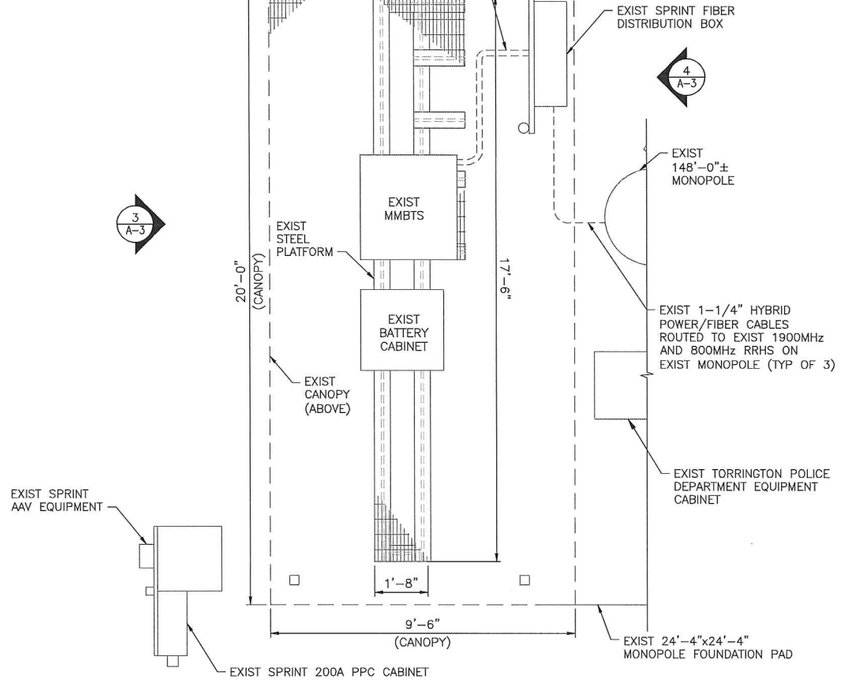
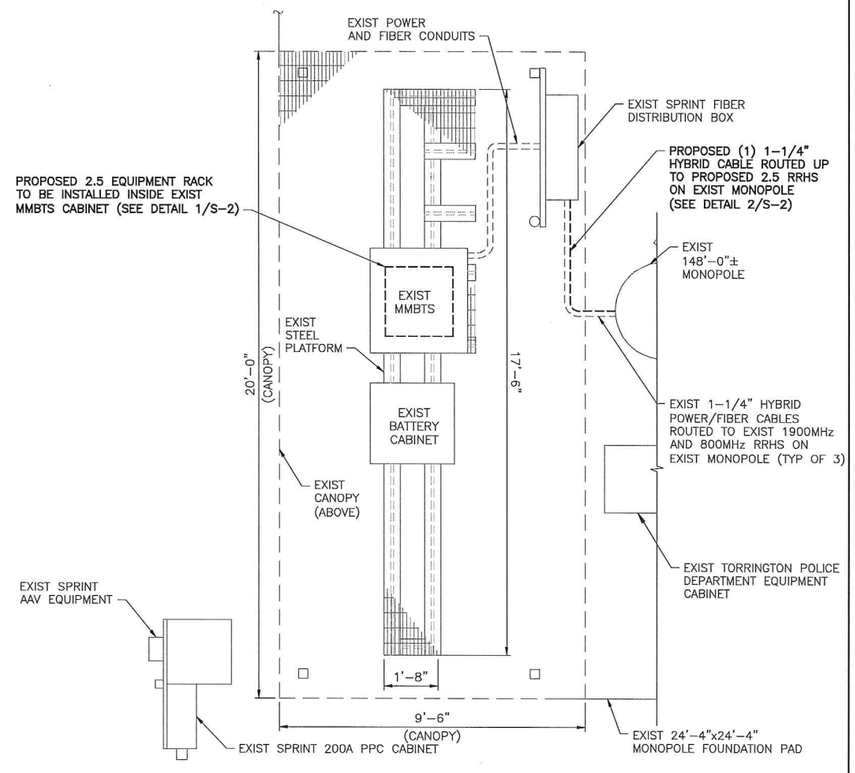


1 A-3 ENLARGED EQUIP. LAYOUT PLAN (EXIST)

SCALE: 1/2" = 1'-0"

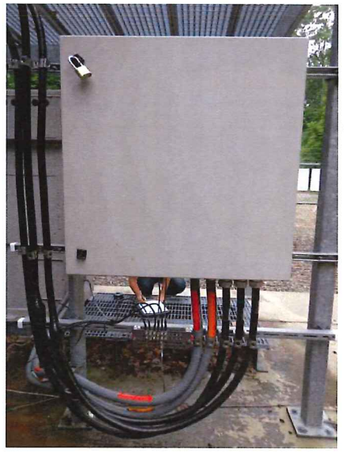
3 A-3 EXIST EQUIPMENT PAD

SCALE: NTS



2 A-3 ENLARGED EQUIP. LAYOUT PLAN (FINAL)

SCALE: 3/4" = 1'-0"



4 A-3 EXIST FIBER DISTRIBUTION BOX

SCALE: NTS

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1	09/22/14	FOR CONSTRUCTION	MP

DATE	REVIEWED BY
9/23/14	JWG

SEAL:
STATE OF CONNECTICUT
ANNOUKUMAR PATEL
No. 22038
LICENSED PROFESSIONAL ENGINEER

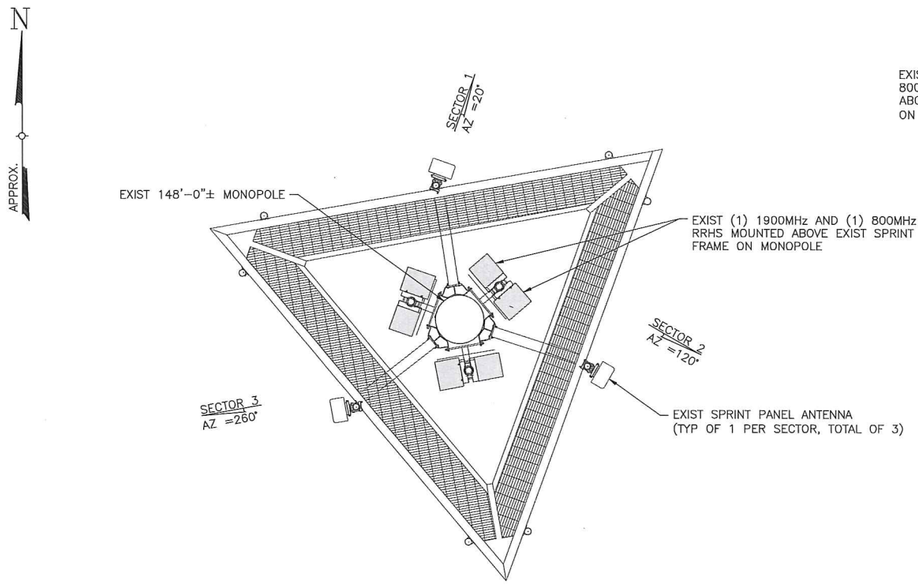
SITE NUMBER:
CT33XC078

SITE NAME:
LONG EDDY/WRIGHT PROPERTY

SITE ADDRESS:
136 WRIGHT RD
TORRINGTON, CT 06790

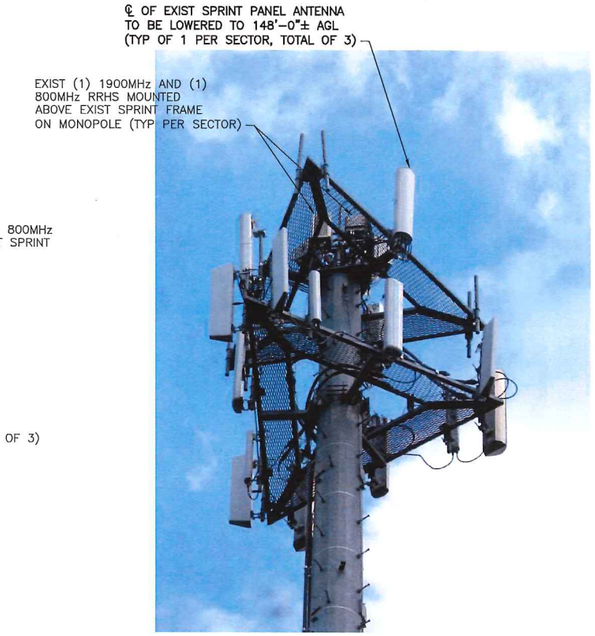
SHEET TITLE:
ENLARGED EQUIPMENT LAYOUT PLANS

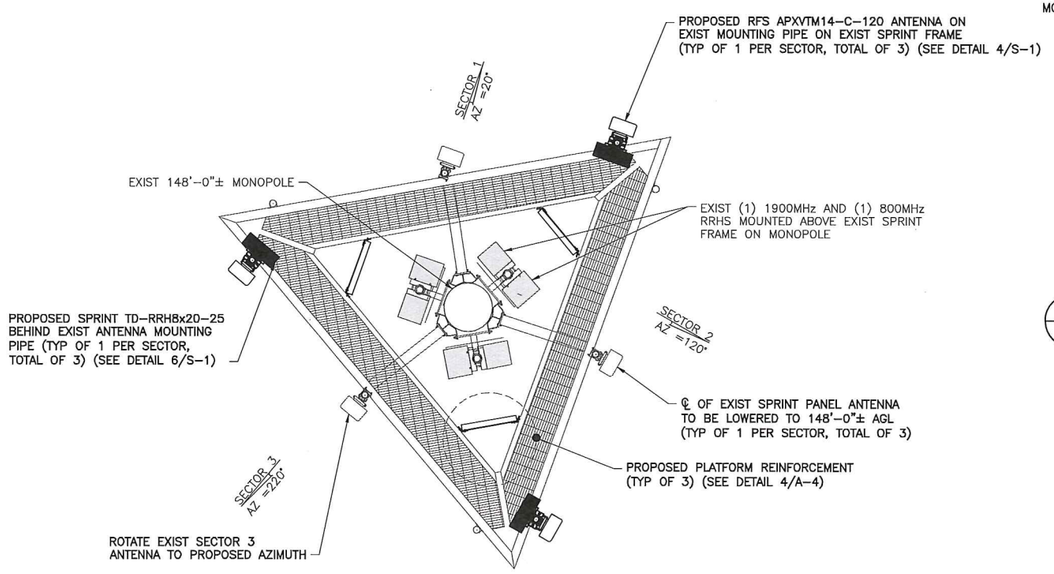
SHEET NO:
A-3



1 / A-4 ANTENNA LAYOUT PLAN (EXIST)

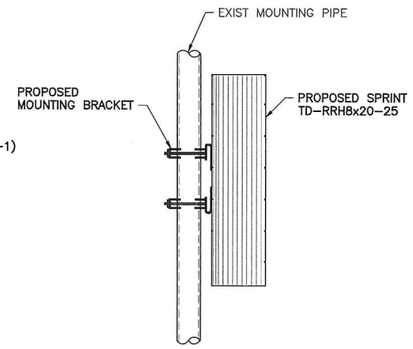
SCALE: 3/8" = 1'-0"





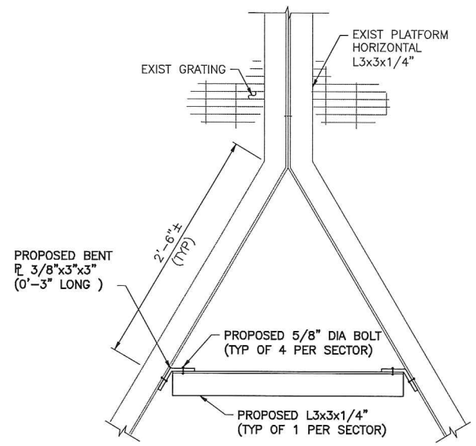
2 / A-4 ANTENNA LAYOUT PLAN (FINAL)

SCALE: 3/8" = 1'-0"



3 / A-4 RRH MOUNTING DETAIL

SCALE: 1 1/2" = 1'-0"



4 / A-4 REINFORCEMENT DETAIL

SCALE: 1 1/2" = 1'-0"

ANTENNA DATA

Status	Exist **(Proposed)**	**Proposed**
Antenna Manufacturer	RFS-CELWAVE	**RFS-CELWAVE**
Antenna Model Number	APXVSPP18-C-A20	**APXVTM14-C-120**
Number of Antennas	3	**3**
Antenna RAD Center	148'	**148'**
Antenna Azimuth	20/120/260 **(20/120/220)**	**20/120/220**
Antenna RRH Model Number	800MHz/1900MHz	**TD-RRH8x20-25**
Number of RRH	6	**3**

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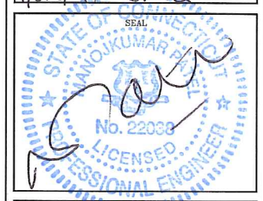


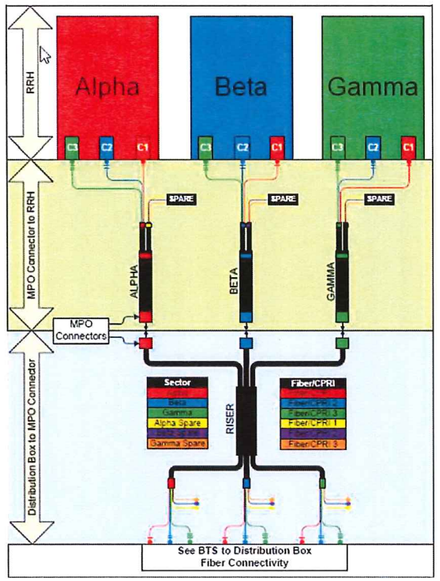
SITE NUMBER:
CT33XC078

SITE NAME:
LONG EDDY/WRIGHT PROPERTY

SITE ADDRESS:
136 WRIGHT RD
TORRINGTON, CT 06790

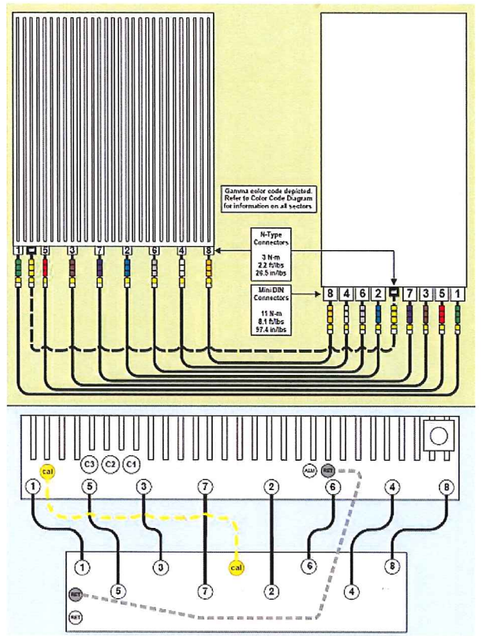
SHEET TITLE:
ANTENNA LAYOUT PLANS

SHEET NO:
A-4



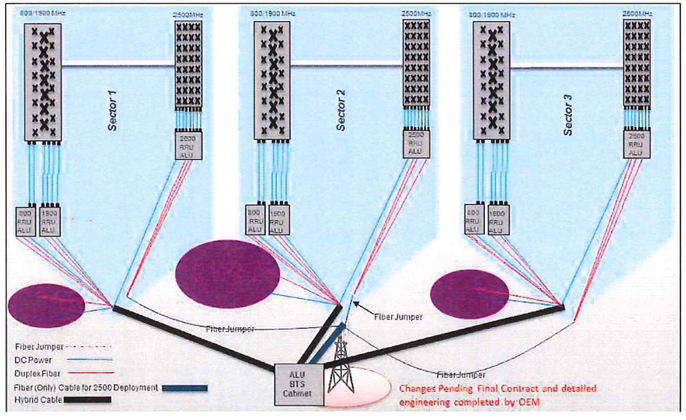
1 A–5 2.5 CABLE COLOR CODING

SCALE: N.T.S.



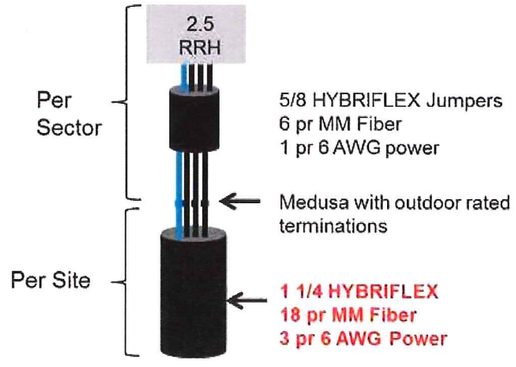
2 A–5 RRH CONNECTIVITY

SCALE: N.T.S.



3 A–5 RAN WIRING

SCALE: N.T.S.



4 A–5 CABLE SCENARIO

SCALE: N.T.S.

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1	09/22/14	FOR CONSTRUCTION	MP

DATE	REVIEWED BY
9/22/14	DMQ

SEAL

STATE OF CONNECTICUT
ANANDKUMAR R. SAINI
No. 22038
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC078

SITE NAME:
LONG EDDY/WRIGHT PROPERTY

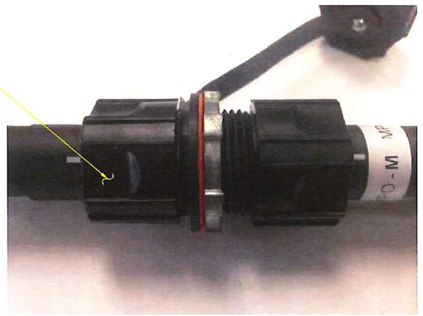
SITE ADDRESS:
136 WRIGHT RD
TORRINGTON, CT 06790

SHEET TITLE:
RAN WIRING DIAGRAM

SHEET NO:
A–5

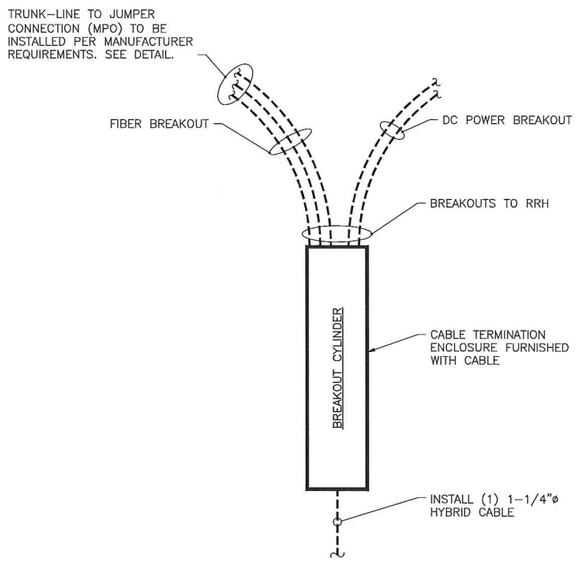
IMPORTANT!! LINE UP WHITE MARKINGS ON JUMPER AND RISER IP-MPO CONNECTOR. PUSH THE WHITE MARK ON THE JUMPER CONNECTOR FLUSH AGAINST THE RED SEAL ON THE RISER CONNECTION

IMPORTANT!! ROTATE THE BAYONET HOUSING CLOCKWISE UNTIL A CLICK SOUND IS HEARD TO ENSURE A GOOD CONNECTION

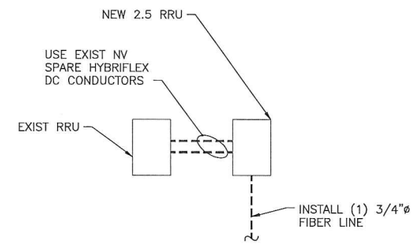


1 A-6 HYBRIFLEX RISER/JUMPER CONNECTION DETAILS

SCALE: N.T.S.



