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

November 11, 2014

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

RE: **Sprint PCS-Exempt Modification – Crown Site BU: 876354**
Sprint PCS Site ID: CT03XC355
Located at: 515 Post Road East, Westport, CT 06880

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. Jim Marpe, First Selectman for the Town of Westport, and the Town of Westport, Property Owner.

Sprint plans to modify the existing wireless communications facility owned by Crown Castle and located at **515 Post Road East, Westport, CT 06880.** Attached are a compound plan and elevation depicting the planned changes (Exhibit-1), and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration (Exhibit-2). Also included is a power density table report reflecting the modification to Sprint's operations at the site (Exhibit-3).

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") § 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in the R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing tower. Sprint's additional antennas will be located at the same elevation on the existing tower.

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

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

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

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

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

Sincerely,

Susan Vale
Real Estate Specialist

Enclosures

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

cc: Mr. Jim Marpe, First Selectman
110 Myrtle Avenue, Room 310
Westport, CT 06880

cc: Town of Westport
110 Myrtle Avenue
Donald J. Miklus Controller
Westport, CT 06880

Sprint

2.5 EQUIPMENT DEPLOYMENT

SITE NUMBER:

CT03XC355

SITE NAME:

WESTPORT FIRE DEPARTMENT

SITE ADDRESS:

515 POST ROAD EAST
WESTPORT, CT 06880

CROWN ID#: 876354

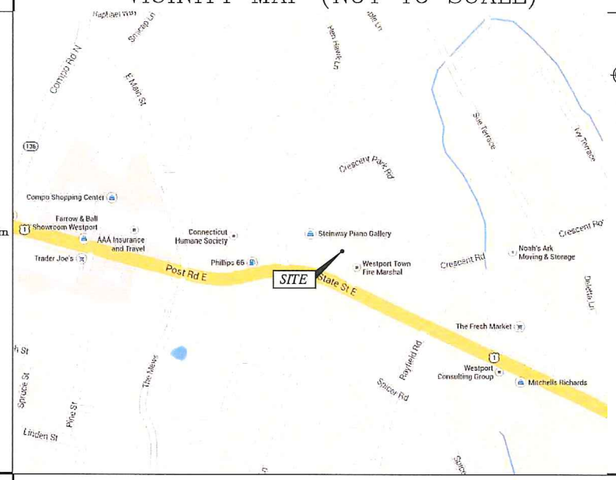
CROWN SITE NAME: WESTPORT FIRE DEPARTMENT

SHEET INFORMATION

SITE NUMBER:	CT03XC355
SITE NAME:	WESTPORT FIRE DEPARTMENT
SITE ADDRESS:	515 POST ROAD EAST WESTPORT, CT 06880
COUNTY:	FAIRFIELD
COORDINATES: (NAD 83)	41° 8' 24.26"N 73° 20' 51.61"W
GROUND ELEV:	31'± AMSL
STRUCTURE TYPE:	MONOPOLE
STRUCTURE HEIGHT:	148'-0"± AGL
STRUCTURE RAD CENTER:	148'-0"± AGL
ZONING CLASSIFICATION:	928
MAP-BLOCK-LOT:	E09-064-000

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 CONTACT:	MICHELLE HISERT (518) 844-5434 Michelle.Hisert@sprint.com
CROWN CM:	JASON D'AMICO (860) 209-0104 jason.d'amico@crowncastle.com
AAV:	AT&T

VICINITY MAP (NOT TO SCALE)



SHEET INDEX

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SP-2	GENERAL NOTES
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GENERAL NOTES

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

PROJECT DESCRIPTION

1. (1) NEW 2.5 EQUIPMENT RACK INSIDE EXIST MMBTS CABINET.
2. (3) NEW RFS APXVTM14-C-120 ANTENNAS.
3. (3) NEW TD-RRH8x20-25 RRH.
4. (1) NEW 5/8" FIBER CABLE.
5. (1) NEW HANDRAIL KIT COMMSCOPE P/N: MT-195-14.

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
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

CROWN CASTLE

TECTONIC
• PLANNING
• ENGINEERING
• SURVEYING
• CONSTRUCTION MANAGEMENT

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

SUBMITTALS

PROJECT NO: 7225.CT03XC355

NO	DATE	DESCRIPTION	BY
0	06/10/14	FOR COMMENT	JT
1	10/23/14	FOR CONSTRUCTION	MP
2	11/10/14	REVISED ADDRESS	MP

DATE	REVIEWED BY
11/10/14	EMG

STATE OF CONNECTICUT
EDWARD N. IAMICELI
28473
LICENSED PROFESSIONAL ENGINEER
11/10/14

SITE NUMBER:
CT03XC355

SITE NAME:
WESTPORT FIRE DEPARTMENT

SITE ADDRESS:
515 POST ROAD EAST
WESTPORT, CT 06880

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

1.04 QUALITY ASSURANCE

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

3.04 SURFACE FINISHES

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

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

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

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

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

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

3.05 PATCHING

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

3.06 DEFECTIVE CONCRETE

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

3.07 PROTECTION

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

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

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

DIVISION 05000 – METALS

PART 1 – GENERAL

1.01 WORK INCLUDED

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

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

1.02 REFERENCE STANDARDS

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

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

PART 2 – PRODUCTS

2.01 MATERIALS

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

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

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

2.02 WELDING

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

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

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

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

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

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

2.03 BOLTING

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

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

C. ALL CONNECTIONS SHALL BE 2 BOLTS MINIMUM.

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

E. STANDARD, OVERSIZED OR HORIZONTAL SHORT SLOTTED HOLES.

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

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

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

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

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

2.04 FABRICATION

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

2.05 FINISH

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

2.06 PROTECTION

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

PART 3 – ERECTION

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

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

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

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

CROWN CASTLE

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TECTONIC Engineering & Surveying Consultants P.C.
1279 Route 300
Newburgh, NY 12550
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SUBMITTALS

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STATE OF CONNECTICUT
EDWARD N. IAMICELI
28473
LICENSED
PROFESSIONAL ENGINEER
11/10/14

SITE NUMBER:
CT03XC355

SITE NAME:
WESTPORT FIRE DEPARTMENT

SITE ADDRESS:
515 POST ROAD EAST
WESTPORT, CT 06880

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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OVERLAND PARK, KANSAS 66251

CROWN CASTLE

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1279 Route 300
Newburgh, NY 12550
Phone: (845) 567–6656
Fax: (845) 567–8703
www.tectonicengineering.com

SUBMITTALS

PROJECT NO: 7225.CT03XC355

NO	DATE	DESCRIPTION	BY
0	06/10/14	FOR COMMENT	JT
1	10/23/14	FOR CONSTRUCTION	MP
2	11/10/14	REVISED ADDRESS	MP

DATE	REVIEWED BY
11/10/14	SMC

STATE OF CONNECTICUT
EDWARD N. IAMICELLI
28479
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC355

SITE NAME:
WESTPORT FIRE DEPARTMENT

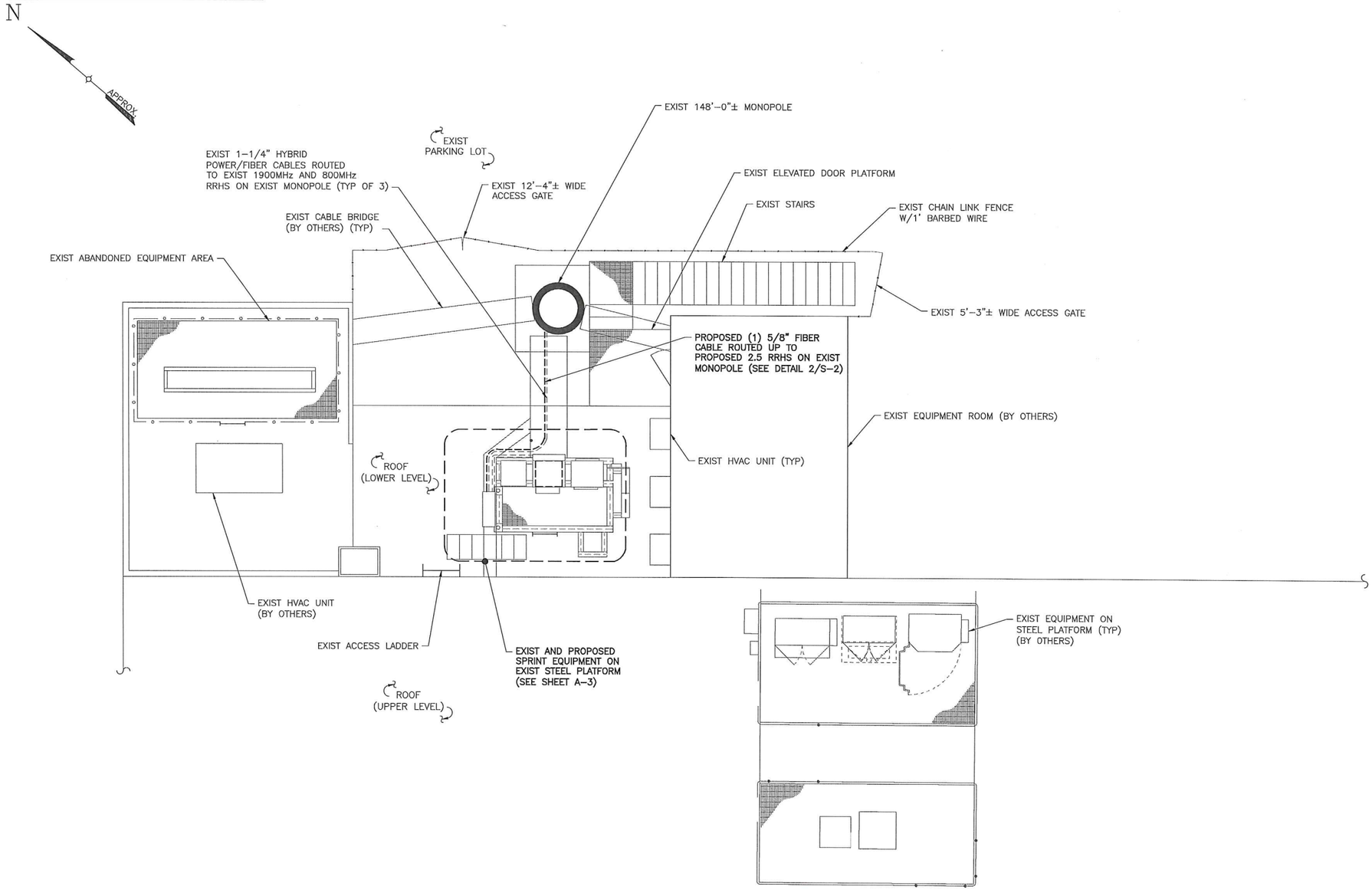
SITE ADDRESS:
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE:
GENERAL NOTES

SHEET NO:
SP–2

NORTH NOTE:

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



1 / A-1 SITE PLAN

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

Sprint

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11/10/14	JT

STATE OF CONNECTICUT
EDWARD M. IAMICELI
28473
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC355

SITE NAME:
WESTPORT FIRE DEPARTMENT

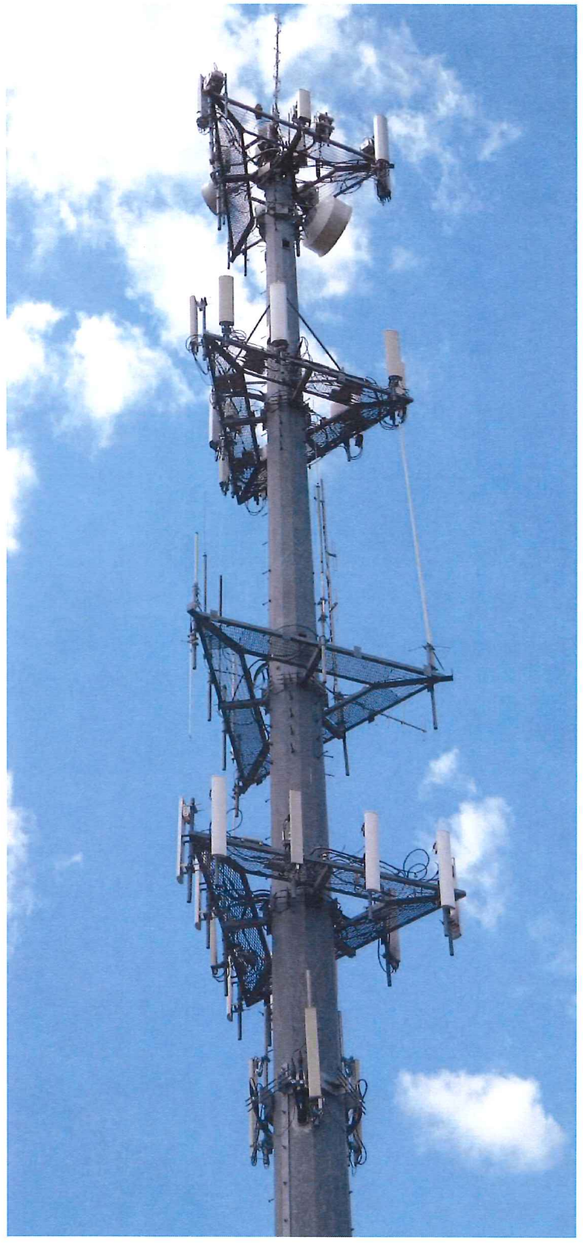
SITE ADDRESS:
515 POST ROAD EAST
WESTPORT, CT 06880

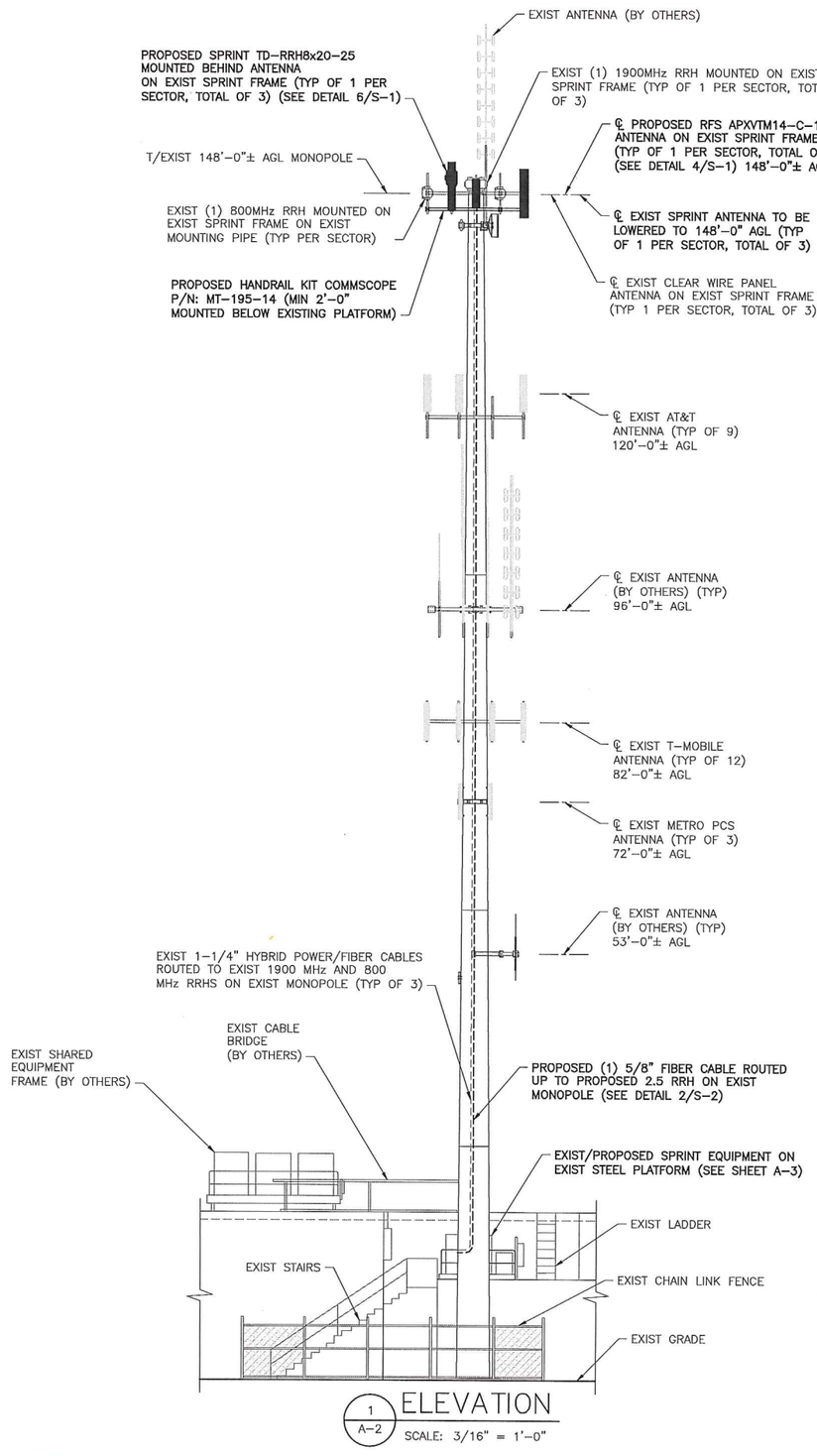
SHEET TITLE:
SITE PLAN

SHEET NO:
A-1

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

THE EXISTING MOUNT HAS BEEN ANALYZED BY TECTONIC ENGINEERING AND FOUND TO BE ADEQUATE TO SUPPORT THE PROPOSED SPRINT UPGRADE ONCE THE PROPOSED MODIFICATIONS HAVE BEEN COMPLETED AS DETAILED IN THE STRUCTURAL ANALYSIS EVALUATION LETTER DATED 10/23/14, REV 1.





