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

September 22, 2014

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

RE: **Sprint PCS-Exempt Modification - Crown Site BU: 876376**
Sprint PCS Site ID: CT33XC111
Located at: 123 Campville Hill Road, Harwinton, CT 06791

Dear Ms. Bachman:

This letter and exhibits are submitted on behalf of Sprint PCS (Sprint). Sprint is making modifications to certain existing sites in its Connecticut system in order to implement their 2.5GHz LTE technology. Please accept this letter and exhibits as notification, pursuant to § 16-50j-73 of the Regulations of Connecticut State Agencies ("R.C.S.A."), of construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In compliance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Mr. Michael R. Criss, First Selectman for Town of Harwinton, and Harwinton Rod & Gun Club, Inc., Property Owner.

Sprint plans to modify the existing wireless communications facility owned by Crown Castle and located at **123 Campville Hill Road, Harwinton, CT 06791**. Attached are a compound plan and elevation depicting the planned changes (Exhibit-1), and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration (Exhibit-2). Also included is a power density table report reflecting the modification to Sprint's operations at the site (Exhibit-3).

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

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

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

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

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

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

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

Sincerely,

Raymond Perry
Real Estate Specialist

Enclosures

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

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

Harwinton Rod & Gun Club, Inc.
P.O. Box 181
Harwinton, CT 06791-0181

Sprint

2.5 EQUIPMENT DEPLOYMENT

SITE NUMBER:

CT33XC111

SITE NAME:

SCOVILLE HILL/HARWINTON ROD & GUN

SITE ADDRESS:

123 CAMPVILLE HILL RD
HARWINTON, CT 06791

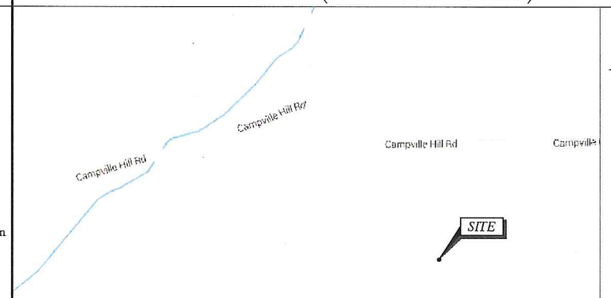
CROWN ID#: 876376
CROWN SITE NAME: SCOVILLE HILL/HARWINTON ROD

SHEET INFORMATION

SITE NUMBER:	CT33XC111
SITE NAME:	SCOVILLE HILL/HARWINTON ROD & GUN
SITE ADDRESS:	123 CAMPVILLE HILL RD HARWINTON, CT 06791
COUNTY:	LITCHFIELD
COORDINATES: (NAD 83)	41° 44' 12.12" N 73° 5' 50.86" W
GROUND ELEV:	737'± AMSL
STRUCTURE TYPE:	MONOPOLE
STRUCTURE HEIGHT:	177'-0"± AGL
STRUCTURE RAD CENTER:	177'-0"± AGL
ZONING CLASSIFICATION:	I-1 RES LAND
PARCEL INFO:	A4/05/0002

LANDLORD:	CROWN CASTLE USA 2000 CORPORATE DRIVE CANONSBURG, PA
LOCAL POWER COMPANY:	CONNECTICUT LIGHT AND POWER CONTACT CUSTOMER SERVICE (800) 286-2000
APPLICANT:	SPRINT 6580 SPRINT PARKWAY OVERLAND PARK, KANSAS 66251
ENGINEER:	JAMES QUICKSELL (845) 567-6656 EXT. 2835 JQuicksell@tectonicengineering.com
SPRINT CM:	GARY WOOD (860) 940-9168 gary.wood@sprint.com
CROWN CM:	JASON D'AMICO (860) 209-0104 jason.d'amico @crowncastle.com
AAV:	CHARTER

VICINITY MAP (NOT TO SCALE)



SHEET INDEX

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

GENERAL NOTES

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

PROJECT DESCRIPTION

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

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

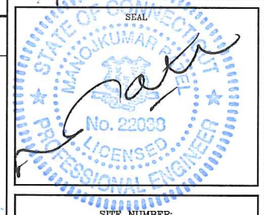
SUBMITTALS

PROJECT NO: 7225.CT33XCIII

NO	DATE	DESCRIPTION	BY
0	06/17/14	FOR COMMENT	JT
1	07/28/14	FOR CONSTRUCTION	MP
2	08/01/14	PER COMMENTS	MP

DATE	REVIEWED BY
8/1/14	DMQ

SEAL



SITE NUMBER:
CT33XC111

SITE NAME:
SCOVILLE HILL/HARWINTON ROD & GUN

SITE ADDRESS:
123 CAMPVILLE RD
HARWINTON, CT 06791

SHEET TITLE:
TITLE SHEET

SHEET NO:
T-1

DIVISION 01000–GENERAL NOTES

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.
2. THE ARCHITECT/ENGINEER HAVE MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.
3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE PROJECT OWNER'S REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK.
4. THE SCOPE OF WORK SHALL INCLUDE FURNISHING ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.
5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
6. ONCE THE CONTRACTOR HAS RECEIVED AND ACCEPTED THE NOTICE TO PROCEED, CONTRACTOR WILL CONTACT THE CROWN CASTLE CONSTRUCTION MANAGER OF RECORD (NOTED ON THE FIRST PAGE ON THIS CONSTRUCTION DRAWING) A MINIMUM OF 48 HOURS PRIOR TO WORK START. UPON ARRIVAL TO THE JOB SITE, CONTRACTOR CREW IS REQUIRED CALL 1–800–788–7011 TO NOTIFY THE CROWN CASTLE NOC WORK HAS BEGUN.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S/VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.
8. THE CONTRACTOR SHALL PROVIDE A FULL SET OF CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDUMS OR CLARIFICATIONS AVAILABLE FOR THE USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.
9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY OR LOCAL GOVERNMENT AUTHORITY.
11. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC. DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.
12. THE CONTRACTOR SHALL KEEP THE GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY. PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.
13. THE CONTRACTOR SHALL COMPLY WITH ALL PERTINENT SECTIONS OF THE BASIC STATE BUILDING CODE, LATEST EDITION, AND ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJECT. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK SHALL BE RELOCATED AS DIRECTED BY THE ARCHITECT/ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR PIER DRILLING AROUND OR NEAR UTILITIES. THE CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT LIMITED TO A) FALL PROTECTION, B) CONFINED SPACE, C) ELECTRICAL SAFETY, D) TRENCHING AND EXCAVATION OF ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHICH INTERFERE WITH THE EXECUTION OF THE WORK SHALL BE REMOVED AND OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT THE POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK SUBJECT TO THE APPROVAL OF THE ARCHITECT/ENGINEER.
14. THE CONTRACTOR SHALL NOTIFY THE PROJECT OWNER'S REPRESENTATIVE IN WRITING WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE LESSEE/LICENSEE REPRESENTATIVE.
15. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC. ON THE JOB.
16. THE CONTRACTOR SHALL NOTIFY THE THE RF ENGINEER FOR ANTENNA AZIMUTH VERIFICATION (DURING ANTENNA INSTALLATION) PRIOR TO CONDUCTING SWEEP TESTS.
17. THE CONTRACTOR SHALL SUBMIT AT THE END OF THE PROJECT A COMPLETE SET OF AS–BUILT DRAWINGS TO THE CLIENT REPRESENTATIVE.
18. REFER TO: CONSTRUCTION STANDARDS–SPRINT DOCUMENT EXHIBIT A–STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES REV. 4.0– 02.15.2011.DOCM.
19. REFER TO: WEATHER PROOFING SPECS: EXCERPT EXH A–WIHRPRF–STD CONSTR SPECS._1572011104218554 92.DOCM.
20. REFER TO: COLOR CODING–SPRINT NEXTEL ANT AND LINE COLOR CODING (DRAFT) V3 09–08–11.PDF
21. REFER TO LATEST DOCUMENTATION REVISION.

DIVISION 03000–CONCRETE

1.03 APPLICABLE STANDARDS (USE LATEST EDITIONS)

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

1.04 QUALITY ASSURANCE

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

3.04 SURFACE FINISHES

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

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

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

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

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

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

3.05 PATCHING

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

3.06 DEFECTIVE CONCRETE

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

3.07 PROTECTION

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

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

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

DIVISION 05000 – METALS

PART 1 – GENERAL

1.01 WORK INCLUDED

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

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

1.02 REFERENCE STANDARDS

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

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

PART 2 – PRODUCTS

2.01 MATERIALS

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

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

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

2.02 WELDING

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

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

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

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

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

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

2.03 BOLTING

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

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

C. ALL CONNECTIONS SHALL BE 2 BOLTS MINIMUM.

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

E. STANDARD, OVERSIZED OR HORIZONTAL SHORT SLOTTED HOLES.

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

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

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

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

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

2.04 FABRICATION

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

2.05 FINISH

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

2.06 PROTECTION

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

PART 3 – ERECTION

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

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

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

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

CROWN CASTLE

TECTONIC
• PLANNING
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• 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.CT33XC111

NO	DATE	DESCRIPTION	BY
0	06/17/14	FOR COMMENT	JT
1	07/28/14	FOR CONSTRUCTION	MP
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DATE	REVIEWED BY
8/1/14	JMG

SEAL

STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 22038
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC111

SITE NAME:
SCOVILLE HILL/HARWINTON ROD & GUN

SITE ADDRESS:
123 CAMPVILLE RD
HARWINTON, CT 06791

SHEET TITLE:
GENERAL NOTES

SHEET NO:
SP–1

DIVISION 13000–SPECIAL CONSTRUCTION ANTENNA INSTALLATION

PART 1 – GENERAL

1.01 WORK INCLUDED

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

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

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

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

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

G. ANTENNA AND HYBRIFLEX CABLE GROUNDING:

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

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

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

1.03 REQUIREMENTS OF REGULATOR AGENCIES

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

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

1. EIA – ELECTRONIC INDUSTRIES ASSOCIATION RS–22. STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES.
2. FAA – FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULAR AC 70/7480–IH, CONSTRUCTION MARKING AND LIGHTING.
3. FCC – FEDERAL COMMUNICATION COMMISSION RULES AND REGULATIONS FORM 715, OBSTRUCTION MARKING AND LIGHTING SPECIFICATION FOR ANTENNA STRUCTURES
4. AISC – AMERICAN INSTITUTE OF STEEL CONSTRUCTION FOR STRUCTURAL JOINTS USING ASTM 1325 OR A490 BOLTS.
5. NEC – NATIONAL ELECTRIC CODE – ON TOWER LIGHTING KITS.
6. UL – UNDERWRITER'S LABORATORIES APPROVED ELECTRICAL PRODUCTS.
7. IN ALL CASES, PART 77 OF THE FAA RULES AND PARTS 17 AND 22 OF THE FCC RULES ARE APPLICABLE AND IN THE EVENT OF CONFLICT, SUPERSEDE ANY OTHER STANDARDS OR SPECIFICATIONS.
8. LIFE SAFETY CODE NFPA, LATEST EDITION.

DIVISION 13000–EARTHWORK

PART 1 GENERAL

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

1.02 RELATED WORK

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

PART 2 PRODUCTS

2.01 MATERIALS

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

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

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

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

MATERIAL SHALL CONFORM TO THE FOLLOWING GRADATION REQUIREMENTS.

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

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

2.02 EQUIPMENT

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

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

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

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

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

3.03 INSTALLATION

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

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

C. DO NOT CREATE DEPRESSIONS WHERE WATER MAY POND.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3.04 FIELD QUALITY CONTROL

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

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

3.05 PROTECTION

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

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

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

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

Sprint

2.5 EQUIPMENT DEPLOYMENT

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SUBMITTALS

PROJECT NO: 7225.CT33XC111

NO	DATE	DESCRIPTION	BY
0	06/17/14	FOR COMMENT	JT
1	07/28/14	FOR CONSTRUCTION	MP
2	08/01/14	PER COMMENTS	MP

DATE	REVIEWED BY
8/1/14	JMA

SEAL

STATE OF CONNECTICUT — No. 22038 — LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC111

SITE NAME:
SCOVILLE HILL/HARWINTON ROD & GUN

SITE ADDRESS:
123 CAMPVILLE RD
HARWINTON, CT 06791

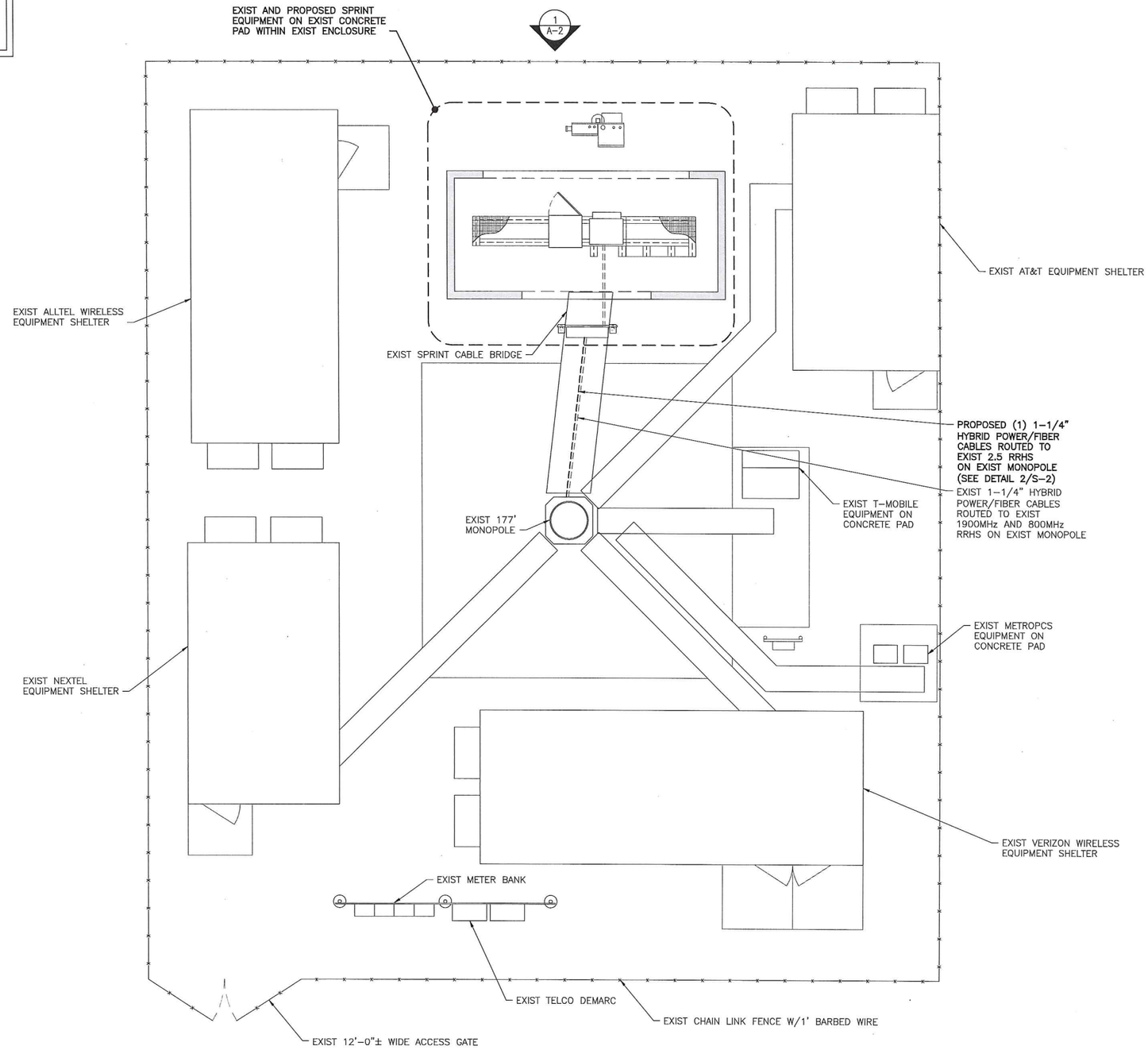
SHEET TITLE:
GENERAL NOTES

SHEET NO:
SP–2

N

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

2.5 EQUIPMENT DEPLOYMENT

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1	07/28/14	FOR CONSTRUCTION	MP
2	08/01/14	PER COMMENTS	MP

DATE	REVIEWED BY
8/11/14	JMA

SEAL

STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 22033
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC111

SITE NAME:
SCOVILLE HILL/HARWINTON ROD & GUN

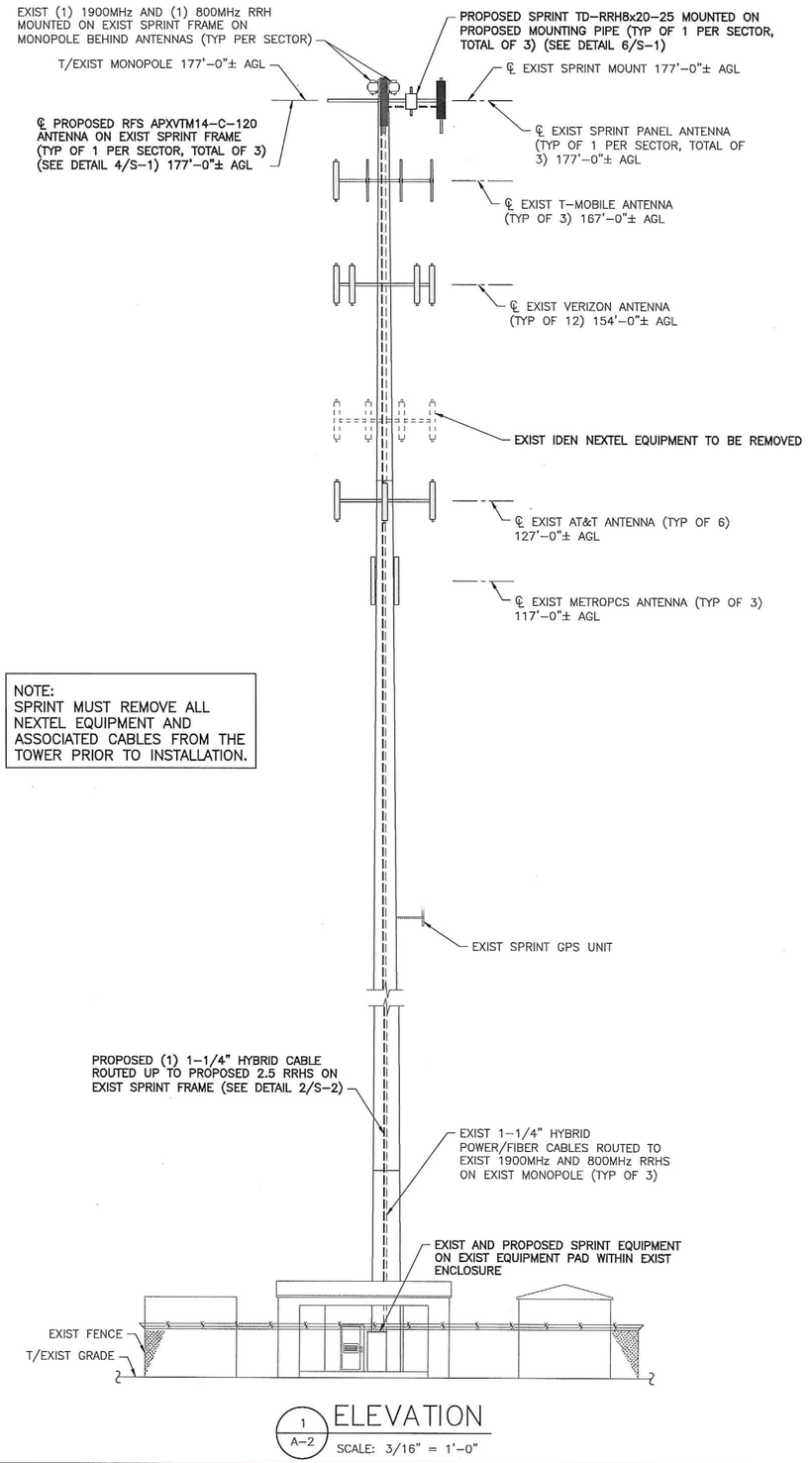
SITE ADDRESS:
123 CAMPVILLE RD
HARWINTON, CT 06791

SHEET TITLE:
SITE PLAN

SHEET NO:
A-1

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

THE EXISTING MOUNT HAS BEEN ANALYZED BY TECTONIC ENGINEERING AND FOUND TO BE ADEQUATE TO SUPPORT THE PROPOSED SPRINT UPGRADE AS DETAILED IN THE STRUCTURAL ANALYSIS EVALUATION LETTER DATED 07/28/14.



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

1 A-2 ELEVATION

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

Sprint
2.5 EQUIPMENT DEPLOYMENT

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SUBMITTALS

PROJECT NO: 7225.CT33XCIII

NO	DATE	DESCRIPTION	BY
0	06/17/14	FOR COMMENT	JT
1	07/28/14	FOR CONSTRUCTION	MP
2	08/01/14	PER COMMENTS	MP

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8/7/14	BMQ

SEAL

STATE OF CONNECTICUT
BRIAN M. QUIMBY
No. 22038
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC111

SITE NAME:
SCOVILLE HILL/HARWINTON ROD & GUN

SITE ADDRESS:
123 CAMPVILLE RD
HARWINTON, CT 06791

SHEET TITLE:
ELEVATION

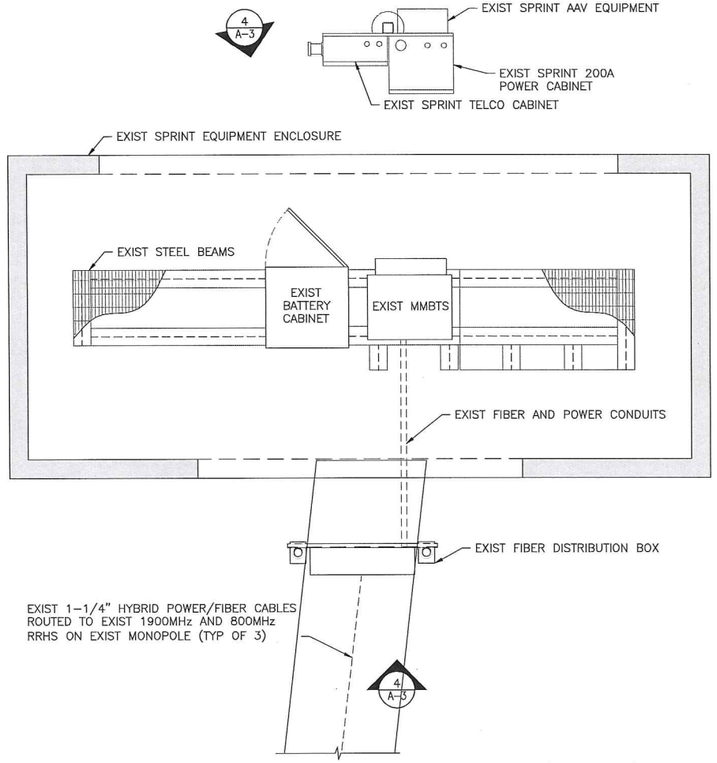
SHEET NO:
A-2

N

APPROX

NORTH NOTE:

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

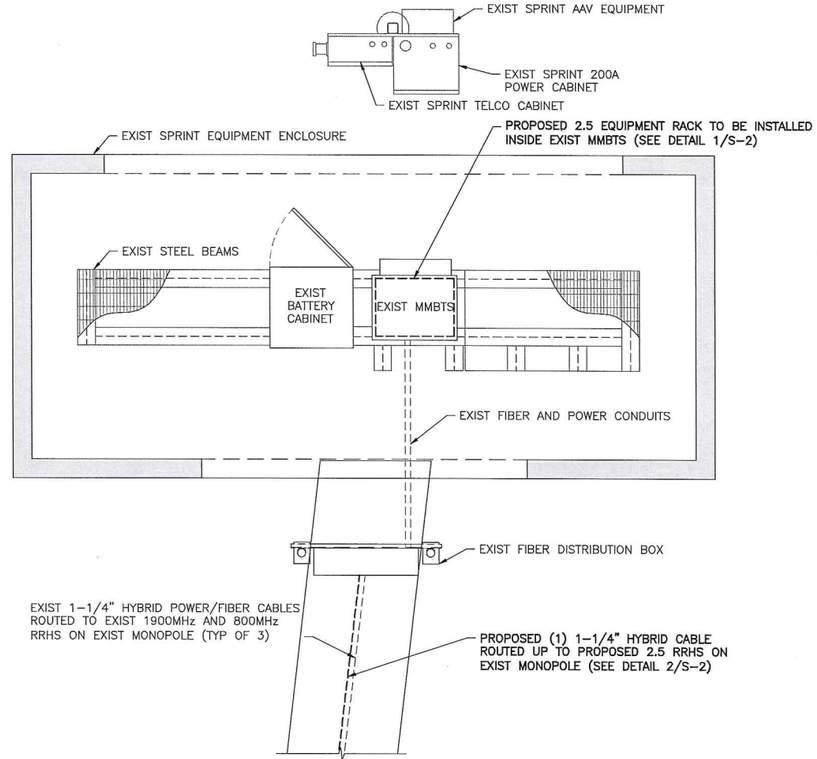


1 A-3 ENLARGED EQUIP. LAYOUT PLAN (EXIST)

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

3 A-3 EXIST EQUIPMENT ENCLOSURE

SCALE: NTS



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

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

4 A-3 EXIST FIBER DISTRIBUTION BOX

SCALE: NTS

Sprint

2.5 EQUIPMENT DEPLOYMENT

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DATE	REVIEWED BY
8/1/14	JMG

SEAL

STATE OF CONNECTICUT
ANANDKUMAR SAINI
No. 22038
LICENSED
PROFESSIONAL ENGINEER

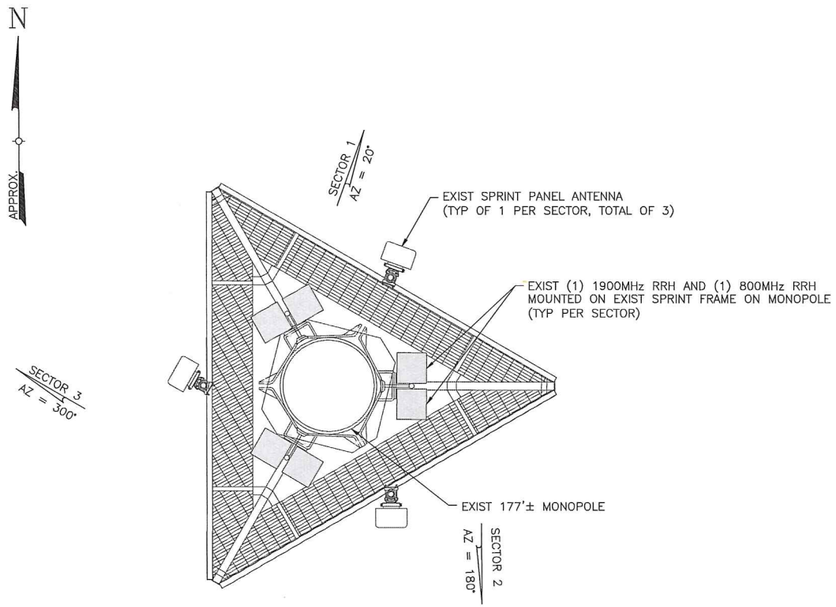
SITE NUMBER:
CT33XC111

SITE NAME:
SCOVILLE HILL/HARWINTON ROD & GUN

SITE ADDRESS:
123 CAMPVILLE RD
HARWINTON, CT 06791

SHEET TITLE:
ENLARGED EQUIPMENT LAYOUT PLANS

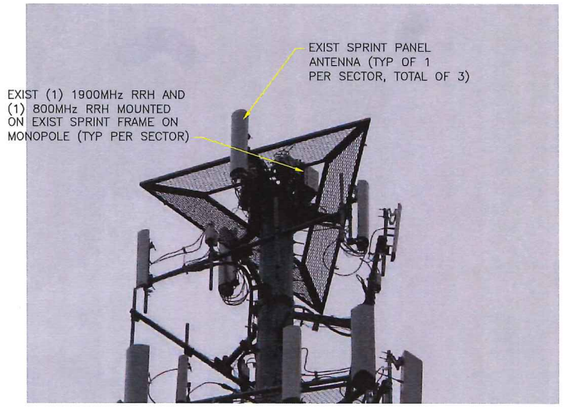
SHEET NO:
A-3

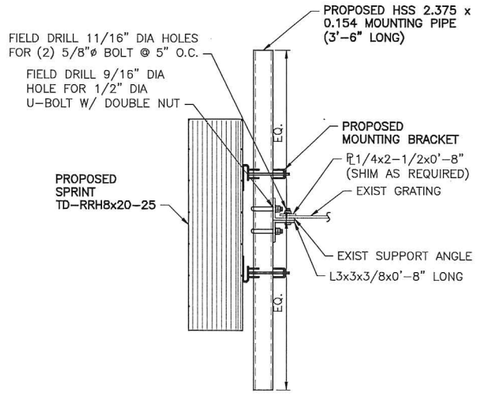


1 A-4 ANTENNA LAYOUT PLAN (EXIST)

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

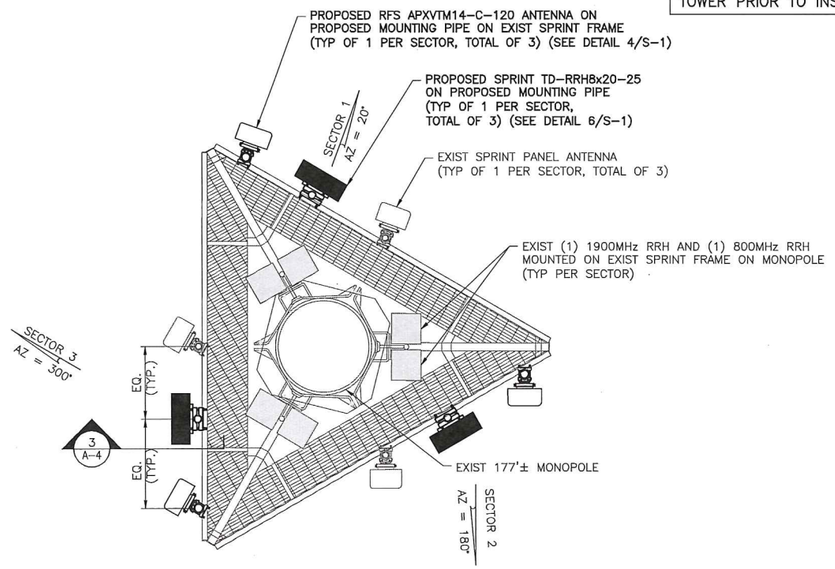
NOTE:
SPRINT MUST REMOVE ALL NEXTEL EQUIPMENT AND ASSOCIATED CABLES FROM THE TOWER PRIOR TO INSTALLATION.





