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

October 13, 2014

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

RE: **Sprint PCS-Exempt Modification - Crown Site BU: 806358**
Sprint PCS Site ID: CT54XC718
Located at: 1432 Old Waterbury Road, Southbury, CT 06488

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. Ed Edelson, First Selectman for Town of Southbury. Crown Atlantic Company, L.L.C. (Crown Castle) is the Property Owner.

Sprint plans to modify the existing wireless communications facility owned by Crown Castle and located at **1432 Old Waterbury Road, Southbury, CT 06488**. 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,

Jeff Barbadora
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. Ed Edelson, First Selectman
Town of Southbury
501 Main Street South
Southbury, CT 06488

Sprint

2.5 EQUIPMENT DEPLOYMENT

SITE NUMBER:

CT54XC718

SITE NAME:

MIDDLEBURY–CROWN

SITE ADDRESS:

1432 OLD WATERBURY ROAD
SOUTHBURY, CT 06488

CROWN ID#: 806358

CROWN SITE NAME: NHV 109 943107

SHEET INFORMATION

SITE NUMBER:	CT54XC718
SITE NAME:	MIDDLEBURY–CROWN
SITE ADDRESS:	1432 OLD WATERBURY ROAD SOUTHBURY, CT 06488
COUNTY:	NEW HAVEN
COORDINATES: (NAD 83)	41° 29' 36.92" N 73° 9' 54.98" W
GROUND ELEV:	646'± AMSL
STRUCTURE TYPE:	MONOPOLE
STRUCTURE HEIGHT:	226'–0"± AGL
STRUCTURE RAD CENTER:	175'–0"± AGL
ZONING CLASSIFICATION:	M–2
PARCEL ID:	46/8/10A//

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:	ANDY CLARK Andrew.Clark@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

SHT. NO.	SHEET DESCRIPTION
T–1	TITLE SHEET
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SP–2	GENERAL NOTES
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A–2	ELEVATION
A–3	ENLARGED EQUIPMENT LAYOUT PLANS
A–4	ANTENNA LAYOUT PLANS
A–5	RAN WIRING DIAGRAM
A–6	CABLE DETAILS
S–1	EQUIPMENT DETAILS
S–2	EQUIPMENT SCHEMATIC DETAILS
E–1	ELECTRICAL & GROUNDING PLANS
E–2	GROUNDING DETAILS & NOTES

GENERAL NOTES

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

PROJECT DESCRIPTION

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

AERIAL VIEW (NOT TO SCALE)

APPROVALS

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

CONSTRUCTION: _____ DATE: _____

LEASING/
SITE ACQUISITION: _____ DATE: _____

LANDLORD/
PROPERTY OWNER: _____ DATE: _____

R.F. ENGINEER: _____ DATE: _____

Sprint
2.5 EQUIPMENT DEPLOYMENT
6850 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.CT54XC718

NO	DATE	DESCRIPTION	BY
0	06/19/14	FOR COMMENT	DS
1	09/23/14	FOR CONSTRUCTION	MP
2	10/10/14	REVISED AZIMUTHS	MP

DATE	REVIEWED BY
10/10/14	TMQ

STATE OF CONNECTICUT
ANTONIO M. GUALTIERI
No. 25406
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT54XC718

SITE NAME:
MIDDLEBURY–CROWN

SITE ADDRESS:
1432 OLD WATERBURY ROAD
SOUTHBURY, CT 06488

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._15720111042185549 2.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
6850 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
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SUBMITTALS

PROJECT NO: 7225.CT54XC718

NO	DATE	DESCRIPTION	BY
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STATE OF CONNECTICUT
ANTONIO A. GUALTIERI
SEAL
No. 25406
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT54XC718

SITE NAME:
MIDDLEBURY–CROWN

SITE ADDRESS:
1432 OLD WATERBURY ROAD
SOUTHBURY, CT 06488

SHEET TITLE:
GENERAL NOTES

SHEET NO:
SP–1

DIVISION 13000–SPECIAL CONSTRUCTION ANTENNA INSTALLATION

PART 1 – GENERAL

1.01 WORK INCLUDED

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

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

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

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

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

G. ANTENNA AND HYBRIFLEX CABLE GROUNDING:

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

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

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

1.03 REQUIREMENTS OF REGULATOR AGENCIES

A. FURNISH U.L. LISTED EQUIPMENT WHERE SUCH LABEL IS AVAILABLE. INSTALL IN CONFORMANCE WITH U.L. STANDARDS WHERE APPLICABLE.
B. INSTALL ANTENNA, ANTENNA CABLES, GROUNDING SYSTEM IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS IN EFFECT AT PROJECT LOCATION AND RECOMMENDATIONS OF STATE AND LOCAL BUILDING CODES HAVING JURISDICTION OVER SPECIFIC PORTIONS OF WORK. THIS WORK INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING:

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

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

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

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

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

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

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

8. LIFE SAFETY CODE NFPA, LATEST EDITION.

DIVISION 13000–EARTHWORK

PART 1 GENERAL

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

1.02 RELATED WORK

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

PART 2 PRODUCTS

2.01 MATERIALS

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

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

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

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

MATERIAL SHALL CONFORM TO THE FOLLOWING GRADATION REQUIREMENTS.

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

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

2.02 EQUIPMENT

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

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

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

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

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

3.03 INSTALLATION

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

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

C. DO NOT CREATE DEPRESSIONS WHERE WATER MAY POND.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3.04 FIELD QUALITY CONTROL

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

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

3.05 PROTECTION

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

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

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

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

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SUBMITTALS

PROJECT NO: 7225.CT54XC718

NO	DATE	DESCRIPTION	BY
0	06/19/14	FOR COMMENT	DS
1	09/23/14	FOR CONSTRUCTION	MP
2	10/10/14	REVISED AZIMUTHS	MP

DATE	REVIEWED BY
10/10/14	

STATE OF CONNECTICUT · ANTONIO A. GUALTIERI · No. 25406 · LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT54XC718

SITE NAME:
MIDDLEBURY–CROWN

SITE ADDRESS:
1432 OLD WATERBURY ROAD
SOUTHBURY, CT 06488

SHEET TITLE:
GENERAL NOTES

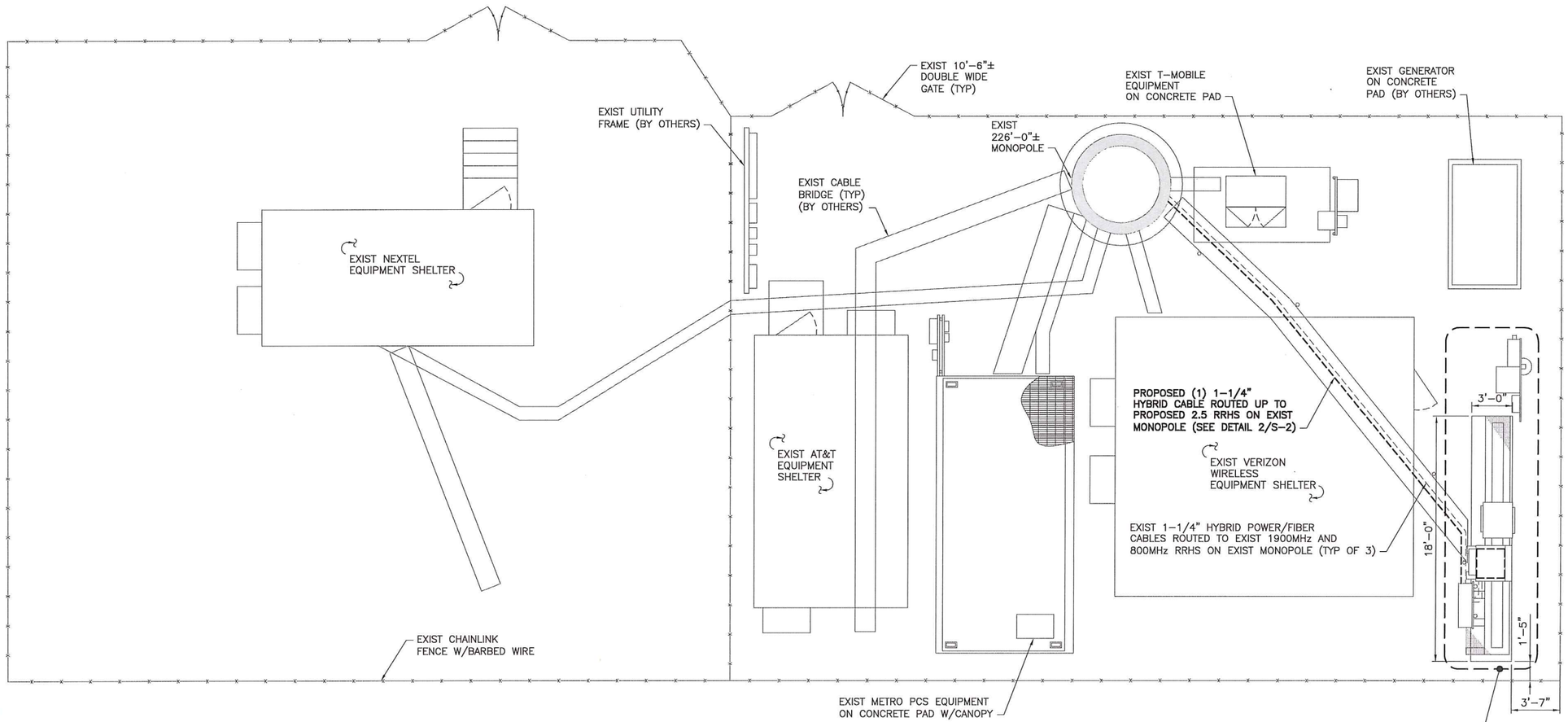
SHEET NO:
SP–2

NORTH NOTE:

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

N

APPROX.



1 A-1 SITE PLAN

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

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STATE OF CONNECTICUT
ANTONIO A. GUALTIERI
No. 25406
LICENSED PROFESSIONAL ENGINEER

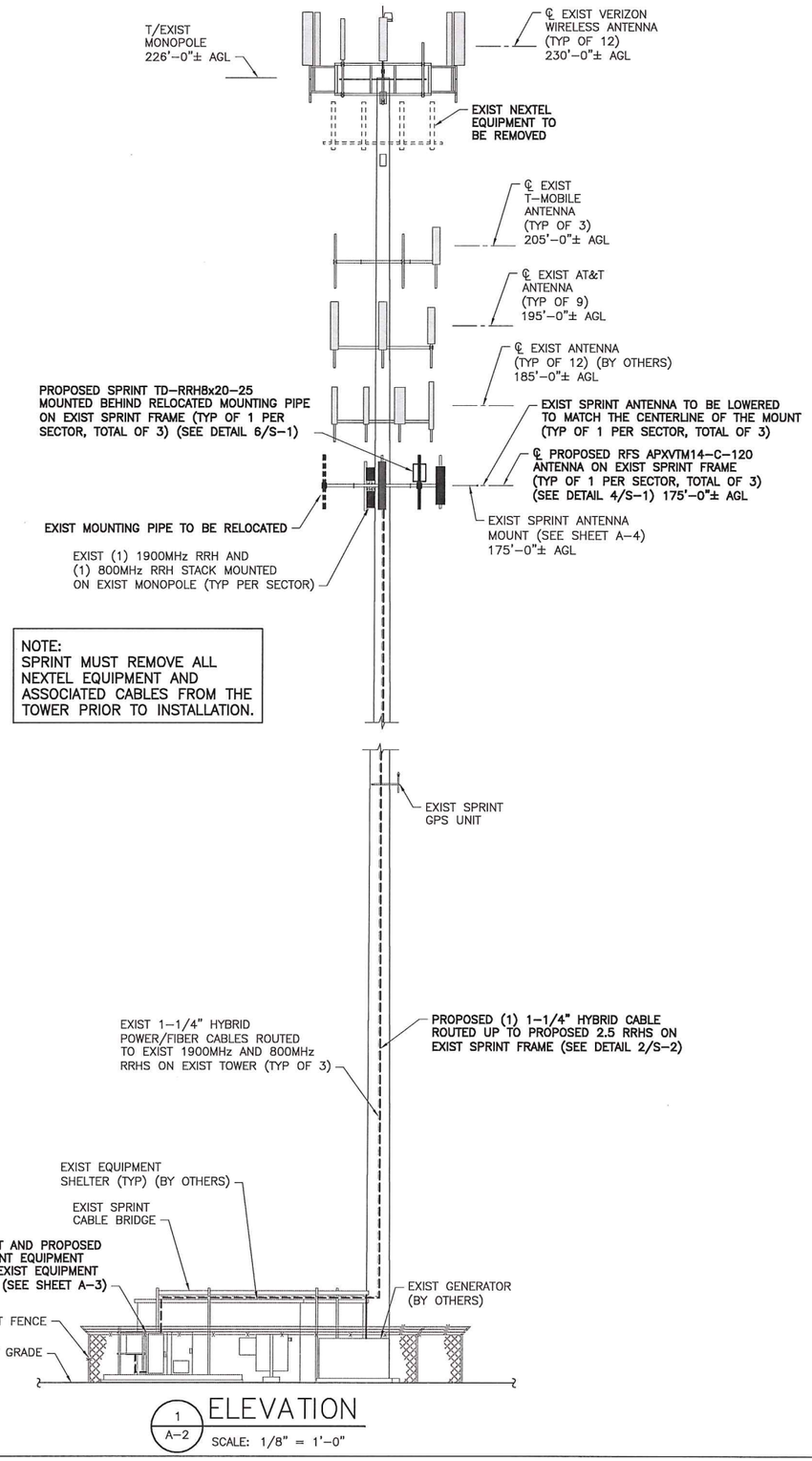
SITE NUMBER:
CT54XC718

SITE NAME:
MIDDLEBURY-CROWN

SITE ADDRESS:
1432 OLD WATERBURY ROAD
SOUTHBURY, CT 06488

SHEET TITLE:
SITE PLAN

SHEET NO:
A-1



NOTE:
SPRINT MUST REMOVE ALL NEXTEL EQUIPMENT AND ASSOCIATED CABLES FROM THE TOWER PRIOR TO INSTALLATION.

1 A-2 ELEVATION

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

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

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

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10/10/14	TMG

STATE OF CONNECTICUT
SEAL
ANTONIO A. GUALTIERI
No. 25406
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT54XC718

SITE NAME:
MIDDLEBURY-CROWN

SITE ADDRESS:
1432 OLD WATERBURY ROAD
SOUTHBURY, CT 06488

SHEET TITLE:
ELEVATION

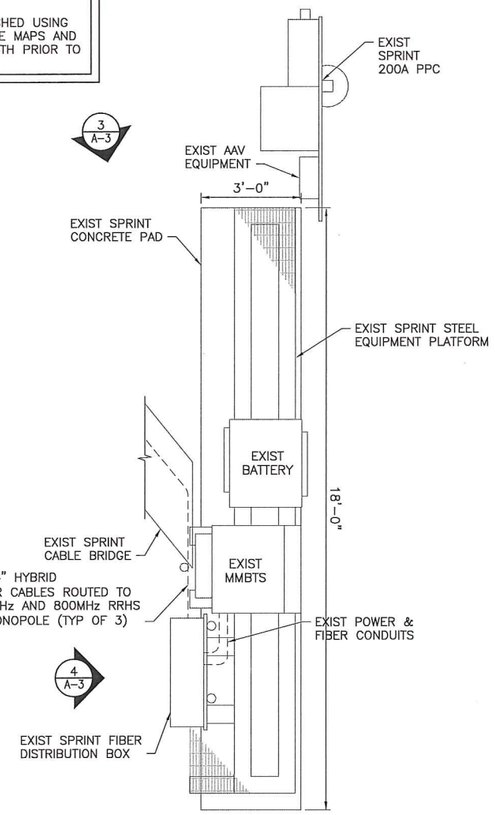
SHEET NO:
A-2

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.