1 A-2 ELEVATION

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

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11/10/14	JAV

STATE OF CONNECTICUT
EDWARD N. IANNICELLI
28473
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC355

SITE NAME:
WESTPORT FIRE DEPARTMENT

SITE ADDRESS:
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE:
ELEVATION

SHEET NO:
A-2

NORTH NOTE:

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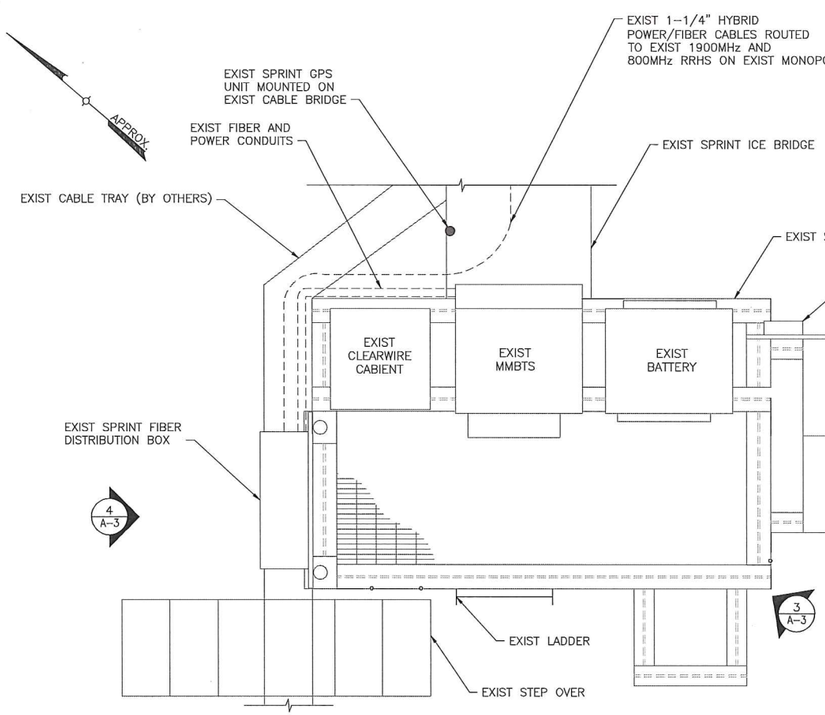
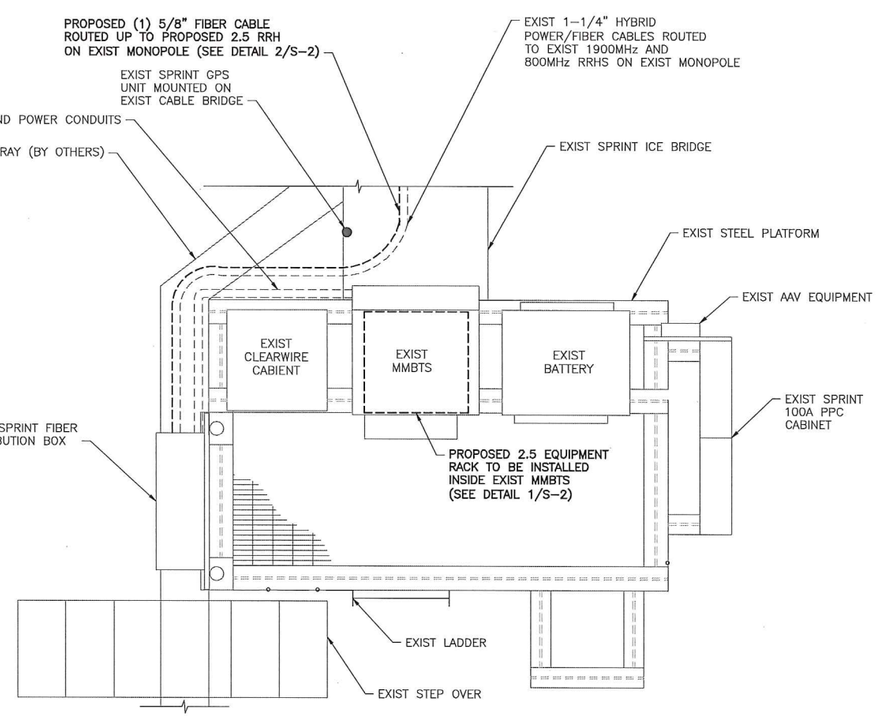


1 A-3 ENLARGED EQUIP. LAYOUT PLAN (EXIST)

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



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

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

3 A-3 EXIST EQUIP. PLATFORM

SCALE: NTS

4 A-3 EXIST FIBER DISTRIBUTION BOX

SCALE: NTS

Sprint

2.5 EQUIPMENT DEPLOYMENT
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STATE OF CONNECTICUT
EDWARD N. IANNICELLI
28473
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC355

SITE NAME:
WESTPORT FIRE DEPARTMENT

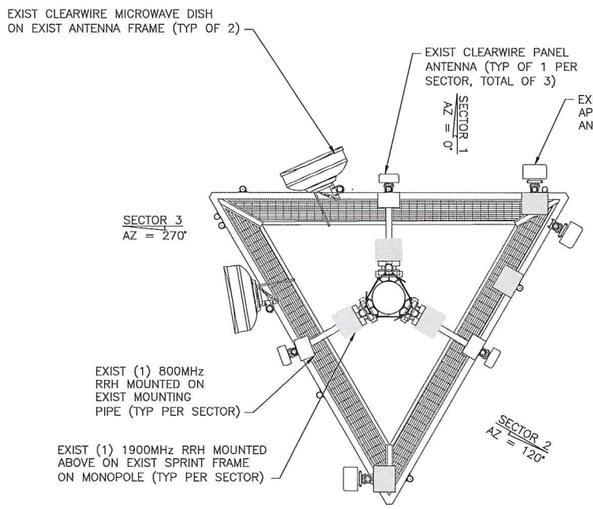
SITE ADDRESS:
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE:
ENLARGED EQUIPMENT LAYOUT PLANS

SHEET NO:
A-3

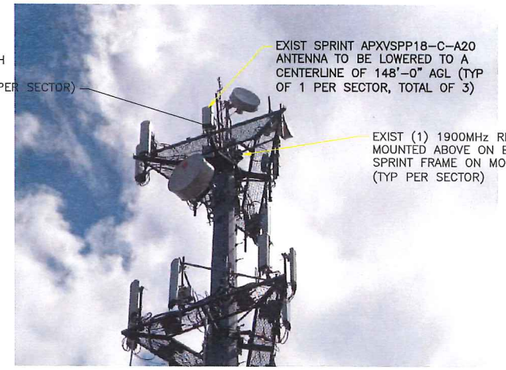
N

APPROX.



1 / A-4 ANTENNA LAYOUT PLAN (EXIST)

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



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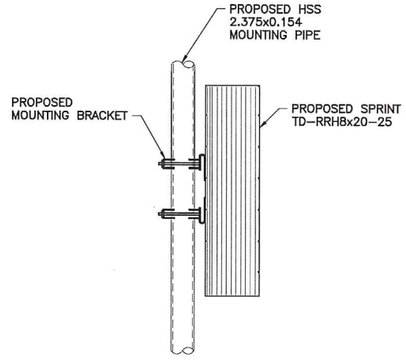
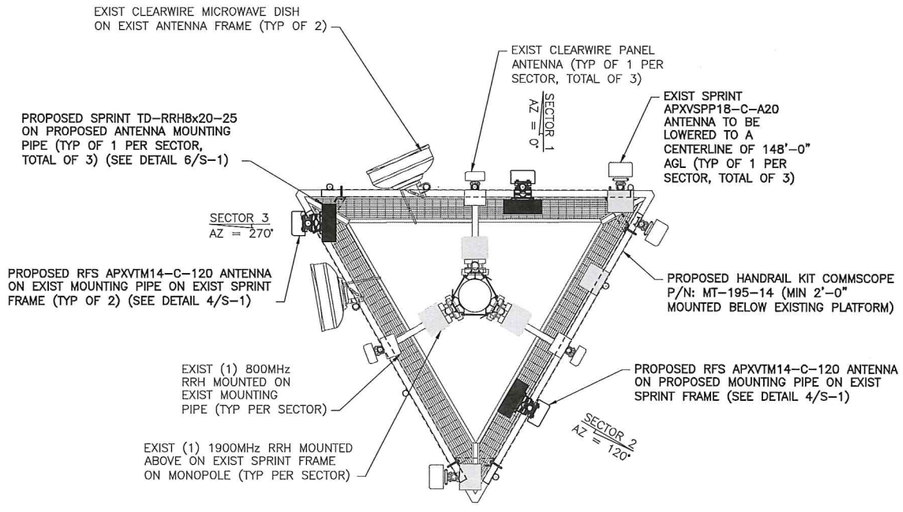


3 / A-4 RRH MOUNTING DETAIL

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	148'	148'
Antenna Azimuth	0/120/270	0/120/270
Antenna RRH Model Number	1900MHz/800MHz RRHS	TD-RRH8x20-25
Number of RRH	6	3

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11/10/14	

STATE OF CONNECTICUT
EDWARD N. VAMICELI
28473
LICENSED
PROFESSIONAL ENGINEER

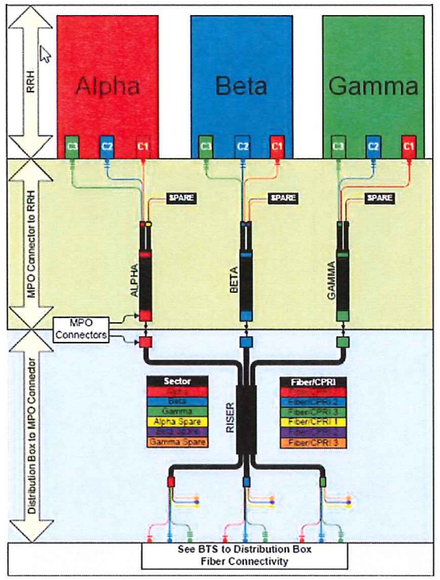
SITE NUMBER:
CT03XC355

SITE NAME:
WESTPORT FIRE DEPARTMENT

SITE ADDRESS:
515 POST ROAD EAST
WESTPORT, CT 06880

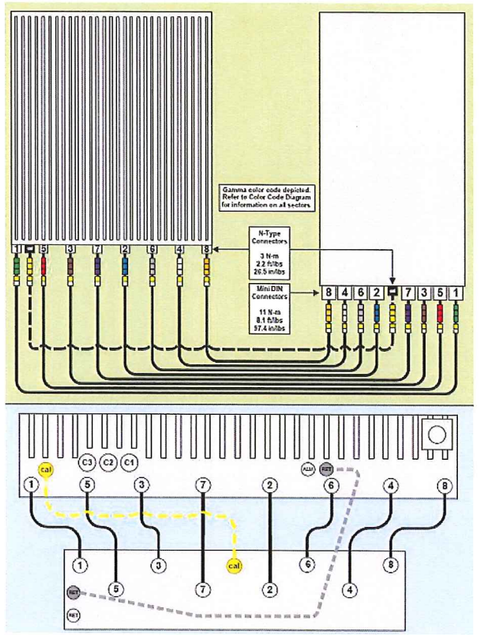
SHEET TITLE:
ANTENNA LAYOUT PLANS

SHEET NO:
A-4



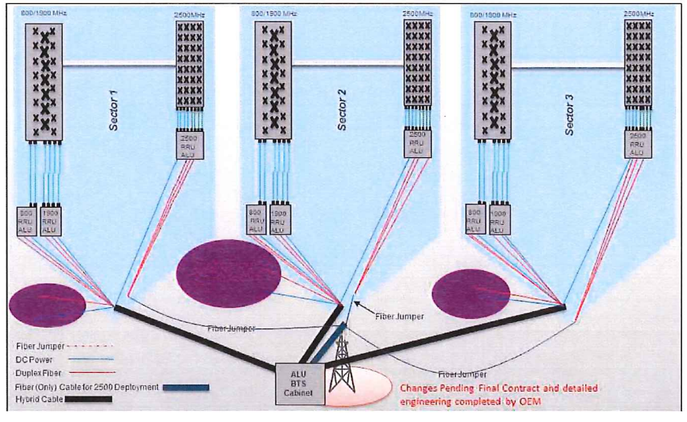
1 A–5 2.5 CABLE COLOR CODING

SCALE: N.T.S.



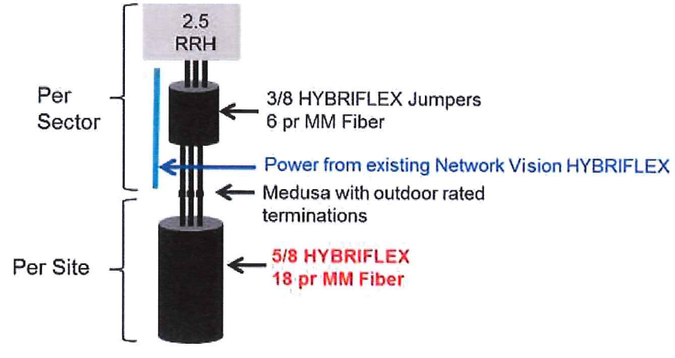
2 A–5 RRH CONNECTIVITY

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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2	11/10/14	REVISED ADDRESS	MP

DATE	REVIEWED BY
11/10/14	

STATE OF CONNECTICUT
SEAL
EDWARD N. IAMICELI
28178
LICENSED
PROFESSIONAL ENGINEER
11/10/14

SITE NUMBER:
CT03XC355

SITE NAME:
WESTPORT FIRE DEPARTMENT

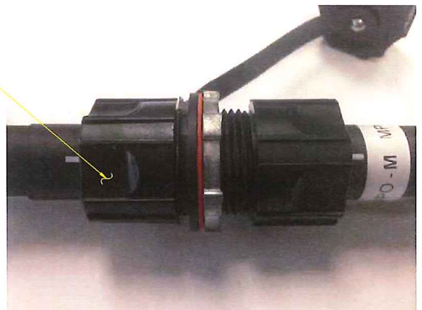
SITE ADDRESS:
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE:
RAN WIRING DIAGRAM

SHEET NO:
A–5

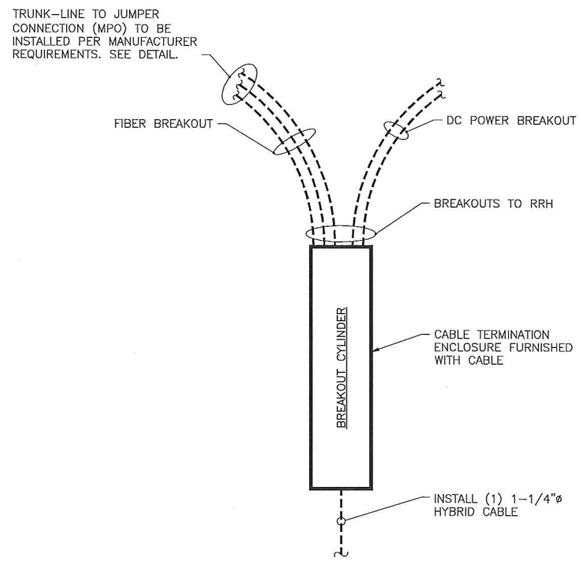
IMPORTANT!! LINE UP WHITE MARKINGS ON JUMPER AND RISER IP-MPO CONNECTOR. PUSH THE WHITE MARK ON THE JUMPER CONNECTOR FLUSH AGAINST THE RED SEAL ON THE RISER CONNECTION

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

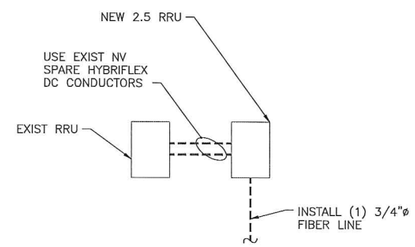


1 / A-6 HYBRIFLEX RISER/JUMPER CONNECTION DETAILS

SCALE: N.T.S.