3 A-4 RRH MOUNTING DETAIL

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



2 A-4 ANTENNA LAYOUT PLAN (FINAL)

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

ANTENNA DATA

Status	Exist	Proposed
Antenna Manufacturer	RFS-CEL WAVE	RFS-CEL WAVE
Antenna Model Number	APXVSPP18C-A20	APXVTM14-C-120
Number of Antennas	3	3
Antenna RAD Center	177'	177'
Antenna Azimuth	20/180/300	20/180/300
Antenna RRH Model Number	1900MHz/800MHz RRHS	TD-RRH8x20-25
Number of RRH	6	3

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DATE	REVIEWED BY
8/1/14	JMQ

SEAL
STATE OF CONNECTICUT
MANOKUMAR
SHAH
No. 22038
LICENSED
PROFESSIONAL ENGINEER

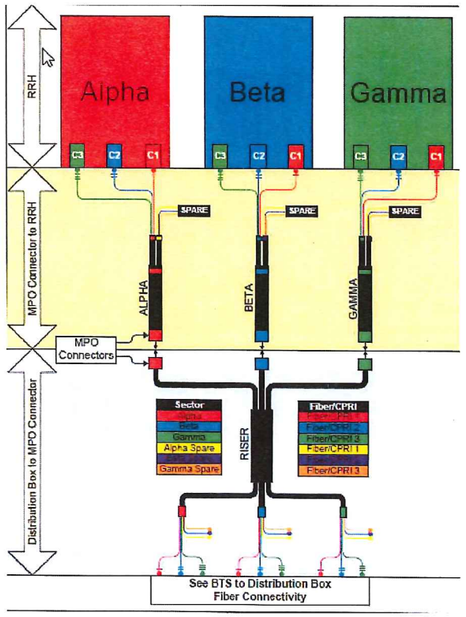
SITE NUMBER:
CT33XC111

SITE NAME:
SCOVILLE HILL/HARWINTON ROD & GUN

SITE ADDRESS:
123 CAMPVILLE RD
HARWINTON, CT 06791

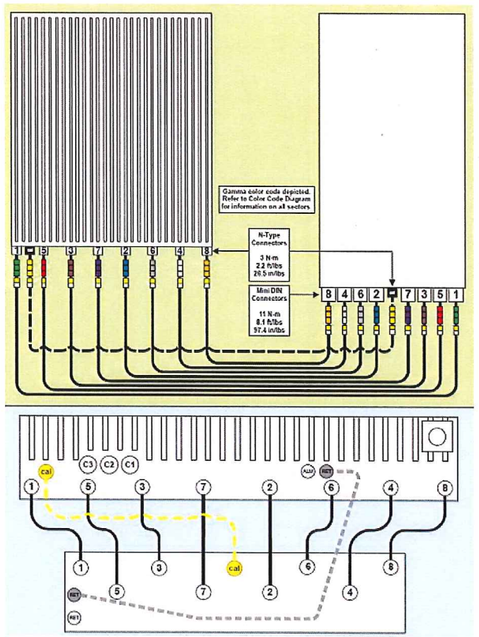
SHEET TITLE:
ANTENNA LAYOUT PLANS

SHEET NO:
A-4



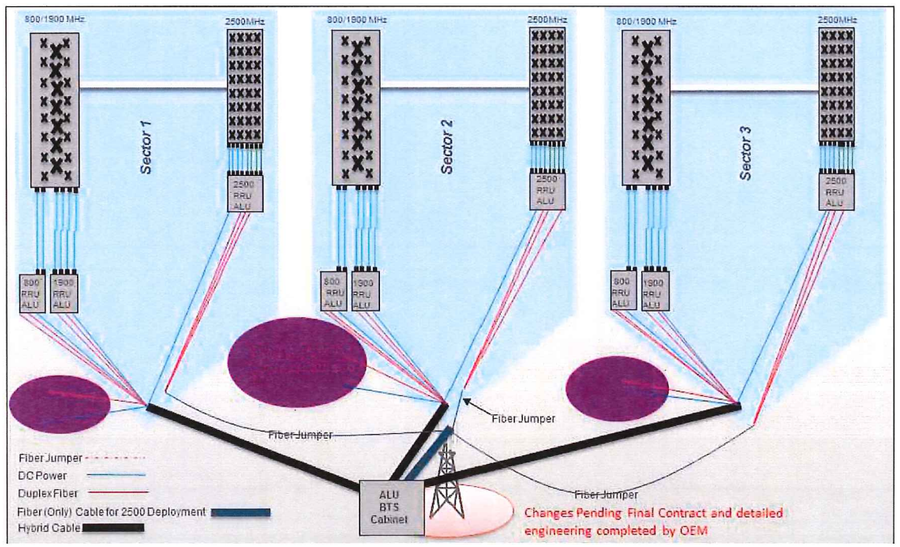
1 A–5 2.5 CABLE COLOR CODING

SCALE: N.T.S.



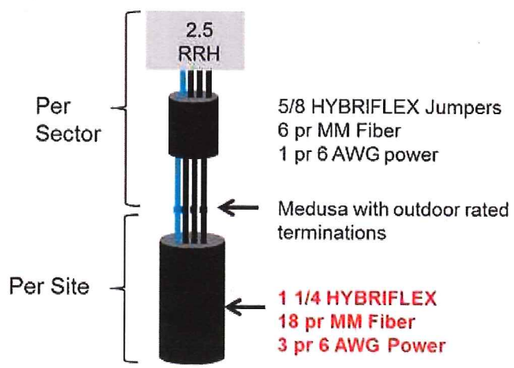
2 A–5 RRH CONNECTIVITY

SCALE: N.T.S.



3 A–5 RAN WIRING

SCALE: N.T.S.



4 A–5 CABLE SCENARIO

SCALE: N.T.S.

Sprint

2.5 EQUIPMENT DEPLOYMENT

6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

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SUBMITTALS

PROJECT NO: 7225.CT33XCIII

NO	DATE	DESCRIPTION	BY
0	06/17/14	FOR COMMENT	JT
1	07/28/14	FOR CONSTRUCTION	MP
2	08/01/14	PER COMMENTS	MP

DATE	REVIEWED BY
8/1/14	SMQ

SEAL

STATE OF CONNECTICUT
No. 22038
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC111

SITE NAME:
SCOVILLE HILL/HARWINTON ROD & GUN

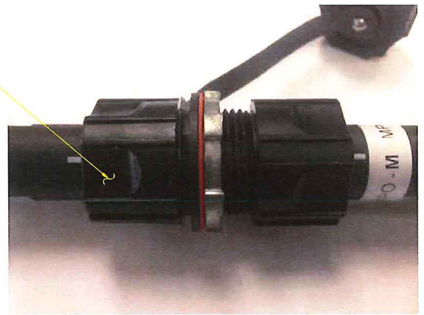
SITE ADDRESS:
123 CAMPVILLE RD
HARWINTON, CT 06791

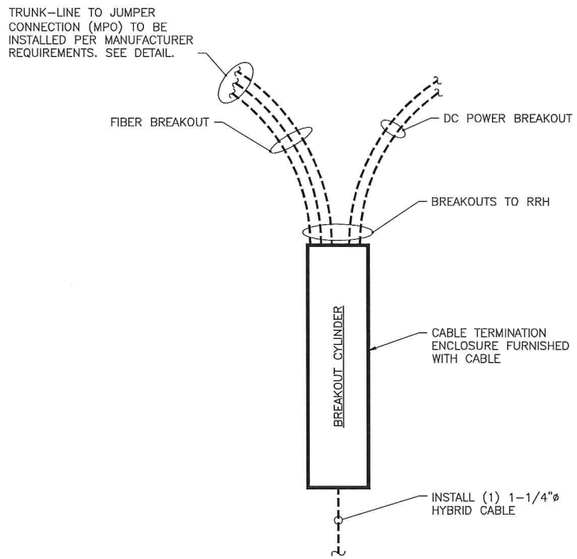
SHEET TITLE:
RAN WIRING DIAGRAM

SHEET NO:
A–5

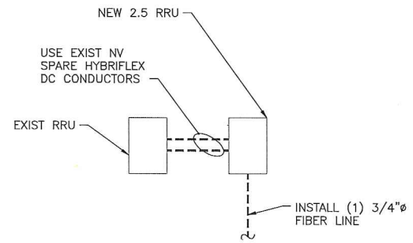
IMPORTANT!! LINE UP WHITE MARKINGS ON JUMPER AND RISER IP–MPO CONNECTOR. PUSH THE WHITE MARK ON THE JUMPER CONNECTOR FLUSH AGAINST THE RED SEAL ON THE RISER CONNECTION

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





2.5 HYBRID CABLE W/FIBER & DC FEEDERS



FIBER ONLY TRUNK LINES

1 / A–6 HYBRIFLEX RISER/JUMPER CONNECTION DETAILS

SCALE: N.T.S.

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.CT33XC111

NO	DATE	DESCRIPTION	BY
0	06/17/14	FOR COMMENT	JT
1	07/28/14	FOR CONSTRUCTION	MP
2	08/01/14	PER COMMENTS	MP

DATE	REVIEWED BY
8/1/14	SMQ

SEAL

STATE OF CONNECTICUT
MICHAEL PAUL
No. 22039
LICENSED PROFESSIONAL ENGINEER

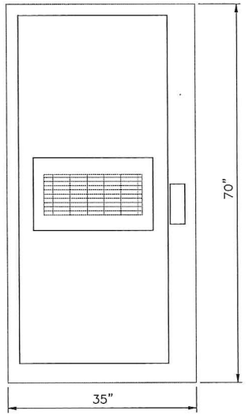
SITE NUMBER:
CT33XC111

SITE NAME:
SCOVILLE HILL/HARWINTON ROD & GUN

SITE ADDRESS:
123 CAMPVILLE RD
HARWINTON, CT 06791

SHEET TITLE:
CABLE DETAILS

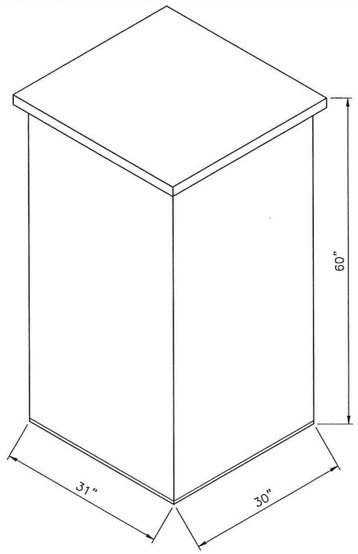
SHEET NO:
A–6



CABINET FRONT 9928 MMBTS MODULAR CELL
SPECIFICATIONS:
HEIGHT: 70" WIDTH: 35" DEPTH: 37.8" WEIGHT: 1090 LBS.

1/S-1 (EXIST) MMBTS CABINET

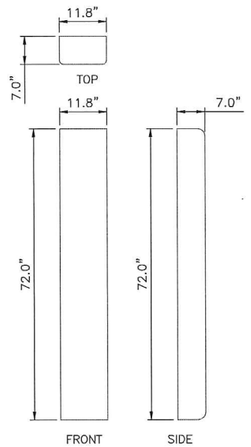
SCALE: 1" = 1'-0"



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

2/S-1 (EXIST) BATTERY CABINET

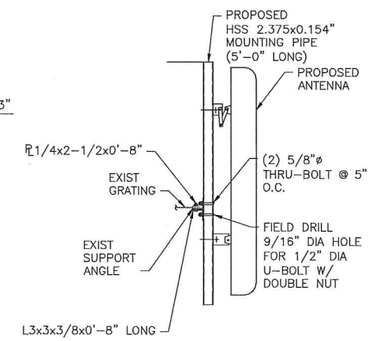
SCALE: 1" = 1'-0"



APXVSPP18-C-A20

3/S-1 (EXIST) ANTENNA DETAIL

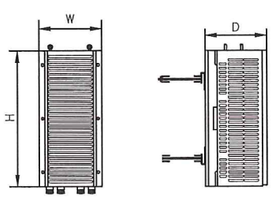
SCALE: 3/4"=1'-0"



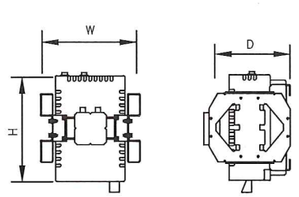
APXVTM14-C-120

4/S-1 (PROPOSED) ANTENNA DETAIL

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



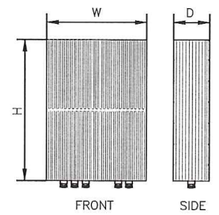
TYPE: 1900 MHz 4x45W MODEL #: RRH 1900 4X45 65MHz HEIGHT: 25.0" WIDTH: 11.1" DEPTH: 11.4" WEIGHT: ±60 LBS.



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

5/S-1 (EXIST) RRH DETAILS

SCALE: 1"=1'-0"



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

6/S-1 (PROPOSED) RRH DETAIL

SCALE: 1"=1'-0"

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SUBMITTALS

PROJECT NO: 7225.CT33XCIII

NO	DATE	DESCRIPTION	BY
0	06/17/14	FOR COMMENT	JT
1	07/28/14	FOR CONSTRUCTION	MP
2	08/01/14	PER COMMENTS	MP

DATE	REVIEWED BY
8/1/14	JMQ

SEAL
STATE OF CONNECTICUT
JAMES M. QUINN
No. 22033
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC111

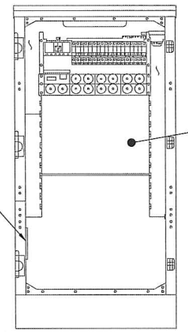
SITE NAME:
SCOVILLE HILL/HARWINTON ROD & GUN

SITE ADDRESS:
123 CAMPVILLE RD
HARWINTON, CT 06791

SHEET TITLE:
EQUIPMENT DETAILS

SHEET NO:
S-1

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



FRONT ELEVATION
(CABINET INTERIOR)

1 S-2 MMBTS INTERIOR DETAIL

SCALE: N.T.S.

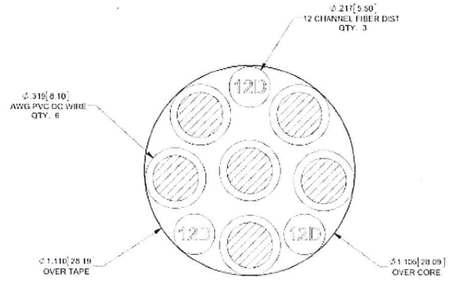
RFS HYBRIFLEX RISER CABLES SCHEDULE

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

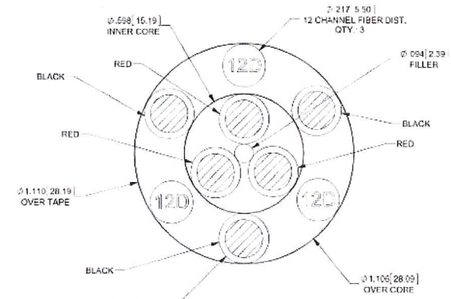
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

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

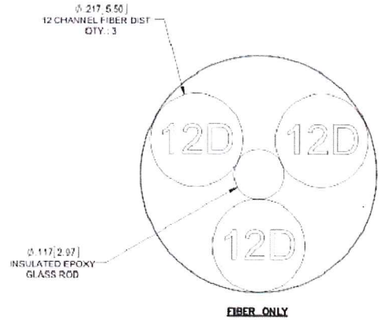
HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE			
MANUF:	RFS		
CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
FIBER ONLY	VARIES	USE NV HYBRIFLEX	7/8"
HYBRIFLEX	<200'	8 AWG	1-1/4"
HYBRIFLEX	225-300'	6 AWG	1-1/4"
HYBRIFLEX	325-375'	4 AWG	1-1/4"



4 AWG

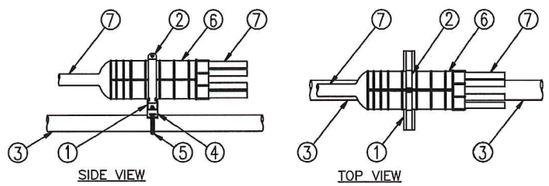


8 AWG & 6 AWG



FIBER ONLY

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



3 S-2 MEDUSA HEAD DETAIL

SCALE: NTS

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

SCALE: NTS

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SUBMITTALS

PROJECT NO: 7225.CT33XC111

NO	DATE	DESCRIPTION	BY
0	06/17/14	FOR COMMENT	JT
1	07/28/14	FOR CONSTRUCTION	MP
2	08/01/14	PER COMMENTS	MP

DATE	REVIEWED BY
8/1/14	JMA

SEAL
STATE OF CONNECTICUT
MICHAEL PARTEL
No. 22038
LICENSED PROFESSIONAL ENGINEER

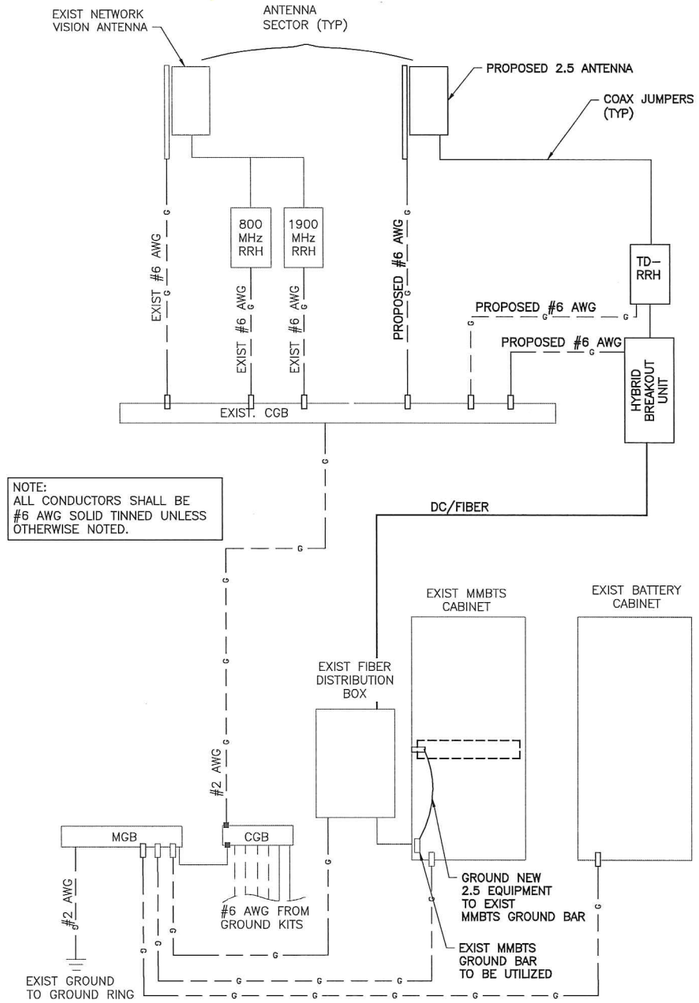
SITE NUMBER:
CT33XC111

SITE NAME:
SCOVILLE HILL/HARWINTON ROD & GUN

SITE ADDRESS:
123 CAMPVILLE RD
HARWINTON, CT 06791

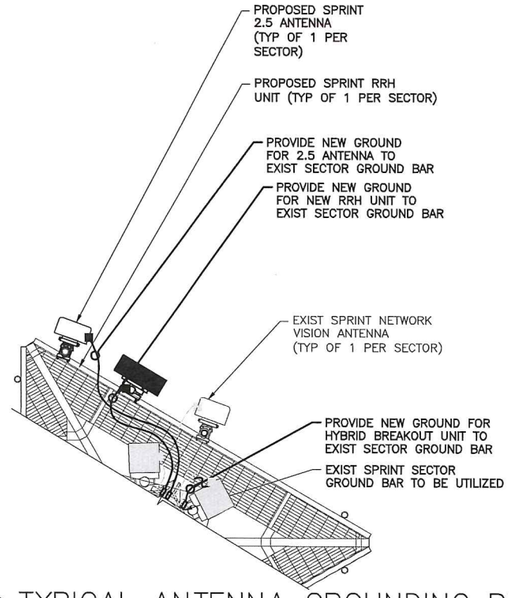
SHEET TITLE:
EQUIPMENT SCHEMATIC DETAILS

SHEET NO:
S-2



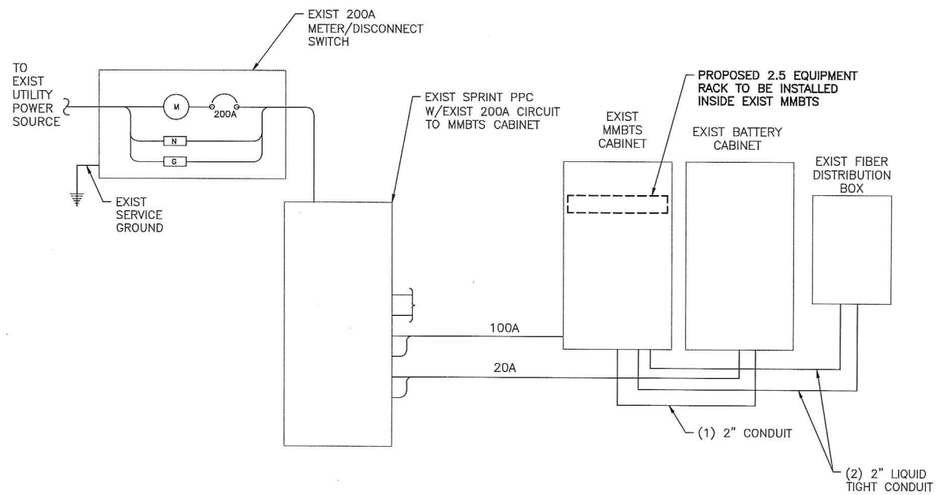
1 / E-1 TYPICAL GROUNDING ONE LINE DIAGRAM

SCALE: NTS



2 / E-1 TYPICAL ANTENNA GROUNDING PLAN

SCALE: NTS



3 / E-1 TYPICAL ELECTRICAL & TELCO PLAN

SCALE: NTS

Sprint

2.5 EQUIPMENT DEPLOYMENT

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8/1/14	JMQ

SEAL

STATE OF CONNECTICUT
No. 22039
LICENSED PROFESSIONAL ENGINEER

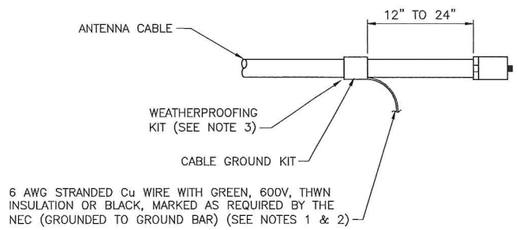
SITE NUMBER:
CT33XC111

SITE NAME:
SCOVILLE HILL/HARWINTON ROD & GUN

SITE ADDRESS:
123 CAMPVILLE RD
HARWINTON, CT 06791

SHEET TITLE:
ELECTRICAL & GROUNDING PLANS

SHEET NO:
E-1



CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

NOTES:

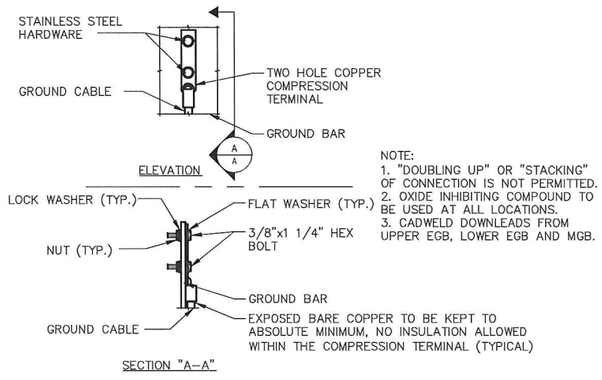
DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

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

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

1 / E-2 CABLE GROUNDING KIT DETAIL

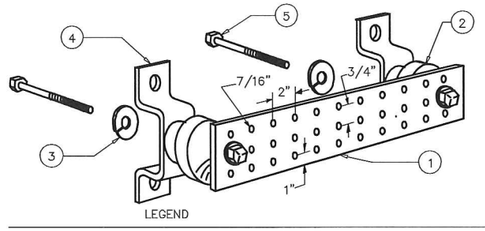
SCALE: N.T.S.



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



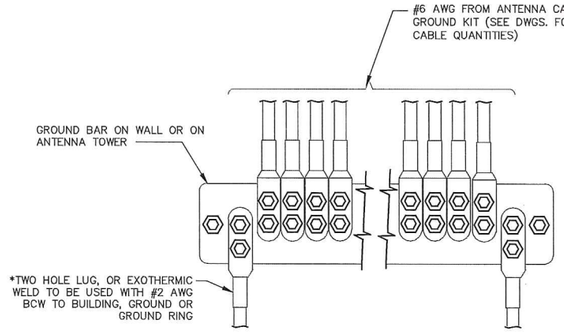
LEGEND

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.CT33XC111

NO	DATE	DESCRIPTION	BY
0	06/17/14	FOR COMMENT	JT
1	07/28/14	FOR CONSTRUCTION	MP
2	08/01/14	PER COMMENTS	MP

DATE	REVIEWED BY
8/1/14	JMQ

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

SITE NUMBER:
CT33XC111

SITE NAME:
SCOVILLE HILL/HARWINTON ROD & GUN

SITE ADDRESS:
123 CAMPVILLE RD
HARWINTON, CT 06791

SHEET TITLE:
GROUNDING DETAILS & NOTES

SHEET NO:
E-2

Date: **June 17, 2014**

Marianne Dunst
Crown Castle
3530 Toringdon Way
Charlotte, NC 28277

AW Solutions Inc
300 Crown Oak Centre
Longwood, Fl 32750
(407) 260-0231

Subject: Structural Analysis Report

Carrier Designation:	***Sprint PCS* Co-Locate**	Scenario 2.5A
	Carrier Site Number:	CT33XC111
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	876376
	Crown Castle Site Name:	SCOVILLE HILL / HARWINTON ROD
	Crown Castle JDE Job Number:	288227
	Crown Castle Work Order Number:	772512
	Crown Castle Application Number:	246000 Rev. 1
Engineering Firm Designation:	**AW Solutions Inc Project Number:**	876376
Site Data:	**123 Campville Hill Rd., HARWINTON, Litchfield County, CT** **Latitude *41° 44' 12.12"*, Longitude *-73° 5' 50.8"*** **177 Foot - Monopole Tower**	

Dear Marianne Dunst,

AW Solutions Inc 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 655538, in accordance with application 246000, 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:

LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

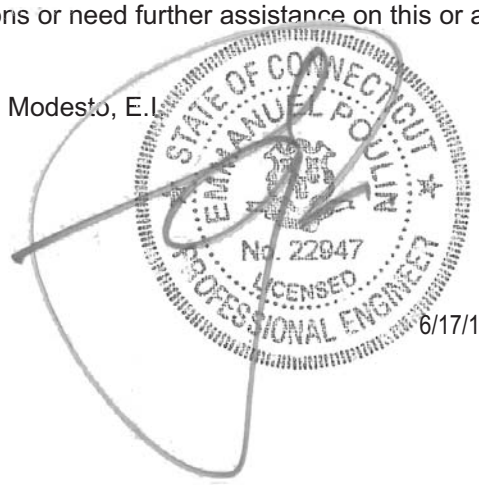
The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code based upon a wind speed of 80 mph fastest mile.

