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

September 11, 2014

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

RE: **Sprint PCS-Exempt Modification - Crown Site BU: 876369**
Sprint PCS Site ID: CT33XC021
Located at: 64 Hungerford Lane, Harwinton, CT 06791

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 Mr. Michael R. Criss, First Selectman for Town of Harwinton, and Buckley Broadcasting Group, Property Owner.

Sprint plans to modify the existing wireless communications facility owned by Crown Castle and located at **64 Hungerford Lane, Harwinton, CT 06791**. 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,

Raymond Perry
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: Mr. Michael R. Criss, First Selectman
Town of Harwinton
100 Bentley Drive
Harwinton, CT 06791

Buckley Broadcasting Group
869 Blue Hills Avenue
Bloomfield, CT 06002

Sprint

2.5 EQUIPMENT DEPLOYMENT

SITE NUMBER:

CT33XC021

SITE NAME:

HARWINTON/BUCKLEY BROADCASTING CORP.

SITE ADDRESS:

64 HUNGERFORD LANE
HARWINTON, CT 06791

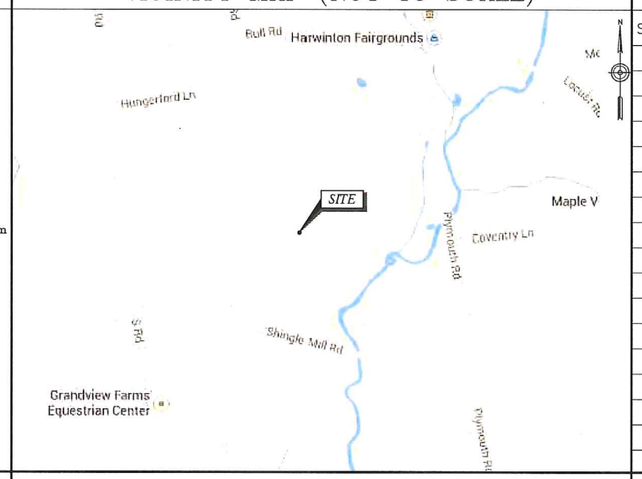
CROWN ID#: 876369
CROWN SITE NAME: HARWINTON/BUCKLEY BROADCASTI

SHEET INFORMATION

SITE NUMBER:	CT33XC021
SITE NAME:	HARWINTON/BUCKLEY BROADCASTING CORP.
SITE ADDRESS:	64 HUNGERFORD LANE HARWINTON, CT 06791
COUNTY:	LITCHFIELD
COORDINATES: (NAD 83)	41° 45' 26.15" N 73° 3' 9.2" W
GROUND ELEV:	857'± AMSL
STRUCTURE TYPE:	MONOPOLE
STRUCTURE HEIGHT:	178'-0"± AGL
STRUCTURE RAD CENTER:	180'-0"± AGL
ZONING CLASSIFICATION:	2-1 COMM LAND
MAP-BLOCK-LOT:	D5/02/0032

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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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.

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.CT33XC021

NO	DATE	DESCRIPTION	BY
0	06/17/14	FOR COMMENT	KA
1	09/10/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
9/10/14	JMQ

SEAL:

SITE NUMBER:
CT33XC021

SITE NAME:
HARWINTON/BUCKLEY BROADCASTING CORP

SITE ADDRESS:
64 HUNGERFORD LANE
HARWINTON, CT 06791

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._1572011104218555492.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. ACI-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.
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SUBMITTALS

PROJECT NO: 7225.CT33XC021

NO	DATE	DESCRIPTION	BY
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DATE	REVIEWED BY
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SEAL:

SITE NUMBER:
CT33XC021

SITE NAME:
HARWINTON/BUCKLEY BROADCASTING CORP

SITE ADDRESS:
64 HUNGERFORD LANE
HARWINTON, CT 06791

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

Sprint

2.5 EQUIPMENT DEPLOYMENT
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OVERLAND PARK, KANSAS 66251

CROWN CASTLE

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SUBMITTALS

PROJECT NO: 7225.CT33XC021

NO	DATE	DESCRIPTION	BY
0	06/17/14	FOR COMMENT	KA
1	09/10/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
9/10/14	JMQ

SEAL

STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 22033
PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC021

SITE NAME:
HARWINTON/BUCKLEY BROADCASTING CORP

SITE ADDRESS:
64 HUNGERFORD LANE
HARWINTON, CT 06791

SHEET TITLE:
GENERAL NOTES

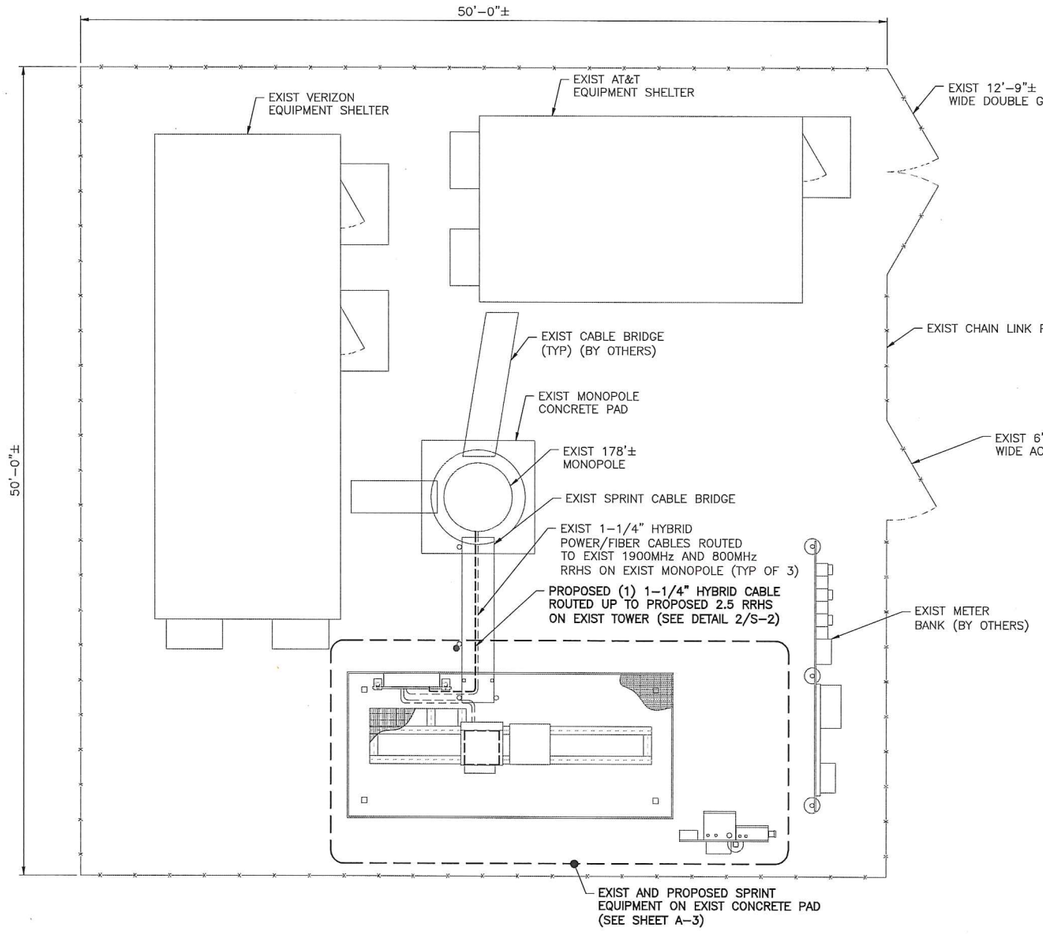
SHEET NO:
SP–2

N

APPROX.

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-2

1
A-1 SITE PLAN

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

Sprint

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NO	DATE	DESCRIPTION	BY
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1	09/10/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
9/19/14	JMQ

SEAL

STATE OF CONNECTICUT · ANOUK UMMELEN · No. 22038 · LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC021

SITE NAME:
HARWINTON/BUCKLEY BROADCASTING CORP

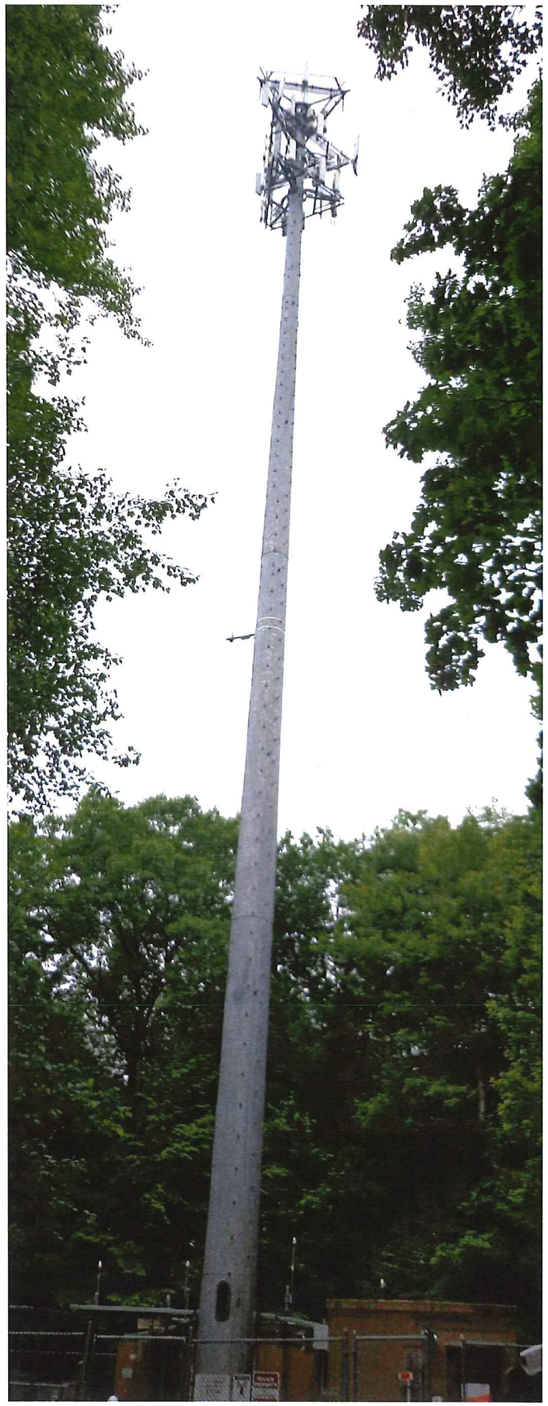
SITE ADDRESS:
64 HUNGERFORD LANE
HARWINTON, CT 06791

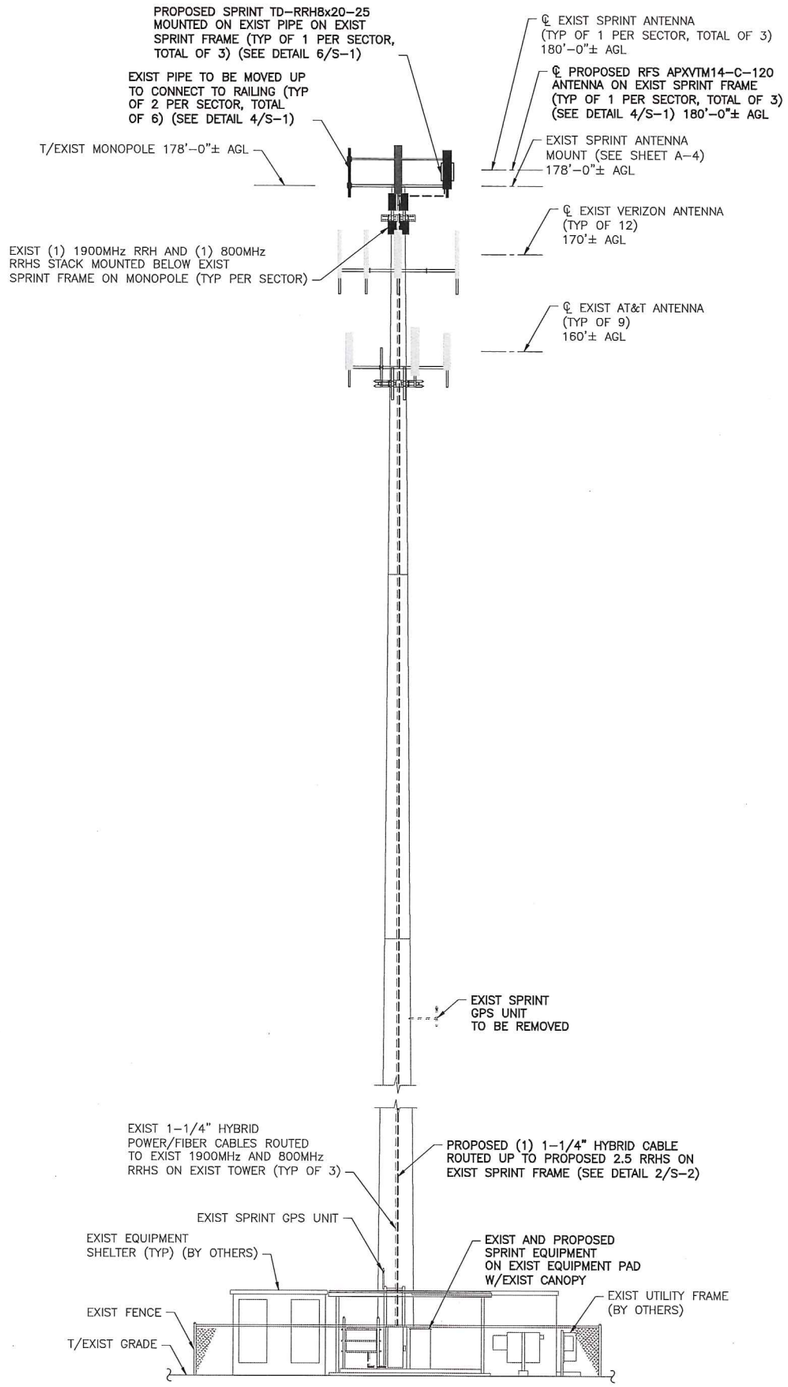
SHEET TITLE:
SITE PLAN

SHEET NO:
A-1

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 09/10/14.