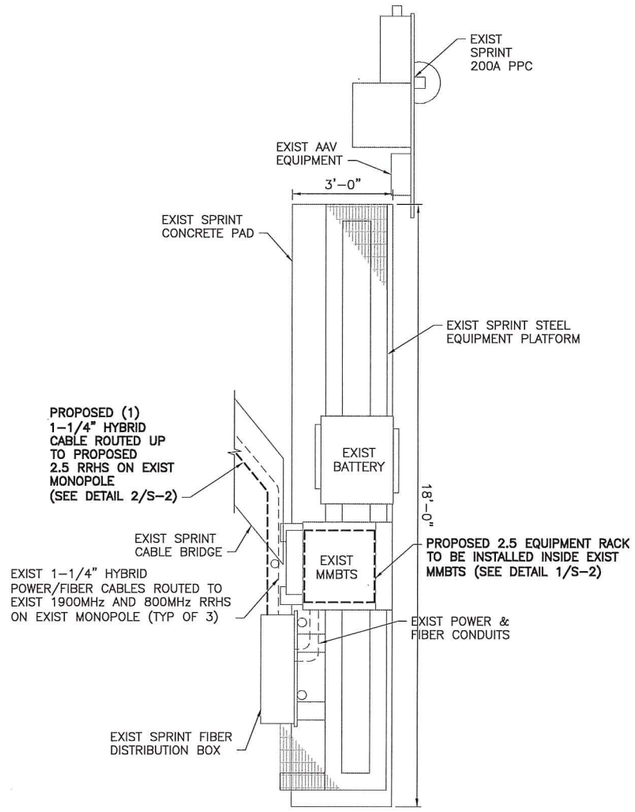
N

APPROX.



1 A-3 ENLARGED EQUIPMENT LAYOUT PLAN (EXIST)

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



2 A-3 ENLARGED EQUIPMENT 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

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10/10/14	JMQ

SEAL
STATE OF CONNECTICUT
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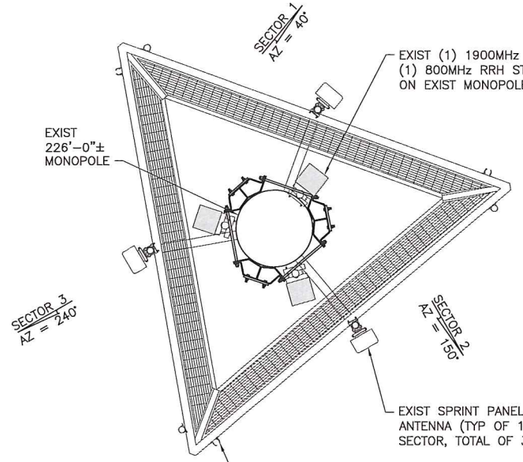
SOUTHBURY, CT 06488

SHEET TITLE:
ENLARGED EQUIPMENT LAYOUT PLANS

SHEET NO:
A-3

N

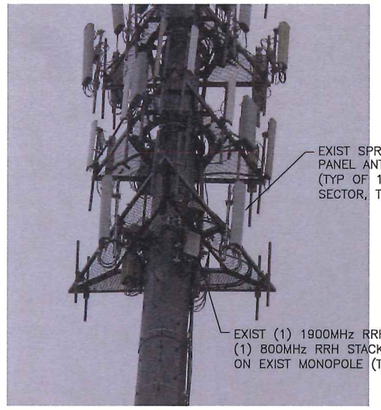
APPROX.



1 / A-4 ANTENNA LAYOUT PLAN (EXIST)

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

NOTE:
SPRINT MUST REMOVE ALL NEXTEL EQUIPMENT AND ASSOCIATED CABLES FROM THE TOWER PRIOR TO INSTALLATION.



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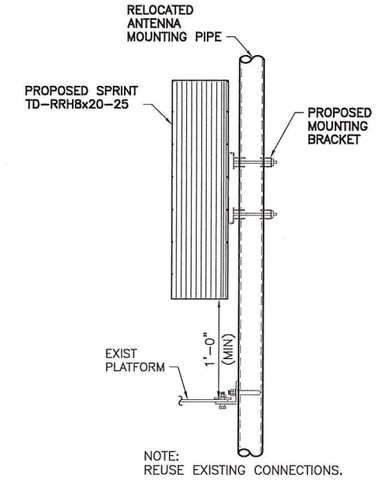
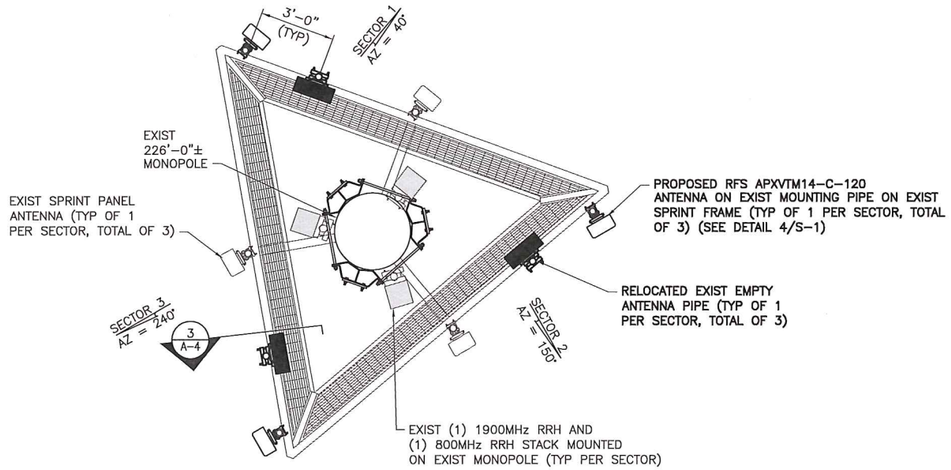


3 / A-4 RRH MOUNTING DETAIL

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



2 / A-4 ANTENNA LAYOUT PLAN (FINAL)

SCALE: 3/8" = 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	175'	175'
Antenna Azimuth	40/150/240	40/150/240
Antenna RRH Model Number	1900MHz/800MHz RRHS	TD-RRH8x20-25
Number of RRH	3	3

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10/10/14	[illegible]

STATE OF CONNECTICUT
ANTONIO A. GUALTIERI
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CT54XC718

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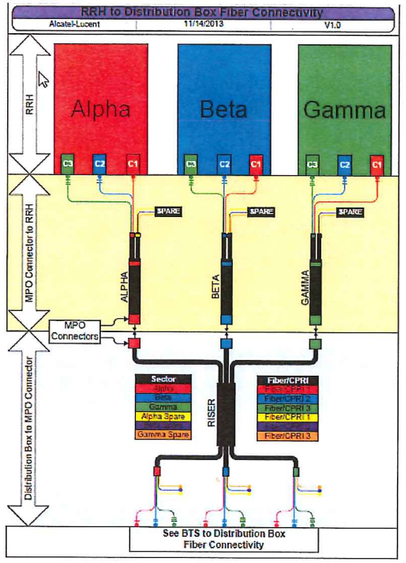
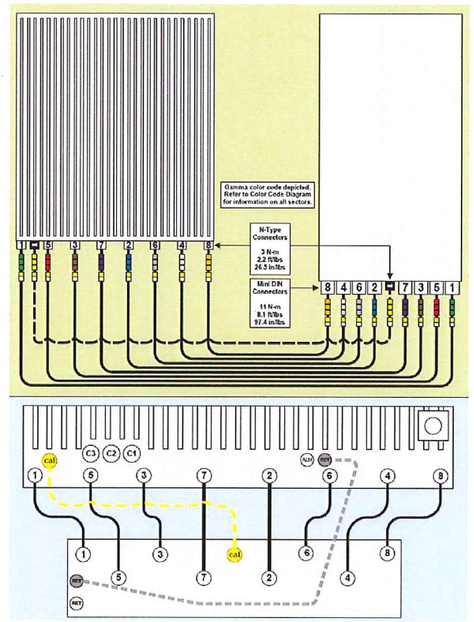
SHEET TITLE:
ANTENNA LAYOUT PLANS

SHEET NO:
A-4



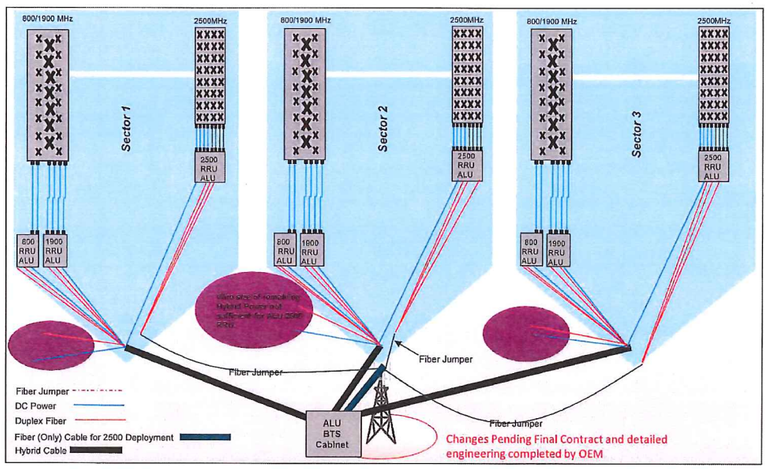
1 A–5 2.5 CABLE COLOR CODING

SCALE: N.T.S.



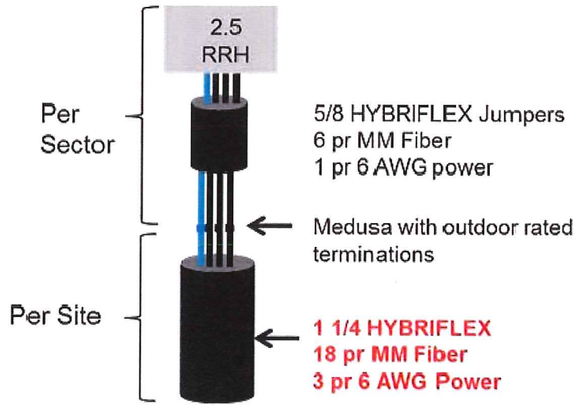
2 A–5 RRH CONNECTIVITY

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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STATE OF CONNECTICUT
ANTONIO A. GUANTIERI
No. 25406
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT54XC718

SITE NAME:
MIDDLEBURY–CROWN

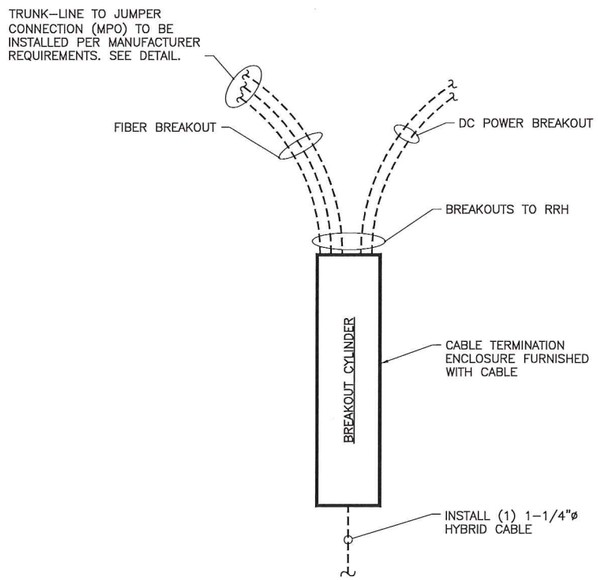
SITE ADDRESS:
1432 OLD WATERBURY ROAD
SOUTHBURY, CT 06488

SHEET TITLE:
RAN WIRING DIAGRAM

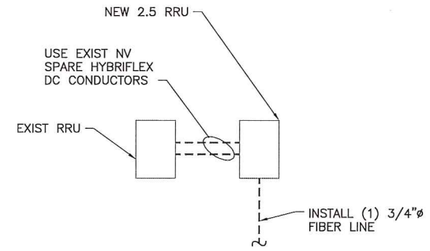
SHEET NO:
A–5

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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• 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.CT54XC718

NO	DATE	DESCRIPTION	BY
0	06/19/14	FOR COMMENT	DS
1	09/23/14	FOR CONSTRUCTION	MP
2	10/10/14	REVISED AZIMUTHS	MP

DATE	REVIEWED BY
10/10/14	

STATE OF CONNECTICUT · SEAL · ANTONIO A. GUALTIERI · No. 25406 · LICENSED PROFESSIONAL ENGINEER

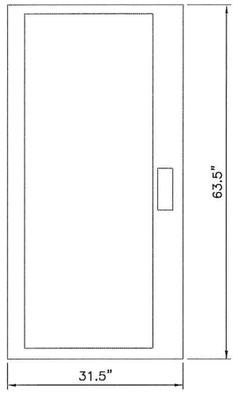
SITE NUMBER:
CT54XC718

SITE NAME:
MIDDLEBURY-CROWN

SITE ADDRESS:
1432 OLD WATERBURY ROAD
SOUTHBURY, CT 06488

SHEET TITLE:
CABLE DETAILS

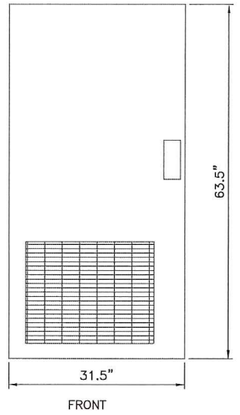
SHEET NO:
A-6



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

1/S-1 (EXIST) MMBTS CABINET

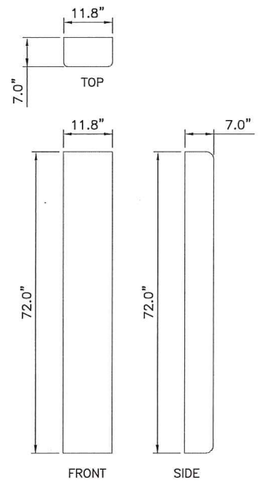
SCALE: 1" = 1'-0"



BATTERY
SPECIFICATIONS:
HEIGHT: 63.5"
WIDTH: 31.5"
DEPTH: 28.0"

2/S-1 (EXIST) BATTERY CABINET

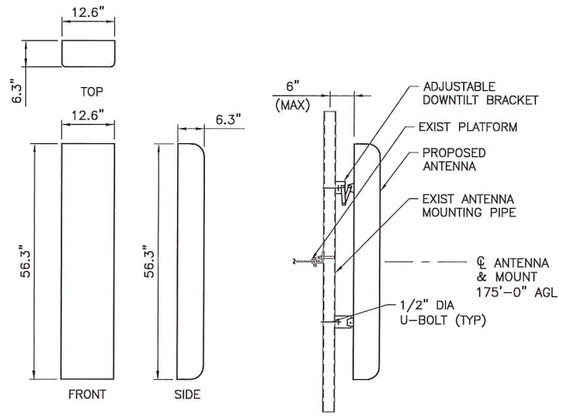
SCALE: 1" = 1'-0"



APXVSPP18-C-A20

3/S-1 (EXIST) ANTENNA DETAILS

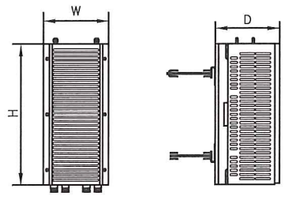
SCALE: 3/4" = 1'-0"



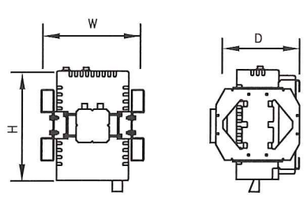
APXVTM14-C-120

4/S-1 (PROPOSED) ANTENNA DETAIL

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



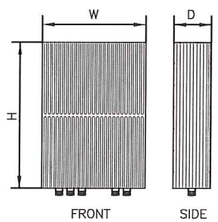
TYPE: 1900 MHz 4x45W
MODEL #: RRH 1900 4X45 65MHz
HEIGHT: 25.0"
WIDTH: 11.1"
DEPTH: 11.4"
WEIGHT: ±60 LBS.



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

5/S-1 (EXIST) RRH DETAILS

SCALE: 1" = 1'-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.

Sprint

2.5 EQUIPMENT DEPLOYMENT
6850 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

CROWN CASTLE

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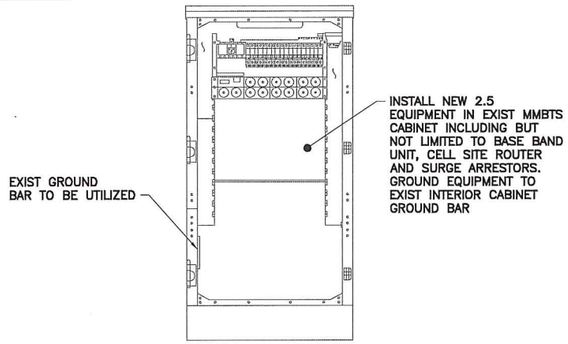
SOUTHBURY, CT 06488

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.

