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

July 15, 2014

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

RE: **Sprint PCS-Exempt Modification - Crown Site BU: 876338**
Sprint PCS Site ID: CT03XC105
Located at: 41 Manitock Hill Road, Waterford, CT 06385

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. Daniel M. Steward, First Selectman for Town of Waterford.

Sprint plans to modify the existing wireless communications facility owned by Crown Castle and located at **41 Manitock Hill Road, Waterford, CT 06385**. Attached are a compound plan and elevation depicting the planned changes (Exhibit-1), and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration (Exhibit-2). Also included is a power density table report reflecting the modification to Sprint's operations at the site (Exhibit-3).

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

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

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

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

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

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

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

Sincerely,

Jeff Barbadora
Real Estate Specialist

Enclosures

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

cc: Mr. Daniel M. Steward, First Selectman
Town of Waterford
15 Rope Ferry Road, Town Hall
Waterford, CT 06385

Sprint

CROWN CASTLE

PROJECT:	2.5 EQUIPMENT DEPLOYMENT
SITE NAME:	WATERFORD
SITE CASCADE:	CT03XC105
SITE NUMBER:	876338
SITE ADDRESS:	41 MANITOCK HILL RD WATERFORD, CT 06385
SITE TYPE:	SELF SUPPORT TOWER
MARKET:	NORTHERN CONNECTICUT

SITE INFORMATION

TOWER OWNER:
CROWN ATLANTIC COMPANY LLC
2000 CORPORATE DRIVE
CANONSBURG, PA 15317
(704) 405-6555

LATITUDE (NAD83):
41° 21' 16.42" N
41.354561°

LONGITUDE (NAD83):
72° 9' 3.38" W
-72.150939°

COUNTY:
NEW LONDON

ZONING JURISDICTION:
CONNECTICUT SITING COUNCIL

ZONING DISTRICT:
R-40

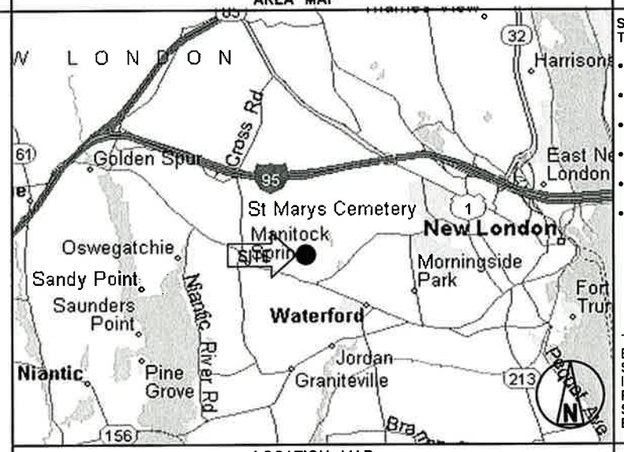
POWER COMPANY:
CL&P
(860) 947-2000

SPRINT PM:
PETER GIRARD
(508) 801-0074
PETER.GIRARD@SPRINT.COM

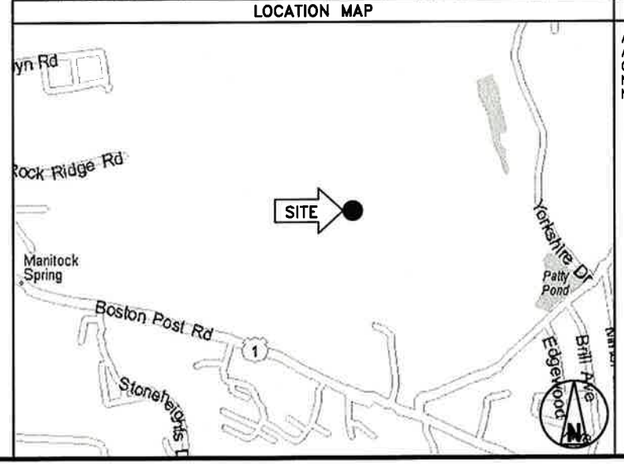
SPRINT CM:
PETER CULBERT
(603) 203-6446
(603) 969-0686
PETER.CULBERT@SPRINT.COM

CROWN CASTLE CM:
JASON D'AMICO
(860) 209-0104
JASON.D'AMICO@CROWNCASTLE.COM

AREA MAP



LOCATION MAP



PROJECT DESCRIPTION

SPRINT PROPOSES TO MODIFY AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY.

- INSTALL 2.5 EQUIPMENT IN EXISTING N.V. MMBS CABINET
- INSTALL (3) PANEL ANTENNAS
- INSTALL (3) RRU'S TO TOWER
- INSTALL (27) JUMPER CABLES
- INSTALL (1) FIBER CABLE
- INSTALL (4) BATTERIES IN EXISTING BBU CABINET

THESE PLANS HAVE BEEN DEVELOPED FOR THE MODIFICATION OF AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY OWNED OR LEASED BY SPRINT IN ACCORDANCE WITH THE SCOPE OF WORK PROVIDED BY SPRINT. INFINIGY HAS INCORPORATED THIS SCOPE OF WORK IN THE PLANS. THESE PLANS ARE NOT FOR CONSTRUCTION UNLESS ACCOMPANIED BY A PASSING STRUCTURAL STABILITY ANALYSIS PREPARED BY A LICENSED STRUCTURAL ENGINEER. STRUCTURAL ANALYSIS MUST INCLUDE BOTH TOWER AND MOUNT.

APPLICABLE CODES

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALL IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.

1. INTERNATIONAL BUILDING CODE (2012 IBC)
2. TIA-EIA-222-G OR LATEST EDITION
3. NFPA 780 – LIGHTNING PROTECTION CODE
4. 2011 NATIONAL ELECTRIC CODE OR LATEST EDITION
5. ANY OTHER NATIONAL OR LOCAL APPLICABLE CODES, MOST RECENT EDITIONS
6. CT BUILDING CODE
7. LOCAL BUILDING CODE
8. CITY/COUNTY ORDINANCES

811 Know what's below. Call before you dig. www.call811.com

DRAWING INDEX

SHEET NO:	SHEET TITLE	REV
T-1	TITLE SHEET & PROJECT DATA	0
SP-1	SPRINT SPECIFICATIONS	0
SP-2	SPRINT SPECIFICATIONS	0
SP-3	SPRINT SPECIFICATIONS	0
A-1	SITE PLAN	0
A-2	TOWER ELEVATION & CABLE PLAN	0
A-3	ANTENNA LAYOUT & MOUNTING DETAILS	0
A-4	COLOR CODING & NOTES	0
A-5	EQUIPMENT & MOUNTING DETAILS	0
A-6	CIVIL DETAILS	0
A-7	PLUMBING DIAGRAM	0
E-1	ELECTRICAL & GROUNDING PLAN	0
E-2	ELECTRICAL & GROUNDING DETAILS	0

PLANS PREPARED FOR:
Sprint
6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:
INFINIGY Design. Build. Deliver.
1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793
JOB NUMBER 353-000

MLA PARTNER:
CROWN CASTLE

ENGINEERING LICENSE:
STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
FOR PERMIT	6/26/14	AJD	0

SITE NAME:
WATERFORD

SITE CASCADE:
CT03XC105

SITE ADDRESS:
41 MANITOCK HILL RD
WATERFORD, CT 06385

SHEET DESCRIPTION:
TITLE SHEET
& PROJECT DATA

SHEET NUMBER:
T-1

THESE OUTLINE SPECIFICATIONS IN CONJUNCTION WITH THE SPRINT STANDARD CONSTRUCTION SPECIFICATIONS, INCLUDING CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

SECTION 01 100 – SCOPE OF WORK

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE SPRINT CONSTRUCTION STANDARDS FOR WIRELESS SITES, CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

1.3 PRECEDENCE: SHOULD CONFLICTS OCCUR BETWEEN THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES INCLUDING THE STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES AND THE CONSTRUCTION DRAWINGS, INFORMATION ON THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE. NOTIFY SPRINT CONSTRUCTION MANAGER IF THIS OCCURS.

1.4 NATIONALLY RECOGNIZED CODES AND STANDARDS:

A. THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL AND LOCAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:

1. GR-63-CORE NEBS REQUIREMENTS: PHYSICAL PROTECTION
5. GR-78-CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
3. GR-1089 CORE, ELECTROMAGNETIC COMPATIBILITY AND ELECTRICAL SAFETY –GENERIC CRITERIA FOR NETWORK TELECOMMUNICATIONS EQUIPMENT.
4. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE – "NEC") AND NFPA 101 (LIFE SAFETY CODE).
5. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM)
6. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE)
7. AMERICAN CONCRETE INSTITUTE (ACI)
8. AMERICAN WIRE PRODUCERS ASSOCIATION (AWPA)
9. CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
10. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
11. PORTLAND CEMENT ASSOCIATION (PCA)
12. NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)
13. BRICK INDUSTRY ASSOCIATION (BIA)
14. AMERICAN WELDING SOCIETY (AWS)
15. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
16. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
17. DOOR AND HARDWARE INSTITUTE (DHI)
18. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
19. APPLICABLE BUILDING CODES INCLUDING UNIFORM BUILDING CODE, SOUTHERN BUILDING CODE, BOCA, AND THE INTERNATIONAL BUILDING CODE.

1.5 DEFINITIONS:

A. WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.

B. COMPANY: SPRINT CORPORATION

C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.

D. CONTRACTOR: CONSTRUCTION CONTRACTOR; CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.

E. THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.

F. OFCI: OWNER FURNISHED, CONTRACTOR INSTALLED EQUIPMENT.

G. CONSTRUCTION MANAGER – ALL PROJECTS RELATED COMMUNICATION TO FLOW THROUGH SPRINT REPRESENTATIVE IN CHARGE OF PROJECT...

1.6 SITE FAMILIARITY: CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE SPRINT CONSTRUCTION MANAGER PRIOR TO THE COMMENCEMENT OF WORK. NO COMPENSATION WILL BE AWARDED BASED ON CLAIM OF LACK OF KNOWLEDGE OR FIELD CONDITIONS.

1.7 POINT OF CONTACT: COMMUNICATION BETWEEN SPRINT AND THE CONTRACTOR SHALL FLOW THROUGH THE SINGLE SPRINT CONSTRUCTION MANAGER APPOINTED TO MANAGE THE PROJECT FOR SPRINT.

1.8 ON-SITE SUPERVISION: THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL EMPLOY A COMPETENT SUPERINTENDENT WHO SHALL BE IN ATTENDANCE AT THE SITE AT ALL TIMES DURING PERFORMANCE OF THE WORK.

1.9 DRAWINGS, SPECIFICATIONS AND DETAILS REQUIRED AT JOBSITE: THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS, STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.

A. THE JOBSITE DRAWINGS, SPECIFICATIONS AND DETAILS SHALL BE CLEARLY MARKED DAILY IN RED PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS-BUILT" DRAWINGS.

B. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK. CONTRACTOR SHALL NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY VARIATIONS PRIOR TO PROCEEDING WITH THE WORK.

C. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE. SPACING BETWEEN EQUIPMENT IS THE REQUIRED CLEARANCE. SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, EXISTING CONDITIONS AND/OR DESIGN INTENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE SPRINT CONSTRUCTION MANAGER PRIOR TO PROCEEDING WITH THE WORK.

1.10 USE OF JOB SITE: THE CONTRACTOR SHALL CONFINE ALL CONSTRUCTION AND RELATED OPERATIONS INCLUDING STAGING AND STORAGE OF MATERIALS AND EQUIPMENT, PARKING, TEMPORARY FACILITIES, AND WASTE STORAGE TO THE LEASE PARCEL UNLESS OTHERWISE PERMITTED BY THE CONTRACT DOCUMENTS.

1.11 UTILITIES SERVICES: WHERE NECESSARY TO CUT EXISTING PIPES, ELECTRICAL WIRES, CONDUITS, CABLES, ETC., OF UTILITY SERVICES, OR OF FIRE PROTECTION OR COMMUNICATIONS SYSTEMS, THEY SHALL BE CUT AND CAPPED AT SUITABLE PLACES OR WHERE SHOWN. ALL SUCH ACTIONS SHALL BE COORDINATED WITH THE UTILITY COMPANY INVOLVED:

1.12 PERMITS / FEES: WHEN REQUIRED THAT A PERMIT OR CONNECTION FEE BE PAID TO A PUBLIC UTILITY PROVIDER FOR NEW SERVICE TO THE CONSTRUCTION PROJECT, PAYMENT OF SUCH FEE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

1.13 CONTRACTOR SHALL TAKE ALL MEASURES AND PROVIDE ALL MATERIAL NECESSARY FOR PROTECTING EXISTING EQUIPMENT AND PROPERTY.

1.14 METHODS OF PROCEDURE (MOPS) FOR CONSTRUCTION: CONTRACTOR SHALL PERFORM WORK AS DESCRIBED IN THE FOLLOWING INSTALLATION AND COMMISSIONING MOPS.