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

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

Structural analysis prepared by: Arturo Modesto, E.I.

Respectfully submitted by:



Emmanuel Poulin, P.E.
VP of Engineering 6/17/14

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 177 ft Monopole tower designed by SUMMIT in August of 2000. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. The tower was reinforced in May of 2013 by Tower Engineering Professional per document #3384748 and in August of 2004 by Hutter Trankina Engineering per document #1634507 to accommodate additional loading.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 28 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
177.0	177.0	3	alcatel lucent	TD-RRH8x20-25	1	1-1/4	1
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			

Notes:
1) Proposed Equipment

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
177.0	177.0	3	alcatel lucent	1900MHz RRH (65MHz)	3	1-1/4	1
		3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	alcatel lucent	800MHZ RRH			
		9	rfs celwave	ACU-A20-N			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 713-1]			
167.0	169.0	3	ems wireless	RR90-17-02DP w/ Mount Pipe	6	1-5/8	1
		6	ericsson	KRY 112 75/1			
	167.0	1	tower mounts	T-Arm Mount [TA 602-3]			
154.0	156.0	1	antel	BXA-171063-8BF-EDIN-2 w/ Mount Pipe	12	1-5/8	1
		2	antel	BXA-171085-8BF-EDIN-2 w/ Mount Pipe			
		3	antel	BXA-70063-6CF-2 w/ Mount Pipe			
		2	antel	LPA-80063/6CF w/ Mount Pipe			
		4	antel	LPA-80080/6CF w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
	154.0	1	tower mounts	Platform Mount [LP 303-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
137.0	139.0	12	decibel	DB844H90 w/ Mount Pipe	12	1-1/4	2
	137.0	1	tower mounts	Platform Mount [LP 712-1]			
127.0	129.0	3	ericsson	RRUS 11	3 12	3/8 1-5/8	1
		1	kathrein	800 10764 w/ Mount Pipe			
		6	kathrein	AP14/17-880/1940/065D/ADT/XXP w/ Mount Pipe			
		1	kmw communications	AM-X-CD-14-65-00T-RET w/ Mount Pipe			
		1	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		6	powerwave technologies	LGP 17201			
		1	raycap	DC6-48-60-18-8F			
	127.0	1	tower mounts	Platform Mount [LP 303-1]			
117.0	117.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			
79.0	80.0	1	spectracom	8225	1	1/2	1
	79.0	1	tower mounts	Side Arm Mount [SO 701-1]			

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

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
177	177	12	-	DAPA 48000 PCS PANEL	-	-
167	167	12	-	DAPA 48000 PCS PANEL	-	-
157	157	12	-	DAPA 48000 PCS PANEL	-	-
75	75	1	-	GPS Antenna	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Criscuolo Shepard Associates	1531965	CCISITES
4-POST-MODIFICATION INSPECTION	B & T Engineering	2461484	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Summit Manufacturing	1613623	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Summit Manufacturing	1613568	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Hutter Trankina Engineering	1634507	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Tower Engineeing Professionals	3384748	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
177 - 172	Pole	TP22.875x22x0.2188	Pole	6.7%	Pass
172 - 167	Pole	TP23.75x22.875x0.2188	Pole	12.5%	Pass
167 - 162	Pole	TP24.625x23.75x0.2188	Pole	20.1%	Pass
162 - 157	Pole	TP25.5x24.625x0.2188	Pole	26.7%	Pass
157 - 152	Pole	TP26.375x25.5x0.2188	Pole	36.4%	Pass
152 - 147	Pole	TP27.25x26.375x0.2188	Pole	45.8%	Pass
147 - 142	Pole	TP28.124x27.25x0.2188	Pole	54.4%	Pass
142 - 137	Pole	TP28.999x28.124x0.2188	Pole	62.1%	Pass
137 - 133.5	Pole	TP30.268x28.999x0.2188	Pole	67.1%	Pass

133.5 - 128.5	Pole	TP30.049x29.174x0.25	Pole	66.6%	Pass
128.5 - 123.5	Pole	TP30.924x30.049x0.25	Pole	74.1%	Pass
123.5 - 118.58	Pole	TP31.784x30.924x0.25	Pole	80.7%	Pass
118.58 - 113.58	Pole + Reinf.	TP32.659x31.784x0.385	Reinf. 5 Tension Rupture	67.8%	Pass
113.58 - 110	Pole + Reinf.	TP33.286x32.659x0.38	Reinf. 5 Tension Rupture	71.8%	Pass
110 - 106.42	Pole + Reinf.	TP33.913x33.286x0.91	Reinf. 4 Compression	57.5%	Pass
106.42 - 101.42	Pole + Reinf.	TP34.788x33.913x0.75	Reinf. 4 Compression	72.5%	Pass
101.42 - 96.42	Pole + Reinf.	TP35.663x34.788x0.73	Reinf. 4 Compression	77.6%	Pass
96.42 - 91.42	Pole + Reinf.	TP36.538x35.663x0.715	Reinf. 4 Compression	82.5%	Pass
91.42 - 88.75	Pole + Reinf.	TP37.836x36.538x0.705	Reinf. 4 Compression	85.1%	Pass
88.75 - 83.75	Pole + Reinf.	TP37.38x36.505x0.7675	Reinf. 4 Compression	83.9%	Pass
83.75 - 80	Pole + Reinf.	TP38.036x37.38x0.7575	Reinf. 4 Compression	86.9%	Pass
80 - 75	Pole + Reinf.	TP38.911x38.036x0.8025	Reinf. 3 Compression	82.1%	Pass
75 - 70	Pole + Reinf.	TP39.786x38.911x0.7875	Reinf. 3 Compression	85.7%	Pass
70 - 65	Pole + Reinf.	TP40.661x39.786x0.7775	Reinf. 3 Compression	89.2%	Pass
65 - 60	Pole + Reinf.	TP41.536x40.661x0.7625	Reinf. 3 Compression	92.5%	Pass
60 - 55	Pole + Reinf.	TP42.411x41.536x0.7425	Reinf. 2 Compression	79.4%	Pass
55 - 50	Pole + Reinf.	TP43.286x42.411x0.7325	Reinf. 2 Compression	81.9%	Pass
50 - 45	Pole + Reinf.	TP45.167x43.286x0.7225	Reinf. 2 Compression	84.5%	Pass
45 - 38.25	Pole + Reinf.	TP44.717x43.536x0.78	Reinf. 2 Compression	82.3%	Pass
38.25 - 33.25	Pole + Reinf.	TP45.592x44.717x0.77	Reinf. 2 Compression	84.4%	Pass
33.25 - 28.25	Pole + Reinf.	TP46.467x45.592x0.76	Reinf. 2 Compression	86.4%	Pass
28.25 - 23.25	Pole + Reinf.	TP47.342x46.467x0.75	Reinf. 2 Compression	88.3%	Pass
23.25 - 20	Pole + Reinf.	TP47.91x47.342x0.745	Reinf. 2 Compression	89.5%	Pass
20 - 15	Pole + Reinf.	TP48.785x47.91x0.785	Reinf. 1 Compression	85.5%	Pass
15 - 10	Pole + Reinf.	TP49.66x48.785x0.775	Reinf. 1 Compression	87.2%	Pass
10 - 5	Pole + Reinf.	TP50.535x49.66x0.765	Reinf. 1 Compression	88.8%	Pass
5 - 0	Pole + Reinf.	TP51.41x50.535x0.755	Reinf. 1 Compression	90.3%	Pass
				Summary	
			Pole	80.7%	Pass
			Reinforcement	92.5%	Pass
			Overall	92.5%	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	86.9	Pass
1	Base Plate	0	85.6	Pass
1	Base Foundation	0	90.1	Pass

Structure Rating (max from all components) =	90.1%

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

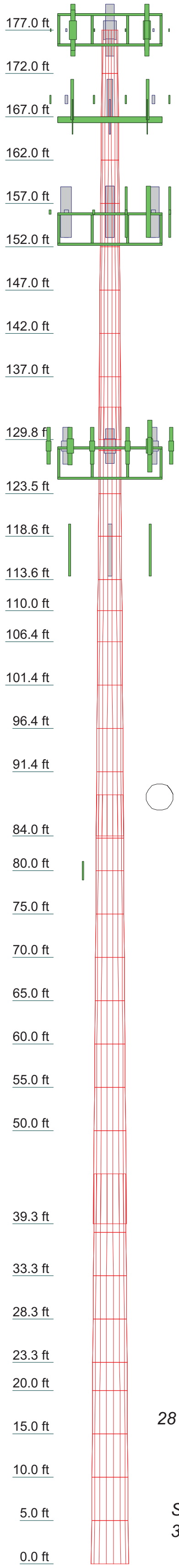
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	5.00	18	0.2188		22.0000	22.8749	A607-65	0.3
2	5.00	18	0.2188		22.8749	23.7498		0.3
3	5.00	18	0.2188		23.7498	24.6248		0.3
4	5.00	18	0.2188		24.6248	25.4997		0.3
5	5.00	18	0.2188		25.4997	26.3746		0.3
6	5.00	18	0.2188		26.3746	27.2495		0.3
7	5.00	18	0.2188		27.2495	28.1244		0.3
8	5.00	18	0.2188		28.1244	28.9994		0.3
9	7.25	18	0.2188	3.75	28.9994	30.2680		0.5
10	5.00	18	[illegible]		[illegible]	[illegible]		0.4
11	5.00	18	0.2500		[illegible]	[illegible]		0.4
12	4.92	18	0.2500		30.924	31.7845		0.4
13	5.00	18	0.3850		31.7845	32.6594		0.6
14	3.58	18	0.3800		32.6594	33.2863		0.5
15	3.58	18	0.9100		33.2863	33.9133		0.9
16	5.00	18	0.7500		33.9133	34.7883		1.1
17	5.00	18	0.7300		34.7883	35.6632		1.1
18	5.00	18	0.7150		35.6632	36.5381		1.1
19	7.42	18	0.7050	4.75	[illegible]	[illegible]		1.7
20	5.00	18	[illegible]		[illegible]	[illegible]		1.3
21	3.75	18	[illegible]		[illegible]	[illegible]		1.0
22	5.00	18	0.8025		38.0360	38.9110		1.4
23	5.00	18	0.7875		38.9110	39.7859		1.4
24	5.00	18	0.7775		39.7859	40.6609		1.4
25	5.00	18	0.7625		40.6609	41.5359		1.4
26	5.00	18	0.7425		41.5359	42.4109		1.4
27	5.00	18	0.7325		42.4109	43.2858		1.4
28	10.75	18	0.7225	5.75	43.2858	45.1670		3.2
29	6.75	18	0.7800		[illegible]	[illegible]		2.2
30	5.00	18	0.7700		[illegible]	[illegible]		1.6
31	5.00	18	0.7600		45.5918	46.4667		1.6
32	5.00	18	0.7500		46.4667	47.3417		1.7
33	3.25	18	0.7450		47.3417	47.9107		1.1
34	5.00	18	0.7850		47.9107	48.7857		1.8
35	5.00	18	0.7750		48.7857	49.6602		1.8
36	5.00	18	0.7650		49.6602	50.5351		1.8
37	5.00	18	0.7550		50.5351	51.4100		1.8
								40.3



DESIGNED APPURTENANCE LOADING

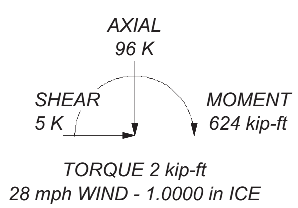
TYPE	ELEVATION	TYPE	ELEVATION
Platform Mount [LP 713-1]	177	BXA-70063-6CF-2 w/ Mount Pipe	154
APXVSPP18-C-A20 w/ Mount Pipe	177	(2) LPA-80080/6CF w/ Mount Pipe	154
APXVSPP18-C-A20 w/ Mount Pipe	177	BXA-171063-8BF-EDIN-2 w/ Mount Pipe	154
APXVSPP18-C-A20 w/ Mount Pipe	177	BXA-70063-6CF-2 w/ Mount Pipe	154
1900MHz RRH (65MHz)	177	(2) LPA-80063/6CF w/ Mount Pipe	154
800 EXTERNAL NOTCH FILTER	177	(2) FD9R6004/2C-3L	154
800MHZ RRH	177	(2) FD9R6004/2C-3L	154
(3) ACU-A20-N	177	(2) FD9R6004/2C-3L	154
1900MHz RRH (65MHz)	177	Platform Mount [LP 303-1]	154
800 EXTERNAL NOTCH FILTER	177	(2) AP14/17-880/1940/065D/ADT/XXP w/ Mount Pipe	127
800MHZ RRH	177	AM-X-CD-14-65-00T-RET w/ Mount Pipe	127
(3) ACU-A20-N	177	(2) AP14/17-880/1940/065D/ADT/XXP w/ Mount Pipe	127
1900MHz RRH (65MHz)	177	AM-X-CD-16-65-00T-RET w/ Mount Pipe	127
800 EXTERNAL NOTCH FILTER	177	800 10764 w/ Mount Pipe	127
800MHZ RRH	177	(2) AP14/17-880/1940/065D/ADT/XXP w/ Mount Pipe	127
(3) ACU-A20-N	177	RRUS 11	127
APXVTM14-C-120 w/ Mount Pipe	177	(2) LGP 17201	127
APXVTM14-C-120 w/ Mount Pipe	177	RRUS 11	127
APXVTM14-C-120 w/ Mount Pipe	177	(2) LGP 17201	127
TD-RRH8x20-25	177	DC6-48-60-18-8F	127
TD-RRH8x20-25	177	RRUS 11	127
TD-RRH8x20-25	177	(2) LGP 17201	127
T-Arm Mount [TA 602-3]	167	Platform Mount [LP 303-1]	127
RR90-17-02DP w/ Mount Pipe	167	APXV18-206517S-C w/ Mount Pipe	117
RR90-17-02DP w/ Mount Pipe	167	APXV18-206517S-C w/ Mount Pipe	117
RR90-17-02DP w/ Mount Pipe	167	Pipe Mount [PM 601-3]	117
(2) KRY 112 75/1	167	APXV18-206517S-C w/ Mount Pipe	117
(2) KRY 112 75/1	167	8225	79
(2) KRY 112 75/1	167	Side Arm Mount [SO 701-1]	79
(3) 4' x 2" Pipe Mount	167		
(3) 4' x 2" Pipe Mount	167		
(3) 4' x 2" Pipe Mount	167		
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	154		
BXA-70063-6CF-2 w/ Mount Pipe	154		
(2) LPA-80080/6CF w/ Mount Pipe	154		
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	154		

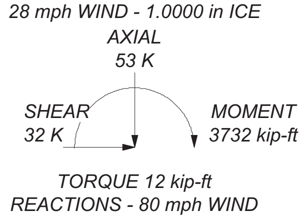
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 28 mph basic wind with 1.00 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 80.8%





AW Solutions Inc
300 Crown Oak Centre
Longwood, Fl 32750
Phone: (407) 260-0231
FAX: (407) 260-0749

Job: **BU 876376**		
Project: **WO 772512**		
Client: Crown Castle	Drawn by: arturo.modesto	App'd:
Code: TIA/EIA-222-F	Date: 06/17/14	Scale: NTS
Path: R:\Central_Data\CROWN CASTLE\CRC - STRUCTURAL\BU876376 - WO772512\ENGINEERING\reinforcement\new1.eri		Dwg No. E-1

Tower Input Data

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

2) Tower is located in Litchfield County, Connecticut.
3) Basic wind speed of 80 mph.
4) Nominal ice thickness of 1.0000 in.
5) Ice density of 56 pcf.
6) A wind speed of 28 mph is used in combination with ice.
7) Temperature drop of 50 °F.
8) Deflections calculated using a wind speed of 50 mph.
9) A non-linear (P-delta) analysis was used.
10) Pressures are calculated at each section.
11) Stress ratio used in pole design is 1.333.
12) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*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	177.00-172.00	5.00	0.00	18	22.0000	22.8749	0.2188	0.8752	A607-65 (65 ksi)
L2	172.00-167.00	5.00	0.00	18	22.8749	23.7498	0.2188	0.8752	A607-65 (65 ksi)
L3	167.00-162.00	5.00	0.00	18	23.7498	24.6248	0.2188	0.8752	A607-65 (65 ksi)
L4	162.00-157.00	5.00	0.00	18	24.6248	25.4997	0.2188	0.8752	A607-65 (65 ksi)
L5	157.00-152.00	5.00	0.00	18	25.4997	26.3746	0.2188	0.8752	A607-65 (65 ksi)
L6	152.00-147.00	5.00	0.00	18	26.3746	27.2495	0.2188	0.8752	A607-65 (65 ksi)
L7	147.00-142.00	5.00	0.00	18	27.2495	28.1244	0.2188	0.8752	A607-65 (65 ksi)
L8	142.00-137.00	5.00	0.00	18	28.1244	28.9994	0.2188	0.8752	A607-65 (65 ksi)
L9	137.00-129.75	7.25	3.75	18	28.9994	30.2680	0.2188	0.8752	A607-65 (65 ksi)
L10	129.75-128.50	5.00	0.00	18	29.1742	30.0491	0.2500	1.0000	A607-65

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
									(65 ksi)
L11	128.50-123.50	5.00	0.00	18	30.0491	30.9241	0.2500	1.0000	A607-65 (65 ksi)
L12	123.50-118.58	4.92	0.00	18	30.9241	31.7845	0.2500	1.0000	A607-65 (65 ksi)
L13	118.58-113.58	5.00	0.00	18	31.7845	32.6594	0.3850	1.5400	A607-65 (65 ksi)
L14	113.58-110.00	3.58	0.00	18	32.6594	33.2864	0.3800	1.5200	A607-65 (65 ksi)
L15	110.00-106.42	3.58	0.00	18	33.2864	33.9133	0.9100	3.6400	A607-65 (65 ksi)
L16	106.42-101.42	5.00	0.00	18	33.9133	34.7883	0.7500	3.0000	A607-65 (65 ksi)
L17	101.42-96.42	5.00	0.00	18	34.7883	35.6632	0.7300	2.9200	A607-65 (65 ksi)
L18	96.42-91.42	5.00	0.00	18	35.6632	36.5381	0.7150	2.8600	A607-65 (65 ksi)
L19	91.42-84.00	7.42	4.75	18	36.5381	37.8360	0.7050	2.8200	A607-65 (65 ksi)
L20	84.00-83.75	5.00	0.00	18	36.5048	37.3798	0.7675	3.0700	A607-65 (65 ksi)
L21	83.75-80.00	3.75	0.00	18	37.3798	38.0360	0.7575	3.0300	A607-65 (65 ksi)
L22	80.00-75.00	5.00	0.00	18	38.0360	38.9110	0.8025	3.2100	A607-65 (65 ksi)
L23	75.00-70.00	5.00	0.00	18	38.9110	39.7859	0.7875	3.1500	A607-65 (65 ksi)
L24	70.00-65.00	5.00	0.00	18	39.7859	40.6609	0.7775	3.1100	A607-65 (65 ksi)
L25	65.00-60.00	5.00	0.00	18	40.6609	41.5359	0.7625	3.0500	A607-65 (65 ksi)
L26	60.00-55.00	5.00	0.00	18	41.5359	42.4109	0.7425	2.9700	A607-65 (65 ksi)
L27	55.00-50.00	5.00	0.00	18	42.4109	43.2858	0.7325	2.9300	A607-65 (65 ksi)
L28	50.00-39.25	10.75	5.75	18	43.2858	45.1670	0.7225	2.8900	A607-65 (65 ksi)
L29	39.25-38.25	6.75	0.00	18	43.5358	44.7169	0.7800	3.1200	A607-65 (65 ksi)
L30	38.25-33.25	5.00	0.00	18	44.7169	45.5918	0.7700	3.0800	A607-65 (65 ksi)
L31	33.25-28.25	5.00	0.00	18	45.5918	46.4667	0.7600	3.0400	A607-65 (65 ksi)
L32	28.25-23.25	5.00	0.00	18	46.4667	47.3417	0.7500	3.0000	A607-65 (65 ksi)
L33	23.25-20.00	3.25	0.00	18	47.3417	47.9103	0.7450	2.9800	A607-65 (65 ksi)
L34	20.00-15.00	5.00	0.00	18	47.9103	48.7853	0.7850	3.1400	A607-65 (65 ksi)
L35	15.00-10.00	5.00	0.00	18	48.7853	49.6602	0.7750	3.1000	A607-65 (65 ksi)
L36	10.00-5.00	5.00	0.00	18	49.6602	50.5351	0.7650	3.0600	A607-65 (65 ksi)
L37	5.00-0.00	5.00		18	50.5351	51.4100	0.7550	3.0200	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.3394	15.1264	906.6446	7.7323	11.1760	81.1243	1814.4823	7.5646	3.4869	15.937
	23.2278	15.7340	1020.3480	8.0429	11.6205	87.8062	2042.0387	7.8685	3.6409	16.64
L2	23.2278	15.7340	1020.3480	8.0429	11.6205	87.8062	2042.0387	7.8685	3.6409	16.64
	24.1162	16.3416	1143.1813	8.3535	12.0649	94.7525	2287.8669	8.1724	3.7949	17.344
L3	24.1162	16.3416	1143.1813	8.3535	12.0649	94.7525	2287.8669	8.1724	3.7949	17.344

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
	25.0046	16.9492	1275.4971	8.6641	12.5094	101.9633	2552.6725	8.4762	3.9489	18.048
L4	25.0046	16.9492	1275.4971	8.6641	12.5094	101.9633	2552.6725	8.4762	3.9489	18.048
	25.8931	17.5568	1417.6479	8.9747	12.9538	109.4384	2837.1612	8.7801	4.1029	18.752
L5	25.8931	17.5568	1417.6479	8.9747	12.9538	109.4384	2837.1612	8.7801	4.1029	18.752
	26.7815	18.1645	1569.9863	9.2853	13.3983	117.1780	3142.0385	9.0840	4.2568	19.455
L6	26.7815	18.1645	1569.9863	9.2853	13.3983	117.1780	3142.0385	9.0840	4.2568	19.455
	27.6699	18.7721	1732.8649	9.5959	13.8428	125.1821	3468.0100	9.3878	4.4108	20.159
L7	27.6699	18.7721	1732.8649	9.5959	13.8428	125.1821	3468.0100	9.3878	4.4108	20.159
	28.5583	19.3797	1906.6363	9.9065	14.2872	133.4505	3815.7814	9.6917	4.5648	20.863
L8	28.5583	19.3797	1906.6363	9.9065	14.2872	133.4505	3815.7814	9.6917	4.5648	20.863
	29.4467	19.9873	2091.6530	10.2171	14.7317	141.9834	4186.0583	9.9955	4.7188	21.567
L9	29.4467	19.9873	2091.6530	10.2171	14.7317	141.9834	4186.0583	9.9955	4.7188	21.567
	30.7349	20.8683	2380.6219	10.6675	15.3761	154.8257	4764.3764	10.4361	4.9421	22.587
L10	30.2906	22.9514	2425.8776	10.2681	14.8205	163.6839	4854.9472	11.4779	4.6947	18.779
	30.5127	23.6456	2652.7448	10.5787	15.2650	173.7800	5308.9802	11.8251	4.8486	19.395
L11	30.5127	23.6456	2652.7448	10.5787	15.2650	173.7800	5308.9802	11.8251	4.8486	19.395
	31.4011	24.3399	2893.3331	10.8893	15.7094	184.1782	5790.4733	12.1722	5.0026	20.011
L12	31.4011	24.3399	2893.3331	10.8893	15.7094	184.1782	5790.4733	12.1722	5.0026	20.011
	32.2748	25.0226	3143.6994	11.1947	16.1465	194.6984	6291.5355	12.5137	5.1541	20.616
L13	32.2748	38.3698	4779.3857	11.1468	16.1465	296.0011	9565.0603	19.1886	4.9165	12.77
	33.1632	39.4390	5190.1462	11.4574	16.5910	312.8295	10387.1218	19.7232	5.0705	13.17
L14	33.1632	38.9328	5125.1230	11.4592	16.5910	308.9103	10256.9897	19.4701	5.0793	13.366
	33.7999	39.6890	5429.6021	11.6818	16.9095	321.0982	10866.3486	19.8483	5.1896	13.657
L15	33.7999	93.5140	12384.2678	11.4936	16.9095	732.3862	24784.8312	46.7659	4.2568	4.678
	34.4365	95.3249	13117.7604	11.7162	17.2280	761.4219	26252.7815	47.6715	4.3671	4.799
L16	34.4365	78.9453	10969.3445	11.7730	17.2280	636.7168	21953.1227	39.4802	4.6487	6.198
	35.3249	81.0281	11860.6435	12.0836	17.6724	671.1377	23736.8935	40.5218	4.8027	6.404
L17	35.3249	78.9137	11564.7211	12.0907	17.6724	654.3929	23144.6593	39.4643	4.8379	6.627
	36.2134	80.9409	12479.0767	12.4013	18.1169	688.8083	24974.5737	40.4782	4.9919	6.838
L18	36.2134	79.3118	12238.4090	12.4066	18.1169	675.5242	24492.9216	39.6634	5.0183	7.019
	37.1018	81.2974	13180.7781	12.7172	18.5614	710.1188	26378.8999	40.6564	5.1723	7.234
L19	37.1018	80.1827	13007.3184	12.7208	18.5614	700.7736	26031.7523	40.0990	5.1899	7.362
	38.4197	83.0869	14472.4956	13.1815	19.2207	752.9645	28964.0345	41.5514	5.4183	7.686
L20	37.9120	87.0577	14047.1633	12.6867	18.5444	757.4862	28112.8101	43.5371	5.0740	6.611
	37.9564	89.1892	15104.3936	12.9974	18.9889	795.4315	30228.6619	44.6031	5.2280	6.812
L21	37.9564	88.0511	14919.8122	13.0009	18.9889	785.7110	29859.2564	44.0339	5.2456	6.925
	38.6228	89.6289	15736.3031	13.2339	19.3223	814.4117	31493.3124	44.8230	5.3611	7.077
L22	38.6228	94.8388	16610.8331	13.2179	19.3223	859.6719	33243.5233	47.4284	5.2819	6.582
	39.5112	97.0674	17809.6049	13.5285	19.7668	900.9868	35642.6441	48.5429	5.4359	6.774
L23	39.5112	95.2906	17497.3604	13.5338	19.7668	885.1903	35017.7443	47.6543	5.4623	6.936
	40.3997	97.4776	18729.9619	13.8444	20.2113	926.7092	37484.5691	48.7481	5.6163	7.132
L24	40.3997	96.2645	18506.3500	13.8480	20.2113	915.6455	37037.0512	48.1414	5.6339	7.246
	41.2882	98.4237	19779.7955	14.1586	20.6557	957.5929	39585.6179	49.2212	5.7879	7.444
L25	41.2882	96.5611	19420.0868	14.1639	20.6557	940.1785	38865.7270	48.2897	5.8143	7.625
	42.1766	98.6787	20725.9512	14.4746	21.1002	982.2619	41479.1742	49.3487	5.9683	7.827