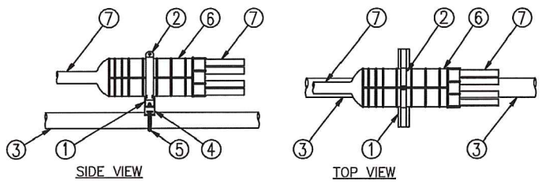


FRONT ELEVATION
(CABINET INTERIOR)

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# 30848-4.
5. NEW ROUND MEMBER ADAPTER SIZED FOR EXISTING PIPE SUPPORT.
6. BREAKOUT UNIT.
7. CABLE.



3 S-2 MEDUSA HEAD DETAIL

SCALE: NTS

RFS HYBRIFLEX RISER CABLES SCHEDULE

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

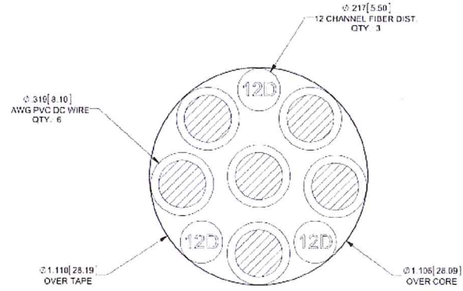
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

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

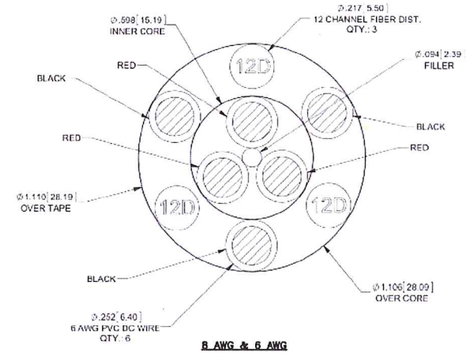
2 S-2 2.5 HYBRID CABLE X-SECTION AND DATA

SCALE: NTS

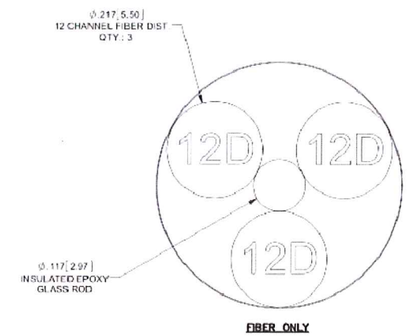
HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE			
MANUF:	RFS		
CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
FIBER ONLY	VARIES	USE NV HYBRIFLEX	7/8"
HYBRIFLEX	<200'	8 AWG	1-1/4"
HYBRIFLEX	225-300'	6 AWG	1-1/4"
HYBRIFLEX	325-375'	4 AWG	1-1/4"



4 AWG



8 AWG & 6 AWG



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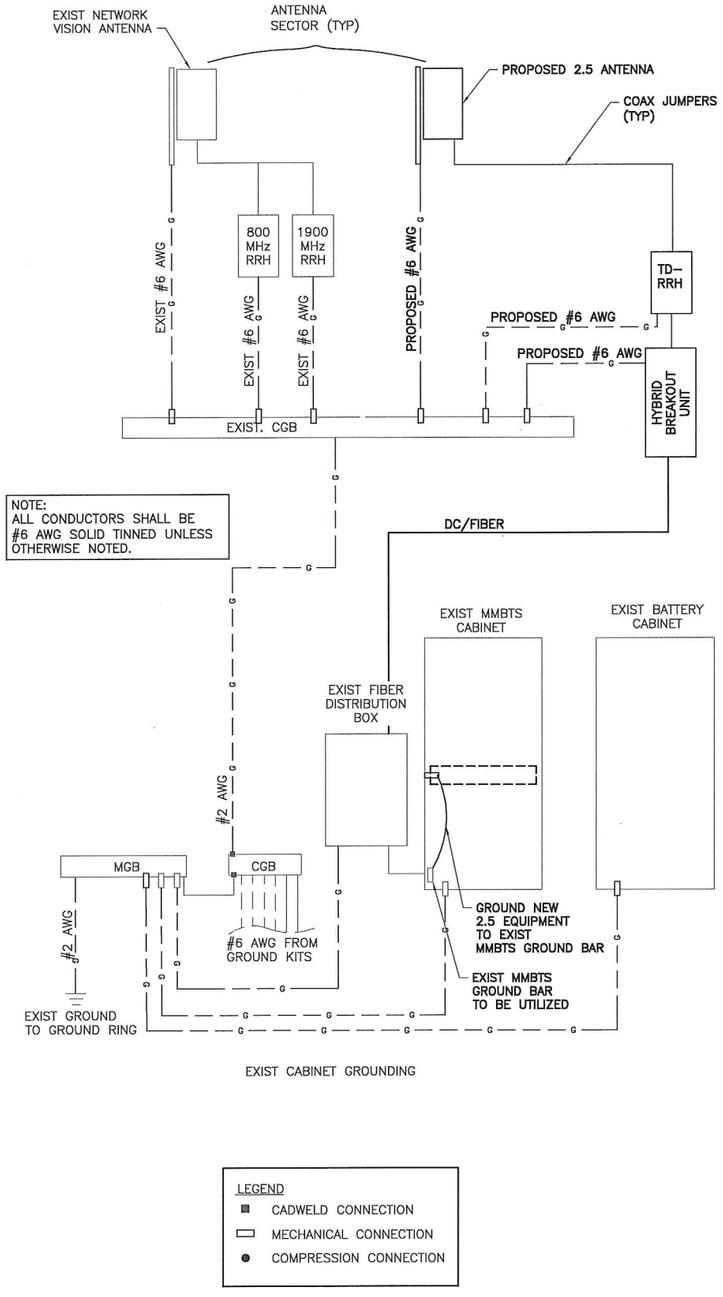
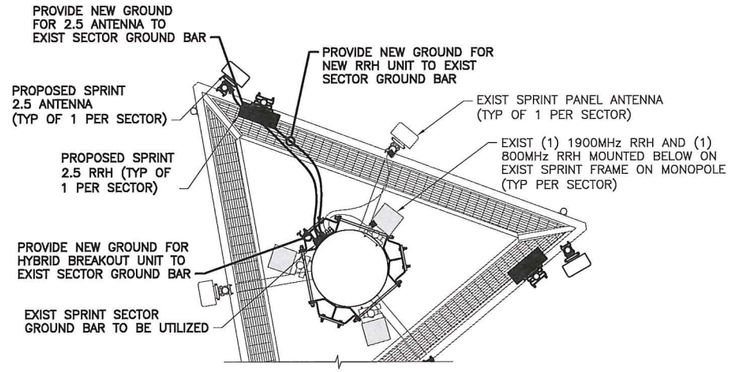
SHEET TITLE:
EQUIPMENT SCHEMATIC DETAILS

SHEET NO:
S-2



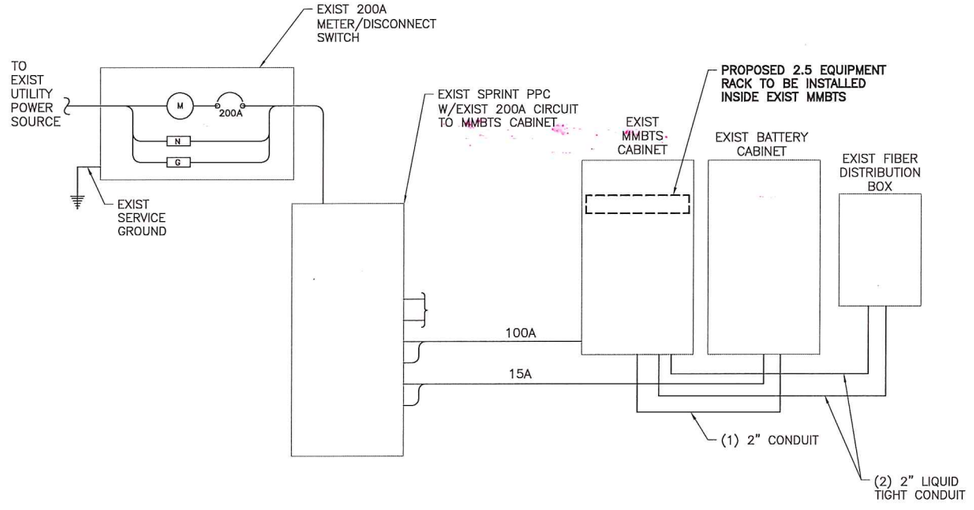
1 E-1 TYPICAL GROUNDING ONE LINE DIAGRAM

SCALE: NTS



2 E-1 TYPICAL ANTENNA GROUNDING PLAN

SCALE: NTS



3 E-1 TYPICAL ELECTRICAL & TELCO PLAN

SCALE: NTS

Sprint

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OVERLAND PARK, KANSAS 66251

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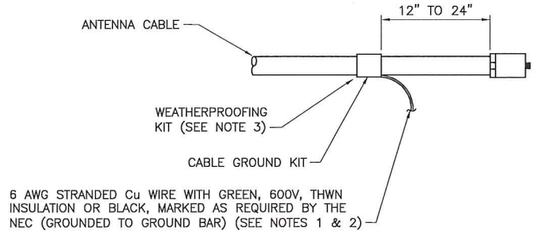
SHEET TITLE:
ELECTRICAL & GROUNDING PLANS

SHEET NO:
E-1



CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

NOTES:

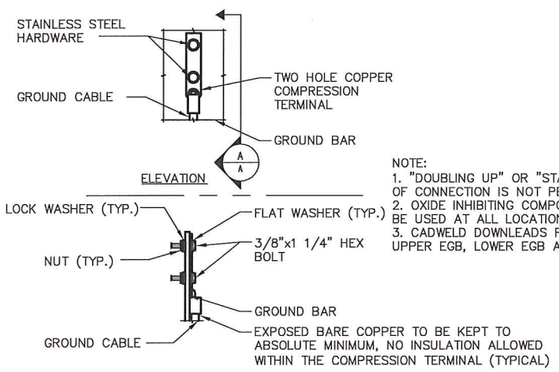
DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

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

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

1 E-2 CABLE GROUNDING KIT DETAIL

SCALE: N.T.S.

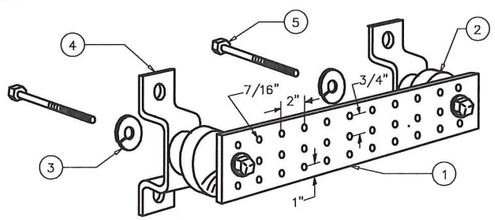


NOTE:
1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB AND MGB.

SECTION "A–A"

2 E-2 GROUNDING BAR CONN. DETAIL

SCALE: NTS



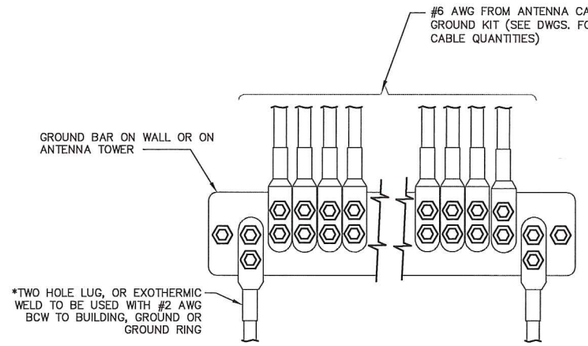
LEGEND

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

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

3 E-2 GROUNDING BAR DETAIL

SCALE: NTS



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

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

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

4 E-2 ANTENNA GROUND BAR DETAIL

SCALE: NTS

GROUNDING NOTES:

1. GROUNDING SHALL BE IN ACCORDANCE WITH NEC ARTICLE 250–GROUNDING AND BONDING.
2. ALL GROUND WIRES SHALL BE #2 AWG UNLESS NOTED OTHERWISE.
3. ALL GROUNDING WIRES SHALL PROVIDE A STRAIGHT, DOWNWARD PATH TO GROUND WITH GRADUAL BENDS AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
4. EACH EQUIPMENT CABINET SHALL BE CONNECTED TO THE MASTER ISOLATION GROUND BAR (MGB) WITH #2 AWG INSULATED STRANDED COPPER WIRE. EQUIPMENT CABINETS WALL HAVE (2) CONNECTIONS.
5. PROVIDE DEDICATED #2 AWG COPPER GROUND WIRE FROM EACH ANTENNA MOUNTING PIPE TO ASSOCIATED CIGBE.
6. THE CONTRACTOR SHALL VERIFY THAT THE EXISTING GROUND BARS HAVE ENOUGH SPACE/HOLES FOR ADDITIONAL TWO HOLE LUGS.
7. ALL CONDUITS SHALL BE RIGID GALVANIZED STEEL AND SHALL BE PROVIDED WITH GROUNDING BUSHINGS.
8. PROVIDE GROUND CONNECTIONS FOR ALL METALLIC STRUCTURES, ENCLOSURES, RACEWAYS AND OTHER CONDUCTIVE ITEMS ASSOCIATED WITH THE INSTALLATION OF CARRIER'S EQUIPMENT.
9. WHEN CABLE LENGTH IS OVER 20' THE MANUFACTURERS GROUND KIT MUST BE INSTALLED PER THE MANUFACTURERS SPECIFICATIONS.
10. REFER TO "ANTI–THEFT UPDATE TO SPRINT GROUNDING 082412.PDF" FOR GUIDELINE TO SUSPECTED OR ACTUAL THEFT OF GROUNDING.
11. HOME RUN GROUNDS ARE NOT APPROVED BY CROWN CASTLE CONSTRUCTION STANDARDS AND THAT ANTENNA BUSS BARS SHOULD BE INSTALLED DIRECTLY TO TOWER STEEL WITHOUT INSULATORS OR DOWN CONDUCTORS.

PROTECTIVE GROUNDING SYSTEM GENERAL NOTES:

1. AT ALL TERMINATIONS AT EQUIPMENT ENCLOSURES, PANEL, AND FRAMES OF EQUIPMENT AND WHERE EXPOSED FOR GROUNDING. CONDUCTOR TERMINATION SHALL BE PERFORMED UTILIZING TWO HOLE BOLTED TONGUE COMPRESSION TYPE LUGS WITH STAINLESS STEEL SELF–TAPPING SCREWS.
2. ALL CLAMPS AND SUPPORTS USED TO SUPPORT THE GROUNDING SYSTEM CONDUCTORS AND PVC CONDUITS SHALL BE PVC TYPE (NON CONDUCTIVE). DO NOT USE METAL BRACKETS OR SUPPORTS WHICH WOULD FORM A COMPLETE RING AROUND ANY GROUNDING CONDUCTOR.
3. ALL GROUNDING CONNECTIONS SHALL BE COATED WITH A COPPER SHIELD ANTI–CORROSIVE AGENT SUCH AS T&B KOPR SHIELD. VERIFY PRODUCT WITH PROJECT MANAGER.
4. ALL BOLTS, WASHERS, AND NUTS USED ON GROUNDING CONNECTIONS SHALL BE STAINLESS STEEL.
5. INSTALL GROUND BUSHING ON ALL METALLIC CONDUITS AND BOND TO THE EQUIPMENT GROUND BUS IN THE PANEL BOARD.
6. GROUND ANTENNA BASES, FRAMES, CABLE RACKS, AND OTHER METALLIC COMPONENTS WITH #2 INSULATED TINNED STRANDED COPPER GROUNDING CONDUCTORS AND CONNECT TO INSULATED SURFACE MOUNTED GROUND BARS. CONNECTION DETAILS SHALL FOLLOW MANUFACTURER'S SPECIFICATIONS FOR GROUNDING.
7. GROUND HYBRID CABLE SHIELD AT BOTH ENDS USING MANUFACTURER'S GUIDELINES.