NOTE: IN SHORT-FORM SPECIFICATIONS ON THE DRAWINGS, A/E TO INSERT LIST OF APPLICABLE MOPS INCLUDING EN-2012-001, EN-2013-002, EL-0568, AND TS-0193

1.15 USE OF ELECTRONIC PROJECT MANAGEMENT SYSTEMS:

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 TEMPORARY UTILITIES AND FACILITIES: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY UTILITIES AND FACILITIES NECESSARY EXCEPT AS OTHERWISE INDICATED IN THE CONSTRUCTION DOCUMENTS. TEMPORARY UTILITIES AND FACILITIES INCLUDE POTABLE WATER, HEAT, HVAC, ELECTRICITY, SANITARY FACILITIES, WASTE DISPOSAL FACILITIES, AND TELEPHONE/COMMUNICATION SERVICES. PROVIDE TEMPORARY UTILITIES AND FACILITIES IN ACCORDANCE WITH OSHA AND THE AUTHORITY HAVING JURISDICTION. CONTRACTOR MAY UTILIZE THE COMPANY ELECTRICAL SERVICE IN THE COMPLETION OF THE WORK WHEN IT BECOMES AVAILABLE. USE OF THE LESSORS OR SITE OWNER'S UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT AS OTHERWISE ALLOWED IN THE CONTRACT DOCUMENTS.

3.2 ACCESS TO WORK: THE CONTRACTOR SHALL PROVIDE ACCESS TO THE JOB SITE FOR AUTHORIZED COMPANY PERSONNEL AND AUTHORIZED REPRESENTATIVES OF THE ARCHITECT/ENGINEER DURING ALL PHASES OF THE WORK.

3.3 TESTING: REQUIREMENTS FOR TESTING BY THIS CONTRACTOR SHALL BE AS INDICATED HEREWITH, ON THE CONSTRUCTION DRAWINGS, AND IN THE INDIVIDUAL SECTIONS OF THESE SPECIFICATIONS. SHOULD COMPANY CHOOSE TO ENGAGE ANY THIRD-PARTY TO CONDUCT ADDITIONAL TESTING, THE CONTRACTOR SHALL COOPERATE WITH AND PROVIDE A WORK AREA FOR COMPANY'S TEST AGENCY.

3.4 DIMENSIONS: VERIFY DIMENSIONS INDICATED ON DRAWINGS WITH FIELD DIMENSIONS BEFORE FABRICATION OR ORDERING OF MATERIALS. DO NOT SCALE DRAWINGS.

3.5 EXISTING CONDITIONS: NOTIFY THE SPRINT CONSTRUCTION MANAGER OF EXISTING CONDITIONS DIFFERING FROM THOSE INDICATED ON THE DRAWINGS. DO NOT REMOVE OR ALTER STRUCTURAL COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL FROM THE ARCHITECT AND ENGINEER.

SECTION 01 200 – COMPANY FURNISHED MATERIAL AND EQUIPMENT

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 RECEIPT OF MATERIAL AND EQUIPMENT:

A. A COMPANY FURNISHED MATERIAL AND EQUIPMENT IS IDENTIFIED ON THE RF DATA SHEET IN THE CONSTRUCTION DOCUMENTS.

B. THE CONTRACTOR IS RESPONSIBLE FOR SPRINT PROVIDED MATERIAL AND EQUIPMENT AND UPON RECEIPT SHALL:

1 ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.

2. VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.

3. TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.

4. RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY-FOUR HOURS AFTER RECEIPT, REPORT TO SPRINT OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.

5. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.

6. COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF-LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

3.2 DELIVERABLES:

A. COMPLETE SHIPPING AND RECEIPT DOCUMENTATION IN ACCORDANCE WITH COMPANY PRACTICE.

B. IF APPLICABLE, COMPLETE LOST/STOLEN/DAMAGED DOCUMENTATION REPORT AS NECESSARY IN ACCORDANCE WITH COMPANY PRACTICE, AND AS DIRECTED BY COMPANY.

C. UPLOAD DOCUMENTATION INTO SPRINT SITE MANAGEMENT SYSTEM (SMS) AND/OR PROVIDE HARD COPY DOCUMENTATION AS REQUESTED.

SECTION 01 300 – CELL SITE CONSTRUCTION CO.

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

1.3 NOTICE TO PROCEED

A. NO WORK SHALL COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF THE WORK ORDER.

B. UPON RECEIVING NOTICE TO PROCEED, CONTRACTOR SHALL FULLY PERFORM ALL WORK NECESSARY TO PROVIDE SPRINT WITH AN OPERATIONAL WIRELESS FACILITY.

TOWER OWNER NOTIFICATION
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.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 FUNCTIONAL REQUIREMENTS:

A. THE ACTIVITIES DESCRIBED IN THIS PARAGRAPH REPRESENT MINIMUM ACTIONS AND PROCESSES REQUIRED TO SUCCESSFULLY COMPLETE THE WORK. THE ACTIVITIES DESCRIBED ARE NOT EXHAUSTIVE, AND CONTRACTOR SHALL TAKE ANY AND ALL ACTIONS AS NECESSARY TO SUCCESSFULLY COMPLETE THE CONSTRUCTION OF A FULLY FUNCTIONING WIRELESS FACILITY AT THE SITE IN ACCORDANCE WITH COMPANY PROCESSES.

B. SUBMIT SPECIFIC DOCUMENTATION AS INDICATED HEREIN, AND OBTAIN REQUIRED APPROVALS WHILE THE WORK IS BEING PERFORMED.

C. MANAGE AND CONDUCT ALL FIELD CONSTRUCTION SERVICE RELATED ACTIVITIES

D. PROVIDE CONSTRUCTION ACTIVITIES TO THE EXTENT REQUIRED BY THE CONTRACT DOCUMENTS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.

1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793

JOB NUMBER 353-000

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED
PROFESSIONAL ENGINEER

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
FOR PERMIT	5/26/14	AJD	0

SITE NAME:

WATERFORD

SITE CASCADE:

CT03XC105

SITE ADDRESS:

41 MANITOCK HILL RD
WATERFORD, CT 06385

SHEET DESCRIPTION:

SPRINT SPECIFICATIONS

SHEET NUMBER:

SP-1

CONTINUE FROM SP-1

1. PERFORM ANY REQUIRED SITE ENVIRONMENTAL MITIGATION.
2. PREPARE GROUND SITES; PROVIDE DE-GRUBBING; AND ROUGH AND FINAL GRADING, AND COMPOUND SURFACE TREATMENTS.
3. MANAGE AND CONDUCT ALL ACTIVITIES FOR INSTALLATION OF UTILITIES INCLUDING ELECTRICAL AND TELCO BACKHAUL.
4. INSTALL UNDERGROUND FACILITIES INCLUDING UNDERGROUND POWER AND COMMUNICATIONS CONDUITS, AND UNDERGROUND GROUNDING SYSTEM.
5. INSTALL ABOVE GROUND GROUNDING SYSTEMS.
6. PROVIDE NEW HVAC INSTALLATIONS AND MODIFICATIONS.
7. INSTALL "H-FRAMES", CABINETS AND SHELTERS AS INDICATED.
8. INSTALL ROADS, ACCESS WAYS, CURBS AND DRAINS AS INDICATED.
9. ACCOMPLISH REQUIRED MODIFICATION OF EXISTING FACILITIES.
10. PROVIDE ANTENNA SUPPORT STRUCTURE FOUNDATIONS.
11. PROVIDE SLABS AND EQUIPMENT PLATFORMS.
12. INSTALL COMPOUND FENCING, SIGHT SHIELDING, LANDSCAPING AND ACCESS BARRIERS.
13. PERFORM INSPECTION AND MATERIAL TESTING AS REQUIRED HEREINAFTER.
14. CONDUCT SITE RESISTANCE TO EARTH TESTING AS REQUIRED HEREINAFTER
15. INSTALL FIXED GENERATOR SETS AND OTHER STANDBY POWER SOLUTIONS.
16. INSTALL TOWERS, ANTENNA SUPPORT STRUCTURES AND PLATFORMS ON EXISTING TOWERS AS REQUIRED.
17. INSTALL CELL SITE RADIOS, MICROWAVE, GPS, COAXIAL MAINLINE, ANTENNAS, CROSS BAND COUPLERS, TOWER TOP AMPLIFIERS, LOW NOISE AMPLIFIERS AND RELATED EQUIPMENT.
18. PERFORM, DOCUMENT, AND CLOSE OUT ANY CONSTRUCTION CONTROL DOCUMENTS THAT MAY BE REQUIRED BY GOVERNMENT AGENCIES AND LANDLORDS.
19. PERFORM ANTENNAL AND COAX SWEEP TESTING AND MAKE ANY AND ALL NECESSARY CORRECTIONS.
20. REMAIN ON SITE MOBILIZED THROUGHOUT HAND-OFF AND INTEGRATION TO ASSIST AS NEEDED UNTIL SITE IS DEEMED SUBSTANTIALLY COMPLETE AND PLACED "ON AIR."

3.2 GENERAL REQUIREMENTS FOR CIVIL CONSTRUCTION:

A. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.

B. EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.

C. CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.

1. IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY COMPANY IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
2. CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.

D. CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION

E. CONDUCT TESTING AS REQUIRED HEREIN.

3.3 DELIVERABLES:

A. CONTRACTOR SHALL REVIEW, APPROVE, AND SUBMIT TO SPRINT SHOP DRAWINGS, PRODUCT DATA, SAMPLES, AND SIMILAR SUBMITTALS AS REQUIRED HEREINAFTER

B. PROVIDE DOCUMENTATION INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING. DOCUMENTATION SHALL BE FORWARDED IN ORIGINAL FORMAT AND/OR UPLOADED INTO SMS.

1. ALL CORRESPONDENCE AND PRELIMINARY CONSTRUCTION REPORTS.
2. PROJECT PROGRESS REPORTS.
3. CIVIL CONSTRUCTION START DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
4. ELECTRICAL SERVICE COMPLETION DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
5. LINES AND ANTENNA INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
6. POWER INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
7. TELCO READY DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
8. PPC (OR SHELTER) INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
9. TOWER CONSTRUCTION START DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
10. TOWER CONSTRUCTION COMPLETE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
11. BTS AND RADIO EQUIPMENT DELIVERED AT SITE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
12. NETWORK OPERATIONS HANDOFF CHECKLIST (HOC WALK) COMPLETE (UPLOAD FORM IN SMS)
13. CIVIL CONSTRUCTION COMPLETE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
14. SITE CONSTRUCTION PROGRESS PHOTOS UNLOADED INTO SMS.

SECTION 01 400 – SUBMITTALS & TESTS

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

1.3 SUBMITTALS:

A. THE WORK IN ALL ASPECTS SHALL COMPLY WITH THE CONSTRUCTION DRAWINGS AND THESE SPECIFICATIONS.

B. SUBMIT THE FOLLOWING TO COMPANY REPRESENTATIVE FOR APPROVAL.

1. CONCRETE MIX-DESIGNS FOR TOWER FOUNDATIONS, ANCHORS PIERS, AND CONCRETE PAVING.
2. CONCRETE BREAK TESTS AS SPECIFIED HEREIN.
3. SPECIAL FINISHES FOR INTERIOR SPACES, IF ANY.
4. ALL EQUIPMENT AND MATERIALS SO IDENTIFIED ON THE CONSTRUCTION DRAWINGS.
5. CHEMICAL GROUNDING DESIGN

D. ALTERNATES: AT THE COMPANY'S REQUEST, ANY ALTERNATIVES TO THE MATERIALS OR METHODS SPECIFIED SHALL BE SUBMITTED TO SPRINT'S CONSTRUCTION MANAGER FOR APPROVAL PRIOR TO BEING SHIPPED TO SITE. SPRINT WILL REVIEW AND APPROVE ONLY THOSE REQUESTS MADE IN WRITING. NO VERBAL APPROVALS WILL BE CONSIDERED. SUBMITTAL FOR APPROVAL SHALL INCLUDE A STATEMENT OF COST REDUCTION PROPOSED FOR USE OF ALTERNATE PRODUCT.

1.4 TESTS AND INSPECTIONS:

A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTIONS AND PROJECT DOCUMENTATION.

B. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

1. COAX SWEEPS AND FIBER TESTS PER TS-0200 REV 4 ANTENNA LINE ACCEPTANCE STANDARDS.
2. AGL, AZIMUTH AND DOWNTILT USING ELECTRONIC COMMERCIAL MADE-FOR-THE-PURPOSE ANTENNA ALIGNMENT TOOL.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.

C. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING;

1. AZIMUTH, DOWNTILT, AGL – UPLOAD REPORT FROM ANTENNA ALIGNMENT TOOL TO SITERRA TASK 465. INSTALLED AZIMUTH, DOWNTILT, AND AGL MUST CONFORM TO THE RF DATA SHEETS. SWEEP AND FIBER TESTS
2. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT
3. ALL AVAILABLE JURISDICTIONAL INFORMATION
4. PDF SCAN OF REDLINES PRODUCED IN FIELD
5. ELECTRONIC AS-BUILT DRAWINGS IN AUTOCAD AND PDF FORMATS. ANY FIELD CHANGE MUST BE REFLECTED BY MODIFYING THE PLANS, ELEVATIONS, AND DETAILS IN THE DRAWING SETS. GENERAL NOTES INDICATING MODIFICATIONS WILL NOT BE ACCEPTED. CHANGES SHALL BE HIGHLIGHTED AS "CLOUDS" IDENTIFIED AS THE "AS-BUILT" CONDITION.
6. LIEN WAIVERS
7. FINAL PAYMENT APPLICATION
8. REQUIRED FINAL CONSTRUCTION PHOTOS
9. CONSTRUCTION AND COMMISSIONING CHECKLIST COMPLETE WITH NO DEFICIENT ITEMS
10. ALL POST NTP TASKS INCLUDING DOCUMENT UPLOADS COMPLETED IN SITERRA (SPRINTS DOCUMENT REPOSITORY OF RECORD).