2.5 HYBRID CABLE W/FIBER & DC FEEDERS



FIBER ONLY TRUNK LINES

2 A-6 TRUNK LINE DETAILS (TYPICAL)

SCALE: N.T.S.

SPECIAL NOTES: CABLE MARKINGS AT RAD CENTER AND ALL WALL/BLDG. PENETRATIONS

- ALL COLOR CODE TAPE SHALL BE 3M-35 AND SHALL BE INSTALLED USING A MINIMUM OF (3) WRAPS OF TAPE.
- ALL COLOR BANDS INSTALLED AT THE TOWER TOP SHALL BE A MINIMUM OF 3" WIDE AND SHALL HAVE A MINIMUM OF 3/4" OF SPACING BETWEEN EACH COLOR.
- ALL COLOR BANDS INSTALLED AT OR NEAR THE GROUND MAY BE ONLY 3/4" WIDE. EACH TOP-JUMPER SHALL BE COLOR CORDED WITH (1) SET OF 3" WIDE BANDS.
- EACH MAIN COAX SHALL BE COLOR CODED WITH (1) SET OF 3" BANDS NEAR THE TOP-JUMPER CONNECTION AND WITH 3/4" COLOR BANDS JUST PRIOR TO ENTERING THE BTS OR TRANSMITTER BUILDING.
- ALL BOTTOM JUMPERS SHALL BE COLOR CODED WITH (1) SET OF 3/4" BANDS ON EACH END OF THE BOTTOM JUMPER.
- ALL COLOR CODES SHALL BE INSTALLED SO AS TO ALIGN NEATLY WITH ONE ANOTHER FROM SIDE-TO-SIDE.
- EACH COLOR BAND SHALL HAVE A MINIMUM OF (3) WRAPS AND SHALL BE NEATLY TRIMMED AND SMOOTHED OUT AS TO AVOID UNRAVELING.
- X-POLE ANTENNAS SHOULD USE "XX-1" FOR THE "+45" PORT, "XX-2" FOR THE "-45" PORT.
- COLOR BAND #4 REFERS TO THE FREQUENCY BAND: ORANGE=850, VIOLET=1900. USED ON JUMPERS ONLY.
- RF FEEDLINE SHALL BE IDENTIFIED WITH A METAL TAG (STAINLESS OR BRASS) AND STAMPED WITH THE SECTOR, ANTENNA POSITION, AND CABLE NUMBER.
- ANTENNAS MUST BE IDENTIFIED, USING THE SECTOR LETTER AND ANTENNA NUMBER, WITH A BLACK MARKER PRIOR TO INSTALLATION.

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OVERLAND PARK, KANSAS 66251

CROWN CASTLE

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SUBMITTALS

PROJECT NO: 7225.CT33XC078

NO	DATE	DESCRIPTION	BY
0	07/17/14	FOR COMMENT	JT
1	09/22/14	FOR CONSTRUCTION	MP

DATE	REVIEWED BY
9/22/14	JMa

SEAL
STATE OF CONNECTICUT
JAMES MANOJKUMAR PATEL
No. 22038
LICENSED PROFESSIONAL ENGINEER

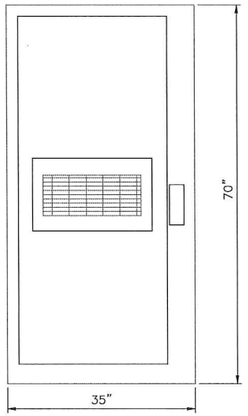
SITE NUMBER:
CT33XC078

SITE NAME:
LONG EDDY/WRIGHT PROPERTY

SITE ADDRESS:
136 WRIGHT RD
TORRINGTON, CT 06790

SHEET TITLE:
CABLE DETAILS

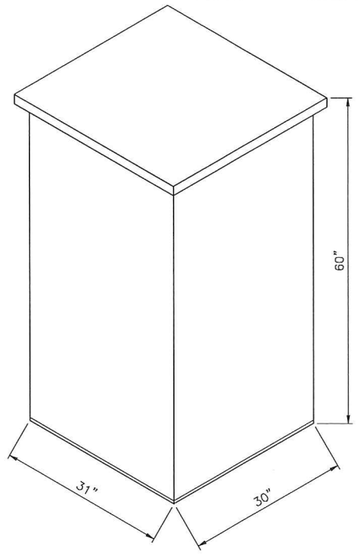
SHEET NO:
A-6



CABINET FRONT 9927 MMBTS MODULAR CELL
SPECIFICATIONS:
HEIGHT: 70" WIDTH: 35" DEPTH: 37.8" WEIGHT: 1090 LBS.

1 S-1 (EXIST) MMBTS CABINET

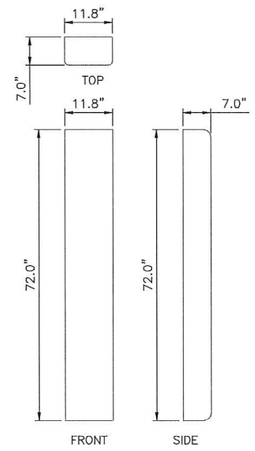
SCALE: 1" = 1'-0"



ANDREW 60ECv2
SPECIFICATIONS:
HEIGHT: 60" WIDTH: 31" DEPTH: 30" WEIGHT: 2430 LBS.

2 S-1 (EXIST) BATTERY CABINET

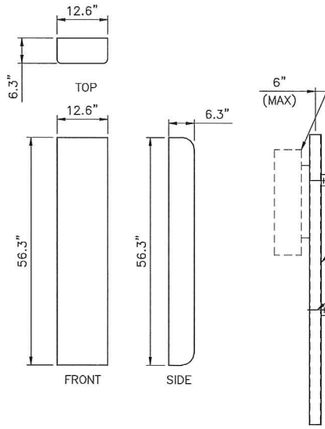
SCALE: 1" = 1'-0"



APXVSPP18-C-A20

3 S-1 (EXIST) ANTENNA DETAILS

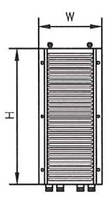
SCALE: 3/4"=1'-0"

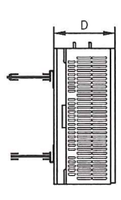


APXVTM14-C-120

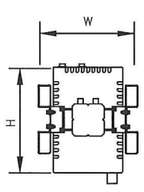
4 S-1 (PROPOSED) ANTENNA DETAIL

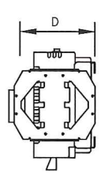
SCALE: 3/4"=1'-0"





TYPE: 1900 MHz 4x45W MODEL #: RRH 1900 4X45 65MHz HEIGHT: 25.0" WIDTH: 11.1" DEPTH: 11.4" WEIGHT: ±60 LBS.

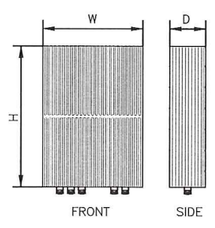




TYPE: 800 MHz 2x50W MODEL #: FD-RRH-2x50-800 HEIGHT: 19.7" WIDTH: 13" DEPTH: 10.8" WEIGHT: ±53 LBS

5 S-1 (EXIST) RRH DETAILS

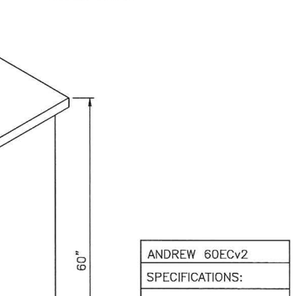
SCALE: 1 1/2"=1'-0"



TYPE: 2.5 RRH MODEL #: TD-RRH8x20-25 HEIGHT: 26.1" WIDTH: 18.6" DEPTH: 6.7" WEIGHT: ±70 LBS

6 S-1 (PROPOSED) RRH DETAIL

SCALE: N.T.S.



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9/22/14	JMG

SEAL

SITE NUMBER:
CT33XC078

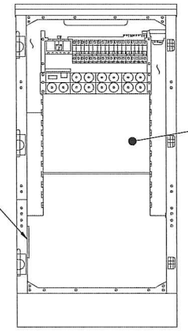
SITE NAME:
LONG EDDY/WRIGHT PROPERTY

SITE ADDRESS:
136 WRIGHT RD
TORRINGTON, CT 06790

SHEET TITLE:
EQUIPMENT DETAILS

SHEET NO:
S-1

NOTE:
LOCATIONS SHOWN FOR INSTALLATION OF NEW EQUIPMENT IN EXISTING CABINET ARE APPROXIMATE. ACTUAL SPACE AVAILABLE TO BE VERIFIED IN FIELD ON A SITE BY SITE BASIS.



EXIST GROUND BAR TO BE UTILIZED

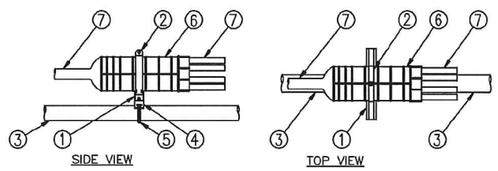
INSTALL NEW 2.5 EQUIPMENT IN EXIST MMBTS CABINET INCLUDING BUT NOT LIMITED TO BASE BAND UNIT, CELL SITE ROUTER AND SURGE ARRESTORS. GROUND EQUIPMENT TO EXIST INTERIOR CABINET GROUND BAR

FRONT ELEVATION
(CABINET INTERIOR)

1 / S-2 MMBTS INTERIOR DETAIL

SCALE: N.T.S.

LEGEND:
1. P1000T-HG UNISTRUT, 12" LONG.
2. 6" PIPE HANGER.
3. EXISTING SUPPORT PIPE.
4. NEW STANDOFF BRACKET, ANDREW PART# 30848-4.
5. NEW ROUND MEMBER ADAPTER SIZED FOR EXISTING PIPE SUPPORT.
6. BREAKOUT UNIT.
7. CABLE.



3 / S-2 MEDUSA HEAD DETAIL

SCALE: NTS

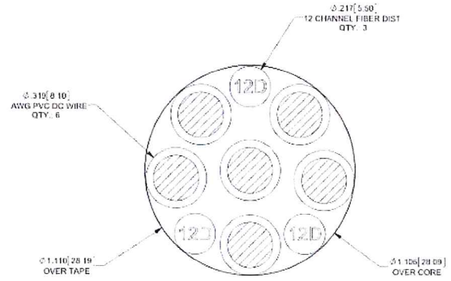
RFS HYBRIFLEX RISER CABLES SCHEDULE

Fiber Only (Existing DC Power)	**Hybrid cable** MN: HB058-M12-050F 12x multi-mode fiber pairs, Top: Outdoor protected connectors, Bottom:LC Connectors, 5/8 cable, 50ft	50 ft
	MN: HB058-M12-075F	75 ft
	MN: HB058-M12-100F	100 ft
	MN:HB058-M12-125F	125 ft
	MN:HB058-M12-150F	150 ft
	MN:HB058-M12-175F	175 ft
	MN:HB058-M12-200F	200 ft
8 AWG Power	**Hybrid cable** MN: HB114-08U3M12-050F 3x 8 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable, 50ft	50 ft
	MN: HB114-08U3M12-075F	75 ft
	MN: HB114-08U3M12-100F	100 ft
	MN: HB114-08U3M12-125F	125 ft
	MN: HB114-08U3M12-150F	150 ft
	MN: HB114-08U3M12-175F	175 ft
	MN: HB114-08U3M12-200F	200 ft
6 AWG Power	**Hybrid cable** MN: HB114-13U3M12-225F 3x 6 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable,225ft	225 ft
	MN: HB114-13U3M12-250F	250 ft
	MN: HB114-13U3M12-275F	275 ft
	MN: HB114-13U3M12-300F	300 ft
4 AWG Power	**Hybrid cable** MN: HB114-21U3M12-225F 3x 6 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable,225ft	325 ft
	MN: HB114-21U3M12-350F	350 ft
	MN: HB114-21U3M12-375F	375 ft

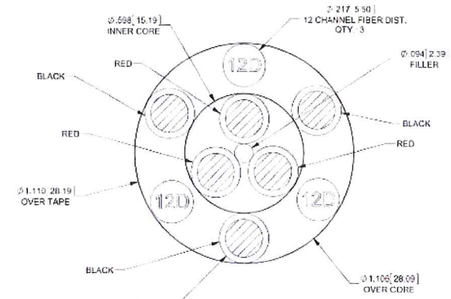
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

Fiber Only	**Hybrid Jumper cable** MN: HBF012-M3-5F1 5 ft, 3x multi-mode fiber pairs, Outdoor & LC connectors, 1/2 cable	5 ft
	MN: HBF012-M3-10F1	10 ft
	MN: HBF012-M3-15F1	15 ft
	MN: HBF012-M3-20F1	20 ft
	MN: HBF012-M3-25F1	25 ft
	MN: HBF012-M3-30F1	30 ft
8 AWG Power	**Hybrid Jumper cable** MN: HBF058-08U1M3-5F1 5 ft, 1x 8 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC Connectors, 5/8 cable	5 ft
	MN: HBF058-08U1M3-10F1	10 ft
	MN: HBF058-08U1M3-15F1	15 ft
	MN: HBF058-08U1M3-20F1	20 ft
	MN: HBF058-08U1M3-25F1	25 ft
	MN: HBF058-08U1M3-30F1	30 ft
6 AWG Power	**Hybrid Jumper cable** MN: HBF058-13U1M3-5F1 5 ft, 1x 6 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC Connectors, 5/8 cable	5 ft
	MN: HBF058-13U1M3-10F1	10 ft
	MN: HBF058-13U1M3-15F1	15 ft
	MN: HBF058-13U1M3-20F1	20 ft
	MN: HBF058-13U1M3-25F1	25 ft
	MN: HBF058-13U1M3-30F1	30 ft
4 AWG Power	**Hybrid Jumper cable** MN: HBF078-21U1M3-5F1 5 ft, 1x 4 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC Connectors, 7/8 cable	5 ft
	MN: HBF078-21U1M3-10F1	10 ft
	MN: HBF078-21U1M3-15F1	15 ft
	MN: HBF078-21U1M3-20F1	20 ft
	MN: HBF078-21U1M3-25F1	25 ft
	MN: HBF078-21U1M3-30F1	30 ft

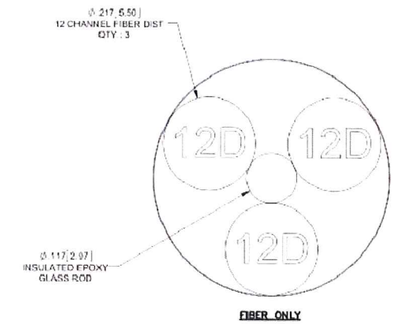
HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE			
MANUF:	RFS		
CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
FIBER ONLY	VARIES	USE NV HYBRIFLEX	7/8"
HYBRIFLEX	<200'	8 AWG	1-1/4"
HYBRIFLEX	225-300'	6 AWG	1-1/4"
HYBRIFLEX	325-375'	4 AWG	1-1/4"



4 AWG



8 AWG & 6 AWG



FIBER ONLY

2 / S-2 2.5 HYBRID CABLE X-SECTION AND DATA

SCALE: NTS

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9/22/14	SMQ

SEAL

STATE OF CONNECTICUT
ANILKUMAR PATEL
No. 22033
LICENSED
PROFESSIONAL ENGINEER

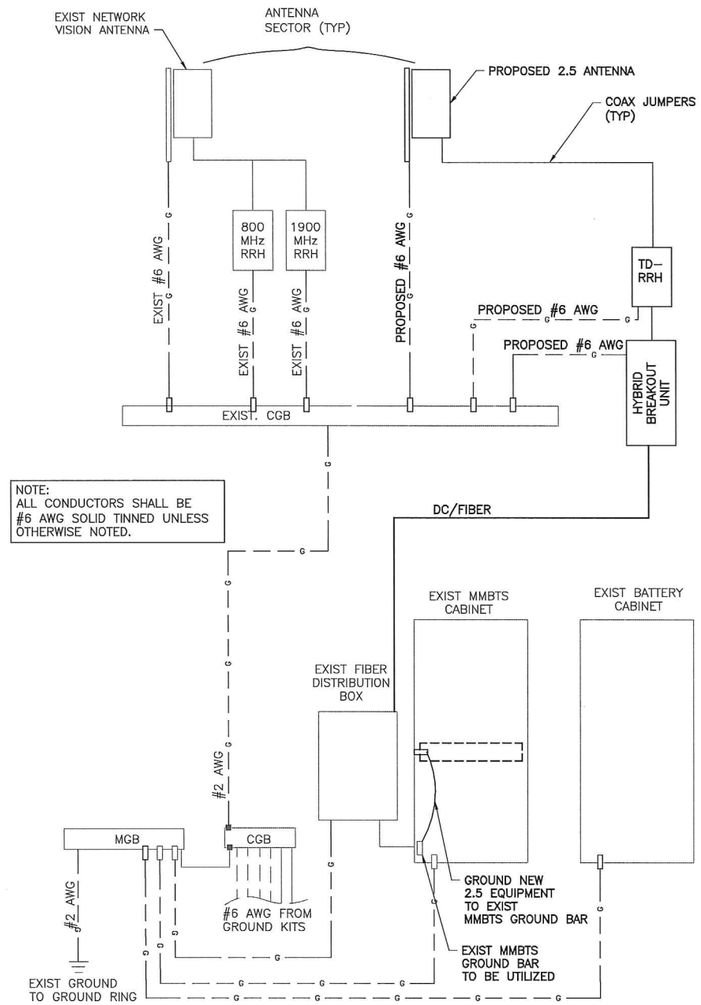
SITE NUMBER:
CT33XC078

SITE NAME:
LONG EDDY/WRIGHT PROPERTY

SITE ADDRESS:
136 WRIGHT RD
TORRINGTON, CT 06790

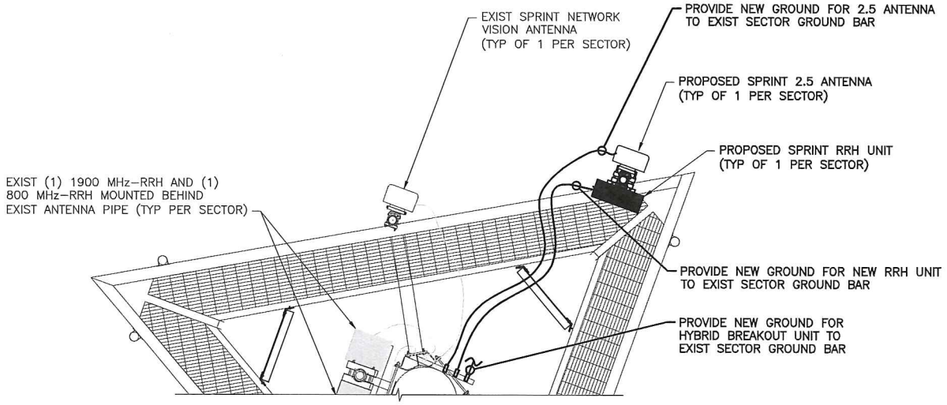
SHEET TITLE:
EQUIPMENT
SCHEMATIC DETAILS

SHEET NO:
S-2



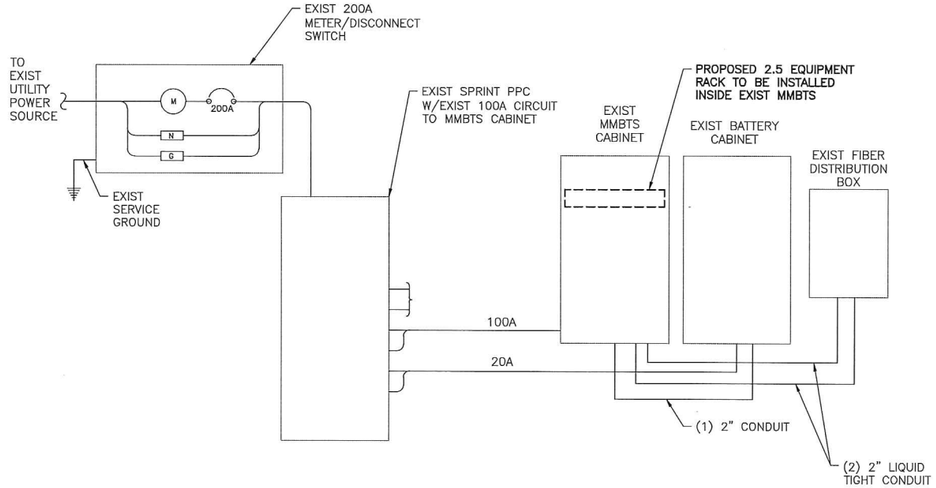
1 E-1 TYPICAL GROUNDING ONE LINE DIAGRAM

SCALE: NTS



2 E-1 TYPICAL ANTENNA GROUNDING PLAN

SCALE: NTS



3 E-1 TYPICAL ELECTRICAL & TELCO PLAN

SCALE: NTS

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SEAL
STATE OF CONNECTICUT
JAMES M. QUINN
No. 22038
LICENSED PROFESSIONAL ENGINEER

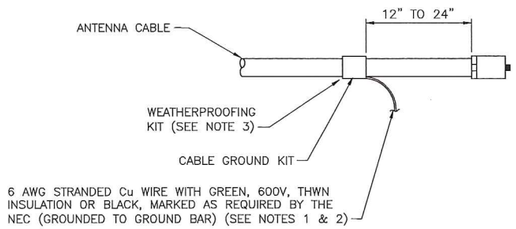
SITE NUMBER:
CT33XC078

SITE NAME:
LONG EDDY/WRIGHT PROPERTY

SITE ADDRESS:
136 WRIGHT RD
TORRINGTON, CT 06790

SHEET TITLE:
ELECTRICAL & GROUNDING PLANS

SHEET NO:
E-1



CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

NOTES:

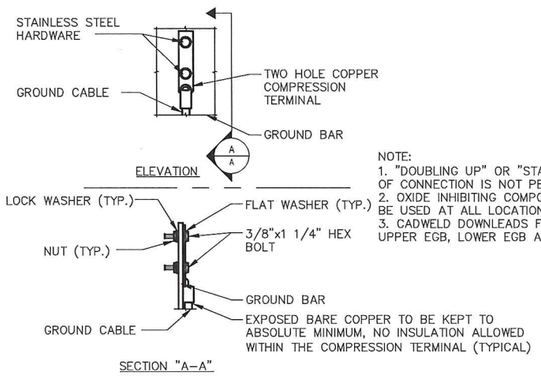
DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.