1 / A-2 ELEVATION

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

Sprint

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NO	DATE	DESCRIPTION	BY
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1	09/10/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
9/10/14	JMG

SEAL

STATE OF CONNECTICUT · JOSHUA M. GRAY · No. 22030 · LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC021

SITE NAME:
HARWINTON/BUCKLEY BROADCASTING CORP

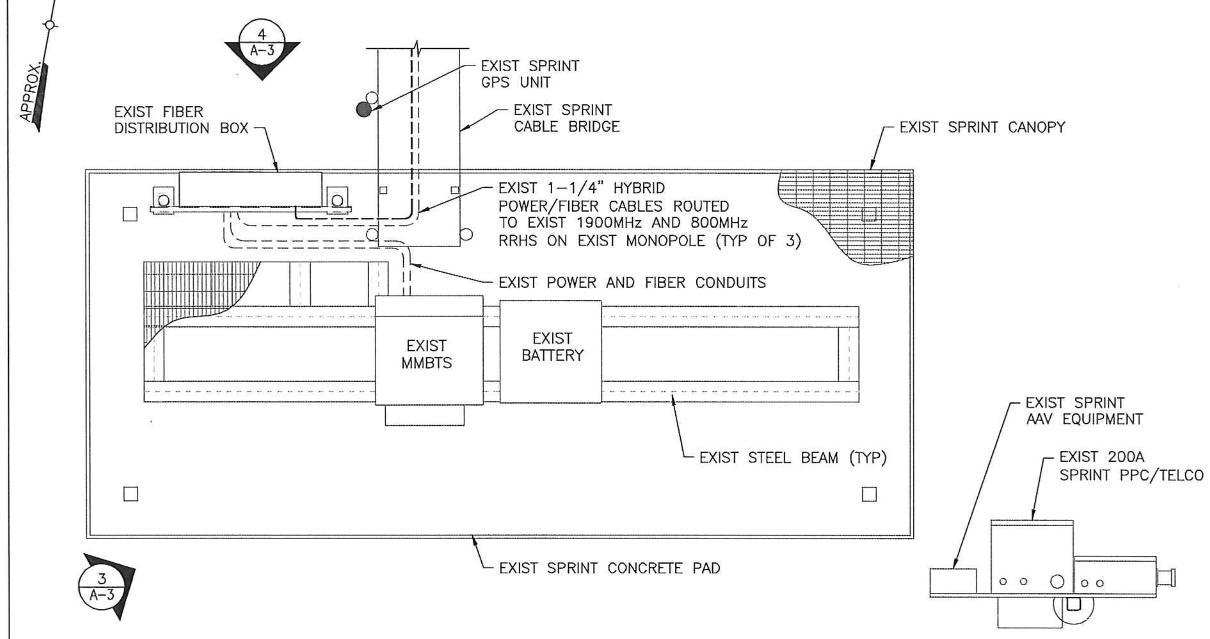
SITE ADDRESS:
64 HUNGERFORD LANE
HARWINTON, CT 06791

SHEET TITLE:
ELEVATION

SHEET NO:
A-2

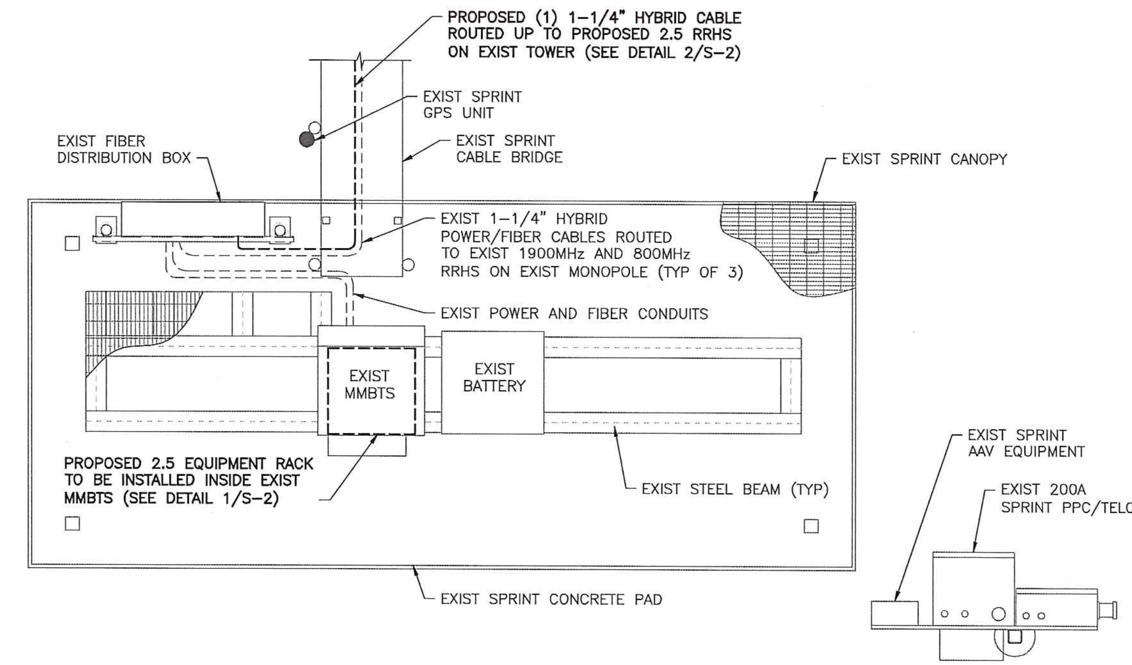
NORTH NOTE:

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-3 ENLARGED EQUIP. LAYOUT PLAN (EXIST)

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

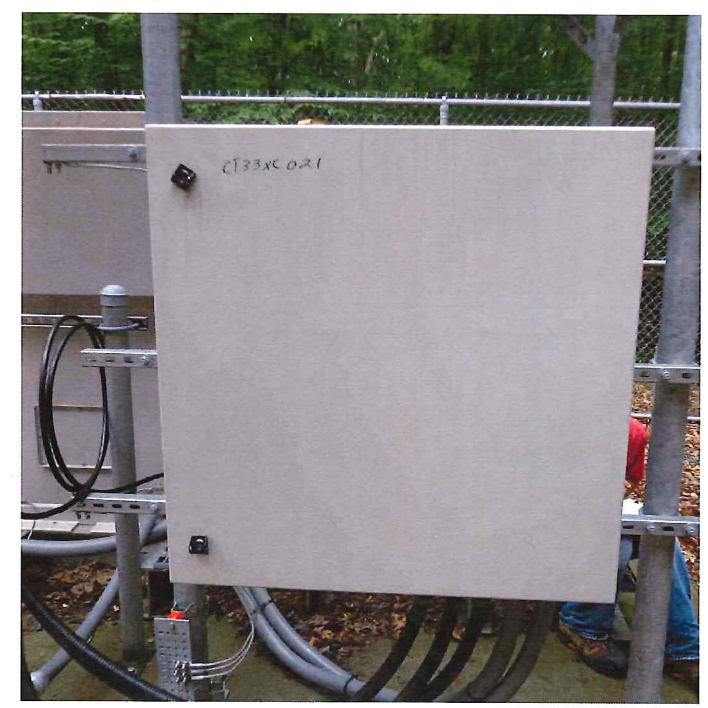


2 / A-3 ENLARGED EQUIP. LAYOUT PLAN (FINAL)

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

3 / A-3 EXIST EQUIPMENT PAD

SCALE: NTS



4 / A-3 EXIST FIBER DISTRIBUTION BOX

SCALE: NTS

Sprint

2.5 EQUIPMENT DEPLOYMENT
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9/10/14	JMQ

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STATE OF CONNECTICUT · MANOJKUMAR PATEL · No. 22033 · LICENSED PROFESSIONAL ENGINEER

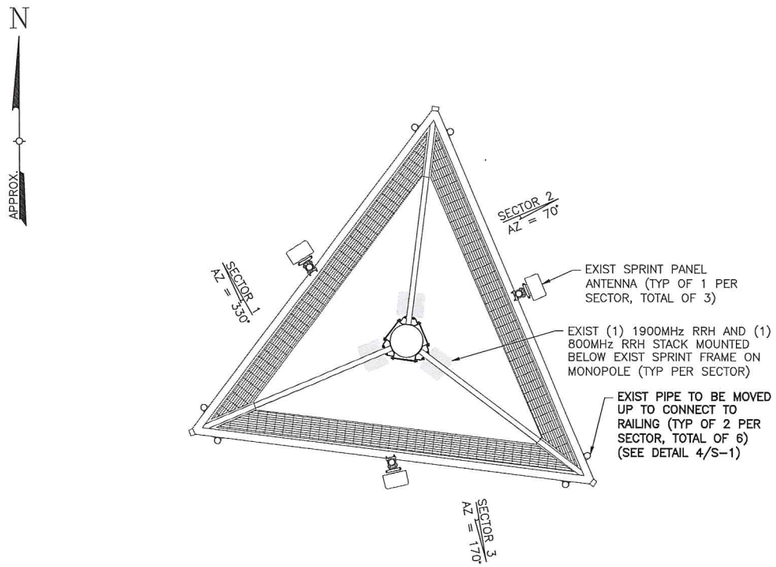
SITE NUMBER:
CT33XC021

SITE NAME:
HARWINTON/BUCKLEY BROADCASTING CORP

SITE ADDRESS:
64 HUNGERFORD LANE
HARWINTON, CT 06791

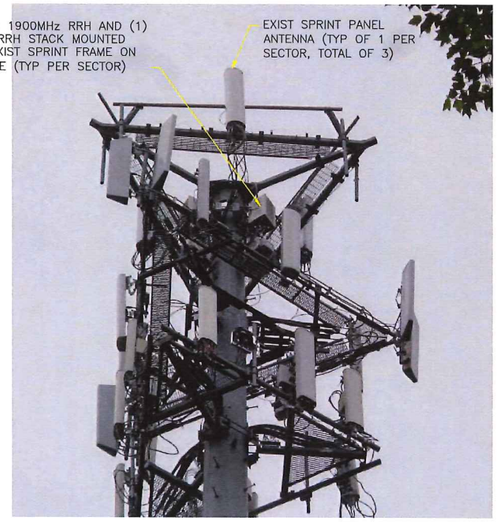
SHEET TITLE:
ENLARGED EQUIPMENT LAYOUT PLANS

SHEET NO:
A-3



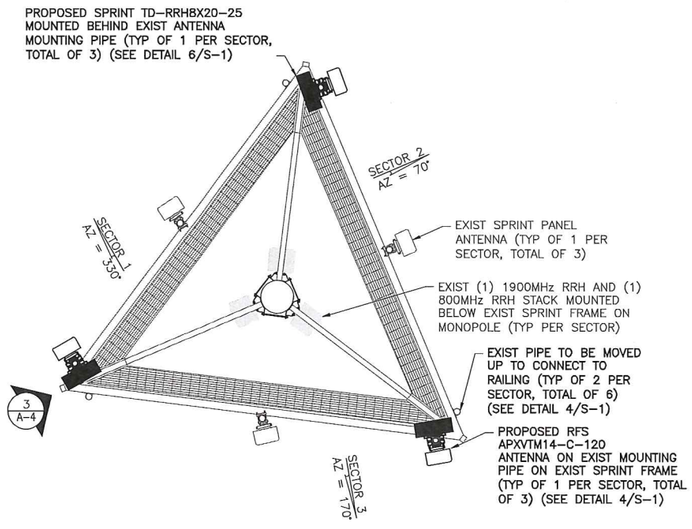
1 / A-4 ANTENNA LAYOUT PLAN (EXIST)

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



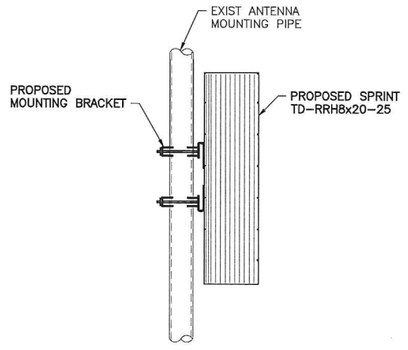
THE PROPOSED INSTALLATION, EXISTING MOUNTS AND EXISTING MONOPOLE SHALL BE ANALYZED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT (TO BE COORDINATED BY OTHERS).