1.5 COMMISSIONING: PERFORM ALL COMMISSIONING AS REQUIRED BY APPLICABLE MOPs

1.6 INTEGRATION: PERFORM ALL INTEGRATION ACTIVITIES AS REQUIRED BY APPLICABLE MOPs

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 REQUIREMENTS FOR TESTING:

A. THIRD PARTY TESTING AGENCY:

1. WHEN THE USE OF A THIRD PARTY INDEPENDENT TESTING AGENCY IS REQUIRED, THE AGENCY THAT IS SELECTED MUST PERFORM SUCH WORK ON A REGULAR BASIS IN THE STATE WHERE THE PROJECT IS LOCATED AND HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.
2. THE THIRD PARTY TESTING AGENCY IS TO BE FAMILIAR WITH THE APPLICABLE REQUIREMENTS FOR THE TESTS TO BE DONE, EQUIPMENT TO BE USED, AND ASSOCIATED HEALTH AND SAFETY ISSUES.
3. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASJTO, AND OTHER METHODS IS NEEDED.
4. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASJTO, AND OTHER METHODS IS NEEDED.

3.2 REQUIRED TESTS:

A. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

1. CONCRETE CYLINDER BREAK TESTS FOR THE TOWER AND ANCHOR FOUNDATIONS AS SPECIFIED IN SECTION: PORTLAND CEMENT CONCRETE PAVING.
2. ASPHALT ROADWAY COMPACTED THICKNESS, SURFACE SMOOTHNESS, AND COMPACTED DENSITY TESTING AS SPECIFIED IN SECTION: HOT MIX ASPHALT PAVING.
3. FIELD QUALITY CONTROL TESTING AS SPECIFIED IN SECTION: PORTLAND CEMENT CONCRETE PAVING.
4. TESTING REQUIRED UNDER SECTION: AGGREGATE BASE FOR ACCESS ROADS, PADS AND ANCHOR LOCATIONS
5. STRUCTURAL BACKFILL COMPACTION TESTS FOR THE TOWER FOUNDATION.
6. SITE RESISTANCE TO EARTH TESTING PER EXHIBIT: CELL SITE GROUNDING SYSTEM DESIGN.
7. ANTENNA AND COAX SWEEP TESTS PER EXHIBIT: ANTENNA TRANSMISSION LINE ACCEPTANCE STANDARDS.
8. GROUNDING AT ANTENNA MASTS FOR GPS AND ANTENNAS
9. ALL OTHER TESTS REQUIRED BY COMPANY OR JURISDICTION.

3.3 REQUIRED INSPECTIONS

A. SCHEDULE INSPECTIONS WITH COMPANY REPRESENTATIVE.

B. CONDUCT INSPECTIONS INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

1. GROUNDING SYSTEM INSTALLATION PRIOR TO EARTH CONCEALMENT DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
2. FORMING FOR CONCRETE AND REBAR PLACEMENT PRIOR TO POUR DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
3. COMPACTION OF BACKFILL MATERIALS; AGGREGATE BASE FOR ROADS, PADS, AND ANCHORS; ASPHALT PAVING; AND SHAFT BACKFILL FOR CONCRETE AND WOOD POLES, BY INDEPENDENT THIRD PARTY AGENCY.
4. PRE- AND POST-CONSTRUCTION ROOFTOP AND STRUCTURAL INSPECTIONS ON EXISTING FACILITIES.
5. TOWER ERECTION SECTION STACKING AND PLATFORM ATTACHMENT DOCUMENTED BY DIGITAL PHOTOGRAPHS BY THIRD PARTY AGENCY.
6. ANTENNA AZIMUTH , DOWN TILT AND PER SUNLIGHT TOOL SUNSIGHT INSTRUMENTS – ANTENNALIGN ALIGNMENT TOOL (AAT)

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.

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Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793

JOB NUMBER 353-000

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
FOR PERMIT	6/26/14	AJD	0

SITE NAME:

WATERFORD

SITE CASCADE:

CT03XC105

SITE ADDRESS:

41 MANITOCK HILL RD
WATERFORD, CT 06385

SHEET DESCRIPTION:

SPRINT SPECIFICATIONS

SHEET NUMBER:

SP-2

CONTINUE FROM SP-2

7. VERIFICATION DOCUMENTED WITH THE ANTENNA CHECKLIST REPORT, BY A&E, SITE DEVELOPMENT REP, OR RF REP.
8. FINAL INSPECTION CHECKLIST AND HANDOFF WALK (HOC.). SIGNED FORM SHOWING ACCEPTANCE BY FIELD OPS IS TO BE UPLOADED INTO SMS.
9. COAX SWEEP AND FIBER TESTING DOCUMENTS SUBMITTED VIA SMS FOR RF APPROVAL.
10. SCAN-ABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT
11. ALL AVAILABLE JURISDICTIONAL INFORMATION
12. PDF SCAN OF REDLINES PRODUCED IN FIELD

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.

D. CONSTRUCTION INSPECTIONS AND CORRECTIVE MEASURES SHALL BE DOCUMENTED BY THE CONTRACTOR WITH WRITTEN REPORTS AND PHOTOGRAPHS. PHOTOGRAPHS MUST BE DIGITAL AND OF SUFFICIENT QUALITY TO CLEARLY SHOW THE SITE CONSTRUCTION. PHOTOGRAPHS MUST CLEARLY IDENTIFY THE PHOTOGRAPHED ITEM AND BE LABELED WITH THE SITE CASCADE NUMBER, SITE NAME, DESCRIPTION, AND DATE.

3.4 DELIVERABLES: TEST AND INSPECTION REPORTS AND CLOSEOUT DOCUMENTATION SHALL BE UPLOADED TO THE SMS AND/OR FORWARDED TO SPRINT FOR INCLUSION INTO THE PERMANENT SITE FILES.

A. THE FOLLOWING TEST AND INSPECTION REPORTS SHALL BE PROVIDED AS APPLICABLE.

1. CONCRETE MIX AND CYLINDER BREAK REPORTS.
2. STRUCTURAL BACKFILL COMPACTION REPORTS.
3. SITE RESISTANCE TO EARTH TEST.
4. ANTENNA AZIMUTH AND DOWN TILT VERIFICATION
5. TOWER ERECTION INSPECTIONS AND MEASUREMENTS DOCUMENTING TOWER INSTALLED PER SUPPLIER'S REQUIREMENTS AND THE APPLICABLE SECTIONS HEREIN.
6. COAX CABLE SWEEP TESTS PER COMPANY'S "ANTENNA LINE ACCEPTANCE STANDARDS".

B. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES THE FOLLOWING;

1. TEST WELLS AND TRENCHES: PHOTOGRAPHS OF ALL TEST WELLS; PHOTOGRAPHS SHOWING ALL OPEN EXCAVATIONS AND TRENCHING PRIOR TO BACKFILLING SHOWING A TAPE MEASURE VISIBLE IN THE EXCAVATIONS INDICATING DEPTH.
2. CONDUITS, CONDUCTORS AND GROUNDING: PHOTOGRAPHS SHOWING TYPICAL INSTALLATION OF CONDUCTORS AND CONNECTORS; PHOTOGRAPHS SHOWING TYPICAL BEND RADIUS OF INSTALLED GROUND WIRES AND GROUND ROD SPACING;
3. CONCRETE FORMS AND REINFORCING: CONCRETE FORMING AT TOWER AND EQUIPMENT/SHELTER PAD/FOUNDATIONS – PHOTOGRAPHS SHOWING ALL REINFORCING STEEL, UTILITY AND CONDUIT STUB OUTS; PHOTOGRAPHS SHOWING CONCRETE POUR OF SHELTER SLAB/FOUNDATION, TOWER FOUNDATION AND GUY ANCHORS WITH VIBRATOR IN USE; PHOTOGRAPHS SHOWING EACH ANCHOR ON GUYED TOWERS, BEFORE CONCRETE POUR.
4. TOWER, ANTENNAS AND MAINLINE: INSPECTION AND PHOTOGRAPHS OF SECTION STACKING; INSPECTION AND PHOTOGRAPHS OF PLATFORM COMPONENT ATTACHMENT POINTS; PHOTOGRAPHS OF TOWER TOP GROUNDING; PHOTOS OF TOWER COAX LINE COLOR CODING AT THE TOP AND AT GROUND LEVEL; INSPECTION AND PHOTOGRAPHS OF OPERATIONAL OF TOWER LIGHTING, AND PLACEMENT OF FAA REGISTRATION SIGN; PHOTOGRAPHS SHOWING ADDITIONAL GROUNDING POINTS FOR TOWERS GREATER THAN 200 FEET.; PHOTOS OF ANTENNA GROUND BAR, EQUIPMENT GROUND BAR, AND MASTER GROUND BAR; PHOTOS OF GPS ANTENNA(S); PHOTOS OF EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA; PHOTOS OF COAX WEATHERPROOFING – TOP AND BOTTOM; PHOTOS OF COAX GROUNDING--TOP AND BOTTOM; PHOTOS OF ANTENNA AND MAST GROUNDING; PHOTOS OF COAX CABLE ENTRY INTO SHELTER; PHOTOS OF PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.
5. ROOF TOPS: PRE-CONSTRUCTION AND POST-CONSTRUCTION VISUAL INSPECTION AND PHOTOGRAPHS OF THE ROOF AND INTERIOR TO DETERMINE AND DOCUMENT CONDITIONS; ROOF TOP CONSTRUCTION INSPECTIONS AS REQUIRED BY THE JURISDICTION; PHOTOGRAPHS OF CABLE TRAY AND/OR ICE BRIDGE; PHOTOGRAPHS OF DOGHOUSE/CABLE EXIT FROM ROOF;
6. SITE LAYOUT – PHOTOGRAPHS OF THE OVERALL COMPOUND, INCLUDING EQUIPMENT PLATFORM FROM ALL FOUR CORNERS.
7. FINISHED UTILITIES: CLOSE-UP PHOTOGRAPHS OF THE PPC BREAKER PANEL; CLOSE-UP PHOTOGRAPH OF THE INSIDE OF THE TELCO PANEL AND NIU; CLOSE-UP PHOTOGRAPH OF THE POWER METER AND DISCONNECT; PHOTOS OF POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE; PHOTOGRAPHS AT METER BOX AND/OR FACILITY DISTRIBUTION PANEL.
8. REQUIRED MATERIALS CERTIFICATIONS: CONCRETE MIX DESIGNS; MILL CERTIFICATION FOR ALL REINFORCING AND STRUCTURAL STEEL; AND ASPHALT PAVING MIX DESIGN.
9. ANY AND ALL SUBMITTALS BY THE JURISDICTION OR COMPANY.

SECTION 01 400 – SUBMITTALS & TESTS

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 WEEKLY REPORTS:

A. CONTRACTOR SHALL PROVIDE SPRINT WITH WEEKLY REPORTS SHOWING PROJECT STATUS. THIS STATUS REPORT FORMAT WILL BE PROVIDED TO THE CONTRACTOR BY SPRINT. THE REPORT WILL CONTAIN SITE ID NUMBER, THE MILESTONES FOR EACH SITE, INCLUDING THE BASELINE DATE, ESTIMATED COMPLETION DATE AND ACTUAL COMPLETION DATE.

B. REPORT INFORMATION WILL BE TRANSMITTED TO SPRINT VIA ELECTRONIC MEANS AS REQUIRED. THIS INFORMATION WILL PROVIDE A BASIS FOR PROGRESS MONITORING AND PAYMENT.

3.2 PROJECT CONFERENCE CALLS:

A. SPRINT MAY HOLD WEEKLY PROJECT CONFERENCE CALLS. CONTRACTOR WILL BE REQUIRED TO COMMUNICATE SITE STATUS, MILESTONE COMPLETIONS AND UPCOMING MILESTONE PROJECTIONS, AND ANSWER ANY OTHER SITE STATUS QUESTIONS AS NECESSARY.

3.3 PROJECT TRACKING IN SMS:

A. CONTRACTOR SHALL PROVIDE SCHEDULE UPDATES AND PROJECTIONS IN THE SMS SYSTEM ON A WEEKLY BASIS.

3.4 ADDITIONAL REPORTING:

A. ADDITIONAL OR ALTERNATE REPORTING REQUIREMENTS MAY BE ADDED TO THE REPORT AS DETERMINED TO BE REASONABLY NECESSARY BY COMPANY.