ELECTRICAL AND GROUNDING NOTES

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

Sprint
2.5 EQUIPMENT DEPLOYMENT
6850 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
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SUBMITTALS

PROJECT NO: 7225.CT54XC718

NO	DATE	DESCRIPTION	BY
0	06/19/14	FOR COMMENT	DS
1	09/23/14	FOR CONSTRUCTION	MP
2	10/10/14	REVISED AZIMUTHS	MP

DATE	REVIEWED BY
10/10/14	

STATE OF CONNECTICUT
ANTONIO A. GUAGLIERI
No. 25406
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT54XC718

SITE NAME:
MIDDLEBURY–CROWN

SITE ADDRESS:
1432 OLD WATERBURY ROAD
SOUTHBURY, CT 06488

SHEET TITLE:
GROUNDING DETAILS & NOTES

SHEET NO:
E–2

Date: **May 29, 2014**

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

Aero Solutions, LLC
5500 Flatiron Parkway, Suite 100
Boulder, CO 80301
720-381-2843

Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Co-Locate**	**Scenario 2.5A**
	Carrier Site Number:	CT54XC718
Crown Castle Designation:	**Crown Castle BU Number:**	806358
	Crown Castle Site Name:	NHV 109 943107
	Crown Castle JDE Job Number:	288218
	Crown Castle Work Order Number:	771363
	Crown Castle Application Number:	246084 Rev. 0
Engineering Firm Designation:	**Aero Solutions, LLC Project Number:**	003-14-0521
Site Data:	**1432 Old Waterbury Road, SOUTHBURY, New Haven County, CT** **Latitude *41° 29' 36.92"*, Longitude *-73° 9' 54.98"*** **226 Foot - Monopole Tower**	

Dear Holly Haas,

Aero Solutions, LLC 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 651248, in accordance with application 246084, 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:

LC11: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II 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 85 mph fastest mile.

All modifications and 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 *Aero Solutions, LLC* 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: Benjamin Ud

Respectfully submitted by:

Shraddha Dharia, P.E.
Structural Engineer
CT PE#: PEN028187
Expires: 1/31/2015

5/30/2014

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 226 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in July of 1999. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

The tower has been modified per reinforcement drawings prepared by VS, in January of 2007. Reinforcement consists of addition of base plate stiffeners. The tower was later reinforced per reinforcement drawings prepared by B&T, in November of 2012. Reinforcement consists of addition of shaft reinforcement members between 124' and 134'.

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 85 mph with no ice, 38 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
175.0	175.0	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
228.0	228.0	6	antel	LPA-80080/6CF w/ Mount Pipe	12	1-5/8"	1
		3	powerwave technologies	P65.16.XL.2 w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
		3	rymsa wireless	MG D3-800Tx w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 713-1]			
		1	tower mounts	Side Arm Mount [SO 202-3]			
220.0	221.0	2	decibel	DB846F65ZAXY w/ Mount Pipe	12	1-5/8"	3
		10	decibel	DB846G90A-XY w/ Mount Pipe			
	220.0	1	tower mounts	Platform Mount [LP 712-1]			
205.0	207.0	3	ems wireless	RR65-18-02DP w/ Mount Pipe	6	1-5/8"	1
		3	rfs celwave	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	6	1-5/8"	2
		3	rfs celwave	ATMAA1412D-1A20			
		3	rfs celwave	ATMPP1412D-1CWA			
	205.0	1	tower mounts	Platform Mount [LP 712-1]			1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
195.0	195.0	9	cci antennas	HPA-65R-BUU-H6 w/ Mount Pipe	4	5/8"	2
		3	communication components inc.	DTMABP7819VG12A	1 2 6	3/8" 5/8" 1-1/4"	1
		3	ericsson	RRUS 11-700			2
		6	ericsson	RRUS 12-B2			
		6	ericsson	RRUS A2 MODULE			
		3	ericsson	RRUS E2 B29			
		3	ericsson	RRUS-11 800MHz			
		3	ericsson	WCS RRUS-32-B30			
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			1
		1	raycap	DC6-48-60-18-8F			
		2	raycap	DC6-48-60-18-8F			2
		1	commscope	MTC3607R			
185.0	187.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	1 6	1/2" 1-5/8"	1
	185.0	1	tower mounts	Platform Mount [LP 712-1]			
176.0	177.0	3	alcatel lucent	TME-800MHZ RRH			1
	176.0	1	tower mounts	Side Arm Mount [SO 102-3]			
	173.0	3	alcatel lucent	TME-1900MHz RRH (65MHz)			
175.0	175.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER	3	1-1/4"	1
		9	rfs celwave	ACU-A20-N			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 1201-1]			
72.0	73.0	1	gps	GPS_A	1	1/2"	1
	72.0	1	tower mounts	Side Arm Mount [SO 701-3]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment to be Removed

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)
230	230	12	swedcom	ALP 9212		
220	220	12	swedcom	ALP 9212		
205	205	12	ems wireless	RR65-18-02		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
195	195	12	swedcom	ALP 9212		
185	185	9	decibel	DB980		
175	175	12	allgon	7184.05		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	East Coast Drilling & Boring	217688	CCISITES
4-POST-MODIFICATION INSPECTION	VS	1863184	CCISITES
4-POST-MODIFICATION INSPECTION	TEP	4062849	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI	821496	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI	821494	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) The tower was reinforced per the referenced drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Aero Solutions, LLC 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	226 - 197.961	Pole	TP28.6437x21.5x0.1875	1	-4.66	848.23	46.3	Pass
L2	197.961 - 162.932	Pole	TP37.108x27.229x0.375	2	-17.34	2192.64	68.6	Pass
L3	162.932 - 132	Pole	TP44.1835x35.0602x0.4375	3	-26.97	3158.04	86.4	Pass
L4	132 - 120.305	Pole	TP47.1416x44.1835x0.5755	4	-28.73	3443.19	84.1	Pass
L5	120.305 - 79.2108	Pole	TP56.6581x44.6496x0.5	5	-43.69	4475.01	88.0	Pass
L6	79.2108 -	Pole	TP65.7875x53.7404x0.5625	6	-62.43	5849.24	82.8	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
	39.1405							
L7	39.1405 - 0	Pole	TP74.5x62.457x0.5625	7	-69.71	5948.55	85.8	Pass
							Summary	
						Pole (L5)	88.0	Pass
						Rating =	88.0	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC11

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	89.2	Pass
1	Base Plate	0	59.2	Pass
1	Base Foundation	0	90.6	Pass
1	Base Foundation Soil Interaction	0	33.9	Pass

Structure Rating (max from all components) =	90.6%

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

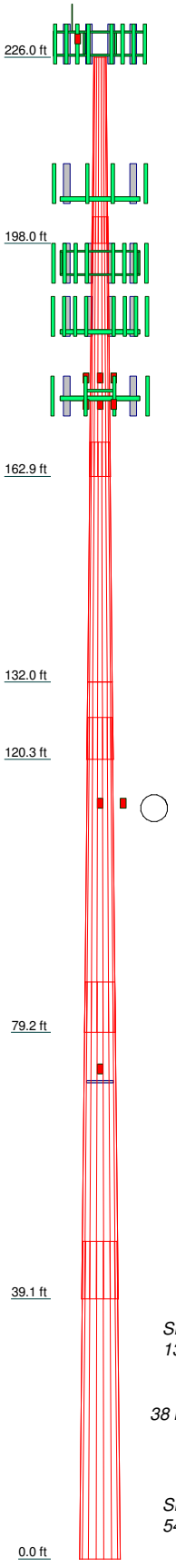
4.1) Recommendations

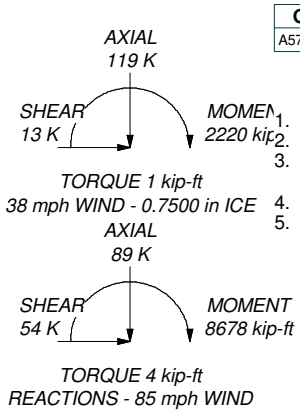
The tower and its base and anchor foundations have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

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	28.04	18	0.1875	4.08	21.5000	28.6437	A572-65	1.4
2	39.11	18	0.3750	5.14	27.2290	37.1080		5.0
3	36.07	18	0.4375		35.0602	44.1835		6.7
4	11.70	18	0.5755	6.39	44.1835	47.1416		3.2
5	47.49	18	0.5000	7.58	44.6496	56.6581	52.435572ksi	12.9
6	47.65	18	0.5625	8.72	53.7404	65.7875	A572-65	17.1
7	47.86	18	0.5625		62.4570	74.5000		19.7
								66.1





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) LPA-80080/6CF w/ Mount Pipe	228	RRUS-11 800MHz	195
P65.16.XL.2 w/ Mount Pipe	228	WCS RRUS-32-B30	195
(2) FD9R6004/2C-3L	228	DC6-48-60-18-8F	195
MG D3-800Tx w/ Mount Pipe	228	DTMABP7819VG12A	195
(2) LPA-80080/6CF w/ Mount Pipe	228	AM-X-CD-16-65-00T-RET w/ Mount Pipe	195
P65.16.XL.2 w/ Mount Pipe	228		
(2) FD9R6004/2C-3L	228	(3) HPA-65R-BUU-H6 w/ Mount Pipe	195
MG D3-800Tx w/ Mount Pipe	228	RRUS 11-700	195
(2) LPA-80080/6CF w/ Mount Pipe	228	(2) RRUS 12-B2	195
P65.16.XL.2 w/ Mount Pipe	228	(2) RRUS A2 MODULE	195
(2) FD9R6004/2C-3L	228	RRUS E2 B29	195
MG D3-800Tx w/ Mount Pipe	228	RRUS-11 800MHz	195
Transition Ladder	228	WCS RRUS-32-B30	195
Side Arm Mount [SO 202-3]	228	DC6-48-60-18-8F	195
Platform Mount [LP 713-1]	228	MTC3607R	195
Lightning Rod 5/8x4'	226	APXV18-206517S-C w/ Mount Pipe	185
Flash Beacon Lighting	226	APXV18-206517S-C w/ Mount Pipe	185
RR65-18-02DP w/ Mount Pipe	205	APXV18-206517S-C w/ Mount Pipe	185
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	205	Transition Ladder	185
		Platform Mount [LP 712-1]	185
ATMAA1412D-1A20	205	TME-1900MHz RRH (65MHz)	176
ATMPP1412D-1CWA	205	TME-800MHZ RRH	176
RR65-18-02DP w/ Mount Pipe	205	TME-1900MHz RRH (65MHz)	176
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	205	TME-800MHZ RRH	176
		TME-1900MHz RRH (65MHz)	176
ATMAA1412D-1A20	205	TME-800MHZ RRH	176
ATMPP1412D-1CWA	205	6' x 2" Mount Pipe	176
RR65-18-02DP w/ Mount Pipe	205	6' x 2" Mount Pipe	176
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	205	6' x 2" Mount Pipe	176
		Side Arm Mount [SO 102-3]	176
ATMAA1412D-1A20	205	800 EXTERNAL NOTCH FILTER	175
ATMPP1412D-1CWA	205	(3) ACU-A20-N	175
Transition Ladder	205	APXVSPP18-C-A20 w/ Mount Pipe	175
Platform Mount [LP 712-1]	205	TD-RRH8x20-25	175
DTMABP7819VG12A	195	APXVTM14-C-120 w/ Mount Pipe	175
AM-X-CD-16-65-00T-RET w/ Mount Pipe	195	800 EXTERNAL NOTCH FILTER	175
		(3) ACU-A20-N	175
DC6-48-60-18-8F	195	APXVSPP18-C-A20 w/ Mount Pipe	175
(3) HPA-65R-BUU-H6 w/ Mount Pipe	195	TD-RRH8x20-25	175
RRUS 11-700	195	APXVTM14-C-120 w/ Mount Pipe	175
(2) RRUS 12-B2	195	800 EXTERNAL NOTCH FILTER	175
(2) RRUS A2 MODULE	195	(3) ACU-A20-N	175
RRUS E2 B29	195	APXVSPP18-C-A20 w/ Mount Pipe	175
RRUS-11 800MHz	195	TD-RRH8x20-25	175
WCS RRUS-32-B30	195	APXVTM14-C-120 w/ Mount Pipe	175
DTMABP7819VG12A	195	6' x 2" Mount Pipe	175
AM-X-CD-16-65-00T-RET w/ Mount Pipe	195	6' x 2" Mount Pipe	175
		6' x 2" Mount Pipe	175
(3) HPA-65R-BUU-H6 w/ Mount Pipe	195	Platform Mount [LP 1201-1]	175
RRUS 11-700	195	Honeywill Side-Light	113
(2) RRUS 12-B2	195	Honeywill Side-Light	113
(2) RRUS A2 MODULE	195	GPS_A	72
RRUS E2 B29	195	Side Arm Mount [SO 701-3]	72

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	52.435572ksi	52 ksi	67 ksi

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 88%

Aero Solutions, LLC
5500 Flatiron Parkway, Suite 100
Boulder, CO 80301
Phone: 720-381-2843
FAX: 720-304-6883

Job: ***BU#806358 NHV 109 943107***			
Project: ***Existing 226 ft. Monopole***			
Client: Crown Castle	Drawn by: Benjamin Ude		App'd:
Code: TIA/EIA-222-F	Date: 05/29/14		Scale: NTS
Path: P:\004_CCI_SITES\806358 NHV 109 943107\003-14-0521\Engineering\Aero Calculations (LC7)\Working RISA\806358 NHV 109 943107.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:

4) Tower is located in New Haven County, Connecticut.
5) Basic wind speed of 85 mph.
6) Nominal ice thickness of 0.7500 in.
7) Ice thickness is considered to increase with height.
8) Ice density of 56 pcf.
9) A wind speed of 38 mph is used in combination with ice.
10) Temperature drop of 50 °F.
11) Deflections calculated using a wind speed of 50 mph.
12) A non-linear (P-delta) analysis was used.
13) Pressures are calculated at each section.
14) Stress ratio used in pole design is 1.333.
15) 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*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	226.00-197.96	28.04	4.08	18	21.5000	28.6437	0.1875	0.7500	A572-65 (65 ksi)
L2	197.96-162.93	39.11	5.14	18	27.2290	37.1080	0.3750	1.5000	A572-65 (65 ksi)
L3	162.93-132.00	36.07	0.00	18	35.0602	44.1835	0.4375	1.7500	A572-65 (65 ksi)
L4	132.00-120.30	11.70	6.39	18	44.1835	47.1416	0.5755	2.3019	52.435572ksi (52 ksi)
L5	120.30-79.21	47.49	7.58	18	44.6496	56.6581	0.5000	2.0000	A572-65 (65 ksi)
L6	79.21-39.14	47.65	8.72	18	53.7404	65.7875	0.5625	2.2500	A572-65 (65 ksi)
L7	39.14-0.00	47.86		18	62.4570	74.5000	0.5625	2.2500	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
L1	21.8317	12.6836	727.8616	7.5659	10.9220	66.6418	1456.6810	6.3430	3.4540	18.421
	29.0856	16.9350	1732.5124	10.1020	14.5510	119.0648	3467.3045	8.4691	4.7113	25.127
L2	28.6958	31.9630	2912.0863	9.5332	13.8323	210.5272	5828.0044	15.9845	4.1323	11.019
	37.6805	43.7215	7453.2354	13.0402	18.8509	395.3790	14916.2779	21.8649	5.8710	15.656
L3	36.9206	48.0779	7281.2065	12.2910	17.8106	408.8141	14571.9937	24.0435	5.4006	12.344
	44.8651	60.7467	14687.1069	15.5298	22.4452	654.3541	29393.5394	30.3791	7.0063	16.014
L4	44.8651	79.6525	19136.7800	15.4808	22.4452	852.6002	38298.7406	39.8338	6.7635	11.753
	47.8688	85.0557	23301.3527	16.5310	23.9479	973.0006	46633.3659	42.5359	7.2841	12.658
L5	46.9800	70.0653	17254.1420	15.6731	22.6820	760.6984	34530.9875	35.0393	6.9783	13.957
	57.5321	89.1229	35510.0754	19.9361	28.7823	1233.7463	71066.8759	44.5699	9.0918	18.184
L6	56.5161	94.9425	33920.4171	18.8782	27.3001	1242.4998	67885.4675	47.4803	8.4683	15.055
	66.8024	116.4511	62590.6069	23.1549	33.4201	1872.8460	125263.5722	58.2366	10.5886	18.824
L7	65.6494	110.5049	53483.9762	21.9726	31.7282	1685.6937	107038.3279	55.2630	10.0024	17.782
	75.6493	132.0062	91171.9378	26.2478	37.8460	2409.0244	182463.8419	66.0156	12.1220	21.55