WEATHER PROOFING SHALL BE (TYPE AND PART NUMBER) AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER AND APPROVED BY CONTRACTOR.

1 E-2 CABLE GROUNDING KIT DETAIL

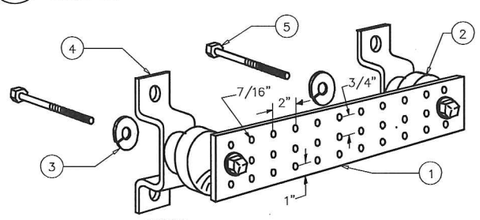
SCALE: N.T.S.



NOTE:
1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB AND MGB.

2 E-2 GROUNDING BAR CONN. DETAIL

SCALE: NTS



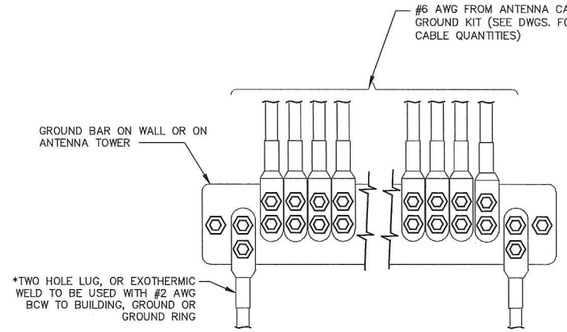
LEGEND

1- COPPER TINNED GROUND BAR, 1/4"X 4"X 20", OR OTHER LENGTH AS REQUIRED, HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION
2- INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4 OR EQUAL
3- 5/8" LOCKWASHERS OR EQUAL
4- WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056 OR EQUAL
5- 5/8-11 X 1" H.H.C.S.BOLTS

NOTE:
ALL BOLTS, NUTS, WASHERS AND LOCK WASHERS SHALL BE 18-8 STAINLESS STEEL.

3 E-2 GROUNDING BAR DETAIL

SCALE: NTS



* - GROUND BARS AT THE BOTTOM OF TOWERS/MONOPOLES SHALL ONLY USE EXOTHERMIC WELDS.

- ATTACH "DO NOT DISCONNECT" LABELS TO GROUND BARS. CAN USE BRASS TAG "DO NOT DISCONNECT" AT EACH HYBRID GROUND POINT OR BACK-A-LITE PLATE LABEL ON GROUND BAR.

- CONNECT SEQUENCE- BOLT/WASHER/NO-OX/GROUND BAR/NO-OX/WASHER/LOCK-WASHER/NUT. THIS IS REPEATED FOR EACH LUG CONNECTION POINT.

4 E-2 ANTENNA GROUND BAR DETAIL

SCALE: NTS

GROUNDING NOTES:

1. GROUNDING SHALL BE IN ACCORDANCE WITH NEC ARTICLE 250-GROUNDING AND BONDING.

2. ALL GROUND WIRES SHALL BE #2 AWG UNLESS NOTED OTHERWISE.

3. ALL GROUNDING WIRES SHALL PROVIDE A STRAIGHT, DOWNWARD PATH TO GROUND WITH GRADUAL BENDS AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.

4. EACH EQUIPMENT CABINET SHALL BE CONNECTED TO THE MASTER ISOLATION GROUND BAR (MGB) WITH #2 AWG INSULATED STRANDED COPPER WIRE. EQUIPMENT CABINETS WALL HAVE (2) CONNECTIONS.

5. PROVIDE DEDICATED #2 AWG COPPER GROUND WIRE FROM EACH ANTENNA MOUNTING PIPE TO ASSOCIATED CIGBE.

6. THE CONTRACTOR SHALL VERIFY THAT THE EXISTING GROUND BARS HAVE ENOUGH SPACE/HOLES FOR ADDITIONAL TWO HOLE LUGS.

7. ALL CONDUITS SHALL BE RIGID GALVANIZED STEEL AND SHALL BE PROVIDED WITH GROUNDING BUSHINGS.

8. PROVIDE GROUND CONNECTIONS FOR ALL METALLIC STRUCTURES, ENCLOSURES, RACEWAYS AND OTHER CONDUCTIVE ITEMS ASSOCIATED WITH THE INSTALLATION OF CARRIER'S EQUIPMENT.

9. WHEN CABLE LENGTH IS OVER 20' THE MANUFACTURERS GROUND KIT MUST BE INSTALLED PER THE MANUFACTURERS SPECIFICATIONS.

10. REFER TO "ANTI-THEFT UPDATE TO SPRINT GROUNDING 082412.PDF" FOR GUIDELINE TO SUSPECTED OR ACTUAL THEFT OF GROUNDING.

11. HOME RUN GROUNDS ARE NOT APPROVED BY CROWN CASTLE CONSTRUCTION STANDARDS AND THAT ANTENNA BUSS BARS SHOULD BE INSTALLED DIRECTLY TO TOWER STEEL WITHOUT INSULATORS OR DOWN CONDUCTORS.

PROTECTIVE GROUNDING SYSTEM GENERAL NOTES:

1. AT ALL TERMINATIONS AT EQUIPMENT ENCLOSURES, PANEL, AND FRAMES OF EQUIPMENT AND WHERE EXPOSED FOR GROUNDING. CONDUCTOR TERMINATION SHALL BE PERFORMED UTILIZING TWO HOLE BOLTED TONGUE COMPRESSION TYPE LUGS WITH STAINLESS STEEL SELF-TAPPING SCREWS.

2. ALL CLAMPS AND SUPPORTS USED TO SUPPORT THE GROUNDING SYSTEM CONDUCTORS AND PVC CONDUITS SHALL BE PVC TYPE (NON CONDUCTIVE). DO NOT USE METAL BRACKETS OR SUPPORTS WHICH WOULD FORM A COMPLETE RING AROUND ANY GROUNDING CONDUCTOR.

3. ALL GROUNDING CONNECTIONS SHALL BE COATED WITH A COPPER SHIELD ANTI-CORROSIVE AGENT SUCH AS T&B KOPR SHIELD. VERIFY PRODUCT WITH PROJECT MANAGER.

4. ALL BOLTS, WASHERS, AND NUTS USED ON GROUNDING CONNECTIONS SHALL BE STAINLESS STEEL.

5. INSTALL GROUND BUSHING ON ALL METALLIC CONDUITS AND BOND TO THE EQUIPMENT GROUND BUS IN THE PANEL BOARD.

6. GROUND ANTENNA BASES, FRAMES, CABLE RACKS, AND OTHER METALLIC COMPONENTS WITH #2 INSULATED TINNED STRANDED COPPER GROUNDING CONDUCTORS AND CONNECT TO INSULATED SURFACE MOUNTED GROUND BARS. CONNECTION DETAILS SHALL FOLLOW MANUFACTURER'S SPECIFICATIONS FOR GROUNDING.

7. GROUND HYBRID CABLE SHIELD AT BOTH ENDS USING MANUFACTURER'S GUIDELINES.

ELECTRICAL AND GROUNDING NOTES

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
3. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
4. BURIED CONDUIT SHALL BE SCHEDULE 40 PVC.
5. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THNN INSULATION.
6. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON THIS DRAWING PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
7. WHERE CONDUIT BETWEEN BTS AND PROJECT OWNER CELL SITE PPC AND BETWEEN BTS AND PROJECT OWNER CELL SITE TELCO SERVICE CABINET ARE UNDERGROUND USE PVC, SCHEDULE 40 CONDUIT. ABOVE THE GROUND PORTION OF THESE CONDUITS SHALL BE PVC CONDUIT.
8. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
9. GROUNDING SHALL COMPLY WITH NEC ART. 250.
10. GROUND HYBRID CABLE SHIELDS AT 3 LOCATIONS USING MANUFACTURER'S HYBRID CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
11. USE #2 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.
12. ALL GROUND CONNECTIONS TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
13. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #2 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 6 FEET OF PROJECT OWNER EQUIPMENT OR CABINET TO MASTER GROUND BAR OR GROUNDING RING.
14. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
15. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
16. BOND ANTENNA MOUNTING BRACKETS, HYBRID CABLE GROUND KITS, AND RRHs TO EGB PLACED NEAR THE ANTENNA LOCATION.
17. BOND ANTENNA EGB'S AND MGB TO GROUND RING.
18. CONTRACTOR SHALL TEST COMPLETED GROUND SYSTEM AND RECORD RESULT FOR PROJECT CLOSE-OUT DOCUMENTATION. 5 OHMS MINIMUM RESISTANCE REQUIRED.
19. CONTRACTOR SHALL CONDUCT ANTENNA, HYBRID CABLES, GPS COAX AND RRH RETURN-LOSS AND DISTANCE- TO-FAULT MEASUREMENTS (SWEEP TESTS) AND RECORD RESULTS FOR PROJECT CLOSE OUT.
20. CONTRACTOR SHALL CHECK CAPACITY OF EXISTING SERVICE & PANEL ON SITE TO DETERMINE IF CAPACITY EXISTS TO ACCOMMODATE THE ADDED LOAD OF THIS PROJECT. ADVISE ENGINEER OF ANY DISCREPANCY.
21. LOCATION OF ALL OUTLET, BOXES, ETC, AND THE TYPE OF CONNECTION (PLUG OR DIRECT) SHALL BE CONFIRMED WITH THE OWNER'S REPRESENTATIVE PRIOR TO ROUGH-IN.
22. ELECTRICAL CHARACTERISTICS OF ALL EQUIPMENT (NEW AND EXISTING) SHALL BE FIELD VERIFIED WITH THE OWNERS REPRESENTATIVE AND EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN OF CONDUIT AND WIRE. ALL EQUIPMENT SHALL BE PROPERLY CONNECTED ACCORDING TO THE NAMEPLATE DATA FURNISHED ON THE EQUIPMENT.

Sprint

2.5 EQUIPMENT DEPLOYMENT
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

CROWN CASTLE

TECTONIC • PLANNING • ENGINEERING • SURVEYING • CONSTRUCTION MANAGEMENT

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1279 Route 300
Newburgh, NY 12550
Phone: (845) 567-6656
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www.tectonicengineering.com

SUBMITTALS

PROJECT NO: 7225.CT33XC078

NO	DATE	DESCRIPTION	BY
0	07/17/14	FOR COMMENT	JT
1	09/22/14	FOR CONSTRUCTION	MP

DATE	REVIEWED BY
9/22/14	SMA

SEAL
STATE OF CONNECTICUT
SHOUKUMAR
No. 22039
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC078

SITE NAME:
LONG EDDY/WRIGHT PROPERTY

SITE ADDRESS:
136 WRIGHT RD
TORRINGTON, CT 06790

SHEET TITLE:
GROUNDING DETAILS & NOTES

SHEET NO:
E-2

June 16, 2014

Patrick Byrum
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704) 405-6532

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
btwo@btgrp.com

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Sprint PCS* Co-Locate**	**SCENARIO 2.5B**
	Carrier Site Number:	CT33XC078
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	876373
	Crown Castle Site Name:	Long Eddy / Wright Property
	Crown Castle JDE Job Number:	288228
	Crown Castle Work Order Number:	773437
	Crown Castle Application Number:	245996 Rev. 0
Engineering Firm Designation:	**B+T Group Project Number:**	89028.004.01
Site Data:	**136 Wright Rd., Torrington, Litchfield County, CT** **Latitude *41° 49' 38.34"*, Longitude *-73° 10' 13.97"*** **148 Foot - Monopole Tower**	

Dear Patrick,

B+T Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 656381, in accordance with application 245996, revision 0.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

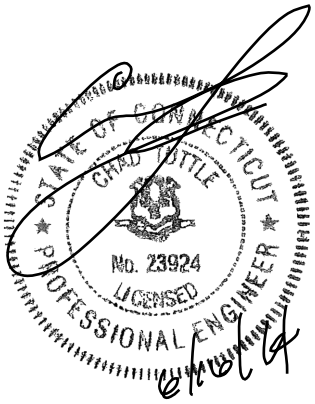
LC4.7: Existing + Reserved + Proposed Equipment + Proposed Modifications **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and IBC 2006 based upon a wind speed of 80 mph fastest mile.

All equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *B+T Group* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:
B+T Engineering, Inc.



Brandon Sevier
Project Engineer

Chad E. Tuttle, P.E.
President

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 148 ft Monopole tower designed by Summit in June of 2000. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. The proposed modifications by B+T GRP dated 2/25/2014 were considered in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 28.1 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
148.0	148.0	3	Alcatel Lucent	TD-RRH8x20-25	1	1 1/4	--
		3	Rfs Celwave	APXVTM14-C-120			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
149.0	149.0	3	Alcatel Lucent	TME-1900MHz RRH (65MHz)	--	--	1
		3	Alcatel Lucent	TME-800MHZ RRH			
		1	--	Collar Mount [SO 102-3]			
148.0	148.0	3	Alcatel Lucent	800 EXTERNAL NOTCH FILTER	3	1 1/4	1
		9	Rfs Celwave	ACU-A20-N			
		3	Rfs Celwave	APXVSPP18-C-A20			
		1	--	Platform Mount [LP 601-1]			
138.0	138.0	1	Antel	BXA-171063-8BF-2	18	1 5/8	1
		2	Antel	BXA-171085-8BF-EDIN-2			
		3	Antel	BXA-70063-6CF-2			
		2	Antel	LPA-80063/6CF			
		4	Antel	LPA-80080/6CF			
		1	--	Platform Mount [LP 601-1]			
128.0	128.0	12	Cci Antennas	HPA-65R-BUU-H8	2 8 3	3/8 3/4 5/16	2
		3	Ericsson	KRF 102 361/1			
		9	Ericsson	RRU-11			
		6	Ericsson	RRUS 12-B2			
		6	Ericsson	RRUS A2			
		3	Ericsson	RRUS E2 B29			
		3	Ericsson	RRUS-32 B30			
		4	Raycap	DC6-48-60-18-8F			
		1	--	Platform Mount [MTC3607]			
79.0	84.0	1	Rfs Celwave	PD1109E	1	1/2	1
	79.0	1	--	Side Arm Mount [SO 701-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
45.0	45.0	1	Gps	GPS_A	1	1/2	1
		1	--	Side Arm Mount [SO 701-1]			
16.0	16.0	1	Gps	GPS_A	1	1/2	1
		1	--	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
148	148	12	Dapa	48000 PCS Panel	--	--
		1	Generic	14' LP Platform		
140	140	12	Dapa	48000 PCS Panel	--	--
		1	Generic	14' LP Platform		
130	130	12	Dapa	48000 PCS Panel	--	--
		1	Generic	14' LP Platform		
120	120	12	Dapa	48000 PCS Panel	--	--
		1	Generic	14' LP Platform		
76	76	1	Generic	GPS Antenna	--	--
		1	Generic	GPS Stand-on Mount		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Sprint PCS Co-locate Rev # 0	245996	CCI Sites
Tower Manufacturer Drawing	Summit, Date: 06/23/2000	1631601	CCI Sites
Tower Modification Drawing	B+T GRP, Project No. 89028.003.01	Date: 02/25/2014	CCI Sites
Foundation Drawing	Summit, Job No. 10186	1634518	CCI Sites
Geotech Report	Clarence Welti Assoc., Inc., Date: 05/12/2000	1531964	CCI Sites
Antenna Configuration	Crown CAD Package	Date: 05/29/2014	CCI Sites

3.1) Analysis Method

tnxTower (version 6.1.4.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
5) Mount areas and weights are assumed based on photographs provided.

This analysis may be affected if any assumptions are not valid or have been made in error. B+T Group should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	148 - 116.5	Pole	TP29.48x24x0.219	1	-9.017	953.210	59.6	Pass
L2	116.5 - 98.5	Pole	TP32.175x28.39x0.25	2	-11.899	1316.941	96.7	Pass
L3	98.5 - 80.25	Pole	TP35.35x32.175x0.434	3	-14.480	1916.361	87.5	Pass
L4	80.25 - 70.5	Pole	TP36.547x34.067x0.487	4	-18.325	2274.471	91.8	Pass
L5	70.5 - 39.75	Pole	TP41.9x36.547x0.591	5	-25.294	3239.110	83.8	Pass
L6	39.75 - 31.75	Pole	TP42.666x40.361x0.643	6	-30.789	3670.349	83.4	Pass
L7	31.75 - 17.75	Pole	TP45.102x42.666x0.626	7	-35.354	3788.293	88.4	Pass
L8	17.75 - 14.25	Pole	TP45.711x45.102x0.728	8	-36.775	4714.421	72.9	Pass
L9	14.25 - 0	Pole	TP48.19x45.711x0.663	9	-41.868	4348.579	85.1	Pass
							Summary	
						Pole (L2)	96.7	Pass
						RATING =	96.7	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	80.7	Pass
1	Base Plate	Base	82.5	Pass
1	Base Foundation (Soil Interaction)	Base	99.1	Pass

Structure Rating (max from all components) =	99.1%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Capacities up to 105% are considered acceptable based on analysis methods used.