3.5 PROJECT PHOTOGRAPHS:

A. FILE DIGITAL PHOTOGRAPHS OF COMPLETED SITE IN JPEG FORMAT IN THE SMS PHOTO LIBRARY FOR THE RESPECTIVE SITE. PHOTOGRAPHS SHALL BE CLEARLY LABELED WITH SITE NUMBER, NAME AND DESCRIPTION, AND SHALL INCLUDE AT A MINIMUM THE FOLLOWING AS APPLICABLE:

1. 1SHELTER AND TOWER OVERVIEW.
2. TOWER FOUNDATION(S) – FORMS AND STEEL BEFORE POUR (EACH ANCHOR ON GUYED TOWERS).
3. TOWER FOUNDATION(S) POUR WITH VIBRATOR IN USE (EACH ANCHOR ON GUYED TOWERS).
4. TOWER STEEL AS BEING INSTALLED INTO HOLE (SHOW ANCHOR STEEL ON GUYED TOWERS).
5. PHOTOS OF TOWER SECTION STACKING.
6. CONCRETE TESTING / SAMPLES.
7. PLACING OF ANCHOR BOLTS IN TOWER FOUNDATION.
8. BUILDING/WATER TANK FROM ROAD FOR TENANT IMPROVEMENTS OR COMMENTS.
9. SHELTER FOUNDATION--FORMS AND STEEL BEFORE POURING.
10. SHELTER FOUNDATION POUR WITH VIBRATOR IN USE.
11. COAX CABLE ENTRY INTO SHELTER.
12. PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.
13. ROOFTOP PRE AND POST CONSTRUCTION PHOTOS TO INCLUDE PENETRATIONS AND INTERIOR CEILING.
14. PHOTOS OF TOWER TOP COAX LINE COLOR CODING AND COLOR CODING AT GROUND LEVEL.
15. PHOTOS OF ALL APPROPRIATE COMPANY OR REGULATORY SIGNAGE.
16. PHOTOS OF EQUIPMENT BOLT DOWN INSIDE SHELTER.
17. POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE AND POWER AND TELCO SUPPLY LOCATIONS INCLUDING METER/DISCONNECT.
18. ELECTRICAL TRENCH(S) WITH ELECTRICAL / CONDUIT BEFORE BACKFILL.
19. ELECTRICAL TRENCH(S) WITH FOIL-BACKED TAPE BEFORE FURTHER BACKFILL.
20. TELCO TRENCH WITH TELEPHONE / CONDUIT BEFORE BACKFILL.
21. TELCO TRENCH WITH FOIL-BACKED TAPE BEFORE FURTHER BACKFILL.
22. SHELTER GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).
23. TOWER GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).
24. FENCE GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).
25. ALL BTS GROUND CONNECTIONS.
26. ALL GROUND TEST WELLS.
27. ANTENNA GROUND BAR AND EQUIPMENT GROUND BAR.
28. ADDITIONAL GROUNDING POINTS ON TOWERS ABOVE 200'.
29. HVAC UNITS INCLUDING CONDENSERS ON SPLIT SYSTEMS.
30. GPS ANTENNAS.
31. CABLE TRAY AND/OR WAVEGUIDE BRIDGE.
32. DOGHOUSE/CABLE EXIT FROM ROOF.
33. EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA.
34. MASTER BUS BAR.
35. TELCO BOARD AND NIU.
36. ELECTRICAL DISTRIBUTION WALL.
37. CABLE ENTRY WITH SURGE SUPPRESSION.
38. ENTRANCE TO EQUIPMENT ROOM.
39. COAX WEATHERPROOFING-TOP AND BOTTOM OF TOWER.
40. COAX GROUNDING -TOP AND BOTTOM OF TOWER.
41. ANTENNA AND MAST GROUNDING.
42. LANDSCAPING – WHERE APPLICABLE.

3.6 FINAL PROJECT ACCEPTANCE: COMPLETE ALL REQUIRED REPORTING TASKS PER CONTRACT, CONTRACT DOCUMENTS OR THE SPRINT INTEGRATED CONSTRUCTION STANDARDS FOR WIRELESS SITES AND UPLOAD INTO SITERRA.

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.

1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793

JOB NUMBER 353-000

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED
PROFESSIONAL ENGINEER

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
FOR PERMIT	6/26/14	AJD	0

SITE NAME:

WATERFORD

SITE CASCADE:

CT03XC105

SITE ADDRESS:

41 MANITOCK HILL RD
WATERFORD, CT 06385

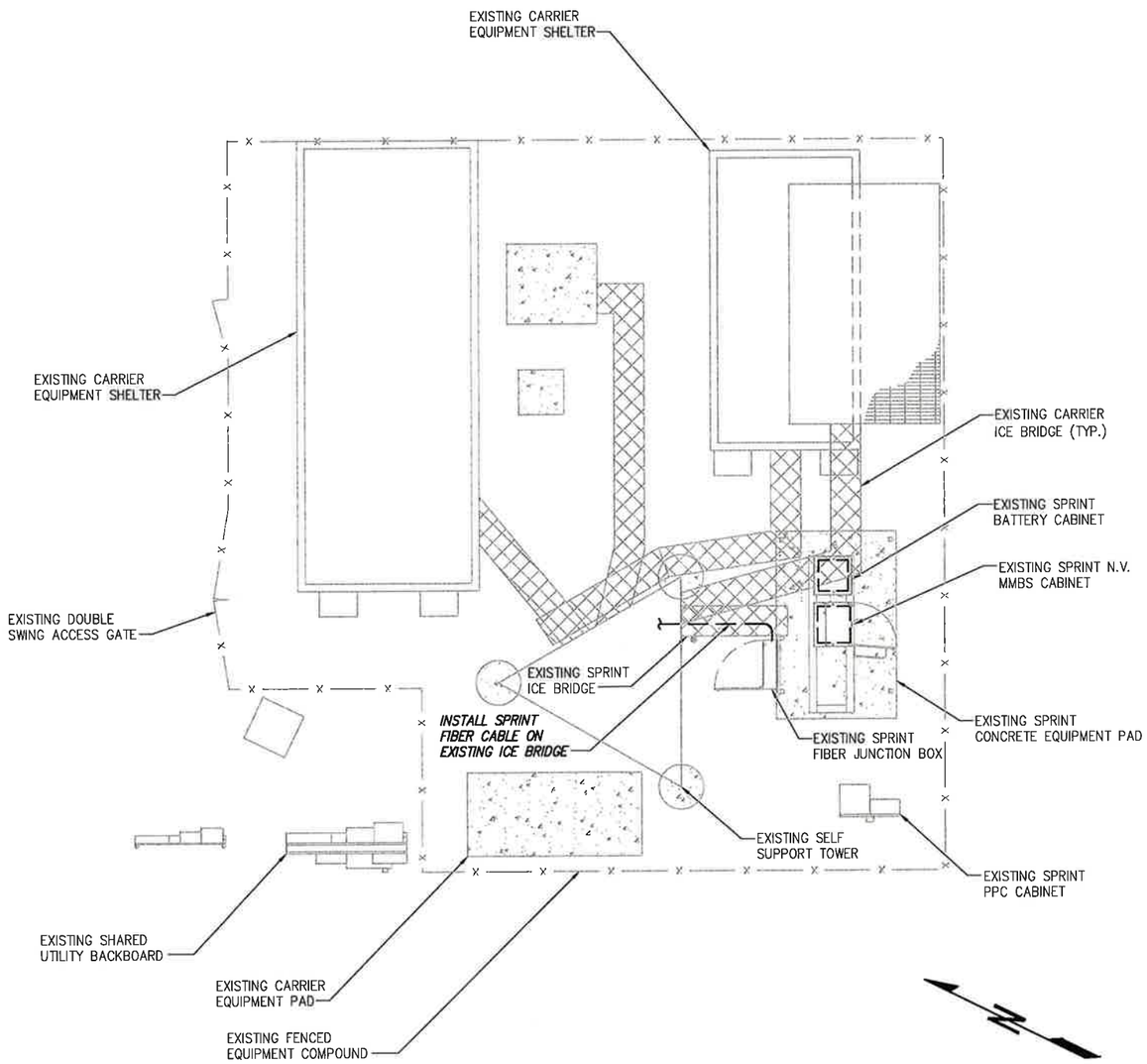
SHEET DESCRIPTION:

SPRINT SPECIFICATIONS

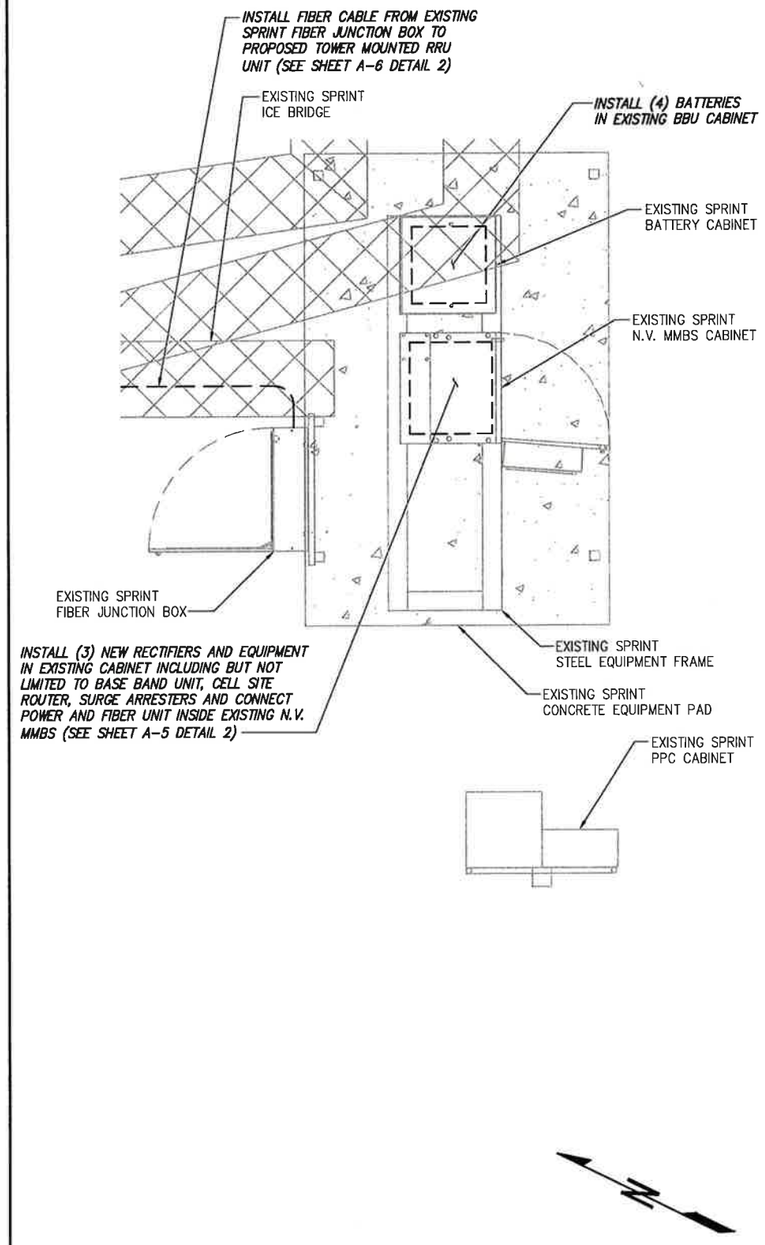
SHEET NUMBER:

SP-3

INFORMATION CONTAINED WITHIN DRAWINGS ARE BASED ON PROVIDED INFORMATION AND ARE NOT THE RESULT OF A FIELD SURVEY.



OVERALL SITE PLAN | SCALE: AS NOTED | 1



SPRINT EQUIPMENT PLAN | SCALE: AS NOTED | 2

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.

1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793

JOB NUMBER 353-000

MLA PARTNER:

CROWN CASTLE

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STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
FOR PERMIT	6/26/14	AJD	0

SITE NAME:

WATERFORD

SITE CASCADE:

CT03XC105

SITE ADDRESS:

41 MANITOCK HILL RD
WATERFORD, CT 06385

SHEET DESCRIPTION:

SITE PLAN

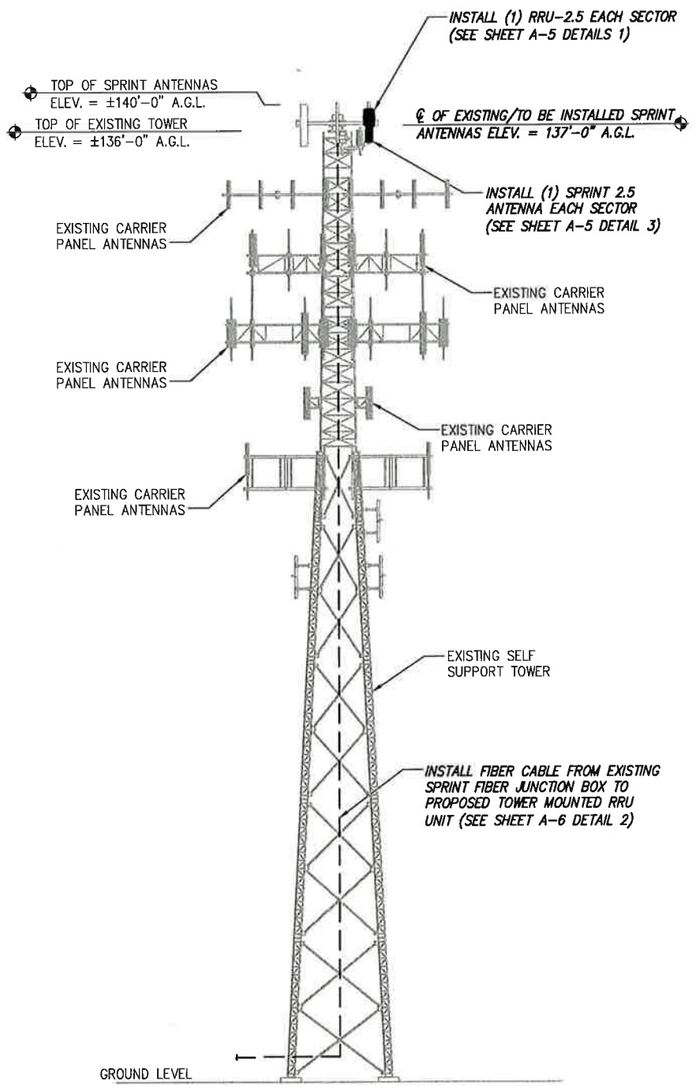
SHEET NUMBER:

A-1

NOTE:
SPRINT TOWER TOP WORK CONTINGENT ON FOLLOWING: COMPLETION OF STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE, COMPLETION OF ANTENNA/RRU MOUNTING ASSESSMENT (PROVIDED BY AE)

NOTE:
INFINIGY ENGINEERING HAS NOT EVALUATED THE EXISTING TOWER OR MOUNT FOR THIS SITE, AND ASSUMES NO RESPONSIBILITY FOR ITS STRUCTURAL INTEGRITY. REFER TO STRUCTURAL ANALYSIS BY OTHERS PRIOR TO ANY CONSTRUCTION.