2.5 HYBRID CABLE W/FIBER & DC FEEDERS



FIBER ONLY TRUNK LINES

2 / A-6 TRUNK LINE DETAILS (TYPICAL)

SCALE: N,T.S.

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

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

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SUBMITTALS

PROJECT NO: 7225.CT03XC355

NO	DATE	DESCRIPTION	BY
0	06/10/14	FOR COMMENT	JT
1	10/23/14	FOR CONSTRUCTION	MP
2	11/10/14	REVISED ADDRESS	MP

DATE	REVIEWED BY
11/10/14	

STATE OF CONNECTICUT
SEAL
EDWARD N. IAMICELI
28119
11/10/14
LICENSED PROFESSIONAL ENGINEER

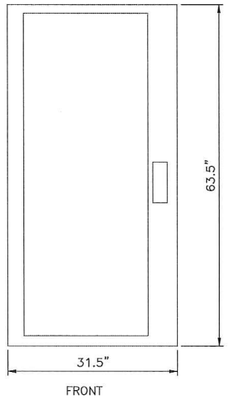
SITE NUMBER:
CT03XC355

SITE NAME:
WESTPORT FIRE DEPARTMENT

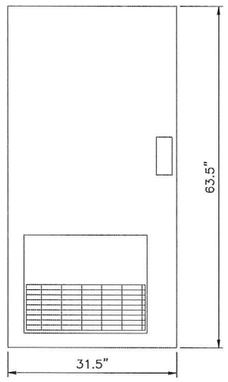
SITE ADDRESS:
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE:
CABLE DETAILS

SHEET NO:
A-6



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



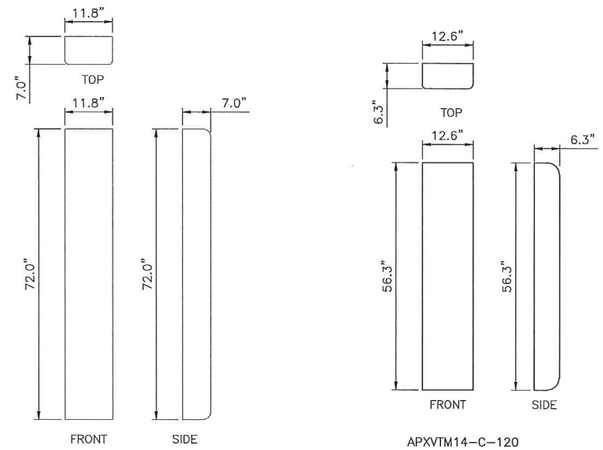
BATTERY	
SPECIFICATIONS:	
HEIGHT:	63.5"
WIDTH:	31.5"
DEPTH:	28.0"

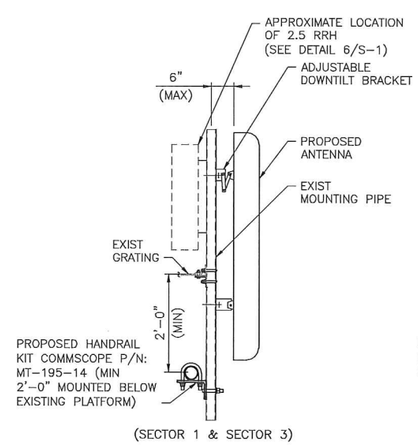
1 S-1 (EXIST) MMBTS CABINET

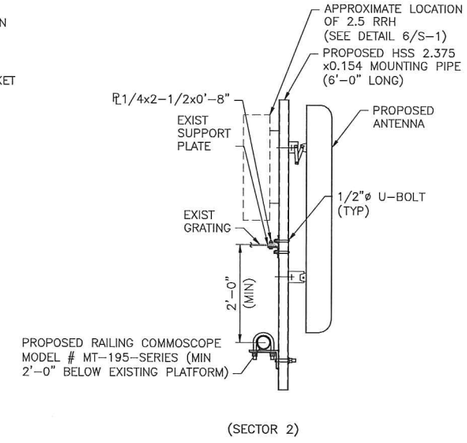
SCALE: 1" = 1'-0"

2 S-1 (EXIST) BATTERY CABINET

SCALE: 1" = 1'-0"





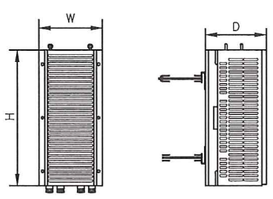


3 S-1 (EXIST) ANTENNA DETAILS

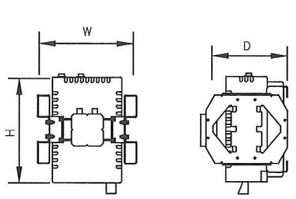
SCALE: 3/4"=1'-0"

4 S-1 (PROPOSED) ANTENNA DETAIL

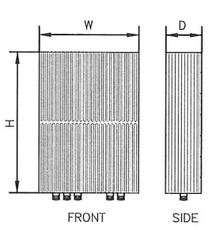
SCALE: 3/4"=1'-0"



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



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

5 S-1 (EXIST) RRH DETAILS

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

6 S-1 (PROPOSED) RRH DETAIL

SCALE: N.T.S.

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SUBMITTALS

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DATE	REVIEWED BY
11/10/14	JOSEPH

STATE OF CONNECTICUT
EDWARD N. IAMICELI
28473
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC355

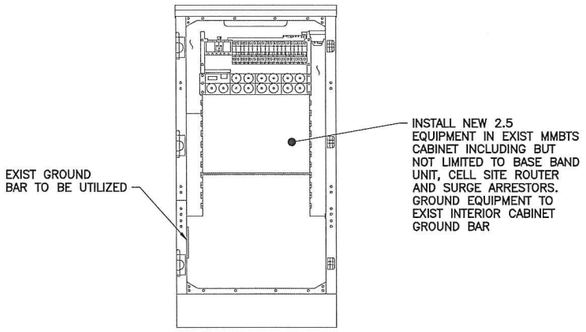
SITE NAME:
WESTPORT FIRE DEPARTMENT

SITE ADDRESS:
515 POST ROAD EAST
WESTPORT, CT 06880

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.

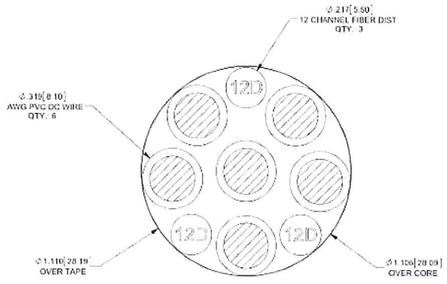
RFS HYBRIFLEX RISER CABLES SCHEDULE

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

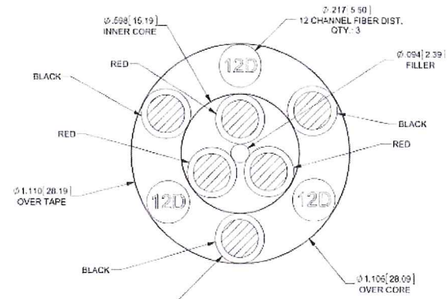
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

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

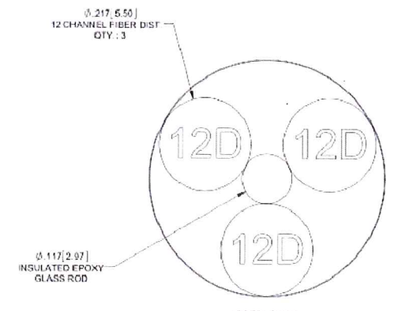
HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE			
MANUF:	RFS		
CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
FIBER ONLY	VARIES	USE NV HYBRIFLEX	7/8"
HYBRIFLEX	<200'	8 AWG	1-1/4"
HYBRIFLEX	225-300'	6 AWG	1-1/4"
HYBRIFLEX	325-375'	4 AWG	1-1/4"



4 AWG

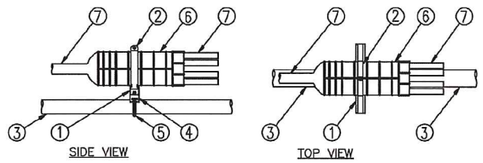


8 AWG & 6 AWG



FIBER ONLY

LEGEND:
1. P1000T-HG UNISTRUT, 12" LONG.
2. 6" PIPE HANGER.
3. EXISTING SUPPORT PIPE.
4. NEW STANDOFF BRACKET, ANDREW PART# 308485-4.
5. NEW ROUND MEMBER ADAPTER SIZED FOR EXISTING PIPE SUPPORT.
6. BREAKOUT UNIT.
7. CABLE.



3 / S-2 MEDUSA HEAD DETAIL

SCALE: NTS

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

SCALE: NTS

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OVERLAND PARK, KANSAS 66251

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DATE	REVIEWED BY
11/10/14	

STATE OF CONNECTICUT
EDWARD N. IAMICELI
28473
LICENSED PROFESSIONAL ENGINEER

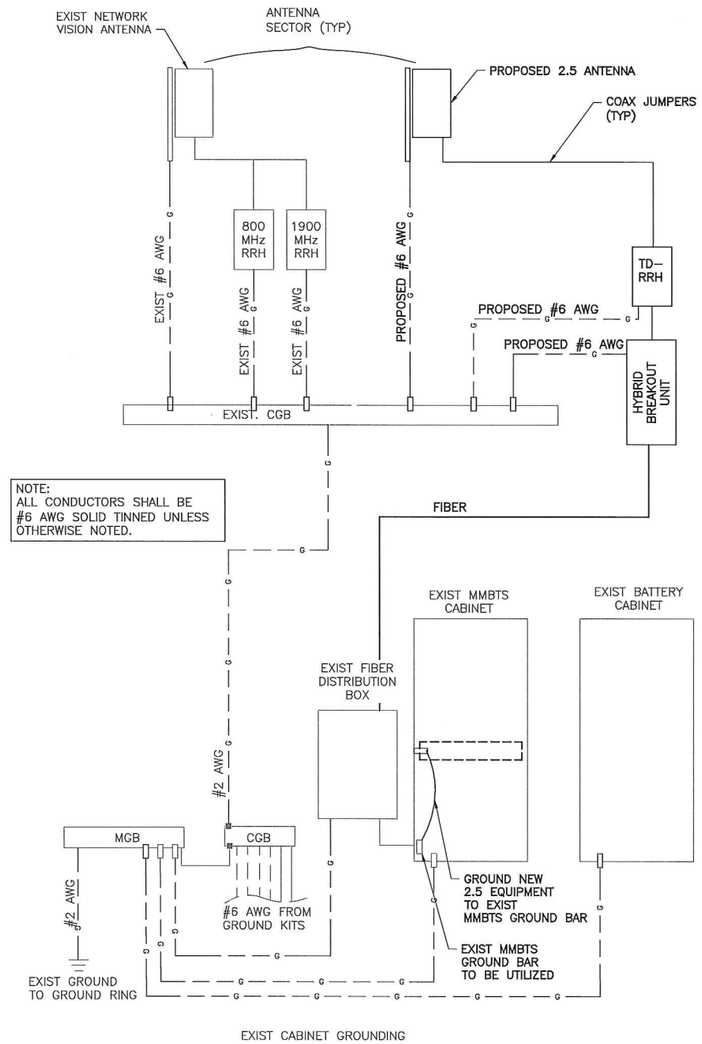
SITE NUMBER:
CT03XC355

SITE NAME:
WESTPORT FIRE DEPARTMENT

SITE ADDRESS:
515 POST ROAD EAST
WESTPORT, CT 06880

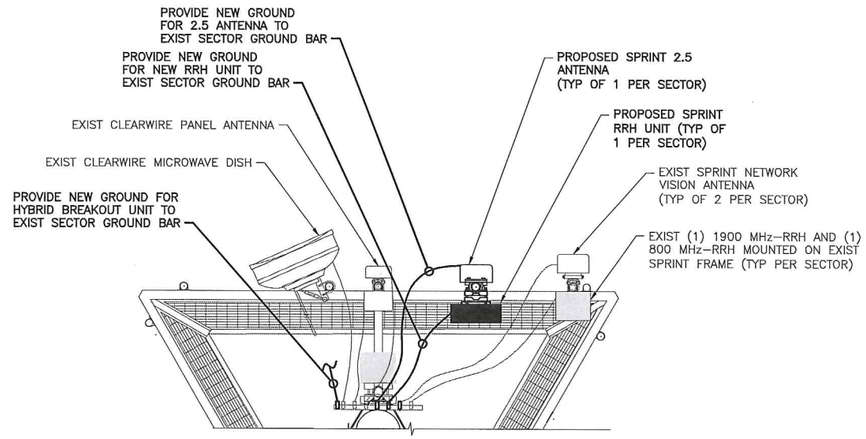
SHEET TITLE:
EQUIPMENT SCHEMATIC DETAILS

SHEET NO:
S-2



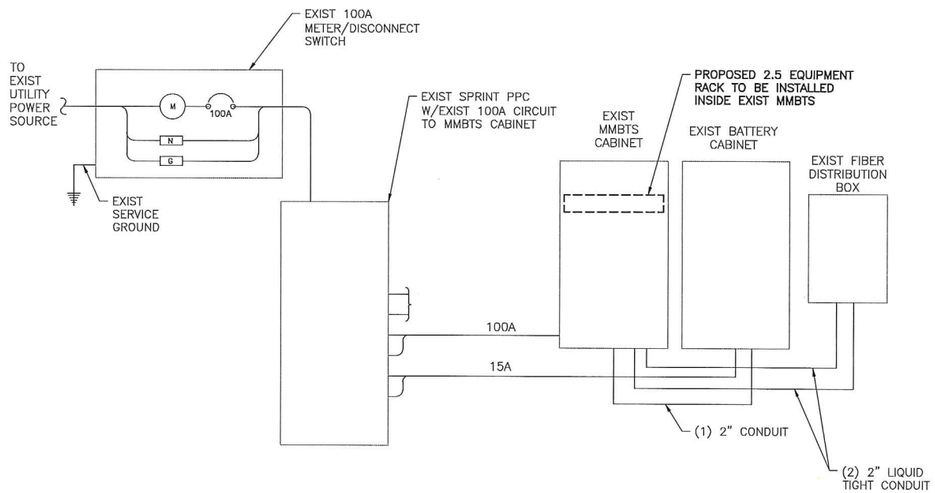
1 / E-1 TYPICAL GROUNDING ONE LINE DIAGRAM

SCALE: NTS



2 / E-1 TYPICAL ANTENNA GROUNDING PLAN

SCALE: NTS



3 / E-1 TYPICAL ELECTRICAL & TELCO PLAN

SCALE: NTS

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OVERLAND PARK, KANSAS 66251

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11/10/14	

STATE OF CONNECTICUT
EDWARD N. IAMICELI
28893
LICENSED
PROFESSIONAL ENGINEER
11/10/14

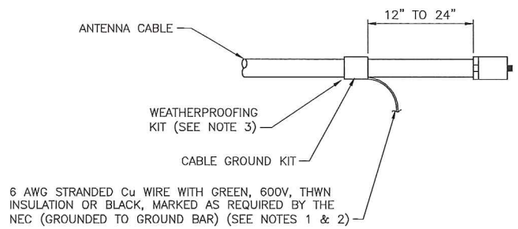
SITE NUMBER:
CT03XC355

SITE NAME:
WESTPORT FIRE DEPARTMENT

SITE ADDRESS:
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE:
ELECTRICAL & GROUNDING PLANS

SHEET NO:
E-1



CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

NOTES:

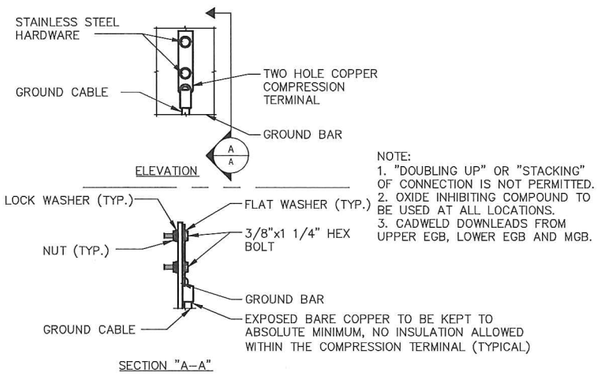
DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

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

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

1 E-2 CABLE GROUNDING KIT DETAIL

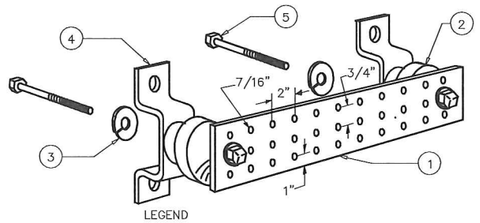
SCALE: N.T.S.