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
L26	42.1766	96.1376	20212.0335	14.4817	21.1002	957.9059	40450.6626	48.0779	6.0035	8.086
	43.0651	98.1996	21540.6983	14.7923	21.5447	999.8137	43109.7405	49.1091	6.1575	8.293
L27	43.0651	96.9003	21265.8914	14.7958	21.5447	987.0585	42559.7650	48.4594	6.1751	8.43
	43.9536	98.9346	22633.5315	15.1064	21.9892	1029.3024	45296.8447	49.4767	6.3291	8.64
L28	43.9536	97.6068	22340.2837	15.1100	21.9892	1015.9664	44709.9634	48.8127	6.3467	8.784
	45.8638	101.9208	25435.2668	15.7778	22.9448	1108.5399	50904.0021	50.9701	6.6778	9.243
L29	45.2291	105.8514	24446.8939	15.1783	22.1162	1105.3850	48925.9557	52.9357	6.2895	8.063
	45.4067	108.7755	26529.4210	15.5976	22.7162	1167.8638	53093.7500	54.3981	6.4974	8.33
L30	45.4067	107.4054	26207.1862	15.6012	22.7162	1153.6785	52448.8565	53.7129	6.5150	8.461
	46.2952	109.5437	27803.7832	15.9118	23.1607	1200.4751	55644.1512	54.7822	6.6690	8.661
L31	46.2952	108.1451	27461.0670	15.9153	23.1607	1185.6777	54958.2680	54.0828	6.6866	8.798
	47.1836	110.2556	29100.3907	16.2259	23.6051	1232.8007	58239.0724	55.1383	6.8405	9.001
L32	47.1836	108.8287	28736.3439	16.2294	23.6051	1217.3783	57510.4998	54.4247	6.8581	9.144
	48.0720	110.9114	30417.9606	16.5400	24.0496	1264.8031	60875.9459	55.4663	7.0121	9.35
L33	48.0720	110.1839	30224.9029	16.5418	24.0496	1256.7756	60489.5765	55.1024	7.0209	9.424
	48.6494	111.5286	31345.1118	16.7437	24.3385	1287.8841	62731.4683	55.7749	7.1210	9.558
L34	48.6494	117.4171	32944.1107	16.7295	24.3385	1353.5825	65931.5701	58.7197	7.0506	8.982
	49.5379	119.5970	34813.2735	17.0401	24.7829	1404.7289	69672.3551	59.8099	7.2046	9.178
L35	49.5379	118.0980	34391.2778	17.0436	24.7829	1387.7012	68827.8084	59.0602	7.2222	9.319
	50.4263	120.2502	36305.9324	17.3542	25.2274	1439.1486	72659.6371	60.1365	7.3762	9.518
L36	50.4263	118.7229	35859.4661	17.3578	25.2274	1421.4509	71766.1170	59.3727	7.3938	9.665
	51.3147	120.8472	37819.0852	17.6684	25.6718	1473.1748	75687.9336	60.4351	7.5478	9.866
L37	51.3147	119.2915	37347.2208	17.6719	25.6718	1454.7942	74743.5841	59.6571	7.5654	10.02
	52.2031	121.3881	39351.2274	17.9825	26.1163	1506.7700	78754.2342	60.7056	7.7194	10.224

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 177.00-172.00				1	1	1		
L2 172.00-167.00				1	1	1		
L3 167.00-162.00				1	1	1		
L4 162.00-157.00				1	1	1		
L5 157.00-152.00				1	1	1		
L6 152.00-147.00				1	1	1		
L7 147.00-142.00				1	1	1		
L8 142.00-				1	1	1		

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
137.00								
L9 137.00-129.75				1	1	1		
L10 129.75-128.50				1	1	1		
L11 128.50-123.50				1	1	1		
L12 123.50-118.58				1	1	1		
L13 118.58-113.58				1	1	0.966234		
L14 113.58-110.00				1	1	0.972682		
L15 110.00-106.42				1	1	0.805695		
L16 106.42-101.42				1	1	0.803506		
L17 101.42-96.42				1	1	0.812949		
L18 96.42-91.42				1	1	0.817924		
L19 91.42-84.00				1	1	0.823192		
L20 84.00-83.75				1	1	0.834928		
L21 83.75-80.00				1	1	0.838094		
L22 80.00-75.00				1	1	0.832876		
L23 75.00-70.00				1	1	0.838275		
L24 70.00-65.00				1	1	0.839035		
L25 65.00-60.00				1	1	0.845661		
L26 60.00-55.00				1	1	0.858625		
L27 55.00-50.00				1	1	0.861018		
L28 50.00-39.25				1	1	0.863863		
L29 39.25-38.25				1	1	0.876468		
L30 38.25-33.25				1	1	0.879828		
L31 33.25-28.25				1	1	0.883592		
L32 28.25-23.25				1	1	0.887757		
L33 23.25-20.00				1	1	0.888913		
L34 20.00-15.00				1	1	0.880749		
L35 15.00-10.00				1	1	0.884625		
L36 10.00-5.00				1	1	0.888872		
L37 5.00-0.00				1	1	0.89349		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight plf
a										
b										
HB114-1-0813U4-M5J(1 1/4")	B	No	Inside Pole	177.00 - 0.00	0.0000	0	3	No Ice	0.00	1.20
								1/2" Ice	0.00	1.20
								1" Ice	0.00	1.20
HB114-21U3M12-XXXF(1-1/4")	B	No	CaAa (Out Of Face)	177.00 - 0.00	0.0000	0.2	1	No Ice	0.15	1.22
								1/2" Ice	0.25	2.47
								1" Ice	0.35	4.32
LDF7-50A(1-5/8")	B	No	Inside Pole	167.00 - 0.00	0.0000	0	6	No Ice	0.00	0.82
								1/2" Ice	0.00	0.82
								1" Ice	0.00	0.82
LDF7-50A(1-5/8")	B	No	CaAa (Out Of Face)	127.00 - 0.00	0.0000	0.1	2	No Ice	0.20	0.82
								1/2" Ice	0.30	2.33
								1" Ice	0.40	4.46
LDF7-50A(1-5/8")	B	No	CaAa (Out Of Face)	127.00 - 0.00	0.0000	0.1	10	No Ice	0.00	0.82
								1/2" Ice	0.00	2.33
								1" Ice	0.00	4.46
FB-L98B-002-75000(3/8")	B	No	Inside Pole	127.00 - 0.00	0.0000	0	3	No Ice	0.00	0.06
								1/2" Ice	0.00	0.06
								1" Ice	0.00	0.06
LDF4-50A(1/2")	B	No	Inside Pole	79.00 - 0.00	0.0000	0	1	No Ice	0.00	0.15
								1/2" Ice	0.00	0.15
								1" Ice	0.00	0.15
c										
CR 50 1873PE(1-5/8")	C	No	Inside Pole	154.00 - 0.00	0.0000	0	12	No Ice	0.00	0.83
								1/2" Ice	0.00	0.83
								1" Ice	0.00	0.83
LCF158-50JL(1-5/8")	C	No	CaAa (Out Of Face)	117.00 - 0.00	0.0000	0.4	1	No Ice	0.20	0.52
								1/2" Ice	0.30	2.03
								1" Ice	0.40	4.16
LCF158-50JL(1-5/8")	C	No	CaAa (Out Of Face)	117.00 - 0.00	0.0000	0.4	5	No Ice	0.00	0.52
								1/2" Ice	0.00	2.03
								1" Ice	0.00	4.16
*										
MP3-04 Mod Channel	A	No	CaAa (Out Of Face)	120.00 - 105.00	0.0000	0	1	No Ice	0.27	0.00
								1/2" Ice	0.38	17.33
								1" Ice	0.49	21.16
MP3-04 Mod Channel	B	No	CaAa (Out Of Face)	120.00 - 105.00	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	17.33
								1" Ice	0.00	21.16
MP3-04 Mod Channel	C	No	CaAa (Out Of Face)	120.00 - 105.00	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	17.33
								1" Ice	0.00	21.16
4 SR	A	No	CaAa (Out Of Face)	110.00 - 80.00	0.0000	0	1	No Ice	0.40	0.00
								1/2" Ice	0.50	45.45
								1" Ice	0.60	48.81
4 SR	B	No	CaAa (Out Of Face)	110.00 - 80.00	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	45.45
								1" Ice	0.00	48.81
4 SR	C	No	CaAa (Out Of Face)	110.00 - 80.00	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	45.45
								1" Ice	0.00	48.81
4.25 SR	A	No	CaAa (Out Of Face)	80.00 - 20.00	0.0000	0	1	No Ice	0.43	0.00
								1/2" Ice	0.52	51.10
								1" Ice	0.62	54.61
4.25 SR	B	No	CaAa (Out Of Face)	80.00 - 20.00	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	51.10
								1" Ice	0.00	54.61
4.25 SR	C	No	CaAa (Out Of Face)	80.00 - 20.00	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	51.10
								1" Ice	0.00	54.61
4.5 SR	A	No	CaAa (Out Of Face)	20.00 - 0.00	0.0000	0	1	No Ice	0.45	0.00
								1/2" Ice	0.55	57.14
								1" Ice	0.65	60.81
4.5 SR	B	No	CaAa (Out Of Face)	20.00 - 0.00	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	57.14

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight plf
4.5 SR	C	No	CaAa (Out Of Face)	20.00 - 0.00	0.0000	0	1	1" Ice	0.00	60.81
								No Ice	0.00	0.00
								1/2" Ice	0.00	57.14
								1" Ice	0.00	60.81

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	177.00-172.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.770	0.02
		C	0.000	0.000	0.000	0.000	0.00
L2	172.00-167.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.770	0.02
		C	0.000	0.000	0.000	0.000	0.00
L3	167.00-162.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.770	0.05
		C	0.000	0.000	0.000	0.000	0.00
L4	162.00-157.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.770	0.05
		C	0.000	0.000	0.000	0.000	0.00
L5	157.00-152.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.770	0.05
		C	0.000	0.000	0.000	0.000	0.02
L6	152.00-147.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.770	0.05
		C	0.000	0.000	0.000	0.000	0.05
L7	147.00-142.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.770	0.05
		C	0.000	0.000	0.000	0.000	0.05
L8	142.00-137.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.770	0.05
		C	0.000	0.000	0.000	0.000	0.05
L9	137.00-129.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	1.116	0.07
		C	0.000	0.000	0.000	0.000	0.07
L10	129.75-128.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.192	0.01
		C	0.000	0.000	0.000	0.000	0.01
L11	128.50-123.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	2.156	0.08
		C	0.000	0.000	0.000	0.000	0.05
L12	123.50-118.58	A	0.000	0.000	0.000	0.381	0.00
		B	0.000	0.000	0.000	2.704	0.10
		C	0.000	0.000	0.000	0.000	0.05
L13	118.58-113.58	A	0.000	0.000	0.000	1.345	0.00
		B	0.000	0.000	0.000	2.750	0.10
		C	0.000	0.000	0.000	0.677	0.06
L14	113.58-110.00	A	0.000	0.000	0.000	0.964	0.00
		B	0.000	0.000	0.000	1.971	0.07
		C	0.000	0.000	0.000	0.709	0.05
L15	110.00-106.42	A	0.000	0.000	0.000	2.397	0.00
		B	0.000	0.000	0.000	1.971	0.07
		C	0.000	0.000	0.000	0.709	0.05
L16	106.42-101.42	A	0.000	0.000	0.000	2.381	0.00
		B	0.000	0.000	0.000	2.750	0.10
		C	0.000	0.000	0.000	0.990	0.07
L17	101.42-96.42	A	0.000	0.000	0.000	2.000	0.00
		B	0.000	0.000	0.000	2.750	0.10
		C	0.000	0.000	0.000	0.990	0.07
L18	96.42-91.42	A	0.000	0.000	0.000	2.000	0.00
		B	0.000	0.000	0.000	2.750	0.10
		C	0.000	0.000	0.000	0.990	0.07
L19	91.42-84.00	A	0.000	0.000	0.000	2.967	0.00
		B	0.000	0.000	0.000	4.079	0.15

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	0.000	1.469	0.10
L20	84.00-83.75	A	0.000	0.000	0.000	0.100	0.00
		B	0.000	0.000	0.000	0.137	0.00
		C	0.000	0.000	0.000	0.050	0.00
L21	83.75-80.00	A	0.000	0.000	0.000	1.500	0.00
		B	0.000	0.000	0.000	2.062	0.07
		C	0.000	0.000	0.000	0.743	0.05
L22	80.00-75.00	A	0.000	0.000	0.000	2.125	0.00
		B	0.000	0.000	0.000	2.750	0.10
		C	0.000	0.000	0.000	0.990	0.07
L23	75.00-70.00	A	0.000	0.000	0.000	2.125	0.00
		B	0.000	0.000	0.000	2.750	0.10
		C	0.000	0.000	0.000	0.990	0.07
L24	70.00-65.00	A	0.000	0.000	0.000	2.125	0.00
		B	0.000	0.000	0.000	2.750	0.10
		C	0.000	0.000	0.000	0.990	0.07
L25	65.00-60.00	A	0.000	0.000	0.000	2.125	0.00
		B	0.000	0.000	0.000	2.750	0.10
		C	0.000	0.000	0.000	0.990	0.07
L26	60.00-55.00	A	0.000	0.000	0.000	2.125	0.00
		B	0.000	0.000	0.000	2.750	0.10
		C	0.000	0.000	0.000	0.990	0.07
L27	55.00-50.00	A	0.000	0.000	0.000	2.125	0.00
		B	0.000	0.000	0.000	2.750	0.10
		C	0.000	0.000	0.000	0.990	0.07
L28	50.00-39.25	A	0.000	0.000	0.000	4.569	0.00
		B	0.000	0.000	0.000	5.912	0.21
		C	0.000	0.000	0.000	2.128	0.14
L29	39.25-38.25	A	0.000	0.000	0.000	0.425	0.00
		B	0.000	0.000	0.000	0.550	0.02
		C	0.000	0.000	0.000	0.198	0.01
L30	38.25-33.25	A	0.000	0.000	0.000	2.125	0.00
		B	0.000	0.000	0.000	2.750	0.10
		C	0.000	0.000	0.000	0.990	0.07
L31	33.25-28.25	A	0.000	0.000	0.000	2.125	0.00
		B	0.000	0.000	0.000	2.750	0.10
		C	0.000	0.000	0.000	0.990	0.07
L32	28.25-23.25	A	0.000	0.000	0.000	2.125	0.00
		B	0.000	0.000	0.000	2.750	0.10
		C	0.000	0.000	0.000	0.990	0.07
L33	23.25-20.00	A	0.000	0.000	0.000	1.381	0.00
		B	0.000	0.000	0.000	1.787	0.06
		C	0.000	0.000	0.000	0.643	0.04
L34	20.00-15.00	A	0.000	0.000	0.000	2.250	0.00
		B	0.000	0.000	0.000	2.750	0.10
		C	0.000	0.000	0.000	0.990	0.07
L35	15.00-10.00	A	0.000	0.000	0.000	2.250	0.00
		B	0.000	0.000	0.000	2.750	0.10
		C	0.000	0.000	0.000	0.990	0.07
L36	10.00-5.00	A	0.000	0.000	0.000	2.250	0.00
		B	0.000	0.000	0.000	2.750	0.10
		C	0.000	0.000	0.000	0.990	0.07
L37	5.00-0.00	A	0.000	0.000	0.000	2.250	0.00
		B	0.000	0.000	0.000	2.750	0.10
		C	0.000	0.000	0.000	0.990	0.07

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	177.00-172.00	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	1.770	0.04
		C		0.000	0.000	0.000	0.000	0.00
L2	172.00-167.00	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	1.770	0.04

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
		C		0.000	0.000	0.000	0.000	0.00
L3	167.00-162.00	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	1.770	0.06
		C		0.000	0.000	0.000	0.000	0.00
L4	162.00-157.00	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	1.770	0.06
		C		0.000	0.000	0.000	0.000	0.00
L5	157.00-152.00	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	1.770	0.06
		C		0.000	0.000	0.000	0.000	0.02
L6	152.00-147.00	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	1.770	0.06
		C		0.000	0.000	0.000	0.000	0.05
L7	147.00-142.00	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	1.770	0.06
		C		0.000	0.000	0.000	0.000	0.05
L8	142.00-137.00	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	1.770	0.06
		C		0.000	0.000	0.000	0.000	0.05
L9	137.00-129.75	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	2.567	0.09
		C		0.000	0.000	0.000	0.000	0.07
L10	129.75-128.50	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.443	0.02
		C		0.000	0.000	0.000	0.000	0.01
L11	128.50-123.50	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	4.556	0.25
		C		0.000	0.000	0.000	0.000	0.05
L12	123.50-118.58	A	1.000	0.000	0.000	0.000	0.694	0.03
		B		0.000	0.000	0.000	5.655	0.36
		C		0.000	0.000	0.000	0.000	0.08
L13	118.58-113.58	A	1.000	0.000	0.000	0.000	2.450	0.11
		B		0.000	0.000	0.000	5.750	0.44
		C		0.000	0.000	0.000	1.360	0.24
L14	113.58-110.00	A	1.000	0.000	0.000	0.000	1.756	0.08
		B		0.000	0.000	0.000	4.120	0.31
		C		0.000	0.000	0.000	1.426	0.20
L15	110.00-106.42	A	1.000	0.000	0.000	0.000	3.905	0.25
		B		0.000	0.000	0.000	4.120	0.49
		C		0.000	0.000	0.000	1.426	0.38
L16	106.42-101.42	A	1.000	0.000	0.000	0.000	3.694	0.27
		B		0.000	0.000	0.000	5.750	0.61
		C		0.000	0.000	0.000	1.990	0.45
L17	101.42-96.42	A	1.000	0.000	0.000	0.000	3.000	0.24
		B		0.000	0.000	0.000	5.750	0.58
		C		0.000	0.000	0.000	1.990	0.42
L18	96.42-91.42	A	1.000	0.000	0.000	0.000	3.000	0.24
		B		0.000	0.000	0.000	5.750	0.58
		C		0.000	0.000	0.000	1.990	0.42
L19	91.42-84.00	A	1.000	0.000	0.000	0.000	4.450	0.36
		B		0.000	0.000	0.000	8.530	0.86
		C		0.000	0.000	0.000	2.952	0.62
L20	84.00-83.75	A	1.000	0.000	0.000	0.000	0.150	0.01
		B		0.000	0.000	0.000	0.288	0.03
		C		0.000	0.000	0.000	0.100	0.02
L21	83.75-80.00	A	1.000	0.000	0.000	0.000	2.250	0.18
		B		0.000	0.000	0.000	4.313	0.43
		C		0.000	0.000	0.000	1.493	0.31
L22	80.00-75.00	A	1.000	0.000	0.000	0.000	3.125	0.27
		B		0.000	0.000	0.000	5.750	0.61
		C		0.000	0.000	0.000	1.990	0.45
L23	75.00-70.00	A	1.000	0.000	0.000	0.000	3.125	0.27
		B		0.000	0.000	0.000	5.750	0.61
		C		0.000	0.000	0.000	1.990	0.45
L24	70.00-65.00	A	1.000	0.000	0.000	0.000	3.125	0.27
		B		0.000	0.000	0.000	5.750	0.61
		C		0.000	0.000	0.000	1.990	0.45
L25	65.00-60.00	A	1.000	0.000	0.000	0.000	3.125	0.27
		B		0.000	0.000	0.000	5.750	0.61

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
		C		0.000	0.000	0.000	1.990	0.45
L26	60.00-55.00	A	1.000	0.000	0.000	0.000	3.125	0.27
		B		0.000	0.000	0.000	5.750	0.61
		C		0.000	0.000	0.000	1.990	0.45
L27	55.00-50.00	A	1.000	0.000	0.000	0.000	3.125	0.27
		B		0.000	0.000	0.000	5.750	0.61
		C		0.000	0.000	0.000	1.990	0.45
L28	50.00-39.25	A	1.000	0.000	0.000	0.000	6.719	0.59
		B		0.000	0.000	0.000	12.363	1.30
		C		0.000	0.000	0.000	4.279	0.96
L29	39.25-38.25	A	1.000	0.000	0.000	0.000	0.625	0.05
		B		0.000	0.000	0.000	1.150	0.12
		C		0.000	0.000	0.000	0.398	0.09
L30	38.25-33.25	A	1.000	0.000	0.000	0.000	3.125	0.27
		B		0.000	0.000	0.000	5.750	0.61
		C		0.000	0.000	0.000	1.990	0.45
L31	33.25-28.25	A	1.000	0.000	0.000	0.000	3.125	0.27
		B		0.000	0.000	0.000	5.750	0.61
		C		0.000	0.000	0.000	1.990	0.45
L32	28.25-23.25	A	1.000	0.000	0.000	0.000	3.125	0.27
		B		0.000	0.000	0.000	5.750	0.61
		C		0.000	0.000	0.000	1.990	0.45
L33	23.25-20.00	A	1.000	0.000	0.000	0.000	2.031	0.18
		B		0.000	0.000	0.000	3.738	0.39
		C		0.000	0.000	0.000	1.294	0.29
L34	20.00-15.00	A	1.000	0.000	0.000	0.000	3.250	0.30
		B		0.000	0.000	0.000	5.750	0.64
		C		0.000	0.000	0.000	1.990	0.48
L35	15.00-10.00	A	1.000	0.000	0.000	0.000	3.250	0.30
		B		0.000	0.000	0.000	5.750	0.64
		C		0.000	0.000	0.000	1.990	0.48
L36	10.00-5.00	A	1.000	0.000	0.000	0.000	3.250	0.30
		B		0.000	0.000	0.000	5.750	0.64
		C		0.000	0.000	0.000	1.990	0.48
L37	5.00-0.00	A	1.000	0.000	0.000	0.000	3.250	0.30
		B		0.000	0.000	0.000	5.750	0.64
		C		0.000	0.000	0.000	1.990	0.48

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	177.00-172.00	0.2588	0.1494	0.5036	0.2907
L2	172.00-167.00	0.2595	0.1498	0.5077	0.2931
L3	167.00-162.00	0.2602	0.1502	0.5116	0.2954
L4	162.00-157.00	0.2608	0.1506	0.5153	0.2975
L5	157.00-152.00	0.2614	0.1509	0.5188	0.2995
L6	152.00-147.00	0.2620	0.1513	0.5221	0.3015
L7	147.00-142.00	0.2625	0.1516	0.5253	0.3033
L8	142.00-137.00	0.2630	0.1519	0.5282	0.3050
L9	137.00-129.75	0.2636	0.1522	0.5317	0.3070
L10	129.75-128.50	0.2638	0.1523	0.5326	0.3075
L11	128.50-123.50	0.6104	0.3524	1.0645	0.6146
L12	123.50-118.58	0.7236	0.3231	1.2097	0.5611
L13	118.58-113.58	0.4276	0.2199	0.7023	0.4069
L14	113.58-110.00	0.3170	0.2787	0.5293	0.4940
L15	110.00-106.42	0.2884	-0.1448	0.4766	-0.0048
L16	106.42-101.42	0.3043	0.0505	0.5137	0.2795
L17	101.42-96.42	0.3123	0.1333	0.5334	0.4056
L18	96.42-91.42	0.3144	0.1342	0.5392	0.4100
L19	91.42-84.00	0.3170	0.1353	0.5461	0.4152
L20	84.00-83.75	0.3174	0.1355	0.5472	0.4161
L21	83.75-80.00	0.3182	0.1358	0.5494	0.4177
L22	80.00-75.00	0.3180	0.1083	0.5515	0.3977

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L23	75.00-70.00	0.3199	0.1089	0.5568	0.4015
L24	70.00-65.00	0.3218	0.1096	0.5618	0.4051
L25	65.00-60.00	0.3236	0.1102	0.5668	0.4087
L26	60.00-55.00	0.3253	0.1107	0.5716	0.4122
L27	55.00-50.00	0.3270	0.1113	0.5764	0.4156
L28	50.00-39.25	0.3295	0.1122	0.5836	0.4208
L29	39.25-38.25	0.3302	0.1124	0.5856	0.4223
L30	38.25-33.25	0.3312	0.1127	0.5883	0.4242
L31	33.25-28.25	0.3327	0.1133	0.5926	0.4273
L32	28.25-23.25	0.3341	0.1138	0.5968	0.4303
L33	23.25-20.00	0.3353	0.1142	0.6002	0.4328
L34	20.00-15.00	0.3348	0.0851	0.6012	0.4099
L35	15.00-10.00	0.3362	0.0854	0.6052	0.4126
L36	10.00-5.00	0.3375	0.0858	0.6090	0.4152
L37	5.00-0.00	0.3388	0.0861	0.6128	0.4178

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
mounts									
Platform Mount [LP 713-1]	C	None		0.0000	177.00	No Ice	31.27	31.27	1.51
						1/2" Ice	39.68	39.68	1.93
						1" Ice	48.09	48.09	2.35
T-Arm Mount [TA 602-3]	C	None		0.0000	167.00	No Ice	11.59	11.59	0.77
						1/2" Ice	15.44	15.44	0.99
						1" Ice	19.29	19.29	1.21
Platform Mount [LP 303-1]	C	None		0.0000	154.00	No Ice	14.66	14.66	1.25
						1/2" Ice	18.87	18.87	1.48
						1" Ice	23.08	23.08	1.71
Platform Mount [LP 303-1]	C	None		0.0000	127.00	No Ice	14.66	14.66	1.25
						1/2" Ice	18.87	18.87	1.48
						1" Ice	23.08	23.08	1.71
Pipe Mount [PM 601-3]	C	None		0.0000	117.00	No Ice	4.39	4.39	0.20
						1/2" Ice	5.48	5.48	0.24
						1" Ice	6.57	6.57	0.28
Side Arm Mount [SO 701-1]	C	None		0.0000	79.00	No Ice	0.85	1.67	0.07
						1/2" Ice	1.14	2.34	0.08
						1" Ice	1.43	3.01	0.09
*									
177									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice	8.50	6.95	0.08
						1/2" Ice	9.15	8.13	0.15
						1" Ice	9.77	9.02	0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice	8.50	6.95	0.08
						1/2" Ice	9.15	8.13	0.15
						1" Ice	9.77	9.02	0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice	8.50	6.95	0.08
						1/2" Ice	9.15	8.13	0.15
						1" Ice	9.77	9.02	0.23
*									

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
1900MHz RRH (65MHz)	A	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	2.70 2.94 3.18	2.77 3.01 3.26	0.06 0.08 0.11
800 EXTERNAL NOTCH FILTER	A	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	0.77 0.89 1.02	0.37 0.46 0.56	0.01 0.02 0.02
800MHZ RRH	A	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	2.49 2.71 2.93	2.07 2.27 2.48	0.05 0.07 0.10
(3) ACU-A20-N	A	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	0.08 0.12 0.17	0.14 0.19 0.25	0.00 0.00 0.00
1900MHz RRH (65MHz)	B	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	2.70 2.94 3.18	2.77 3.01 3.26	0.06 0.08 0.11
800 EXTERNAL NOTCH FILTER	B	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	0.77 0.89 1.02	0.37 0.46 0.56	0.01 0.02 0.02
800MHZ RRH	B	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	2.49 2.71 2.93	2.07 2.27 2.48	0.05 0.07 0.10
(3) ACU-A20-N	B	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	0.08 0.12 0.17	0.14 0.19 0.25	0.00 0.00 0.00
1900MHz RRH (65MHz)	C	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	2.70 2.94 3.18	2.77 3.01 3.26	0.06 0.08 0.11
800 EXTERNAL NOTCH FILTER	C	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	0.77 0.89 1.02	0.37 0.46 0.56	0.01 0.02 0.02
800MHZ RRH	C	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	2.49 2.71 2.93	2.07 2.27 2.48	0.05 0.07 0.10
(3) ACU-A20-N	C	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	0.08 0.12 0.17	0.14 0.19 0.25	0.00 0.00 0.00
PROPOSED APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	7.13 7.66 8.18	4.96 5.75 6.47	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	7.13 7.66 8.18	4.96 5.75 6.47	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	7.13 7.66 8.18	4.96 5.75 6.47	0.08 0.13 0.19
* TD-RRH8x20-25	A	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice	4.72 5.01 5.32	1.70 1.92 2.15	0.07 0.10 0.13