NOTE:
SEE DETAIL 2 ON A-3 FOR ANTENNA LAYOUT



TOWER ELEVATION | NO SCALE | 1

DETAIL NOT USED | NO SCALE | 2

DETAIL NOT USED | NO SCALE | 3

DETAIL NOT USED | NO SCALE | 4

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JOHN S. STEVENS
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LICENSED PROFESSIONAL ENGINEER

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
FOR PERMIT	6/26/14	AJD	0

SITE NAME:

WATERFORD

SITE CASCADE:

CT03XC105

SITE ADDRESS:

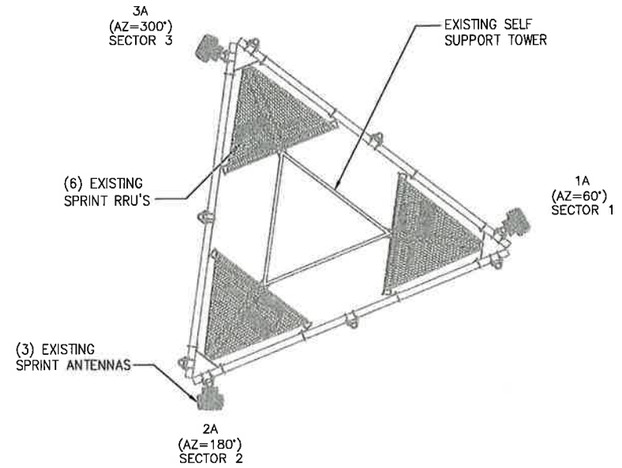
41 MANITOCK HILL RD
WATERFORD, CT 06385

SHEET DESCRIPTION:

TOWER ELEVATION & CABLE PLAN

SHEET NUMBER:

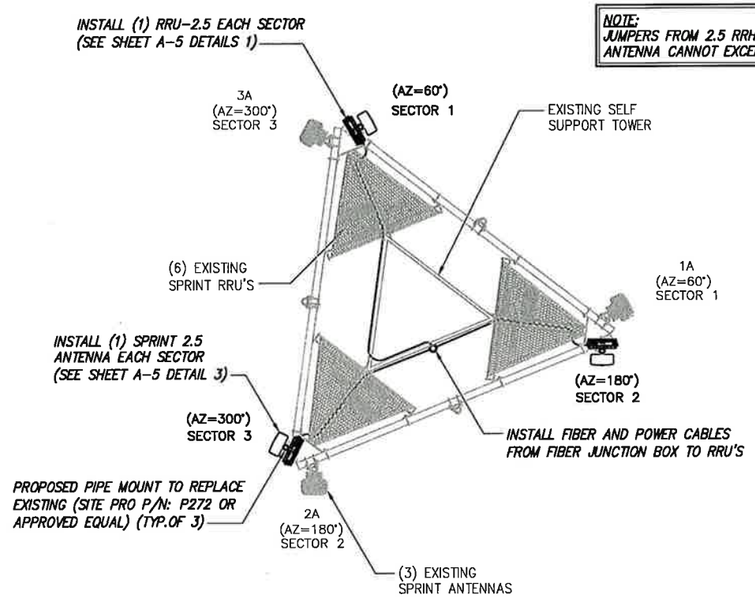
A-2



EXISTING ANTENNA & RRU LAYOUT | NO SCALE | 1

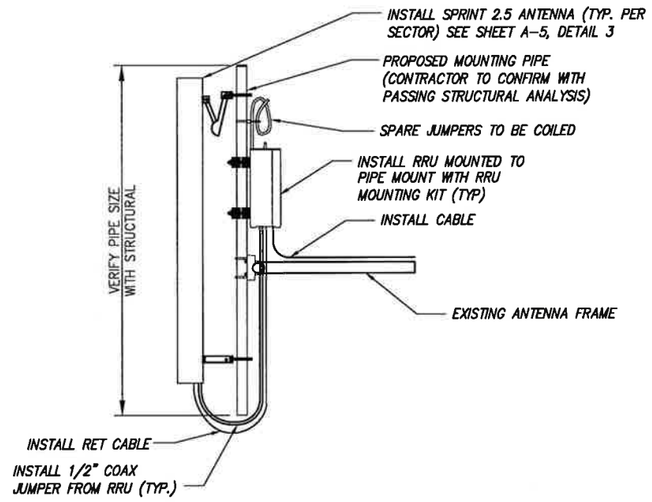
THE CONFIGURATION PLANS ARE BASED ON PROVIDED INFORMATION AND ARE FOR CONCEPTUAL PURPOSES ONLY. CONTRACTOR TO VERIFY FIELD CONDITIONS PRIOR TO CONSTRUCTION.

NOTE:
JUMPERS FROM 2.5 RRH TO THE 2.5 ANTENNA CANNOT EXCEED 15 FEET



FINAL ANTENNA LAYOUT | NO SCALE | 2

DETAIL NOT USED | NO SCALE | 3



NOTES:

1. CUT DC CONDUCTORS TO LENGTH.
2. COIL FIBER CABLE AND SECURE AT SIDE OF RRU.
3. DO NO EXCEED BEND RADIUS.

NOTE:
CONTRACTOR TO POSITION RRU ON MOUNT BEHIND ANTENNA SUCH THAT THE RRU DOES NOT INTERFERE WITH THE EXISTING PLATFORM/T-ARM MOUNTING HARDWARE.

NOTE:
SPARE DC CABLES ARE COILED UP ON NV RRHS AT SPRINT ARRAY. THESE ARE TO BE USED TO POWER UP THE 2.5 RRHS AND TIED INTO EXISTING DC BREAKERS INSIDE THE FIBER JUNCTION BOX LOCATED AT EQUIPMENT.

NOTE:
THE DIAGRAM IS FOR CONCEPTUAL PURPOSES ONLY. CONTRACTOR IS TO REFER TO PASSING STRUCTURAL ANALYSIS FOR ANTENNA AND RRU MOUNTING DETAILS

TYPICAL ANTENNA & RRU MOUNTING DETAILS | NO SCALE | 4

PLANS PREPARED FOR:

Sprint
6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.
1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793

JOB NUMBER 353-000

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT
REED S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
FOR PERMIT	6/26/14	AJD	0

SITE NAME:

WATERFORD

SITE CASCADE:

CT03XC105

SITE ADDRESS:

41 MANITOCK HILL RD
WATERFORD, CT 06385

SHEET DESCRIPTION:

ANTENNA LAYOUT
& MOUNTING DETAILS

SHEET NUMBER:

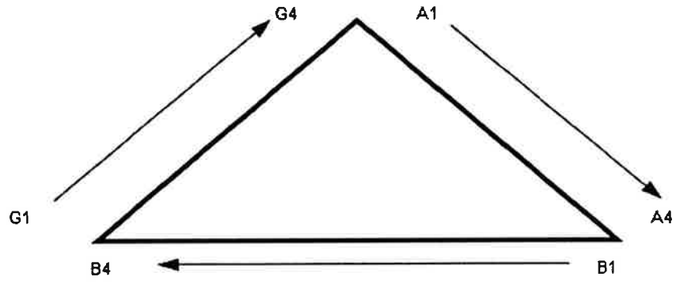
A-3

NV CABLES			
BAND	INDICATOR	PORT	COLOR
800-1	YEL GRN	NV-1	GRN
1900-1	YEL RED	NV-2	BLU
1900-2	YEL BRN	NV-3	BRN
1900-3	YEL BLU	NV-4	WHT
1900-4	YEL SLT	NV-5	RED
800-2	YEL ORG	NV-6	SLT
SPARE	YEL WHT	NV-7	PPL
2500	YEL PPL	NV-8	ORG

HYBRID	
HYBRID	COLOR
1	GRN
2	BLU
3	BRN
4	WHT
5	RED
6	SLT
7	PPL
8	ORG

2.5 Band		
2500 Radio 1		COLOR
YEL	WHT	GRN
YEL	WHT	BLU
YEL	WHT	BRN
YEL	WHT	WHT
YEL	WHT	RED
YEL	WHT	SLT
YEL	WHT	PPL
YEL	WHT	ORG

Figure 1: Antenna Orientation



NOTES:

1. ALL CABLES SHALL BE MARKED WITH 2" WIDE, UV STABILIZED, UL APPROVED TAPE.

2. THE FIRST RING SHALL BE CLOSEST TO THE END OF THE CABLE AND SPACED APPROXIMATELY 2" FROM THE END CONNECTOR, WEATHERPROOFING, OR BREAK-OUT CYLINDER. THERE SHALL BE A 1" SPACE BETWEEN EACH RING FOR THE CABLE IDENTIFIER, AND NO SPACES BETWEEN THE FREQUENCY BANDS.

3. A 2" GAP SHALL SEPARATE THE CABLE COLOR CODE FROM THE FREQUENCY COLOR CODE. THE 2" COLOR RINGS FOR THE FREQUENCY CODE SHALL BE PLACED NEXT TO EACH OTHER WITH NO SPACES.

4. THE 2" COLORED TAPE(S) SHALL EACH BE WRAPPED A MINIMUM OF 3 TIMES AROUND THE INDIVIDUAL CABLES, AND THE TAPE SHALL BE KEPT IN THE SAME LOCATION AS MUCH AS POSSIBLE.

5. SITES WITH MORE THAN FOUR (4) SECTORS WILL REQUIRE ADDITIONAL RINGS FOR EACH SECTOR, FOLLOWING THE PATTERN. HIGH CAPACITY SITES WILL USE THE NEXT COLOR IN THE SEQUENCE FOR ADDITIONAL CABLES IN EACH SECTOR.

6. HYBRID FIBER CABLE SHALL BE SECTOR IDENTIFIED INSIDE THE CABINET ON FREQUENCY BUNDLES, ON THE SEALTITE, ON THE MAIN LINE UPON EXIT OF SEALTITE, AND BEFORE AND AFTER THE BREAKOUT UNIT (MEDUSA), AS WELL AS BEFORE AND AFTER ANY ENTRANCE OR EXIT.

7. HFC "MAIN TRUNK" WILL NOT BE MARKED WITH THE FREQUENCY CODES, AS IT CONTAINS ALL FREQUENCIES.

8. INDIVIDUAL POWER PAIRS AND FIBER BUNDLES SHALL BE LABELED WITH BOTH THE CABLE AND FREQUENCY.

Sector	Cable	First Ring	Second Ring	Third Ring
1 Alpha	1	Green	No Tape	No Tape
1	2	Blue	No Tape	No Tape
1	3		No Tape	No Tape
1	4	White	No Tape	No Tape
1	5	Red	No Tape	No Tape
1	6	Grey	No Tape	No Tape
1	7	Purple	No Tape	No Tape
1	8	Orange	No Tape	No Tape
2 Beta	1	Green	Green	No Tape
2	2	Blue	Blue	No Tape
2	3			No Tape
2	4	White	White	No Tape
2	5	Red	Red	No Tape
2	6	Grey	Grey	No Tape
2	7	Purple	Purple	No Tape
2	8	Orange	Orange	No Tape
3 Gamma	1	Green	Green	Green
3	2	Blue	Blue	Blue
3	3			
3	4	White	White	White
3	5	Red	Red	Red
3	6	Grey	Grey	Grey
3	7	Purple	Purple	Purple
3	8	Orange	Orange	Orange

NV FREQUENCY	INDICATOR	ID
800-1	YEL	GRN
1900-1	YEL	RED
1900-2	YEL	BRN
1900-3	YEL	BLU
1900-4	YEL	SLT
800-1	YEL	ORG
RESERVED	YEL	WHT
RESERVED	YEL	PPL

2.5 FREQUENCY	INDICATOR		ID
2500 -1	YEL	WHT	GRN
2500 -2	YEL	WHT	RED
2500 -3	YEL	WHT	BRN
2500 -4	YEL	WHT	BLU
2500 -5	YEL	WHT	SLT
2500 -6	YEL	WHT	ORG
2500 -7	YEL	WHT	WHT
2500 -8	YEL	WHT	PPL

Example – Sector 2, Cable 2, 800mhz Radio #1

Example – Sector 3, Cable 1, 1900mhz Radio #1

Example – Sector 1, Cable 4, 800 mhz Radio #1 and 1900mhz Radio #1

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JOB NUMBER 353-000

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED
PROFESSIONAL ENGINEER

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SITE NAME:

WATERFORD

SITE CASCADE:

CT03XC105

SITE ADDRESS:

41 MANITOCK HILL RD
WATERFORD, CT 06385

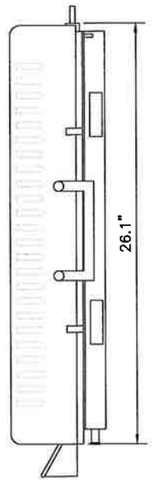
SHEET DESCRIPTION:

COLOR CODING AND NOTES

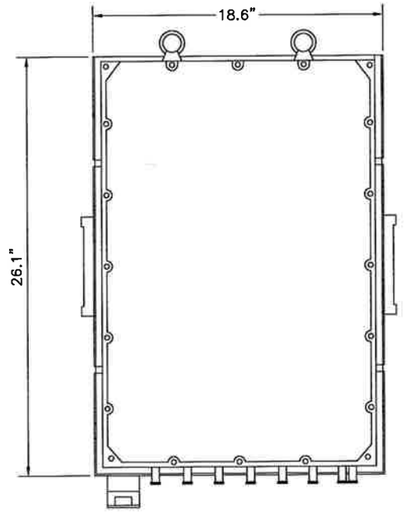
SHEET NUMBER:

A-4

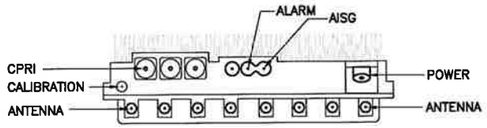
RRU: ALCATEL LUCENT TD-RRH8X20
COLOR: LIGHT GREY
WEIGHT: 70 LBS.