4.1) Recommendations

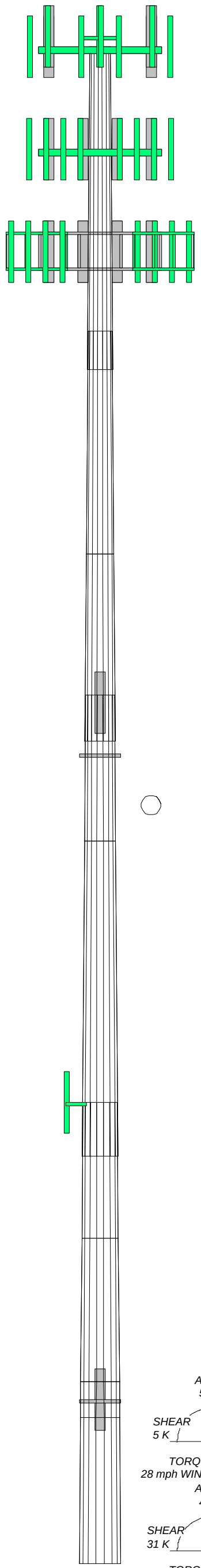
For the determined structural capacity to be effective, the modifications proposed in document 4491592 (B+T mod drawings, Dated 02/25/2014) shall be installed prior to any loading changes.

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4	5	6	7	8	9
Length (ft)	31.500	21.750	18.250	14.250	30.750	13.250	14.000	3.500	14.250
Number of Sides	18	18	18	18	18	18	18	18	18
Thickness (in)	0.219	0.250	0.434	0.487	0.591	0.643	0.626	0.728	0.663
Socket Length (ft)	3.750		4.500		5.250				
Top Dia (in)	24.000	28.390	32.175	34.067	36.547	40.361	42.666	45.102	45.711
Bot Dia (in)	29.480	32.175	35.350	36.547	41.900	42.666	45.102	45.711	48.190
Grade	A607-60	A607-65	50.956421ksi	51.034175ksi	53.421477ksi	53.48381ksi	53.566146ksi	53.732719ksi	54.360134ksi
Weight (K)	2.0	1.8	2.7	2.5	7.2	3.6	3.9	1.2	4.5

148.0 ft
116.5 ft
98.5 ft
80.3 ft
70.5 ft
39.8 ft
31.8 ft
17.8 ft
14.3 ft
0.0 ft



DESIGNED APPURTENANCE LOADING

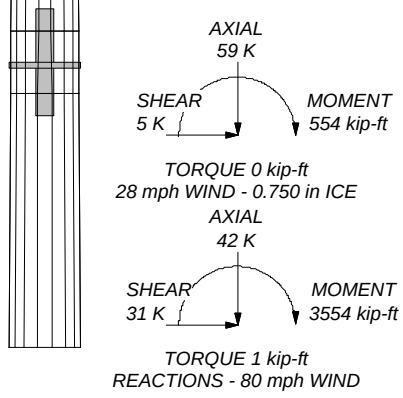
TYPE	ELEVATION	TYPE	ELEVATION
TME-1900MHz RRH (65MHz) (E)	149	BXA-171063-8BF-2 w/ Mount Pipe (E)	138
TME-1900MHz RRH (65MHz) (E)	149	Platform Mount [LP 601-1] (E)	138
TME-1900MHz RRH (65MHz) (E)	149	(4) HPA-65R-BUU-H8 w/ Mount Pipe (R)	128
TME-800MHZ RRH (E)	149	(4) HPA-65R-BUU-H8 w/ Mount Pipe (R)	128
TME-800MHZ RRH (E)	149	(4) HPA-65R-BUU-H8 w/ Mount Pipe (R)	128
TME-800MHZ RRH (E)	149	(3) RRU-11 (R)	128
Side Arm Mount [SO 102-3] (E)	149	(3) RRU-11 (R)	128
APXVSPP18-C-A20 w/ Mount Pipe (E)	148	(3) RRU-11 (R)	128
APXVSPP18-C-A20 w/ Mount Pipe (E)	148	RRUS E2 B29 (R)	128
APXVSPP18-C-A20 w/ Mount Pipe (E)	148	RRUS E2 B29 (R)	128
800 EXTERNAL NOTCH FILTER (E)	148	RRUS E2 B29 (R)	128
800 EXTERNAL NOTCH FILTER (E)	148	DC6-48-60-18-8F (R)	128
800 EXTERNAL NOTCH FILTER (E)	148	(2) DC6-48-60-18-8F (R)	128
(3) ACU-A20-N (E)	148	DC6-48-60-18-8F (R)	128
(3) ACU-A20-N (E)	148	RRUS-32 B30 (R)	128
(3) ACU-A20-N (E)	148	RRUS-32 B30 (R)	128
APXVTM14-C-120 w/ Mount Pipe (P)	148	RRUS-32 B30 (R)	128
APXVTM14-C-120 w/ Mount Pipe (P)	148	(2) RRUS A2 (R)	128
APXVTM14-C-120 w/ Mount Pipe (P)	148	(2) RRUS A2 (R)	128
TD-RRH8x20-25 (P)	148	(2) RRUS A2 (R)	128
TD-RRH8x20-25 (P)	148	(2) RRUS 12-B2 (R)	128
TD-RRH8x20-25 (P)	148	(2) RRUS 12-B2 (R)	128
5' x 2' Pipe Mount (E)	148	(2) RRUS 12-B2 (R)	128
5' x 2' Pipe Mount (E)	148	KRF 102 361/1 (R)	128
5' x 2' Pipe Mount (E)	148	KRF 102 361/1 (R)	128
Platform Mount [LP 601-1] (E)	148	KRF 102 361/1 (R)	128
(2) LPA-80063/6CF w/ Mount Pipe (E)	138	Platform Mount [MTC3607] (R)	128
(2) LPA-80080/6CF w/ Mount Pipe (E)	138	PD1109E (E)	79
(2) LPA-80080/6CF w/ Mount Pipe (E)	138	Side Arm Mount [SO 701-1] (E)	79
BXA-70063-6CF-2 w/ Mount Pipe (E)	138	GPS_A (E)	45
BXA-70063-6CF-2 w/ Mount Pipe (E)	138	Side Arm Mount [SO 701-1] (E)	45
BXA-70063-6CF-2 w/ Mount Pipe (E)	138	GPS_A (E)	16
BXA-171085-8BF-EDIN-2 w/ Mount Pipe (E)	138	Side Arm Mount [SO 701-1] (E)	16
BXA-171085-8BF-EDIN-2 w/ Mount Pipe (E)	138		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	53.48381ksi	53 ksi	68 ksi
A607-65	65 ksi	80 ksi	53.566146ksi	54 ksi	69 ksi
50.956421ksi	51 ksi	66 ksi	56.732719ksi	57 ksi	72 ksi
51.034175ksi	51 ksi	66 ksi	54.360134ksi	54 ksi	69 ksi
53.421477ksi	53 ksi	68 ksi			

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 28 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 96.7%



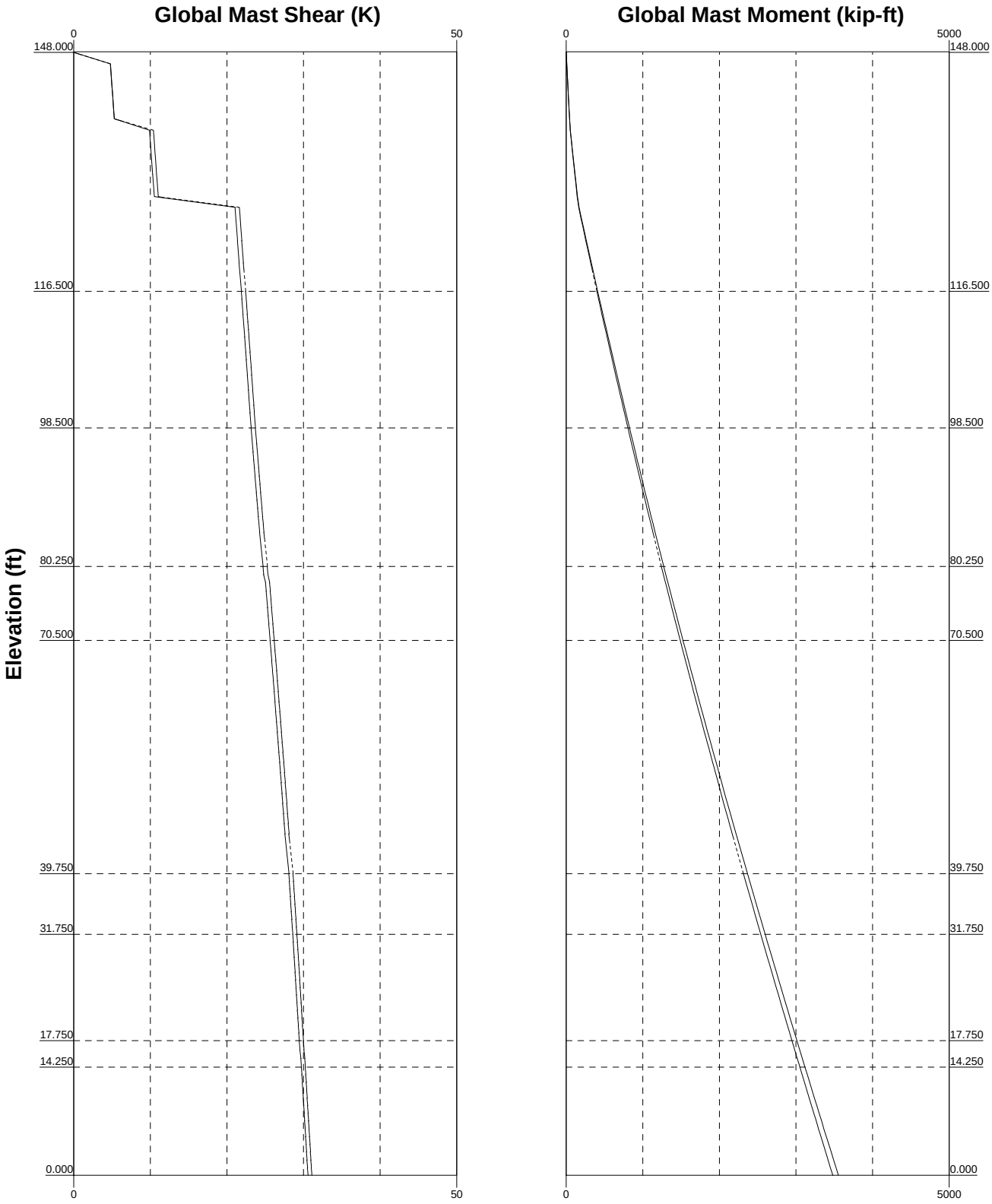
B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 89028.004.01 - LONG EDDY WRIGHT PROPERTY, CT (BU# 87637			
Project:			
Client: Crown Castle	Drawn by: B. Sevier	App'd:	
Code: TIA/EIA-222-F	Date: 06/16/14	Scale: NTS	
Path:		Dwg No. E-1	

TIA/EIA-222-F - 80 mph/28 mph 0.750 in Ice

Maximum Values

Vx Vz Mx Mz



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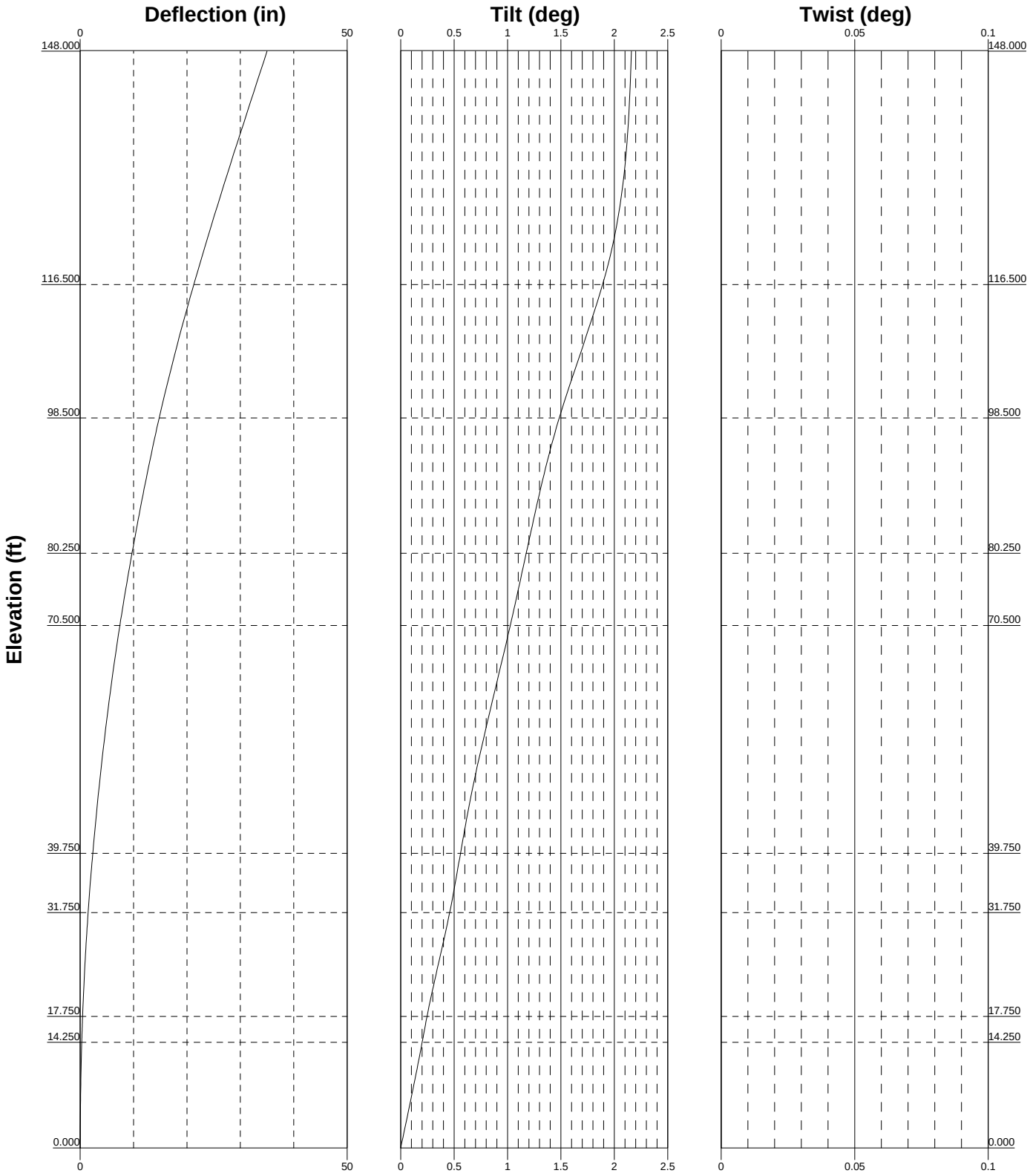
Job: 89028.004.01 - LONG EDDY WRIGHT PROPERTY, CT (BU# 87637			
Project:			
Client: Crown Castle	Drawn by: B. Sevier	App'd:	
Code: TIA/EIA-222-F	Date: 06/16/14	Scale: NTS	
Path:		Dwg No. E-4	

TIA/EIA-222-F - Service - 50 mph

Maximum Values



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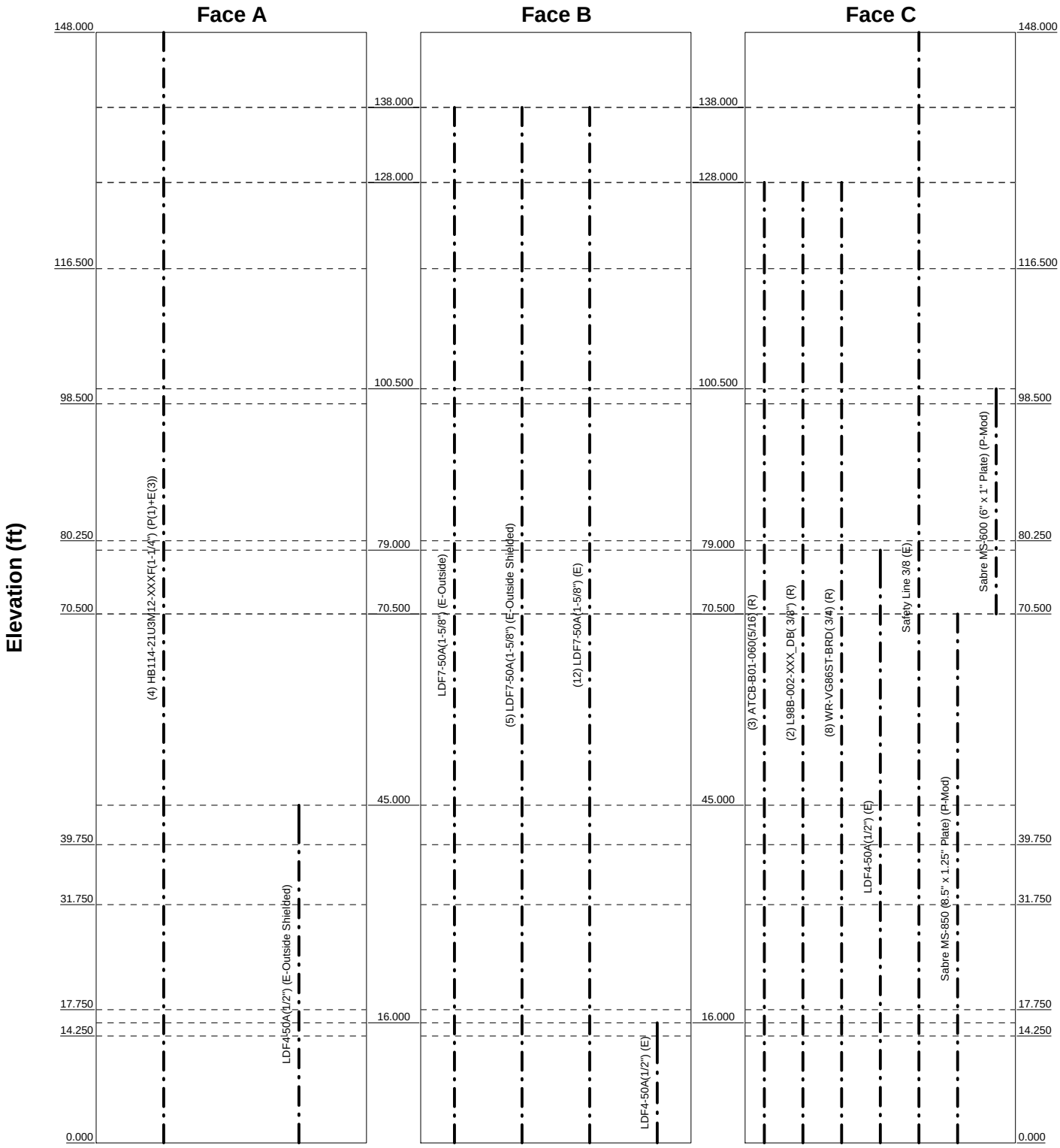
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: ***89028.004.01 - LONG EDDY WRIGHT PROPERTY, CT (BU# 87637***			
Project:			
Client: Crown Castle	Drawn by: B. Sevier	App'd:	
Code: TIA/EIA-222-F	Date: 06/16/14	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart
0' - 148'

Round Flat App In Face App Out Face Truss Leg



B+T Group
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Job: ***89028.004.01 - LONG EDDY WRIGHT PROPERTY, CT (BU# 87637***		
Project:		
Client: Crown Castle	Drawn by: B. Sevier	App'd:
Code: TIA/EIA-222-F	Date: 06/16/14	Scale: NTS
Path:		Dwg No. E-7