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 226.00-197.96				1	1	1		
L2 197.96-162.93				1	1	1		
L3 162.93-132.00				1	1	1		
L4 132.00-120.30				1	1	0.982348		
L5 120.30-79.21				1	1	1		
L6 79.21-39.14				1	1	1		
L7 39.14-0.00				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 plf
**										

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 plf

Description	*Face or Leg*	*Allow Shield*	*Component Type*	*Placement* *ft*	*Total Number*		*C_AA_A* *ft^2/ft*	*Weight* *plf*
**								
561(1-5/8")	B	No	Inside Pole	226.00 - 8.00	12	No Ice	0.00	1.35
						1/2" Ice	0.00	1.35
						1" Ice	0.00	1.35
						2" Ice	0.00	1.35
						4" Ice	0.00	1.35
**								
**								
LDF7-50A(1-5/8")	B	No	Inside Pole	205.00 - 3.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF7-50A(1-5/8")	B	No	Inside Pole	205.00 - 3.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
**								
LDF6-50A(1-1/4")	C	No	Inside Pole	193.00 - 8.00	3	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
LDF6-50A(1-1/4")	C	No	CaAa (Out Of Face)	185.00 - 8.00	3	No Ice	0.00	0.66
						1/2" Ice	0.00	1.91
						1" Ice	0.00	3.78
						2" Ice	0.00	9.33
						4" Ice	0.00	27.78
LDF6-50A(1-1/4")	C	No	CaAa (Out Of Face)	193.00 - 185.00	1	No Ice	0.16	0.66
						1/2" Ice	0.25	1.91
						1" Ice	0.35	3.78
						2" Ice	0.55	9.33
						4" Ice	0.95	27.78
LDF6-50A(1-1/4")	C	No	CaAa (Out Of Face)	193.00 - 185.00	2	No Ice	0.00	0.66
						1/2" Ice	0.00	1.91
						1" Ice	0.00	3.78
						2" Ice	0.00	9.33
						4" Ice	0.00	27.78
FB-L98-002-XXX(3/8)	C	No	Inside Pole	193.00 - 8.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
WR-VG82ST-BRDA(5/8")	C	No	Inside Pole	193.00 - 8.00	2	No Ice	0.00	0.31
						1/2" Ice	0.00	0.31
						1" Ice	0.00	0.31
						2" Ice	0.00	0.31
						4" Ice	0.00	0.31
WR-VG82ST-BRDA(5/8")	C	No	CaAa (Out Of Face)	193.00 - 8.00	4	No Ice	0.00	0.31
						1/2" Ice	0.00	1.01
						1" Ice	0.00	2.32
						2" Ice	0.00	6.77
						4" Ice	0.00	23.01
2" Rigid Conduit	C	No	Inside Pole	193.00 - 8.00	1	No Ice	0.00	2.80
						1/2" Ice	0.00	2.80
						1" Ice	0.00	2.80
						2" Ice	0.00	2.80
						4" Ice	0.00	2.80
**								
LDF4-50A(1/2")	C	No	CaAa (Out Of Face)	185.00 - 8.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.84
						1" Ice	0.00	2.14
						2" Ice	0.00	6.58
						4" Ice	0.00	22.78
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	185.00 - 8.00	1	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
						2" Ice	0.60	10.54

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						4" Ice	1.00	30.04
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	185.00 - 8.00	5	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04
**								
HB114-1-0813U4-M5J(1 1/4")	A	No	Inside Pole	175.00 - 8.00	3	No Ice	0.00	1.20
						1/2" Ice	0.00	1.20
						1" Ice	0.00	1.20
						2" Ice	0.00	1.20
						4" Ice	0.00	1.20
HB114-21U3M12-XXXF(1-1/4")	A	No	Inside Pole	175.00 - 8.00	1	No Ice	0.00	1.22
						1/2" Ice	0.00	1.22
						1" Ice	0.00	1.22
						2" Ice	0.00	1.22
						4" Ice	0.00	1.22
**								
LDF4-50A(1/2")	A	No	Inside Pole	72.00 - 8.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
**								
MS600	A	No	CaAa (Out Of Face)	134.00 - 124.00	1	No Ice	0.17	0.00
						1/2" Ice	0.17	0.00
						1" Ice	0.17	0.00
						2" Ice	0.17	0.00
						4" Ice	0.17	0.00
**								

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	226.00-197.96	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.52
		C	0.000	0.000	0.000	0.000	0.00
L2	197.96-162.93	A	0.000	0.000	0.000	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.91
		C	0.000	0.000	0.000	5.609	0.37
L3	162.93-132.00	A	0.000	0.000	0.000	0.333	0.15
		B	0.000	0.000	0.000	0.000	0.81
		C	0.000	0.000	0.000	6.125	0.42
L4	132.00-120.30	A	0.000	0.000	0.000	1.334	0.06
		B	0.000	0.000	0.000	0.000	0.30
		C	0.000	0.000	0.000	2.316	0.16
L5	120.30-79.21	A	0.000	0.000	0.000	0.000	0.20
		B	0.000	0.000	0.000	0.000	1.07
		C	0.000	0.000	0.000	8.137	0.56
L6	79.21-39.14	A	0.000	0.000	0.000	0.000	0.20
		B	0.000	0.000	0.000	0.000	1.04
		C	0.000	0.000	0.000	7.934	0.55
L7	39.14-0.00	A	0.000	0.000	0.000	0.000	0.15
		B	0.000	0.000	0.000	0.000	0.86
		C	0.000	0.000	0.000	6.166	0.43

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

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	226.00-197.96	A	0.937	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.52
		C		0.000	0.000	0.000	0.000	0.00
L2	197.96-162.93	A	0.919	0.000	0.000	0.000	0.000	0.06
		B		0.000	0.000	0.000	0.000	0.91
		C		0.000	0.000	0.000	11.245	1.34
L3	162.93-132.00	A	0.897	0.000	0.000	0.000	0.333	0.15
		B		0.000	0.000	0.000	0.000	0.81
		C		0.000	0.000	0.000	11.811	1.58
L4	132.00-120.30	A	0.881	0.000	0.000	0.000	1.334	0.06
		B		0.000	0.000	0.000	0.000	0.30
		C		0.000	0.000	0.000	4.376	0.57
L5	120.30-79.21	A	0.856	0.000	0.000	0.000	0.000	0.20
		B		0.000	0.000	0.000	0.000	1.07
		C		0.000	0.000	0.000	15.376	2.01
L6	79.21-39.14	A	0.804	0.000	0.000	0.000	0.000	0.20
		B		0.000	0.000	0.000	0.000	1.04
		C		0.000	0.000	0.000	14.795	1.92
L7	39.14-0.00	A	0.750	0.000	0.000	0.000	0.000	0.15
		B		0.000	0.000	0.000	0.000	0.86
		C		0.000	0.000	0.000	11.175	1.41

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	226.00-197.96	0.0000	0.0000	0.0000	0.0000
L2	197.96-162.93	-0.2013	0.1162	-0.3626	0.2093
L3	162.93-132.00	-0.2421	0.1232	-0.4266	0.2311
L4	132.00-120.30	-0.2377	-0.0192	-0.4166	0.0954
L5	120.30-79.21	-0.2459	0.1419	-0.4334	0.2502
L6	79.21-39.14	-0.2475	0.1429	-0.4356	0.2515
L7	39.14-0.00	-0.1963	0.1134	-0.3409	0.1968

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
**									
Flash Beacon Lighting	C	From Leg	3.00 0.00 2.00	0.0000	226.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.70 3.10 3.50 4.30 5.90	2.70 3.10 3.50 4.30 5.90	0.05 0.07 0.09 0.13 0.21
Lightning Rod 5/8x4'	C	From Leg	4.00 0.00 6.00	0.0000	226.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.25 0.66 0.97 1.49 2.68	0.25 0.66 0.97 1.49 2.68	0.03 0.03 0.04 0.06 0.14
**									
(2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	30.0000	228.00	No Ice 1/2" Ice	4.58 5.13 5.65	10.76 12.04 13.03	0.05 0.11 0.19

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	6.70	15.05	0.36
						2" Ice	8.91	19.31	0.86
						4" Ice			
P65.16.XL.2 w/ Mount Pipe	A	From Leg	4.00	30.0000	228.00	No Ice	8.64	5.78	0.06
			0.00			1/2"	9.29	6.95	0.12
			0.00			Ice	9.91	7.83	0.19
						1" Ice	11.18	9.63	0.36
						2" Ice	13.83	13.44	0.84
						4" Ice			
(2) FD9R6004/2C-3L	A	From Leg	4.00	30.0000	228.00	No Ice	0.37	0.08	0.00
			0.00			1/2"	0.45	0.14	0.01
			0.00			Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
						4" Ice			
MG D3-800Tx w/ Mount Pipe	A	From Leg	4.00	30.0000	228.00	No Ice	3.57	3.42	0.03
			0.00			1/2"	3.98	4.12	0.07
			0.00			Ice	4.39	4.78	0.11
						1" Ice	5.33	6.16	0.21
						2" Ice	7.34	9.18	0.52
						4" Ice			
(2) LPA-80080/6CF w/ Mount Pipe	B	From Leg	4.00	30.0000	228.00	No Ice	4.58	10.76	0.05
			0.00			1/2"	5.13	12.04	0.11
			0.00			Ice	5.65	13.03	0.19
						1" Ice	6.70	15.05	0.36
						2" Ice	8.91	19.31	0.86
						4" Ice			
P65.16.XL.2 w/ Mount Pipe	B	From Leg	4.00	30.0000	228.00	No Ice	8.64	5.78	0.06
			0.00			1/2"	9.29	6.95	0.12
			0.00			Ice	9.91	7.83	0.19
						1" Ice	11.18	9.63	0.36
						2" Ice	13.83	13.44	0.84
						4" Ice			
(2) FD9R6004/2C-3L	B	From Leg	4.00	30.0000	228.00	No Ice	0.37	0.08	0.00
			0.00			1/2"	0.45	0.14	0.01
			0.00			Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
						4" Ice			
MG D3-800Tx w/ Mount Pipe	B	From Leg	4.00	30.0000	228.00	No Ice	3.57	3.42	0.03
			0.00			1/2"	3.98	4.12	0.07
			0.00			Ice	4.39	4.78	0.11
						1" Ice	5.33	6.16	0.21
						2" Ice	7.34	9.18	0.52
						4" Ice			
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.00	30.0000	228.00	No Ice	4.58	10.76	0.05
			0.00			1/2"	5.13	12.04	0.11
			0.00			Ice	5.65	13.03	0.19
						1" Ice	6.70	15.05	0.36
						2" Ice	8.91	19.31	0.86
						4" Ice			
P65.16.XL.2 w/ Mount Pipe	C	From Leg	4.00	30.0000	228.00	No Ice	8.64	5.78	0.06
			0.00			1/2"	9.29	6.95	0.12
			0.00			Ice	9.91	7.83	0.19
						1" Ice	11.18	9.63	0.36
						2" Ice	13.83	13.44	0.84
						4" Ice			
(2) FD9R6004/2C-3L	C	From Leg	4.00	30.0000	228.00	No Ice	0.37	0.08	0.00
			0.00			1/2"	0.45	0.14	0.01
			0.00			Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
						4" Ice			
MG D3-800Tx w/ Mount Pipe	C	From Leg	4.00	30.0000	228.00	No Ice	3.57	3.42	0.03
			0.00			1/2"	3.98	4.12	0.07

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* °	*Placement* *ft*		*C_AA_A Front* *ft^2*	*C_AA_A Side* *ft^2*	*Weight* *K*
			0.00			Ice	4.39	4.78	0.11
						1" Ice	5.33	6.16	0.21
						2" Ice	7.34	9.18	0.52
						4" Ice			
Transition Ladder	C	From Leg	2.00 0.00 -4.00	0.0000	228.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.00 8.00 10.00 14.00 22.00	6.00 8.00 10.00 14.00 22.00	0.16 0.24 0.32 0.48 0.80
Side Arm Mount [SO 202-3]	C	None		0.0000	228.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.18 8.56 10.94 15.70 25.22	6.18 8.56 10.94 15.70 25.22	0.33 0.40 0.47 0.61 0.90
Platform Mount [LP 713-1]	C	None		0.0000	228.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	31.27 39.68 48.09 64.91 98.55	31.27 39.68 48.09 64.91 98.55	1.51 1.93 2.35 3.19 4.86
**									
**									
RR65-18-02DP w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	60.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	0.03 0.07 0.12 0.22 0.56
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	60.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.47 7.99 8.52 9.59 11.87	3.49 4.26 4.96 6.40 9.49	0.06 0.11 0.16 0.30 0.68
ATMAA1412D-1A20	A	From Leg	4.00 0.00 2.00	60.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.17 1.31 1.47 1.81 2.58	0.47 0.57 0.69 0.95 1.57	0.01 0.02 0.03 0.06 0.14
ATMPP1412D-1CWA	A	From Leg	4.00 0.00 2.00	60.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.17 1.32 1.48 1.82 2.61	0.42 0.53 0.65 0.92 1.57	0.01 0.02 0.03 0.05 0.13
RR65-18-02DP w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	60.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	0.03 0.07 0.12 0.22 0.56
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	60.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.47 7.99 8.52 9.59 11.87	3.49 4.26 4.96 6.40 9.49	0.06 0.11 0.16 0.30 0.68
ATMAA1412D-1A20	B	From Leg	4.00 0.00 2.00	60.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.17 1.31 1.47 1.81 2.58	0.47 0.57 0.69 0.95 1.57	0.01 0.02 0.03 0.06 0.14

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			
ATMPP1412D-1CWA	B	From Leg	4.00 0.00 2.00	60.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.17 1.32 1.48 1.82 2.61	0.42 0.53 0.65 0.92 1.57	0.01 0.02 0.03 0.05 0.13
RR65-18-02DP w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	60.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	0.03 0.07 0.12 0.22 0.56
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	60.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.47 7.99 8.52 9.59 11.87	3.49 4.26 4.96 6.40 9.49	0.06 0.11 0.16 0.30 0.68
ATMAA1412D-1A20	C	From Leg	4.00 0.00 2.00	60.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.17 1.31 1.47 1.81 2.58	0.47 0.57 0.69 0.95 1.57	0.01 0.02 0.03 0.06 0.14
ATMPP1412D-1CWA	C	From Leg	4.00 0.00 2.00	60.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.17 1.32 1.48 1.82 2.61	0.42 0.53 0.65 0.92 1.57	0.01 0.02 0.03 0.05 0.13
Transition Ladder	C	From Leg	2.00 0.00 -4.00	0.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.00 8.00 10.00 14.00 22.00	6.00 8.00 10.00 14.00 22.00	0.16 0.24 0.32 0.48 0.80
Platform Mount [LP 712-1]	C	None		0.0000	205.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.53 29.94 35.35 46.17 67.81	24.53 29.94 35.35 46.17 67.81	1.34 1.65 1.96 2.58 3.82
**									
DTMABP7819VG12A	A	From Leg	4.00 0.00 0.00	23.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.14 1.28 1.44 1.77 2.54	0.39 0.49 0.59 0.83 1.41	0.02 0.03 0.04 0.06 0.14
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	23.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.30 7.48 8.37 10.18 14.02	0.07 0.14 0.21 0.38 0.87
DC6-48-60-18-8F	A	From Leg	4.00 0.00 0.00	23.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.80 3.04 3.54 4.66	2.57 2.80 3.04 3.54 4.66	0.03 0.06 0.08 0.14 0.31
(3) HPA-65R-BUU-H6 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	23.0000	195.00	No Ice 1/2" Ice	10.60 11.27 11.91	8.11 9.30 10.21	0.08 0.16 0.25