SIDE VIEW



FRONT VIEW

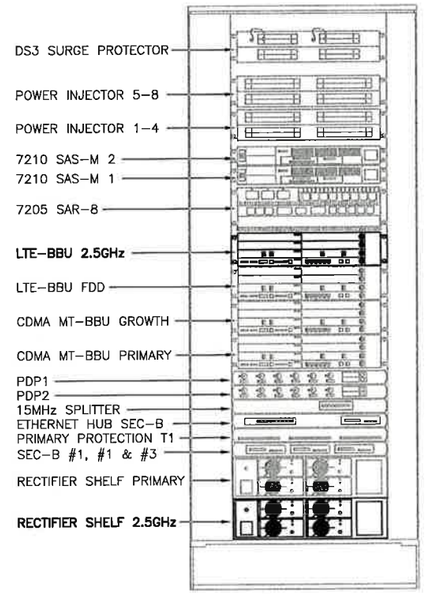


PLAN VIEW

NOTES

COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRU'S RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING. DO NOT OPEN RRU PACKAGES IN THE RAIN

2.5 RRU | NO SCALE | 1

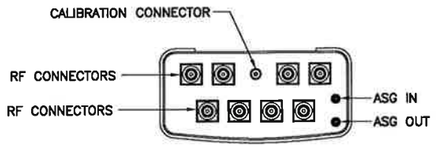


FRONT VIEW

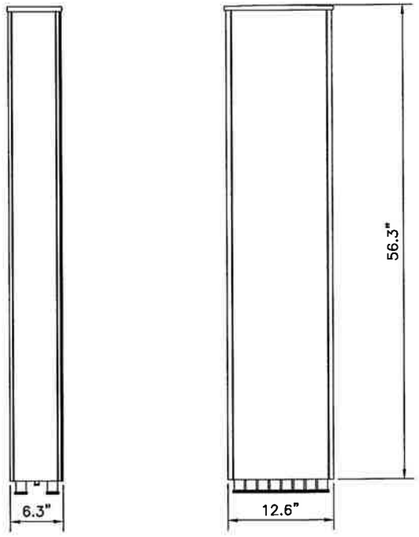
NEW EQUIPMENT IN EXISTING CABINET | NO SCALE | 2

ANTENNA: RFS APXVTM14-C-I20

RADOME MATERIAL:	ASA
RADOME COLOR:	LIGHT GRAY
DIMENSIONS, HxWxD.in(mim):	56.3"x12.6"x6.3" (1430x320x160mm)
WEIGHT:	52.9 lbs
CONNECTORS:	(8) 4.1/9.5 DIN FEMALE (1) NF – CALIBRATION CONNECTOR



PLAN VIEW



2.5 ANTENNA | NO SCALE | 3

DETAIL NOT USED | NO SCALE | 4

PLANS PREPARED FOR:
Sprint
6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:
INFINIGY Design. Build. Deliver.
1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793
JOB NUMBER 353-000

MLA PARTNER:
CROWN CASTLE

ENGINEERING LICENSE:
STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
FOR PERMIT	6/26/14	AJD	0

SITE NAME:
WATERFORD

SITE CASCADE:
CT03XC105

SITE ADDRESS:
41 MANITOCK HILL RD
WATERFORD, CT 06385

SHEET DESCRIPTION:
EQUIPMENT & MOUNTING DETAILS

SHEET NUMBER:
A-5

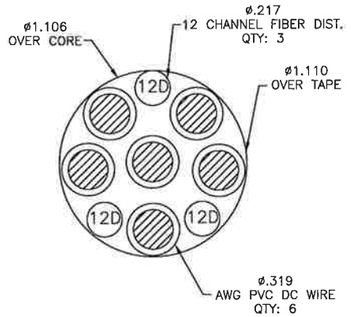
RFS HYBRIFLEX RISER CABLE SCHEDULE

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, 50 ft	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, 50 ft	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 pair, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable, 225 ft	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: HB114-21U3M12-325F 3x 4 AWG power pair, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable, 325 ft	325 ft
	MN: HB114-21U3M12-350F	350 ft
	MN: HB114-21U3M12-375F	375 ft

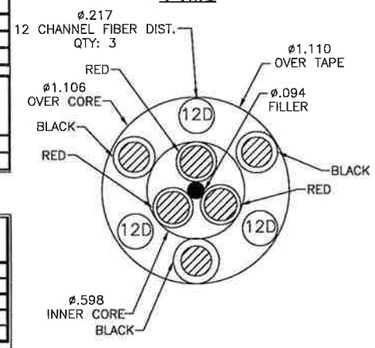
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

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

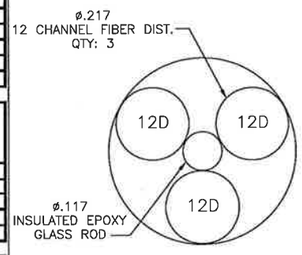
NOTE:
SPRINT CM TO CONFIRM HYBRID OR FIBER RISER CABLE AND HYBRID OR FIBER JUMPER CABLE MODEL NUMBERS IF HYBRID CABLES ARE REQUIRED BEFORE PREPARING BOM.



4 AWG



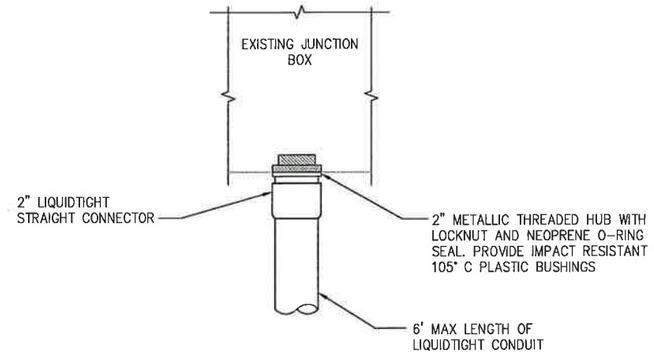
8 & 6 AWG



FIBER ONLY

2.5 CABLE CROSS SECTION DATA

NO SCALE | 1



FIBER JUNCTION BOX PENETRATION

NO SCALE | 2

DETAIL NOT USED

NO SCALE | 3

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.
1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793

JOB NUMBER 353-000

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED
PROFESSIONAL ENGINEER

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
FOR PERMIT	6/26/14	AJD	0

SITE NAME:

WATERFORD

SITE CASCADE:

CT03XC105

SITE ADDRESS:

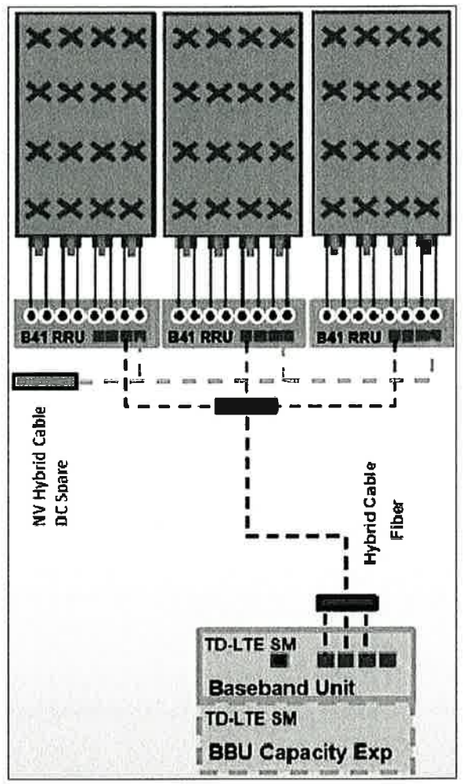
41 MANITOCK HILL RD
WATERFORD, CT 06385

SHEET DESCRIPTION:

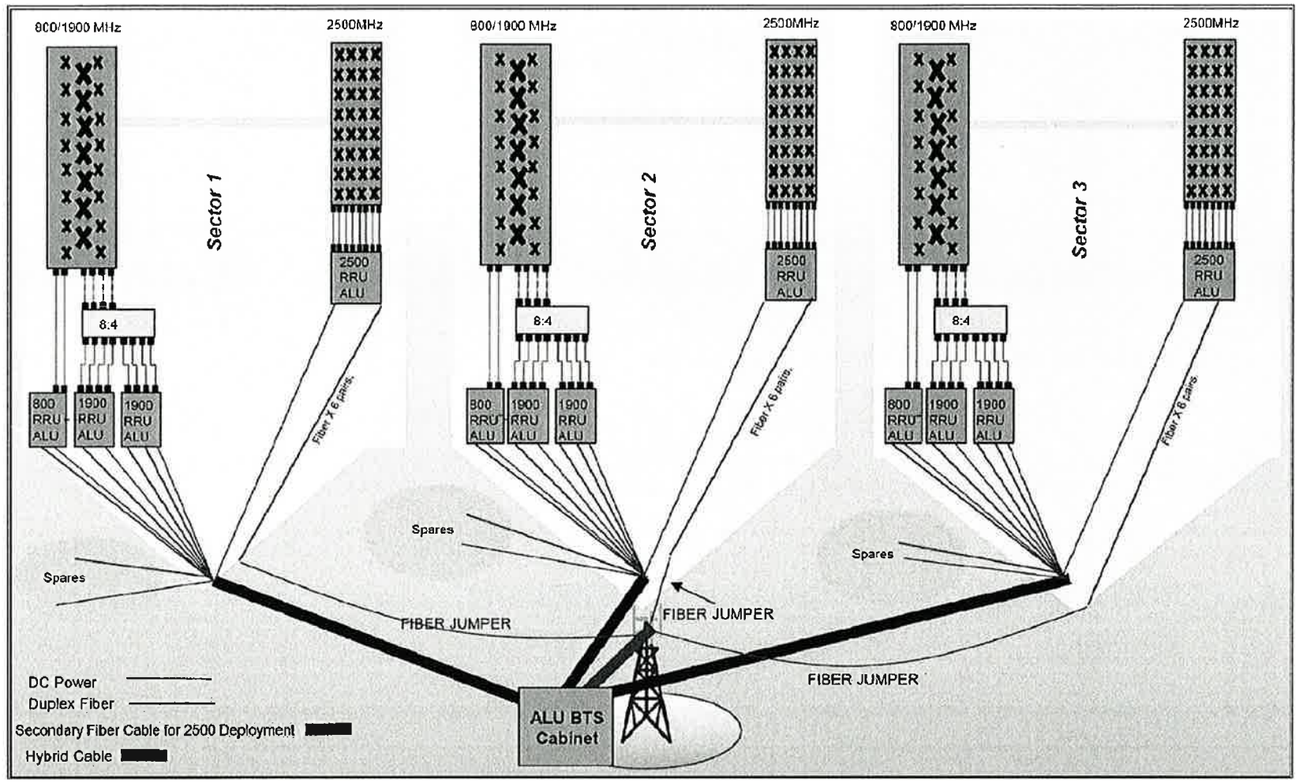
CIVIL DETAILS

SHEET NUMBER:

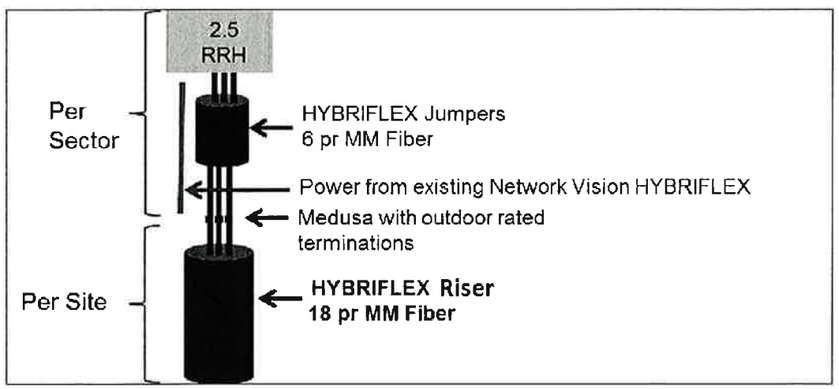
A-6



ALU 2.5 ALU SCENARIO 1



RAN WIRING DIAGRAM



RF 2.5 ALU SCENARIO 1

PLUMBING DIAGRAM

NO SCALE

1

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

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SITE CASCADE:

CT03XC105

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41 MANITOCK HILL RD
WATERFORD, CT 06385

SHEET DESCRIPTION:

CIVIL DETAILS

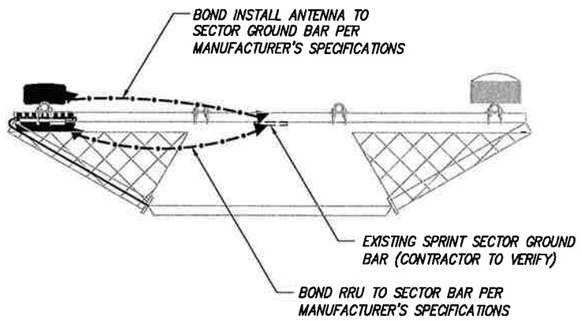
SHEET NUMBER:

A-7

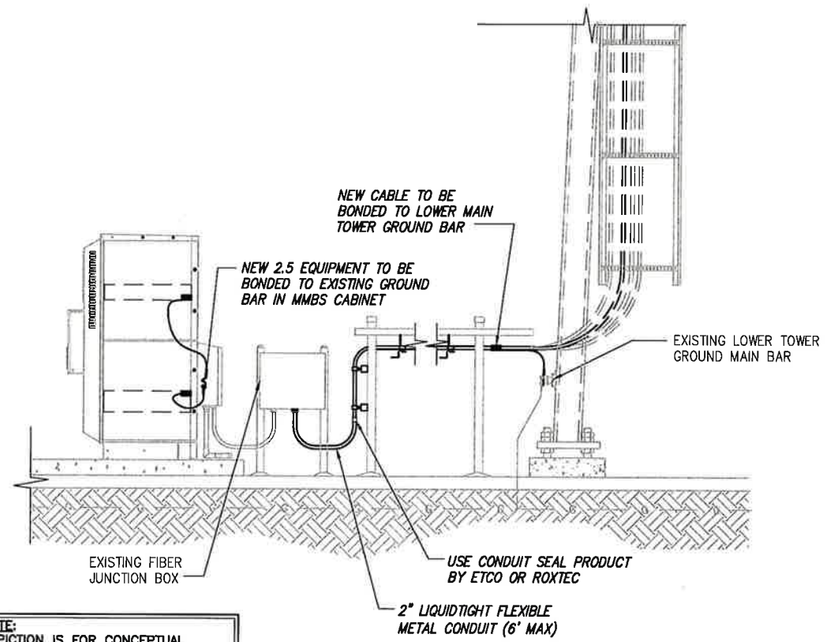
PLAN NOT USED | NO SCALE | 1

LEGEND:

— G —	EXISTING GROUND RING
■	CADWELD CONNECTION (EXOTHERMIC WELD)
▲	MECHANICAL CONNECTION
⊗	GROUND ROD
●	CABLE GROUND KIT



TYPICAL ANTENNA GROUNDING PLAN | NO SCALE | 2



NOTE:
DEPICTION IS FOR CONCEPTUAL PURPOSES ONLY. CONTRACTOR IS TO FIELD VERIFY PRIOR TO CONSTRUCTION

TYPICAL EQUIPMENT GROUNDING PLAN (ELEVATION) | NO SCALE | 3

PLANS PREPARED FOR:

Sprint

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Overland Park, Kansas 66251

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CT03XC105

SITE ADDRESS:

41 MANITOCK HILL RD
WATERFORD, CT 06385

SHEET DESCRIPTION:

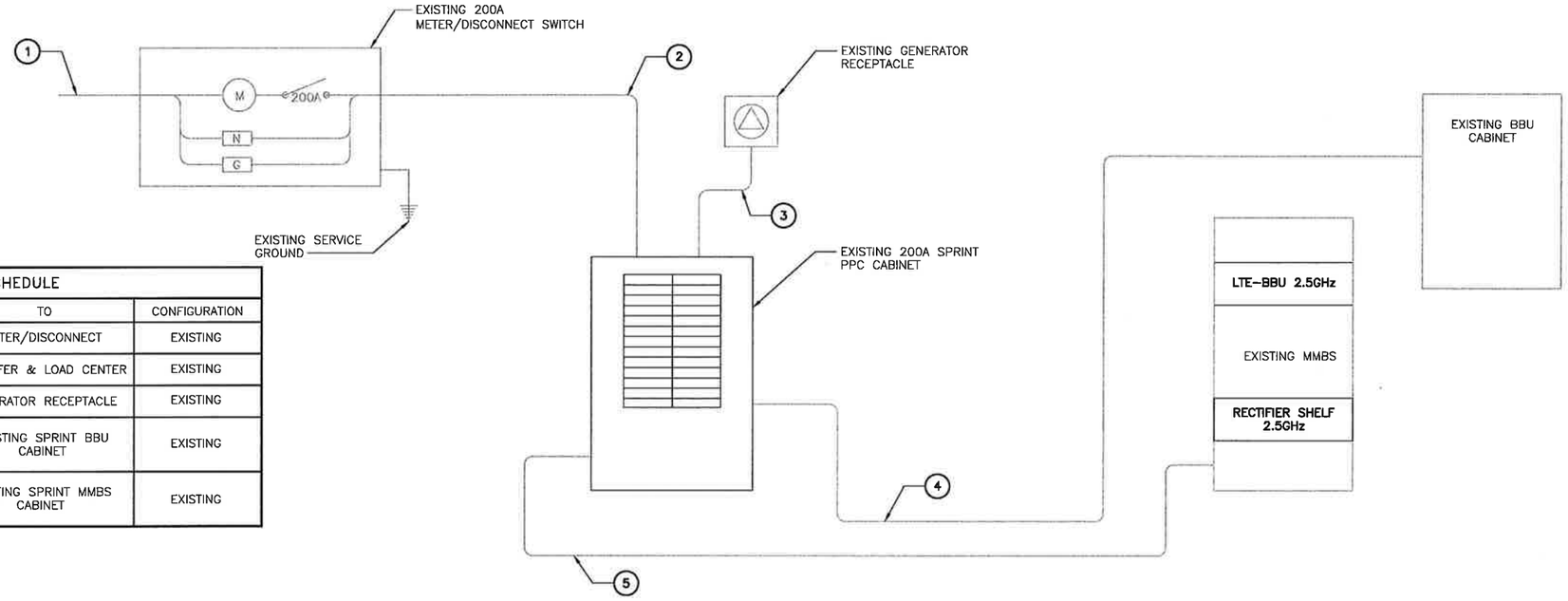
ELECTRICAL & GROUNDING PLAN

SHEET NUMBER:

E-1

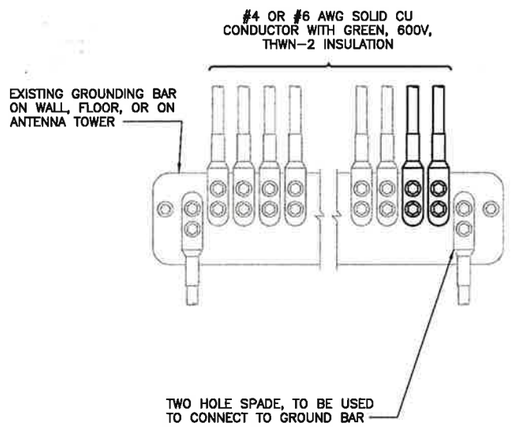
NOTES

CG SHALL REFERENCE ALL SPECS FOR "CONNECTING THE POWER SUPPLY" OF THE NEW INSTALLATION DOCUMENTS, FOR ALL CONNECTION SPECIFICATIONS.



CIRCUIT SCHEDULE			
NO	FROM	TO	CONFIGURATION
1	UTILITY SOURCE	METER/DISCONNECT	EXISTING
2	METER/DISCONNECT	TRANSFER & LOAD CENTER	EXISTING
3	TRANSFER & LOAD CENTER	GENERATOR RECEPTACLE	EXISTING
4	TRANSFER & LOAD CENTER	EXISTING SPRINT BBU CABINET	EXISTING
5	TRANSFER & LOAD CENTER	EXISTING SPRINT MMBS CABINET	EXISTING

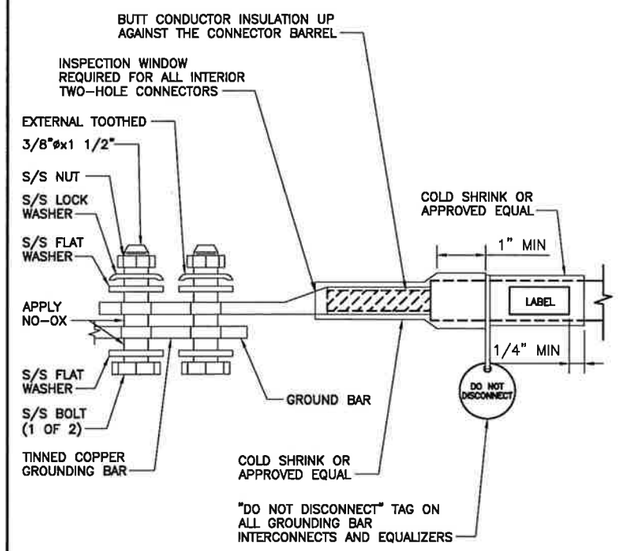
ELECTRICAL ONE–LINE DIAGRAM — NO SCALE — 1



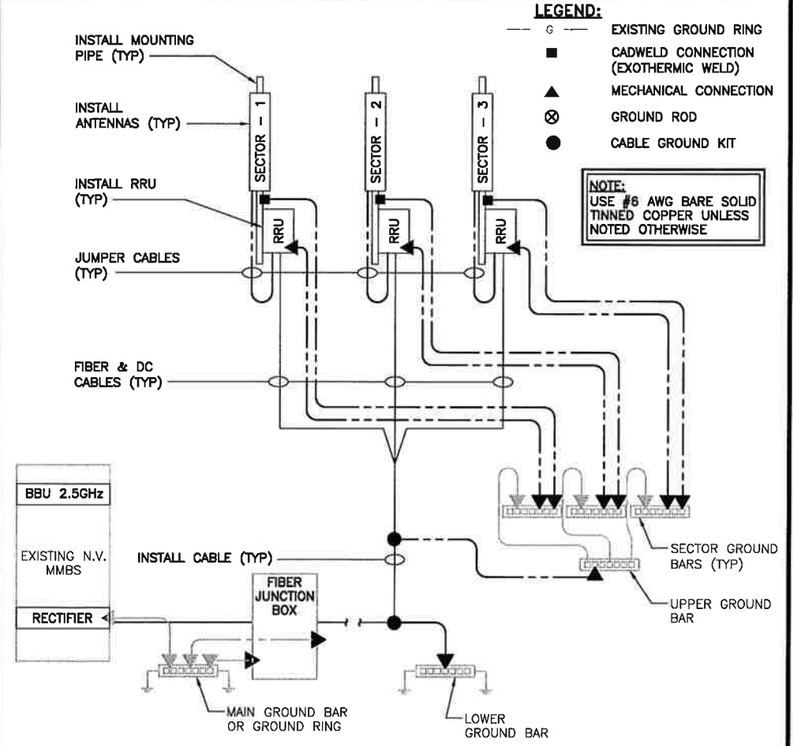
NOTES

1. APPLY NO–OX TO LUG AND BAR CONTACT SURFACE. DO NOT COAT INLINE LUG.
2. IF STOLEN GROUND BARS ARE ENCOUNTERED, CONTACT SPRINT CM FOR REPLACEMENT THREADED ROD KIT.

INSTALLATION OF GROUNDING CONDUCTOR TO GROUNDING BAR — NO SCALE — 2



TWO HOLE LUG — NO SCALE — 3



GROUNDING RISER DIAGRAM — NO SCALE — 4

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.

1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793

JOB NUMBER 353–000

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT — JOHN S. STEVENS — No. 24705 — LICENSED PROFESSIONAL ENGINEER

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
FOR PERMIT	6/26/14	AJD	0

SITE NAME:

WATERFORD

SITE CASCADE:

CT03XC105

SITE ADDRESS:

41 MANITOCK HILL RD
WATERFORD, CT 06385

SHEET DESCRIPTION:

ELECTRICAL & GROUNDING DETAILS

SHEET NUMBER:

E-2

Date: **May 19, 2014**

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

Tower Engineering Professionals
326 Tryon Rd.
Raleigh, NC 27603
(919) 661-6351
crown@tepgroup.net

Subject: Structural Analysis Report

Carrier Designation:	***Sprint PCS* Co-Locate**	Scenario 2.5A
	Carrier Site Number:	CT03XC105
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	876338
	Crown Castle Site Name:	Waterford
	Crown Castle JDE Job Number:	286434
	Crown Castle Work Order Number:	757721
	Crown Castle Application Number:	245612 Rev. 5
Engineering Firm Designation:	**TEP Project Number:**	25598.19255
Site Data:	**41 Manitock Hill Road, Waterford, New London County, CT 06385** **Latitude *41° 21' 16.42"*, Longitude *-72° 9' 3.38"*** **136 Foot - Self Support Tower**	

Dear Patrick Byrum,

Tower Engineering Professionals 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 646278, in accordance with application 245612, revision 5.

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

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table 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 Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, ASCE 7-05 Minimum Design Loads for Buildings and Other Structures and the 2005 Connecticut State Building Code (2003 International Building Code) with 2009 and 2011 Connecticut amendments based upon a wind speed of 85 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the appurtenances listed in Tables 1 and 2 and the attached drawing for the determined available structural capacity to be effective.

We at *Tower Engineering Professionals* 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: Matt Young, E.I. / DTS

Respectfully submitted by:

Graham M. Andres, P.E.