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
TD-RRH8x20-25	B	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	4.72 5.01 5.32	1.70 1.92 2.15	0.07 0.10 0.13
TD-RRH8x20-25	C	From Leg	4.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	4.72 5.01 5.32	1.70 1.92 2.15	0.07 0.10 0.13
167									
RR90-17-02DP w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	167.00	No Ice 1/2" Ice 1" Ice	4.59 5.09 5.58	3.32 4.09 4.78	0.03 0.07 0.12
RR90-17-02DP w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	167.00	No Ice 1/2" Ice 1" Ice	4.59 5.09 5.58	3.32 4.09 4.78	0.03 0.07 0.12
RR90-17-02DP w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	167.00	No Ice 1/2" Ice 1" Ice	4.59 5.09 5.58	3.32 4.09 4.78	0.03 0.07 0.12
*									
(2) KRY 112 75/1	A	From Leg	4.00 0.00 2.00	0.0000	167.00	No Ice 1/2" Ice 1" Ice	0.58 0.69 0.81	0.51 0.62 0.74	0.01 0.02 0.02
(2) KRY 112 75/1	B	From Leg	4.00 0.00 2.00	0.0000	167.00	No Ice 1/2" Ice 1" Ice	0.58 0.69 0.81	0.51 0.62 0.74	0.01 0.02 0.02
(2) KRY 112 75/1	C	From Leg	4.00 0.00 2.00	0.0000	167.00	No Ice 1/2" Ice 1" Ice	0.58 0.69 0.81	0.51 0.62 0.74	0.01 0.02 0.02
154									
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	3.16 3.53 3.94	3.33 3.94 4.56	0.03 0.06 0.10
BXA-70063-6CF-2 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	7.97 8.61 9.22	5.80 6.95 7.82	0.04 0.10 0.17
(2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	4.56 5.11 5.61	10.73 11.99 12.97	0.05 0.11 0.19
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	3.16 3.53 3.94	3.33 3.94 4.56	0.03 0.06 0.10
BXA-70063-6CF-2 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	7.97 8.61 9.22	5.80 6.95 7.82	0.04 0.10 0.17
(2) LPA-80080/6CF w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	4.56 5.11 5.61	10.73 11.99 12.97	0.05 0.11 0.19
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	3.18 3.56 3.96	3.35 3.97 4.60	0.03 0.06 0.10
BXA-70063-6CF-2 w/	A	From Leg	4.00	0.0000	154.00	No Ice	7.97	5.80	0.04

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
Mount Pipe			0.00			1/2"	8.61	6.95	0.10
			2.00			Ice	9.22	7.82	0.17
						1" Ice			
(2) LPA-80063/6CF w/ Mount Pipe	A	From Leg	4.00	0.0000	154.00	No Ice	10.58	10.67	0.05
			0.00			1/2"	11.24	11.93	0.14
			2.00			Ice	11.87	12.91	0.25
						1" Ice			
*									
(2) FD9R6004/2C-3L	A	From Leg	4.00	0.0000	154.00	No Ice	0.37	0.08	0.00
			0.00			1/2"	0.45	0.14	0.01
			2.00			Ice	0.54	0.20	0.01
						1" Ice			
(2) FD9R6004/2C-3L	B	From Leg	4.00	0.0000	154.00	No Ice	0.37	0.08	0.00
			0.00			1/2"	0.45	0.14	0.01
			2.00			Ice	0.54	0.20	0.01
						1" Ice			
(2) FD9R6004/2C-3L	C	From Leg	4.00	0.0000	154.00	No Ice	0.37	0.08	0.00
			0.00			1/2"	0.45	0.14	0.01
			2.00			Ice	0.54	0.20	0.01
						1" Ice			
137									
127									
(2) AP14/17-880/1940/065D/ADT/XXP w/ Mount Pipe	A	From Leg	4.00	0.0000	127.00	No Ice	5.39	3.75	0.06
			0.00			1/2"	5.86	4.42	0.10
			2.00			Ice	6.34	5.07	0.15
						1" Ice			
AM-X-CD-14-65-00T-RET w/ Mount Pipe	A	From Leg	4.00	0.0000	127.00	No Ice	5.74	4.02	0.03
			0.00			1/2"	6.20	4.63	0.08
			2.00			Ice	6.66	5.28	0.13
						1" Ice			
(2) AP14/17-880/1940/065D/ADT/XXP w/ Mount Pipe	B	From Leg	4.00	0.0000	127.00	No Ice	5.39	3.75	0.06
			0.00			1/2"	5.86	4.42	0.10
			2.00			Ice	6.34	5.07	0.15
						1" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.00	0.0000	127.00	No Ice	8.50	6.30	0.07
			0.00			1/2"	9.15	7.48	0.14
			2.00			Ice	9.77	8.37	0.21
						1" Ice			
800 10764 w/ Mount Pipe	C	From Leg	4.00	0.0000	127.00	No Ice	6.20	4.29	0.06
			0.00			1/2"	6.69	4.99	0.11
			2.00			Ice	7.18	5.66	0.17
						1" Ice			
(2) AP14/17-880/1940/065D/ADT/XXP w/ Mount Pipe	C	From Leg	4.00	0.0000	127.00	No Ice	5.39	3.75	0.06
			0.00			1/2"	5.86	4.42	0.10
			2.00			Ice	6.34	5.07	0.15
						1" Ice			
*									
RRUS 11	A	From Leg	4.00	0.0000	127.00	No Ice	3.25	1.37	0.05
			0.00			1/2"	3.49	1.55	0.07
			2.00			Ice	3.74	1.74	0.10
						1" Ice			
(2) LGP 17201	A	From Leg	4.00	0.0000	127.00	No Ice	1.95	0.52	0.03
			0.00			1/2"	2.13	0.64	0.04
			2.00			Ice	2.33	0.77	0.06
						1" Ice			
RRUS 11	B	From Leg	4.00	0.0000	127.00	No Ice	3.25	1.37	0.05
			0.00			1/2"	3.49	1.55	0.07
			2.00			Ice	3.74	1.74	0.10
						1" Ice			
(2) LGP 17201	B	From Leg	4.00	0.0000	127.00	No Ice	1.95	0.52	0.03
			0.00			1/2"	2.13	0.64	0.04
			2.00			Ice	2.33	0.77	0.06
						1" Ice			
DC6-48-60-18-8F	B	From Leg	4.00	0.0000	127.00	No Ice	1.27	1.27	0.02
			0.00			1/2"	1.46	1.46	0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			2.00			Ice 1" Ice	1.66	1.66	0.05
RRUS 11	C	From Leg	4.00 0.00 2.00	0.0000	127.00	No Ice 1/2" Ice 1" Ice	3.25 3.49 3.74	1.37 1.55 1.74	0.05 0.07 0.10
(2) LGP 17201	C	From Leg	4.00 0.00 2.00	0.0000	127.00	No Ice 1/2" Ice 1" Ice	1.95 2.13 2.33	0.52 0.64 0.77	0.03 0.04 0.06
117 APXV18-206517S-C w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice	5.40 5.96 6.48	4.70 5.86 6.73	0.05 0.10 0.15
APXV18-206517S-C w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice	5.40 5.96 6.48	4.70 5.86 6.73	0.05 0.10 0.15
APXV18-206517S-C w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice	5.40 5.96 6.48	4.70 5.86 6.73	0.05 0.10 0.15
79 8225	C	From Leg	2.00 0.00 1.00	0.0000	79.00	No Ice 1/2" Ice 1" Ice	0.89 1.08 1.28	0.89 1.08 1.28	0.00 0.01 0.02
* (3) 4' x 2" Pipe Mount	A	From Leg	4.00 0.00 0.00	0.0000	167.00	No Ice 1/2" Ice 1" Ice	0.79 1.03 1.28	0.79 1.03 1.28	0.03 0.04 0.04
(3) 4' x 2" Pipe Mount	B	From Leg	4.00 0.00 0.00	0.0000	167.00	No Ice 1/2" Ice 1" Ice	0.79 1.03 1.28	0.79 1.03 1.28	0.03 0.04 0.04
(3) 4' x 2" Pipe Mount	C	From Leg	4.00 0.00 0.00	0.0000	167.00	No Ice 1/2" Ice 1" Ice	0.79 1.03 1.28	0.79 1.03 1.28	0.03 0.04 0.04

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

Comb. No.	Description
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	177 - 172	Pole	Max Tension	14	0.00	0.00	-0.00
			Max. Compression	14	-5.18	-0.04	-0.00
			Max. Mx	5	-2.42	-24.23	0.04
			Max. My	8	-2.43	-0.02	-24.22
			Max. Vy	5	5.01	-24.23	0.04
			Max. Vx	2	-5.01	-0.04	24.22
			Max. Torque	9			0.01
L2	172 - 167	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-5.64	-0.07	-0.00
			Max. Mx	5	-2.69	-50.13	0.08
			Max. My	8	-2.70	-0.04	-50.10
			Max. Vy	5	5.35	-50.13	0.08
			Max. Vx	2	-5.35	-0.08	50.09
			Max. Torque	9			0.02
L3	167 - 162	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-8.24	-0.12	-0.00
			Max. Mx	5	-4.06	-87.00	0.15
			Max. My	8	-4.07	-0.06	-86.95
			Max. Vy	5	7.28	-87.00	0.15
			Max. Vx	2	-7.28	-0.14	86.93
			Max. Torque	9			0.02
L4	162 - 157	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-8.76	-0.17	0.00
			Max. Mx	5	-4.39	-124.26	0.22
			Max. My	8	-4.40	-0.08	-124.19
			Max. Vy	5	7.63	-124.26	0.22
			Max. Vx	2	-7.62	-0.20	124.17
			Max. Torque	9			0.03
L5	157 - 152	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-13.12	-3.05	5.51
			Max. Mx	5	-6.17	-180.27	1.54
			Max. My	2	-6.19	-1.32	180.12
			Max. Vy	5	12.42	-180.27	1.54
			Max. Vx	2	-12.27	-1.32	180.12
			Max. Torque	6			11.71
L6	152 - 147	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	14	-13.72	-3.11	5.52
			Max. Mx	5	-6.59	-243.27	2.60
			Max. My	2	-6.61	-2.36	242.36
			Max. Vy	5	12.78	-243.27	2.60
			Max. Vx	2	-12.63	-2.36	242.36
			Max. Torque	6			11.71
L7	147 - 142	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-14.34	-3.17	5.53
			Max. Mx	5	-7.04	-308.04	3.64
			Max. My	2	-7.06	-3.40	306.37
			Max. Vy	5	13.13	-308.04	3.64
			Max. Vx	2	-12.98	-3.40	306.37
			Max. Torque	6			11.71
L8	142 - 137	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-14.97	-3.22	5.53
			Max. Mx	5	-7.50	-374.58	4.68
			Max. My	2	-7.52	-4.44	372.16
			Max. Vy	5	13.49	-374.58	4.68
			Max. Vx	2	-13.34	-4.44	372.16
			Max. Torque	6			11.70
L9	137 - 129.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-15.42	-3.26	5.52
			Max. Mx	5	-7.83	-422.22	5.40
			Max. My	2	-7.85	-5.16	419.27
			Max. Vy	5	13.74	-422.22	5.40
			Max. Vx	2	-13.59	-5.16	419.27
			Max. Torque	6			11.70
L10	129.75 - 128.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-16.38	-3.32	5.52
			Max. Mx	5	-8.60	-491.90	6.42
			Max. My	2	-8.62	-6.19	488.18
			Max. Vy	5	14.13	-491.90	6.42
			Max. Vx	2	-13.98	-6.19	488.18
			Max. Torque	6			11.69
L11	128.5 - 123.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-21.06	-4.07	4.92
			Max. Mx	5	-11.12	-579.91	7.19
			Max. My	2	-11.14	-7.34	574.91
			Max. Vy	5	17.74	-579.91	7.19
			Max. Vx	2	-17.58	-7.34	574.91
			Max. Torque	6			11.69
L12	123.5 - 118.583	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-22.13	-4.49	4.70
			Max. Mx	5	-11.74	-668.26	8.13
			Max. My	2	-11.75	-8.39	662.34
			Max. Vy	5	18.18	-668.26	8.13
			Max. Vx	2	-18.01	-8.39	662.34
			Max. Torque	6			11.64
L13	118.583 - 113.583	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-24.49	-4.74	4.36
			Max. Mx	5	-12.88	-763.22	9.07
			Max. My	2	-12.90	-9.44	756.37
			Max. Vy	5	19.50	-763.22	9.07
			Max. Vx	2	-19.34	-9.44	756.37
			Max. Torque	6			11.64
L14	113.583 - 110	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-25.70	-4.86	4.08
			Max. Mx	5	-13.49	-833.81	9.74
			Max. My	2	-13.51	-10.19	826.29
			Max. Vy	5	19.89	-833.81	9.74
			Max. Vx	2	-19.73	-10.19	826.29
			Max. Torque	6			11.64
L15	110 - 106.417	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	14	-27.90	-4.99	3.79
			Max. Mx	5	-14.55	-905.96	10.40
			Max. My	2	-14.56	-10.93	897.77
			Max. Vy	5	20.37	-905.96	10.40
			Max. Vx	2	-20.21	-10.93	897.77
			Max. Torque	6			11.64
L16	106.417 - 101.417	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-30.54	-5.17	3.38
			Max. Mx	5	-15.82	-1009.39	11.33
			Max. My	2	-15.83	-11.97	1000.27
			Max. Vy	5	20.99	-1009.39	11.33
			Max. Vx	8	20.83	9.61	-998.78
			Max. Torque	6			11.64
L17	101.417 - 96.417	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-33.11	-5.36	2.95
			Max. Mx	5	-17.11	-1115.88	12.26
			Max. My	2	-17.12	-13.02	1105.81
			Max. Vy	5	21.59	-1115.88	12.26
			Max. Vx	8	21.43	10.52	-1104.47
			Max. Torque	6			11.64
L18	96.417 - 91.417	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-35.69	-5.54	2.51
			Max. Mx	5	-18.41	-1225.34	13.18
			Max. My	2	-18.43	-14.06	1214.33
			Max. Vy	5	22.18	-1225.34	13.18
			Max. Vx	8	22.02	11.43	-1213.13
			Max. Torque	6			11.64
L19	91.417 - 84	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-37.08	-5.65	2.27
			Max. Mx	5	-19.12	-1284.93	13.67
			Max. My	2	-19.13	-14.62	1273.42
			Max. Vy	5	22.49	-1284.93	13.67
			Max. Vx	8	22.33	11.91	-1272.29
			Max. Torque	6			11.64
L20	84 - 83.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-40.90	-5.84	1.82
			Max. Mx	5	-21.63	-1399.08	14.60
			Max. My	2	-21.65	-15.66	1386.61
			Max. Vy	5	23.15	-1399.08	14.60
			Max. Vx	8	22.98	12.82	-1385.63
			Max. Torque	6			11.65
L21	83.75 - 80	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-42.96	-5.99	1.48
			Max. Mx	5	-22.73	-1486.71	15.28
			Max. My	2	-22.74	-16.45	1473.53
			Max. Vy	5	23.58	-1486.71	15.28
			Max. Vx	8	23.42	13.50	-1472.67
			Max. Torque	6			11.65
L22	80 - 75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-46.00	-6.13	0.98
			Max. Mx	5	-24.35	-1606.48	16.20
			Max. My	2	-24.36	-17.49	1592.34
			Max. Vy	5	24.25	-1606.48	16.20
			Max. Vx	8	24.09	14.41	-1591.64
			Max. Torque	6			11.65
L23	75 - 70	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-48.95	-6.33	0.50
			Max. Mx	5	-25.92	-1729.17	17.11
			Max. My	2	-25.93	-18.54	1714.07
			Max. Vy	5	24.82	-1729.17	17.11
			Max. Vx	8	24.65	15.33	-1713.53
			Max. Torque	6			11.55
L24	70 - 65	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-51.92	-6.52	0.01
			Max. Mx	5	-27.52	-1854.67	18.02
			Max. My	2	-27.53	-19.59	1838.61

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	5	25.37	-1854.67	18.02
			Max. Vx	8	25.21	16.24	-1838.22
			Max. Torque	6			11.55
L25	65 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-54.92	-6.71	-0.48
			Max. Mx	5	-29.13	-1982.91	18.93
			Max. My	2	-29.14	-20.63	1965.89
			Max. Vy	5	25.92	-1982.91	18.93
			Max. Vx	8	25.75	17.14	-1965.67
			Max. Torque	6			11.55
L26	60 - 55	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-57.93	-6.90	-0.99
			Max. Mx	5	-30.76	-2113.83	19.82
			Max. My	2	-30.77	-21.68	2095.84
			Max. Vy	5	26.44	-2113.83	19.82
			Max. Vx	8	26.28	18.05	-2095.79
			Max. Torque	6			11.55
L27	55 - 50	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-60.96	-7.10	-1.50
			Max. Mx	5	-32.41	-2247.36	20.72
			Max. My	8	-32.42	18.96	-2228.52
			Max. Vy	5	26.96	-2247.36	20.72
			Max. Vx	8	26.79	18.96	-2228.52
			Max. Torque	6			11.56
L28	50 - 39.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-64.01	-7.30	-2.03
			Max. Mx	5	-34.08	-2383.37	21.61
			Max. My	8	-34.09	19.86	-2363.75
			Max. Vy	5	27.44	-2383.37	21.61
			Max. Vx	8	27.28	19.86	-2363.75
			Max. Torque	6			11.56
L29	39.25 - 38.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-70.05	-7.57	-2.75
			Max. Mx	5	-38.21	-2571.19	22.81
			Max. My	8	-38.21	21.08	-2550.49
			Max. Vy	5	28.18	-2571.19	22.81
			Max. Vx	8	28.02	21.08	-2550.49
			Max. Torque	6			11.56
L30	38.25 - 33.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-73.29	-7.78	-3.29
			Max. Mx	5	-40.06	-2713.23	23.69
			Max. My	8	-40.06	21.98	-2691.74
			Max. Vy	5	28.63	-2713.23	23.69
			Max. Vx	8	28.47	21.98	-2691.74
			Max. Torque	6			11.56
L31	33.25 - 28.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-76.54	-7.99	-3.84
			Max. Mx	5	-41.93	-2857.48	24.56
			Max. My	8	-41.93	22.88	-2835.21
			Max. Vy	5	29.06	-2857.48	24.56
			Max. Vx	8	28.90	22.88	-2835.21
			Max. Torque	6			11.56
L32	28.25 - 23.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-79.83	-8.21	-4.41
			Max. Mx	5	-43.82	-3003.90	25.43
			Max. My	8	-43.82	23.77	-2980.84
			Max. Vy	5	29.50	-3003.90	25.43
			Max. Vx	8	29.33	23.77	-2980.84
			Max. Torque	6			11.57
L33	23.25 - 20	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-81.97	-8.35	-4.78
			Max. Mx	5	-45.06	-3100.22	25.99
			Max. My	8	-45.06	24.35	-3076.65
			Max. Vy	5	29.78	-3100.22	25.99
			Max. Vx	8	29.61	24.35	-3076.65

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	6			11.57
L34	20 - 15	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-85.48	-8.57	-5.36
			Max. Mx	5	-47.06	-3250.20	26.85
			Max. My	8	-47.07	25.24	-3225.86
			Max. Vy	5	30.21	-3250.20	26.85
			Max. Vx	8	30.05	25.24	-3225.86
			Max. Torque	6			11.57
L35	15 - 10	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-89.00	-8.79	-5.95
			Max. Mx	5	-49.09	-3402.36	27.70
			Max. My	8	-49.09	26.12	-3377.24
			Max. Vy	5	30.65	-3402.36	27.70
			Max. Vx	8	30.49	26.12	-3377.24
			Max. Torque	6			11.58
L36	10 - 5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-92.55	-9.02	-6.55
			Max. Mx	5	-51.14	-3556.68	28.54
			Max. My	8	-51.14	27.00	-3530.80
			Max. Vy	5	31.08	-3556.68	28.54
			Max. Vx	8	30.92	27.00	-3530.80
			Max. Torque	6			11.58
L37	5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-96.12	-9.26	-7.16
			Max. Mx	5	-53.20	-3713.15	29.38
			Max. My	8	-53.20	27.87	-3686.50
			Max. Vy	5	31.51	-3713.15	29.38
			Max. Vx	8	31.35	27.87	-3686.50
			Max. Torque	6			11.58

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	96.12	-0.00	-0.00
	Max. H_x	11	53.21	31.49	-0.19
	Max. H_z	2	53.21	-0.19	31.34
	Max. M_x	2	3684.49	-0.19	31.34
	Max. M_z	5	3713.15	-31.49	0.19
	Max. Torsion	6	11.58	-27.18	-15.50
	Min. Vert	29	53.21	-10.69	6.18
	Min. H_x	5	53.21	-31.49	0.19
	Min. H_z	8	53.21	0.19	-31.34
	Min. M_x	8	-3686.50	0.19	-31.34
	Min. M_z	11	-3707.95	31.49	-0.19
	Min. Torsion	12	-11.54	27.18	15.50

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	53.21	0.00	0.00	1.00	-2.53	-0.00
Dead+Wind 0 deg - No Ice	53.21	0.19	-31.34	-3684.49	-33.01	6.83
Dead+Wind 30 deg - No Ice	53.21	15.91	-27.23	-3205.89	-1884.23	1.20
Dead+Wind 60 deg - No Ice	53.21	27.37	-15.83	-1868.03	-3231.24	-4.76
Dead+Wind 90 deg - No Ice	53.21	31.49	-0.19	-29.38	-3713.15	-9.45
Dead+Wind 120 deg - No Ice	53.21	27.18	15.50	1817.46	-3200.84	-11.58
Dead+Wind 150 deg - No Ice	53.21	15.58	27.04	3177.58	-1831.51	-10.60
Dead+Wind 180 deg - No Ice	53.21	-0.19	31.34	3686.50	27.87	-6.78

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 210 deg - No Ice	53.21	-15.91	27.23	3207.90	1879.03	-1.16
Dead+Wind 240 deg - No Ice	53.21	-27.37	15.83	1870.10	3226.00	4.75
Dead+Wind 270 deg - No Ice	53.21	-31.49	0.19	31.50	3707.95	9.39
Dead+Wind 300 deg - No Ice	53.21	-27.18	-15.50	-1815.33	3195.70	11.54
Dead+Wind 330 deg - No Ice	53.21	-15.58	-27.04	-3175.51	1826.41	10.61
Dead+Ice+Temp	96.12	0.00	0.00	7.16	-9.26	-0.00
Dead+Wind 0 deg+Ice+Temp	96.12	0.03	-5.03	-599.48	-14.78	1.14
Dead+Wind 30 deg+Ice+Temp	96.12	2.57	-4.38	-520.86	-321.10	0.26
Dead+Wind 60 deg+Ice+Temp	96.12	4.41	-2.55	-300.72	-543.91	-0.69
Dead+Wind 90 deg+Ice+Temp	96.12	5.08	-0.03	1.95	-623.52	-1.46
Dead+Wind 120 deg+Ice+Temp	96.12	4.38	2.49	306.04	-538.59	-1.83
Dead+Wind 150 deg+Ice+Temp	96.12	2.51	4.34	530.07	-311.88	-1.72
Dead+Wind 180 deg+Ice+Temp	96.12	-0.03	5.03	614.02	-4.13	-1.15
Dead+Wind 210 deg+Ice+Temp	96.12	-2.57	4.38	535.39	302.18	-0.27
Dead+Wind 240 deg+Ice+Temp	96.12	-4.41	2.55	315.26	524.99	0.68
Dead+Wind 270 deg+Ice+Temp	96.12	-5.08	0.03	12.60	604.60	1.45
Dead+Wind 300 deg+Ice+Temp	96.12	-4.38	-2.49	-291.49	519.67	1.83
Dead+Wind 330 deg+Ice+Temp	96.12	-2.51	-4.34	-515.53	292.96	1.72
Dead+Wind 0 deg - Service	53.21	0.07	-12.24	-1439.66	-14.50	2.68
Dead+Wind 30 deg - Service	53.21	6.21	-10.64	-1252.59	-738.15	0.47
Dead+Wind 60 deg - Service	53.21	10.69	-6.18	-729.63	-1264.71	-1.87
Dead+Wind 90 deg - Service	53.21	12.30	-0.07	-10.89	-1453.08	-3.71
Dead+Wind 120 deg - Service	53.21	10.62	6.06	711.04	-1252.80	-4.55
Dead+Wind 150 deg - Service	53.21	6.09	10.56	1242.71	-717.53	-4.17
Dead+Wind 180 deg - Service	53.21	-0.07	12.24	1441.67	9.30	-2.67
Dead+Wind 210 deg - Service	53.21	-6.21	10.64	1254.60	732.94	-0.46
Dead+Wind 240 deg - Service	53.21	-10.69	6.18	731.64	1259.49	1.87
Dead+Wind 270 deg - Service	53.21	-12.30	0.07	12.91	1447.87	3.70
Dead+Wind 300 deg - Service	53.21	-10.62	-6.06	-709.01	1247.60	4.55
Dead+Wind 330 deg - Service	53.21	-6.09	-10.56	-1240.69	712.33	4.17

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-53.21	0.00	0.00	53.21	0.00	0.000%
2	0.19	-53.21	-31.34	-0.19	53.21	31.34	0.000%
3	15.91	-53.21	-27.23	-15.91	53.21	27.23	0.000%
4	27.37	-53.21	-15.83	-27.37	53.21	15.83	0.000%
5	31.49	-53.21	-0.19	-31.49	53.21	0.19	0.000%
6	27.18	-53.21	15.50	-27.18	53.21	-15.50	0.000%
7	15.58	-53.21	27.04	-15.58	53.21	-27.04	0.000%
8	-0.19	-53.21	31.34	0.19	53.21	-31.34	0.000%
9	-15.91	-53.21	27.23	15.91	53.21	-27.23	0.000%
10	-27.37	-53.21	15.83	27.37	53.21	-15.83	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
11	-31.49	-53.21	0.19	31.49	53.21	-0.19	0.000%
12	-27.18	-53.21	-15.50	27.18	53.21	15.50	0.000%
13	-15.58	-53.21	-27.04	15.58	53.21	27.04	0.000%
14	0.00	-96.12	0.00	-0.00	96.12	-0.00	0.000%
15	0.03	-96.12	-5.03	-0.03	96.12	5.03	0.000%
16	2.57	-96.12	-4.38	-2.57	96.12	4.38	0.000%
17	4.41	-96.12	-2.55	-4.41	96.12	2.55	0.000%
18	5.08	-96.12	-0.03	-5.08	96.12	0.03	0.000%
19	4.38	-96.12	2.49	-4.38	96.12	-2.49	0.000%
20	2.51	-96.12	4.34	-2.51	96.12	-4.34	0.000%
21	-0.03	-96.12	5.03	0.03	96.12	-5.03	0.000%
22	-2.57	-96.12	4.38	2.57	96.12	-4.38	0.000%
23	-4.41	-96.12	2.55	4.41	96.12	-2.55	0.000%
24	-5.08	-96.12	0.03	5.08	96.12	-0.03	0.000%
25	-4.38	-96.12	-2.49	4.38	96.12	2.49	0.000%
26	-2.51	-96.12	-4.34	2.51	96.12	4.34	0.000%
27	0.07	-53.21	-12.24	-0.07	53.21	12.24	0.000%
28	6.21	-53.21	-10.64	-6.21	53.21	10.64	0.000%
29	10.69	-53.21	-6.18	-10.69	53.21	6.18	0.000%
30	12.30	-53.21	-0.07	-12.30	53.21	0.07	0.000%
31	10.62	-53.21	6.06	-10.62	53.21	-6.06	0.000%
32	6.09	-53.21	10.56	-6.09	53.21	-10.56	0.000%
33	-0.07	-53.21	12.24	0.07	53.21	-12.24	0.000%
34	-6.21	-53.21	10.64	6.21	53.21	-10.64	0.000%
35	-10.69	-53.21	6.18	10.69	53.21	-6.18	0.000%
36	-12.30	-53.21	0.07	12.30	53.21	-0.07	0.000%
37	-10.62	-53.21	-6.06	10.62	53.21	6.06	0.000%
38	-6.09	-53.21	-10.56	6.09	53.21	10.56	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00039441
3	Yes	6	0.00000001	0.00005130
4	Yes	6	0.00000001	0.00005639
5	Yes	5	0.00000001	0.00055484
6	Yes	6	0.00000001	0.00004202
7	Yes	6	0.00000001	0.00006247
8	Yes	5	0.00000001	0.00032868
9	Yes	6	0.00000001	0.00004915
10	Yes	6	0.00000001	0.00004599
11	Yes	5	0.00000001	0.00048819
12	Yes	6	0.00000001	0.00006435
13	Yes	6	0.00000001	0.00004209
14	Yes	4	0.00000001	0.00019279
15	Yes	5	0.00000001	0.00056531
16	Yes	5	0.00000001	0.00060391
17	Yes	5	0.00000001	0.00061096
18	Yes	5	0.00000001	0.00058267
19	Yes	5	0.00000001	0.00059534
20	Yes	5	0.00000001	0.00058879
21	Yes	5	0.00000001	0.00055455
22	Yes	5	0.00000001	0.00057699
23	Yes	5	0.00000001	0.00057855
24	Yes	5	0.00000001	0.00055476
25	Yes	5	0.00000001	0.00057880
26	Yes	5	0.00000001	0.00057699
27	Yes	5	0.00000001	0.00008123
28	Yes	5	0.00000001	0.00014553
29	Yes	5	0.00000001	0.00017645
30	Yes	5	0.00000001	0.00011638
31	Yes	5	0.00000001	0.00013838
32	Yes	5	0.00000001	0.00021901