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

2 E-2 GROUNDING BAR CONN. DETAIL

SCALE: NTS



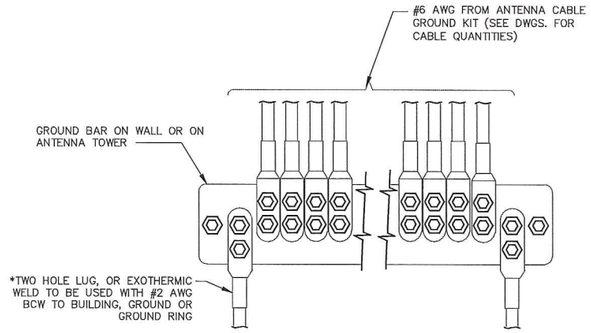
LEGEND

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

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

3 E-2 GROUNDING BAR DETAIL

SCALE: NTS



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

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

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

4 E-2 ANTENNA GROUND BAR DETAIL

SCALE: NTS

GROUNDING NOTES:

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

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

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

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

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

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

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

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

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

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

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

PROTECTIVE GROUNDING SYSTEM GENERAL NOTES:

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

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

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

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

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

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

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

ELECTRICAL AND GROUNDING NOTES

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

Sprint

2.5 EQUIPMENT DEPLOYMENT
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

CROWN CASTLE

TECTONIC • PLANNING • ENGINEERING • SURVEYING • CONSTRUCTION MANAGEMENT

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.CT03XC355

NO	DATE	DESCRIPTION	BY
0	06/10/14	FOR COMMENT	JT
1	10/23/14	FOR CONSTRUCTION	MP
2	11/10/14	REVISED ADDRESS	MP

DATE	REVIEWED BY
11/10/14	JT

STATE OF CONNECTICUT
EDWARD N. IAMICELI
28478
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC355

SITE NAME:
WESTPORT FIRE DEPARTMENT

SITE ADDRESS:
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE:
GROUNDING DETAILS & NOTES

SHEET NO:
E-2

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **July 07, 2014**

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

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
jwoolley@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Co-Locate**	**Scenario 2.5A**
	Carrier Site Number:	CT03XC355
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	876354
	Crown Castle Site Name:	WESTPORT FIRE DEPARTMENT
	Crown Castle JDE Job Number:	288080
	Crown Castle Work Order Number:	794876
	Crown Castle Application Number:	245839 Rev. 1
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37513-1197.003.7805
Site Data:	**515 Boston Post Road, WESTPORT, Fairfield County, CT** **Latitude *41° 8' 24.26"*, Longitude *-73° 20' 51.61"*** **148 Foot - Monopole Tower**	

Dear Adam Winters,

Paul J Ford and Company 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 664936, in accordance with application 245839, revision 1.

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:

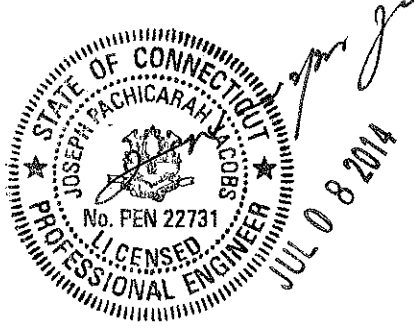
LC11: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements the 2005 Connecticut State Building Code 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 (with a 1.15 importance factor), 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

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

Respectfully submitted by:

John J. Woolley, E.I.
Structural Designer



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Structural Designer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 148 ft Monopole tower designed by SUMMIT in February of 1997. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements the 2005 Connecticut State Building Code 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 (with a 1.15 importance factor), 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
148.0	148.0	3	alcatel lucent	TD-RRH8x20-25	1	1-1/4	-
		3	rfs celwave	APXVTM14-C-120 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
148.0	160.0	1	decibel	DB420	3 2 6	1-1/4 1/2 5/16	1
	152.0	2	andrew	VHLP800-11			
	151.0	3	argus technologies	LLPX310R w/ Mount Pipe			
		3	samsung telecommunications	FDD_R6_RRH			
	148.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	alcatel lucent	800MHZ RRH			
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		9	rfs celwave	ACU-A20-N			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		1	tower mounts	Miscellaneous [NA 507-1]			
		1	tower mounts	Platform Mount [LP 712-1]			
144.0	144.0	1	andrew	VHLP2.5-10W	1	EW90	1
		1	tower mounts	Pipe Mount [PM 601-1]			
134.0	134.0	12	decibel	DB844H90E-XY w/ Mount Pipe	12	1-1/4	3
		1	tower mounts	Platform Mount [LP 303-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
120.0	120.0	6	ericsson	RRUS-11	2 1	3/8 5/8	2
		3	powerwave technologies	P65-16-XLH-RR w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		6	powerwave technologies	7770.00 w/ Mount Pipe	12	1-5/8	1
		6	powerwave technologies	LGP13519			
		6	powerwave technologies	LGP2140X			
		1	tower mounts	Platform Mount [LP 712-1]			
96.0	110.0	1	rfs celwave	PD220	7 5	7/8 1/2	1
	108.0	1	decibel	DB205-A			
	107.0	1	decibel	DB224			
		1	decibel	DB420-B			
	105.0	1	andrew	DB806E-XT			
		2	rfs celwave	PD1110			
		2	rfs celwave	PD201-1			
	96.0	1	tower mounts	Platform Mount [LP 712-1]			
	90.0	3	rfs celwave	PD83-1			
82.0	82.0	6	andrew	ETW190VS12UB	18 6	7/8 1-1/4	1
		9	ems wireless	RR90-17-00DPL2 w/ Mount Pipe			
		3	rfs celwave	APXV18-206516S-C-A20 w/ Mount Pipe			
		3	rfs celwave	ATMAA1412D-1A20			
		1	tower mounts	Platform Mount [LP 712-1]			
72.0	72.0	3	kathrein	800 10504 w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			
53.0	56.0	1	radiall larsen	BSA150B	2	1/2	1
	53.0	1	tower mounts	Side Arm Mount [SO 702-1]			
	50.0	1	radiall larsen	BSA150B			
50.0	50.0	1	trimble	BULLET III	1	1/2	1

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Sea Consultants	1531886	CCISITES
4-POST-MODIFICATION INSPECTION	PJF	2485808	CCISITES
4-POST-MODIFICATION INSPECTION	TEP	2971197	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PJF/Summit	1448194	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Summit	1446984	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) Monopole has been reinforced in conformance with the referenced modification drawings.
5) Per Town of Westport, pole analysis shall use an importance factor of 1.15. TIA-F wind speed has been adjusted accordingly (TIA-F default, I=1.0).

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	148 - 100.5	Pole	TP31.643x22x0.25	1	-7.66	1181.35	78.2	Pass
L2	100.5 - 70.667	Pole	TP37.1993x30.331x0.375	2	-17.24	2133.80	91.0	Pass
L3	70.667 - 63.75	Pole	TP38.6035x37.1993x0.4947	3	-18.97	2316.39	93.9	Pass
L4	63.75 - 63.25	Pole	TP38.705x38.6035x0.375	4	-19.08	2221.04	98.0	Pass
L5	63.25 - 53.229	Pole	TP39.9894x38.705x0.4375	5	-21.47	2673.84	94.8	Pass
L6	53.229 - 28.75	Pole	TP44.959x39.9894x0.5776	6	-27.34	3392.34	91.9	Pass
L7	28.75 - 25.75	Pole	TP44.6929x42.6364x0.6898	7	-32.16	4186.82	82.4	Pass
L8	25.75 - 0	Pole	TP49.92x44.6929x0.7194	8	-42.98	4787.50	86.8	Pass
							Summary	
						Pole (L4)	98.0	Pass
						Rating =	98.0	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	85.8	Pass
1	Base Plate	0	51.7	Pass
1	Base Foundation Structural Steel	0	61.2	Pass
1, 2	Base Foundation Soil Interaction	0	97.0	Pass

Structure Rating (max from all components) =	98.0%

Notes:

1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

2) Foundation Analysis Notes: According to the procedures prescribed and agreed to by the Crown Castle Engineering Foundation Committee, held in January 2010, the existing caisson foundation was analyzed using the methodology in the software ‘PLS-Caisson’ (Version 8.10, or newer, by Power Line Systems, Inc.). Per the methods in PLS-Caisson, the soil reactions of cohesive soils are calculated using 8CD independent of the depth of the soil layer. The depth of soil to be ignored at the top of the caisson is the greater of the geotechnical report’s recommendation, the frost depth of the site or half of the caisson diameter.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

1) Tower is located in Fairfield County, Connecticut.
2) Basic wind speed of 91.20 mph.
3) Nominal ice thickness of 0.7500 in.
4) Ice density of 56.00 pcf.
5) A wind speed of 28.10 mph is used in combination with ice.
6) Temperature drop of 50.00 °F.
7) Deflections calculated using a wind speed of 50.00 mph.
8) A non-linear (P-delta) analysis was used.
9) Pressures are calculated at each section.
10) Stress ratio used in pole design is 1.333.
11) 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	148.0000-100.5000	47.5000	4.00	12	22.0000	31.6430	0.2500	1.0000	A607-60 (60 ksi)
L2	100.5000-70.6670	33.8330	0.00	12	30.3310	37.1993	0.3750	1.5000	A607-60 (60 ksi)
L3	70.6670-63.7500	6.9170	0.00	12	37.1993	38.6035	0.4947	1.9788	Reinf 47.71 ksi (48 ksi)
L4	63.7500-63.2500	0.5000	0.00	12	38.6035	38.7050	0.3750	1.5000	A607-60 (60 ksi)
L5	63.2500-53.2290	10.0210	0.00	12	38.7050	39.9894	0.4375	1.7500	A607-60 (60 ksi)
L6	53.2290-28.7500	24.4790	5.75	12	39.9894	44.9590	0.5776	2.3105	Reinf 52.77 ksi (53 ksi)
L7	28.7500-25.7500	8.7500	0.00	12	42.6364	44.6929	0.6898	2.7592	Reinf 53.56 ksi (54 ksi)
L8	25.7500-0.0000	25.7500		12	44.6929	49.9200	0.7194	2.8776	Reinf 52.52 ksi (53 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	22.7761	17.5087	1057.2060	7.7865	11.3960	92.7699	2142.1860	8.6173	5.2260	20.904
	32.7592	25.2714	3178.9251	11.2387	16.3911	193.9425	6441.3640	12.4378	7.8103	31.241
L2	32.2416	36.1718	4143.0744	10.7242	15.7114	263.6980	8394.9919	17.8027	7.1237	18.997
	38.5115	44.4653	7696.1918	13.1831	19.2692	399.4032	15594.5711	21.8845	8.9644	23.905
L3	38.5115	58.4680	10054.1303	13.1402	19.2692	521.7713	20372.3938	28.7762	8.6436	17.472
	39.9653	60.7048	11252.7463	13.6429	19.9966	562.7331	22801.1148	29.8770	9.0199	18.233
L4	39.9653	46.1609	8610.6084	13.6858	19.9966	430.6037	17447.4271	22.7190	9.3407	24.909
	40.0703	46.2834	8679.3765	13.7221	20.0492	432.9044	17586.7699	22.7793	9.3679	24.981
L5	40.0703	53.9093	10076.4866	13.6998	20.0492	502.5886	20417.6937	26.5325	9.2004	21.03
	41.4001	55.7188	11125.5698	14.1596	20.7145	537.0905	22543.4207	27.4231	9.5447	21.816
L6	41.4001	73.3047	14533.4832	14.1094	20.7145	701.6087	29448.7771	36.0783	9.1691	15.874
	46.5450	82.5480	20753.6112	15.8885	23.2888	891.1427	42052.4428	40.6276	10.5010	18.179
L7	45.5395	93.1700	20924.5209	15.0169	22.0857	947.4257	42398.7523	45.8554	9.5779	13.885
	46.2695	97.7377	24155.4333	15.7531	23.1509	1043.3897	48945.4567	48.1035	10.1290	14.684
L8	46.2695	101.8646	25141.4949	15.7425	23.1509	1085.9824	50943.4850	50.1347	10.0497	13.969
	51.6810	113.9732	35215.1242	17.6138	25.8586	1361.8362	71355.3889	56.0941	11.4505	15.917

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 148.0000-100.5000				1	1	1		
L2 100.5000-70.6670				1	1	1		
L3 70.6670-63.7500				1	1	1		
L4 63.7500-63.2500				1	1	1		
L5 63.2500-53.2290				1	1	1		
L6 53.2290-28.7500				1	1	1		
L7 28.7500-25.7500				1	1	1		
L8 25.7500-0.0000				1	1	1		

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
MLE Hybrid 3Power/6Fiber RL 2(1 1/4")	C	No	Inside Pole	148.0000 - 0.0000	3	No Ice	0.0000	0.68
						1/2" Ice	0.0000	0.68
						1" Ice	0.0000	0.68
HB114-21U3M12-	C	No	Inside Pole	148.0000 - 0.0000	1	No Ice	0.0000	1.22

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
XXXF(1-1/4")						1/2" Ice	0.0000	1.22
						1" Ice	0.0000	1.22
7983A(1/2")	C	No	Inside Pole	148.0000 - 0.0000	2	No Ice	0.0000	0.08
						1/2" Ice	0.0000	0.08
						1" Ice	0.0000	0.08
9207(5/16")	C	No	Inside Pole	148.0000 - 0.0000	6	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
2" Conduit	C	No	Inside Pole	148.0000 - 0.0000	2	No Ice	0.0000	0.95
						1/2" Ice	0.0000	0.95
						1" Ice	0.0000	0.95
LDF7-50A(1-5/8")	C	No	Inside Pole	120.0000 - 0.0000	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
FB-L98-002-XXX(3/8)	C	No	Inside Pole	120.0000 - 0.0000	2	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
WR-VG82ST-BRDA(5/8")	C	No	Inside Pole	120.0000 - 0.0000	1	No Ice	0.0000	0.31
						1/2" Ice	0.0000	0.31
						1" Ice	0.0000	0.31
LDF4-50A(1/2")	C	No	Inside Pole	96.0000 - 0.0000	5	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
LDF5-50A(7/8")	C	No	Inside Pole	96.0000 - 0.0000	7	No Ice	0.0000	0.33
						1/2" Ice	0.0000	0.33
						1" Ice	0.0000	0.33
LDF5-50A(7/8")	C	No	Inside Pole	82.0000 - 0.0000	12	No Ice	0.0000	0.33
						1/2" Ice	0.0000	0.33
						1" Ice	0.0000	0.33
HJ7-50A(1-5/8")	C	No	Inside Pole	72.0000 - 0.0000	6	No Ice	0.0000	1.04
						1/2" Ice	0.0000	1.04
						1" Ice	0.0000	1.04
LDF4-50A(1/2")	C	No	Inside Pole	53.0000 - 0.0000	2	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
LDF4-50A(1/2")	C	No	Inside Pole	50.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
EW90(ELLIPTICAL)	C	No	Inside Pole	144.0000 - 0.0000	1	No Ice	0.0000	0.32
						1/2" Ice	0.0000	0.32
						1" Ice	0.0000	0.32
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	35.5000 - 0.0000	1	No Ice	0.2083	0.00
						1/2" Ice	0.3194	0.00
						1" Ice	0.4306	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	55.5000 - 35.5000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	72.2500 - 62.2500	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	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	148.0000-100.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.49
L2	100.5000-70.6670	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.264	0.62
L3	70.6670-63.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.153	0.20
L4	63.7500-63.2500	A	0.000	0.000	0.000	0.000	0.00

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
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.083	0.01
L5	63.2500-53.2290	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.545	0.30
L6	53.2290-28.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.361	0.73
L7	28.7500-25.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.625	0.09
L8	25.7500-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.365	0.77

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	148.0000-100.5000	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.49
L2	100.5000-70.6670	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.528	0.62
L3	70.6670-63.7500	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.306	0.20
L4	63.7500-63.2500	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.167	0.01
L5	63.2500-53.2290	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.090	0.30
L6	53.2290-28.7500	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.441	0.73
L7	28.7500-25.7500	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.125	0.09
L8	25.7500-0.0000	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	9.656	0.77