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Litchfield County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 0.750 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 28 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
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		Treat Feedline Bundles As Cylinder
	Consider Moments - Horizontals		Assume Legs Pinned		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Calculate Redundant Bracing Forces
	Use Moment Magnification	√	Use Clear Spans For Wind Area		Ignore Redundant Members in FEA
√	Use Code Stress Ratios		Use Clear Spans For KL/r		SR Leg Bolts Resist Compression
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		All Leg Panels Have Same Allowable
√	Escalate Ice	√	Bypass Mast Stability Checks		Offset Girt At Foundation
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Consider Feedline Torque
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Include Angle Block Shear Check
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Poles
	Leg Bolts Are At Top Of Section		SR Members Have Cut Ends	√	Include Shear-Torsion Interaction
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component		Always Use Sub-Critical Flow
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Use Top Mounted Sockets
	Add IBC .6D+W Combination		Use TIA-222-G Tension Splice Capacity Exemption		

Tapered Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Splice Length* *ft*	*Number of Sides*	*Top Diameter* *in*	*Bottom Diameter* *in*	*Wall Thickness* *in*	*Bend Radius* *in*	*Pole Grade*
L1	148.000-116.500	31.500	3.750	18	24.000	29.480	0.219	0.875	A607-60 (60 ksi)
L2	116.500-98.500	21.750	0.000	18	28.390	32.175	0.250	1.000	A607-65 (65 ksi)
L3	98.500-80.250	18.250	4.500	18	32.175	35.350	0.434	1.736	50.956421ksi (51 ksi)
L4	80.250-70.500	14.250	0.000	18	34.067	36.547	0.487	1.947	51.034175ksi (51 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L5	70.500-39.750	30.750	5.250	18	36.547	41.900	0.591	2.365	53.421477ksi (53 ksi)
L6	39.750-31.750	13.250	0.000	18	40.361	42.666	0.643	2.573	53.48381ksi (53 ksi)
L7	31.750-17.750	14.000	0.000	18	42.666	45.102	0.626	2.506	53.566146ksi (54 ksi)
L8	17.750-14.250	3.500	0.000	18	45.102	45.711	0.728	2.911	56.732719ksi (57 ksi)
L9	14.250-0.000	14.250		18	45.711	48.190	0.663	2.652	54.360134ksi (54 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	24.370	16.512	1179.768	8.442	12.192	96.766	2361.088	8.257	3.839	17.55
	29.935	20.316	2197.713	10.388	14.976	146.751	4398.319	10.160	4.803	21.959
L2	29.491	22.329	2233.892	9.990	14.422	154.893	4470.723	11.167	4.557	18.227
	32.671	25.332	3261.812	11.333	16.345	199.564	6527.916	12.668	5.223	20.891
L3	32.671	43.726	5565.479	11.268	16.345	340.507	11138.281	21.867	4.899	11.287
	35.895	48.100	7408.540	12.395	17.958	412.553	14826.827	24.055	5.458	12.575
L4	35.388	51.890	7392.471	11.921	17.306	427.161	14794.670	25.950	5.139	10.555
	37.111	55.723	9154.622	12.802	18.566	493.082	18321.290	27.867	5.575	11.452
L5	37.111	67.480	11022.014	12.764	18.566	593.663	22058.531	33.747	5.392	9.119
	42.546	77.526	16713.430	14.665	21.285	785.214	33448.852	38.770	6.334	10.712
L6	41.911	81.096	16162.580	14.100	20.503	788.285	32346.427	40.556	5.971	9.282
	43.325	85.803	19143.219	14.918	21.674	883.214	38311.628	42.910	6.377	9.913
L7	43.325	83.582	18662.634	14.924	21.674	861.042	37349.825	41.799	6.407	10.228
	45.798	88.424	22097.930	15.789	22.912	964.478	44224.937	44.221	6.836	10.913
L8	45.798	102.493	25497.284	15.753	22.912	1112.845	51028.117	51.256	6.657	9.148
	46.416	103.899	26561.387	15.969	23.221	1143.846	53157.724	51.960	6.764	9.295
L9	46.416	94.802	24305.487	15.992	23.221	1046.697	48642.956	47.410	6.878	10.374
	48.933	100.020	28543.219	16.872	24.481	1165.956	57123.997	50.019	7.314	11.032

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
L1 148.000-116.500				1	1	1		
L2 116.500-98.500				1	1	1		
L3 98.500-80.250				1	1	0.962717		
L4 80.250-70.500				1	1	0.968696		
L5 70.500-39.750				1	1	0.953422		
L6 39.750-31.750				1	1	0.958861		
L7 31.750-17.750				1	1	0.963264		

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
L8 17.750-14.250				1	1	0.983373		
L9 14.250-0.000				1	1	0.944694		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
$$$										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
HB114-21U3M12-XXX F(1-1/4") (P(1)+E(3))	A	No	Inside Pole	148.000 - 0.000	4	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
$$$								
LDF7-50A(1-5/8") (E-Outside)	B	No	CaAa (Out Of Face)	138.000 - 0.000	1	No Ice	0.198	0.001
						1/2" Ice	0.298	0.002
						1" Ice	0.398	0.004
						2" Ice	0.598	0.011
						4" Ice	0.998	0.030
LDF7-50A(1-5/8") (E-Outside Shielded)	B	No	CaAa (Out Of Face)	138.000 - 0.000	5	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.011
						4" Ice	0.000	0.030
LDF7-50A(1-5/8") (E)	B	No	Inside Pole	138.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
$$$								
ATCB-B01-060(5/16) (R)	C	No	Inside Pole	128.000 - 0.000	3	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
L98B-002-XXX_DB(3/8") (R)	C	No	Inside Pole	128.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
WR-VG86ST-BRD(3/4) (R)	C	No	Inside Pole	128.000 - 0.000	8	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
$$$								
LDF4-50A(1/2") (E)	C	No	Inside Pole	79.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
$$$								
LDF4-50A(1/2") (E-Outside Shielded)	A	No	CaAa (Out Of Face)	45.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.007
						4" Ice	0.000	0.023
$$$								
LDF4-50A(1/2") (E)	B	No	Inside Pole	16.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
$$$								
Safety Line 3/8 (E)	C	No	CaAa (Out Of Face)	148.000 - 0.000	1	No Ice	0.037	0.000
						1/2" Ice	0.137	0.001
						1" Ice	0.238	0.001
						2" Ice	0.437	0.002
						4" Ice	0.838	0.004
$$$								
Sabre MS-850 (8.5" x 1.25" Plate) (P-Mod)	C	No	CaAa (Out Of Face)	70.500 - 0.000	1	No Ice	0.208	0.000
						1/2" Ice	0.292	0.000
						1" Ice	0.375	0.000
						2" Ice	0.542	0.000
						4" Ice	0.875	0.000
Sabre MS-600 (6" x 1" Plate) (P-Mod)	C	No	CaAa (Out Of Face)	100.500 - 70.500	1	No Ice	0.167	0.000
						1/2" Ice	0.250	0.000
						1" Ice	0.333	0.000
						2" Ice	0.500	0.000
						4" Ice	0.833	0.000
$$$								

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
L1	148.000-116.500	A	0.000	0.000	0.000	0.000	0.154
		B	0.000	0.000	0.000	4.257	0.317
		C	0.000	0.000	0.000	1.181	0.065
L2	116.500-98.500	A	0.000	0.000	0.000	0.000	0.088
		B	0.000	0.000	0.000	3.564	0.266
		C	0.000	0.000	0.000	1.008	0.095
L3	98.500-80.250	A	0.000	0.000	0.000	0.000	0.089
		B	0.000	0.000	0.000	3.614	0.269
		C	0.000	0.000	0.000	3.726	0.096
L4	80.250-70.500	A	0.000	0.000	0.000	0.000	0.048
		B	0.000	0.000	0.000	1.931	0.144
		C	0.000	0.000	0.000	1.991	0.053
L5	70.500-39.750	A	0.000	0.000	0.000	0.000	0.151
		B	0.000	0.000	0.000	6.088	0.454

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
		C	0.000	0.000	0.000	7.559	0.167
L6	39.750-31.750	A	0.000	0.000	0.000	0.000	0.040
		B	0.000	0.000	0.000	1.584	0.118
		C	0.000	0.000	0.000	1.967	0.043
L7	31.750-17.750	A	0.000	0.000	0.000	0.000	0.070
		B	0.000	0.000	0.000	2.772	0.207
		C	0.000	0.000	0.000	3.442	0.076
L8	17.750-14.250	A	0.000	0.000	0.000	0.000	0.018
		B	0.000	0.000	0.000	0.693	0.052
		C	0.000	0.000	0.000	0.860	0.019
L9	14.250-0.000	A	0.000	0.000	0.000	0.000	0.072
		B	0.000	0.000	0.000	2.821	0.212
		C	0.000	0.000	0.000	3.503	0.077

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
L1	148.000-116.500	A	0.886	0.000	0.000	0.000	0.000	0.154
		B		0.000	0.000	0.000	8.065	0.724
		C		0.000	0.000	0.000	6.761	0.095
L2	116.500-98.500	A	0.864	0.000	0.000	0.000	0.000	0.088
		B		0.000	0.000	0.000	6.752	0.606
		C		0.000	0.000	0.000	4.492	0.112
L3	98.500-80.250	A	0.845	0.000	0.000	0.000	0.000	0.089
		B		0.000	0.000	0.000	6.698	0.596
		C		0.000	0.000	0.000	9.381	0.113
L4	80.250-70.500	A	0.828	0.000	0.000	0.000	0.000	0.048
		B		0.000	0.000	0.000	3.578	0.318
		C		0.000	0.000	0.000	5.012	0.062
L5	70.500-39.750	A	0.798	0.000	0.000	0.000	0.000	0.159
		B		0.000	0.000	0.000	10.993	0.967
		C		0.000	0.000	0.000	16.552	0.193
L6	39.750-31.750	A	0.757	0.000	0.000	0.000	0.000	0.052
		B		0.000	0.000	0.000	2.860	0.252
		C		0.000	0.000	0.000	4.306	0.050
L7	31.750-17.750	A	0.750	0.000	0.000	0.000	0.000	0.089
		B		0.000	0.000	0.000	4.872	0.423
		C		0.000	0.000	0.000	7.292	0.087
L8	17.750-14.250	A	0.750	0.000	0.000	0.000	0.000	0.022
		B		0.000	0.000	0.000	1.218	0.106
		C		0.000	0.000	0.000	1.823	0.022
L9	14.250-0.000	A	0.750	0.000	0.000	0.000	0.000	0.091
		B		0.000	0.000	0.000	4.959	0.433
		C		0.000	0.000	0.000	7.422	0.089

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	148.000-116.500	0.123	0.123	0.051	0.281
L2	116.500-98.500	0.167	0.174	0.124	0.361

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L3	98.500-80.250	-0.007	0.264	-0.140	0.485
L4	80.250-70.500	-0.007	0.266	-0.142	0.492
L5	70.500-39.750	-0.055	0.293	-0.179	0.511
L6	39.750-31.750	-0.055	0.295	-0.181	0.519
L7	31.750-17.750	-0.055	0.297	-0.177	0.512
L8	17.750-14.250	-0.056	0.298	-0.178	0.516
L9	14.250-0.000	-0.056	0.299	-0.179	0.520

Discrete Tower Loads

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
TME-1900MHz RRH (65MHz) (E)	A	From Leg	2.000 0.000 0.000	0.000	149.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.907 3.145 3.391 3.909 5.050	3.801 4.065 4.337 4.908 6.152	0.044 0.075 0.110 0.192 0.407
TME-1900MHz RRH (65MHz) (E)	B	From Leg	2.000 0.000 0.000	0.000	149.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.907 3.145 3.391 3.909 5.050	3.801 4.065 4.337 4.908 6.152	0.044 0.075 0.110 0.192 0.407
TME-1900MHz RRH (65MHz) (E)	C	From Leg	2.000 0.000 0.000	0.000	149.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.907 3.145 3.391 3.909 5.050	3.801 4.065 4.337 4.908 6.152	0.044 0.075 0.110 0.192 0.407
TME-800MHZ RRH (E)	A	From Leg	2.000 0.000 0.000	0.000	149.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.490 2.706 2.931 3.407 4.462	2.068 2.271 2.481 2.928 3.927	0.053 0.074 0.098 0.157 0.318
TME-800MHZ RRH (E)	B	From Leg	2.000 0.000 0.000	0.000	149.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.490 2.706 2.931 3.407 4.462	2.068 2.271 2.481 2.928 3.927	0.053 0.074 0.098 0.157 0.318
TME-800MHZ RRH (E)	C	From Leg	2.000 0.000 0.000	0.000	149.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.490 2.706 2.931 3.407 4.462	2.068 2.271 2.481 2.928 3.927	0.053 0.074 0.098 0.157 0.318
Side Arm Mount [SO 102-3] (E)	C	None		0.000	149.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.000 3.480 3.960 4.920 6.840	3.000 3.480 3.960 4.920 6.840	0.081 0.111 0.141 0.201 0.321
$$$ APXVSPP18-C-A20 w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	148.000	No Ice 1/2" Ice 1" Ice	8.498 9.149 9.767	6.946 8.127 9.021	0.083 0.151 0.227

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
						2" Ice	11.031	10.844	0.406
						4" Ice	13.679	14.851	0.909
APXVSPP18-C-A20 w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	148.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.946 8.127 9.021 10.844 14.851	0.083 0.151 0.227 0.406 0.909
APXVSPP18-C-A20 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	148.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.946 8.127 9.021 10.844 14.851	0.083 0.151 0.227 0.406 0.909
800 EXTERNAL NOTCH FILTER (E)	A	From Leg	4.000 0.000 0.000	0.000	148.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.770 0.890 1.018 1.301 1.970	0.375 0.465 0.563 0.787 1.337	0.011 0.017 0.024 0.045 0.114
800 EXTERNAL NOTCH FILTER (E)	B	From Leg	4.000 0.000 0.000	0.000	148.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.770 0.890 1.018 1.301 1.970	0.375 0.465 0.563 0.787 1.337	0.011 0.017 0.024 0.045 0.114
800 EXTERNAL NOTCH FILTER (E)	C	From Leg	4.000 0.000 0.000	0.000	148.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.770 0.890 1.018 1.301 1.970	0.375 0.465 0.563 0.787 1.337	0.011 0.017 0.024 0.045 0.114
(3) ACU-A20-N (E)	A	From Leg	4.000 0.000 0.000	0.000	148.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.078 0.121 0.173 0.302 0.665	0.136 0.189 0.251 0.400 0.802	0.001 0.002 0.004 0.012 0.045
(3) ACU-A20-N (E)	B	From Leg	4.000 0.000 0.000	0.000	148.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.078 0.121 0.173 0.302 0.665	0.136 0.189 0.251 0.400 0.802	0.001 0.002 0.004 0.012 0.045
(3) ACU-A20-N (E)	C	From Leg	4.000 0.000 0.000	0.000	148.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.078 0.121 0.173 0.302 0.665	0.136 0.189 0.251 0.400 0.802	0.001 0.002 0.004 0.012 0.045
APXVTM14-C-120 w/ Mount Pipe (P)	A	From Leg	4.000 0.000 0.000	0.000	148.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.134 7.662 8.183 9.256 11.526	4.959 5.754 6.472 8.010 11.412	0.077 0.132 0.193 0.339 0.753
APXVTM14-C-120 w/ Mount Pipe (P)	B	From Leg	4.000 0.000 0.000	0.000	148.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.134 7.662 8.183 9.256 11.526	4.959 5.754 6.472 8.010 11.412	0.077 0.132 0.193 0.339 0.753
APXVTM14-C-120 w/ Mount Pipe (P)	C	From Leg	4.000 0.000 0.000	0.000	148.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.134 7.662 8.183 9.256 11.526	4.959 5.754 6.472 8.010 11.412	0.077 0.132 0.193 0.339 0.753

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
TD-RRH8x20-25	A	From Leg	4.000	0.000	148.000	No Ice	4.720	1.703	0.070
(P)			0.000			1/2" Ice	5.014	1.920	0.097
			0.000			1" Ice	5.316	2.145	0.128
						2" Ice	5.948	2.622	0.201
						4" Ice	7.314	3.680	0.397
TD-RRH8x20-25	B	From Leg	4.000	0.000	148.000	No Ice	4.720	1.703	0.070
(P)			0.000			1/2" Ice	5.014	1.920	0.097
			0.000			1" Ice	5.316	2.145	0.128
						2" Ice	5.948	2.622	0.201
						4" Ice	7.314	3.680	0.397
TD-RRH8x20-25	C	From Leg	4.000	0.000	148.000	No Ice	4.720	1.703	0.070
(P)			0.000			1/2" Ice	5.014	1.920	0.097
			0.000			1" Ice	5.316	2.145	0.128
						2" Ice	5.948	2.622	0.201
						4" Ice	7.314	3.680	0.397
5' x 2' Pipe Mount	A	From Leg	4.000	0.000	148.000	No Ice	1.188	1.188	0.018
(E)			0.000			1/2" Ice	1.496	1.496	0.027
			0.000			1" Ice	1.807	1.807	0.040
						2" Ice	2.458	2.458	0.076
						4" Ice	3.919	3.919	0.196
5' x 2' Pipe Mount	B	From Leg	4.000	0.000	148.000	No Ice	1.188	1.188	0.018
(E)			0.000			1/2" Ice	1.496	1.496	0.027
			0.000			1" Ice	1.807	1.807	0.040
						2" Ice	2.458	2.458	0.076
						4" Ice	3.919	3.919	0.196
5' x 2' Pipe Mount	C	From Leg	4.000	0.000	148.000	No Ice	1.188	1.188	0.018
(E)			0.000			1/2" Ice	1.496	1.496	0.027
			0.000			1" Ice	1.807	1.807	0.040
						2" Ice	2.458	2.458	0.076
						4" Ice	3.919	3.919	0.196
Platform Mount [LP 601-1]	C	None		0.000	148.000	No Ice	28.470	28.470	1.122
(E)						1/2" Ice	33.590	33.590	1.514
						1" Ice	38.710	38.710	1.905
						2" Ice	48.950	48.950	2.689
						4" Ice	69.430	69.430	4.255
$$$									
$$$									
(2) LPA-80063/6CF w/ Mount Pipe	A	From Leg	4.000	0.000	138.000	No Ice	10.577	10.671	0.052
(E)			0.000			1/2" Ice	11.241	11.932	0.145
			0.000			1" Ice	11.872	12.911	0.246
						2" Ice	13.163	14.921	0.476
						4" Ice	15.866	19.158	1.088
(2) LPA-80080/6CF w/ Mount Pipe	B	From Leg	4.000	0.000	138.000	No Ice	4.564	10.728	0.046
(E)			0.000			1/2" Ice	5.105	11.990	0.113
			0.000			1" Ice	5.612	12.968	0.187
						2" Ice	6.651	14.980	0.363
						4" Ice	8.834	19.217	0.857
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.000	0.000	138.000	No Ice	4.564	10.728	0.046
(E)			0.000			1/2" Ice	5.105	11.990	0.113
			0.000			1" Ice	5.612	12.968	0.187
						2" Ice	6.651	14.980	0.363
						4" Ice	8.834	19.217	0.857
BXA-70063-6CF-2 w/ Mount Pipe	A	From Leg	4.000	0.000	138.000	No Ice	7.969	5.801	0.042
(E)			0.000			1/2" Ice	8.609	6.953	0.103
			0.000			1" Ice	9.216	7.819	0.171
						2" Ice	10.459	9.601	0.335
						4" Ice	13.066	13.366	0.804