33	Yes	5	0.00000001	0.00007562
34	Yes	5	0.00000001	0.00013348
35	Yes	5	0.00000001	0.00012359
36	Yes	5	0.00000001	0.00011027
37	Yes	5	0.00000001	0.00023044
38	Yes	5	0.00000001	0.00013179

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	K	K	
L1	177 - 172 (1)	TP22.8749x22x0.2188	5.00	0.00	0.0	39.000	15.7340	-2.42	613.63	0.004
L2	172 - 167 (2)	TP23.7498x22.8749x0.2188	5.00	0.00	0.0	39.000	16.3416	-2.69	637.32	0.004
L3	167 - 162 (3)	TP24.6248x23.7498x0.2188	5.00	0.00	0.0	39.000	16.9492	-4.06	661.02	0.006
L4	162 - 157 (4)	TP25.4997x24.6248x0.2188	5.00	0.00	0.0	39.000	17.5568	-4.39	684.72	0.006
L5	157 - 152 (5)	TP26.3746x25.4997x0.2188	5.00	0.00	0.0	39.000	18.1645	-6.15	708.41	0.009
L6	152 - 147 (6)	TP27.2495x26.3746x0.2188	5.00	0.00	0.0	39.000	18.7721	-6.58	732.11	0.009
L7	147 - 142 (7)	TP28.1244x27.2495x0.2188	5.00	0.00	0.0	39.000	19.3797	-7.02	755.81	0.009
L8	142 - 137 (8)	TP28.9994x28.1244x0.2188	5.00	0.00	0.0	39.000	19.9873	-7.48	779.50	0.010
L9	137 - 129.75 (9)	TP30.268x28.9994x0.2188	7.25	0.00	0.0	39.000	20.4126	-7.82	796.09	0.010
L10	129.75 - 128.5 (10)	TP30.0491x29.1742x0.25	5.00	0.00	0.0	39.000	23.6456	-8.59	922.18	0.009
L11	128.5 - 123.5 (11)	TP30.9241x30.0491x0.25	5.00	0.00	0.0	39.000	24.3399	-11.10	949.26	0.012
L12	123.5 - 118.583 (12)	TP31.7845x30.9241x0.25	4.92	0.00	0.0	39.000	25.0226	-11.72	975.88	0.012
L13	118.583 - 113.583 (13)	TP32.6594x31.7845x0.385	5.00	0.00	0.0	39.000	39.4390	-12.87	1538.12	0.008
L14	113.583 - 110 (14)	TP33.2864x32.6594x0.38	3.58	0.00	0.0	39.000	39.6890	-13.48	1547.87	0.009
L15	110 - 106.417 (15)	TP33.9133x33.2864x0.91	3.58	0.00	0.0	39.000	95.3249	-14.53	3717.67	0.004
L16	106.417 - 101.417 (16)	TP34.7883x33.9133x0.75	5.00	0.00	0.0	39.000	81.0281	-15.81	3160.10	0.005
L17	101.417 - 96.417 (17)	TP35.6632x34.7883x0.73	5.00	0.00	0.0	39.000	80.9409	-17.10	3156.70	0.005
L18	96.417 - 91.417 (18)	TP36.5381x35.6632x0.715	5.00	0.00	0.0	39.000	81.2974	-18.40	3170.60	0.006
L19	91.417 - 84 (19)	TP37.836x36.5381x0.705	7.42	0.00	0.0	39.000	81.2270	-19.11	3167.85	0.006
L20	84 - 83.75 (20)	TP37.3798x36.5048x0.7675	5.00	0.00	0.0	39.000	89.1892	-21.62	3478.38	0.006
L21	83.75 - 80 (21)	TP38.036x37.3798x0.7575	3.75	0.00	0.0	39.000	89.6289	-22.72	3495.53	0.006
L22	80 - 75 (22)	TP38.911x38.036x0.8025	5.00	0.00	0.0	39.000	97.0674	-24.34	3785.63	0.006
L23	75 - 70 (23)	TP39.7859x38.911x0.7875	5.00	0.00	0.0	39.000	97.4776	-25.91	3801.63	0.007
L24	70 - 65 (24)	TP40.6609x39.7859x0.7775	5.00	0.00	0.0	39.000	98.4237	-27.51	3838.52	0.007
L25	65 - 60 (25)	TP41.5359x40.6609x0.7625	5.00	0.00	0.0	39.000	98.6787	-29.12	3848.47	0.008
L26	60 - 55 (26)	TP42.4109x41.5359x0.7425	5.00	0.00	0.0	39.000	98.1996	-30.76	3829.78	0.008
L27	55 - 50 (27)	TP43.2858x42.4109x0.7325	5.00	0.00	0.0	39.000	98.9346	-32.41	3858.45	0.008
L28	50 - 39.25 (28)	TP45.167x43.2858x0.7225	10.75	0.00	0.0	39.000	99.6133	-34.08	3884.92	0.009
L29	39.25 - 38.25	TP44.7169x43.5358x0.78	6.75	0.00	0.0	39.000	108.776	-38.20	4242.25	0.009

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 $\frac{P}{P_a}$
	(29)						0			
L30	38.25 - 33.25 (30)	TP45.5918x44.7169x0.77	5.00	0.00	0.0	39.000	109.544 0	-40.05	4272.20	0.009
L31	33.25 - 28.25 (31)	TP46.4667x45.5918x0.76	5.00	0.00	0.0	39.000	110.256 0	-41.92	4299.97	0.010
L32	28.25 - 23.25 (32)	TP47.3417x46.4667x0.75	5.00	0.00	0.0	39.000	110.911 0	-43.81	4325.55	0.010
L33	23.25 - 20 (33)	TP47.9103x47.3417x0.745	3.25	0.00	0.0	39.000	111.529 0	-45.05	4349.62	0.010
L34	20 - 15 (34)	TP48.7853x47.9103x0.785	5.00	0.00	0.0	39.000	119.597 0	-47.06	4664.28	0.010
L35	15 - 10 (35)	TP49.6602x48.7853x0.775	5.00	0.00	0.0	39.000	120.250 0	-49.09	4689.76	0.010
L36	10 - 5 (36)	TP50.5351x49.6602x0.765	5.00	0.00	0.0	39.000	120.847 0	-51.14	4713.04	0.011
L37	5 - 0 (37)	TP51.41x50.5351x0.755	5.00	0.00	0.0	39.000	121.388 0	-53.20	4734.14	0.011

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	177 - 172 (1)	TP22.8749x22x0.2188	24.24	3.312	39.000	0.085	0.00	0.000	39.000	0.000
L2	172 - 167 (2)	TP23.7498x22.8749x0.2188	50.14	6.350	39.000	0.163	0.00	0.000	39.000	0.000
L3	167 - 162 (3)	TP24.6248x23.7498x0.2188	87.01	10.240	39.000	0.263	0.00	0.000	39.000	0.000
L4	162 - 157 (4)	TP25.4997x24.6248x0.2188	124.28	13.628	39.000	0.349	0.00	0.000	39.000	0.000
L5	157 - 152 (5)	TP26.3746x25.4997x0.2188	181.37	18.574	39.000	0.476	0.00	0.000	39.000	0.000
L6	152 - 147 (6)	TP27.2495x26.3746x0.2188	245.04	23.490	39.000	0.602	0.00	0.000	39.000	0.000
L7	147 - 142 (7)	TP28.1244x27.2495x0.2188	310.48	27.918	39.000	0.716	0.00	0.000	39.000	0.000
L8	142 - 137 (8)	TP28.9994x28.1244x0.2188	377.69	31.921	39.000	0.818	0.00	0.000	39.000	0.000
L9	137 - 129.75 (9)	TP30.268x28.9994x0.2188	425.80	34.498	39.000	0.885	0.00	0.000	39.000	0.000
L10	129.75 - 128.5 (10)	TP30.0491x29.1742x0.25	496.14	34.260	39.000	0.878	0.00	0.000	39.000	0.000
L11	128.5 - 123.5 (11)	TP30.9241x30.0491x0.25	584.62	38.091	39.000	0.977	0.00	0.000	39.000	0.000
L12	123.5 - 118.583 (12)	TP31.7845x30.9241x0.25	673.57	41.515	39.000	1.064	0.00	0.000	39.000	0.000
L13	118.583 - 113.583 (13)	TP32.6594x31.7845x0.385	769.13	29.503	39.000	0.756	0.00	0.000	39.000	0.000
L14	113.583 - 110 (14)	TP33.2864x32.6594x0.38	840.15	31.398	39.000	0.805	0.00	0.000	39.000	0.000
L15	110 - 106.417 (15)	TP33.9133x33.2864x0.91	912.73	14.384	39.000	0.369	0.00	0.000	39.000	0.000
L16	106.417 - 101.417 (16)	TP34.7883x33.9133x0.75	1016.76	18.180	39.000	0.466	0.00	0.000	39.000	0.000
L17	101.417 - 96.417 (17)	TP35.6632x34.7883x0.73	1123.84	19.579	39.000	0.502	0.00	0.000	39.000	0.000
L18	96.417 - 91.417 (18)	TP36.5381x35.6632x0.715	1233.90	20.851	39.000	0.535	0.00	0.000	39.000	0.000
L19	91.417 - 84 (19)	TP37.836x36.5381x0.705	1293.81	21.584	39.000	0.553	0.00	0.000	39.000	0.000
L20	84 - 83.75 (20)	TP37.3798x36.5048x0.7675	1408.54	21.250	39.000	0.545	0.00	0.000	39.000	0.000
L21	83.75 - 80 (21)	TP38.036x37.3798x0.7575	1496.63	22.052	39.000	0.565	0.00	0.000	39.000	0.000
L22	80 - 75 (22)	TP38.911x38.036x0.8025	1616.9	21.536	39.000	0.552	0.00	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
			9							
L23	75 - 70 (23)	TP39.7859x38.911x0.7875	1740.28	22.535	39.000	0.578	0.00	0.000	39.000	0.000
L24	70 - 65 (24)	TP40.6609x39.7859x0.7775	1866.37	23.388	39.000	0.600	0.00	0.000	39.000	0.000
L25	65 - 60 (25)	TP41.5359x40.6609x0.7625	1995.20	24.375	39.000	0.625	0.00	0.000	39.000	0.000
L26	60 - 55 (26)	TP42.4109x41.5359x0.7425	2126.71	25.525	39.000	0.654	0.00	0.000	39.000	0.000
L27	55 - 50 (27)	TP43.2858x42.4109x0.7325	2260.82	26.358	39.000	0.676	0.00	0.000	39.000	0.000
L28	50 - 39.25 (28)	TP45.167x43.2858x0.7225	2397.43	27.179	39.000	0.697	0.00	0.000	39.000	0.000
L29	39.25 - 38.25 (29)	TP44.7169x43.5358x0.783	2586.03	26.572	39.000	0.681	0.00	0.000	39.000	0.000
L30	38.25 - 33.25 (30)	TP45.5918x44.7169x0.775	2728.65	27.276	39.000	0.699	0.00	0.000	39.000	0.000
L31	33.25 - 28.25 (31)	TP46.4667x45.5918x0.765	2873.47	27.970	39.000	0.717	0.00	0.000	39.000	0.000
L32	28.25 - 23.25 (32)	TP47.3417x46.4667x0.755	3020.47	28.657	39.000	0.735	0.00	0.000	39.000	0.000
L33	23.25 - 20 (33)	TP47.9103x47.3417x0.745	3117.16	29.044	39.000	0.745	0.00	0.000	39.000	0.000
L34	20 - 15 (34)	TP48.7853x47.9103x0.785	3267.71	27.915	39.000	0.716	0.00	0.000	39.000	0.000
L35	15 - 10 (35)	TP49.6602x48.7853x0.775	3420.43	28.520	39.000	0.731	0.00	0.000	39.000	0.000
L36	10 - 5 (36)	TP50.5351x49.6602x0.765	3575.32	29.123	39.000	0.747	0.00	0.000	39.000	0.000
L37	5 - 0 (37)	TP51.41x50.5351x0.755	3732.35	29.725	39.000	0.762	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	177 - 172 (1)	TP22.8749x22x0.2188	5.01	0.319	26.000	0.025	0.01	0.000	26.000	0.000
L2	172 - 167 (2)	TP23.7498x22.8749x0.2188	5.35	0.327	26.000	0.025	0.01	0.001	26.000	0.000
L3	167 - 162 (3)	TP24.6248x23.7498x0.2188	7.28	0.430	26.000	0.033	0.02	0.001	26.000	0.000
L4	162 - 157 (4)	TP25.4997x24.6248x0.2188	7.63	0.435	26.000	0.033	0.03	0.001	26.000	0.000
L5	157 - 152 (5)	TP26.3746x25.4997x0.2188	12.56	0.691	26.000	0.053	5.81	0.290	26.000	0.011
L6	152 - 147 (6)	TP27.2495x26.3746x0.2188	12.91	0.688	26.000	0.053	5.80	0.271	26.000	0.010
L7	147 - 142 (7)	TP28.1244x27.2495x0.2188	13.27	0.685	26.000	0.053	5.79	0.254	26.000	0.010
L8	142 - 137 (8)	TP28.9994x28.1244x0.2188	13.62	0.682	26.000	0.052	5.78	0.238	26.000	0.009
L9	137 - 129.75 (9)	TP30.268x28.9994x0.2188	13.87	0.680	26.000	0.052	5.77	0.228	26.000	0.009
L10	129.75 - 128.5 (10)	TP30.0491x29.1742x0.25	14.26	0.603	26.000	0.046	5.76	0.194	26.000	0.007
L11	128.5 - 123.5 (11)	TP30.9241x30.0491x0.25	17.87	0.734	26.000	0.056	5.09	0.162	26.000	0.006
L12	123.5 - 118.583 (12)	TP31.7845x30.9241x0.25	18.31	0.732	26.000	0.056	5.07	0.152	26.000	0.006
L13	118.583 - 113.583 (13)	TP32.6594x31.7845x0.385	19.63	0.498	26.000	0.038	5.04	0.094	26.000	0.004
L14	113.583 - 110 (14)	TP33.2864x32.6594x0.38	20.02	0.504	26.000	0.039	5.03	0.091	26.000	0.004
L15	110 - 106.417 (15)	TP33.9133x33.2864x0.91	20.50	0.215	26.000	0.017	5.02	0.038	26.000	0.001

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 $\frac{f_{vt}}{F_{vt}}$
L16	106.417 - 101.417 (16)	TP34.7883x33.9133x0.75	21.12	0.261	26.000	0.020	5.02	0.043	26.000	0.002
L17	101.417 - 96.417 (17)	TP35.6632x34.7883x0.73	21.72	0.268	26.000	0.021	5.00	0.042	26.000	0.002
L18	96.417 - 91.417 (18)	TP36.5381x35.6632x0.715	22.31	0.274	26.000	0.021	4.99	0.041	26.000	0.002
L19	91.417 - 84 (19)	TP37.836x36.5381x0.705	22.62	0.279	26.000	0.021	4.98	0.040	26.000	0.002
L20	84 - 83.75 (20)	TP37.3798x36.5048x0.7675	23.27	0.261	26.000	0.020	4.97	0.036	26.000	0.001
L21	83.75 - 80 (21)	TP38.036x37.3798x0.7575	23.71	0.265	26.000	0.020	4.96	0.035	26.000	0.001
L22	80 - 75 (22)	TP38.911x38.036x0.8025	24.38	0.251	26.000	0.019	4.94	0.032	26.000	0.001
L23	75 - 70 (23)	TP39.7859x38.911x0.7875	24.95	0.256	26.000	0.020	4.93	0.031	26.000	0.001
L24	70 - 65 (24)	TP40.6609x39.7859x0.7775	25.50	0.259	26.000	0.020	4.92	0.030	26.000	0.001
L25	65 - 60 (25)	TP41.5359x40.6609x0.7625	26.04	0.264	26.000	0.020	4.91	0.029	26.000	0.001
L26	60 - 55 (26)	TP42.4109x41.5359x0.7425	26.57	0.271	26.000	0.021	4.89	0.028	26.000	0.001
L27	55 - 50 (27)	TP43.2858x42.4109x0.7325	27.08	0.274	26.000	0.021	4.88	0.028	26.000	0.001
L28	50 - 39.25 (28)	TP45.167x43.2858x0.7225	27.57	0.277	26.000	0.021	4.87	0.027	26.000	0.001
L29	39.25 - 38.25 (29)	TP44.7169x43.5358x0.78	28.31	0.260	26.000	0.020	4.85	0.024	26.000	0.001
L30	38.25 - 33.25 (30)	TP45.5918x44.7169x0.77	28.76	0.263	26.000	0.020	4.84	0.023	26.000	0.001
L31	33.25 - 28.25 (31)	TP46.4667x45.5918x0.76	29.19	0.265	26.000	0.020	4.83	0.023	26.000	0.001
L32	28.25 - 23.25 (32)	TP47.3417x46.4667x0.75	29.62	0.267	26.000	0.021	4.82	0.022	26.000	0.001
L33	23.25 - 20 (33)	TP47.9103x47.3417x0.745	29.90	0.268	26.000	0.021	4.81	0.022	26.000	0.001
L34	20 - 15 (34)	TP48.7853x47.9103x0.785	30.34	0.254	26.000	0.020	4.80	0.020	26.000	0.001
L35	15 - 10 (35)	TP49.6602x48.7853x0.775	30.77	0.256	26.000	0.020	4.79	0.019	26.000	0.001
L36	10 - 5 (36)	TP50.5351x49.6602x0.765	31.20	0.258	26.000	0.020	4.78	0.019	26.000	0.001
L37	5 - 0 (37)	TP51.41x50.5351x0.755	31.63	0.261	26.000	0.020	4.76	0.018	26.000	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	177 - 172 (1)	0.004	0.085	0.000	0.025	0.000	0.089 ✔	1.333	H1-3+VT ✔
L2	172 - 167 (2)	0.004	0.163	0.000	0.025	0.000	0.167 ✔	1.333	H1-3+VT ✔
L3	167 - 162 (3)	0.006	0.263	0.000	0.033	0.000	0.269 ✔	1.333	H1-3+VT ✔
L4	162 - 157 (4)	0.006	0.349	0.000	0.033	0.000	0.356 ✔	1.333	H1-3+VT ✔
L5	157 - 152 (5)	0.009	0.476	0.000	0.053	0.011	0.486 ✔	1.333	H1-3+VT ✔
L6	152 - 147 (6)	0.009	0.602	0.000	0.053	0.010	0.613 ✔	1.333	H1-3+VT ✔
L7	147 - 142 (7)	0.009	0.716	0.000	0.053	0.010	0.726 ✔	1.333	H1-3+VT ✔
L8	142 - 137 (8)	0.010	0.818	0.000	0.052	0.009	0.829 ✔	1.333	H1-3+VT ✔

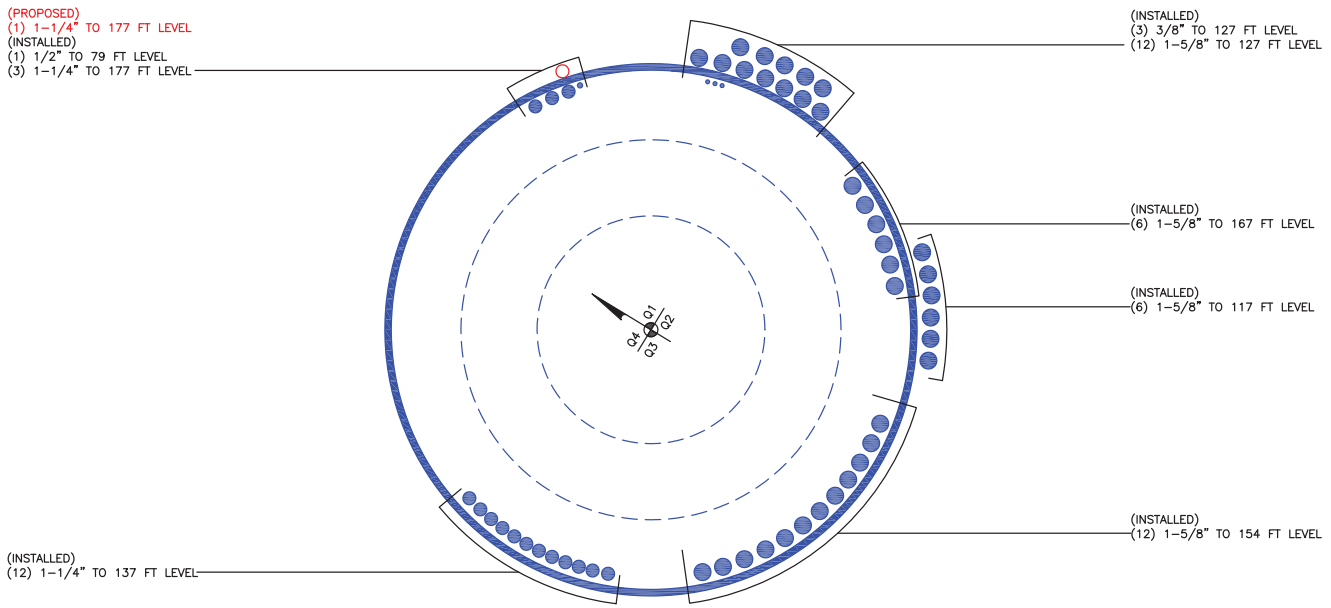
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L9	137 - 129.75 (9)	0.010	0.885	0.000	0.052	0.009	0.896 ✔	1.333	H1-3+VT ✔
L10	129.75 - 128.5 (10)	0.009	0.878	0.000	0.046	0.007	0.889 ✔	1.333	H1-3+VT ✔
L11	128.5 - 123.5 (11)	0.012	0.977	0.000	0.056	0.006	0.990 ✔	1.333	H1-3+VT ✔
L12	123.5 - 118.583 (12)	0.012	1.064	0.000	0.056	0.006	1.078 ✔	1.333	H1-3+VT ✔
L13	118.583 - 113.583 (13)	0.008	0.756	0.000	0.038	0.004	0.765 ✔	1.333	H1-3+VT ✔
L14	113.583 - 110 (14)	0.009	0.805	0.000	0.039	0.004	0.814 ✔	1.333	H1-3+VT ✔
L15	110 - 106.417 (15)	0.004	0.369	0.000	0.017	0.001	0.373 ✔	1.333	H1-3+VT ✔
L16	106.417 - 101.417 (16)	0.005	0.466	0.000	0.020	0.002	0.471 ✔	1.333	H1-3+VT ✔
L17	101.417 - 96.417 (17)	0.005	0.502	0.000	0.021	0.002	0.508 ✔	1.333	H1-3+VT ✔
L18	96.417 - 91.417 (18)	0.006	0.535	0.000	0.021	0.002	0.541 ✔	1.333	H1-3+VT ✔
L19	91.417 - 84 (19)	0.006	0.553	0.000	0.021	0.002	0.560 ✔	1.333	H1-3+VT ✔
L20	84 - 83.75 (20)	0.006	0.545	0.000	0.020	0.001	0.551 ✔	1.333	H1-3+VT ✔
L21	83.75 - 80 (21)	0.006	0.565	0.000	0.020	0.001	0.572 ✔	1.333	H1-3+VT ✔
L22	80 - 75 (22)	0.006	0.552	0.000	0.019	0.001	0.559 ✔	1.333	H1-3+VT ✔
L23	75 - 70 (23)	0.007	0.578	0.000	0.020	0.001	0.585 ✔	1.333	H1-3+VT ✔
L24	70 - 65 (24)	0.007	0.600	0.000	0.020	0.001	0.607 ✔	1.333	H1-3+VT ✔
L25	65 - 60 (25)	0.008	0.625	0.000	0.020	0.001	0.633 ✔	1.333	H1-3+VT ✔
L26	60 - 55 (26)	0.008	0.654	0.000	0.021	0.001	0.663 ✔	1.333	H1-3+VT ✔
L27	55 - 50 (27)	0.008	0.676	0.000	0.021	0.001	0.684 ✔	1.333	H1-3+VT ✔
L28	50 - 39.25 (28)	0.009	0.697	0.000	0.021	0.001	0.706 ✔	1.333	H1-3+VT ✔
L29	39.25 - 38.25 (29)	0.009	0.681	0.000	0.020	0.001	0.690 ✔	1.333	H1-3+VT ✔
L30	38.25 - 33.25 (30)	0.009	0.699	0.000	0.020	0.001	0.709 ✔	1.333	H1-3+VT ✔
L31	33.25 - 28.25 (31)	0.010	0.717	0.000	0.020	0.001	0.727 ✔	1.333	H1-3+VT ✔
L32	28.25 - 23.25 (32)	0.010	0.735	0.000	0.021	0.001	0.745 ✔	1.333	H1-3+VT ✔
L33	23.25 - 20 (33)	0.010	0.745	0.000	0.021	0.001	0.755 ✔	1.333	H1-3+VT ✔
L34	20 - 15 (34)	0.010	0.716	0.000	0.020	0.001	0.726 ✔	1.333	H1-3+VT ✔
L35	15 - 10 (35)	0.010	0.731	0.000	0.020	0.001	0.742 ✔	1.333	H1-3+VT ✔
L36	10 - 5 (36)	0.011	0.747	0.000	0.020	0.001	0.758 ✔	1.333	H1-3+VT ✔
L37	5 - 0 (37)	0.011	0.762	0.000	0.020	0.001	0.774 ✔	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	177 - 172	Pole	TP22.8749x22x0.2188	1	-2.42	817.96	6.7	Pass
L2	172 - 167	Pole	TP23.7498x22.8749x0.2188	2	-2.69	849.55	12.5	Pass
L3	167 - 162	Pole	TP24.6248x23.7498x0.2188	3	-4.06	881.14	20.2	Pass
L4	162 - 157	Pole	TP25.4997x24.6248x0.2188	4	-4.39	912.73	26.7	Pass
L5	157 - 152	Pole	TP26.3746x25.4997x0.2188	5	-6.15	944.32	36.5	Pass
L6	152 - 147	Pole	TP27.2495x26.3746x0.2188	6	-6.58	975.90	46.0	Pass
L7	147 - 142	Pole	TP28.1244x27.2495x0.2188	7	-7.02	1007.49	54.5	Pass
L8	142 - 137	Pole	TP28.9994x28.1244x0.2188	8	-7.48	1039.08	62.2	Pass
L9	137 - 129.75	Pole	TP30.268x28.9994x0.2188	9	-7.82	1061.19	67.2	Pass
L10	129.75 - 128.5	Pole	TP30.0491x29.1742x0.25	10	-8.59	1229.26	66.7	Pass
L11	128.5 - 123.5	Pole	TP30.9241x30.0491x0.25	11	-11.10	1265.36	74.2	Pass
L12	123.5 - 118.583	Pole	TP31.7845x30.9241x0.25	12	-11.72	1300.85	80.8	Pass
L13	118.583 - 113.583	Pole	TP32.6594x31.7845x0.385	13	-12.87	2050.31	57.4	Pass
L14	113.583 - 110	Pole	TP33.2864x32.6594x0.38	14	-13.48	2063.31	61.1	Pass
L15	110 - 106.417	Pole	TP33.9133x33.2864x0.91	15	-14.53	4955.65	28.0	Pass
L16	106.417 - 101.417	Pole	TP34.7883x33.9133x0.75	16	-15.81	4212.41	35.4	Pass
L17	101.417 - 96.417	Pole	TP35.6632x34.7883x0.73	17	-17.10	4207.88	38.1	Pass
L18	96.417 - 91.417	Pole	TP36.5381x35.6632x0.715	18	-18.40	4226.41	40.6	Pass
L19	91.417 - 84	Pole	TP37.836x36.5381x0.705	19	-19.11	4222.74	42.0	Pass
L20	84 - 83.75	Pole	TP37.3798x36.5048x0.7675	20	-21.62	4636.68	41.4	Pass
L21	83.75 - 80	Pole	TP38.036x37.3798x0.7575	21	-22.72	4659.54	42.9	Pass
L22	80 - 75	Pole	TP38.911x38.036x0.8025	22	-24.34	5046.24	41.9	Pass
L23	75 - 70	Pole	TP39.7859x38.911x0.7875	23	-25.91	5067.57	43.9	Pass
L24	70 - 65	Pole	TP40.6609x39.7859x0.7775	24	-27.51	5116.75	45.5	Pass
L25	65 - 60	Pole	TP41.5359x40.6609x0.7625	25	-29.12	5130.01	47.5	Pass
L26	60 - 55	Pole	TP42.4109x41.5359x0.7425	26	-30.76	5105.10	49.7	Pass
L27	55 - 50	Pole	TP43.2858x42.4109x0.7325	27	-32.41	5143.31	51.3	Pass
L28	50 - 39.25	Pole	TP45.167x43.2858x0.7225	28	-34.08	5178.60	52.9	Pass
L29	39.25 - 38.25	Pole	TP44.7169x43.5358x0.78	29	-38.20	5654.92	51.8	Pass
L30	38.25 - 33.25	Pole	TP45.5918x44.7169x0.77	30	-40.05	5694.84	53.2	Pass
L31	33.25 - 28.25	Pole	TP46.4667x45.5918x0.76	31	-41.92	5731.86	54.5	Pass
L32	28.25 - 23.25	Pole	TP47.3417x46.4667x0.75	32	-43.81	5765.96	55.9	Pass
L33	23.25 - 20	Pole	TP47.9103x47.3417x0.745	33	-45.05	5798.04	56.7	Pass
L34	20 - 15	Pole	TP48.7853x47.9103x0.785	34	-47.06	6217.48	54.5	Pass
L35	15 - 10	Pole	TP49.6602x48.7853x0.775	35	-49.09	6251.45	55.7	Pass
L36	10 - 5	Pole	TP50.5351x49.6602x0.765	36	-51.14	6282.48	56.8	Pass
L37	5 - 0	Pole	TP51.41x50.5351x0.755	37	-53.20	6310.61	58.0	Pass
							Summary	
						Pole (L12)	80.8	Pass
						RATING =	**80.8**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876376 TOWER ID: C_BASELEVEL