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	13.21	12.17	0.46
						2" Ice	15.93	16.35	1.02
						4" Ice			
RRUS 11-700	A	From Leg	4.00	23.0000	195.00	No Ice	2.94	1.25	0.06
			0.00			1/2"	3.17	1.41	0.07
			0.00			Ice	3.41	1.59	0.10
						1" Ice	3.91	1.96	0.15
						2" Ice	5.02	2.82	0.30
						4" Ice			
(2) RRUS 12-B2	A	From Leg	4.00	23.0000	195.00	No Ice	3.67	1.48	0.06
			0.00			1/2"	3.92	1.67	0.08
			0.00			Ice	4.19	1.86	0.11
						1" Ice	4.74	2.27	0.17
						2" Ice	5.96	3.20	0.34
						4" Ice			
(2) RRUS A2 MODULE	A	From Leg	4.00	23.0000	195.00	No Ice	1.87	1.02	0.02
			0.00			1/2"	2.05	1.17	0.03
			0.00			Ice	2.24	1.32	0.05
						1" Ice	2.66	1.66	0.09
						2" Ice	3.58	2.44	0.21
						4" Ice			
RRUS E2 B29	A	From Leg	4.00	23.0000	195.00	No Ice	3.67	1.49	0.06
			0.00			1/2"	3.93	1.67	0.08
			0.00			Ice	4.19	1.87	0.11
						1" Ice	4.75	2.28	0.17
						2" Ice	5.96	3.21	0.35
						4" Ice			
RRUS-11 800MHz	A	From Leg	4.00	23.0000	195.00	No Ice	2.94	1.52	0.05
			0.00			1/2"	3.17	1.69	0.08
			0.00			Ice	3.41	1.88	0.10
						1" Ice	3.91	2.27	0.16
						2" Ice	5.02	3.16	0.32
						4" Ice			
WCS RRUS-32-B30	A	From Leg	4.00	23.0000	195.00	No Ice	3.87	2.76	0.08
			0.00			1/2"	4.15	3.02	0.10
			0.00			Ice	4.44	3.29	0.14
						1" Ice	5.06	3.85	0.21
						2" Ice	6.38	5.08	0.41
						4" Ice			
DTMABP7819VG12A	B	From Leg	4.00	23.0000	195.00	No Ice	1.14	0.39	0.02
			0.00			1/2"	1.28	0.49	0.03
			0.00			Ice	1.44	0.59	0.04
						1" Ice	1.77	0.83	0.06
						2" Ice	2.54	1.41	0.14
						4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.00	23.0000	195.00	No Ice	8.50	6.30	0.07
			0.00			1/2"	9.15	7.48	0.14
			0.00			Ice	9.77	8.37	0.21
						1" Ice	11.03	10.18	0.38
						2" Ice	13.68	14.02	0.87
						4" Ice			
(3) HPA-65R-BUU-H6 w/ Mount Pipe	B	From Leg	4.00	23.0000	195.00	No Ice	10.60	8.11	0.08
			0.00			1/2"	11.27	9.30	0.16
			0.00			Ice	11.91	10.21	0.25
						1" Ice	13.21	12.17	0.46
						2" Ice	15.93	16.35	1.02
						4" Ice			
RRUS 11-700	B	From Leg	4.00	23.0000	195.00	No Ice	2.94	1.25	0.06
			0.00			1/2"	3.17	1.41	0.07
			0.00			Ice	3.41	1.59	0.10
						1" Ice	3.91	1.96	0.15
						2" Ice	5.02	2.82	0.30
						4" Ice			
(2) RRUS 12-B2	B	From Leg	4.00	23.0000	195.00	No Ice	3.67	1.48	0.06
			0.00			1/2"	3.92	1.67	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	4.19	1.86	0.11
						1" Ice	4.74	2.27	0.17
						2" Ice	5.96	3.20	0.34
						4" Ice			
(2) RRUS A2 MODULE	B	From Leg	4.00	23.0000	195.00	No Ice	1.87	1.02	0.02
			0.00			1/2"	2.05	1.17	0.03
			0.00			Ice	2.24	1.32	0.05
						1" Ice	2.66	1.66	0.09
						2" Ice	3.58	2.44	0.21
						4" Ice			
RRUS E2 B29	B	From Leg	4.00	23.0000	195.00	No Ice	3.67	1.49	0.06
			0.00			1/2"	3.93	1.67	0.08
			0.00			Ice	4.19	1.87	0.11
						1" Ice	4.75	2.28	0.17
						2" Ice	5.96	3.21	0.35
						4" Ice			
RRUS-11 800MHz	B	From Leg	4.00	23.0000	195.00	No Ice	2.94	1.52	0.05
			0.00			1/2"	3.17	1.69	0.08
			0.00			Ice	3.41	1.88	0.10
						1" Ice	3.91	2.27	0.16
						2" Ice	5.02	3.16	0.32
						4" Ice			
WCS RRUS-32-B30	B	From Leg	4.00	23.0000	195.00	No Ice	3.87	2.76	0.08
			0.00			1/2"	4.15	3.02	0.10
			0.00			Ice	4.44	3.29	0.14
						1" Ice	5.06	3.85	0.21
						2" Ice	6.38	5.08	0.41
						4" Ice			
DC6-48-60-18-8F	B	From Leg	4.00	23.0000	195.00	No Ice	2.57	2.57	0.03
			0.00			1/2"	2.80	2.80	0.06
			0.00			Ice	3.04	3.04	0.08
						1" Ice	3.54	3.54	0.14
						2" Ice	4.66	4.66	0.31
						4" Ice			
DTMABP7819VG12A	C	From Leg	4.00	23.0000	195.00	No Ice	1.14	0.39	0.02
			0.00			1/2"	1.28	0.49	0.03
			0.00			Ice	1.44	0.59	0.04
						1" Ice	1.77	0.83	0.06
						2" Ice	2.54	1.41	0.14
						4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.00	23.0000	195.00	No Ice	8.50	6.30	0.07
			0.00			1/2"	9.15	7.48	0.14
			0.00			Ice	9.77	8.37	0.21
						1" Ice	11.03	10.18	0.38
						2" Ice	13.68	14.02	0.87
						4" Ice			
(3) HPA-65R-BUU-H6 w/ Mount Pipe	C	From Leg	4.00	23.0000	195.00	No Ice	10.60	8.11	0.08
			0.00			1/2"	11.27	9.30	0.16
			0.00			Ice	11.91	10.21	0.25
						1" Ice	13.21	12.17	0.46
						2" Ice	15.93	16.35	1.02
						4" Ice			
RRUS 11-700	C	From Leg	4.00	23.0000	195.00	No Ice	2.94	1.25	0.06
			0.00			1/2"	3.17	1.41	0.07
			0.00			Ice	3.41	1.59	0.10
						1" Ice	3.91	1.96	0.15
						2" Ice	5.02	2.82	0.30
						4" Ice			
(2) RRUS 12-B2	C	From Leg	4.00	23.0000	195.00	No Ice	3.67	1.48	0.06
			0.00			1/2"	3.92	1.67	0.08
			0.00			Ice	4.19	1.86	0.11
						1" Ice	4.74	2.27	0.17
						2" Ice	5.96	3.20	0.34
						4" Ice			
(2) RRUS A2 MODULE	C	From Leg	4.00	23.0000	195.00	No Ice	1.87	1.02	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2"	2.05	1.17	0.03
			0.00			Ice	2.24	1.32	0.05
						1" Ice	2.66	1.66	0.09
						2" Ice	3.58	2.44	0.21
						4" Ice			
RRUS E2 B29	C	From Leg	4.00	23.0000	195.00	No Ice	3.67	1.49	0.06
			0.00			1/2"	3.93	1.67	0.08
			0.00			Ice	4.19	1.87	0.11
						1" Ice	4.75	2.28	0.17
						2" Ice	5.96	3.21	0.35
						4" Ice			
RRUS-11 800MHz	C	From Leg	4.00	23.0000	195.00	No Ice	2.94	1.52	0.05
			0.00			1/2"	3.17	1.69	0.08
			0.00			Ice	3.41	1.88	0.10
						1" Ice	3.91	2.27	0.16
						2" Ice	5.02	3.16	0.32
						4" Ice			
WCS RRUS-32-B30	C	From Leg	4.00	23.0000	195.00	No Ice	3.87	2.76	0.08
			0.00			1/2"	4.15	3.02	0.10
			0.00			Ice	4.44	3.29	0.14
						1" Ice	5.06	3.85	0.21
						2" Ice	6.38	5.08	0.41
						4" Ice			
DC6-48-60-18-8F	C	From Leg	4.00	23.0000	195.00	No Ice	2.57	2.57	0.03
			0.00			1/2"	2.80	2.80	0.06
			0.00			Ice	3.04	3.04	0.08
						1" Ice	3.54	3.54	0.14
						2" Ice	4.66	4.66	0.31
						4" Ice			
MTC3607R	C	None		0.0000	195.00	No Ice	30.10	30.10	1.59
						1/2"	40.80	40.80	2.03
						Ice	51.50	51.50	2.47
						1" Ice	72.90	72.90	3.35
						2" Ice	115.70	115.70	5.11
						4" Ice			
**									
APXV18-206517S-C w/ Mount Pipe	A	From Leg	4.00	23.0000	185.00	No Ice	5.40	4.70	0.05
			0.00			1/2"	5.96	5.86	0.10
			2.00			Ice	6.48	6.73	0.15
						1" Ice	7.55	8.51	0.28
						2" Ice	9.92	12.28	0.68
						4" Ice			
APXV18-206517S-C w/ Mount Pipe	B	From Leg	4.00	23.0000	185.00	No Ice	5.40	4.70	0.05
			0.00			1/2"	5.96	5.86	0.10
			2.00			Ice	6.48	6.73	0.15
						1" Ice	7.55	8.51	0.28
						2" Ice	9.92	12.28	0.68
						4" Ice			
APXV18-206517S-C w/ Mount Pipe	C	From Leg	4.00	23.0000	185.00	No Ice	5.40	4.70	0.05
			0.00			1/2"	5.96	5.86	0.10
			2.00			Ice	6.48	6.73	0.15
						1" Ice	7.55	8.51	0.28
						2" Ice	9.92	12.28	0.68
						4" Ice			
Transition Ladder	C	From Leg	2.00	0.0000	185.00	No Ice	6.00	6.00	0.16
			0.00			1/2"	8.00	8.00	0.24
			-4.00			Ice	10.00	10.00	0.32
						1" Ice	14.00	14.00	0.48
						2" Ice	22.00	22.00	0.80
						4" Ice			
Platform Mount [LP 712-1]	C	None		0.0000	185.00	No Ice	24.53	24.53	1.34
						1/2"	29.94	29.94	1.65
						Ice	35.35	35.35	1.96
						1" Ice	46.17	46.17	2.58
						2" Ice	67.81	67.81	3.82

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			
**									
TME-1900MHz RRH (65MHz)	A	From Leg	1.00 0.00 -3.00	20.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.70 2.94 3.18 3.70 4.85	2.77 3.01 3.26 3.78 4.93	0.06 0.08 0.11 0.18 0.35
TME-800MHZ RRH	A	From Leg	1.00 0.00 1.00	20.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
TME-1900MHz RRH (65MHz)	B	From Leg	1.00 0.00 -3.00	10.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.70 2.94 3.18 3.70 4.85	2.77 3.01 3.26 3.78 4.93	0.06 0.08 0.11 0.18 0.35
TME-800MHZ RRH	B	From Leg	1.00 0.00 1.00	10.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
TME-1900MHz RRH (65MHz)	C	From Leg	1.00 0.00 -3.00	20.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.70 2.94 3.18 3.70 4.85	2.77 3.01 3.26 3.78 4.93	0.06 0.08 0.11 0.18 0.35
TME-800MHZ RRH	C	From Leg	1.00 0.00 1.00	20.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
6' x 2" Mount Pipe	A	From Leg	1.00 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
6' x 2" Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
6' x 2" Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
Side Arm Mount [SO 102-3]	C	None		0.0000	176.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.00 3.48 3.96 4.92 6.84	3.00 3.48 3.96 4.92 6.84	0.08 0.11 0.14 0.20 0.32
**									
800 EXTERNAL NOTCH FILTER	A	From Leg	4.00 0.00	40.0000	175.00	No Ice 1/2"	0.77 0.89	0.37 0.46	0.01 0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	1.02	0.56	0.02
						1" Ice	1.30	0.79	0.04
						2" Ice	1.97	1.34	0.11
						4" Ice			
(3) ACU-A20-N	A	From Leg	4.00	40.0000	175.00	No Ice	0.08	0.14	0.00
			0.00			1/2"	0.12	0.19	0.00
			0.00			Ice	0.17	0.25	0.00
						1" Ice	0.30	0.40	0.01
						2" Ice	0.67	0.80	0.04
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00	40.0000	175.00	No Ice	8.50	6.95	0.08
			0.00			1/2"	9.15	8.13	0.15
			0.00			Ice	9.77	9.02	0.23
						1" Ice	11.03	10.84	0.41
						2" Ice	13.68	14.85	0.91
						4" Ice			
TD-RRH8x20-25	A	From Leg	4.00	40.0000	175.00	No Ice	4.72	1.70	0.07
			0.00			1/2"	5.01	1.92	0.10
			0.00			Ice	5.32	2.15	0.13
						1" Ice	5.95	2.62	0.20
						2" Ice	7.31	3.68	0.40
						4" Ice			
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00	40.0000	175.00	No Ice	7.13	4.96	0.08
			0.00			1/2"	7.66	5.75	0.13
			0.00			Ice	8.18	6.47	0.19
						1" Ice	9.26	8.01	0.34
						2" Ice	11.53	11.41	0.75
						4" Ice			
800 EXTERNAL NOTCH FILTER	B	From Leg	4.00	30.0000	175.00	No Ice	0.77	0.37	0.01
			0.00			1/2"	0.89	0.46	0.02
			0.00			Ice	1.02	0.56	0.02
						1" Ice	1.30	0.79	0.04
						2" Ice	1.97	1.34	0.11
						4" Ice			
(3) ACU-A20-N	B	From Leg	4.00	30.0000	175.00	No Ice	0.08	0.14	0.00
			0.00			1/2"	0.12	0.19	0.00
			0.00			Ice	0.17	0.25	0.00
						1" Ice	0.30	0.40	0.01
						2" Ice	0.67	0.80	0.04
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00	30.0000	175.00	No Ice	8.50	6.95	0.08
			0.00			1/2"	9.15	8.13	0.15
			0.00			Ice	9.77	9.02	0.23
						1" Ice	11.03	10.84	0.41
						2" Ice	13.68	14.85	0.91
						4" Ice			
TD-RRH8x20-25	B	From Leg	4.00	30.0000	175.00	No Ice	4.72	1.70	0.07
			0.00			1/2"	5.01	1.92	0.10
			0.00			Ice	5.32	2.15	0.13
						1" Ice	5.95	2.62	0.20
						2" Ice	7.31	3.68	0.40
						4" Ice			
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00	30.0000	175.00	No Ice	7.13	4.96	0.08
			0.00			1/2"	7.66	5.75	0.13
			0.00			Ice	8.18	6.47	0.19
						1" Ice	9.26	8.01	0.34
						2" Ice	11.53	11.41	0.75
						4" Ice			
800 EXTERNAL NOTCH FILTER	C	From Leg	4.00	0.0000	175.00	No Ice	0.77	0.37	0.01
			0.00			1/2"	0.89	0.46	0.02
			0.00			Ice	1.02	0.56	0.02
						1" Ice	1.30	0.79	0.04
						2" Ice	1.97	1.34	0.11
						4" Ice			
(3) ACU-A20-N	C	From Leg	4.00	0.0000	175.00	No Ice	0.08	0.14	0.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 0.00			1/2" Ice	0.12 0.17	0.19 0.25	0.00 0.00
						1" Ice	0.30	0.40	0.01
						2" Ice	0.67	0.80	0.04
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
TD-RRH8x20-25	C	From Leg	4.00 0.00 0.00	0.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	0.07 0.10 0.13 0.20 0.40
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
6' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
6' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
6' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
Platform Mount [LP 1201-1]	C	None		0.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	23.10 26.80 30.50 37.90 52.70	23.10 26.80 30.50 37.90 52.70	2.10 2.50 2.90 3.70 5.30
**									
Honeywill Side-Light	A	From Leg	2.00 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.28 0.36 0.46 0.69 1.27	0.28 0.36 0.46 0.69 1.27	0.00 0.01 0.01 0.03 0.08
Honeywill Side-Light	B	From Leg	2.00 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.28 0.36 0.46 0.69 1.27	0.28 0.36 0.46 0.69 1.27	0.00 0.01 0.01 0.03 0.08
**									
GPS_A	A	From Leg	2.00 0.00 1.00	0.0000	72.00	No Ice 1/2" Ice 1" Ice	0.30 0.37 0.46 0.65	0.30 0.37 0.46 0.65	0.00 0.00 0.01 0.02