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
BXA-70063-6CF-2 w/ Mount Pipe	B	From Leg	4.000 0.000	0.000	138.000	No Ice 1/2" Ice	7.969 8.609	5.801 6.953	0.042 0.103
(E)			0.000			1" Ice 2" Ice 4" Ice	9.216 10.459 13.066	7.819 9.601 13.366	0.171 0.335 0.804
BXA-70063-6CF-2 w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	138.000	No Ice 1/2" Ice	7.969 8.609	5.801 6.953	0.042 0.103
(E)			0.000			1" Ice 2" Ice 4" Ice	9.216 10.459 13.066	7.819 9.601 13.366	0.171 0.335 0.804
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	138.000	No Ice 1/2" Ice	3.179 3.555	3.353 3.971	0.029 0.061
(E)			0.000			1" Ice 2" Ice 4" Ice	3.964 4.853 6.767	4.595 5.893 8.885	0.099 0.193 0.488
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	B	From Leg	4.000 0.000	0.000	138.000	No Ice 1/2" Ice	3.179 3.555	3.353 3.971	0.029 0.061
(E)			0.000			1" Ice 2" Ice 4" Ice	3.964 4.853 6.767	4.595 5.893 8.885	0.099 0.193 0.488
BXA-171063-8BF-2 w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	138.000	No Ice 1/2" Ice	3.179 3.555	3.353 3.971	0.029 0.061
(E)			0.000			1" Ice 2" Ice 4" Ice	3.964 4.853 6.767	4.595 5.893 8.885	0.099 0.193 0.488
Platform Mount [LP 601-1]	C	None		0.000	138.000	No Ice 1/2" Ice	28.470 33.590	28.470 33.590	1.122 1.514
(E)						1" Ice 2" Ice 4" Ice	38.710 48.950 69.430	38.710 48.950 69.430	1.905 2.689 4.255
$$$									
(4) HPA-65R-BUU-H8 w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	128.000	No Ice 1/2" Ice	13.533 14.335	9.582 11.052	0.100 0.196
(R)			0.000			1" Ice 2" Ice 4" Ice	15.143 16.708 19.954	12.496 14.752 19.462	0.303 0.550 1.219
(4) HPA-65R-BUU-H8 w/ Mount Pipe	B	From Leg	4.000 0.000	0.000	128.000	No Ice 1/2" Ice	13.533 14.335	9.582 11.052	0.100 0.196
(R)			0.000			1" Ice 2" Ice 4" Ice	15.143 16.708 19.954	12.496 14.752 19.462	0.303 0.550 1.219
(4) HPA-65R-BUU-H8 w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	128.000	No Ice 1/2" Ice	13.533 14.335	9.582 11.052	0.100 0.196
(R)			0.000			1" Ice 2" Ice 4" Ice	15.143 16.708 19.954	12.496 14.752 19.462	0.303 0.550 1.219
(3) RRU-11	A	From Leg	4.000 0.000	0.000	128.000	No Ice 1/2" Ice	1.912 2.102	1.472 1.645	0.044 0.060
(R)			0.000			1" Ice 2" Ice 4" Ice	2.301 2.725 3.676	1.827 2.218 3.102	0.078 0.123 0.254
(3) RRU-11	B	From Leg	4.000 0.000	0.000	128.000	No Ice 1/2" Ice	1.912 2.102	1.472 1.645	0.044 0.060
(R)			0.000			1" Ice 2" Ice 4" Ice	2.301 2.725 3.676	1.827 2.218 3.102	0.078 0.123 0.254
(3) RRU-11	C	From Leg	4.000	0.000	128.000	No Ice	1.912	1.472	0.044

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(R)			0.000			1/2" Ice	2.102	1.645	0.060
			0.000			1" Ice	2.301	1.827	0.078
						2" Ice	2.725	2.218	0.123
						4" Ice	3.676	3.102	0.254
RRUS E2 B29	A	From Leg	4.000	0.000	128.000	No Ice	3.669	1.488	0.060
(R)			0.000			1/2" Ice	3.926	1.673	0.083
			0.000			1" Ice	4.191	1.866	0.110
						2" Ice	4.747	2.280	0.173
						4" Ice	5.963	3.211	0.346
RRUS E2 B29	B	From Leg	4.000	0.000	128.000	No Ice	3.669	1.488	0.060
(R)			0.000			1/2" Ice	3.926	1.673	0.083
			0.000			1" Ice	4.191	1.866	0.110
						2" Ice	4.747	2.280	0.173
						4" Ice	5.963	3.211	0.346
RRUS E2 B29	C	From Leg	4.000	0.000	128.000	No Ice	3.669	1.488	0.060
(R)			0.000			1/2" Ice	3.926	1.673	0.083
			0.000			1" Ice	4.191	1.866	0.110
						2" Ice	4.747	2.280	0.173
						4" Ice	5.963	3.211	0.346
DC6-48-60-18-8F	A	From Leg	4.000	0.000	128.000	No Ice	2.567	4.317	0.019
(R)			0.000			1/2" Ice	2.798	4.596	0.050
			0.000			1" Ice	3.038	4.885	0.085
						2" Ice	3.543	5.488	0.167
						4" Ice	4.658	6.797	0.383
(2) DC6-48-60-18-8F	B	From Leg	4.000	0.000	128.000	No Ice	2.567	4.317	0.019
(R)			0.000			1/2" Ice	2.798	4.596	0.050
			0.000			1" Ice	3.038	4.885	0.085
						2" Ice	3.543	5.488	0.167
						4" Ice	4.658	6.797	0.383
DC6-48-60-18-8F	C	From Leg	4.000	0.000	128.000	No Ice	2.567	4.317	0.019
(R)			0.000			1/2" Ice	2.798	4.596	0.050
			0.000			1" Ice	3.038	4.885	0.085
						2" Ice	3.543	5.488	0.167
						4" Ice	4.658	6.797	0.383
RRUS-32 B30	A	From Leg	4.000	0.000	128.000	No Ice	3.866	2.762	0.077
(R)			0.000			1/2" Ice	4.151	3.021	0.105
			0.000			1" Ice	4.444	3.290	0.136
						2" Ice	5.055	3.852	0.211
						4" Ice	6.383	5.081	0.412
RRUS-32 B30	B	From Leg	4.000	0.000	128.000	No Ice	3.866	2.762	0.077
(R)			0.000			1/2" Ice	4.151	3.021	0.105
			0.000			1" Ice	4.444	3.290	0.136
						2" Ice	5.055	3.852	0.211
						4" Ice	6.383	5.081	0.412
RRUS-32 B30	C	From Leg	4.000	0.000	128.000	No Ice	3.866	2.762	0.077
(R)			0.000			1/2" Ice	4.151	3.021	0.105
			0.000			1" Ice	4.444	3.290	0.136
						2" Ice	5.055	3.852	0.211
						4" Ice	6.383	5.081	0.412
(2) RRUS A2	A	From Leg	4.000	0.000	128.000	No Ice	2.411	0.533	0.022
(R)			0.000			1/2" Ice	2.619	0.665	0.035
			0.000			1" Ice	2.837	0.806	0.050
						2" Ice	3.297	1.114	0.088
						4" Ice	4.322	1.833	0.203
(2) RRUS A2	B	From Leg	4.000	0.000	128.000	No Ice	2.411	0.533	0.022
(R)			0.000			1/2" Ice	2.619	0.665	0.035
			0.000			1" Ice	2.837	0.806	0.050

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
						2" Ice	3.297	1.114	0.088
						4" Ice	4.322	1.833	0.203
(2) RRUS A2	C	From Leg	4.000	0.000	128.000	No Ice	2.411	0.533	0.022
(R)			0.000			1/2" Ice	2.619	0.665	0.035
			0.000			1" Ice	2.837	0.806	0.050
						2" Ice	3.297	1.114	0.088
						4" Ice	4.322	1.833	0.203
(2) RRUS 12-B2	A	From Leg	4.000	0.000	128.000	No Ice	3.667	1.483	0.049
(R)			0.000			1/2" Ice	3.924	1.668	0.073
			0.000			1" Ice	4.189	1.861	0.099
						2" Ice	4.745	2.274	0.162
						4" Ice	5.960	3.204	0.335
(2) RRUS 12-B2	B	From Leg	4.000	0.000	128.000	No Ice	3.667	1.483	0.049
(R)			0.000			1/2" Ice	3.924	1.668	0.073
			0.000			1" Ice	4.189	1.861	0.099
						2" Ice	4.745	2.274	0.162
						4" Ice	5.960	3.204	0.335
(2) RRUS 12-B2	C	From Leg	4.000	0.000	128.000	No Ice	3.667	1.483	0.049
(R)			0.000			1/2" Ice	3.924	1.668	0.073
			0.000			1" Ice	4.189	1.861	0.099
						2" Ice	4.745	2.274	0.162
						4" Ice	5.960	3.204	0.335
KRF 102 361/1	A	From Leg	4.000	0.000	128.000	No Ice	2.262	0.631	0.026
(R)			0.000			1/2" Ice	2.465	0.756	0.039
			0.000			1" Ice	2.676	0.890	0.055
						2" Ice	3.124	1.185	0.095
						4" Ice	4.125	1.877	0.212
KRF 102 361/1	B	From Leg	4.000	0.000	128.000	No Ice	2.262	0.631	0.026
(R)			0.000			1/2" Ice	2.465	0.756	0.039
			0.000			1" Ice	2.676	0.890	0.055
						2" Ice	3.124	1.185	0.095
						4" Ice	4.125	1.877	0.212
KRF 102 361/1	C	From Leg	4.000	0.000	128.000	No Ice	2.262	0.631	0.026
(R)			0.000			1/2" Ice	2.465	0.756	0.039
			0.000			1" Ice	2.676	0.890	0.055
						2" Ice	3.124	1.185	0.095
						4" Ice	4.125	1.877	0.212
Platform Mount [MTC3607]	C	None		0.000	128.000	No Ice	32.790	32.790	2.246
(R)						1/2" Ice	44.630	44.630	2.475
						1" Ice	56.470	56.470	2.908
						2" Ice	80.150	80.150	3.773
						4" Ice	127.510	127.510	5.503
$$$									
PD1109E	A	From Leg	2.000	0.000	79.000	No Ice	2.854	2.854	0.017
(E)			0.000			1/2" Ice	3.924	3.924	0.038
			5.000			1" Ice	5.010	5.010	0.066
						2" Ice	6.434	6.434	0.142
						4" Ice	9.089	9.089	0.383
Side Arm Mount [SO 701-1]	A	From Leg	1.000	0.000	79.000	No Ice	0.850	1.670	0.065
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
						2" Ice	2.010	4.350	0.121
						4" Ice	3.170	7.030	0.177
$$$									
GPS_A	C	From Leg	2.000	0.000	45.000	No Ice	0.297	0.297	0.001
(E)			0.000			1/2" Ice	0.374	0.374	0.005
			0.000			1" Ice	0.459	0.459	0.010

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	0.655	0.655	0.025
						4" Ice	1.151	1.151	0.079
Side Arm Mount [SO 701-1]	C	From Leg	1.000	0.000	45.000	No Ice	0.850	1.670	0.065
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
						2" Ice	2.010	4.350	0.121
						4" Ice	3.170	7.030	0.177
$$$									
GPS_A	A	From Leg	2.000	0.000	16.000	No Ice	0.297	0.297	0.001
(E)			0.000			1/2" Ice	0.374	0.374	0.005
			0.000			1" Ice	0.459	0.459	0.010
						2" Ice	0.655	0.655	0.025
						4" Ice	1.151	1.151	0.079
Side Arm Mount [SO 701-1]	A	From Leg	1.000	0.000	16.000	No Ice	0.850	1.670	0.065
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
						2" Ice	2.010	4.350	0.121
						4" Ice	3.170	7.030	0.177
$$$									

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service

Comb. No.	Description
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	148 - 116.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-20.206	-0.804	0.052
			Max. Mx	5	-9.110	-318.794	0.239
			Max. My	8	-9.017	0.125	-328.179
			Max. Vy	5	21.590	-318.794	0.239
			Max. Vx	8	22.148	0.125	-328.179
			Max. Torque	9			0.936
L2	116.5 - 98.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-23.991	-1.352	-0.283
			Max. Mx	5	-11.971	-805.809	0.859
			Max. My	8	-11.899	0.688	-827.324
			Max. Vy	5	23.164	-805.809	0.859
			Max. Vx	8	23.723	0.688	-827.324
			Max. Torque	9			0.964
L3	98.5 - 80.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-27.132	-1.716	-0.515
			Max. Mx	5	-14.542	-1131.923	1.247
			Max. My	8	-14.480	1.037	-1161.096
			Max. Vy	5	24.277	-1131.923	1.247
			Max. Vx	8	24.837	1.037	-1161.096
			Max. Torque	9			0.975
L4	80.25 - 70.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-31.824	-2.107	-0.351
			Max. Mx	5	-18.375	-1488.769	1.841
			Max. My	2	-18.325	-2.284	1525.428
			Max. Vy	5	25.645	-1488.769	1.841
			Max. Vx	8	26.176	1.399	-1525.427
			Max. Torque	9			0.979
L5	70.5 - 39.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-39.849	-2.848	-0.811
			Max. Mx	5	-25.325	-2167.843	2.545
			Max. My	8	-25.294	2.031	-2217.941
			Max. Vy	5	27.591	-2167.843	2.545
			Max. Vx	8	28.119	2.031	-2217.941
			Max. Torque	2			-0.814
L6	39.75 - 31.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-46.172	-3.022	-1.173
			Max. Mx	5	-30.813	-2540.723	2.679
			Max. My	8	-30.789	2.364	-2598.183
			Max. Vy	5	28.607	-2540.723	2.679
			Max. Vx	8	29.145	2.364	-2598.183
			Max. Torque	9			0.671

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L7	31.75 - 17.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-51.297	-3.452	-1.409
			Max. Mx	5	-35.367	-2947.133	2.907
			Max. My	8	-35.354	2.548	-3012.053
			Max. Vy	5	29.458	-2947.133	2.907
			Max. Vx	8	29.991	2.548	-3012.053
			Max. Torque	9			0.680
L8	17.75 - 14.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-52.898	-3.563	-1.193
			Max. Mx	5	-36.786	-3050.704	3.153
			Max. My	8	-36.775	2.593	-3117.246
			Max. Vy	5	29.735	-3050.704	3.153
			Max. Vx	8	30.244	2.593	-3117.246
			Max. Torque	9			0.681
L9	14.25 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-58.602	-4.030	-1.450
			Max. Mx	5	-41.869	-3480.472	3.375
			Max. My	8	-41.869	2.770	-3554.174
			Max. Vy	5	30.591	-3480.472	3.375
			Max. Vx	8	31.093	2.770	-3554.174
			Max. Torque	2			-0.640

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	58.602	-0.000	-0.000
	Max. H_x	11	41.878	30.578	-0.020
	Max. H_z	2	41.878	-0.020	31.080
	Max. M_x	2	3553.759	-0.020	31.080
	Max. M_z	5	3480.472	-30.578	0.020
	Max. Torsion	8	0.634	0.020	-31.080
	Min. Vert	1	41.878	0.000	0.000
	Min. H_x	5	41.878	-30.578	0.020
	Min. H_z	8	41.878	0.020	-31.080
	Min. M_x	8	-3554.174	0.020	-31.080
	Min. M_z	11	-3478.844	30.578	-0.020
	Min. Torsion	2	-0.634	-0.020	31.080

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	41.878	0.000	0.000	0.201	-0.791	0.000
Dead+Wind 0 deg - No Ice	41.878	0.020	-31.080	-3553.759	-4.393	0.634
Dead+Wind 30 deg - No Ice	41.878	15.306	-26.926	-3079.453	-1743.658	0.609
Dead+Wind 60 deg - No Ice	41.878	26.491	-15.557	-1779.960	-3016.024	0.420
Dead+Wind 90 deg - No Ice	41.878	30.578	-0.020	-3.375	-3480.472	0.120
Dead+Wind 120 deg - No Ice	41.878	26.471	15.522	1774.179	-3012.458	-0.213
Dead+Wind 150 deg - No Ice	41.878	15.271	26.906	3076.302	-1737.464	-0.489
Dead+Wind 180 deg - No Ice	41.878	-0.020	31.080	3554.174	2.770	-0.634

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 210 deg - No Ice	41.878	-15.306	26.926	3079.866	1742.035	-0.610
Dead+Wind 240 deg - No Ice	41.878	-26.491	15.557	1780.372	3014.398	-0.422
Dead+Wind 270 deg - No Ice	41.878	-30.578	0.020	3.788	3478.844	-0.120
Dead+Wind 300 deg - No Ice	41.878	-26.471	-15.522	-1773.764	3010.831	0.214
Dead+Wind 330 deg - No Ice	41.878	-15.271	-26.906	-3075.886	1735.839	0.490
Dead+Ice+Temp	58.602	0.000	0.000	1.450	-4.030	-0.000
Dead+Wind 0 deg+Ice+Temp	58.602	0.002	-4.712	-551.127	-4.611	0.064
Dead+Wind 30 deg+Ice+Temp	58.602	2.327	-4.082	-477.306	-276.077	0.060
Dead+Wind 60 deg+Ice+Temp	58.602	4.029	-2.357	-275.191	-474.689	0.040
Dead+Wind 90 deg+Ice+Temp	58.602	4.651	-0.002	1.063	-547.227	0.010
Dead+Wind 120 deg+Ice+Temp	58.602	4.027	2.354	277.434	-474.255	-0.023
Dead+Wind 150 deg+Ice+Temp	58.602	2.324	4.080	479.867	-275.325	-0.050
Dead+Wind 180 deg+Ice+Temp	58.602	-0.002	4.712	554.122	-3.742	-0.064
Dead+Wind 210 deg+Ice+Temp	58.602	-2.327	4.082	480.301	267.724	-0.060
Dead+Wind 240 deg+Ice+Temp	58.602	-4.029	2.357	278.186	466.336	-0.040
Dead+Wind 270 deg+Ice+Temp	58.602	-4.651	0.002	1.932	538.874	-0.010
Dead+Wind 300 deg+Ice+Temp	58.602	-4.027	-2.354	-274.439	465.902	0.023
Dead+Wind 330 deg+Ice+Temp	58.602	-2.324	-4.080	-476.872	266.972	0.050
Dead+Wind 0 deg - Service	41.878	0.008	-12.141	-1389.639	-2.218	0.251
Dead+Wind 30 deg - Service	41.878	5.979	-10.518	-1204.139	-682.381	0.241
Dead+Wind 60 deg - Service	41.878	10.348	-6.077	-695.934	-1179.925	0.167
Dead+Wind 90 deg - Service	41.878	11.944	-0.008	-1.192	-1361.527	0.048
Dead+Wind 120 deg - Service	41.878	10.340	6.063	693.925	-1178.525	-0.084
Dead+Wind 150 deg - Service	41.878	5.965	10.510	1203.156	-679.955	-0.193
Dead+Wind 180 deg - Service	41.878	-0.008	12.141	1390.056	0.584	-0.251
Dead+Wind 210 deg - Service	41.878	-5.979	10.518	1204.556	680.746	-0.241
Dead+Wind 240 deg - Service	41.878	-10.348	6.077	696.351	1178.290	-0.167
Dead+Wind 270 deg - Service	41.878	-11.944	0.008	1.609	1359.892	-0.048
Dead+Wind 300 deg - Service	41.878	-10.340	-6.063	-693.508	1176.890	0.084
Dead+Wind 330 deg - Service	41.878	-5.965	-10.510	-1202.739	678.321	0.193