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	148.0000-100.5000	0.0000	0.0000	0.0000	0.0000
L2	100.5000-70.6670	-0.0124	0.0072	-0.0237	0.0137
L3	70.6670-63.7500	-0.2057	0.1187	-0.3781	0.2183
L4	63.7500-63.2500	-0.2059	0.1189	-0.3791	0.2189
L5	63.2500-53.2290	-0.0698	0.0403	-0.1325	0.0765
L6	53.2290-28.7500	-0.2209	0.1276	-0.3960	0.2286
L7	28.7500-25.7500	-0.2562	0.1479	-0.4291	0.2477
L8	25.7500-0.0000	-0.2570	0.1484	-0.4323	0.2496

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
TD-RRH8x20-25	A	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	4.7198 5.0138 5.3165	1.7027 1.9196 2.1453	0.07 0.10 0.13
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	7.1342 7.6618 8.1830	4.9591 5.7544 6.4723	0.08 0.13 0.19
TD-RRH8x20-25	B	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	4.7198 5.0138 5.3165	1.7027 1.9196 2.1453	0.07 0.10 0.13
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	7.1342 7.6618 8.1830	4.9591 5.7544 6.4723	0.08 0.13 0.19
TD-RRH8x20-25	C	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	4.7198 5.0138 5.3165	1.7027 1.9196 2.1453	0.07 0.10 0.13
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	7.1342 7.6618 8.1830	4.9591 5.7544 6.4723	0.08 0.13 0.19
LLPX310R w/ Mount Pipe	A	From Leg	4.0000 0.00 3.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	4.9623 5.3512 5.7501	2.8484 3.3668 3.9019	0.04 0.08 0.12
LLPX310R w/ Mount Pipe	B	From Leg	4.0000 0.00 3.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	4.9623 5.3512 5.7501	2.8484 3.3668 3.9019	0.04 0.08 0.12
LLPX310R w/ Mount Pipe	C	From Leg	4.0000 0.00 3.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	4.9623 5.3512 5.7501	2.8484 3.3668 3.9019	0.04 0.08 0.12
DB420	A	From Leg	4.0000 0.00 12.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	3.3300 5.9940 8.6580	3.3300 5.9940 8.6580	0.03 0.04 0.05
FDD_R6_RRH	A	From Leg	4.0000 0.00 3.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	1.7889 1.9715 2.1627	0.7778 0.9182 1.0673	0.03 0.04 0.06
FDD_R6_RRH	B	From Leg	4.0000 0.00 3.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	1.7889 1.9715 2.1627	0.7778 0.9182 1.0673	0.03 0.04 0.06
FDD_R6_RRH	C	From Leg	4.0000 0.00 3.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	1.7889 1.9715 2.1627	0.7778 0.9182 1.0673	0.03 0.04 0.06
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	8.4975 9.1490 9.7672	6.9458 8.1266 9.0212	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	8.4975 9.1490 9.7672	6.9458 8.1266 9.0212	0.08 0.15 0.23
APXVSPP18-C-A20 w/	C	From Leg	4.0000	0.0000	148.0000	No Ice	8.4975	6.9458	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0.00 0.00			1/2" Ice 1" Ice	9.1490 9.7672	8.1266 9.0212	0.15 0.23
PCS 1900MHz 4x45W-65MHz	A	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	2.7087 2.9477 3.1953	2.6111 2.8475 3.0925	0.06 0.08 0.11
PCS 1900MHz 4x45W-65MHz	B	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	2.7087 2.9477 3.1953	2.6111 2.8475 3.0925	0.06 0.08 0.11
PCS 1900MHz 4x45W-65MHz	C	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	2.7087 2.9477 3.1953	2.6111 2.8475 3.0925	0.06 0.08 0.11
800MHZ RRH	A	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	2.4899 2.7061 2.9310	2.0685 2.2705 2.4812	0.05 0.07 0.10
800MHZ RRH	B	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	2.4899 2.7061 2.9310	2.0685 2.2705 2.4812	0.05 0.07 0.10
800MHZ RRH	C	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	2.4899 2.7061 2.9310	2.0685 2.2705 2.4812	0.05 0.07 0.10
800 EXTERNAL NOTCH FILTER	A	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	0.7701 0.8898 1.0181	0.3747 0.4647 0.5634	0.01 0.02 0.02
800 EXTERNAL NOTCH FILTER	B	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	0.7701 0.8898 1.0181	0.3747 0.4647 0.5634	0.01 0.02 0.02
800 EXTERNAL NOTCH FILTER	C	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	0.7701 0.8898 1.0181	0.3747 0.4647 0.5634	0.01 0.02 0.02
(3) ACU-A20-N	A	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	0.0778 0.1210 0.1728	0.1361 0.1890 0.2506	0.00 0.00 0.00
(3) ACU-A20-N	B	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	0.0778 0.1210 0.1728	0.1361 0.1890 0.2506	0.00 0.00 0.00
(3) ACU-A20-N	C	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	0.0778 0.1210 0.1728	0.1361 0.1890 0.2506	0.00 0.00 0.00
Platform Mount [LP 712-1]	C	None		0.0000	148.0000	No Ice 1/2" Ice 1" Ice	24.5300 29.9400 35.3500	24.5300 29.9400 35.3500	1.34 1.65 1.96
Miscellaneous [NA 507-1]	C	None		0.0000	148.0000	No Ice 1/2" Ice 1" Ice	4.8000 6.7000 8.6000	4.8000 6.7000 8.6000	0.25 0.29 0.34
6' x 2'' Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	1.4250 1.9250 2.2939	1.4250 1.9250 2.2939	0.02 0.03 0.05
6' x 2'' Mount Pipe	B	From Leg	4.0000 0.00	0.0000	148.0000	No Ice 1/2"	1.4250 1.9250	1.4250 1.9250	0.02 0.03

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" Ice	2.2939	2.2939	0.05
6' x 2" Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice	1.4250 1.9250 2.2939	1.4250 1.9250 2.2939	0.02 0.03 0.05
***									
Pipe Mount [PM 601-1]	C	None		0.0000	144.0000	No Ice 1/2" Ice 1" Ice	3.0000 3.7400 4.4800	0.9000 1.1200 1.3400	0.07 0.08 0.09
***									
***									
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	6.1194 6.6258 7.1283	4.2543 5.0137 5.7109	0.06 0.10 0.16
(2) LGP13519	A	From Leg	4.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	0.3379 0.4220 0.5147	0.2074 0.2804 0.3621	0.01 0.01 0.01
(2) LGP2140X	A	From Leg	4.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	1.2600 1.4160 1.5806	0.3780 0.4932 0.6170	0.01 0.02 0.03
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	6.1194 6.6258 7.1283	4.2543 5.0137 5.7109	0.06 0.10 0.16
(2) LGP2140X	B	From Leg	4.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	1.2600 1.4160 1.5806	0.3780 0.4932 0.6170	0.01 0.02 0.03
(2) LGP13519	B	From Leg	4.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	0.3379 0.4220 0.5147	0.2074 0.2804 0.3621	0.01 0.01 0.01
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	6.1194 6.6258 7.1283	4.2543 5.0137 5.7109	0.06 0.10 0.16
(2) LGP2140X	C	From Leg	4.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	1.2600 1.4160 1.5806	0.3780 0.4932 0.6170	0.01 0.02 0.03
(2) LGP13519	C	From Leg	4.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	0.3379 0.4220 0.5147	0.2074 0.2804 0.3621	0.01 0.01 0.01
(2) RRUS-11	A	From Leg	4.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	3.2486 3.4905 3.7411	1.3726 1.5510 1.7380	0.05 0.07 0.09
P65-16-XLH-RR w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	8.6375 9.2903 9.9098	6.3625 7.5378 8.4270	0.08 0.14 0.22
DC6-48-60-18-8F	A	From Leg	4.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	2.5667 2.7978 3.0377	2.5667 2.7978 3.0377	0.02 0.04 0.07
(2) RRUS-11	B	From Leg	4.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	3.2486 3.4905 3.7411	1.3726 1.5510 1.7380	0.05 0.07 0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
P65-16-XLH-RR w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	8.6375 9.2903 9.9098	6.3625 7.5378 8.4270	0.08 0.14 0.22
(2) RRUS-11	C	From Leg	4.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	3.2486 3.4905 3.7411	1.3726 1.5510 1.7380	0.05 0.07 0.09
P65-16-XLH-RR w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	8.6375 9.2903 9.9098	6.3625 7.5378 8.4270	0.08 0.14 0.22
Platform Mount [LP 712-1]	C	None		0.0000	120.0000	No Ice 1/2" Ice 1" Ice	24.5300 29.9400 35.3500	24.5300 29.9400 35.3500	1.34 1.65 1.96
6' x 2" Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	1.4250 1.9250 2.2939	1.4250 1.9250 2.2939	0.02 0.03 0.05
6' x 2" Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	1.4250 1.9250 2.2939	1.4250 1.9250 2.2939	0.02 0.03 0.05
6' x 2" Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	1.4250 1.9250 2.2939	1.4250 1.9250 2.2939	0.02 0.03 0.05
****									
DB420-B	A	From Leg	4.0000 0.00 11.00	0.0000	96.0000	No Ice 1/2" Ice 1" Ice	3.3300 5.9940 8.6580	3.3300 5.9940 8.6580	0.03 0.04 0.05
(2) PD1110	A	From Leg	4.0000 0.00 9.00	0.0000	96.0000	No Ice 1/2" Ice 1" Ice	2.5023 3.8435 5.2013	2.5023 3.8435 5.2013	0.02 0.04 0.07
PD201-1	A	From Leg	4.0000 0.00 9.00	0.0000	96.0000	No Ice 1/2" Ice 1" Ice	0.6279 1.5391 2.4669	0.6279 1.5391 2.4669	0.00 0.01 0.02
(2) PD83-1	A	From Leg	4.0000 0.00 -6.00	0.0000	96.0000	No Ice 1/2" Ice 1" Ice	3.7000 5.5750 7.4667	3.7000 5.5750 7.4667	0.02 0.05 0.09
DB205-A	B	From Leg	4.0000 0.00 12.00	0.0000	96.0000	No Ice 1/2" Ice 1" Ice	1.8083 3.6333 5.4750	1.8083 3.6333 5.4750	0.04 0.05 0.08
PD201-1	B	From Leg	4.0000 0.00 9.00	0.0000	96.0000	No Ice 1/2" Ice 1" Ice	0.6279 1.5391 2.4669	0.6279 1.5391 2.4669	0.00 0.01 0.02
PD83-1	B	From Leg	4.0000 0.00 -6.00	0.0000	96.0000	No Ice 1/2" Ice 1" Ice	3.7000 5.5750 7.4667	3.7000 5.5750 7.4667	0.02 0.05 0.09
DB806E-XT	C	From Leg	4.0000 0.00 9.00	0.0000	96.0000	No Ice 1/2" Ice 1" Ice	2.0000 2.8292 3.4557	2.0000 2.8292 3.4557	0.02 0.03 0.05
DB224	C	From Leg	4.0000 0.00 11.00	0.0000	96.0000	No Ice 1/2" Ice 1" Ice	6.1979 8.5814 10.9772	0.0000 2.3673 4.7469	0.03 0.05 0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
PD220	C	From Leg	4.0000 0.00 14.00	0.0000	96.0000	No Ice 1/2" Ice 1" Ice	3.0800 5.3000 7.5367	3.0800 5.3000 7.5367	0.02 0.05 0.09
(4) 6' x 2" Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	96.0000	No Ice 1/2" Ice 1" Ice	1.4250 1.9250 2.2939	1.4250 1.9250 2.2939	0.02 0.03 0.05
(3) 6' x 2" Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	96.0000	No Ice 1/2" Ice 1" Ice	1.4250 1.9250 2.2939	1.4250 1.9250 2.2939	0.02 0.03 0.05
(3) 6' x 2" Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	96.0000	No Ice 1/2" Ice 1" Ice	1.4250 1.9250 2.2939	1.4250 1.9250 2.2939	0.02 0.03 0.05
Platform Mount [LP 712-1]	C	None		0.0000	96.0000	No Ice 1/2" Ice 1" Ice	24.5300 29.9400 35.3500	24.5300 29.9400 35.3500	1.34 1.65 1.96
***									
(3) RR90-17-00DPL2 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	82.0000	No Ice 1/2" Ice 1" Ice	4.5931 5.0883 5.5778	3.3194 4.0888 4.7844	0.04 0.08 0.12
(3) RR90-17-00DPL2 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	82.0000	No Ice 1/2" Ice 1" Ice	4.5931 5.0883 5.5778	3.3194 4.0888 4.7844	0.04 0.08 0.12
(3) RR90-17-00DPL2 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	82.0000	No Ice 1/2" Ice 1" Ice	4.5931 5.0883 5.5778	3.3194 4.0888 4.7844	0.04 0.08 0.12
(2) ETW190VS12UB	A	From Leg	4.0000 0.00 0.00	0.0000	82.0000	No Ice 1/2" Ice 1" Ice	0.6644 0.7783 0.9008	0.3669 0.4613 0.5644	0.01 0.02 0.03
(2) ETW190VS12UB	B	From Leg	4.0000 0.00 0.00	0.0000	82.0000	No Ice 1/2" Ice 1" Ice	0.6644 0.7783 0.9008	0.3669 0.4613 0.5644	0.01 0.02 0.03
(2) ETW190VS12UB	C	From Leg	4.0000 0.00 0.00	0.0000	82.0000	No Ice 1/2" Ice 1" Ice	0.6644 0.7783 0.9008	0.3669 0.4613 0.5644	0.01 0.02 0.03
APXV18-206516S-C-A20 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	82.0000	No Ice 1/2" Ice 1" Ice	3.8586 4.2736 4.7274	3.2963 4.0044 4.6717	0.04 0.07 0.11
APXV18-206516S-C-A20 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	82.0000	No Ice 1/2" Ice 1" Ice	3.8586 4.2736 4.7274	3.2963 4.0044 4.6717	0.04 0.07 0.11
APXV18-206516S-C-A20 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	82.0000	No Ice 1/2" Ice 1" Ice	3.8586 4.2736 4.7274	3.2963 4.0044 4.6717	0.04 0.07 0.11
ATMAA1412D-1A20	A	From Leg	4.0000 0.00 0.00	0.0000	82.0000	No Ice 1/2" Ice 1" Ice	1.1667 1.3136 1.4691	0.4667 0.5747 0.6914	0.01 0.02 0.03
ATMAA1412D-1A20	B	From Leg	4.0000 0.00 0.00	0.0000	82.0000	No Ice 1/2" Ice 1" Ice	1.1667 1.3136 1.4691	0.4667 0.5747 0.6914	0.01 0.02 0.03

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
ATMAA1412D-1A20	C	From Leg	4.0000 0.00 0.00	0.0000	82.0000	No Ice 1/2" Ice 1" Ice	1.1667 1.3136 1.4691	0.4667 0.5747 0.6914	0.01 0.02 0.03
Platform Mount [LP 712-1]	C	None		0.0000	82.0000	No Ice 1/2" Ice 1" Ice	24.5300 29.9400 35.3500	24.5300 29.9400 35.3500	1.34 1.65 1.96
***									
800 10504 w/ Mount Pipe	A	From Leg	1.0000 0.00 0.00	0.0000	72.0000	No Ice 1/2" Ice 1" Ice	3.5887 4.0069 4.4217	3.1779 3.9053 4.5808	0.04 0.07 0.11
800 10504 w/ Mount Pipe	B	From Leg	1.0000 0.00 0.00	0.0000	72.0000	No Ice 1/2" Ice 1" Ice	3.5887 4.0069 4.4217	3.1779 3.9053 4.5808	0.04 0.07 0.11
800 10504 w/ Mount Pipe	C	From Leg	1.0000 0.00 0.00	0.0000	72.0000	No Ice 1/2" Ice 1" Ice	3.5887 4.0069 4.4217	3.1779 3.9053 4.5808	0.04 0.07 0.11
Pipe Mount [PM 601-3]	C	None		0.0000	72.0000	No Ice 1/2" Ice 1" Ice	4.3900 5.4800 6.5700	4.3900 5.4800 6.5700	0.20 0.24 0.28
****									
BSA150B	A	From Leg	4.0000 0.00 -3.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice	11.7778 12.3000 12.8333	11.7778 12.3000 12.8333	0.00 0.15 0.31
BSA150B	A	From Leg	4.0000 0.00 3.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice	11.7778 12.3000 12.8333	11.7778 12.3000 12.8333	0.00 0.15 0.31
BULLET III	C	From Leg	4.0000 0.00 0.00	0.0000	50.0000	No Ice 1/2" Ice 1" Ice	0.0774 0.1184 0.1680	0.0774 0.1184 0.1680	0.00 0.00 0.00
Side Arm Mount [SO 702-1]	A	None		0.0000	53.0000	No Ice 1/2" Ice 1" Ice	1.0000 1.0000 1.0000	1.4300 2.0500 2.6700	0.03 0.04 0.05
***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP800-11	B	Paraboloid w/Shroud (HP)	From Leg	1.0000 0.00 4.00	40.0000		148.0000	2.9167	No Ice 1/2" Ice 1" Ice	6.6800 7.0700 7.4600	0.02 0.06 0.09
VHLP800-11	C	Paraboloid w/Shroud (HP)	From Leg	1.0000 0.00 4.00	-20.0000		148.0000	2.9167	No Ice 1/2" Ice 1" Ice	6.6800 7.0700 7.4600	0.02 0.06 0.09
VHLP2.5-10W	A	Paraboloid w/Shroud (HP)	From Leg	1.0000 0.00	0.0000		144.0000	2.9167	No Ice 1/2" Ice	6.6813 7.0686	0.05 0.08