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 09/10/14.



2 / A-4 ANTENNA LAYOUT PLAN (FINAL)

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



3 / A-4 RRH MOUNTING DETAIL

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

ANTENNA DATA

Status	Exist	Proposed
Antenna Manufacturer	RFS-CEL WAVE	**RFS-CEL WAVE**
Antenna Model Number	APXVSPP18C-A20	**APXVTM14-C-120**
Number of Antennas	3	**3**
Antenna RAD Center	180'	**180'**
Antenna Azimuth	330/70/170	**330/70/170**
Antenna RRH Model Number	1900MHz/800MHz RRHS	**TD-RRHx20-25**
Number of RRH	6	**3**

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DATE	REVIEWED BY
9/10/14	SMQ

SEAL

STATE OF CONNECTICUT
No. 22032
LICENSED PROFESSIONAL ENGINEER

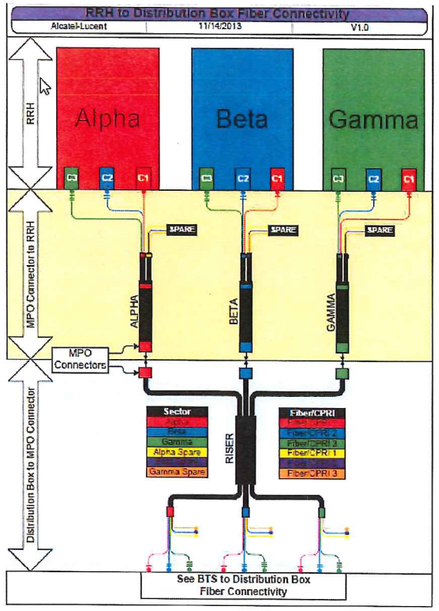
SITE NUMBER:
CT33XC021

SITE NAME:
HARWINTON/BUCKLEY BROADCASTING CORP

SITE ADDRESS:
64 HUNGERFORD LANE
HARWINTON, CT 06791

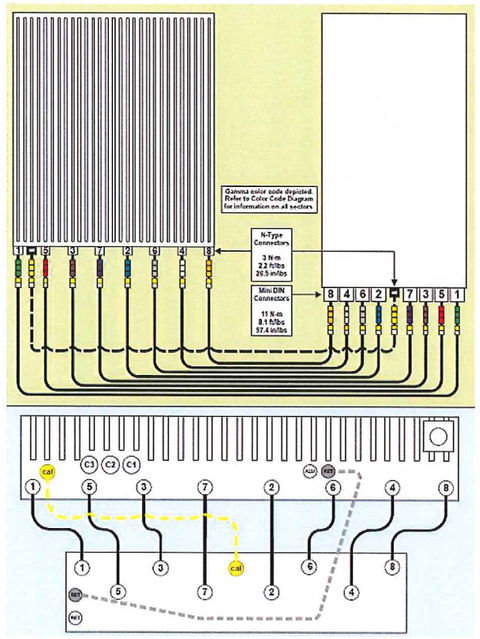
SHEET TITLE:
ANTENNA LAYOUT PLANS

SHEET NO:
A-4



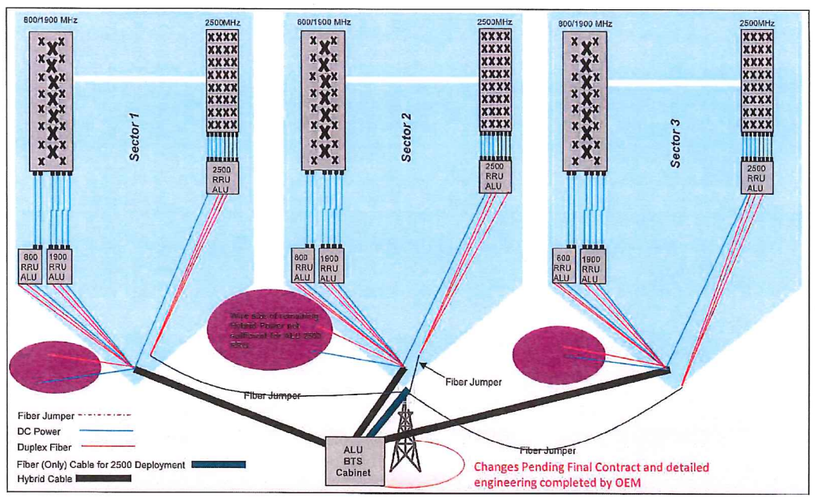
1 / A–5 2.5 CABLE COLOR CODING

SCALE: N.T.S.



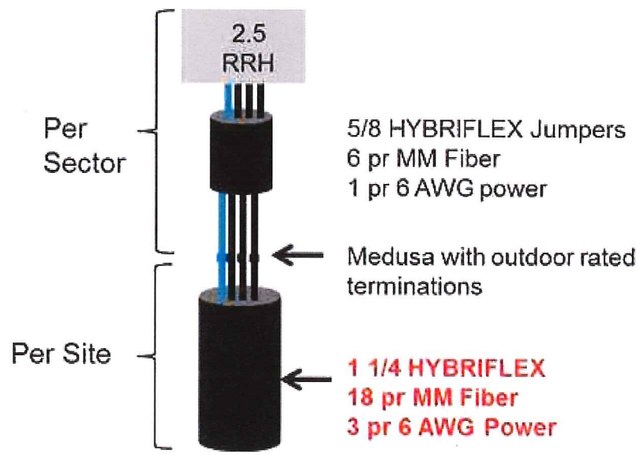
2 / A–5 RRH CONNECTIVITY

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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OVERLAND PARK, KANSAS 66251

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SUBMITTALS

PROJECT NO: 7225.CT33XC021

NO	DATE	DESCRIPTION	BY
0	06/17/14	FOR COMMENT	KA
1	09/10/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
9/10/14	SMQ

SEAL

STATE OF CONNECTICUT
MANOJKUMAR QUINTAL
No. 22008
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC021

SITE NAME:
HARWINTON/BUCKLEY BROADCASTING CORP

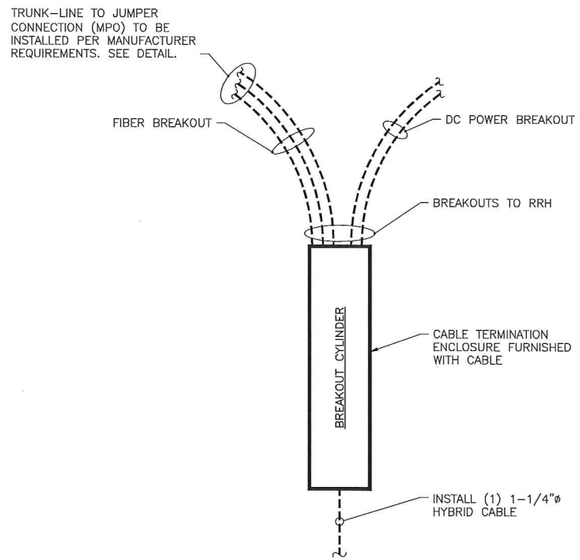
SITE ADDRESS:
64 HUNGERFORD LANE
HARWINTON, CT 06791

SHEET TITLE:
RAN WIRING DIAGRAM

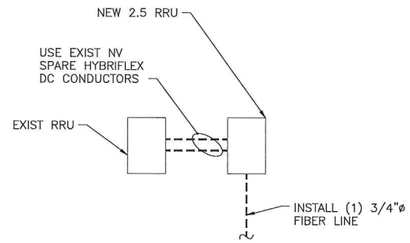
SHEET NO:
A–5

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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SUBMITTALS

PROJECT NO: 7225.CT33XC021

NO	DATE	DESCRIPTION	BY
0	06/17/14	FOR COMMENT	KA
1	09/10/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
9/10/14	JMQ

SEAL

STATE OF CONNECTICUT
JOSEPH M. QUINN
No. 22038
LICENSED PROFESSIONAL ENGINEER

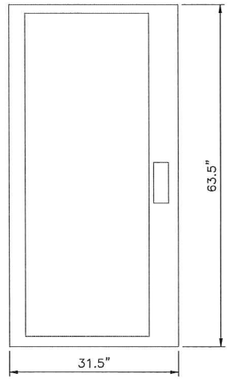
SITE NUMBER:
CT33XC021

SITE NAME:
HARWINTON/BUCKLEY BROADCASTING CORP

SITE ADDRESS:
64 HUNGERFORD LANE
HARWINTON, CT 06791

SHEET TITLE:
CABLE DETAILS

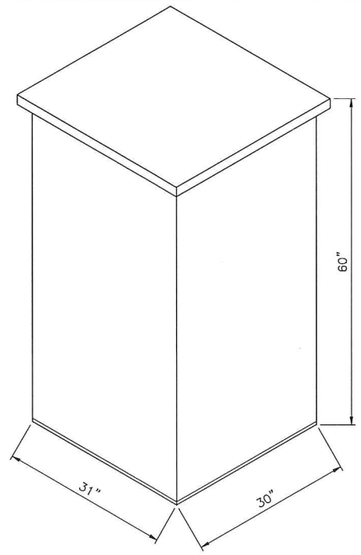
SHEET NO:
A-6



9927 MMBTS MODULAR CELL
SPECIFICATIONS:
HEIGHT: 63.5" WIDTH: 31.5" DEPTH: 38.0"

1 S-1 (EXIST) MMBTS CABINET

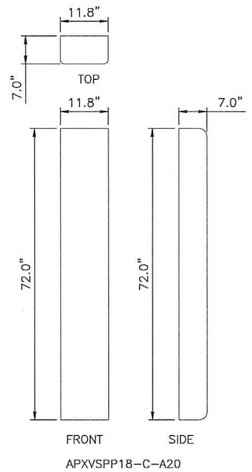
SCALE: 1" = 1'-0"



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

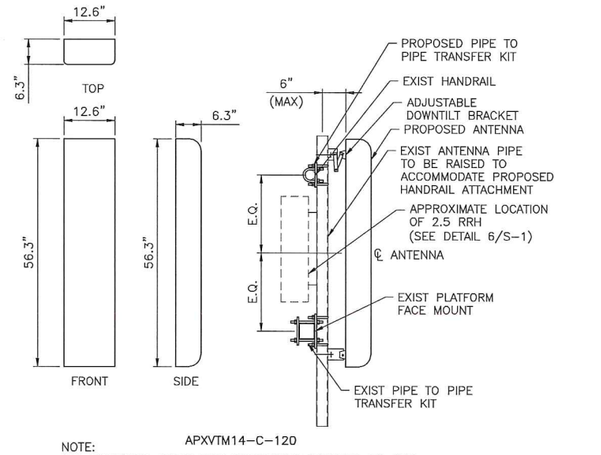
2 S-1 (EXIST) BATTERY CABINET

SCALE: 1" = 1'-0"



3 S-1 (EXIST) ANTENNA DETAILS

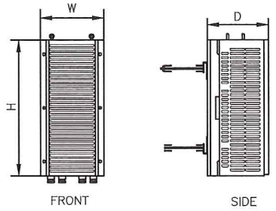
SCALE: 3/4"=1'-0"



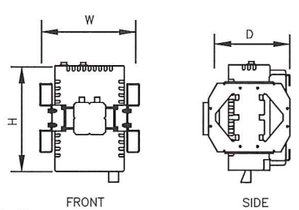
NOTE:
ALL MOUNTING PIPES NOT CURRENTLY SECURED TO THE EXISTING HANDRAIL MUST BE ATTACHED AS DEPICTED ABOVE.