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	0.000	-41.878	0.000	0.000	41.878	0.000	0.000%
2	0.020	-41.878	-31.080	-0.020	41.878	31.080	0.000%
3	15.306	-41.878	-26.926	-15.306	41.878	26.926	0.000%
4	26.491	-41.878	-15.557	-26.491	41.878	15.557	0.000%
5	30.578	-41.878	-0.020	-30.578	41.878	0.020	0.000%
6	26.471	-41.878	15.522	-26.471	41.878	-15.522	0.000%
7	15.271	-41.878	26.906	-15.271	41.878	-26.906	0.000%
8	-0.020	-41.878	31.080	0.020	41.878	-31.080	0.000%
9	-15.306	-41.878	26.926	15.306	41.878	-26.926	0.000%
10	-26.491	-41.878	15.557	26.491	41.878	-15.557	0.000%
11	-30.578	-41.878	0.020	30.578	41.878	-0.020	0.000%
12	-26.471	-41.878	-15.522	26.471	41.878	15.522	0.000%
13	-15.271	-41.878	-26.906	15.271	41.878	26.906	0.000%
14	0.000	-58.602	0.000	-0.000	58.602	-0.000	0.000%
15	0.002	-58.602	-4.712	-0.002	58.602	4.712	0.000%
16	2.327	-58.602	-4.082	-2.327	58.602	4.082	0.000%
17	4.029	-58.602	-2.357	-4.029	58.602	2.357	0.000%
18	4.651	-58.602	-0.002	-4.651	58.602	0.002	0.000%
19	4.027	-58.602	2.354	-4.027	58.602	-2.354	0.000%
20	2.324	-58.602	4.080	-2.324	58.602	-4.080	0.000%
21	-0.002	-58.602	4.712	0.002	58.602	-4.712	0.000%
22	-2.327	-58.602	4.082	2.327	58.602	-4.082	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
23	-4.029	-58.602	2.357	4.029	58.602	-2.357	0.000%
24	-4.651	-58.602	0.002	4.651	58.602	-0.002	0.000%
25	-4.027	-58.602	-2.354	4.027	58.602	2.354	0.000%
26	-2.324	-58.602	-4.080	2.324	58.602	4.080	0.000%
27	0.008	-41.878	-12.141	-0.008	41.878	12.141	0.000%
28	5.979	-41.878	-10.518	-5.979	41.878	10.518	0.000%
29	10.348	-41.878	-6.077	-10.348	41.878	6.077	0.000%
30	11.944	-41.878	-0.008	-11.944	41.878	0.008	0.000%
31	10.340	-41.878	6.063	-10.340	41.878	-6.063	0.000%
32	5.965	-41.878	10.510	-5.965	41.878	-10.510	0.000%
33	-0.008	-41.878	12.141	0.008	41.878	-12.141	0.000%
34	-5.979	-41.878	10.518	5.979	41.878	-10.518	0.000%
35	-10.348	-41.878	6.077	10.348	41.878	-6.077	0.000%
36	-11.944	-41.878	0.008	11.944	41.878	-0.008	0.000%
37	-10.340	-41.878	-6.063	10.340	41.878	6.063	0.000%
38	-5.965	-41.878	-10.510	5.965	41.878	10.510	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	0.00064865
3	Yes	5	0.00000001	0.00073666
4	Yes	5	0.00000001	0.00071526
5	Yes	4	0.00000001	0.00025682
6	Yes	5	0.00000001	0.00071819
7	Yes	5	0.00000001	0.00072974
8	Yes	4	0.00000001	0.00052608
9	Yes	5	0.00000001	0.00071473
10	Yes	5	0.00000001	0.00073040
11	Yes	4	0.00000001	0.00034175
12	Yes	5	0.00000001	0.00072089
13	Yes	5	0.00000001	0.00071504
14	Yes	4	0.00000001	0.00001992
15	Yes	5	0.00000001	0.00020056
16	Yes	5	0.00000001	0.00021467
17	Yes	5	0.00000001	0.00021316
18	Yes	5	0.00000001	0.00019885
19	Yes	5	0.00000001	0.00021346
20	Yes	5	0.00000001	0.00021508
21	Yes	5	0.00000001	0.00020144
22	Yes	5	0.00000001	0.00021275
23	Yes	5	0.00000001	0.00021055
24	Yes	5	0.00000001	0.00019531
25	Yes	5	0.00000001	0.00020940
26	Yes	5	0.00000001	0.00021150
27	Yes	4	0.00000001	0.00018372
28	Yes	5	0.00000001	0.00008586
29	Yes	5	0.00000001	0.00008088
30	Yes	4	0.00000001	0.00013151
31	Yes	5	0.00000001	0.00008168
32	Yes	5	0.00000001	0.00008448
33	Yes	4	0.00000001	0.00017538
34	Yes	5	0.00000001	0.00008089
35	Yes	5	0.00000001	0.00008414

36	Yes	4	0.00000001	0.00013523
37	Yes	5	0.00000001	0.00008213
38	Yes	5	0.00000001	0.00008106

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 116.5	34.998	33	2.159	0.002
L2	120.25 - 98.5	22.803	33	1.958	0.002
L3	98.5 - 80.25	14.800	33	1.487	0.001
L4	84.75 - 70.5	10.863	33	1.243	0.001
L5	70.5 - 39.75	7.437	33	1.024	0.000
L6	45 - 31.75	3.035	33	0.623	0.000
L7	31.75 - 17.75	1.498	33	0.461	0.000
L8	17.75 - 14.25	0.461	33	0.246	0.000
L9	14.25 - 0	0.298	33	0.200	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.000	TME-1900MHz RRH (65MHz)	33	34.998	2.159	0.002	21236
148.000	APXVSPP18-C-A20 w/ Mount Pipe	33	34.998	2.159	0.002	21236
138.000	(2) LPA-80063/6CF w/ Mount Pipe	33	30.477	2.128	0.002	10617
128.000	(4) HPA-65R-BUU-H8 w/ Mount Pipe	33	26.069	2.059	0.002	5308
79.000	PD1109E	33	9.403	1.155	0.001	3868
45.000	GPS_A	33	3.035	0.623	0.000	4522
16.000	GPS_A	33	0.374	0.223	0.000	3466

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 116.5	89.339	8	5.514	0.006
L2	120.25 - 98.5	58.235	8	5.001	0.005
L3	98.5 - 80.25	37.811	8	3.798	0.002
L4	84.75 - 70.5	27.757	8	3.176	0.001
L5	70.5 - 39.75	19.007	8	2.616	0.001
L6	45 - 31.75	7.758	8	1.593	0.000
L7	31.75 - 17.75	3.829	8	1.179	0.000
L8	17.75 - 14.25	1.180	8	0.630	0.000
L9	14.25 - 0	0.761	8	0.513	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.000	TME-1900MHz RRH (65MHz)	8	89.339	5.514	0.006	8454
148.000	APXVSPP18-C-A20 w/ Mount Pipe	8	89.339	5.514	0.006	8454
138.000	(2) LPA-80063/6CF w/ Mount Pipe	8	77.809	5.433	0.006	4226
128.000	(4) HPA-65R-BUU-H8 w/ Mount Pipe	8	66.566	5.259	0.006	2111
79.000	PD1109E	8	24.028	2.951	0.001	1522
45.000	GPS_A	8	7.758	1.593	0.000	1772
16.000	GPS_A	8	0.957	0.570	0.000	1356

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	148 - 116.5 (1)	TP29.48x24x0.219	31.500	0.000	0.0	36.000	19.864	-9.017	715.086	0.013
L2	116.5 - 98.5 (2)	TP32.175x28.39x0.25	21.750	0.000	0.0	39.000	25.332	-11.899	987.953	0.012
L3	98.5 - 80.25 (3)	TP35.35x32.175x0.434	18.250	0.000	0.0	30.574	47.022	-14.480	1437.630	0.010
L4	80.25 - 70.5 (4)	TP36.547x34.067x0.487	14.250	0.000	0.0	30.621	55.723	-18.325	1706.280	0.011
L5	70.5 - 39.75 (5)	TP41.9x36.547x0.591	30.750	0.000	0.0	32.053	75.811	-25.294	2429.940	0.010
L6	39.75 - 31.75 (6)	TP42.666x40.361x0.643	13.250	0.000	0.0	32.090	85.803	-30.789	2753.450	0.011
L7	31.75 - 17.75 (7)	TP45.102x42.666x0.626	14.000	0.000	0.0	32.140	88.424	-35.354	2841.930	0.012
L8	17.75 - 14.25 (8)	TP45.711x45.102x0.728	3.500	0.000	0.0	34.040	103.899	-36.775	3536.700	0.010
L9	14.25 - 0 (9)	TP48.19x45.711x0.663	14.250	0.000	0.0	32.616	100.020	-41.868	3262.250	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	148 - 116.5 (1)	TP29.48x24x0.219	328.179	28.078	36.000	0.780	0.000	0.000	36.000	0.000
L2	116.5 - 98.5 (2)	TP32.175x28.39x0.25	827.324	49.748	39.000	1.276	0.000	0.000	39.000	0.000
L3	98.5 - 80.25 (3)	TP35.35x32.175x0.434	1161.100	35.350	30.574	1.156	0.000	0.000	30.574	0.000
L4	80.25 - 70.5 (4)	TP36.547x34.067x0.487	1525.433	37.124	30.621	1.212	0.000	0.000	30.621	0.000
L5	70.5 - 39.75 (5)	TP41.9x36.547x0.591	2217.942	35.458	32.053	1.106	0.000	0.000	32.053	0.000
L6	39.75 - 31.75 (6)	TP42.666x40.361x0.643	2598.183	35.301	32.090	1.100	0.000	0.000	32.090	0.000
L7	31.75 - 17.75 (7)	TP45.102x42.666x0.626	3012.050	37.476	32.140	1.166	0.000	0.000	32.140	0.000
L8	17.75 - 14.25 (8)	TP45.711x45.102x0.728	3117.250	32.703	34.040	0.961	0.000	0.000	34.040	0.000
L9	14.25 - 0 (9)	TP48.19x45.711x0.663	3554.175	36.580	32.616	1.122	0.000	0.000	32.616	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	148 - 116.5 (1)	TP29.48x24x0.219	22.148	1.115	24.000	0.093	0.797	0.033	24.000	0.001
L2	116.5 - 98.5 (2)	TP32.175x28.39x0.25	23.723	0.936	26.000	0.072	0.817	0.024	26.000	0.001
L3	98.5 - 80.25 (3)	TP35.35x32.175x0.434	24.837	0.528	20.383	0.052	0.815	0.012	20.383	0.001
L4	80.25 - 70.5 (4)	TP36.547x34.067x0.487	26.176	0.470	20.414	0.046	0.814	0.010	20.414	0.000
L5	70.5 - 39.75 (5)	TP41.9x36.547x0.591	28.119	0.371	21.369	0.035	0.804	0.006	21.369	0.000
L6	39.75 - 31.75 (6)	TP42.666x40.361x0.643	29.145	0.340	21.394	0.032	0.647	0.004	21.394	0.000
L7	31.75 - 17.75 (7)	TP45.102x42.666x0.626	29.991	0.339	21.427	0.032	0.642	0.004	21.427	0.000
L8	17.75 - 14.25 (8)	TP45.711x45.102x0.728	30.244	0.291	22.693	0.026	0.640	0.003	22.693	0.000
L9	14.25 - 0 (9)	TP48.19x45.711x0.663	31.093	0.311	21.744	0.029	0.635	0.003	21.744	0.000

Pole Interaction Design Data

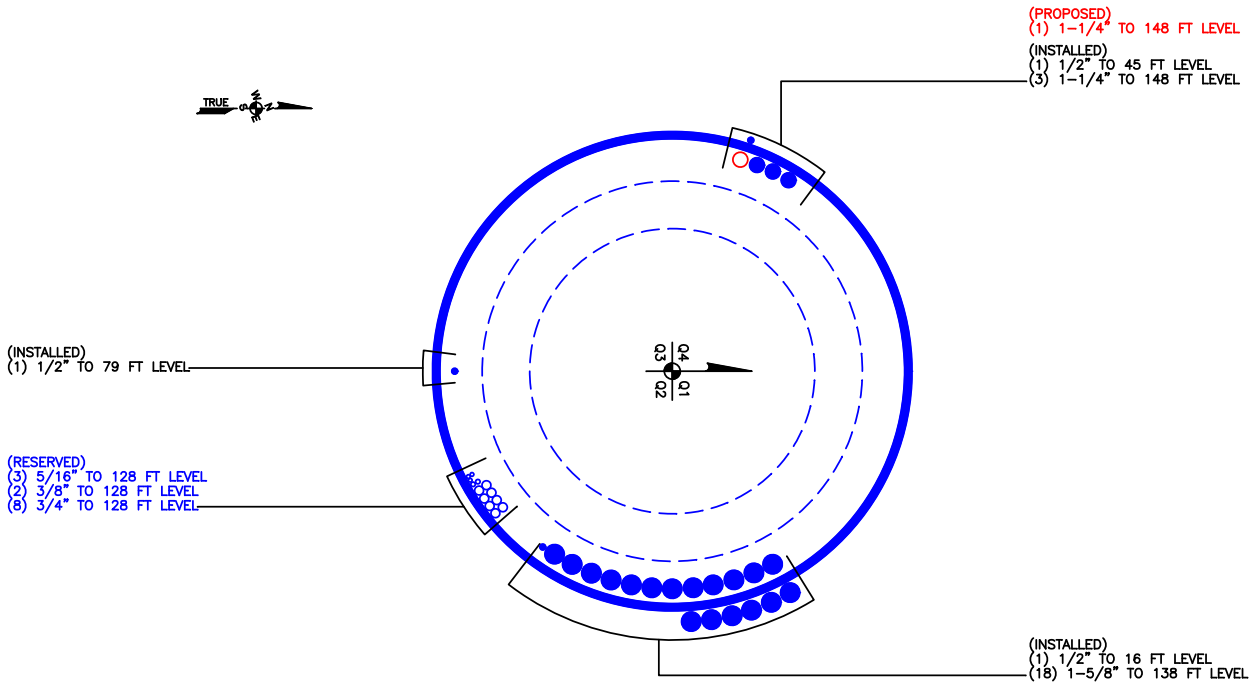
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	148 - 116.5 (1)	0.013	0.780	0.000	0.093	0.001	0.795 ✔	1.333	H1-3+VT ✔
L2	116.5 - 98.5 (2)	0.012	1.276	0.000	0.072	0.001	1.289 ✔	1.333	H1-3+VT ✔
L3	98.5 - 80.25 (3)	0.010	1.156	0.000	0.052	0.001	1.167 ✔	1.333	H1-3+VT ✔
L4	80.25 - 70.5 (4)	0.011	1.212	0.000	0.046	0.000	1.224 ✔	1.333	H1-3+VT ✔
L5	70.5 - 39.75 (5)	0.010	1.106	0.000	0.035	0.000	1.117 ✔	1.333	H1-3+VT ✔
L6	39.75 - 31.75 (6)	0.011	1.100	0.000	0.032	0.000	1.111 ✔	1.333	H1-3+VT ✔
L7	31.75 - 17.75 (7)	0.012	1.166	0.000	0.032	0.000	1.179 ✔	1.333	H1-3+VT ✔
L8	17.75 - 14.25 (8)	0.010	0.961	0.000	0.026	0.000	0.971 ✔	1.333	H1-3+VT ✔
L9	14.25 - 0 (9)	0.013	1.122	0.000	0.029	0.000	1.135 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	148 - 116.5	Pole	TP29.48x24x0.219	1	-9.017	953.210	59.6	Pass
L2	116.5 - 98.5	Pole	TP32.175x28.39x0.25	2	-11.899	1316.941	96.7	Pass
L3	98.5 - 80.25	Pole	TP35.35x32.175x0.434	3	-14.480	1916.361	87.5	Pass
L4	80.25 - 70.5	Pole	TP36.547x34.067x0.487	4	-18.325	2274.471	91.8	Pass
L5	70.5 - 39.75	Pole	TP41.9x36.547x0.591	5	-25.294	3239.110	83.8	Pass
L6	39.75 - 31.75	Pole	TP42.666x40.361x0.643	6	-30.789	3670.349	83.4	Pass
L7	31.75 - 17.75	Pole	TP45.102x42.666x0.626	7	-35.354	3788.293	88.4	Pass
L8	17.75 - 14.25	Pole	TP45.711x45.102x0.728	8	-36.775	4714.421	72.9	Pass
L9	14.25 - 0	Pole	TP48.19x45.711x0.663	9	-41.868	4348.579	85.1	Pass
							Summary	
						Pole (L2)	96.7	Pass
						RATING =	**96.7**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876373 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Reinforcement Capacity

AeroSolutions LLC
Optimizing Your Tower Infrastructure

5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Dimensions and Properties														Compression				Axial				
																		ASD-9			LRFD	
Model	Weight (lb/ft)	Area (in^2)	Moment of Inertia (in^4)	Moment of Inertia (in^4)	Centroid from Mating Edge (in)	Centroid from Bolt Hole Center (in)	Web Thickness (in)	Width (in)	Flange Width (in)	Flange Thickness (in)	Hole Diameter (in)	Yield Stress (ksi)	Ultimate Stress (ksi)	Slender. Ratio Coefficient	Unbraced Length (in)	Slender. Ratio Coefficient	Unbraced Length (in)	Allowable Axial (kip)	Allowable Axial w/ increase (kip)	Governing Axial	Design Axial Strength (kip)	Governing Axial
8.5x1.25	36.2	10.63	1.38	63.97	0.625	0	1.25	8.5	0	0	1.21875	65	80	0.80	17	1.00	17	350.9	467.9	Compress.	541.4	Rupture
6.5x1.25	27.6	8.13	1.06	28.61	0.625	0	1.25	6.5	0	0	1.21875	65	80	0.80	19	1.00	19	260.4	347.2	Compress.	391.4	Rupture
6x1	20.4	6.00	0.50	18.00	0.5	0	1	6	0	0	1.21875	65	80	0.80	16	1.00	16	188.8	251.7	Rupture	283.1	Rupture

Rein1

Bottom	Top	Qty	Model	Position	T or T&C
0	14.25	2	8.5x1.25	F	T&C
14.25	31.75	3	8.5x1.25	F	T&C
31.75	70.5	3	8.5x1.25	F	T&C
70.5	98.5	3	6x1	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Flats (Used for relative orientation only. Actual flat numbers may vary.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
											1						1
					1						1						1
					1						1						1
					1						1						1

Rein2

Bottom	Top	Qty	Model	Position	T or T&C
0	17.75	2	6.5x1.25	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
			1			1											

Rein3

Bottom	Top	Qty	Model	Position	T or T&C
0				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Reinforced Pole Stress
and Effective Thickness Check