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter		Aperture Area	Weight
				ft	°	°	ft	ft		ft^2	K
				0.00					1'' Ice	7.4558	0.12

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 148.0000-100.5000	123.1494	1.457	30.97	106.168	A	0.000	106.168	106.168	100.00	0.000	0.000
					B	0.000	106.168		100.00	0.000	0.000
					C	0.000	106.168		100.00	0.000	0.000
L2 100.5000-70.6670	85.1429	1.311	27.92	84.952	A	0.000	84.952	84.952	100.00	0.000	0.000
					B	0.000	84.952		100.00	0.000	0.000
					C	0.000	84.952		100.00	0.000	0.264
L3 70.6670-63.7500	67.1871	1.225	26.09	21.847	A	0.000	21.847	21.847	100.00	0.000	0.000
					B	0.000	21.847		100.00	0.000	0.000
					C	0.000	21.847		100.00	0.000	1.153
L4 63.7500-63.2500	63.4999	1.206	25.67	1.611	A	0.000	1.611	1.611	100.00	0.000	0.000
					B	0.000	1.611		100.00	0.000	0.000
					C	0.000	1.611		100.00	0.000	0.083
L5 63.2500-53.2290	58.2122	1.176	25.04	32.858	A	0.000	32.858	32.858	100.00	0.000	0.000
					B	0.000	32.858		100.00	0.000	0.000
					C	0.000	32.858		100.00	0.000	0.545
L6 53.2290-28.7500	40.7508	1.062	22.62	86.644	A	0.000	86.644	86.644	100.00	0.000	0.000
					B	0.000	86.644		100.00	0.000	0.000
					C	0.000	86.644		100.00	0.000	4.361
L7 28.7500-25.7500	27.2460	1	21.29	11.085	A	0.000	11.085	11.085	100.00	0.000	0.000
					B	0.000	11.085		100.00	0.000	0.000
					C	0.000	11.085		100.00	0.000	0.625
L8 25.7500-0.0000	12.6379	1	21.29	101.512	A	0.000	101.512	101.512	100.00	0.000	0.000
					B	0.000	101.512		100.00	0.000	0.000
					C	0.000	101.512		100.00	0.000	5.365

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 148.0000-100.5000	123.1494	1.457	2.94	0.7500	112.106	A	0.000	112.106	112.106	100.00	0.000	0.000
						B	0.000	112.106		100.00	0.000	0.000
						C	0.000	112.106		100.00	0.000	0.000
L2 100.5000-70.6670	85.1429	1.311	2.65	0.7500	88.681	A	0.000	88.681	88.681	100.00	0.000	0.000
						B	0.000	88.681		100.00	0.000	0.000
						C	0.000	88.681		100.00	0.000	0.528
L3 70.6670-63.7500	67.1871	1.225	2.48	0.7500	22.712	A	0.000	22.712	22.712	100.00	0.000	0.000
						B	0.000	22.712		100.00	0.000	0.000
						C	0.000	22.712		100.00	0.000	2.306
L4 63.7500-63.2500	63.4999	1.206	2.44	0.7500	1.673	A	0.000	1.673	1.673	100.00	0.000	0.000
						B	0.000	1.673		100.00	0.000	0.000
						C	0.000	1.673		100.00	0.000	0.167
L5 63.2500-53.2290	58.2122	1.176	2.38	0.7500	34.111	A	0.000	34.111	34.111	100.00	0.000	0.000
						B	0.000	34.111		100.00	0.000	0.000
						C	0.000	34.111		100.00	0.000	1.090
L6 53.2290-28.7500	40.7508	1.062	2.15	0.7500	89.704	A	0.000	89.704	89.704	100.00	0.000	0.000
						B	0.000	89.704		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						C	0.000	89.704		100.00	0.000	8.441
L7 28.7500-25.7500	27.2460	1	2.02	0.7500	11.460	A	0.000	11.460	11.460	100.00	0.000	0.000
						B	0.000	11.460		100.00	0.000	0.000
						C	0.000	11.460		100.00	0.000	1.125
L8 25.7500-0.0000	12.6379	1	2.02	0.7500	104.731	A	0.000	104.731	104.731	100.00	0.000	0.000
						B	0.000	104.731		100.00	0.000	0.000
						C	0.000	104.731		100.00	0.000	9.656

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 148.0000-100.5000	123.1494	1.457	9.31	106.168	A	0.000	106.168	106.168	100.00	0.000	0.000
					B	0.000	106.168		100.00	0.000	0.000
					C	0.000	106.168		100.00	0.000	0.000
L2 100.5000-70.6670	85.1429	1.311	8.39	84.952	A	0.000	84.952	84.952	100.00	0.000	0.000
					B	0.000	84.952		100.00	0.000	0.000
					C	0.000	84.952		100.00	0.000	0.264
L3 70.6670-63.7500	67.1871	1.225	7.84	21.847	A	0.000	21.847	21.847	100.00	0.000	0.000
					B	0.000	21.847		100.00	0.000	0.000
					C	0.000	21.847		100.00	0.000	1.153
L4 63.7500-63.2500	63.4999	1.206	7.72	1.611	A	0.000	1.611	1.611	100.00	0.000	0.000
					B	0.000	1.611		100.00	0.000	0.000
					C	0.000	1.611		100.00	0.000	0.083
L5 63.2500-53.2290	58.2122	1.176	7.53	32.858	A	0.000	32.858	32.858	100.00	0.000	0.000
					B	0.000	32.858		100.00	0.000	0.000
					C	0.000	32.858		100.00	0.000	0.545
L6 53.2290-28.7500	40.7508	1.062	6.80	86.644	A	0.000	86.644	86.644	100.00	0.000	0.000
					B	0.000	86.644		100.00	0.000	0.000
					C	0.000	86.644		100.00	0.000	4.361
L7 28.7500-25.7500	27.2460	1	6.40	11.085	A	0.000	11.085	11.085	100.00	0.000	0.000
					B	0.000	11.085		100.00	0.000	0.000
					C	0.000	11.085		100.00	0.000	0.625
L8 25.7500-0.0000	12.6379	1	6.40	101.512	A	0.000	101.512	101.512	100.00	0.000	0.000
					B	0.000	101.512		100.00	0.000	0.000
					C	0.000	101.512		100.00	0.000	5.365

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

Comb. No.	Description
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	148 - 100.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-13.78	0.00	0.61
			Max. Mx	5	-7.72	-551.42	7.69
			Max. My	2	-7.66	-4.85	569.79
			Max. Vy	5	18.96	-551.42	7.69
			Max. Vx	2	-19.36	-4.85	569.79
			Max. Torque	5			2.13
L2	100.5 - 70.667	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-27.06	0.15	1.55
			Max. Mx	5	-17.27	-1413.22	18.54
			Max. My	2	-17.24	-13.29	1440.14
			Max. Vy	5	31.57	-1413.22	18.54
			Max. Vx	2	-31.83	-13.29	1440.14
			Max. Torque	5			5.33
L3	70.667 - 63.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-28.92	0.15	1.55
			Max. Mx	5	-19.00	-1635.05	20.65
			Max. My	2	-18.97	-14.96	1663.71
			Max. Vy	5	32.59	-1635.05	20.65
			Max. Vx	2	-32.84	-14.96	1663.71
			Max. Torque	5			5.32
L4	63.75 - 63.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-29.03	0.15	1.55
			Max. Mx	5	-19.11	-1651.36	20.81
			Max. My	2	-19.08	-15.08	1680.15
			Max. Vy	5	32.66	-1651.36	20.81
			Max. Vx	2	-32.91	-15.08	1680.15
			Max. Torque	5			5.30
L5	63.25 - 53.229	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31.58	0.15	1.54
			Max. Mx	5	-21.50	-1985.40	23.85
			Max. My	2	-21.48	-17.49	2016.70
			Max. Vy	5	34.02	-1985.40	23.85
			Max. Vx	2	-34.27	-17.49	2016.70
			Max. Torque	5			5.30

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L6	53.229 - 28.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-38.30	0.17	4.18
			Max. Mx	5	-27.36	-2665.02	29.30
			Max. My	2	-27.34	-21.96	2700.99
			Max. Vy	5	37.58	-2665.02	29.30
			Max. Vx	2	-37.83	-21.96	2700.99
			Max. Torque	5			10.79
L7	28.75 - 25.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-43.37	0.17	4.18
			Max. Mx	5	-32.18	-2999.53	31.91
			Max. My	2	-32.17	-24.04	3037.66
			Max. Vy	5	38.86	-2999.53	31.91
			Max. Vx	2	-39.10	-24.04	3037.66
			Max. Torque	5			10.73
L8	25.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-54.76	0.17	4.17
			Max. Mx	5	-42.98	-4044.14	39.45
			Max. My	2	-42.98	-30.12	4088.55
			Max. Vy	5	42.33	-4044.14	39.45
			Max. Vx	2	-42.57	-30.12	4088.55
			Max. Torque	5			10.73

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	54.76	-0.00	-0.00
	Max. H_x	11	43.00	42.26	-0.09
	Max. H_z	2	43.00	-0.23	42.56
	Max. M_x	2	4088.55	-0.23	42.56
	Max. M_z	5	4044.14	-42.31	0.29
	Max. Torsion	5	10.68	-42.31	0.29
	Min. Vert	2	43.00	-0.23	42.56
	Min. H_x	5	43.00	-42.31	0.29
	Min. H_z	8	43.00	0.22	-42.47
	Min. M_x	8	-4072.94	0.22	-42.47
	Min. M_z	11	-4035.78	42.26	-0.09
	Min. Torsion	11	-10.58	42.26	-0.09

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	43.00	0.00	-0.00	-0.73	0.03	0.00
Dead+Wind 0 deg - No Ice	43.00	0.23	-42.56	-4088.55	-30.12	0.25
Dead+Wind 30 deg - No Ice	43.00	21.17	-37.01	-3561.94	-2018.29	-5.01
Dead+Wind 60 deg - No Ice	43.00	36.67	-21.53	-2077.22	-3503.63	-8.97
Dead+Wind 90 deg - No Ice	43.00	42.31	-0.29	-39.45	-4044.14	-10.68
Dead+Wind 120 deg - No Ice	43.00	36.42	21.25	2043.35	-3471.56	-8.85
Dead+Wind 150 deg - No Ice	43.00	20.89	36.78	3530.68	-1986.77	-4.89
Dead+Wind 180 deg - No Ice	43.00	-0.22	42.47	4072.94	28.15	-0.04
Dead+Wind 210 deg - No Ice	43.00	-21.16	36.95	3550.19	2016.53	4.84
Dead+Wind 240 deg - No Ice	43.00	-36.57	21.57	2081.35	3488.00	8.47
Dead+Wind 270 deg - No Ice	43.00	-42.26	0.09	7.47	4035.78	10.58
Dead+Wind 300 deg - No Ice	43.00	-36.52	-21.22	-2040.87	3486.10	9.19
Dead+Wind 330 deg - No Ice	43.00	-20.86	-36.81	-3536.79	1981.57	5.37
Dead+Ice+Temp	54.76	0.00	0.00	-4.17	0.17	-0.00

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 0 deg+Ice+Temp	54.76	0.02	-4.79	-478.49	-2.86	-0.02
Dead+Wind 30 deg+Ice+Temp	54.76	2.38	-4.16	-417.09	-234.04	-0.69
Dead+Wind 60 deg+Ice+Temp	54.76	4.13	-2.42	-244.70	-406.43	-1.17
Dead+Wind 90 deg+Ice+Temp	54.76	4.76	-0.03	-8.26	-469.24	-1.36
Dead+Wind 120 deg+Ice+Temp	54.76	4.10	2.39	232.85	-403.19	-1.12
Dead+Wind 150 deg+Ice+Temp	54.76	2.35	4.14	405.42	-230.95	-0.60
Dead+Wind 180 deg+Ice+Temp	54.76	-0.02	4.78	468.34	2.99	0.04
Dead+Wind 210 deg+Ice+Temp	54.76	-2.38	4.16	407.35	234.19	0.67
Dead+Wind 240 deg+Ice+Temp	54.76	-4.12	2.42	236.62	405.13	1.13
Dead+Wind 270 deg+Ice+Temp	54.76	-4.76	0.01	-3.60	468.70	1.36
Dead+Wind 300 deg+Ice+Temp	54.76	-4.11	-2.39	-241.11	405.05	1.15
Dead+Wind 330 deg+Ice+Temp	54.76	-2.35	-4.14	-414.57	230.74	0.64
Dead+Wind 0 deg - Service	43.00	0.07	-12.79	-1230.54	-9.04	0.06
Dead+Wind 30 deg - Service	43.00	6.36	-11.12	-1072.18	-607.19	-1.51
Dead+Wind 60 deg - Service	43.00	11.02	-6.47	-625.48	-1054.05	-2.70
Dead+Wind 90 deg - Service	43.00	12.72	-0.09	-12.41	-1216.65	-3.21
Dead+Wind 120 deg - Service	43.00	10.95	6.39	614.20	-1044.38	-2.67
Dead+Wind 150 deg - Service	43.00	6.28	11.06	1061.68	-597.70	-1.49
Dead+Wind 180 deg - Service	43.00	-0.07	12.76	1224.77	8.49	-0.03
Dead+Wind 210 deg - Service	43.00	-6.36	11.11	1067.57	606.70	1.47
Dead+Wind 240 deg - Service	43.00	-10.99	6.48	625.65	1049.38	2.57
Dead+Wind 270 deg - Service	43.00	-12.70	0.03	1.71	1214.17	3.20
Dead+Wind 300 deg - Service	43.00	-10.98	-6.38	-614.53	1048.80	2.77
Dead+Wind 330 deg - Service	43.00	-6.27	-11.06	-1064.59	596.17	1.61