06/10/08	APPLICATION ADDED PER WORK ORDER # 233602	CCS
01/07/09	AS-BUILT INFORMATION ADDED PER WORK ORDER # 270662	ZRR
17/05/10	AS-BUILT INFORMATION ADDED PER WORK ORDER # 321479	LMC
03/05/11	AS-BUILT INFORMATION ADDED PER WORK ORDER # 400488	AM
14/05/12	UPDATED PER WORK ORDER # 498946	TS
30/05/12	APPLICATION ADDED PER WORK ORDER # 519472	JW
10/08/12	APPLICATION ADDED PER WORK ORDER # 632515	AM
29/07/13	UPDATED PER WORK ORDER # 772508	JF
27/05/14	UPDATED PER WORK ORDER #	KW

DRAWN BY: DVA
CHECKED BY: LAN
DRAWING DATE: 09/01/08

SITE NUMBER:
SITE NAME:

SITE NAME

SCOVILLE HILL / HARWINGTON ROD

BUSINESS UNIT NUMBER

876376

SITE ADDRESS

123 CAMPVILLE HILL RD.
HARWINTON, CT 06791
LITCHFIELD COUNTY
USA

SHEET TITLE

BASE LEVEL

SHEET NUMBER

A1-0

BASE LEVEL DRAWING

SCALE: 1" = 1'-0"

1

PLOT DATE: 5/27/2014 - FILE NAME: 876376-BASELEVEL.DWG
Xref R:\TEMPLATES\TYPICAL BLOCKS FOR TEMPLATES\TITLE BLOCK STD-VER 5.1.dwg

APPENDIX C

ADDITIONAL CALCULATIONS

CCIpole

per TIA-222- F

Site BU: 876376

Work Order: 772512

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	177	47.25	3.75	18	22	30.268	0.2188	0.8752	A607-65
2	133.5	49.5	4.75	18	29.17	37.836	0.25	1	A607-65
3	88.75	49.5	5.75	18	36.50	45.167	0.3125	1.25	A607-65
4	45	45	0	18	43.54	51.41	0.375	1.5	A607-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	0	20	solid round	SR 4.5	3																		
2	20	60	solid round	SR 4.25 (33')	3																		
3	60	80	solid round	SR 4.25 (66')	3																		
4	80	110	solid round	SR 4	3																		
5	106.417	118.583	channel	MP3-04 (1.1875")	3																		
6																							
7																							
8																							
9																							
10																							

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	I_x (in^4)	I_y (in^4)	L_u (in)	Connection Length (in)	Bolt Hole Size (in)	Reinforcement Material
1	0	0	15.90431281	3	20.129	20.129	33.000	n/a	0.0000	A572-50
2	0	0	14.18625433	2.875	16.015	16.015	33.000	n/a	0.0000	A572-50
3	0	0	14.18625433	3	16.015	16.015	66.000	n/a	0.0000	A572-50
4	0	0	12.56637061	2.875	12.566	12.566	66.000	n/a	0.0000	A572-50
5	4.78	1.61	4.13	0.61	0.910	11.860	18.000	18.000	1.1875	A572-65

TNX Geometry Input

Increment (ft): 5

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	177 - 172	5		18	22.000	22.875	0.2188	A607-65	1.000
2	172 - 167	5		18	22.875	23.750	0.2188	A607-65	1.000
3	167 - 162	5		18	23.750	24.625	0.2188	A607-65	1.000
4	162 - 157	5		18	24.625	25.500	0.2188	A607-65	1.000
5	157 - 152	5		18	25.500	26.375	0.2188	A607-65	1.000
6	152 - 147	5		18	26.375	27.250	0.2188	A607-65	1.000
7	147 - 142	5		18	27.250	28.124	0.2188	A607-65	1.000
8	142 - 137	5		18	28.124	28.999	0.2188	A607-65	1.000
9	137 - 133.5	7.25	3.75	18	28.999	30.268	0.2188	A607-65	1.000
10	133.5 - 128.5	5		18	29.174	30.049	0.25	A607-65	1.000
11	128.5 - 123.5	5		18	30.049	30.924	0.25	A607-65	1.000
12	123.5 - 118.583	4.917		18	30.924	31.784	0.25	A607-65	1.000
13	118.583 - 113.583	5		18	31.784	32.659	0.385	A607-65	0.966
14	113.583 - 110	3.583		18	32.659	33.286	0.38	A607-65	0.973
15	110 - 106.417	3.583		18	33.286	33.913	0.91	A607-65	0.806
16	106.417 - 101.417	5		18	33.913	34.788	0.75	A607-65	0.804
17	101.417 - 96.417	5		18	34.788	35.663	0.73	A607-65	0.813
18	96.417 - 91.417	5		18	35.663	36.538	0.715	A607-65	0.818
19	91.417 - 88.75	7.417	4.75	18	36.538	37.836	0.705	A607-65	0.823
20	88.75 - 83.75	5		18	36.505	37.380	0.7675	A607-65	0.835
21	83.75 - 80	3.75		18	37.380	38.036	0.7575	A607-65	0.838
22	80 - 75	5		18	38.036	38.911	0.8025	A607-65	0.833
23	75 - 70	5		18	38.911	39.786	0.7875	A607-65	0.838
24	70 - 65	5		18	39.786	40.661	0.7775	A607-65	0.839
25	65 - 60	5		18	40.661	41.536	0.7625	A607-65	0.846
26	60 - 55	5		18	41.536	42.411	0.7425	A607-65	0.859
27	55 - 50	5		18	42.411	43.286	0.7325	A607-65	0.861
28	50 - 45	10.75	5.75	18	43.286	45.167	0.7225	A607-65	0.864
29	45 - 38.25	6.75		18	43.536	44.717	0.78	A607-65	0.876
30	38.25 - 33.25	5		18	44.717	45.592	0.77	A607-65	0.880
31	33.25 - 28.25	5		18	45.592	46.467	0.76	A607-65	0.884
32	28.25 - 23.25	5		18	46.467	47.342	0.75	A607-65	0.888
33	23.25 - 20	3.25		18	47.342	47.910	0.745	A607-65	0.889
34	20 - 15	5		18	47.910	48.785	0.785	A607-65	0.881
35	15 - 10	5		18	48.785	49.660	0.775	A607-65	0.885
36	10 - 5	5		18	49.660	50.535	0.765	A607-65	0.889
37	5 - 0	5		18	50.535	51.410	0.755	A607-65	0.893

TNX Section Forces

Increment (ft): 5

	Section Height (ft)	TNX Output P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	177 - 172	2.4178	24.238	5.0123
2	172 - 167	2.6899	50.138	5.3485
3	167 - 162	4.0597	87.013	7.2802
4	162 - 157	4.3865	124.28	7.6288
5	157 - 152	6.1524	181.38	12.557
6	152 - 147	6.5758	245.04	12.912
7	147 - 142	7.0192	310.48	13.268
8	142 - 137	7.4819	377.7	13.624
9	137 - 133.5	7.8437	425.81	13.874
10	133.5 - 128.5	8.6556	496.17	14.269
11	128.5 - 123.5	11.209	584.68	17.878
12	123.5 - 118.583	11.868	673.66	18.314
13	118.583 - 113.583	13.052	769.27	19.64
14	113.583 - 110	13.696	840.32	20.03
15	110 - 106.417	14.776	912.94	20.512
16	106.417 - 101.417	16.087	1017	21.133
17	101.417 - 96.417	17.417	1124.2	21.733
18	96.417 - 91.417	18.763	1234.3	22.327
19	91.417 - 88.75	19.488	1294.3	22.638
20	88.75 - 83.75	22.045	1409.1	23.29
21	83.75 - 80	23.167	1497.2	23.726
22	80 - 75	24.828	1617.7	24.396
23	75 - 70	26.444	1741.1	24.963
24	70 - 65	28.078	1867.2	25.519
25	65 - 60	29.731	1996.2	26.061
26	60 - 55	31.404	2127.8	26.589
27	55 - 50	33.096	2261.9	27.101
28	50 - 45	34.806	2398.6	27.584
29	45 - 38.25	38.984	2587.3	28.324
30	38.25 - 33.25	40.873	2730	28.771
31	33.25 - 28.25	42.783	2874.9	29.203
32	28.25 - 23.25	44.713	3022	29.632
33	23.25 - 20	45.98	3118.7	29.911
34	20 - 15	48.027	3269.3	30.344
35	15 - 10	50.094	3422	30.776
36	10 - 5	52.181	3576.9	31.205
37	5 - 0	54.288	3734	31.63

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
177 - 172	Pole	TP22.875x22x0.2188	Pole	6.7%	Pass
172 - 167	Pole	TP23.75x22.875x0.2188	Pole	12.5%	Pass
167 - 162	Pole	TP24.625x23.75x0.2188	Pole	20.1%	Pass
162 - 157	Pole	TP25.5x24.625x0.2188	Pole	26.7%	Pass
157 - 152	Pole	TP26.375x25.5x0.2188	Pole	36.4%	Pass
152 - 147	Pole	TP27.25x26.375x0.2188	Pole	45.8%	Pass
147 - 142	Pole	TP28.124x27.25x0.2188	Pole	54.4%	Pass
142 - 137	Pole	TP28.999x28.124x0.2188	Pole	62.1%	Pass
137 - 133.5	Pole	TP30.268x28.999x0.2188	Pole	67.1%	Pass
133.5 - 128.5	Pole	TP30.049x29.174x0.25	Pole	66.6%	Pass
128.5 - 123.5	Pole	TP30.924x30.049x0.25	Pole	74.1%	Pass
123.5 - 118.58	Pole	TP31.784x30.924x0.25	Pole	80.7%	Pass
118.58 - 113.58	Pole + Reinf.	TP32.659x31.784x0.385	Reinf. 5 Tension Rupture	67.8%	Pass
113.58 - 110	Pole + Reinf.	TP33.286x32.659x0.38	Reinf. 5 Tension Rupture	71.8%	Pass
110 - 106.42	Pole + Reinf.	TP33.913x33.286x0.91	Reinf. 4 Compression	57.5%	Pass
106.42 - 101.42	Pole + Reinf.	TP34.788x33.913x0.75	Reinf. 4 Compression	72.5%	Pass
101.42 - 96.42	Pole + Reinf.	TP35.663x34.788x0.73	Reinf. 4 Compression	77.6%	Pass
96.42 - 91.42	Pole + Reinf.	TP36.538x35.663x0.715	Reinf. 4 Compression	82.5%	Pass
91.42 - 88.75	Pole + Reinf.	TP37.836x36.538x0.705	Reinf. 4 Compression	85.1%	Pass
88.75 - 83.75	Pole + Reinf.	TP37.38x36.505x0.7675	Reinf. 4 Compression	83.9%	Pass
83.75 - 80	Pole + Reinf.	TP38.036x37.38x0.7575	Reinf. 4 Compression	86.9%	Pass
80 - 75	Pole + Reinf.	TP38.911x38.036x0.8025	Reinf. 3 Compression	82.1%	Pass
75 - 70	Pole + Reinf.	TP39.786x38.911x0.7875	Reinf. 3 Compression	85.7%	Pass
70 - 65	Pole + Reinf.	TP40.661x39.786x0.7775	Reinf. 3 Compression	89.2%	Pass
65 - 60	Pole + Reinf.	TP41.536x40.661x0.7625	Reinf. 3 Compression	92.5%	Pass
60 - 55	Pole + Reinf.	TP42.411x41.536x0.7425	Reinf. 2 Compression	79.4%	Pass
55 - 50	Pole + Reinf.	TP43.286x42.411x0.7325	Reinf. 2 Compression	81.9%	Pass
50 - 45	Pole + Reinf.	TP45.167x43.286x0.7225	Reinf. 2 Compression	84.5%	Pass
45 - 38.25	Pole + Reinf.	TP44.717x43.536x0.78	Reinf. 2 Compression	82.3%	Pass
38.25 - 33.25	Pole + Reinf.	TP45.592x44.717x0.77	Reinf. 2 Compression	84.4%	Pass
33.25 - 28.25	Pole + Reinf.	TP46.467x45.592x0.76	Reinf. 2 Compression	86.4%	Pass
28.25 - 23.25	Pole + Reinf.	TP47.342x46.467x0.75	Reinf. 2 Compression	88.3%	Pass
23.25 - 20	Pole + Reinf.	TP47.91x47.342x0.745	Reinf. 2 Compression	89.5%	Pass
20 - 15	Pole + Reinf.	TP48.785x47.91x0.785	Reinf. 1 Compression	85.5%	Pass
15 - 10	Pole + Reinf.	TP49.66x48.785x0.775	Reinf. 1 Compression	87.2%	Pass
10 - 5	Pole + Reinf.	TP50.535x49.66x0.765	Reinf. 1 Compression	88.8%	Pass
5 - 0	Pole + Reinf.	TP51.41x50.535x0.755	Reinf. 1 Compression	90.3%	Pass
				Summary	
			Pole	80.7%	Pass
			Reinforcement	92.5%	Pass
			Overall	92.5%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity					
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5
177 - 172	1020	n/a	1020	15.73	n/a	15.73	6.7%					
172 - 167	1143	n/a	1143	16.34	n/a	16.34	12.5%					
167 - 162	1275	n/a	1275	16.95	n/a	16.95	20.1%					
162 - 157	1417	n/a	1417	17.56	n/a	17.56	26.7%					
157 - 152	1569	n/a	1569	18.16	n/a	18.16	36.4%					
152 - 147	1732	n/a	1732	18.77	n/a	18.77	45.8%					
147 - 142	1906	n/a	1906	19.38	n/a	19.38	54.4%					
142 - 137	2091	n/a	2091	19.99	n/a	19.99	62.1%					
137 - 133.5	2227	n/a	2227	20.41	n/a	20.41	67.1%					
133.5 - 128.5	2652	n/a	2652	23.64	n/a	23.64	66.6%					
128.5 - 123.5	2892	n/a	2892	24.34	n/a	24.34	74.1%					
123.5 - 118.58	3143	n/a	3143	25.02	n/a	25.02	80.7%					
118.58 - 113.58	3411	1784	5196	25.72	12.39	38.11	56.5%					67.8%
113.58 - 110	3613	1851	5464	26.21	12.39	38.60	59.8%					71.7%
110 - 106.42	3823	9371	13194	26.71	50.09	76.80	27.6%				57.5%	30.9%
106.42 - 101.42	4129	7784	11912	27.41	37.70	65.10	34.9%				72.5%	
101.42 - 96.42	4451	8121	12572	28.10	37.70	65.80	37.5%				77.6%	
96.42 - 91.42	4789	8467	13255	28.79	37.70	66.49	40.0%				82.5%	
91.42 - 88.75	4976	8654	13629	29.16	37.70	66.86	41.4%				85.1%	
88.75 - 83.75	6380	8805	15185	36.76	37.70	74.46	40.9%				83.8%	
83.75 - 80	6725	9074	15799	37.42	37.70	75.11	42.4%				86.9%	
80 - 75	7204	10780	17984	38.28	42.56	80.84	41.3%			82.1%		
75 - 70	7705	11203	18907	39.15	42.56	81.71	43.1%			85.7%		
70 - 65	8228	11633	19861	40.02	42.56	82.58	44.9%			89.2%		
65 - 60	8775	12071	20847	40.89	42.56	83.45	46.9%			92.5%		
60 - 55	9346	12390	21736	41.75	42.56	84.31	48.8%		79.4%			
55 - 50	9941	12842	22783	42.62	42.56	85.18	50.5%		82.0%			
50 - 45	10561	13303	23863	43.49	42.56	86.05	52.1%		84.5%			
45 - 38.25	13106	13599	26705	52.78	42.56	95.33	50.9%		82.3%			
38.25 - 33.25	13897	14073	27970	53.82	42.56	96.38	52.3%		84.4%			
33.25 - 28.25	14719	14555	29275	54.86	42.56	97.42	53.6%		86.4%			
28.25 - 23.25	15574	15045	30619	55.90	42.56	98.46	54.9%		88.3%			
23.25 - 20	16146	15368	31515	56.58	42.56	99.14	55.9%		89.4%			
20 - 15	17054	17964	35018	57.62	47.71	105.33	53.6%	85.5%				
15 - 10	17996	18540	36536	58.66	47.71	106.37	54.7%	87.2%				
10 - 5	18971	19126	38097	59.70	47.71	107.41	55.8%	88.8%				
5 - 0	19981	19720	39702	60.74	47.71	108.46	56.9%	90.3%				

Project: BU 876376
Site: WO 772512

ANCHOR BOLTS ANALYSIS - 2 BOLT CIRCLES

Designed By: AM
Date: 06.16.2014
Checked by: EP

1.0 BASE REACTIONS:

M= Moment at the base
Q= Axial load at the base
V= Shear load at the base

$M := 3732 \cdot kip \cdot ft$ (from structural analysis)

$Q := 53 \cdot kip$ (from structural analysis)

$V := 32 \cdot kip$ (from structural analysis)

2.0 BOLT PARAMETERS:

n= Number of bolts
d= Bolt diameter
D= Circle diameter
F_b= Yield strength of bolt
F_u= Ultimate strength of bolt

(inner bolt circle)

$n_1 := 16$
$D_1 := 58 \cdot in$
$F_{b1} := 75 \cdot ksi$
$d_1 := 2.25 \cdot in$
$F_{u1} := 100 \cdot ksi$

(outer bolt circle)

$n_2 := 3$
$D_2 := 66.91 \cdot in$
$F_{b2} := 127.7 \cdot ksi$
$d_2 := 1.75 \cdot in$
$F_{u2} := 150 \cdot ksi$

3.0 VERIFY STRESS IN BOLTS:

θ= Angle between bolts
r= Distance from centroid of pole to extreme bolt
I_b= Inertia of one bolt
a= Area of one bolt
y= Distance from bolt to center
I_x= moment of inertia of bolt system
Q.e= Axial load on existing bolts
M.e= Moment on existing bolts
Q.n.= Axial load on new bolts
M.n= Moment on new bolts

$$TPI_1 := \begin{cases} 8 & \text{if } d_1 = 1\,in \\ 7 & \text{if } d_1 = 1.125\,in \\ 7 & \text{if } d_1 = 1.25\,in \\ 6 & \text{if } d_1 = 1.375\,in \\ 6 & \text{if } d_1 = 1.5\,in \\ 5 & \text{if } d_1 = 1.75\,in \\ 4.5 & \text{if } d_1 = 2\,in \\ 4.5 & \text{if } d_1 = 2.25\,in \\ 4.5 & \text{if } d_1 = 2.5\,in \end{cases}$$

$$TPI_2 := \begin{cases} 8 & \text{if } d_2 = 1\,in \\ 7 & \text{if } d_2 = 1.125\,in \\ 7 & \text{if } d_2 = 1.25\,in \\ 6 & \text{if } d_2 = 1.375\,in \\ 6 & \text{if } d_2 = 1.5\,in \\ 5 & \text{if } d_2 = 1.75\,in \\ 4.5 & \text{if } d_2 = 2\,in \\ 4.5 & \text{if } d_2 = 2.25\,in \\ 4.5 & \text{if } d_2 = 2.5\,in \end{cases}$$

$\theta_1 := \frac{360deg}{n_1}$ $\quad i := 1 .. n_1$ $\quad \phi_1(i) := i \cdot \theta_1$

$\theta_2 := \frac{360deg}{n_2}$ $\quad j := 1 .. n_2$ $\quad \phi_2(j) := j \cdot \theta_2$

$a_1 := \frac{\pi}{4} \cdot \left(d_1 - \frac{0.9743in}{TPI_1} \right)^2 = 3.248 \cdot in^2$ $\quad y_1(i) := \frac{D_1 \cdot \cos(\phi_1(i))}{2}$

$a_2 := 1.56in^2$ $\quad y_2(j) := \frac{D_2 \cdot \cos(\phi_2(j))}{2}$

$Ix_1(i) := a_1 \cdot y_1(i)^2$

$Ix_2(j) := a_2 \cdot y_2(j)^2$

$$Ix := \sum_{i=1}^{n_1} Ix_1(i) + \sum_{j=1}^{n_2} Ix_2(j) \qquad Ix = 24469 \cdot in^4$$

$$M_e := M \cdot \frac{\left(\sum_{i=1}^{n_1} Ix_1(i) \right)}{Ix} = 3333 \cdot kip \cdot ft$$

$$Q_e := Q \cdot \frac{n_1 \cdot a_1}{n_1 \cdot a_1 + n_2 \cdot a_2} = 49 \cdot kip$$

$$V_e := V \cdot \frac{n_1 \cdot a_1}{n_1 \cdot a_1 + n_2 \cdot a_2} = 29 \cdot kip$$

$$M_n := M \cdot \frac{\left(\sum_{j=1}^{n_2} Ix_2(j) \right)}{Ix} = 399 \cdot kip \cdot ft$$

$$Q_n := Q \cdot \frac{n_2 \cdot a_2}{n_1 \cdot a_1 + n_2 \cdot a_2} = 4 \cdot kip$$

$$V_n := V \cdot \frac{n_2 \cdot a_2}{n_1 \cdot a_1 + n_2 \cdot a_2} = 3 \cdot kip$$

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#: *876376*
Site Name: *Scoville Hill/Harwinton Roa*
App #:

Anchor Rod Data		
Qty:	16	
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:	57	in
Thick:	2.75	in
Grade:	55	ksi
Clip Distance:	6	in

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

Pole Data		
Diam:	51.41	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	3333	ft-kips
Unfactored Axial, P:	49	kips
Unfactored Shear, V:	29	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	169.3 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	86.9% **Pass**

Base Plate Results — Flexural Check

Base Plate Stress:	47.1 ksi
Allowable PL Bending Stress:	55.0 ksi
Base Plate Stress Ratio:	85.6% **Pass**

PL Ref. Data
Yield Line (in): 29.20
Max PL Length: 29.20

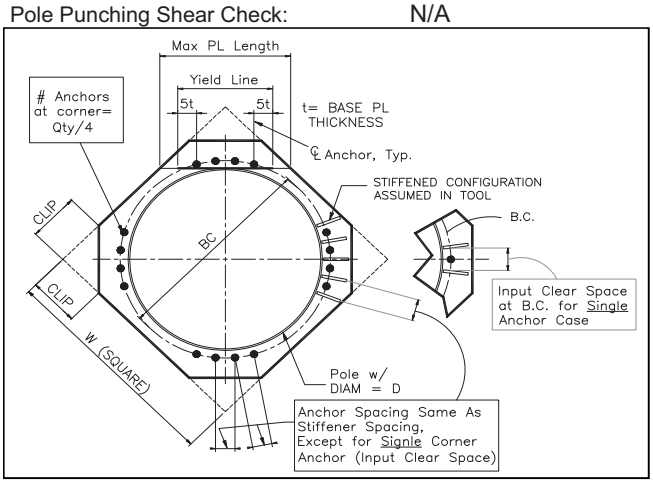
N/A - Unstiffened

Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A



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

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#: *876376*
Site Name: *Scoville Hill/Harwinton Rod*
App #:

Anchor Rod Data		
Qty:	3	
Diam:	1.75	in
Rod Material:	Other	
Yield, Fy:	127.7	ksi
Strength, Fu:	150	ksi
Bolt Circle:	66.91	in
Anchor Spacing:	20	in

Plate Data		
W=Side:	57	in
Thick:	2.75	in
Grade:	55	ksi
Clip Distance:	6	in

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

Pole Data		
Diam:	51.41	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	399	ft-kips
Unfactored Axial, P:	4	kips
Unfactored Shear, V:	3	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	94.1	Kips
Allowable Tension:	158.7	Kips
Anchor Rod Stress Ratio:	59.3%	**Pass**

Base Plate Results Flexural Check

Base Plate Stress:	16.6	ksi
Allowable PL Bending Stress:	55.0	ksi
Base Plate Stress Ratio:	30.2%	**Pass**

PL Ref. Data	
Yield Line (in):	27.50
Max PL Length:	29.20

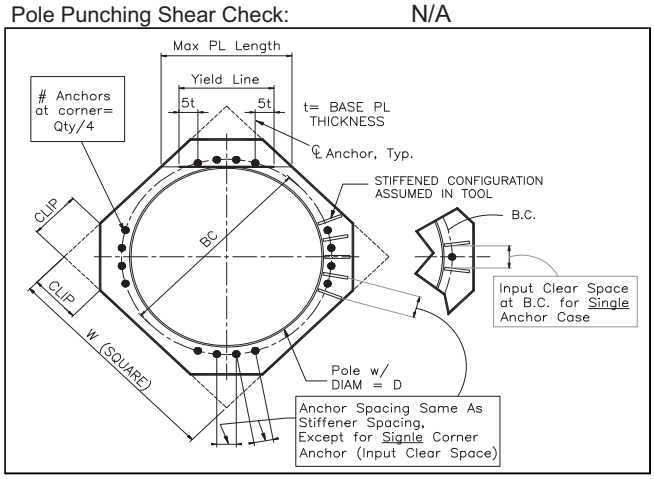
N/A - Unstiffened

Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A



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

Version 1.1
Rev. Date: 06.13.2014

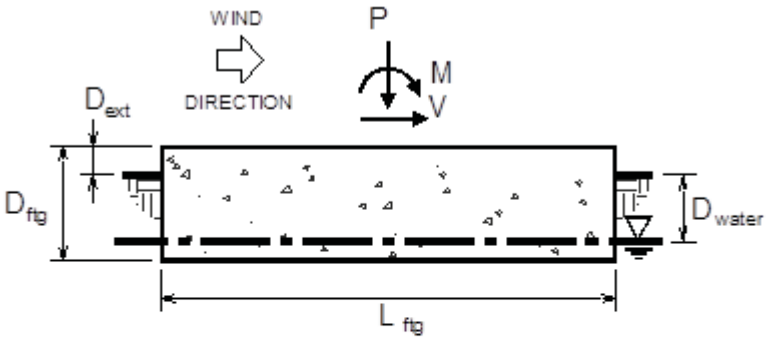
Project: BU876376
Site: Scoville Hill / Harwinton Rod

MP - SQUARE MAT ON GRADE
FOUNDATION ANALYSIS
TIA-222-F

Designed by: AM
Checked by : EP
Date: 06.16.2014

1.0 FOUNDATION GEOMETRY & MATERIALS:

L_{ftg}= Length of footing (parallel to wind direction)
L_{tower}= Centerline distance between tower legs
D_{ftg}= Depth of footing
D_{ext}= Height of pad above soil grade line
D_{offset}= Offset distance between center of footing and monopole
B_{ftg}= Width of footing (perpendicular to wind direction)
ρ_{conc}= Concrete density
A_{ftg} = Bearing area of spread footing
V_{ftg} = Volume of spread footing