4 S-1 (PROPOSED) ANTENNA DETAIL

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



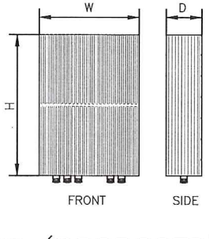
TYPE: 1900 MHz 4x45W MODEL #: RRH 1900 4X45 65MHz HEIGHT: 25.0" WIDTH: 11.1" DEPTH: 11.4" WEIGHT: ±60 LBS.



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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9/10/14	JPG

SEAL

STATE OF CONNECTICUT
JOSHUA P. GOKUMA
No. 22033
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC021

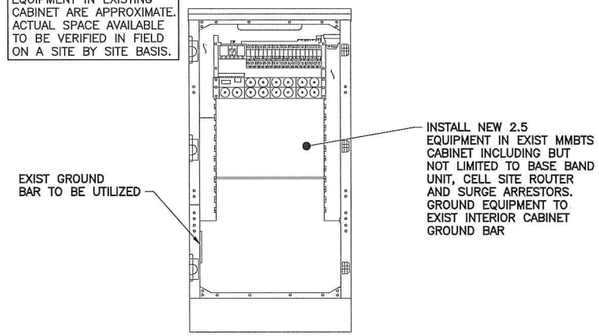
SITE NAME:
HARWINTON/BUCKLEY BROADCASTING CORP

SITE ADDRESS:
64 HUNGERFORD LANE
HARWINTON, CT 06791

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.

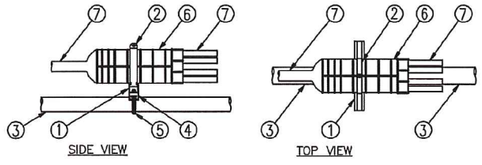


FRONT ELEVATION
(CABINET INTERIOR)

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# 308B48-4.
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

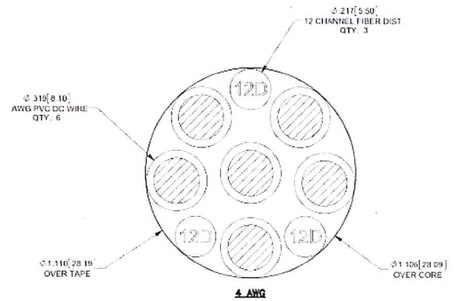
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

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

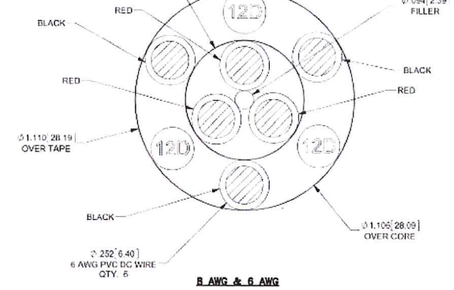
2 S-2 2.5 HYBRID CABLE X-SECTION AND DATA

SCALE: NTS

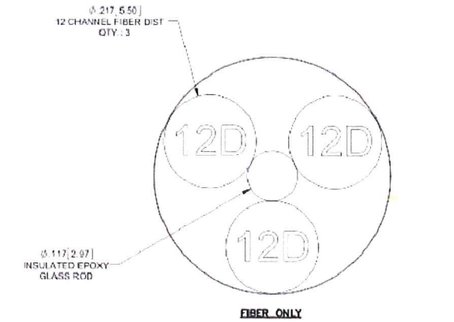
HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE			
MANUF:	RFS		
CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
FIBER ONLY	VARIES	USE NV HYBRIFLEX	7/8"
HYBRIFLEX	<200'	8 AWG	1-1/4"
HYBRIFLEX	225-300'	6 AWG	1-1/4"
HYBRIFLEX	325-375'	4 AWG	1-1/4"



4 AWG



8 AWG & 6 AWG



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9/10/14	SMQ

SEAL
STATE OF CONNECTICUT MANOJKUMAR SHARMA No. 22030 LICENSED PROFESSIONAL ENGINEER

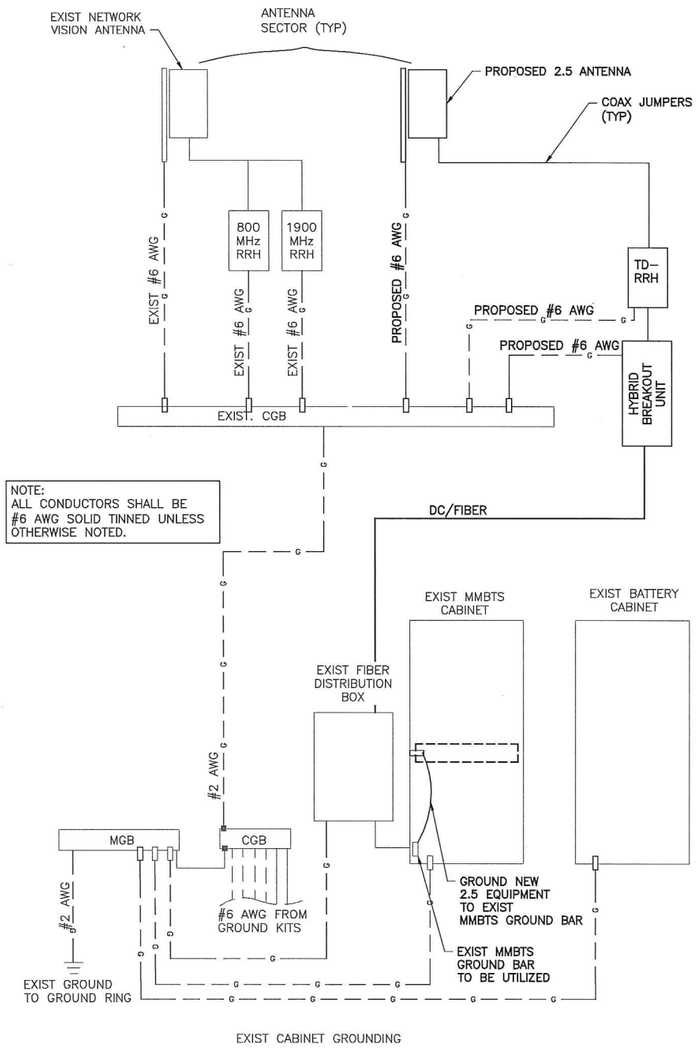
SITE NUMBER:
CT33XC021

SITE NAME:
HARWINTON/BUCKLEY BROADCASTING CORP

SITE ADDRESS:
64 HUNGERFORD LANE
HARWINTON, CT 06791

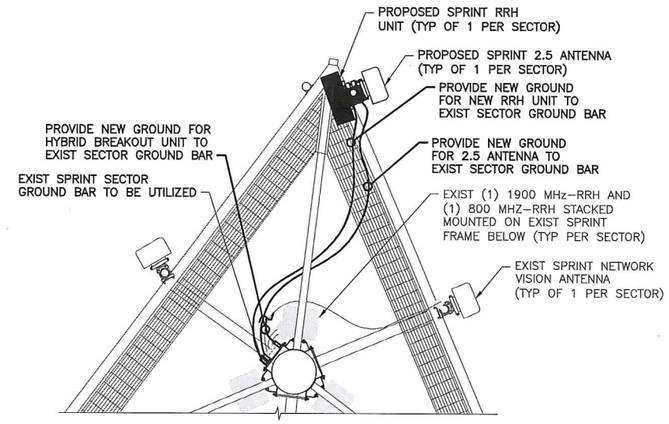
SHEET TITLE:
EQUIPMENT SCHEMATIC DETAILS

SHEET NO:
S-2



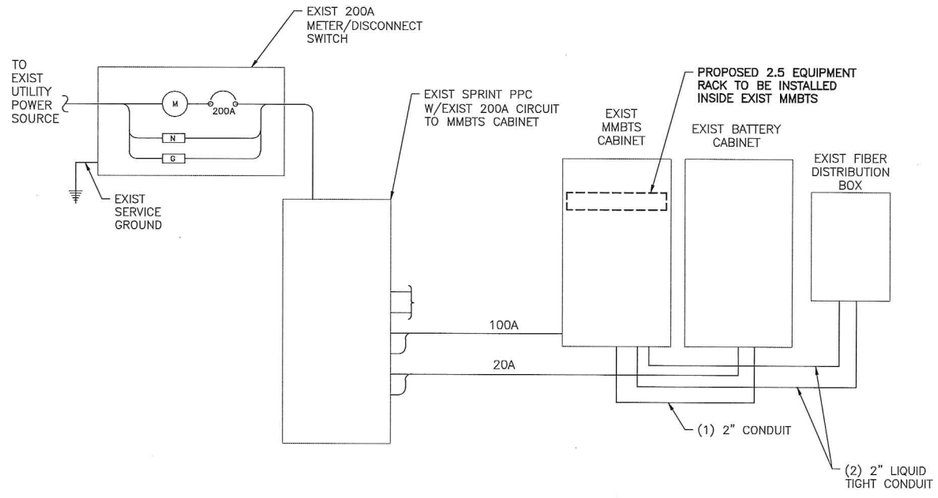
1 E-1 TYPICAL GROUNDING ONE LINE DIAGRAM

SCALE: NTS



2 E-1 TYPICAL ANTENNA GROUNDING PLAN

SCALE: NTS



3 E-1 TYPICAL ELECTRICAL & TELCO PLAN

SCALE: NTS

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DATE: 9/10/14 REVIEWED BY: JMQ

SEAL

STATE OF CONNECTICUT MARIO J. QUATTROCCHI No. 22033 LICENSED PROFESSIONAL ENGINEER

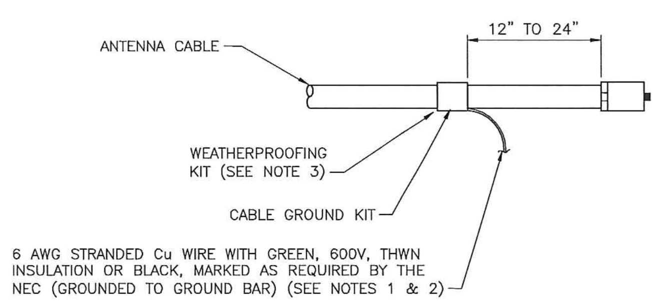
SITE NUMBER:
CT33XC021

SITE NAME:
HARWINTON/BUCKLEY BROADCASTING CORP

SITE ADDRESS:
64 HUNGERFORD LANE
HARWINTON, CT 06791

SHEET TITLE:
ELECTRICAL & GROUNDING PLANS

SHEET NO:
E-1



CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

NOTES:

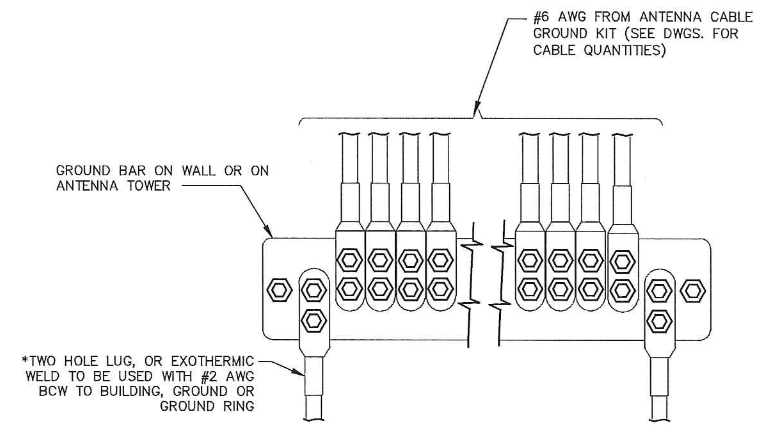
DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

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.