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	1.15	1.15	0.08
						4" Ice			
Side Arm Mount [SO 701-3]	A	From Leg	1.00 0.00 0.00	0.0000	72.00	No Ice	2.83	2.83	0.20
						1/2" Ice	3.92	3.92	0.24
						1" Ice	5.01	5.01	0.28
						2" Ice	7.19	7.19	0.36
						4" Ice	11.55	11.55	0.53
**									

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	226 - 197.961	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-10.74	2.15	-1.24
			Max. Mx	11	-4.67	218.34	-0.55
			Max. My	8	-4.67	0.96	-217.87
			Max. Vy	11	-12.53	218.34	-0.55
			Max. Vx	8	12.53	0.96	-217.87
			Max. Torque	13			2.62
L2	197.961 - 162.932	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-34.53	4.51	-2.60
			Max. Mx	11	-17.37	1077.43	-2.40
			Max. My	8	-17.36	3.04	-1077.06
			Max. Vy	11	-34.96	1077.43	-2.40
			Max. Vx	8	35.01	3.04	-1077.06
			Max. Torque	13			3.66
L3	162.932 - 132	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-46.67	7.09	-4.08
			Max. Mx	11	-26.99	2415.93	-9.17
			Max. My	8	-26.98	10.08	-2417.41
			Max. Vy	11	-39.21	2415.93	-9.17
			Max. Vx	8	39.27	10.08	-2417.41
			Max. Torque	2			3.37
L4	132 - 120.305	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-48.79	7.52	-4.32
			Max. Mx	11	-28.75	2625.65	-10.17
			Max. My	8	-28.75	11.13	-2627.38
			Max. Vy	5	39.89	-2620.86	7.45
			Max. Vx	8	39.95	11.13	-2627.38
			Max. Torque	2			3.38
L5	120.305 - 79.2108	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-66.92	10.96	-6.30
			Max. Mx	11	-43.71	4320.43	-17.74
			Max. My	8	-43.70	19.02	-4324.17
			Max. Vy	11	-44.84	4320.43	-17.74
			Max. Vx	8	44.90	19.02	-4324.17
			Max. Torque	2			3.43
L6	79.2108 - 39.1405	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-89.07	14.56	-7.44
			Max. Mx	11	-62.44	6161.58	-24.48
			Max. My	8	-62.44	26.73	-6166.55
			Max. Vy	11	-49.47	6161.58	-24.48
			Max. Vx	8	49.53	26.73	-6166.55
			Max. Torque	2			3.53
L7	39.1405 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-118.97	18.43	-9.68
			Max. Mx	11	-88.51	8643.58	-33.36
			Max. My	8	-88.51	35.96	-8650.87
			Max. Vy	11	-54.01	8643.58	-33.36
			Max. Vx	8	54.06	35.96	-8650.87
			Max. Torque	2			3.63

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	23	118.97	11.23	-6.50
	Max. H_x	11	88.53	53.97	-0.17
	Max. H_z	2	88.53	-0.17	54.02
	Max. M_x	2	8646.97	-0.17	54.02

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. M_z	5	8634.42	-53.97	0.17
	Max. Torsion	2	3.63	-0.17	54.02
	Min. Vert	1	88.53	0.00	0.00
	Min. H_x	5	88.53	-53.97	0.17
	Min. H_z	8	88.53	0.17	-54.02
	Min. M_x	8	-8650.87	0.17	-54.02
	Min. M_z	11	-8643.58	53.97	-0.17
	Min. Torsion	8	-3.62	0.17	-54.02

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	88.53	0.00	0.00	1.88	4.41	0.00
Dead+Wind 0 deg - No Ice	88.53	0.17	-54.02	-8646.97	-26.85	-3.63
Dead+Wind 30 deg - No Ice	88.53	27.13	-46.87	-7503.86	-4342.09	-2.97
Dead+Wind 60 deg - No Ice	88.53	46.82	-27.16	-4349.66	-7492.66	-1.52
Dead+Wind 90 deg - No Ice	88.53	53.97	-0.17	-29.45	-8634.42	0.34
Dead+Wind 120 deg - No Ice	88.53	46.65	26.86	4299.28	-7461.41	2.10
Dead+Wind 150 deg - No Ice	88.53	26.83	46.70	7476.52	-4287.78	3.30
Dead+Wind 180 deg - No Ice	88.53	-0.17	54.02	8650.87	35.96	3.62
Dead+Wind 210 deg - No Ice	88.53	-27.13	46.87	7507.77	4351.20	2.97
Dead+Wind 240 deg - No Ice	88.53	-46.82	27.16	4353.59	7501.78	1.53
Dead+Wind 270 deg - No Ice	88.53	-53.97	0.17	33.36	8643.58	-0.33
Dead+Wind 300 deg - No Ice	88.53	-46.65	-26.86	-4295.38	7470.55	-2.10
Dead+Wind 330 deg - No Ice	88.53	-26.83	-46.70	-7472.63	4296.91	-3.31
Dead+Ice+Temp	118.97	-0.00	0.00	9.68	18.43	0.00
Dead+Wind 0 deg+Ice+Temp	118.97	0.03	-12.95	-2185.16	13.25	-1.20
Dead+Wind 30 deg+Ice+Temp	118.97	6.50	-11.23	-1893.82	-1082.67	-0.88
Dead+Wind 60 deg+Ice+Temp	118.97	11.23	-6.50	-1092.40	-1883.48	-0.32
Dead+Wind 90 deg+Ice+Temp	118.97	12.95	-0.03	4.36	-2174.60	0.33
Dead+Wind 120 deg+Ice+Temp	118.97	11.20	6.45	1102.59	-1878.02	0.88
Dead+Wind 150 deg+Ice+Temp	118.97	6.45	11.20	1908.01	-1073.21	1.21
Dead+Wind 180 deg+Ice+Temp	118.97	-0.03	12.95	2204.81	24.18	1.20
Dead+Wind 210 deg+Ice+Temp	118.97	-6.50	11.23	1913.47	1120.10	0.88
Dead+Wind 240 deg+Ice+Temp	118.97	-11.23	6.50	1112.05	1920.90	0.32
Dead+Wind 270 deg+Ice+Temp	118.97	-12.95	0.03	15.29	2212.02	-0.33
Dead+Wind 300 deg+Ice+Temp	118.97	-11.20	-6.45	-1082.94	1915.44	-0.88
Dead+Wind 330 deg+Ice+Temp	118.97	-6.45	-11.20	-1888.36	1110.64	-1.21
Dead+Wind 0 deg - Service	88.53	0.06	-18.69	-2995.85	-6.28	-1.27
Dead+Wind 30 deg - Service	88.53	9.39	-16.22	-2599.67	-1502.01	-1.04
Dead+Wind 60 deg - Service	88.53	16.20	-9.40	-1506.37	-2594.05	-0.53
Dead+Wind 90 deg - Service	88.53	18.67	-0.06	-8.91	-2989.77	0.12
Dead+Wind 120 deg - Service	88.53	16.14	9.29	1491.46	-2583.17	0.74
Dead+Wind 150 deg - Service	88.53	9.28	16.16	2592.73	-1483.17	1.16
Dead+Wind 180 deg - Service	88.53	-0.06	18.69	2999.79	15.49	1.27
Dead+Wind 210 deg - Service	88.53	-9.39	16.22	2603.61	1511.22	1.04
Dead+Wind 240 deg -	88.53	-16.20	9.40	1510.31	2603.26	0.53

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
Service						
Dead+Wind 270 deg - Service	88.53	-18.67	0.06	12.85	2998.98	-0.12
Dead+Wind 300 deg - Service	88.53	-16.14	-9.29	-1487.52	2592.38	-0.74
Dead+Wind 330 deg - Service	88.53	-9.28	-16.16	-2588.79	1492.37	-1.16

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-88.53	0.00	0.00	88.53	0.00	0.000%
2	0.17	-88.53	-54.02	-0.17	88.53	54.02	0.000%
3	27.13	-88.53	-46.87	-27.13	88.53	46.87	0.000%
4	46.82	-88.53	-27.16	-46.82	88.53	27.16	0.000%
5	53.97	-88.53	-0.17	-53.97	88.53	0.17	0.000%
6	46.65	-88.53	26.86	-46.65	88.53	-26.86	0.000%
7	26.83	-88.53	46.70	-26.83	88.53	-46.70	0.000%
8	-0.17	-88.53	54.02	0.17	88.53	-54.02	0.000%
9	-27.13	-88.53	46.87	27.13	88.53	-46.87	0.000%
10	-46.82	-88.53	27.16	46.82	88.53	-27.16	0.000%
11	-53.97	-88.53	0.17	53.97	88.53	-0.17	0.000%
12	-46.65	-88.53	-26.86	46.65	88.53	26.86	0.000%
13	-26.83	-88.53	-46.70	26.83	88.53	46.70	0.000%
14	0.00	-118.97	0.00	0.00	118.97	-0.00	0.000%
15	0.03	-118.97	-12.95	-0.03	118.97	12.95	0.000%
16	6.50	-118.97	-11.23	-6.50	118.97	11.23	0.000%
17	11.23	-118.97	-6.50	-11.23	118.97	6.50	0.000%
18	12.95	-118.97	-0.03	-12.95	118.97	0.03	0.000%
19	11.20	-118.97	6.45	-11.20	118.97	-6.45	0.000%
20	6.45	-118.97	11.20	-6.45	118.97	-11.20	0.000%
21	-0.03	-118.97	12.95	0.03	118.97	-12.95	0.000%
22	-6.50	-118.97	11.23	6.50	118.97	-11.23	0.000%
23	-11.23	-118.97	6.50	11.23	118.97	-6.50	0.000%
24	-12.95	-118.97	0.03	12.95	118.97	-0.03	0.000%
25	-11.20	-118.97	-6.45	11.20	118.97	6.45	0.000%
26	-6.45	-118.97	-11.20	6.45	118.97	11.20	0.000%
27	0.06	-88.53	-18.69	-0.06	88.53	18.69	0.000%
28	9.39	-88.53	-16.22	-9.39	88.53	16.22	0.000%
29	16.20	-88.53	-9.40	-16.20	88.53	9.40	0.000%
30	18.67	-88.53	-0.06	-18.67	88.53	0.06	0.000%
31	16.14	-88.53	9.29	-16.14	88.53	-9.29	0.000%
32	9.28	-88.53	16.16	-9.28	88.53	-16.16	0.000%
33	-0.06	-88.53	18.69	0.06	88.53	-18.69	0.000%
34	-9.39	-88.53	16.22	9.39	88.53	-16.22	0.000%
35	-16.20	-88.53	9.40	16.20	88.53	-9.40	0.000%
36	-18.67	-88.53	0.06	18.67	88.53	-0.06	0.000%
37	-16.14	-88.53	-9.29	16.14	88.53	9.29	0.000%
38	-9.28	-88.53	-16.16	9.28	88.53	16.16	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00009873
3	Yes	6	0.00000001	0.00013092
4	Yes	6	0.00000001	0.00013447
5	Yes	4	0.00000001	0.00064452
6	Yes	6	0.00000001	0.00013423

7	Yes	6	0.00000001	0.00012894
8	Yes	5	0.00000001	0.00015478
9	Yes	6	0.00000001	0.00013632
10	Yes	6	0.00000001	0.00013265
11	Yes	5	0.00000001	0.00005946
12	Yes	6	0.00000001	0.00012999
13	Yes	6	0.00000001	0.00013540
14	Yes	4	0.00000001	0.00008965
15	Yes	5	0.00000001	0.00061847
16	Yes	5	0.00000001	0.00083135
17	Yes	5	0.00000001	0.00083790
18	Yes	5	0.00000001	0.00061324
19	Yes	5	0.00000001	0.00084874
20	Yes	5	0.00000001	0.00083311
21	Yes	5	0.00000001	0.00062580
22	Yes	5	0.00000001	0.00087391
23	Yes	5	0.00000001	0.00086565
24	Yes	5	0.00000001	0.00062597
25	Yes	5	0.00000001	0.00084319
26	Yes	5	0.00000001	0.00086038
27	Yes	4	0.00000001	0.00050486
28	Yes	5	0.00000001	0.00023179
29	Yes	5	0.00000001	0.00024392
30	Yes	4	0.00000001	0.00025166
31	Yes	5	0.00000001	0.00024440
32	Yes	5	0.00000001	0.00022604
33	Yes	4	0.00000001	0.00057353
34	Yes	5	0.00000001	0.00025299
35	Yes	5	0.00000001	0.00023981
36	Yes	4	0.00000001	0.00028080
37	Yes	5	0.00000001	0.00023006
38	Yes	5	0.00000001	0.00024944

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	226 - 197.961	60.162	34	2.5917	0.0103
L2	202.042 - 162.932	47.596	34	2.3757	0.0053
L3	168.07 - 132	31.881	34	1.9827	0.0028
L4	132 - 120.305	18.797	34	1.4414	0.0014
L5	126.698 - 79.2108	17.233	34	1.3751	0.0013
L6	86.7941 - 39.1405	7.773	34	0.8562	0.0006
L7	47.8645 - 0	2.362	34	0.4460	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
228.00	(2) LPA-80080/6CF w/ Mount Pipe	34	60.162	2.5917	0.0103	24109
226.00	Flash Beacon Lighting	34	60.162	2.5917	0.0103	24109
205.00	RR65-18-02DP w/ Mount Pipe	34	49.102	2.4038	0.0058	5753
195.00	DTMABP7819VG12A	34	44.097	2.3060	0.0044	4862
185.00	APXV18-206517S-C w/ Mount Pipe	34	39.340	2.1983	0.0036	4642
176.00	TME-1900MHz RRH (65MHz)	34	35.278	2.0897	0.0031	4460
175.00	800 EXTERNAL NOTCH FILTER	34	34.840	2.0769	0.0031	4441
113.00	Honeywill Side-Light	34	13.536	1.1976	0.0010	4775

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
72.00	GPS_A	34	5.270	0.6878	0.0005	4815

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	226 - 197.961	172.626	9	7.4339	0.0296
L2	202.042 - 162.932	136.693	9	6.8246	0.0155
L3	168.07 - 132	91.665	9	5.7018	0.0080
L4	132 - 120.305	54.099	9	4.1486	0.0040
L5	126.698 - 79.2108	49.604	9	3.9581	0.0037
L6	86.7941 - 39.1405	22.391	9	2.4661	0.0018
L7	47.8645 - 0	6.806	9	1.2851	0.0008

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
228.00	(2) LPA-80080/6CF w/ Mount Pipe	9	172.626	7.4339	0.0296	8733
226.00	Flash Beacon Lighting	9	172.626	7.4339	0.0296	8733
205.00	RR65-18-02DP w/ Mount Pipe	9	141.000	6.9042	0.0169	2080
195.00	DTMABP7819VG12A	9	126.677	6.6267	0.0129	1751
185.00	APXV18-206517S-C w/ Mount Pipe	9	113.050	6.3193	0.0105	1663
176.00	TME-1900MHz RRH (65MHz)	9	101.409	6.0086	0.0090	1591
175.00	800 EXTERNAL NOTCH FILTER	9	100.154	5.9717	0.0089	1583
113.00	Honeywill Side-Light	9	38.973	3.4481	0.0029	1674
72.00	GPS_A	9	15.185	1.9816	0.0014	1678

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	226 - 197.961 (1)	TP28.6437x21.5x0.1875	28.04	0.00	0.0	39.000	16.3163	-4.66	636.33	0.007
L2	197.961 - 162.932 (2)	TP37.108x27.229x0.375	39.11	0.00	0.0	39.000	42.1767	-17.34	1644.89	0.011
L3	162.932 - 132 (3)	TP44.1835x35.0602x0.4375	36.07	0.00	0.0	39.000	60.7467	-26.97	2369.12	0.011
L4	132 - 120.305 (4)	TP47.1416x44.1835x0.5755	11.70	0.00	0.0	31.461	82.1021	-28.73	2583.04	0.011
L5	120.305 - 79.2108 (5)	TP56.6581x44.6496x0.5	47.49	0.00	0.0	39.000	86.0796	-43.69	3357.10	0.013
L6	79.2108 - 39.1405 (6)	TP65.7875x53.7404x0.5625	47.65	0.00	0.0	39.000	112.5130	-62.43	4388.03	0.014

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 $\frac{P}{P_a}$
L7	39.1405 - 0 (7)	TP74.5x62.457x0.5625	47.86	0.00	0.0	39.000	114.4240	-69.71	4462.53	0.016