SECTION

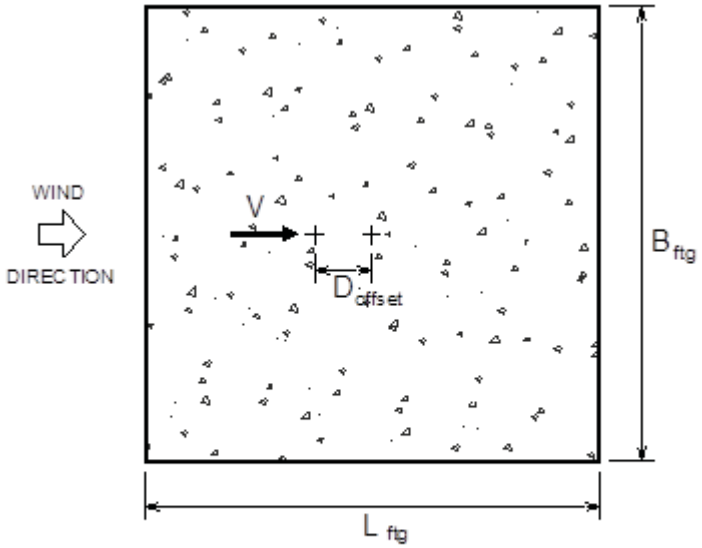
$L_{ftg} := 24.5\,ft$ $B_{ftg} := L_{ftg} = 24.5\ ft$

$D_{ftg} := 5.0\,ft$ $D_{ext} := 1.5\,ft$ $D_{offset} := 0\,ft$

$\rho_{conc} := 150 \cdot pcf$

$A_{ftg} := L_{ftg} \cdot B_{ftg} = 600.25\ ft^2$

$V_{ftg} := A_{ftg} \cdot (D_{ftg}) + 7ft \cdot 7ft \cdot 3.5ft = 3172.75 \cdot ft^3$



PLAN

2.0 SOIL PARAMETERS:

Data obtained from Geotechnical report:
D_{water}= Depth of water table below soil grade line
$D_{neglect}$= Depth of soil below grade line that is neglected
γ_{soil}= Moist density of soil
ϕ= Angle of friction of soil
K_p = Passive earth pressure coefficient
q_{brg_allow}= Allowable gross bearing capacity of soil
FOS_{coh}= Factor of Safety for cohesion
FOS_{lat}= Factor of Safety for lateral bearing
μ= Coefficient of friction - concrete & soil (sand)
c= Cohesion (clay)

$D_{water} := 99\,ft$ ☐ Check here if Groundwater is not present

$D_{neglect} := 1.5\,ft$

$\phi := 30\,deg$

$FOS_{lat} := 2.0$

$\mu := 0.7$

$\gamma_{soil} := 125\,pcf$

$K_p := \begin{cases} 0 & \text{if } \phi = 0 \cdot deg \\ \left(\tan\left(45 \cdot deg + \frac{\phi}{2}\right)\right)^2 & \text{otherwise} \end{cases} = 3.00$

$c := 0 \cdot psf$ If c is unknown, use 0

$q_{brg\_allow} := 20000\,psf$

$FOS_{coh} := 1.0$

3.0 LOADS:

Load combinations based on TIA-222-F (1.0D + 1.0W):

P = Unactored downward load from tnxTower (1.0D + 1.0W)
V = Unfactored shear from tnxTower (1.0W)
M = Unfactored tower moment from tnxTower (1.0D)

$P := 53 \cdot kip$

$V := 32 \cdot kip$

$M := 3732 \cdot kip \cdot ft$

γ'_{soil} = Density of soil considering ground water depth
ρ'_{conc_ftg} = Density of concrete footing considering ground water depth
WT_{ftg} = Weight of footing

$\gamma'_{soil} = 125 \cdot pcf$

$\rho'_{conc\_ftg} = 150 \cdot pcf$

$WT_{ftg} := \rho'_{conc\_ftg} \cdot V_{ftg} = 475.91 \cdot kip$

4.0 ANALYSIS

4.1 BEARING CHECK:

Considering 1.0D+1.0W TIA-222-F Load Combination:

M_{over} = Overturning moment due to wind
P_{tot} = Axial dead load, self-weight of footing, and weight of soil directly above footing
e_{brg} = Eccentricity in the direction of the wind (L_{ftg})
q_{min} = Minimum bearing pressure due to applied loads
q_{max} = Maximum bearing pressure due to applied loads

$M_{over} := M + V \cdot D_{ftg} + P \cdot D_{offset} = 3892 \cdot kip \cdot ft$

$P_{tot} := P + WT_{ftg} = 528.91 \cdot kip$

$e_{brg} := \frac{M_{over}}{P_{tot}} = 7.36\ ft \qquad \frac{L_{ftg}}{6} = 4.08\ ft \qquad \frac{L_{ftg}}{2} = 12.25\ ft$

$$q_{min} := if\left(e_{brg} \le \frac{L_{ftg}}{6}, \frac{P_{tot}}{L_{ftg} \cdot B_{ftg}} - \frac{6 \cdot M_{over}}{B_{ftg} \cdot L_{ftg}^2}, if\left(e_{brg} \ge \frac{L_{ftg}}{2}, \text{"NO GOOD"}, 0 \cdot psf\right)\right) = 0 \cdot psf$$

$$q_{max} := if\left[e_{brg} \le \frac{L_{ftg}}{6}, \frac{P_{tot}}{L_{ftg} \cdot B_{ftg}} + \frac{6 \cdot M_{over}}{B_{ftg} \cdot L_{ftg}^2}, if\left[e_{brg} \ge \frac{L_{ftg}}{2}, \text{"NO GOOD"}, \frac{2 \cdot P_{tot}}{3 \cdot B_{ftg} \cdot \left(\frac{L_{ftg}}{2} - e_{brg}\right)}\right]\right] = 2942 \cdot psf$$

$q_{brg\_allow} = 20000 \cdot psf$

$if\left(1.10 \cdot q_{brg\_allow} > q_{max}, \text{"OK"}, \text{"NO GOOD"}\right) = \text{"OK"}$

$$\frac{q_{max}}{q_{brg\_allow}} = 14.7 \cdot \%$$

4.2 OVERTURNING CHECK:

Considering 1.0D+1.0W Load Combination with Factor of Safety (FS) = 1.5 per TIA-222-F, Sect. 7.2.4.5:

L_{brg} = Length of soil bearing area due to applied factored loads

γ'_{soil} = Density of soil above top of footing considering ground water depth

M_{resist} = Resisting moment due to axial dead load, footing self-weight and weight of soil above footing and extending beyond top of footing at $\phi°$

$e_{OT} := e_{brg} = 7.36\ ft$

$L_{ftg} = 24.5\ ft$

$\frac{L_{ftg}}{6} = 4.08\ ft$

$L_{brg} := \begin{cases} L_{ftg} & \text{if } e_{OT} < \frac{L_{ftg}}{6} \\ 3 \cdot \left(\frac{L_{ftg}}{2} - e_{OT} \right) & \text{otherwise} \end{cases} = 14.67 \cdot ft$

$q_{min} = 0 \cdot psf$

$q_{max} = 2942 \cdot psf$

$M_{resist} := \left(P + WT_{ftg}\right) \cdot \frac{L_{ftg}}{2} = 6479 \cdot kip \cdot ft$

$M_{over} = 3892 \cdot kip \cdot ft$

$\frac{M_{resist}}{M_{over}} = 1.66$

$if\left(1.10 \cdot \frac{M_{resist}}{M_{over}} > 1.5, \text{"OK"}, \text{"NO GOOD"}\right) = \text{"OK"}$

$\frac{1.5 \cdot M_{over}}{M_{resist}} = 90.1 \cdot \%$

4.3 SLIDING RESISTANCE CHECK:

Considering 1.0D+1.0W Load Combination with Factor of Safety (FS) = 1.5 per TIA-222-F:

q_{lat_allow} = Allowable lateral bearing capacity of soil
$R_{s\_lat\_brg}$ = Nominal soil resistance to bearing
$R_{s\_lat\_sliding}$ = Nominal soil resistance to sliding
R_s = Total nominal soil resistance to resist sliding (bearing + sliding)
R_{s_allow} = Allowable strength of soil to resist sliding

$$q_{lat\_allow\_ftg} := \frac{K_p \cdot \gamma'_{soil}}{FOS_{lat}} = 187 \cdot \frac{psf}{ft}$$

$$R_{s\_lat\_brg} := q_{lat\_allow\_ftg} \cdot \left(\frac{D_{ftg} - D_{ext}}{2} \right) \cdot \left(D_{ftg} - D_{ext} \right) \cdot B_{ftg} + \left(2 \cdot c \cdot \sqrt{K_p} \right) \cdot \left(D_{ftg} - D_{ext} \right) \cdot \left(L_{ftg} \right) = 28.1 \cdot kip$$

Bearing - Soil Pressure (sand) | Lateral Bearing - Cohesion (clay)

$$R_{s\_lat\_sliding} := (\mu) \cdot (P) + c \cdot \left[A_{ftg} + 2 \cdot \left[\left(D_{ftg} - D_{ext} \right) \cdot L_{ftg} \right] \right] = 37.1 \cdot kip$$

Lateral Sliding Friction (sand) | Lateral Sliding Cohesion (clay)

$$R_{s\_allow} := R_{s\_lat\_brg} + R_{s\_lat\_sliding} = 65.24 \cdot kip$$

$$V = 32 \cdot kip$$

$$\frac{R_{s\_allow}}{V} = 2.04$$

$$if\left(1.10 \cdot \frac{R_{s\_allow}}{V} > 1.5, \text{"OK"}, \text{"NO GOOD"} \right) = \text{"OK"}$$

$$\frac{1.5 \cdot V}{R_{s\_allow}} = 73.6 \cdot \%$$

5.0 CONCRETE DESIGN (ACI 318-05):

Load Combinations from TIA-222-F (1.0D + 1.0W) factored to meet ACI 318-05 load combination (1.2D + 1.6W):

d = Distance from extreme compression fiber to center of longitudinal reinforcement
No_rebar = Number of longitudinal reinforcement at steel depth "d" in direction of wind
Size_rebar = (#) size of longitudinal reinforcement at steel depth "d" in direction of wind
dia_s = Diameter of single longitudinal reinforcement (in^2) at steel depth "d" in direction of wind
A_s = Total area of longitudinal reinforcement at steel depth "d" in direction of wind
f_y = Specified yield strength of reinforcement (psi)
f_c = Specified compressive strength of concrete (psi)
M_{over}= Overturning moment due to wind
P_{tot}= Axial dead load, self-weight of footing, and weight of soil directly above footing
e_{ult}= Eccentricity in the direction of the wind (L_{ftg}) caused by ultimate loads
L_{brg_ult} = Length of soil bearing area due to applied factored loads
q_{u_min}= Minimum bearing pressure due to factored loads
q_{u_max}= Maximum bearing pressure due to factored loads

$d := 57 \cdot in$ $f_y := 60000 \cdot psi$

$No\_rebar := 27$ $f_c := 3000 \cdot psi$

$Size\_rebar := 9$

$dia_s = 1.128 \cdot in$ $A_s := No\_rebar\left(dia_s\right)^2 \cdot \frac{\pi}{4} = 26.98 \cdot in^2$

$M_{u\_over} := 1.6 \cdot M_{over} = 6227 \cdot kip \cdot ft$

$P_{u\_tot} := 1.2 \cdot P_{tot} = 635 \cdot kip$

$P_{ult} := 1.2 \cdot P = 64 \cdot kip$

$e_{ult} := \frac{M_{u\_over}}{P_{u\_tot}} = 9.81\ ft$ $\frac{L_{ftg}}{6} = 4.08\ ft$ $\frac{L_{ftg}}{2} = 12.25\ ft$ $L_{brg\_ult} := \begin{cases} L_{ftg} & \text{if } e_{ult} < \frac{L_{ftg}}{6} \\ 3 \cdot \left(\frac{L_{ftg}}{2} - e_{ult}\right) & \text{otherwise} \end{cases} = 7.32\ ft$

$q_{min} := \text{if}\left(e_{ult} \le \frac{L_{ftg}}{6}, \frac{P_{u\_tot}}{L_{ftg} \cdot B_{ftg}} - \frac{6 \cdot M_{u\_over}}{B_{ftg} \cdot L_{ftg}^2}, \text{if}\left(e_{ult} \ge \frac{L_{ftg}}{2}, \text{"NO GOOD"}, 0 \cdot psf\right)\right) = 0 \cdot psf$

$q_{max} := \text{if}\left[e_{ult} \le \frac{L_{ftg}}{6}, \frac{P_{u\_tot}}{L_{ftg} \cdot B_{ftg}} + \frac{6 \cdot M_{u\_over}}{B_{ftg} \cdot L_{ftg}^2}, \text{if}\left[e_{ult} \ge \frac{L_{ftg}}{2}, \text{"NO GOOD"}, \frac{2 \cdot P_{u\_tot}}{3 \cdot B_{ftg} \cdot \left(\frac{L_{ftg}}{2} - e_{ult}\right)}\right]\right] = 7082 \cdot psf$

$q_{min\_net} := q_{min} - \left(\rho'_{conc\_ftg} \cdot D_{ftg}\right) = -750 \cdot psf$

$q_{u\_min} := \begin{cases} 0 \cdot psf & \text{if } q_{min\_net} < 0 \cdot psf \\ q_{min\_net} & \text{otherwise} \end{cases} = 0 \cdot psf$

$q_{u\_max} := q_{max} - \left(\rho'_{conc\_ftg} \cdot D_{ftg}\right) = 6332 \cdot psf$

$L_{u\_brg} := \begin{cases} \frac{\left(q_{u\_max} \cdot L_{brg\_ult}\right)}{\left(q_{u\_max} - q_{min\_net}\right)} & \text{if } q_{u\_min} = 0 \cdot psf \\ L_{brg\_ult} & \text{otherwise} \end{cases} = 6.54 \cdot ft$

5.1 DESIGN FOR FLEXURAL (ONE-WAY) SHEAR:

Load Combinations from TIA-222-F (1.0D + 1.0W) factored to meet ACI 318-05 load combination (1.2D + 1.6W):

ϕ_v= Shear resistance factor (ACI 318-05, Sect. 9.3.1)
x_1= Distance from the edge of the footing to the critical section for flexural shear
q_{x1}= Bearing pressure at critical section for flexural shear due to factored loads
V_{u1}= Ultimate factored flexural (one-way) shear force due to factored loads
V_{c1}= Nominal strength of concrete to resist flexural (one-way) shear (ACI 318-05, Section 11.3.1.1)
$\phi_v V_{c1}$= Design strength of concrete to resist flexural (one-way) shear

$$\phi_v := 0.75$$

$$x_1 := \frac{L_{ftg}}{2} + D_{offset} - d = 7.5\,ft$$

$$q_{x1} := \frac{(q_{u\_max} - q_{u\_min})\cdot(L_{u\_brg} - x_1)}{L_{u\_brg}} + q_{u\_min} = -928\cdot psf$$

$$V_{u1} := \begin{cases} \frac{q_{u\_max}\cdot B_{ftg}\cdot L_{u\_brg}}{2} & \text{if } L_{u\_brg} < x_1 \\ \left(\frac{q_{u\_max} + q_{x1}}{2}\right)\cdot B_{ftg}\cdot x_1 & \text{otherwise} \end{cases} = 507\cdot kip$$

$$V_{c1} := 2\cdot d\cdot B_{ftg}\cdot\sqrt{f_c\cdot psi} = 1836\cdot kip$$

$$\phi_v\cdot V_{c1} = 1377\cdot kip$$

$$\text{if}\left(1.10\cdot\phi_v\cdot V_{c1} > V_{u1}, \text{"OK"}, \text{"NO GOOD"}\right) = \text{"OK"}$$

$$\frac{V_{u1}}{\phi_v\cdot V_{c1}} = 36.9\cdot\%$$

5.2 DESIGN FOR PUNCHING (TWO-WAY) SHEAR:

Load Combinations from TIA-222-F (1.0D + 1.0W) factored to meet ACI 318-05 load combination (1.2D + 1.6W):

ϕ_v= Shear resistance factor (ACI 318-05, Sect. 9.3.2.3 -see flexural (one-way) shear section above for value)
x_{2A}= Distance from the edge of the footing to the critical section for punching shear corresponding to the smaller bearing pressure
x_{2B}= Distance from the edge of the footing to the critical section for punching shear corresponding to the larger bearing pressure
q_{x2A}= Smaller bearing pressure at critical section for punching shear due to factored loads
q_{x2B}= Larger bearing pressure at critical section for punching shear due to factored loads
V_{u2}= Ultimate factored punching (two-way) shear force due to factored loads
b_0 = Perimeter of critical section for punching shear
V_{c2}= Nominal strength of concrete to resist punching (two-way) shear (ACI 318-05, Section 11.12.2)
$\phi_v V_{c2}$= Design strength of concrete to resist punching (two-way) shear

$$V_{u2} := P_{ult} = 63.6\cdot kip$$

$$b_0 := 4\cdot d = 19\,ft$$

$$V_{c2} := 4\cdot d\cdot b_0\cdot\sqrt{f_c\cdot psi} = 2847\cdot kip$$

$$\phi_v\cdot V_{c2} = 2135\cdot kip$$

$$\text{if}\left(1.10\cdot\phi_v\cdot V_{c2} > V_{u2}, \text{"OK"}, \text{"NO GOOD"}\right) = \text{"OK"}$$

$$\frac{V_{u2}}{\phi_v\cdot V_{c2}} = 3.0\cdot\%$$

5.3 DESIGN FOR FLEXURE:

Load Combinations from TIA-222-F (1.0D + 1.0W) factored to meet ACI 318-05 load combination (1.2D + 1.6W):

x_f= Distance from the edge of the footing to the critical section for flexure corresponding to the smaller bearing pressure

q_f= Smaller bearing pressure at critical section for flexure due to factored loads

M_u= Ultimate factored moment on footing pad due to factored loads

ρ = Ratio of A_s to bd

β_1 = Factor relating depth of equivalent rectangular compressive stress block to neutral axis depth (ACI 318-05, Sect. 10.2.7.3)

ϕ_f= Flexural resistance factor (ACI 318-05, Sect. 9.3.2.3)

M_n= Nominal strength of concrete footing pad to resist flexure

$\phi_f M_n$= Design strength of concrete footing pad to resist flexure

A_s = Total area of longitudinal reinforcement at steel depth "d" in direction of wind

A_{st} = Total area of longitudinal reinforcement in direction of wind (assumes A_s at top and bottom of footing pad)

A_{st_min} = Minimum area of longitudinal reinforcement required in direction of wind (ACI 318-05, Sect. 7.12.2.1)

$$x_f := \frac{L_{ftg}}{2} + D_{offset} = 12.25\ \text{ft}$$

$$q_f := \frac{(q_{u\_max} - q_{u\_min})\cdot(L_{u\_brg} - x_f)}{L_{u\_brg}} + q_{u\_min} = -5526\cdot\text{psf}$$

$$M_u := \begin{cases} \left(\frac{q_{u\_max}\cdot B_{ftg}\cdot L_{u\_brg}}{2}\right)\cdot\left(x_f - \frac{L_{u\_brg}}{3}\right) & \text{if } L_{u\_brg} < x_f \\ \frac{(q_f\cdot B_{ftg})\cdot x_f^{\,2}}{2} + \frac{(q_{u\_max}\cdot B_{ftg} - q_f\cdot B_{ftg})\cdot(x_f)^2}{3} & \text{otherwise} \end{cases} = 5109\cdot\text{kip}\cdot\text{ft}$$

$$\rho := \frac{A_s}{B_{ftg}\cdot d} = 0.0016$$

$$\beta_1 = 0.85$$

$$\phi_f = 0.9$$

$$a := \frac{A_s\cdot f_y}{0.85 f_c\cdot B_{ftg}} = 2.16\cdot\text{in}$$

$$M_n := A_s\cdot f_y\cdot\left(d - \frac{a}{2}\right) = 7544\cdot\text{kip}\cdot\text{ft}$$

$$\phi_f\cdot M_n = 6790\cdot\text{kip}\cdot\text{ft}$$

$$\text{if}\left(1.10\cdot\phi_f\cdot M_n > M_u, \text{"OK"}, \text{"NO GOOD"}\right) = \text{"OK"}$$

$$\frac{M_u}{\phi_f\cdot M_n} = 75.2\cdot\%$$

5.3.1 FLEXURAL MINIMUM STEEL CHECK:

$$A_s = 26.98\cdot\text{in}^2$$

$$A_{s\_min} := \begin{cases} 0\cdot\text{in}^2 & \text{if } \phi_f\cdot M_n \geq \frac{4}{3}\cdot M_u \\ \text{otherwise} & \\ \quad \begin{cases} \frac{200\cdot B_{ftg}\cdot d}{\left(\frac{f_y}{\text{psi}}\right)} & \text{if } f_c \leq 4444\cdot\text{psi} \\ \frac{3\cdot\sqrt{f_c\cdot\text{psi}}\cdot B_{ftg}\cdot d}{(f_y)} & \text{if } f_c > 4444\cdot\text{psi} \end{cases} & \end{cases} = 55.86\cdot\text{in}^2$$

$$\text{if}\left(A_s > A_{s\_min}, \text{"OK"}, \text{"NO GOOD"}\right) = \text{"NO GOOD"}$$

5.3.2 TEMPERATURE MINIMUM STEEL CHECK:

$$A_{st} := 2\cdot A_s = 53.96\cdot\text{in}^2$$

$$A_{st\_min} := 0.0018\cdot B_{ftg}\cdot D_{ftg} = 31.75\cdot\text{in}^2$$

$$\text{if}\left(A_{st} > A_{st\_min}, \text{"OK"}, \text{"NO GOOD"}\right) = \text{"OK"}$$

Version 1.0
Rev. Date: 06.13.2014

Project: BU876376
Site: Scoville Hill / Harwinton Rod

MP - SQUARE MAT ON GRADE
FOUNDATION ANALYSIS
TIA-222-F

Designed by: AM
Checked by : EP
Date: 06.16.2014

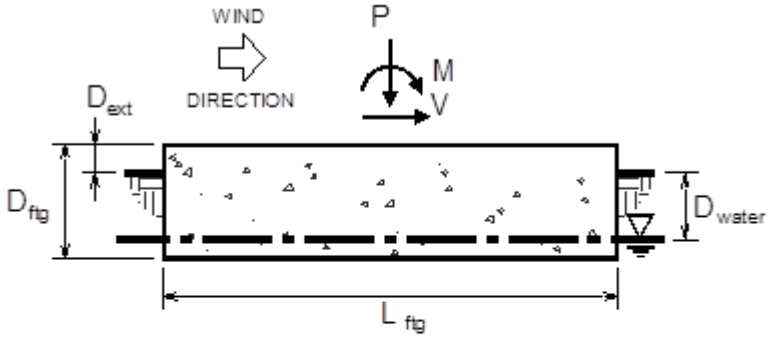
1.0 FOUNDATION GEOMETRY & MATERIALS:

$L_{ftg} = 24.5$ ft $\quad B_{ftg} = 24.5$ ft

$D_{ftg} = 5$ ft $\quad D_{ext} = 1.5$ ft $\quad D_{offset} = 0$

$d = 57 \cdot in$ $\quad No\_rebar = 27$ $\quad Size\_rebar = 9$

$f_y = 60000 \cdot psi$ $\quad f_c = 3000 \cdot psi$



SECTION

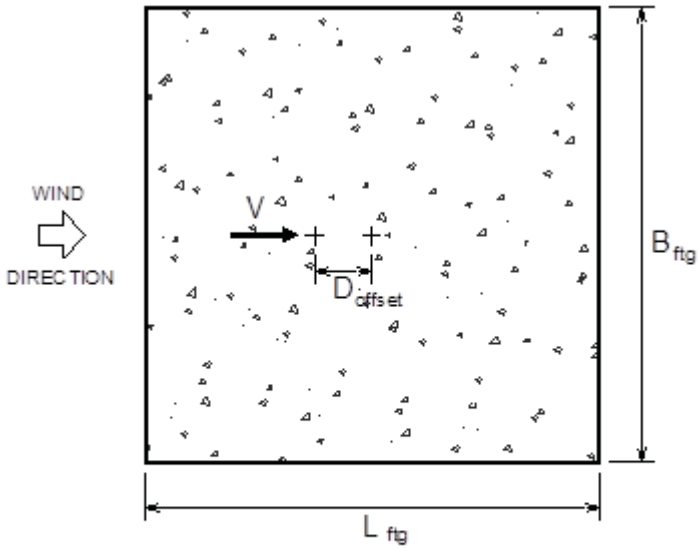
2.0 SOIL PARAMETERS:

$\phi = 30 \cdot deg$ $\quad K_p = 3.00$

$\gamma_{soil} = 125 \cdot pcf$ $\quad \mu = 0.7$ $\quad c = 0 \cdot psf$

Groundwater = 99 ft

$q_{brg\_allow} = 20000 \cdot psf$



PLAN

3.0 LOADS:

Load combinations based on TIA-222-F (1.0D + 1.0W):

P = 53·kip

V = 32·kip

M = 3732·kip·ft

4.0 ANALYSIS RESULTS:

		APPLIED	ALLOWABLE	CHECK
4.1	BEARING:	$B_{app} = 2942 \cdot psf$	$B_{cap} = 20000 \cdot psf$	B% = 14.7·%
4.2	OVERTURNING:	$M_{app} = 3892 \cdot kip \cdot ft$	$M_{cap} = 4319 \cdot kip \cdot ft$	M% = 90.1·%
4.3	SLIDING:	$V_{app} = 32 \cdot kip$	$V_{cap} = 43 \cdot kip$	V% = 73.6·%
5.1	FLEXURAL (ONE-WAY) SHEAR:	$V1_{app} = 507 \cdot kip$	$V1_{cap} = 1377 \cdot kip$	V1% = 36.9·%
5.2	PUNCHING (TWO-WAY) SHEAR:	$V2_{app} = 64 \cdot kip$	$V2_{cap} = 2135 \cdot kip$	V2% = 3.0·%
5.3	PAD FLEXURE:	$F_{app} = 5109 \cdot kip \cdot ft$	$F_{cap} = 6790 \cdot kip \cdot ft$	F% = 75.2·%

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

Sprint Existing Facility

Site ID: CT33XC111

Scoville Hill / Harwinton Rod & Gun

123 Campville Hill Road
Harwinton, CT 06791

September 19, 2014

EBI Project Number: 62144691

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:
CT33XC111 - Scoville Hill / Harwinton Rod & Gun

Site Total: 45.37% - MPE% in full compliance

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at **123 Campville Hill Road, Harwinton, CT**, for the purpose of determining whether the radio frequency (RF) exposure levels from the proposed Sprint equipment upgrades on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed upgrades to the existing Sprint Wireless antenna facility located at **123 Campville Hill Road, Harwinton, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

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

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

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

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

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

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

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

7) The antenna mounting height centerline for the proposed antennas is **177 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	CT33XC111 - Scoville Hill / Harwinton Rod & Gun
Site Addresss	123 Campville Hill Road, Harwinton, CT, 06791
Site Type	Monopole

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	5.9	177	171	1/2 "	0.5	0	138.69	0.17%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	177	171	1/2 "	0.5	0	39.00	0.08%
1B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	177	171	1/2 "	0.5	0	138.69	0.30%
														Sector total Power Density Value:		0.56%

Sector 2

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
2a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	5.9	177	171	1/2 "	0.5	0	138.69	0.17%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	177	171	1/2 "	0.5	0	39.00	0.08%
2B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	177	171	1/2 "	0.5	0	138.69	0.30%
														Sector total Power Density Value:		0.56%

Sector 3

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
3a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	5.9	177	171	1/2 "	0.5	0	138.69	0.17%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	177	171	1/2 "	0.5	0	39.00	0.08%
3B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	177	171	1/2 "	0.5	0	138.69	0.30%
														Sector total Power Density Value:		0.56%

Site Composite MPE %	
Carrier	MPE %
Sprint	1.67%
T-Mobile	0.88%
MetroPCS	4.97%
Verizon Wireless	14.48%
Nextel	4.05%
AT&T	19.32%
Total Site MPE %	**45.37%**

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Summary

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

The anticipated Maximum Composite contributions from the Sprint facility are **1.67% (0.56% from sector 1, 0.56% from sector 2 and 0.56% 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 **45.37%** 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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