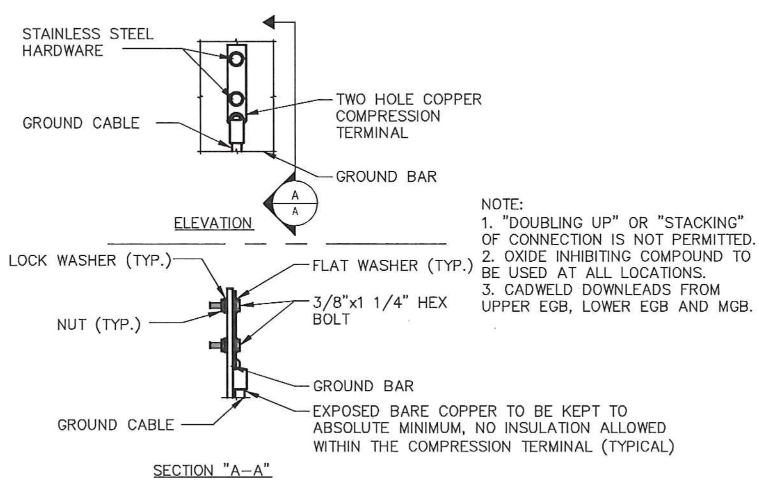
* – GROUND BARS AT THE BOTTOM OF TOWERS/MONOPOLES SHALL ONLY USE EXOTHERMIC WELDS.

– 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

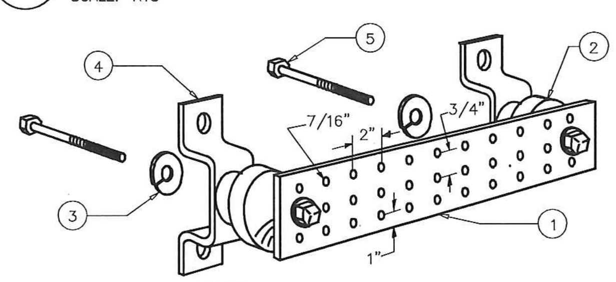
SCALE: NTS



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

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
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.CT33XC021

NO	DATE	DESCRIPTION	BY
0	06/17/14	FOR COMMENT	KA
1	09/10/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
9/10/14	JMQ

SEAL: STATE OF CONNECTICUT ... No. 22... LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC021

SITE NAME:
HARWINTON/BUCKLEY BROADCASTING CORP

SITE ADDRESS:
64 HUNGERFORD LANE
HARWINTON, CT 06791

SHEET TITLE:
GROUNDING DETAILS & NOTES

SHEET NO:
E-2

Date: **June 05, 2014**

Veronica Harris
Crown Castle
1200 McArthur Blvd
Mahwah, NJ 07430

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Sprint PCS* Co-Locate**	**Scenario 2.5B**
	Carrier Site Number:	CT33XC021
Crown Castle Designation:	**Crown Castle BU Number:**	876369
	Crown Castle Site Name:	HARWINTON / BUCKLEY BROADCASTI
	Crown Castle JDE Job Number:	288229
	Crown Castle Work Order Number:	773486
	Crown Castle Application Number:	245988 Rev. 0
Engineering Firm Designation:	**Crown Castle Project Number:**	773486
Site Data:	**64 Hungerford Lane, Harwinton, Litchfield County, CT** **Latitude *41° 45' 26.15"*, Longitude *-73° 3' 9.2"*** **178 Foot - Monopole Tower**	

Dear Veronica Harris,

Crown Castle 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 773486, in accordance with application 245988, 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:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment 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 *Crown Castle* 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.

Structural analysis prepared by: Anandraya Shet /Jose Monroy

Respectfully submitted by:

Aaron C. Poot, P.E.
Manager Engineering

STATE OF CONNECTICUT
AARON C. POOT
No. 25050
LICENSED
PROFESSIONAL ENGINEER

tnxTower Report - version 6.1.4.1

6/5/14

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 178 ft Monopole tower designed by Engineered Endeavors, Inc. in November of 2007. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

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 1 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
178.0	180.0	3	alcatel lucent	TD-RRH8x20-25	1	1-1/4	-
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			

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
178.0	180.0	3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1-1/4	1
	178.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		9	rfs celwave	ACU-A20-N			
		1	tower mounts	Platform Mount [LP 713-1]			
174.0	176.0	3	alcatel lucent	TME-1900MHz RRH	-	-	1
	174.0	1	tower mounts	Side Arm Mount [SO 102-3]			
	172.0	3	alcatel lucent	TME-800MHZ RRH			
168.0	170.0	3	antel	BXA-171085-12BF-2 w/ Mount Pipe	12	1-5/8	1
		3	antel	BXA-70063-6CF-2 w/ Mount Pipe			
		6	antel	LPA-80080/6CF w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
	168.0	1	tower mounts	Platform Mount [LP 303-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
156.0	158.0	3	ericsson	RRUS 11	12 1 2	1-5/8 3/8 7/16	1
		1	kathrein	800 10764 w/ Mount Pipe			
		1	kmw communications	AM-X-CD-14-65-00T-RET w/ Mount Pipe			
		1	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		1	raycap	TME-DC6-48-60-18-8F			
	156.0	12	powerwave technologies	LGP2140X			
		1	tower mounts	Platform Mount [LP 303-1]			
75.0	76.0	1	lucent	KS24019-L112A	1	1/2	1
	75.0	1	tower mounts	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)
178	178	12	DAPA	48000	-	-
168	168	12	DAPA	48000	-	-
158	158	12	DAPA	48000	-	-
148	148	12	DAPA	48000	-	-
138	138	12	DAPA	48000	-	-
128	128	12	DAPA	48000	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, P.E., P.C.	1532983	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI	2150286	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI	2150280	CCISITES

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.

This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle 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	178 - 129.87	Pole	TP29.64x19.5x0.25	1	-8.796	1175.451	81.4	Pass
L2	129.87 - 84.8307	Pole	TP38.5x28.245x0.375	2	-16.502	2290.414	80.1	Pass
L3	84.8307 - 41.2839	Pole	TP46.8x36.64x0.438	3	-27.235	3250.654	78.6	Pass
L4	41.2839 - 0	Pole	TP54.5x44.591x0.5	4	-43.233	4455.179	73.3	Pass
							Summary	
						Pole (L1)	81.4	Pass
						RATING =	81.4	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	68.7	Pass
1	Base Plate	0	81.3	Pass
1	Base Foundation (Soil Interaction)	0	87.4	Pass

Structure Rating (max from all components) =	87.4%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

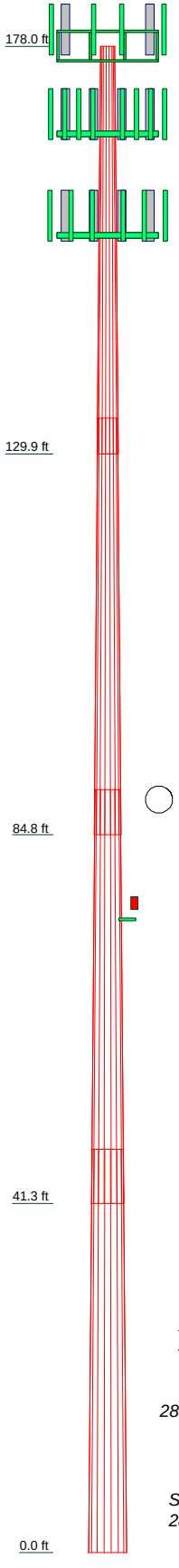
4.1) Recommendations

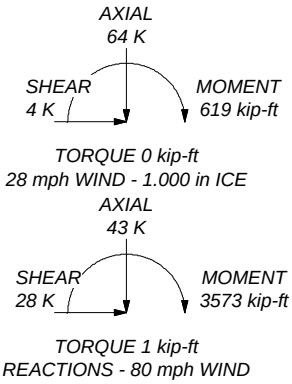
The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	48.130	18	0.250	4.250	19.500	29.640	A572-65	3.2
2	49.289	18	0.375	5.333	28.245	38.500		6.6
3	48.880	18	0.438	6.417	36.640	46.800		9.5
4	47.701	18	0.500		44.591	54.500		12.6
								31.9





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVSPP18-C-A20 w/ Mount Pipe	178	(2) LPA-80080/6CF w/ Mount Pipe	168
APXVSPP18-C-A20 w/ Mount Pipe	178	BXA-70063-6CF-2 w/ Mount Pipe	168
APXVSPP18-C-A20 w/ Mount Pipe	178	BXA-70063-6CF-2 w/ Mount Pipe	168
800 EXTERNAL NOTCH FILTER	178	BXA-70063-6CF-2 w/ Mount Pipe	168
800 EXTERNAL NOTCH FILTER	178	BXA-171085-12BF-2 w/ Mount Pipe	168
800 EXTERNAL NOTCH FILTER	178	BXA-171085-12BF-2 w/ Mount Pipe	168
(3) ACU-A20-N	178	BXA-171085-12BF-2 w/ Mount Pipe	168
(3) ACU-A20-N	178	(2) FD9R6004/2C-3L	168
(3) ACU-A20-N	178	(2) FD9R6004/2C-3L	168
APXVTM14-C-120 w/ Mount Pipe	178	(2) FD9R6004/2C-3L	168
APXVTM14-C-120 w/ Mount Pipe	178	Platform Mount [LP 303-1]	168
APXVTM14-C-120 w/ Mount Pipe	178	(2) 7770.00 w/ Mount Pipe	156
TD-RRH8x20-25	178	(2) 7770.00 w/ Mount Pipe	156
TD-RRH8x20-25	178	(2) 7770.00 w/ Mount Pipe	156
TD-RRH8x20-25	178	AM-X-CD-16-65-00T-RET w/ Mount Pipe	156
6' x 2" Mount Pipe	178	800 10764 w/ Mount Pipe	156
6' x 2" Mount Pipe	178	AM-X-CD-14-65-00T-RET w/ Mount Pipe	156
6' x 2" Mount Pipe	178	TME-DC6-48-60-18-8F	156
Platform Mount [LP 713-1]	178	(4) LGP2140X	156
TME-800MHZ RRH	174	(4) LGP2140X	156
TME-800MHZ RRH	174	(4) LGP2140X	156
TME-800MHZ RRH	174	RRUS 11	156
TME-1900MHz RRH	174	RRUS 11	156
TME-1900MHz RRH	174	RRUS 11	156
TME-1900MHz RRH	174	6' x 2" Mount Pipe	156
6' x 2" Mount Pipe	174	6' x 2" Mount Pipe	156
6' x 2" Mount Pipe	174	6' x 2" Mount Pipe	156
6' x 2" Mount Pipe	174	Platform Mount [LP 303-1]	156
Side Arm Mount [SO 102-3]	174	KS24019-L112A	75
(2) LPA-80080/6CF w/ Mount Pipe	168	Side Arm Mount [SO 701-1]	75
(2) LPA-80080/6CF w/ Mount Pipe	168		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 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 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 81.4%

CROWN CASTLE
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Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: (724) 416-2000
FAX: (724) 416-2257

Job: **BU# 876369**			
Project:			
Client: Crown Castle	Drawn by: jarroyomonroy	App'd:	
Code: TIA/EIA-222-F	Date: 06/05/14	Scale: NTS	
Path: X:\ENG Work Area\JMonroy\India QA\876369\B&T India files\JAM\876369.eri		Dwg No. E-1	

Tower Input Data

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

1) Tower is located in Litchfield County, Connecticut.
2) Basic wind speed of 80 mph.
3) Nominal ice thickness of 1.000 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56.000 pcf.
6) A wind speed of 28 mph is used in combination with ice.
7) Temperature drop of 50.000 °F.
8) Deflections calculated using a wind speed of 50 mph.
9) A non-linear (P-delta) analysis was used.
10) Pressures are calculated at each section.
11) Stress ratio used in pole design is 1.333.
12) 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	178.000-129.870	48.130	4.250	18	19.500	29.640	0.250	1.000	A572-65 (65 ksi)
L2	129.870-84.831	49.289	5.333	18	28.245	38.500	0.375	1.500	A572-65 (65 ksi)
L3	84.831-41.284	48.880	6.417	18	36.640	46.800	0.438	1.750	A572-65 (65 ksi)
L4	41.284-0.000	47.701		18	44.591	54.500	0.500	2.000	A572-65 (65 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

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	19.801	15.275	715.116	6.834	9.906	72.190	1431.173	7.639	2.992	11.968
	30.097	23.321	2544.973	10.433	15.057	169.021	5093.294	11.663	4.777	19.107
L2	29.578	33.172	3255.132	9.894	14.348	226.866	6514.547	16.589	4.311	11.496
	39.094	45.378	8333.073	13.534	19.558	426.070	16677.111	22.693	6.116	16.309
L3	38.331	50.272	8324.333	12.852	18.613	447.225	16659.619	25.141	5.679	12.98
	47.522	64.380	17483.282	16.459	23.774	735.383	34989.569	32.196	7.467	17.067
L4	46.633	69.973	17185.937	15.652	22.652	758.681	34394.488	34.993	6.968	13.936
	55.341	85.698	31571.532	19.170	27.686	1140.343	63184.607	42.857	8.712	17.424