AeroSolutions LLC
Optimizing Your Tower Infrastructure
5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Section		Loads				Pole																Unreinforced Pole - Rev. F					Reinforced Pole					Rev. F	Reinforcement 1								Reinforcement 2								Composite							
Section	Elevation (ft)	Moment (ft-kip)	Compression (kip)	Shear (kip)	Torsion (kip-ft)	Number of Sides	OD (in)	Thickness (in)	Yield Strength (ksi)	Flat Width (in)	Area (in²)	Moment of Inertia (in⁴)	Percent of Composite Moment of Inertia	Angle Offset to Pole Flat	Distance to Extreme Fiber (in)	Section Modulus (in³)	Torsion Constant (in⁴)	Polygonal Compact Criterion	Allowable Bending Stress (ksi)	Allowable Bending Moment Strength (ft-kip)	Allowable Axial Stress (ksi)	Allowable Shear Stress (ksi)	Bending Stress (ksi)	Axial Stress (ksi)	Shear Stress (ksi)	Torsion Shear Stress (ksi)	Stress Ratio	Moment in Pole when Reinforced (ft-kip)	Bending Stress (ksi)	Axial Stress (ksi)	Shear Stress (ksi)	Torsion Shear Stress (ksi)	Reinforced Pole Stress Ratio	Qty	Model	Position (F-Flat, C-Corner)	Gap Between Pole and Back of Rein. (in)	Tension only or Tension & Comp.	Total Moment of Inertia (in⁴)	Axial Force (kip)	Stress Ratio	Qty	Model	Position (F-Flat, C-Corner)	Gap Between Pole and Back of Rein. (in)	Tension only or Tension & Comp.	Total Moment of Inertia (in⁴)	Axial Force (kip)	Stress Ratio	Centroid Offset (in)	Area (in²)	Moment of Inertia (in⁴)	Controlling Stress Ratio	Thickness (in)	Weight Multiplier	Derated Yield Stress (ksi)	% Error in Derated Yield Stress
1	148	0.0	0.0	0.0	0.0	18	24.0000	0.2188	60	3.85	16.5	1178	100%	TRUE	12.17	97	2336	136	48.0	387.2	48.0	32.0	0.0	0.00	0.00	0.00	**0.000**	0.0	0.0	0.00	0.00	0.00	**0.000**																		0.000	16.5	1178	**0.000**	**0.2188**	**1.00**	**60.0**	**143.2%**
2	120.25	328.2	9.0	22.1	0.8	18	28.8276	0.2188	60	4.70	19.8	2052	100%	TRUE	14.62	140	4067	166	48.0	561.2	48.0	32.0	28.1	0.45	0.00	0.03	**0.596**	328.2	28.1	0.45	0.00	0.00	**0.594**																		0.000	19.8	2052	**0.594**	**0.2188**	**1.00**	**60.0**	**0.8%**
3	116.5	411.8	9.7	22.4	0.8	18	29.4800	0.4688	60	4.37	43.1	4581	100%	TRUE	14.93	307	9091	72	48.0	1227.0	48.0	32.0	16.1	0.22	0.00	0.02	**0.340**	411.8	16.1	0.22	0.00	0.00	**0.340**																		0.000	43.1	4581	**0.340**	**0.4688**	**1.00**	**60.0**	**0.4%**
4	98.5	827.3	11.9	23.7	0.8	18	32.1746	0.2500	65	5.23	25.3	3258	100%	TRUE	16.32	200	6458	169	52.0	865.1	52.0	34.7	49.7	0.47	0.00	0.02	**0.965**	827.3	49.7	0.47	0.00	0.00	**0.965**																		0.000	25.3	3258	**0.965**	**0.2500**	**1.00**	**65.0**	**0.1%**
5	84.75	1161.1	14.5	24.8	0.8	18	34.5670	0.2500	65	5.65	27.2	4047	58%	0	17.28	234	8021	182	52.0	1014.5	52.0	34.7	59.5	0.53	0.00	0.02	**0.113**	679.0	34.8	0.53	0.00	0.00	**0.680**	3	6x1	F	0	T&C	2874	214.9	**0.854**																		0.000	45.2	6921	**0.854**	**0.4540**	**0.96**	**51.0**	**2.4%**
6	80.25	1273.8	16.1	25.3	0.8	18	35.3500	0.5625	65	5.24	62.0	9478	76%	0	17.68	536	18810	75	52.0	2323.2	52.0	34.7	28.5	0.26	0.00	0.01	**0.533**	967.5	21.7	0.26	0.00	0.00	**0.421**	3	6x1	F	0	T&C	3001	133.6	**0.531**																		0.000	80.0	12479	**0.531**	**0.7514**	**0.97**	**51.0**	**2.2%**
7	70.5	1525.4	18.3	26.2	0.8	18	36.5475	0.3125	65	5.89	35.9	5955	65%	0	18.27	326	11805	152	52.0	1411.7	52.0	34.7	56.2	0.51	0.00	0.02	**1.090**	992.2	36.5	0.51	0.00	0.00	**0.713**	3	6x1	F	0	T&C	3200	225.1	**0.895**																		0.000	53.9	9155	**0.895**	**0.4869**	**0.97**	**51.0**	**2.3%**
8	45	2217.0	25.3	28.1	0.8	18	40.9862	0.3125	65	6.68	40.3	8423	54%	0	20.49	411	16695	172	52.0	1790.6	52.0	34.7	64.8	0.63	0.00	0.01	**1.259**	1195.3	34.9	0.63	0.00	0.00	**0.683**	3	8.5x1.25	F	0	T&C	7206	382.2	**0.817**																		0.000	72.2	15629	**0.817**	**0.5913**	**0.95**	**53.4**	**2.3%**
9	39.75	2397.1	28.3	28.6	0.6	18	41.9000	0.6875	65	6.18	89.8	19261	72%	0	20.95	919	38226	72	52.0	3983.0	52.0	34.7	30.9	0.31	0.00	0.00	**0.600**	1702.7	22.2	0.31	0.00	0.00	**0.434**	3	8.5x1.25	F	0	T&C	7517	243.2	**0.520**																		0.000	121.7	26778	**0.520**	**0.9742**	**0.96**	**53.5**	**2.2%**
10	31.75	2598.2	30.8	29.1	0.6	18	42.6663	0.3750	65	6.86	50.3	11361	59%	0	21.33	533	22512	148	52.0	2307.1	52.0	34.7	58.5	0.61	0.00	0.01	**0.917**	1541.9	34.7	0.61	0.00	0.00	**0.680**	3	8.5x1.25	F	0	T&C	7782	380.1	**0.812**																		0.000	82.2	19143	**0.812**	**0.6433**	**0.96**	**53.5**	**2.4%**
11	17.75	3032.1	35.4	30.0	0.6	18	45.1020	0.3750	65	7.29	53.2	13440	61%	0	22.55	596	26641	157	52.0	2581.9	52.0	34.7	60.6	0.66	0.00	0.01	**1.179**	1831.9	36.9	0.66	0.00	0.00	**0.722**	3	8.5x1.25	F	0	T&C	8658	402.9	**0.861**																		0.000	85.1	22098	**0.861**	**0.6264**	**0.96**	**53.6**	**2.5%**
12	14.25	3117.2	36.8	30.2	0.6	18	45.7109	0.3750	65	7.40	53.9	14230	54%	0	24.94	571	27744	159	52.0	2472.1	52.0	34.7	65.6	0.68	0.00	0.01	**1.219**	1670.0	35.1	0.68	0.00	0.00	**0.689**	3	8.5x1.25	F	0	T&C	9023	382.6	**0.818**	3	6.5x1.25	F	0	T&C	5887	313.3	**0.702**	2.081	102.0	26561	**0.818**	**0.7277**	**0.98**	**56.7**	**11.1%**
13	0	3554.2	41.9	31.1	0.6	18	48.1800	0.3750	65	7.84	56.9	16440	62%	0	24.67	666	32548	168	52.0	2886.7	52.0	34.7	64.0	0.74	0.00	0.01	**1.246**	2187.3	39.4	0.74	0.00	0.00	**0.772**	2	8.5x1.25	F	0	T&C	4387	313.1	**0.712**	2	6.5x1.25	F	0	T&C	5887	313.3	**0.702**	0.577	94.4	26713	**0.902**	**0.8198**	**1.01**	**53.3**	**2.5%**
																											1.274					**0.965**																					**0.965**				

Anchor Rod Information for TIA/EIA-222-F and TIA-222-G-2

Site Information	
ID:	876373
Name:	LONG EDDY - WRIGHT PROPERTY
App. #:	245996

AeroSolutions LLC
Optimizing Your Tower Infrastructure

Base Reactions		
Moment:	3554	ft-kip
Axial:	42	kip
Shear:	31	kip
Base Plate Type:	Square	

Design Information	
TIA Code:	F
ASIF:	1.333
Failure:	100%
eta Factor:	0.50

Original Anchor Rod Data

Quantity:	16	
Diameter:	2.25	in
Material:	#18J	
Bolt Circle:	55.0	in
Bolt Spacing:	6	in
Bolt Group Area:	63.62	in^2
Bolt Group MOIx:	24055	in^4

Reactions Seen by Original AR Group

Moment:	2870.3	kip-ft
Axial:	41.9	kip
Shear:	31.1	kip

Original AR Capacity Check

Tension Load:	153.0	kip
Allowable load:	194.8	kip
AR Capacity:	78.5%	Pass

First Added Anchor Rod Data

Quantity:	3	
Diameter:	2.25	in
Material:	A193 B7	
Bolt Circle:	62.0	in
Bolt Group Area:	11.93	in^2
Bolt Group MOIx:	5732	in^4

Reactions Seen by First Added AR Group

Moment:	683.9	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

First Added AR Capacity Check

Tension Load:	176.5	kip
Allowable load:	218.6	kip
AR Capacity:	80.7%	Pass

Second Added Anchor Rod Data

Quantity:		
Diameter:		in
Material:		
Bolt Circle:		in
Bolt Group Area:	0.00	in^2
Bolt Group MOIx:	0	in^4

Reactions Seen by Second Added AR Group

Moment:	0.0	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

Second Added AR Capacity Check

Tension Load:	0.0	kip
Allowable load:	0.0	kip
AR Capacity:	0.0%	

Third Added Anchor Rod Data

Quantity:		
Diameter:		in
Material:		
Bolt Circle:		in
Bolt Group Area:	0.00	in^2
Bolt Group MOIx:	0	in^4

Reactions Seen by Second Added AR Group

Moment:	0.0	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

Second Added AR Capacity Check

Tension Load:	0.0	kip
Allowable load:	0.0	kip
AR Capacity:	0.0%	

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

Assumptions: 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *876373*
Site Name: *LONG EDDY - WRIGHT P*
App #: *245996 Rev # 0*

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	55	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	54	in
Thick:	2.75	in
Grade:	55	ksi
Clip Distance:	6	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
Weld Type:	Both	**
Groove Depth:	0.375	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.375	in
Width:	6	in
Height:	12	in
Thick:	0.75	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	80	ksi

Pole Data		
Diam:	48.19	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	2870.28796	ft-kips
Unfactored Axial, P:	41.8685	kips
Unfactored Shear, V:	31.093007	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	153.9	Kips
Allowable Tension:	195.0	Kips
Anchor Rod Stress Ratio:	79.0%	**Pass**

Base Plate Results Flexural Check

Base Plate Stress:	45.4	ksi
Allowable PL Bending Stress:	55.0	ksi
Base Plate Stress Ratio:	82.5%	**Pass**

PL Ref. Data	
Yield Line (in):	28.18
Max PL Length:	28.18

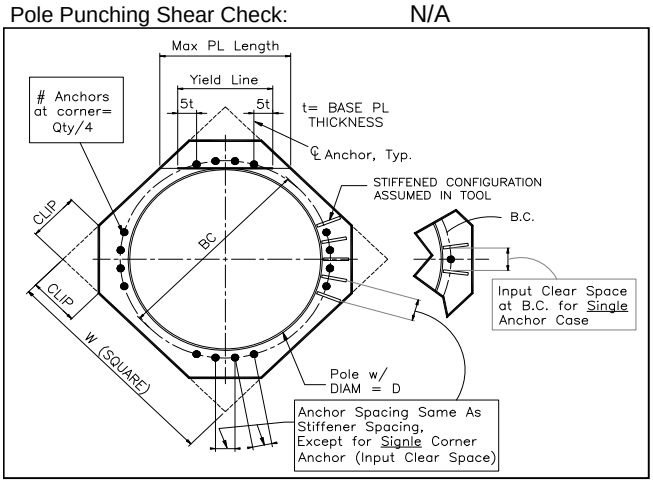
N/A - Unstiffened

Stiffener Results

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A



** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Monopole Block Foundation

Checks capacity of monolithic block foundation for a monopole tower per TIA/EIA-222-F

BU #: 876373
Site Name: LONG EDDY / WRIGHT PRC
App No.: 245996 Rev #0

Design Reactions		
Shear, **S**:	31.00	kips
Moment, **M**:	3554.00	ft*kips
Height, **H**:	148.00	ft
Weight, **Wt**:	42.00	kips
Base Diameter, **BD**:	48.2	in

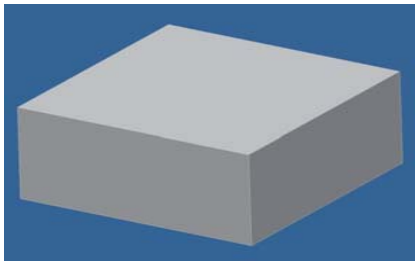
Foundation Dimensions		
Depth, **D**:	3.5	ft
Block Width, **W**:	24.5	ft
Neglected Depth, **N**:	3.5	ft
Ext. Above Grade, **E**:	0.5	ft
Anchor Steel Length, **Lst**:	84.0	in
Clear Cover, **cc**:	3.0	in

Soil Properties		
Soil Unit Weight, **γ**:	0.120	kcf
Allowable Bearing, **Bc**:	6.000	ksf
Int. Angle of Friction, **Φ**:	32.00	deg
Cohesion, **Co**:	0.000	ksf
Passive Pressure, **Pp**:	0.000	kcf
Base Friction, **μ**:	0.4	
Seismic Zone, **z**:	1	

Material Properties		
Rebar Yield Strength, **Fy**:	60000	psi
Concrete Strength, **F'c**:	3000	psi
Concrete Density, **δc**:	0.150	kcf

Rebar Properties		
Pad Rebar Size, **sp**:	8	
Rebar Quanity, **mp**:	26	24

Design Checks	*Capacity/ Availability*	*Demands/ Limits*	*Check*	*%*
Shear (ksf)	75.01	31.00	**OK**	**41.3%**
*Overturning (ft*kips):*	3711.68	3678.00	**OK**	**99.1%**
Bearing (ksf):	6.00	3.18	**OK**	**53.0%**
Shear - 1-Way (kips):	1433.17	739.34	**OK**	**51.6%**
Pad Rebar Area (in²):	20.42	18.63	**OK**	**N/A**
Bar Spacing (in):	10.48	18 > Bs > 2	**OK**	**N/A**
Development Length (in):	144.00	42.72	**OK**	**N/A**



Modification Checks	*Capacity/ Availibility*	*Demands/ Limits*	*Check*
Minimum Extra Thickness (in):	0.00	0.00	**Not Used**
Pad Rebar Area-short (in²):	8.84	1.87	**Not Used**
Pad Rebar Area-long (in2):	2.21	1.87	**Not Used**
Pad Rebar Spacing-short (in2):	14.37	18 > Bs > 2	**Not Used**
Pad Rebar Spacing-long (in2):	71.06	18 > Bs > 2	**Not Used**
End Cap Width (in):	0.00	0.00	**Not Used**
End Cap Rebar Area (in2):	4.81	0.00	**Not Used**
EC Rebar Spacing (in):	-1.73	18 > Bs > 2	**Not Used**
Tie Spacing (in):	14.66	288 > s > 4.5	**Not Used**
Dowel Area (in2):	8.84	0.00	**Not Used**
Dowel Embedment (in):	15.00	6.00	**Not Used**
Shear Strength of Cone (kips):	59.53	23.86	**Not Used**
Dowel Edge Distance (in):	12.00	14.51	**Not Used**
Dowel Spacing (in):	30.00	30.00	**Not Used**
Dowel Edge Distance (vert) (in):	24.00	14.51	**Not Used**
Dowel Devel. Length (in):	-3.00	15.38	**Not Used**

Modifications					
Pad Thickness, Te:	0	in	**End Cap Width**, **Wec**:	0	in
Revised Pad Thickness, **Tx**:	4	ft	Revised Width, **Wx**:	24.5	ft
Pad Rebar Size, **Se**:	6		EC Rebar Size, **Sec**:	7	per side, top & bottom
Rebar Quanity (long), **me**:	20	5	EC Rebar Quanity, **mec**:	8	0
Rebar Quanity (short), **mex**:	5	5	EC Tie Size, **Sect**:	4	per side
Dowel Size, **Sed**:	7		Tie Quanity, **mect**:	20	0
Dowel Quanity, **med**:	20	0	EC Dowel Size, **Secd**:	6	per side
			Dowel Quanity, **mecd**:	20	0
			Rows of Dowels, **Nd**:	2	
			Dowel Depth, **decd**:	15	in
			Edge Distance, **eecd**:	12	in

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RADIO FREQUENCY FCC REGULATORY COMPLIANCE MAXIMUM PERMISSIBLE EXPOSURE (MPE) ASSESSMENT

Sprint Existing Facility

Site ID: CT33XC078

Long Eddy / Wright Property

136 Wright Road
Torrington, CT 06790

November 13, 2014

EBI Project Number: 62144689

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
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November 13, 2014

Sprint
Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, NJ 07495

Re: Radio Frequency Maximum Permissible Exposure (MPE) Assessment for Site:
CT33XC078 - Long Eddy / Wright Property

Site Total: 31.04% - MPE% in full compliance

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at **136 Wright Road, Torrington, CT**, for the purpose of determining whether the radio frequency (RF) exposure levels from the proposed Sprint equipment upgrades on this property are within specified federal limits.

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

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the cellular band (850 MHz Band) is approximately 567 $\mu W/cm^2$, and the general population exposure limit for the 1900 MHz and 2500 MHz bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed upgrades to the existing Sprint Wireless antenna facility located at **136 Wright Road, Torrington, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all emissions were calculated using the following assumptions:

1) 2 channels in the 1900 MHz Band were considered for each sector of the proposed installation.

2) 1 channel in the 800 MHz Band was considered for each sector of the proposed installation.

3) 2 channels in the 2500 MHz Band were considered for each sector of the proposed installation.

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

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

6) The antennas used in this modeling are the RFS APXVSPP18-C-A20 and the RFS APXVTM14-C-I20. This is based on feedback from the carrier with regards to anticipated antenna selection. The RFS APXVSPP18-C-A20 has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. The RFS APXVTM14-C-I20 has a 15.9 dBd gain value at its main lobe at 2500 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

7) The antenna mounting height centerline for the proposed antennas is **148 feet** above ground level (AGL).

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

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

Site ID	CT33XC078 - Long Eddy / Wright Property
Site Addresss	136 Wright Road, Torrington, CT, 06790
Site Type	Monopole

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	5.9	148	142	1/2 "	0.5	0	138.69	0.25%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	148	142	1/2 "	0.5	0	39.00	0.12%
1B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	148	142	1/2 "	0.5	0	138.69	0.44%
														Sector total Power Density Value:		0.81%

Sector 2

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
2a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	5.9	148	142	1/2 "	0.5	0	138.69	0.25%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	148	142	1/2 "	0.5	0	39.00	0.12%
2B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	148	142	1/2 "	0.5	0	138.69	0.44%
														Sector total Power Density Value:		0.81%

Sector 3

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
3a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	5.9	148	142	1/2 "	0.5	0	138.69	0.25%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	148	142	1/2 "	0.5	0	39.00	0.12%
3B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	148	142	1/2 "	0.5	0	138.69	0.44%
														Sector total Power Density Value:		0.81%

Site Composite MPE %	
Carrier	MPE %
Sprint	2.42%
AT&T	9.38%
Verizon Wireless	19.24%
Total Site MPE %	**31.04%**

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Summary

All calculations performed for this analysis yielded results that were well within the allowable limits for general public Maximum Permissible Exposure (MPE) to radio frequency energy.

The anticipated Maximum Composite contributions from the Sprint facility are **2.42% (0.81% from sector 1, 0.81% from sector 2 and 0.81% from sector 3)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **31.04%** of the allowable FCC established general public limit sampled at 6 feet above ground level. This total composite site value is based upon MPE values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Scott Heffernan
RF Engineering Director

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