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	-43.00	0.00	0.00	43.00	0.00	0.000%
2	0.23	-43.00	-42.56	-0.23	43.00	42.56	0.002%
3	21.17	-43.00	-37.01	-21.17	43.00	37.01	0.000%
4	36.67	-43.00	-21.53	-36.67	43.00	21.53	0.000%
5	42.31	-43.00	-0.29	-42.31	43.00	0.29	0.000%
6	36.42	-43.00	21.25	-36.42	43.00	-21.25	0.000%
7	20.89	-43.00	36.78	-20.89	43.00	-36.78	0.000%
8	-0.22	-43.00	42.47	0.22	43.00	-42.47	0.002%
9	-21.16	-43.00	36.95	21.16	43.00	-36.95	0.000%
10	-36.57	-43.00	21.57	36.57	43.00	-21.57	0.000%
11	-42.26	-43.00	0.09	42.26	43.00	-0.09	0.000%
12	-36.52	-43.00	-21.22	36.52	43.00	21.22	0.000%
13	-20.86	-43.00	-36.81	20.86	43.00	36.81	0.000%
14	0.00	-54.76	0.00	-0.00	54.76	-0.00	0.001%
15	0.02	-54.76	-4.79	-0.02	54.76	4.79	0.000%
16	2.38	-54.76	-4.16	-2.38	54.76	4.16	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
17	4.13	-54.76	-2.42	-4.13	54.76	2.42	0.000%
18	4.76	-54.76	-0.03	-4.76	54.76	0.03	0.000%
19	4.10	-54.76	2.39	-4.10	54.76	-2.39	0.000%
20	2.35	-54.76	4.14	-2.35	54.76	-4.14	0.000%
21	-0.02	-54.76	4.78	0.02	54.76	-4.78	0.000%
22	-2.38	-54.76	4.16	2.38	54.76	-4.16	0.000%
23	-4.12	-54.76	2.42	4.12	54.76	-2.42	0.000%
24	-4.76	-54.76	0.01	4.76	54.76	-0.01	0.000%
25	-4.11	-54.76	-2.39	4.11	54.76	2.39	0.000%
26	-2.35	-54.76	-4.14	2.35	54.76	4.14	0.000%
27	0.07	-43.00	-12.79	-0.07	43.00	12.79	0.003%
28	6.36	-43.00	-11.12	-6.36	43.00	11.12	0.001%
29	11.02	-43.00	-6.47	-11.02	43.00	6.47	0.001%
30	12.72	-43.00	-0.09	-12.72	43.00	0.09	0.001%
31	10.95	-43.00	6.39	-10.95	43.00	-6.39	0.001%
32	6.28	-43.00	11.06	-6.28	43.00	-11.06	0.001%
33	-0.07	-43.00	12.77	0.07	43.00	-12.76	0.003%
34	-6.36	-43.00	11.11	6.36	43.00	-11.11	0.001%
35	-10.99	-43.00	6.48	10.99	43.00	-6.48	0.001%
36	-12.70	-43.00	0.03	12.70	43.00	-0.03	0.001%
37	-10.98	-43.00	-6.38	10.98	43.00	6.38	0.001%
38	-6.27	-43.00	-11.06	6.27	43.00	11.06	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	12	0.00000001	0.00007816
3	Yes	15	0.00000001	0.00006892
4	Yes	15	0.00000001	0.00008219
5	Yes	14	0.00000001	0.00006657
6	Yes	15	0.00000001	0.00006535
7	Yes	15	0.00000001	0.00007580
8	Yes	12	0.00000001	0.00005541
9	Yes	15	0.00000001	0.00007701
10	Yes	15	0.00000001	0.00006766
11	Yes	14	0.00000001	0.00005930
12	Yes	15	0.00000001	0.00008099
13	Yes	15	0.00000001	0.00006619
14	Yes	6	0.00000001	0.00001502
15	Yes	13	0.00000001	0.00009026
16	Yes	13	0.00000001	0.00009183
17	Yes	13	0.00000001	0.00009109
18	Yes	13	0.00000001	0.00008802
19	Yes	13	0.00000001	0.00008876
20	Yes	13	0.00000001	0.00008910
21	Yes	13	0.00000001	0.00008777
22	Yes	13	0.00000001	0.00008979
23	Yes	13	0.00000001	0.00008954
24	Yes	13	0.00000001	0.00008788
25	Yes	13	0.00000001	0.00009049
26	Yes	13	0.00000001	0.00009102
27	Yes	11	0.00000001	0.00007227
28	Yes	12	0.00000001	0.00007386
29	Yes	12	0.00000001	0.00012756
30	Yes	12	0.00000001	0.00007950
31	Yes	12	0.00000001	0.00007538
32	Yes	12	0.00000001	0.00010505
33	Yes	11	0.00000001	0.00007085
34	Yes	12	0.00000001	0.00010543
35	Yes	12	0.00000001	0.00007731
36	Yes	12	0.00000001	0.00007675
37	Yes	12	0.00000001	0.00012787
38	Yes	12	0.00000001	0.00007004

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 100.5	26.733	27	1.6765	0.0103
L2	104.5 - 70.667	12.887	28	1.2549	0.0063
L3	70.667 - 63.75	5.468	28	0.7976	0.0036
L4	63.75 - 63.25	4.375	28	0.7111	0.0032
L5	63.25 - 53.229	4.301	28	0.7029	0.0032
L6	53.229 - 28.75	2.980	28	0.5531	0.0026
L7	34.5 - 25.75	1.252	28	0.3277	0.0013
L8	25.75 - 0	0.702	28	0.2621	0.0010

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.0000	VHLP800-11	27	26.733	1.6765	0.0104	32690
148.0000	TD-RRH8x20-25	27	26.733	1.6765	0.0104	32690
144.0000	VHLP2.5-10W	27	25.367	1.6440	0.0100	32690
120.0000	(2) 7770.00 w/ Mount Pipe	27	17.437	1.4311	0.0078	5836
96.0000	DB420-B	28	10.690	1.1393	0.0055	3823
82.0000	(3) RR90-17-00DPL2 w/ Mount Pipe	28	7.562	0.9406	0.0043	3939
72.0000	800 10504 w/ Mount Pipe	28	5.694	0.8127	0.0037	4050
53.0000	BSA150B	28	2.954	0.5499	0.0026	4073
50.0000	BULLET III	28	2.620	0.5083	0.0024	4319

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 100.5	88.606	2	5.5559	0.0336
L2	104.5 - 70.667	42.746	3	4.1625	0.0206
L3	70.667 - 63.75	18.153	3	2.6477	0.0118
L4	63.75 - 63.25	14.526	3	2.3610	0.0106
L5	63.25 - 53.229	14.280	3	2.3336	0.0105
L6	53.229 - 28.75	9.898	3	1.8367	0.0087
L7	34.5 - 25.75	4.158	3	1.0883	0.0044
L8	25.75 - 0	2.332	3	0.8706	0.0033

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.0000	VHLP800-11	2	88.606	5.5559	0.0341	10029
148.0000	TD-RRH8x20-25	2	88.606	5.5559	0.0341	10029
144.0000	VHLP2.5-10W	2	84.084	5.4487	0.0329	10029
120.0000	(2) 7770.00 w/ Mount Pipe	2	57.826	4.7455	0.0256	1787
96.0000	DB420-B	3	35.469	3.7797	0.0182	1165
82.0000	(3) RR90-17-00DPL2 w/ Mount	3	25.100	3.1218	0.0143	1196

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
	Pipe					
72.0000	800 10504 w/ Mount Pipe	3	18.904	2.6979	0.0121	1227
53.0000	BSA150B	3	9.810	1.8260	0.0087	1230
50.0000	BULLET III	3	8.701	1.6880	0.0080	1304

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	148 - 100.5 (1)	TP31.643x22x0.25	47.5000	0.0000	0.0	36.000	24.6177	-7.66	886.24	0.009
L2	100.5 - 70.667 (2)	TP37.1993x30.331x0.375	33.8330	0.0000	0.0	36.000	44.4653	-17.24	1600.75	0.011
L3	70.667 - 63.75 (3)	TP38.6035x37.1993x0.4947	6.9170	0.0000	0.0	28.626	60.7048	-18.97	1737.73	0.011
L4	63.75 - 63.25 (4)	TP38.705x38.6035x0.375	0.5000	0.0000	0.0	36.000	46.2834	-19.08	1666.20	0.011
L5	63.25 - 53.229 (5)	TP39.9894x38.705x0.4375	10.0210	0.0000	0.0	36.000	55.7188	-21.47	2005.88	0.011
L6	53.229 - 28.75 (6)	TP44.959x39.9894x0.5776	24.4790	0.0000	0.0	31.662	80.3768	-27.34	2544.89	0.011
L7	28.75 - 25.75 (7)	TP44.6929x42.6364x0.6898	8.7500	0.0000	0.0	32.136	97.7377	-32.16	3140.90	0.010
L8	25.75 - 0 (8)	TP49.92x44.6929x0.7194	25.7500	0.0000	0.0	31.512	113.9730	-42.98	3591.52	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	148 - 100.5 (1)	TP31.643x22x0.25	569.81	37.161	36.000	1.032	0.00	0.000	36.000	0.000
L2	100.5 - 70.667 (2)	TP37.1993x30.331x0.375	1440.20	43.271	36.000	1.202	0.00	0.000	36.000	0.000
L3	70.667 - 63.75 (3)	TP38.6035x37.1993x0.4947	1664.03	35.485	28.626	1.240	0.00	0.000	28.626	0.000
L4	63.75 - 63.25 (4)	TP38.705x38.6035x0.375	1680.51	46.583	36.000	1.294	0.00	0.000	36.000	0.000
L5	63.25 - 53.229 (5)	TP39.9894x38.705x0.4375	2017.87	45.084	36.000	1.252	0.00	0.000	36.000	0.000
L6	53.229 - 28.75 (6)	TP44.959x39.9894x0.5776	2703.66	38.414	31.662	1.213	0.00	0.000	31.662	0.000
L7	28.75 - 25.75 (7)	TP44.6929x42.6364x0.6898	3041.04	34.975	32.136	1.088	0.00	0.000	32.136	0.000
L8	25.75 - 0 (8)	TP49.92x44.6929x0.7194	4094.02	36.075	31.512	1.145	0.00	0.000	31.512	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	148 - 100.5 (1)	TP31.643x22x0.25	19.36	0.787	24.000	0.067	0.23	0.007	24.000	0.000
L2	100.5 - 70.667 (2)	TP37.1993x30.331x0.375	31.83	0.716	24.000	0.061	0.46	0.006	24.000	0.000
L3	70.667 - 63.75 (3)	TP38.6035x37.1993x0.4947	32.93	0.542	19.084	0.058	2.16	0.022	19.084	0.001
L4	63.75 - 63.25 (4)	TP38.705x38.6035x0.375	33.00	0.713	24.000	0.060	2.16	0.028	24.000	0.001
L5	63.25 - 53.229 (5)	TP39.9894x38.705x0.4375	34.35	0.617	24.000	0.052	2.17	0.023	24.000	0.001
L6	53.229 - 28.75 (6)	TP44.959x39.9894x0.5776	37.91	0.472	21.108	0.045	4.95	0.033	21.108	0.002
L7	28.75 - 25.75 (7)	TP44.6929x42.6364x0.6898	39.18	0.401	21.424	0.038	4.96	0.027	21.424	0.001
L8	25.75 - 0 (8)	TP49.92x44.6929x0.7194	42.65	0.374	21.008	0.036	5.01	0.021	21.008	0.001

Pole Interaction Design Data

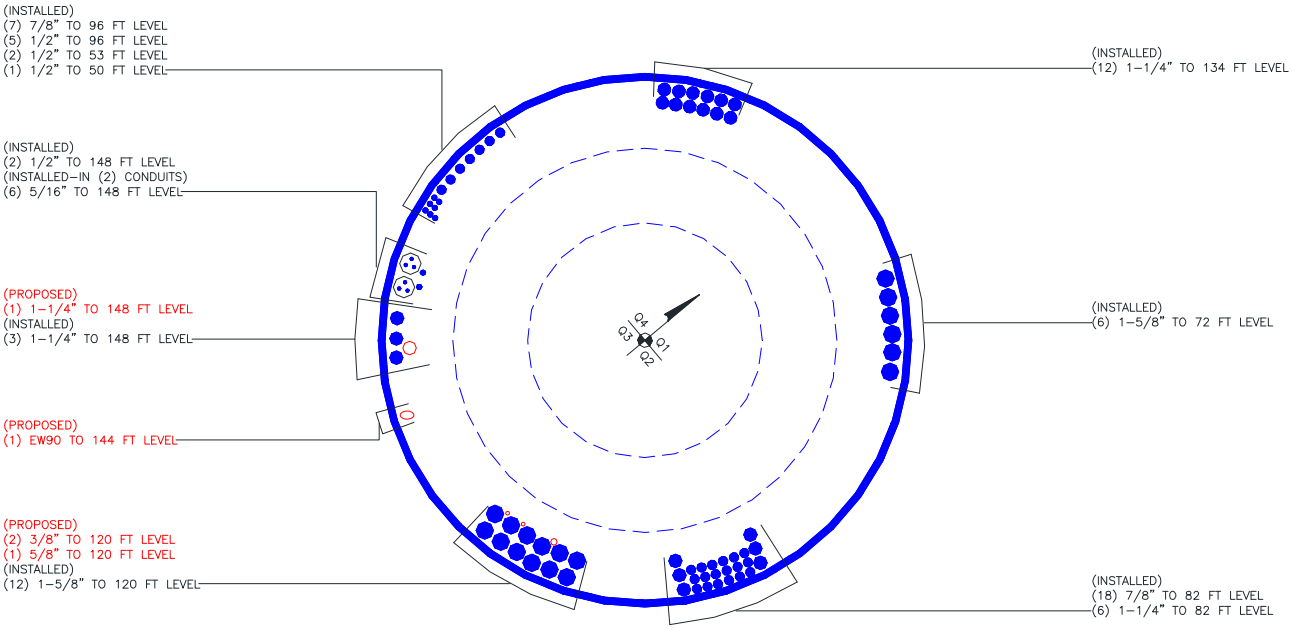
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	148 - 100.5 (1)	0.009	1.032	0.000	0.067	0.000	1.042 ✔	1.333	H1-3+VT ✔
L2	100.5 - 70.667 (2)	0.011	1.202	0.000	0.061	0.000	1.214 ✔	1.333	H1-3+VT ✔
L3	70.667 - 63.75 (3)	0.011	1.240	0.000	0.058	0.001	1.251 ✔	1.333	H1-3+VT ✔
L4	63.75 - 63.25 (4)	0.011	1.294	0.000	0.060	0.001	1.306 ✔	1.333	H1-3+VT ✔
L5	63.25 - 53.229 (5)	0.011	1.252	0.000	0.052	0.001	1.264 ✔	1.333	H1-3+VT ✔
L6	53.229 - 28.75 (6)	0.011	1.213	0.000	0.045	0.002	1.225 ✔	1.333	H1-3+VT ✔
L7	28.75 - 25.75 (7)	0.010	1.088	0.000	0.038	0.001	1.099 ✔	1.333	H1-3+VT ✔
L8	25.75 - 0 (8)	0.012	1.145	0.000	0.036	0.001	1.157 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P_{allow} K	% Capacity	Pass Fail
L1	148 - 100.5	Pole	TP31.643x22x0.25	1	-7.66	1181.35	78.2	Pass
L2	100.5 - 70.667	Pole	TP37.1993x30.331x0.375	2	-17.24	2133.80	91.0	Pass
L3	70.667 - 63.75	Pole	TP38.6035x37.1993x0.4947	3	-18.97	2316.39	93.9	Pass
L4	63.75 - 63.25	Pole	TP38.705x38.6035x0.375	4	-19.08	2221.04	98.0	Pass
L5	63.25 - 53.229	Pole	TP39.9894x38.705x0.4375	5	-21.47	2673.84	94.8	Pass
L6	53.229 - 28.75	Pole	TP44.959x39.9894x0.5776	6	-27.34	3392.34	91.9	Pass
L7	28.75 - 25.75	Pole	TP44.6929x42.6364x0.6898	7	-32.16	4186.82	82.4	Pass
L8	25.75 - 0	Pole	TP49.92x44.6929x0.7194	8	-42.98	4787.50	86.8	Pass
							Summary	
						Pole (L4)	98.0	Pass
						RATING =	**98.0**	**Pass**

APPENDIX B

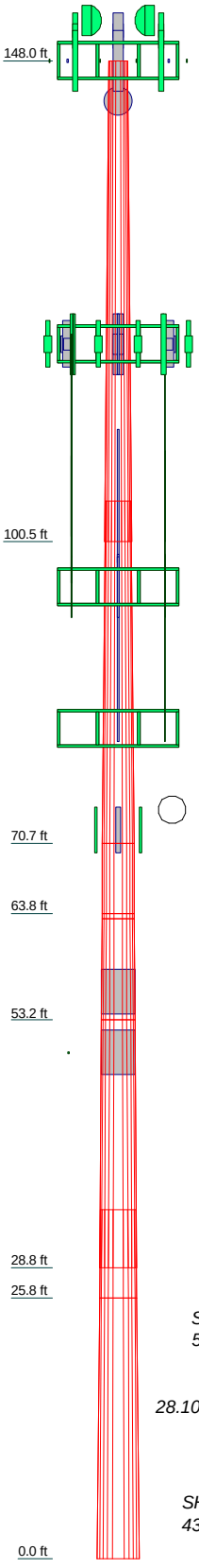
BASE LEVEL DRAWING

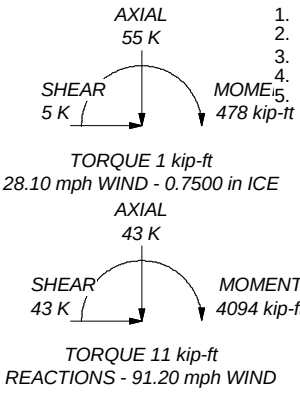

(INSTALLED)
(7) 7/8" TO 96 FT LEVEL
(5) 1/2" TO 96 FT LEVEL
(2) 1/2" TO 53 FT LEVEL
(1) 1/2" TO 50 FT LEVEL
(INSTALLED)
(12) 1-1/4" TO 134 FT LEVEL
(INSTALLED)
(2) 1/2" TO 148 FT LEVEL
(INSTALLED-IN (2) CONDUITS)
(6) 5/16" TO 148 FT LEVEL
(PROPOSED)
(1) 1-1/4" TO 148 FT LEVEL
(INSTALLED)
(3) 1-1/4" TO 148 FT LEVEL
(INSTALLED)
(6) 1-5/8" TO 72 FT LEVEL
(PROPOSED)
(1) EW90 TO 144 FT LEVEL
(PROPOSED)
(2) 3/8" TO 120 FT LEVEL
(1) 5/8" TO 120 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 120 FT LEVEL
(INSTALLED)
(18) 7/8" TO 82 FT LEVEL
(6) 1-1/4" TO 82 FT LEVEL
Q4
Q1
Q3
Q2

APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	8
Length (ft)	47.5000	33.8330	6.9170	0.5000	10.0210	24.4790	8.7500	25.7500
Number of Sides	12	12	12	12	12	12	12	12
Thickness (in)	0.2500	0.3750	0.4947	0.3750	0.4375	0.5776	0.6898	0.7194
Socket Length (ft)	4.0000					5.7500		
Top Dia (in)	22.0000	30.3310	37.1993	38.6035	38.7050	39.9894	42.6364	44.6929
Bot Dia (in)	31.6430	37.1993	38.6035	38.7050	39.9894	44.9590	44.6929	49.9200
Grade	A607-60		Reinf 47.71 ksi		A607-60	Reinf 52.77 ksi	Reinf 53.56 ksi	Reinf 52.52 ksi
Weight (K)	3.5	4.6	1.4	0.1	1.9	6.5	2.8	9.5





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
TD-RRH8x20-25	148	(2) RRUS-11	120
APXVTM14-C-120 w/ Mount Pipe	148	P65-16-XLH-RR w/ Mount Pipe	120
TD-RRH8x20-25	148	Platform Mount [LP 712-1]	120
APXVTM14-C-120 w/ Mount Pipe	148	6' x 2" Mount Pipe	120
TD-RRH8x20-25	148	6' x 2" Mount Pipe	120
APXVTM14-C-120 w/ Mount Pipe	148	6' x 2" Mount Pipe	120
LLPX310R w/ Mount Pipe	148	(2) LGP13519	120
LLPX310R w/ Mount Pipe	148	(2) 7770.00 w/ Mount Pipe	120
LLPX310R w/ Mount Pipe	148	(2) LGP2140X	120
DB420	148	(2) PD83-1	96
FDD_R6_RRH	148	DB205-A	96
FDD_R6_RRH	148	PD201-1	96
FDD_R6_RRH	148	PD83-1	96
APXVSPP18-C-A20 w/ Mount Pipe	148	DB806E-XT	96
APXVSPP18-C-A20 w/ Mount Pipe	148	DB224	96
APXVSPP18-C-A20 w/ Mount Pipe	148	PD220	96
PCS 1900MHz 4x45W-65MHz	148	(4) 6' x 2" Mount Pipe	96
PCS 1900MHz 4x45W-65MHz	148	(3) 6' x 2" Mount Pipe	96
PCS 1900MHz 4x45W-65MHz	148	(3) 6' x 2" Mount Pipe	96
800MHZ RRH	148	Platform Mount [LP 712-1]	96
800MHZ RRH	148	DB420-B	96
800MHZ RRH	148	(2) PD1110	96
800 EXTERNAL NOTCH FILTER	148	PD201-1	96
800 EXTERNAL NOTCH FILTER	148	(2) ETW190VS12UB	82
800 EXTERNAL NOTCH FILTER	148	(2) ETW190VS12UB	82
(3) ACU-A20-N	148	(2) ETW190VS12UB	82
(3) ACU-A20-N	148	APXV18-206516S-C-A20 w/ Mount Pipe	82
(3) ACU-A20-N	148	APXV18-206516S-C-A20 w/ Mount Pipe	82
Platform Mount [LP 712-1]	148	APXV18-206516S-C-A20 w/ Mount Pipe	82
Miscellaneous [NA 507-1]	148	ATMAA1412D-1A20	82
6' x 2" Mount Pipe	148	ATMAA1412D-1A20	82
6' x 2" Mount Pipe	148	ATMAA1412D-1A20	82
6' x 2" Mount Pipe	148	Platform Mount [LP 712-1]	82
VHLP800-11	148	(3) RR90-17-00DPL2 w/ Mount Pipe	82
VHLP800-11	148	(3) RR90-17-00DPL2 w/ Mount Pipe	82
Pipe Mount [PM 601-1]	144	(3) RR90-17-00DPL2 w/ Mount Pipe	82
VHLP2.5-10W	144	Pipe Mount [PM 601-3]	72
(2) 7770.00 w/ Mount Pipe	120	800 10504 w/ Mount Pipe	72
(2) LGP2140X	120	800 10504 w/ Mount Pipe	72
(2) LGP13519	120	800 10504 w/ Mount Pipe	72
(2) 7770.00 w/ Mount Pipe	120	Side Arm Mount [SO 702-1]	53
(2) LGP2140X	120	BSA150B	53
(2) LGP13519	120	BSA150B	53
(2) RRUS-11	120	BULLET III	50
P65-16-XLH-RR w/ Mount Pipe	120		
DC6-48-60-18-8F	120		
(2) RRUS-11	120		
P65-16-XLH-RR w/ Mount Pipe	120		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	Reinf 53.56 ksi	54 ksi	67 ksi
Reinf 47.71 ksi	48 ksi	60 ksi	Reinf 52.52 ksi	53 ksi	66 ksi
Reinf 52.77 ksi	53 ksi	66 ksi			

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 91.20 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 28.10 mph basic wind with 0.75 in ice.
4. Deflections are based upon a 50.00 mph wind.
5. TOWER RATING: 98%

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: **148' Monopole / Westport Fire Department**		
Project: **PJF 37512-1197 / BU 876354**		
Client: CCI	Drawn by: John J Woolley	App'd:
Code: TIA/EIA-222-F	Date: 07/08/14	Scale: NTS
Path: G:\TOWER\375_Crown_Castle\2013\37513-1197 BU 876354\37513-1197.003.7805 WO 794876 BU 876354 - 003 SA\37513-1197.003.7805.eri		Dwg No. E-1

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

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

Site Data

BU#:
Site Name:
App #:

Anchor Rod Data		
Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	58	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	60	in
Thick:	2.75	in
Grade:	50	ksi
Clip Distance:	0	in

Stiffener Data (Welding at both sides)		
Configuration:	Stiffened	
Weld Type:	Both	**
Groove Depth:	0.5	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.5	in
Fillet V. Weld:	0.375	in
Width:	6	in
Height:	18	in
Thick:	1	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	49.92	in
Thick:	0.5	in
Grade:	60	ksi
# of Sides:	12	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	4094	ft-kips
Unfactored Axial, P:	43	kips
Unfactored Shear, V:	43	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	167.3	Kips
Allowable Tension:	195.0	Kips
Anchor Rod Stress Ratio:	85.8%	**Pass**

Base Plate Results Shear Check Only

Base Plate Stress:	5.2	ksi
Allowable PL Bending Stress:	26.7	ksi
Base Plate Stress Ratio:	19.5%	**Pass**

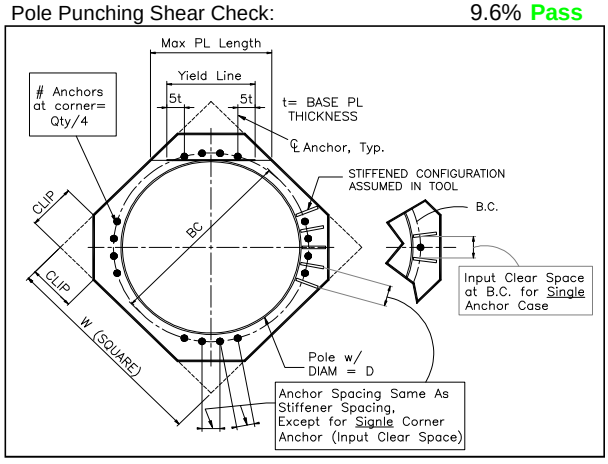
PL Ref. Data
Yield Line (in):
N/A, Roark
Max PL Length:
34.93

Stiffener Results

Horizontal Weld :	50.1%	**Pass**
Vertical Weld:	43.4%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	12.2%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	50.4%	**Pass**
Plate Comp. (AISC Bracket):	51.7%	**Pass**

Pole Results

Pole Punching Shear Check:	9.6%	**Pass**



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

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Job Number:	37513-1197.003.7805	**Page:**	1
Site Number:	876354	**By:**	JJW
Site Name:	Site Name	**Date:**	7/8/2014

DRILLED PIER SOIL AND STEEL ANALYSIS - TIA/EIA-222-F

Unfactored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, M =	4094.0		k-ft
Shear, V =	43.0		kips
Axial Load, P =	43.0		kips
OTM =	4115.5	0.0	k-ft @ Ground

Safety Factors / Load Factors / Φ Factors

Tower Type =	Monopole DP
ACI Code =	ACI 318-02
Seismic Design Category =	D
Reference Standard =	TIA/EIA-222-F
Use 1.3 Load Factor?	Yes
Load Factor =	1.30

Drilled Pier Parameters

Diameter =	7	ft
Height Above Grade =	0.5	ft
Depth Below Grade =	22.5	ft
fc' =	3	ksi
εc =	0.003	in/in
Mat Ftdn. Cap Width =		ft
Mat Ftdn. Cap Length =		ft
Depth Below Grade =		ft

	Safety Factor	Φ Factor
Soil Lateral Resistance =	2.00	0.75
Skin Friction =	2.00	0.75
End Bearing =	2.00	0.75
Concrete Wt. Resist Uplift =	1.25	

Load Combinations Checked per TIA/EIA-222-F

1. Ult. Skin Friction/2.00 + Ult. End Bearing/2.00 + Effective Soil Wt. - Buoyant Conc. Wt. ≥ Comp.
2. Ult. Skin Friction/2.00 + Buoyant Conc. Wt./1.25 ≥ Uplift
3. Ult. Skin Friction/1.50 + Buoyant Conc. Wt./1.50 ≥ Uplift

Steel Parameters

Number of Bars =	40	
Rebar Size =	#11	
Rebar Fy =	60	ksi
Rebar MOE =	29000	ksi
Tie Size =	#5	
Side Clear Cover to Ties =	4	in

Soil Parameters

Water Table Depth =	99.00	ft
Depth to Ignore Soil =	3.50	ft
Depth to Full Cohesion =	0	ft
Full Cohesion Starts at?	Ground	

Above Full Cohesion Lateral Resistance = 4(Cohesion)(Dia)(H)
Below Full Cohesion Lateral Resistance = 8(Cohesion)(Dia)(H)

Direct Embed Pole Shaft Parameters

Dia @ Grade =		in
Dia @ Depth Below Grade =		in
Number of Sides =		
Thickness =		in
Fy =		ksi
Backfill Condition =		

Maximum Capacity Ratios

Maximum Soil Ratio =	100.0%
Maximum Steel Ratio =	100.0%

Define Soil Layers

Note: Cohesion = Undrained Shear Strengh = Unconfined Compressive Strength / 2

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	6.5	100		30	Sand	0			6.5
2	20	135		38	Sand	10000			26.5
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	16.78	ft, from Grade	Shear, V =	43.00	kips
Bending Moment, M =	4836.87	k-ft, from COR	Resisting Shear, Va =	44.34	kips
Resisting Moment, Ma =	4987.43	k-ft, from COR			

MOMENT RATIO = 97.0% OK **SHEAR RATIO = 97.0% OK**

Soil Results: Uplift

Uplift, T =	0.00	kips
Allowable Uplift Cap., Ta =	106.22	kips

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

Compression, C =	43.00	kips
Allowable Comp. Cap., Ca =	167.79	kips

COMPRESSION RATIO = 25.6% OK

Steel Results (ACI 318-02):

Minimum Steel Area =	18.47	sq in
Actual Steel Area =	62.40	sq in
Allowable Min Axial, Pa =	-2592.00	kips, Where Ma = 0 k-ft
Allowable Max Axial, Pa =	7086.56	kips, Where Ma = 0 k-ft

Axial Load, P =	80.52	kips @ 6.00 ft Below Grade
Moment, M =	4332.13	k-ft @ 6.00 ft Below Grade
Allowable Moment, Ma =	7073.59	k-ft

MOMENT RATIO = 61.2% OK

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#: *876354*
Site Name: *Site Name*
App #:

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

Pier Properties

Concrete:

Pier Diameter =	7.0	ft
Concrete Area =	5541.8	in^2

Reinforcement:

Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	6.11	ft
Vert. Cage Diameter =	73.34	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:	0.0113	1.13%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:

(3)*(Sqrt(f'c)/Fy:	0.0027
200 / Fy:	0.0033

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	1.13%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	9212.52	kips
at Mu=(ϕ=0.65)Mn=	5501.91	ft-kips
Max Tu, (φ=0.9) Tn =	3369.6	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	F	
Max. Service Shaft M:	4332.13	ft-kips **(* Note)**
Max. Service Shaft P:	80.52	kips
Max Axial Force Type:	Comp.	

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

Load Factor	**Shaft Factored Loads**		
1.30	Mu:	5631.769	ft-kips
1.30	Pu:	104.676	kips

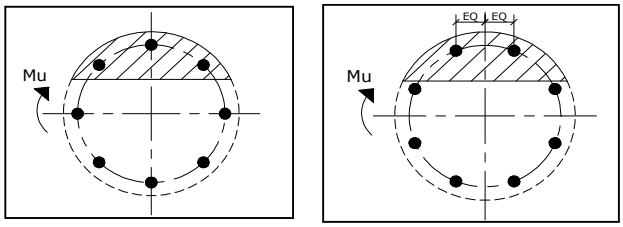
Material Properties

Concrete Comp. strength, f'c =	3000	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=	2002	
Seismic Properties		
Seismic Design Category =	D	
Seismic Risk =	**High**	

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

Results:

Governing Orientation Case: **2**



Case 1 Case 2

Dist. From Edge to Neutral Axis:	**18.83**	in
Extreme Steel Strain, ϵt:	**0.0095**	
ϵt > 0.0050, Tension Controlled		
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	104.68	kips
Drilled Shaft Moment Capacity, φMn:	**9195.66**	ft-kips
Drilled Shaft Superimposed Mu:	**5631.77**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**61.2%**

EBI Consulting
environmental | engineering | due diligence

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

Sprint Existing Facility

Site ID: CT03XC355

Westport Fire Department

515 Boston Post Road
Westport, CT 06820

September 19, 2014

EBI Project Number: 62144688

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

EBI Consulting
environmental | engineering | due diligence

September 19, 2014

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

Re: Radio Frequency Maximum Permissible Exposure (MPE) Assessment for Site:
CT03XC355 - Westport Fire Department

Site Total: 94.44% - MPE% in full compliance

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at **515 Boston Post Road, Westport, 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 **515 Boston Post Road, Westport, 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) 3 channels in the 1900 MHz Band were considered for each sector of the proposed installation.

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

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

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

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

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

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

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

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

Site ID	CT03XC355 - Westport Fire Department
Site Addresss	515 Boston Post Road, Westport, CT, 06820
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	3	60	5.9	148	142	1/2 "	0.5	0	208.04	0.37%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	148	142	1/2 "	0.5	0	39.00	0.12%
1B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	148	142	1/2 "	0.5	0	138.69	0.44%
														Sector total Power Density Value:		0.93%

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	3	60	5.9	148	142	1/2 "	0.5	0	208.04	0.37%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	148	142	1/2 "	0.5	0	39.00	0.12%
2B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	148	142	1/2 "	0.5	0	138.69	0.44%
														Sector total Power Density Value:		0.93%

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	3	60	5.9	148	142	1/2 "	0.5	0	208.04	0.37%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	148	142	1/2 "	0.5	0	39.00	0.12%
3B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	148	142	1/2 "	0.5	0	138.69	0.44%
														Sector total Power Density Value:		0.93%

Site Composite MPE %	
Carrier	MPE %
Sprint	2.79%
Nextel	3.13%
Westport	10.92%
Westport FD	0.06%
Clearwire	0.74%
MetroPCS	42.82%
AT&T	22.95%
T-Mobile	11.03%
Total Site MPE %	**94.44%**

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Summary

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

The anticipated Maximum Composite contributions from the Sprint facility are **2.79% (0.93% from sector 1, 0.93% from sector 2 and 0.93% 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 **94.44%** 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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