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 178.000-129.870				1	1	1		
L2 129.870-84.831				1	1	1		
L3 84.831-41.284				1	1	1		
L4 41.284-0.000				1	1	1		

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
HB114-1-0813U4-M5J(1 1/4")	C	No	Inside Pole	178.000 - 0.000	3	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
HB114-21U3M12-XXXF(1-1/4")	C	No	CaAa (Out Of Face)	178.000 - 0.000	1	No Ice	0.154	0.001
						1/2" Ice	0.254	0.002
						1" Ice	0.354	0.004
						2" Ice	0.554	0.010
						4" Ice	0.954	0.028
////								
LDF7-50A(1-5/8")	A	No	Inside Pole	168.000 - 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
////								
LDF7-50A(1-5/8")	A	No	Inside Pole	156.000 - 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
FB-L98B-002-75000(3/8")	A	No	CaAa (Out Of Face)	156.000 - 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	0.006
						4" Ice	0.000	0.022

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
WR-VG122ST-BRDA(7/16)	A	No	CaAa (Out Of Face)	156.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.022
2" Rigid Conduit	A	No	CaAa (Out Of Face)	156.000 - 0.000	1	No Ice	0.200	0.003
						1/2" Ice	0.300	0.004
						1" Ice	0.400	0.006
						2" Ice	0.600	0.013
						4" Ice	1.000	0.032
////								
LDF4-50A(1/2")	C	No	Inside Pole	75.000 - 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
////								

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	178.000-129.870	A	0.000	0.000	0.000	5.226	0.714
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	7.412	0.232
L2	129.870-84.831	A	0.000	0.000	0.000	9.008	1.028
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	6.936	0.217
L3	84.831-41.284	A	0.000	0.000	0.000	8.709	0.994
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	6.706	0.215
L4	41.284-0.000	A	0.000	0.000	0.000	8.257	0.942
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	6.358	0.205

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	178.000-129.870	A	1.202	0.000	0.000	0.000	11.506	1.046
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	18.979	0.435
L2	129.870-84.831	A	1.151	0.000	0.000	0.000	19.832	1.600
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	17.760	0.407
L3	84.831-41.284	A	1.080	0.000	0.000	0.000	18.735	1.506
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	16.732	0.387
L4	41.284-0.000	A	1.000	0.000	0.000	0.000	17.177	1.373
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	15.278	0.352

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	178.000-129.870	-0.177	-0.056	-0.364	-0.069
L2	129.870-84.831	-0.178	-0.164	-0.375	-0.267
L3	84.831-41.284	-0.182	-0.168	-0.388	-0.278
L4	41.284-0.000	-0.184	-0.170	-0.391	-0.282

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	178.000	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	B	From Leg	4.000 0.000 2.000	0.000	178.000	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	C	From Leg	4.000 0.000 2.000	0.000	178.000	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	A	From Leg	4.000 0.000 0.000	0.000	178.000	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	B	From Leg	4.000 0.000 0.000	0.000	178.000	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	C	From Leg	4.000 0.000 0.000	0.000	178.000	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	A	From Leg	4.000 0.000 0.000	0.000	178.000	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	B	From Leg	4.000 0.000 0.000	0.000	178.000	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	C	From Leg	4.000 0.000 0.000	0.000	178.000	No Ice 1/2" Ice	0.078 0.121 0.173	0.136 0.189 0.251	0.001 0.002 0.004

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
						1" Ice	0.302	0.400	0.012
						2" Ice	0.665	0.802	0.045
						4" Ice			
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	178.000	No Ice	7.134	4.959	0.074
						1/2" Ice	7.662	5.754	0.128
						1" Ice	8.183	6.472	0.190
						2" Ice	9.256	8.010	0.335
						4" Ice	11.526	11.412	0.749
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	178.000	No Ice	7.134	4.959	0.074
						1/2" Ice	7.662	5.754	0.128
						1" Ice	8.183	6.472	0.190
						2" Ice	9.256	8.010	0.335
						4" Ice	11.526	11.412	0.749
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	178.000	No Ice	7.134	4.959	0.074
						1/2" Ice	7.662	5.754	0.128
						1" Ice	8.183	6.472	0.190
						2" Ice	9.256	8.010	0.335
						4" Ice	11.526	11.412	0.749
TD-RRH8x20-25	A	From Leg	4.000 0.000 2.000	0.000	178.000	No Ice	4.720	1.703	0.070
						1/2" Ice	5.014	1.920	0.097
						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 2.000	0.000	178.000	No Ice	4.720	1.703	0.070
						1/2" Ice	5.014	1.920	0.097
						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 2.000	0.000	178.000	No Ice	4.720	1.703	0.070
						1/2" Ice	5.014	1.920	0.097
						1" Ice	5.316	2.145	0.128
						2" Ice	5.948	2.622	0.201
						4" Ice	7.314	3.680	0.397
6' x 2" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	178.000	No Ice	1.425	1.425	0.022
						1/2" Ice	1.925	1.925	0.033
						1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	178.000	No Ice	1.425	1.425	0.022
						1/2" Ice	1.925	1.925	0.033
						1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	178.000	No Ice	1.425	1.425	0.022
						1/2" Ice	1.925	1.925	0.033
						1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
Platform Mount [LP 713-1]	C	None		0.000	178.000	No Ice	31.270	31.270	1.510
						1/2" Ice	39.680	39.680	1.929
						1" Ice	48.090	48.090	2.348
						2" Ice	64.910	64.910	3.186
						4" Ice	98.550	98.550	4.862
$$$ TME-800MHZ RRH	A	From Leg	1.000	0.000	174.000	No Ice	2.490	2.068	0.053

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000 -2.000			1/2" Ice 1" Ice 2" Ice 4" Ice	2.706 2.931 3.407 4.462	2.271 2.481 2.928 3.927	0.074 0.098 0.157 0.318
TME-800MHZ RRH	B	From Leg	1.000 0.000 -2.000	0.000	174.000	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	C	From Leg	1.000 0.000 -2.000	0.000	174.000	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-1900MHz RRH	A	From Leg	1.000 0.000 2.000	0.000	174.000	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	B	From Leg	1.000 0.000 2.000	0.000	174.000	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	C	From Leg	1.000 0.000 2.000	0.000	174.000	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
6' x 2" Mount Pipe	A	From Leg	1.000 0.000 0.000	0.000	174.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
6' x 2" Mount Pipe	B	From Leg	1.000 0.000 0.000	0.000	174.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
6' x 2" Mount Pipe	C	From Leg	1.000 0.000 0.000	0.000	174.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
Side Arm Mount [SO 102-3]	C	None		0.000	174.000	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
$$$ (2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.564 5.105 5.612 6.651 8.834	10.728 11.990 12.968 14.980 19.217	0.046 0.113 0.187 0.363 0.857

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
						4" Ice			
(2) LPA-80080/6CF w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.564 5.105 5.612 6.651 8.834	10.728 11.990 12.968 14.980 19.217	0.046 0.113 0.187 0.363 0.857
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.564 5.105 5.612 6.651 8.834	10.728 11.990 12.968 14.980 19.217	0.046 0.113 0.187 0.363 0.857
BXA-70063-6CF-2 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.969 8.609 9.216 10.459 13.066	5.801 6.953 7.819 9.601 13.366	0.042 0.103 0.171 0.335 0.804
BXA-70063-6CF-2 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.969 8.609 9.216 10.459 13.066	5.801 6.953 7.819 9.601 13.366	0.042 0.103 0.171 0.335 0.804
BXA-70063-6CF-2 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.969 8.609 9.216 10.459 13.066	5.801 6.953 7.819 9.601 13.366	0.042 0.103 0.171 0.335 0.804
BXA-171085-12BF-2 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.971 5.521 6.036 7.091 9.359	5.228 6.389 7.261 9.046 12.817	0.040 0.086 0.139 0.271 0.671
BXA-171085-12BF-2 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.971 5.521 6.036 7.091 9.359	5.228 6.389 7.261 9.046 12.817	0.040 0.086 0.139 0.271 0.671
BXA-171085-12BF-2 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.971 5.521 6.036 7.091 9.359	5.228 6.389 7.261 9.046 12.817	0.040 0.086 0.139 0.271 0.671
(2) FD9R6004/2C-3L	A	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
(2) FD9R6004/2C-3L	B	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
(2) FD9R6004/2C-3L	C	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice	0.367 0.451 0.543 0.755	0.085 0.136 0.196 0.343	0.003 0.005 0.009 0.020

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 4" Ice	1.281	0.740	0.063
Platform Mount [LP 303-1]	C	None		0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.660 18.870 23.080 31.500 48.340	14.660 18.870 23.080 31.500 48.340	1.250 1.481 1.713 2.175 3.101
$$$									
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	156.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.119 6.626 7.128 8.164 10.360	4.254 5.014 5.711 7.155 10.412	0.055 0.103 0.157 0.287 0.665
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	156.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.119 6.626 7.128 8.164 10.360	4.254 5.014 5.711 7.155 10.412	0.055 0.103 0.157 0.287 0.665
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	156.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.119 6.626 7.128 8.164 10.360	4.254 5.014 5.711 7.155 10.412	0.055 0.103 0.157 0.287 0.665
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	156.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.304 7.479 8.368 10.179 14.024	0.074 0.139 0.212 0.385 0.874
800 10764 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	156.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.203 6.690 7.178 8.186 10.328	4.294 4.992 5.662 7.100 10.300	0.064 0.112 0.166 0.296 0.673
AM-X-CD-14-65-00T-RET w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	156.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.744 6.198 6.661 7.618 9.668	4.015 4.633 5.276 6.678 9.744	0.035 0.080 0.131 0.254 0.610
TME-DC6-48-60-18-8F	A	From Leg	4.000 0.000 2.000	0.000	156.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.266 1.456 1.658 2.093 3.098	1.266 1.456 1.658 2.093 3.098	0.020 0.035 0.053 0.095 0.215
(4) LGP2140X	A	From Leg	4.000 0.000 0.000	0.000	156.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.260 1.416 1.581 1.936 2.750	0.378 0.493 0.617 0.890 1.541	0.019 0.026 0.035 0.060 0.140
(4) LGP2140X	B	From Leg	4.000 0.000 0.000	0.000	156.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.260 1.416 1.581 1.936 2.750	0.378 0.493 0.617 0.890 1.541	0.019 0.026 0.035 0.060 0.140
(4) LGP2140X	C	From Leg	4.000 0.000	0.000	156.000	No Ice 1/2"	1.260 1.416	0.378 0.493	0.019 0.026

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			Ice	1.581	0.617	0.035
						1" Ice	1.936	0.890	0.060
						2" Ice	2.750	1.541	0.140
						4" Ice			
RRUS 11	A	From Leg	4.000 0.000 2.000	0.000	156.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.048 0.068 0.092 0.150 0.310
RRUS 11	B	From Leg	4.000 0.000 2.000	0.000	156.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.048 0.068 0.092 0.150 0.310
RRUS 11	C	From Leg	4.000 0.000 2.000	0.000	156.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.048 0.068 0.092 0.150 0.310
6' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	156.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
6' x 2" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	156.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.925 2.294 3.060 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
Platform Mount [LP 303-1]	C	None		0.000	156.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.660 18.870 23.080 31.500 48.340	14.660 18.870 23.080 31.500 48.340	1.250 1.481 1.713 2.175 3.101
$$$* *$$$									
KS24019-L112A	B	From Leg	2.000 0.000 1.000	0.000	75.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.100 0.180 0.260 0.420 0.740	0.100 0.180 0.260 0.420 0.740	0.005 0.006 0.008 0.011 0.017
Side Arm Mount [SO 701-1]	B	From Leg	1.000 0.000 0.000	0.000	75.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.850 1.140 1.430 2.010 3.170	1.670 2.340 3.010 4.350 7.030	0.065 0.079 0.093 0.121 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
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	178 - 129.87	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-20.472	0.067	0.772
			Max. Mx	5	-8.799	-553.900	0.071
			Max. My	2	-8.796	0.004	554.404
			Max. Vy	5	16.927	-553.900	0.071
			Max. Vx	2	-16.944	0.004	554.404
			Max. Torque	5			0.436
L2	129.87 - 84.8307	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-30.827	0.354	1.549
			Max. Mx	5	-16.504	-1379.422	0.087
			Max. My	2	-16.501	0.213	1380.892
			Max. Vy	5	20.652	-1379.422	0.087
			Max. Vx	2	-20.670	0.213	1380.892
			Max. Torque	5			0.480
L3	84.8307 - 41.2839	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-44.464	0.435	2.311
			Max. Mx	5	-27.237	-2333.816	0.387
			Max. My	2	-27.236	-0.068	2336.411
			Max. Vy	5	24.176	-2333.816	0.387
			Max. Vx	2	-24.208	-0.068	2336.411
			Max. Torque	5			0.496