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	226 - 197.961 (1)	TP28.6437x21.5x0.1875	218.54	23.733	39.000	0.609	0.00	0.000	39.000	0.000
L2	197.961 - 162.932 (2)	TP37.108x27.229x0.375	1078.97	35.203	39.000	0.903	0.00	0.000	39.000	0.000
L3	162.932 - 132 (3)	TP44.1835x35.0602x0.4375	2424.51	44.462	39.000	1.140	0.00	0.000	39.000	0.000
L4	132 - 120.305 (4)	TP47.1416x44.1835x0.5755	2635.28	34.897	31.461	1.109	0.00	0.000	31.461	0.000
L5	120.305 - 79.2108 (5)	TP56.6581x44.6496x0.5	4337.98	45.244	39.000	1.160	0.00	0.000	39.000	0.000
L6	79.2108 - 39.1405 (6)	TP65.7875x53.7404x0.5625	6186.24	42.473	39.000	1.089	0.00	0.000	39.000	0.000
L7	39.1405 - 0 (7)	TP74.5x62.457x0.5625	6624.37	43.969	39.000	1.127	0.00	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	226 - 197.961 (1)	TP28.6437x21.5x0.1875	12.53	0.768	26.000	0.059	0.00	0.000	26.000	0.000
L2	197.961 - 162.932 (2)	TP37.108x27.229x0.375	35.13	0.833	26.000	0.064	1.14	0.018	26.000	0.001
L3	162.932 - 132 (3)	TP44.1835x35.0602x0.4375	39.41	0.649	26.000	0.050	2.60	0.023	26.000	0.001
L4	132 - 120.305 (4)	TP47.1416x44.1835x0.5755	40.09	0.488	20.974	0.047	2.61	0.017	20.974	0.001
L5	120.305 - 79.2108 (5)	TP56.6581x44.6496x0.5	45.04	0.523	26.000	0.040	2.64	0.013	26.000	0.001
L6	79.2108 - 39.1405 (6)	TP65.7875x53.7404x0.5625	49.67	0.441	26.000	0.034	2.92	0.010	26.000	0.000
L7	39.1405 - 0 (7)	TP74.5x62.457x0.5625	50.97	0.445	26.000	0.034	2.93	0.009	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	226 - 197.961 (1)	0.007	0.609	0.000	0.059	0.000	0.617 ✔	1.333	H1-3+VT ✔
L2	197.961 - 162.932 (2)	0.011	0.903	0.000	0.064	0.001	0.914 ✔	1.333	H1-3+VT ✔
L3	162.932 - 132 (3)	0.011	1.140	0.000	0.050	0.001	1.152 ✔	1.333	H1-3+VT ✔

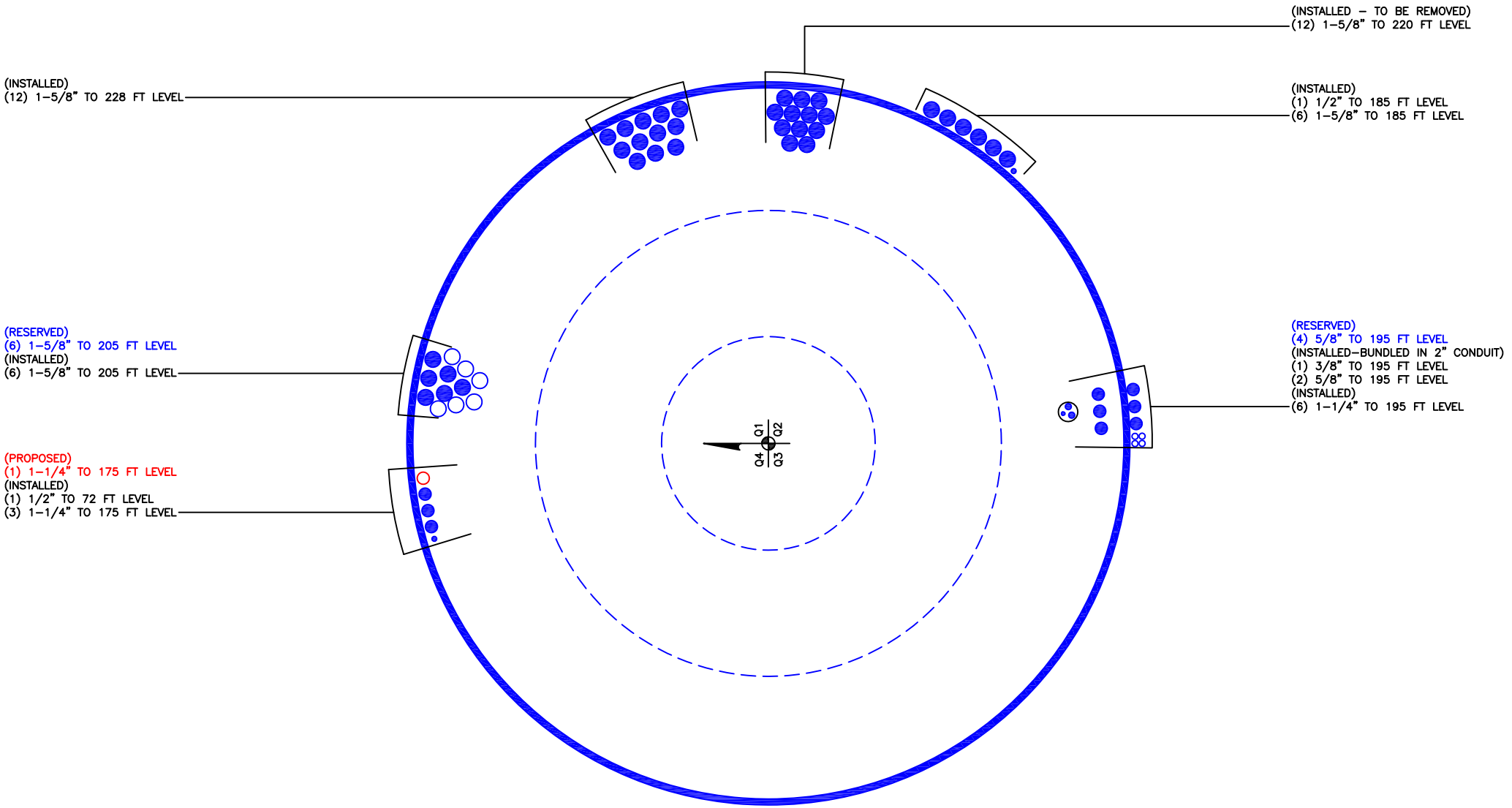
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L4	132 - 120.305 (4)	0.011	1.109	0.000	0.047	0.001	1.121 ✔	1.333	H1-3+VT ✔
L5	120.305 - 79.2108 (5)	0.013	1.160	0.000	0.040	0.001	1.174 ✔	1.333	H1-3+VT ✔
L6	79.2108 - 39.1405 (6)	0.014	1.089	0.000	0.034	0.000	1.104 ✔	1.333	H1-3+VT ✔
L7	39.1405 - 0 (7)	0.016	1.127	0.000	0.034	0.000	1.143 ✔	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	226 - 197.961	Pole	TP28.6437x21.5x0.1875	1	-4.66	848.23	46.3	Pass
L2	197.961 - 162.932	Pole	TP37.108x27.229x0.375	2	-17.34	2192.64	68.6	Pass
L3	162.932 - 132	Pole	TP44.1835x35.0602x0.4375	3	-26.97	3158.04	86.4	Pass
L4	132 - 120.305	Pole	TP47.1416x44.1835x0.5755	4	-28.73	3443.19	84.1	Pass
L5	120.305 - 79.2108	Pole	TP56.6581x44.6496x0.5	5	-43.69	4475.01	88.0	Pass
L6	79.2108 - 39.1405	Pole	TP65.7875x53.7404x0.5625	6	-62.43	5849.24	82.8	Pass
L7	39.1405 - 0	Pole	TP74.5x62.457x0.5625	7	-69.71	5948.55	85.8	Pass
							Summary	
						Pole (L5)	88.0	Pass
						RATING =	**88.0**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(INSTALLED – TO BE REMOVED)
(12) 1–5/8" TO 220 FT LEVEL
(INSTALLED)
(12) 1–5/8" TO 228 FT LEVEL
(INSTALLED)
(1) 1/2" TO 185 FT LEVEL
(6) 1–5/8" TO 185 FT LEVEL
(RESERVED)
(6) 1–5/8" TO 205 FT LEVEL
(INSTALLED)
(6) 1–5/8" TO 205 FT LEVEL
(RESERVED)
(4) 5/8" TO 195 FT LEVEL
(INSTALLED–BUNDLED IN 2" CONDUIT)
(1) 3/8" TO 195 FT LEVEL
(2) 5/8" TO 195 FT LEVEL
(INSTALLED)
(6) 1–1/4" TO 195 FT LEVEL
(PROPOSED)
(1) 1–1/4" TO 175 FT LEVEL
(INSTALLED)
(1) 1/2" TO 72 FT LEVEL
(3) 1–1/4" TO 175 FT LEVEL
Q1
Q2
Q3
Q4

APPENDIX C

ADDITIONAL CALCULATIONS

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

TIA Rev F

Site Data

BU#: *806358*
Site Name: *NHV 109 943107*
App #: *246084 R0*

Pole Manufacturer:	*Other*

Reactions		
Moment:	8677.5341	ft-kips
Axial:	88.5065	kips
Shear:	54.199876	kips

Anchor Rod Data		
Qty:	28	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	84	in

Plate Data		
Diam:	90	in
Thick:	2.5	in
Grade:	60	ksi
Single-Rod B-eff:	8.44	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Both	
Groove Depth:	0.5	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.5	in
Fillet V. Weld:	0.5	in
Width:	6	in
Height:	18	in
Thick:	1	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	74.5	in
Thick:	0.5625	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	

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

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	173.9 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	89.2% **Pass**	

Base Plate Results

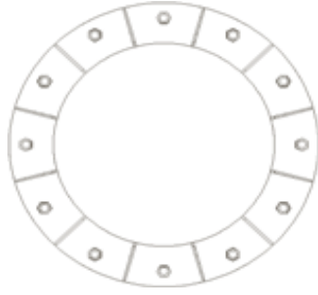
	Flexural Check	Stiffened
Base Plate Stress:	35.5 ksi	Service, ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	59.2% **Pass**	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	54.7% **Pass**
Vertical Weld:	35.3% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	13.6% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	55.1% **Pass**
Plate Comp. (AISC Bracket):	56.1% **Pass**

Pole Results

Pole Punching Shear Check:	8.5% **Pass**



* 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

AeroSolutions LLC
Optimizing Your Tower Infrastructure

Site Number	806358
Site Name	NHV 109 943107

Caisson Analysis

Pier Properties		
Moment	8678	kip-ft
Shear	54	kip
Pier Diameter	9.0	ft
Height Above Grade	1.00	ft
Depth Below Grade	36.00	ft
Donut Diameter		ft
Donut Depth		ft

Analysis Properties		
TIA Code	F	
Soil Safety Factor	2.00	
Water Table Depth	99.0	ft
Ignored Soil Depth	4.5	ft
Cohesion Based on	PLS Caisson	
Max Soil Capacity	100%	

Soil Properties

Layer	Top of Soil Layer (ft)	Layer Thickness (ft)	Bottom of Soil Layer (ft)	Soil Unit Weight (pcf)	Cohesion (psf)	Friction Angle (degrees)
Soil.Layer	*Soil.Top*	*Soil.Thick*	*Soil.Bottom*	*Soil.Weight*	*Soil.Cohesion*	*Soil.Phi*
1	0.00	4	4.00	100	0	28
2	4.00	5	9.00	110	0	35
3	9.00	5	14.00	120	0	40
4	14.00	5	19.00	125	0	40
5	19.00	20	39.00	130	0	40
6						
7						
8						
9						
10						

Critical Depths Below Grade		
Rotation Axis	26.55	ft
Zero Shear	9.04	ft

Results		
Soil Capacity	33.9%	**OK**
Max Pier Moment	9114	kip-ft

Moment At User Defined Depths Below Grade			
	kip-ft		kip-ft
	kip-ft		kip-ft

V1.0

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: *806358*
Site Name: *NHV 109 943107*
App #: *246084 R0*

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	9113.581	ft-kips **(* Note)**
Max. Service Shaft P:	88.5065	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Enter Load Factors Below:		
For M (WL)	1.3	<---- Enter Factor
For P (DL)	1.3	<---- Enter Factor

Load Factor	Shaft Factored Loads		
1.30	Mu:	11847.66	ft-kips
1.30	Pu:	115.0585	kips

Pier Properties		
Concrete:		
Pier Diameter =	9.0	ft
Concrete Area =	9160.9	in^2
Reinforcement:		
Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	8.11	ft
Vert. Cage Diameter =	97.34	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	40	
As Total=	62.4	in^2
A s/ Aconc, Rho:	0.0068	0.68%

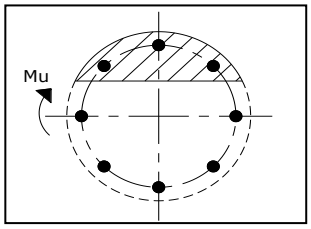
Material Properties		
Concrete Comp. strength, f'c =	4000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	
ACI 318 Code		
Select Analysis ACI Code=	2005	
Seismic Properties		
Seismic Design Category =	C	
Seismic Risk =	**Moderate**	

Solve (Run) <-- Press Upon Completing All Input

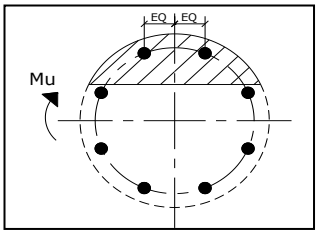
ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:
(3)*(Sqrt(f'c)/Fy: 0.0032
200 / Fy: 0.0033

Results:

Governing Orientation Case: **1**



Case 1



Case 2

Dist. From Edge to Neutral Axis: **16.42** in
Extreme Steel Strain, ϵt: **0.0158**
ϵt > 0.0050, Tension Controlled
Reduction Factor,φ: **0.900**

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.68%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	18033.00	kips
at Mu=(ϕ=0.65)Mn=	14169.12	ft-kips
Max Tu, (φ=0.9) Tn =	3369.6	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	115.06	kips
Drilled Shaft Moment Capacity, φMn:	**13071.59**	ft-kips
Drilled Shaft Superimposed Mu:	**11847.66**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**90.6%**

EBI Consulting
environmental | engineering | due diligence

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

Sprint Existing Facility

Site ID: CT54XC718

Middlebury - Crown

1432 Old Waterbury Road
Southbury, CT 06488

July 15, 2014

EBI Project Number: 62143790

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

EBI Consulting
environmental | engineering | due diligence

July 15, 2014

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

Re: Radio Frequency Maximum Permissible Exposure (MPE) Assessment for Site:
CT54XC718 - Middlebury - Crown

Site Total: 22.51% - MPE% in full compliance

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 1432 Old Waterbury Road, Southbury, 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 1432 Old Waterbury Road, Southbury, 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) mounting height centerline for the proposed antennas is **175 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	CT54XC718 - Middlebury - Crown
Site Addresss	1432 Old Waterbury Road, Southbury, CT, 06488
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	175	169	1/2 "	0.5	0	138.69	0.17%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	175	169	1/2 "	0.5	0	39.00	0.09%
1B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	175	169	1/2 "	0.5	0	138.69	0.31%
														Sector total Power Density Value:		0.57%

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	175	169	1/2 "	0.5	0	138.69	0.17%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	175	169	1/2 "	0.5	0	39.00	0.09%
2B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	175	169	1/2 "	0.5	0	138.69	0.31%
														Sector total Power Density Value:		0.57%

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	175	169	1/2 "	0.5	0	138.69	0.17%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	175	169	1/2 "	0.5	0	39.00	0.09%
3B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	175	169	1/2 "	0.5	0	138.69	0.31%
														Sector total Power Density Value:		0.57%

Site Composite MPE %	
Carrier	MPE %
Sprint	1.71%
AT&T	10.26%
MetroPCS	2.50%
T-Mobile	2.16%
Nextel	1.18%
Verizon Wireless	4.70%
Total Site MPE %	**22.51%**

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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 **1.71% (0.57% from sector 1, 0.57% from sector 2 and 0.57% 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 **22.51%** 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.

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