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L4	41.2839 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-63.873	0.842	3.417
			Max. Mx	5	-43.233	-3568.520	1.070
			Max. My	2	-43.233	-0.400	3572.951
			Max. Vy	5	27.519	-3568.520	1.070
			Max. Vx	2	-27.549	-0.400	3572.951
			Max. Torque	5			0.505

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	63.873	-0.003	4.456
	Max. H_x	11	43.250	27.492	-0.009
	Max. H_z	2	43.250	-0.009	27.523
	Max. M_x	2	3572.951	-0.009	27.523
	Max. M_z	5	3568.520	-27.492	0.009
	Max. Torsion	5	0.505	-27.492	0.009
	Min. Vert	1	43.250	-0.004	0.000
	Min. H_x	5	43.250	-27.492	0.009
	Min. H_z	8	43.250	0.009	-27.523
	Min. M_x	8	-3571.596	0.009	-27.523
	Min. M_z	11	-3568.513	27.492	-0.009
	Min. Torsion	11	-0.504	27.492	-0.009

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	43.250	0.004	0.000	-0.652	-0.004	0.000
Dead+Wind 0 deg - No Ice	43.250	0.009	-27.523	-3572.951	-0.400	-0.026
Dead+Wind 30 deg - No Ice	43.250	13.754	-23.840	-3094.570	-1784.608	-0.274
Dead+Wind 60 deg - No Ice	43.250	23.813	-13.769	-1787.167	-3090.639	-0.449
Dead+Wind 90 deg - No Ice	43.250	27.492	-0.009	-1.070	-3568.520	-0.505
Dead+Wind 120 deg - No Ice	43.250	23.804	13.754	1785.130	-3090.240	-0.424
Dead+Wind 150 deg - No Ice	43.250	13.738	23.831	3092.820	-1783.921	-0.230
Dead+Wind 180 deg - No Ice	43.250	-0.009	27.523	3571.596	0.391	0.027
Dead+Wind 210 deg - No Ice	43.250	-13.754	23.840	3093.217	1784.598	0.276
Dead+Wind 240 deg - No Ice	43.250	-23.813	13.769	1785.816	3090.629	0.450
Dead+Wind 270 deg - No Ice	43.250	-27.492	0.009	-0.280	3568.513	0.504
Dead+Wind 300 deg - No Ice	43.250	-23.804	-13.754	-1786.482	3090.234	0.422
Dead+Wind 330 deg - No Ice	43.250	-13.738	-23.831	-3094.174	1783.915	0.229
Dead+Ice+Temp	63.873	-0.000	-0.000	-3.417	0.842	-0.000
Dead+Wind 0 deg+Ice+Temp	63.873	0.003	-4.456	-619.218	0.694	-0.028
Dead+Wind 30 deg+Ice+Temp	63.873	2.229	-3.860	-536.836	-306.978	-0.063
Dead+Wind 60 deg+Ice+Temp	63.873	3.858	-2.230	-311.577	-532.160	-0.082
Dead+Wind 90 deg+Ice+Temp	63.873	4.453	-0.003	-3.798	-614.514	-0.079
Dead+Wind 120 deg+Ice+Temp	63.873	3.855	2.226	304.031	-531.972	-0.054
Dead+Wind 150 deg+Ice+Temp	63.873	2.224	3.858	529.429	-306.653	-0.015
Dead+Wind 180 deg+Ice+Temp	63.873	-0.003	4.456	611.998	1.070	0.028
Dead+Wind 210 deg+Ice+Temp	63.873	-2.229	3.860	529.617	308.743	0.063

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 240 deg+Ice+Temp	63.873	-3.858	2.230	304.357	533.925	0.082
Dead+Wind 270 deg+Ice+Temp	63.873	-4.453	0.003	-3.422	616.278	0.078
Dead+Wind 300 deg+Ice+Temp	63.873	-3.855	-2.226	-311.251	533.737	0.054
Dead+Wind 330 deg+Ice+Temp	63.873	-2.224	-3.858	-536.648	308.417	0.015
Dead+Wind 0 deg - Service	43.250	0.004	-10.751	-1398.565	-0.159	-0.010
Dead+Wind 30 deg - Service	43.250	5.373	-9.312	-1211.368	-698.347	-0.109
Dead+Wind 60 deg - Service	43.250	9.302	-5.379	-699.761	-1209.415	-0.178
Dead+Wind 90 deg - Service	43.250	10.739	-0.004	-0.836	-1396.415	-0.200
Dead+Wind 120 deg - Service	43.250	9.299	5.372	698.131	-1209.260	-0.168
Dead+Wind 150 deg - Service	43.250	5.366	9.309	1209.850	-698.080	-0.091
Dead+Wind 180 deg - Service	43.250	-0.004	10.751	1397.202	0.149	0.010
Dead+Wind 210 deg - Service	43.250	-5.373	9.312	1210.005	698.336	0.109
Dead+Wind 240 deg - Service	43.250	-9.302	5.379	698.398	1209.404	0.178
Dead+Wind 270 deg - Service	43.250	-10.739	0.004	-0.528	1396.404	0.200
Dead+Wind 300 deg - Service	43.250	-9.299	-5.372	-699.494	1209.250	0.168
Dead+Wind 330 deg - Service	43.250	-5.366	-9.309	-1211.214	698.070	0.091

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	-43.250	0.000	-0.004	43.250	0.000	0.009%
2	0.009	-43.250	-27.523	-0.009	43.250	27.523	0.000%
3	13.754	-43.250	-23.840	-13.754	43.250	23.840	0.000%
4	23.813	-43.250	-13.769	-23.813	43.250	13.769	0.000%
5	27.492	-43.250	-0.009	-27.492	43.250	0.009	0.000%
6	23.804	-43.250	13.754	-23.804	43.250	-13.754	0.000%
7	13.738	-43.250	23.831	-13.738	43.250	-23.831	0.000%
8	-0.009	-43.250	27.523	0.009	43.250	-27.523	0.000%
9	-13.754	-43.250	23.840	13.754	43.250	-23.840	0.000%
10	-23.813	-43.250	13.769	23.813	43.250	-13.769	0.000%
11	-27.492	-43.250	0.009	27.492	43.250	-0.009	0.000%
12	-23.804	-43.250	-13.754	23.804	43.250	13.754	0.000%
13	-13.738	-43.250	-23.831	13.738	43.250	23.831	0.000%
14	0.000	-63.873	0.000	0.000	63.873	0.000	0.000%
15	0.003	-63.873	-4.456	-0.003	63.873	4.456	0.000%
16	2.229	-63.873	-3.860	-2.229	63.873	3.860	0.000%
17	3.858	-63.873	-2.230	-3.858	63.873	2.230	0.000%
18	4.453	-63.873	-0.003	-4.453	63.873	0.003	0.000%
19	3.855	-63.873	2.226	-3.855	63.873	-2.226	0.000%
20	2.224	-63.873	3.858	-2.224	63.873	-3.858	0.000%
21	-0.003	-63.873	4.456	0.003	63.873	-4.456	0.000%
22	-2.229	-63.873	3.860	2.229	63.873	-3.860	0.000%
23	-3.858	-63.873	2.230	3.858	63.873	-2.230	0.000%
24	-4.453	-63.873	0.003	4.453	63.873	-0.003	0.000%
25	-3.855	-63.873	-2.226	3.855	63.873	2.226	0.000%
26	-2.224	-63.873	-3.858	2.224	63.873	3.858	0.000%
27	0.004	-43.250	-10.751	-0.004	43.250	10.751	0.000%
28	5.373	-43.250	-9.312	-5.373	43.250	9.312	0.000%
29	9.302	-43.250	-5.379	-9.302	43.250	5.379	0.000%
30	10.739	-43.250	-0.004	-10.739	43.250	0.004	0.000%
31	9.299	-43.250	5.372	-9.299	43.250	-5.372	0.000%
32	5.366	-43.250	9.309	-5.366	43.250	-9.309	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
33	-0.004	-43.250	10.751	0.004	43.250	-10.751	0.000%
34	-5.373	-43.250	9.312	5.373	43.250	-9.312	0.000%
35	-9.302	-43.250	5.379	9.302	43.250	-5.379	0.000%
36	-10.739	-43.250	0.004	10.739	43.250	-0.004	0.000%
37	-9.299	-43.250	-5.372	9.299	43.250	5.372	0.000%
38	-5.366	-43.250	-9.309	5.366	43.250	9.309	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00003706
2	Yes	4	0.00000001	0.00042652
3	Yes	6	0.00000001	0.00004514
4	Yes	6	0.00000001	0.00004564
5	Yes	4	0.00000001	0.00050881
6	Yes	6	0.00000001	0.00004500
7	Yes	6	0.00000001	0.00004549
8	Yes	4	0.00000001	0.00042635
9	Yes	6	0.00000001	0.00004548
10	Yes	6	0.00000001	0.00004499
11	Yes	4	0.00000001	0.00050990
12	Yes	6	0.00000001	0.00004564
13	Yes	6	0.00000001	0.00004515
14	Yes	4	0.00000001	0.00001389
15	Yes	5	0.00000001	0.00023233
16	Yes	5	0.00000001	0.00026236
17	Yes	5	0.00000001	0.00026244
18	Yes	5	0.00000001	0.00023059
19	Yes	5	0.00000001	0.00025928
20	Yes	5	0.00000001	0.00025931
21	Yes	5	0.00000001	0.00022936
22	Yes	5	0.00000001	0.00025994
23	Yes	5	0.00000001	0.00025987
24	Yes	5	0.00000001	0.00023113
25	Yes	5	0.00000001	0.00026296
26	Yes	5	0.00000001	0.00026291
27	Yes	4	0.00000001	0.00012692
28	Yes	5	0.00000001	0.00011299
29	Yes	5	0.00000001	0.00011514
30	Yes	4	0.00000001	0.00014083
31	Yes	5	0.00000001	0.00011218
32	Yes	5	0.00000001	0.00011434
33	Yes	4	0.00000001	0.00012670
34	Yes	5	0.00000001	0.00011427
35	Yes	5	0.00000001	0.00011207
36	Yes	4	0.00000001	0.00014086
37	Yes	5	0.00000001	0.00011511
38	Yes	5	0.00000001	0.00011299

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	178 - 129.87	51.939	27	2.846	0.002
L2	134.12 - 84.8307	27.976	27	2.165	0.001
L3	90.1641 - 41.2839	11.821	27	1.307	0.000
L4	47.7005 - 0	3.167	27	0.614	0.000

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178.000	APXVSPP18-C-A20 w/ Mount Pipe	27	51.939	2.846	0.002	20158
174.000	TME-800MHZ RRH	27	49.602	2.789	0.002	20158
168.000	(2) LPA-80080/6CF w/ Mount Pipe	27	46.114	2.703	0.001	10079
156.000	(2) 7770.00 w/ Mount Pipe	27	39.293	2.525	0.001	4580
75.000	KS24019-L112A	27	7.990	1.037	0.000	3386

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	178 - 129.87	132.319	2	7.254	0.004
L2	134.12 - 84.8307	71.352	2	5.521	0.002
L3	90.1641 - 41.2839	30.176	2	3.337	0.001
L4	47.7005 - 0	8.088	2	1.568	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178.000	APXVSPP18-C-A20 w/ Mount Pipe	2	132.319	7.254	0.004	8114
174.000	TME-800MHZ RRH	2	126.376	7.108	0.004	8114
168.000	(2) LPA-80080/6CF w/ Mount Pipe	2	117.504	6.889	0.004	4056
156.000	(2) 7770.00 w/ Mount Pipe	2	100.153	6.437	0.003	1840
75.000	KS24019-L112A	2	20.399	2.647	0.001	1332

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	178 - 129.87 (1)	TP29.64x19.5x0.25	48.130	0.000	0.0	39.000	22.611	-8.796	881.809	0.010
L2	129.87 - 84.8307 (2)	TP38.5x28.245x0.375	49.289	0.000	0.0	39.000	44.057	-16.502	1718.240	0.010
L3	84.8307 -	TP46.8x36.64x0.438	48.880	0.000	0.0	39.000	62.528	-27.235	2438.600	0.011

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 $\frac{P}{P_a}$
L4	41.2839 (3) 41.2839 - 0 (4)	TP54.5x44.591x0.5	47.701	0.000	0.0	39.000	85.698	-43.233	3342.220	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	178 - 129.87 (1)	TP29.64x19.5x0.25	554.403	41.885	39.000	1.074	0.000	0.000	39.000	0.000
L2	129.87 - 84.8307 (2)	TP38.5x28.245x0.375	1380.892	41.271	39.000	1.058	0.000	0.000	39.000	0.000
L3	84.8307 - 41.2839 (3)	TP46.8x36.64x0.438	2336.408	40.429	39.000	1.037	0.000	0.000	39.000	0.000
L4	41.2839 - 0 (4)	TP54.5x44.591x0.5	3572.950	37.599	39.000	0.964	0.000	0.000	39.000	0.000

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	178 - 129.87 (1)	TP29.64x19.5x0.25	16.944	0.749	26.000	0.058	0.004	0.000	26.000	0.000
L2	129.87 - 84.8307 (2)	TP38.5x28.245x0.375	20.670	0.469	26.000	0.037	0.052	0.001	26.000	0.000
L3	84.8307 - 41.2839 (3)	TP46.8x36.64x0.438	24.208	0.387	26.000	0.030	0.039	0.000	26.000	0.000
L4	41.2839 - 0 (4)	TP54.5x44.591x0.5	27.549	0.321	26.000	0.025	0.026	0.000	26.000	0.000

Pole Interaction Design Data

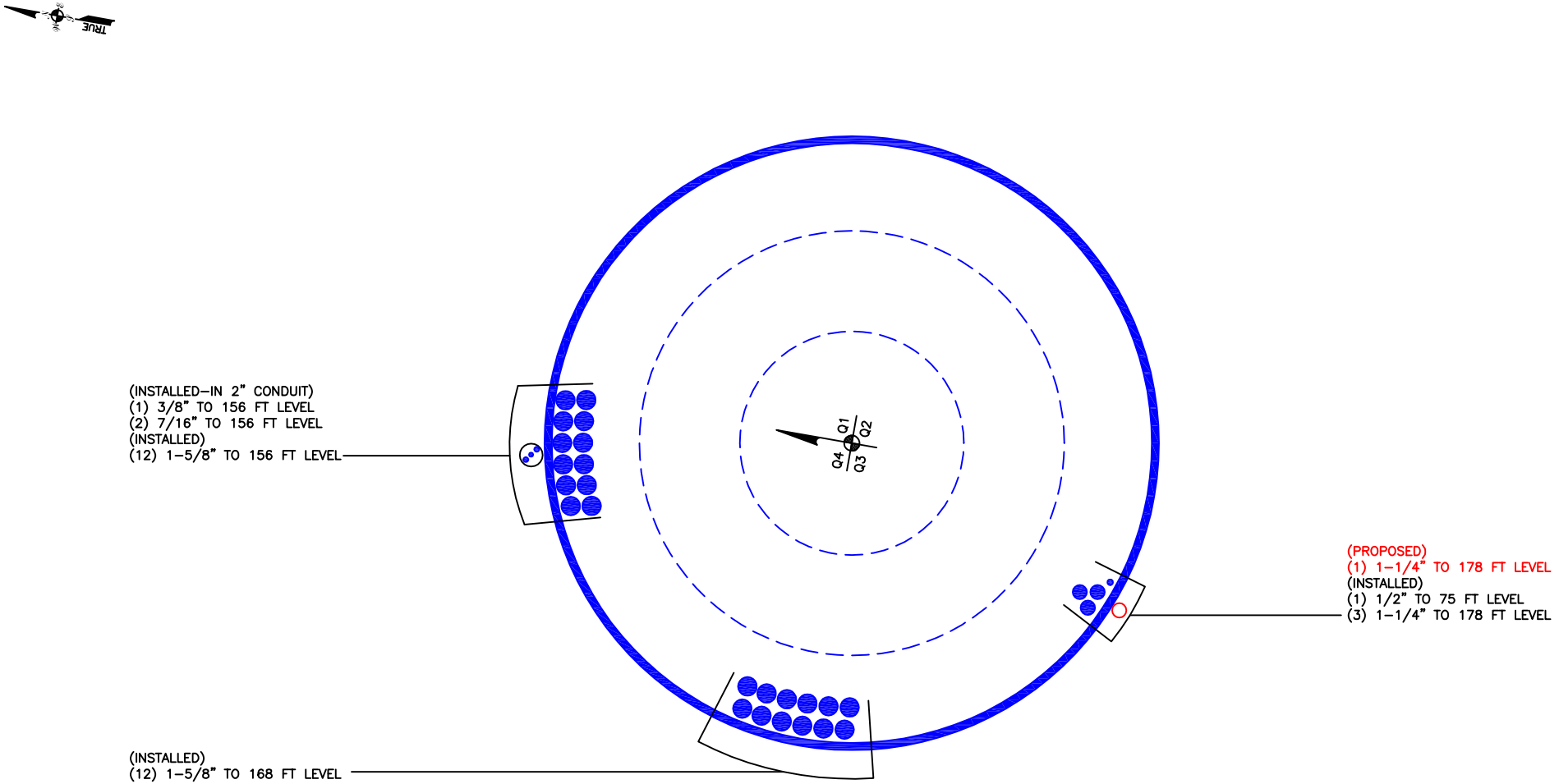
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	178 - 129.87 (1)	0.010	1.074	0.000	0.058	0.000	1.085 ✔	1.333	H1-3+VT ✔
L2	129.87 - 84.8307 (2)	0.010	1.058	0.000	0.037	0.000	1.068 ✔	1.333	H1-3+VT ✔
L3	84.8307 - 41.2839 (3)	0.011	1.037	0.000	0.030	0.000	1.048 ✔	1.333	H1-3+VT ✔
L4	41.2839 - 0 (4)	0.013	0.964	0.000	0.025	0.000	0.977 ✔	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	178 - 129.87	Pole	TP29.64x19.5x0.25	1	-8.796	1175.451	81.4	Pass
L2	129.87 - 84.8307	Pole	TP38.5x28.245x0.375	2	-16.502	2290.414	80.1	Pass
L3	84.8307 - 41.2839	Pole	TP46.8x36.64x0.438	3	-27.235	3250.654	78.6	Pass
L4	41.2839 - 0	Pole	TP54.5x44.591x0.5	4	-43.233	4455.179	73.3	Pass
							Summary	
						Pole (L1)	81.4	Pass
						RATING =	**81.4**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876369 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#:	*876369*
Site Name:	*HARWINTON / BUCKLEY E*
App #:	*245988 Revision # 0*
Pole Manufacturer:	*Other*

Reactions		
Moment:	3573	ft-kips
Axial:	43	kips
Shear:	28	kips

Anchor Rod Data		
Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	63	in

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Anchor Rod Results

			Rigid
Maximum Rod Tension:	134.0	Kips	Service, ASD
Allowable Tension:	195.0	Kips	Fty*ASIF
Anchor Rod Stress Ratio:	68.7%	**Pass**	

Plate Data		
Diam:	69	in
Thick:	2.25	in
Grade:	60	ksi
Single-Rod B-eff:	8.65	in

Base Plate Results

	Flexural Check	Rigid
Base Plate Stress:	48.8 ksi	Service ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	81.3% **Pass**	Y.L. Length: 31.60

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:		
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

Stiffener Results

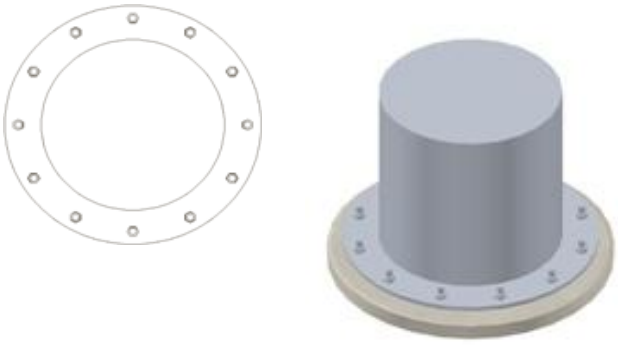
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check:	n/a

Pole Data		
Diam:	54.5	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

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

Monopole Pier and Pad Foundation

BU # : 876369
Site Name: HARWINTON / BUCKLEY BF
App. Number: 245988 Revision # 0

TIA-222 Revision: F

Design Reactions		
Shear, **S**:	28	kips
Moment, **M**:	3573	ft-kips
Tower Height, **H**:	178	ft
Tower Weight, **Wt**:	43	kips
Base Diameter, **BD**:	4.54	ft

Foundation Dimensions		
Depth, **D**:	6.5	ft
Pad Width, **W**:	28	ft
Neglected Depth, **N**:	4	ft
Thickness, **T**:	3.00	ft
Pier Diameter, **Pd**:	7.00	ft
Ext. Above Grade, **E**:	1.00	ft
BP Dist. Above Pier:	3	in.
Clear Cover, **Cc**:	3.0	in

Soil Properties		
Soil Unit Weight, **γ**:	0.075	kcf
Ult. Bearing Capacity, Bc:	8.0	ksf
Angle of Friction, **Φ**:	38	deg
Cohesion, **Co**:	0.000	ksf
Passive Pressure, **Pp**:	0.000	ksf
Base Friction, **μ**:	0.30	

Material Properties		
Rebar Yield Strength, **Fy**:	60000	psi
Concrete Strength, **F'c**:	4000	psi
Concrete Unit Weight, **δc**:	0.088	kcf
Seismic Zone, **z**:	1	

Rebar Properties		
Pier Rebar Size, **Sp**:	8	
Pier Rebar Quanity, **mp**:	46	36
Pad Rebar Size, **Spad**:	8	
Pad Rebar Quanity, **mpad**:	68	15
Pier Tie Size, **St**:	4	3
Tie Quanity, **mt**:	16	6

Design Checks	Capacity/ Availability	Demand/ Limits	Check
Req'd Pier Diam.(ft)	7	6.041666667	**OK**
Overturning (ft-kips)	4090.35	3573.00	**87.4%**
Shear Capacity (kips)	75.41	28.00	**37.1%**
Bearing (ksf)	6.00	2.45	**40.8%**
Pad Shear - 1-way (kips)	1035.96	419.14	**40.5%**
Pad Shear - 2-way (kips)	2256.89	88.77	**3.9%**
Pad Moment Capacity (k-ft)	7515.52	1864.36	**24.8%**
Pier Moment Capacity (k-ft)	4585.34	3699.00	**80.7%**

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

Sprint Existing Facility

Site ID: CT33XC021

Harwinton / Buckley Broadcasting Corp.

64 Hungerford Lane
Harwinton, CT 06791

July 14, 2014

EBI Project Number: 62143786

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

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July 14, 2014

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

Re: Radio Frequency Maximum Permissible Exposure (MPE) Assessment for Site:
CT33XC021 - Harwinton / Buckley Broadcasting Corp.

Site Total: 27.82% - MPE% in full compliance

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 64 Hungerford Lane, Harwinton, 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 64 Hungerford Lane, Harwinton, 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 **180 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	CT33XC021 - Harwinton / Buckley Broadcasting Corp.
Site Addresss	64 Hungerfofd Lane, Harwinton, CT, 06791
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	180	174	1/2 "	0.5	0	138.69	0.16%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	180	174	1/2 "	0.5	0	39.00	0.08%
1B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	180	174	1/2 "	0.5	0	138.69	0.29%
														Sector total Power Density Value:		0.54%

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	180	174	1/2 "	0.5	0	138.69	0.16%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	180	174	1/2 "	0.5	0	39.00	0.08%
2B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	180	174	1/2 "	0.5	0	138.69	0.29%
														Sector total Power Density Value:		0.54%

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	180	174	1/2 "	0.5	0	138.69	0.16%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	180	174	1/2 "	0.5	0	39.00	0.08%
3B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	180	174	1/2 "	0.5	0	138.69	0.29%
														Sector total Power Density Value:		0.54%

Site Composite MPE %	
Carrier	MPE %
Sprint	1.61%
Verizon Wireless	13.33%
AT&T	12.88%
Total Site MPE %	**27.82%**

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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 **1.61% (0.54% from sector 1, 0.54% from sector 2 and 0.54% 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 **27.82%** 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

EBI Consulting
21 B Street
Burlington, MA 01803