STATE OF CONNECTICUT
GRAHAM M. ANDRES
29538
LICENSED
PROFESSIONAL ENGINEER
5/19/14

Electronic Copy

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 136-ft self-support tower designed by Pirod, Inc. in February of 1999. The tower was originally designed for a wind speed of 90 mph per EIA/TIA-222-F for the appurtenances listed in Table 3. The tower has been modified per reinforcement drawings prepared by Vertical Structures, Inc. in October of 2007. TEP did not visit the site. All information provided to TEP was assumed to be accurate and complete.

2) ANALYSIS CRITERIA

The analysis has been performed in accordance with the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and ASCE 7-05 Minimum Design Loads for Buildings and Other Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch escalating 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
136.0	137.0	3	Alcatel Lucent	TD-RRH8x20-25	1	1-1/4	1
		3	RFS Celwave	APXVTM14-C-120 w/ Mount Pipe			
134.0	134.0	3	Alcatel Lucent	1900MHz RRH (65MHz)	-	-	1

Notes:
1) See “Appendix B – Base Level Drawing” for assumed feed line configuration.

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
136.0	137.0	3	RFS Celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1-1/4	1
	136.0	3	RFS Celwave	IBC1900BB-1			
		3	RFS Celwave	IBC1900HG-2A			
		1	Tower Mounts	Platform Mount [LP 405-1]			
134.0	134.0	3	Alcatel Lucent	1900MHz RRH (65MHz)	-	-	1
		3	Alcatel Lucent	TME-800MHz 2X50W RRH w/ Filter			
		1	Tower Mounts	Pipe Mount [PM 601-3]			
127.0	127.0	12	Decibel	DB844H90E-XY w/ Mount Pipe	12	1-1/4	1
		1	Tower Mounts	Sector Mount [SM 411-3]			
117.0	119.0	3	Ericsson	Air 21 B2A B4P w/ Mount Pipe	1	1-5/8	2
		3	Ericsson	Air 21 B4A B2P w/ Mount Pipe			
		3	Ericsson	KRY 112 144/1			
	117.0	1	Tower Mounts	Sector Mount [SM 411-3]	12	1-5/8	1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
107.0	107.0	3	Alcatel Lucent	RRH2x40-AWS	13	1-5/8	1
		3	Antel	BXA-171063/12CF			
		3	Antel	BXA-185063/8CF			
		3	Antel	BXA-70063/6CF			
		3	Antel	BXA-80063/4CF			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			
		6	RFS Celwave	FD9R6004/2C-3L			
		1	Tower Mounts	Sector Mount [SM 307-3]			
97.0	97.0	1	Andrew	SBNH-1D6565C w/ Mount Pipe	1 2 6	3/8 5/8 1-5/8	1
		6	Ericsson	RRUS-11			
		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			
		3	Powerwave Technologies	7770.00 w/ Mount Pipe			
		6	Powerwave Technologies	LGP21401			
		1	Raycap	DC6-48-60-18-8F			
		1	Tower Mounts	Pipe Mount [PM 601-3]			
87.0	89.0	3	Kathrein	800 10504 w/ Mount Pipe	6	7/8	1
		3	Kathrein	860 10118			
	87.0	1	Tower Mounts	Sector Mount [SM 104-3]			
80.0	80.0	1	GPS	GPS_A	1	1/2	1
		1	Tower Mounts	Side Arm Mount [SO 701-1]			
72.0	72.0	2	GPS	GPS_A	2	1/2	1
		2	Tower Mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing equipment
2) Reserved equipment

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
136.0	136.0	12	Allgon	7184.05	12	1-5/8
127.0	127.0	12	Swedcom	ALP9212	12	1-5/8
117.0	117.0	12	Swedcom	ALP9212	12	1-5/8
102.0	102.0	2	Decibel	DB810	2	1-5/8
80.0	80.0	2	Generic	GPS	2	1/2

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Geotechnical Report	SEA Consultants, Inc.	2035622	CCISites
Foundation Drawings	Pirod, Inc.	2068030	CCISites
Manufacturer Drawings	Pirod, Inc.	1441523	CCISites
Reinforcement Drawing	Vertical Structures, Inc.	2125417	CCISites
Post Modification Inspection	Vertical Structures, Inc.	2376132	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) The tower and foundation were built in accordance with the manufacturer's specifications.
2) The tower and foundation 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 "Appendix B – Base Level Drawing".
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by the standard.
5) All tower components are in sufficient condition to carry their full design capacity.
6) Serviceability with respect to antenna twist, tilt, roll, or lateral translation, is not checked and is left to the carrier or tower owner to ensure conformance.
7) All antenna mounts and mounting hardware are structurally sufficient to carry the full design capacity requirements of appurtenance wind area and weight as provided by the original manufacturer specifications. It is the carrier's responsibility to ensure compliance to the structural limitations of the existing and/or proposed antenna mounts. TEP did not perform a site visit to verify the size, condition or capacity of the antenna mounts and did not analyze antennas supporting mounts as part of this structural analysis report.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
T1	136 - 132.917	Leg	1 1/2	2	-1850.280	31183.699	5.9	Pass
T2	132.917 - 130	Leg	1 1/2	14	-7465.340	46641.267	16.0	Pass
T3	130 - 110	Leg	2	29	-49563.398	97160.637	51.0	Pass
T4	110 - 94.9434	Leg	2 1/4	86	-91349.500	128951.749	70.8	Pass
T5	94.9434 - 92.5938	Leg	2 1/4	128	-99769.703	146940.583	67.9	Pass
T6	92.5938 - 90	Leg	2 1/4	140	-112448.000	149109.374	75.4	Pass
T7	90 - 80	Leg	Pirod 105244 w/ 1 1/4" Reinforcement	Note 1	Note 1	Note 1	61.6	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
T8	80 - 60	Leg	Pirod 105217	164	-163313.000	184672.479	88.4	Pass
T9	60 - 40	Leg	Pirod 105218	179	-199247.000	258238.080	77.2	Pass
T10	40 - 20	Leg	Pirod 105218	194	-230065.000	258238.080	89.1	Pass
T11	20 - 0	Leg	Pirod 105219	209	-258009.000	343622.059	75.1	Pass
T1	136 - 132.917	Diagonal	3/4	7	-1845.000	4118.997	44.8	Pass
T2	132.917 - 130	Diagonal	3/4	22	-1857.780	5220.534	35.6	Pass
T3	130 - 110	Diagonal	7/8	37	-4274.680	8159.052	52.4	Pass
T4	110 - 94.9434	Diagonal	1	95	-5620.610	12341.394	45.5	Pass
T5	94.9434 - 92.5938	Diagonal	1	135	-5735.430	12093.322	47.4	Pass
T6	92.5938 - 90	Diagonal	1	149	-6225.880	12502.807	49.8	Pass
T7	90 - 80	Diagonal	L3x3x3/16	158	-7906.770	17487.626	45.2 79.3 (b)	Pass
T8	80 - 60	Diagonal	L2 1/2x2 1/2x3/16	167	-7111.440	9648.400	73.7	Pass
T9	60 - 40	Diagonal	L3x3x3/16	182	-6569.730	13367.857	49.1 56.6 (b)	Pass
T10	40 - 20	Diagonal	L3x3x3/16	197	-6477.040	10672.238	60.7	Pass
T11	20 - 0	Diagonal	L3x3x5/16	211	-8138.250	14010.496	58.1	Pass
T5	94.9434 - 92.5938	Secondary Horizontal	1 1/2	136	-1728.200	31478.127	5.5	Pass
T6	92.5938 - 90	Secondary Horizontal	1 1/2	151	-1947.800	30779.635	6.3	Pass
T1	136 - 132.917	Top Girt	4 1/2 X 3/8	4	-1244.890	1820.545	68.4	Pass
T2	132.917 - 130	Top Girt	7/8	18	-191.691	5406.061	3.5	Pass
T3	130 - 110	Top Girt	7/8	33	-901.980	5464.673	16.5	Pass
T4	110 - 94.9434	Top Girt	1	90	-1491.300	7364.171	20.3	Pass
T2	132.917 - 130	Bottom Girt	7/8	21	-773.059	5406.061	14.3	Pass
T3	130 - 110	Bottom Girt	7/8	36	-1971.210	4329.197	45.5	Pass
T6	92.5938 - 90	Bottom Girt	1	144	-972.726	6015.855	16.2	Pass
							Summary	
						Leg (T10)	89.1	Pass
						Diagonal (T7)	79.3	Pass
						Secondary Horizontal (T6)	6.3	Pass
						Top Girt (T1)	68.4	Pass
						Bottom Girt (T3)	45.5	Pass
						Bolt Checks	79.3	Pass
						Rating =	**89.1**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
-	Anchor Rods	-	57.3	Pass
1	Base Foundation Soil Interaction	-	91.9	Pass
1	Base Foundation Structural	-	35.0	Pass

Structure Rating (max from all components) =	91.9%

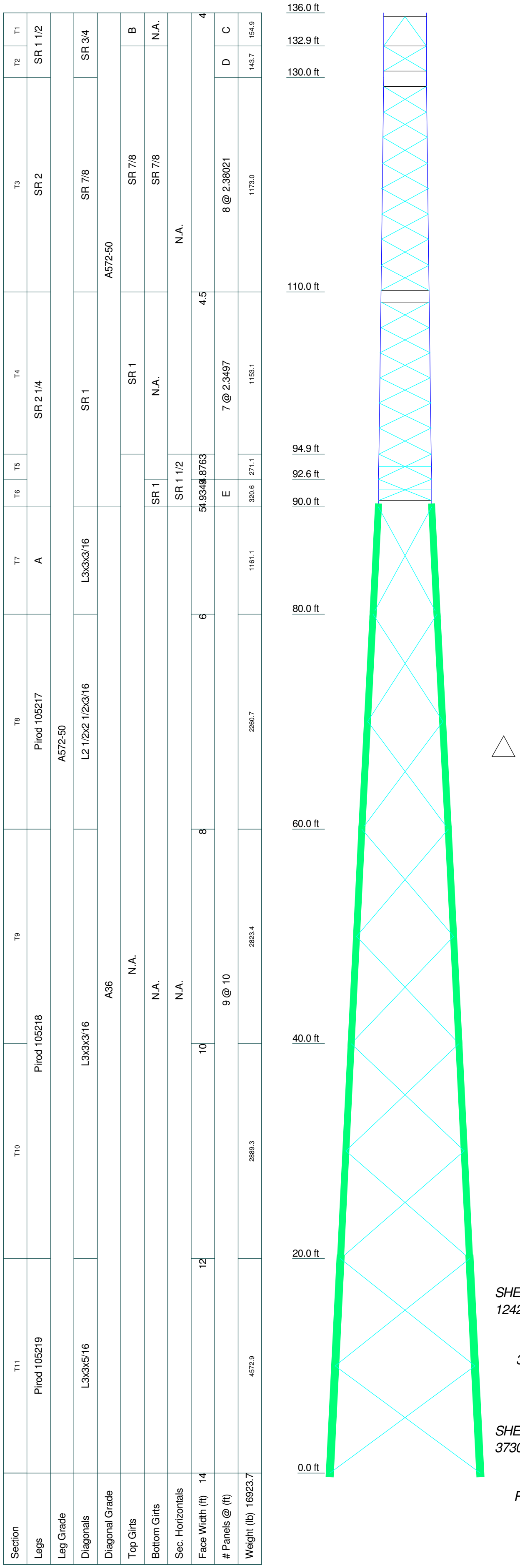
Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.

4.1) Recommendations

1) If the load differs from that described in Tables 1 and 2 of this report, "Appendix B – Base Level Drawing" or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
2) The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVSPP18-C-A20 w/ Mount Pipe	136	BXA-70063/6CF	107
APXVSPP18-C-A20 w/ Mount Pipe	136	BXA-70063/6CF	107
APXVSPP18-C-A20 w/ Mount Pipe	136	BXA-185063/8CF	107
IBC1900BB-1	136	BXA-185063/8CF	107
IBC1900BB-1	136	BXA-185063/8CF	107
IBC1900BB-1	136	BXA-171063/12CF	107
IBC1900HG-2A	136	BXA-171063/12CF	107
IBC1900HG-2A	136	BXA-171063/12CF	107
IBC1900HG-2A	136	(2) FD9R6004/2C-3L	107
APXVTM14-C-120 w/ Mount Pipe	136	(2) FD9R6004/2C-3L	107
APXVTM14-C-120 w/ Mount Pipe	136	(2) FD9R6004/2C-3L	107
APXVTM14-C-120 w/ Mount Pipe	136	RRH2x40-AWS	107
TD-RRH8x20-25	136	RRH2x40-AWS	107
TD-RRH8x20-25	136	RRH2x40-AWS	107
TD-RRH8x20-25	136	DB-T1-6Z-8AB-0Z	107
2.4" x 6-ft pipe	136	Sector Mount [SM 307-3]	107
2.4" x 6-ft pipe	136	AM-X-CD-16-65-00T-RET w/ Mount Pipe	97
2.4" x 6-ft pipe	136	AM-X-CD-14-65-00T-RET w/ Mount Pipe	97
Platform Mount [LP 405-1]	136	SBNH-1D6565C w/ Mount Pipe	97
TME-800MHz 2X50W RRH W/FILTER	134	7770.00 w/Mount Pipe	97
TME-800MHz 2X50W RRH W/FILTER	134	7770.00 w/Mount Pipe	97
TME-800MHz 2X50W RRH W/FILTER	134	7770.00 w/Mount Pipe	97
(2) 1900MHz RRH (65MHz)	134	(2) LGP21401	97
(2) 1900MHz RRH (65MHz)	134	(2) LGP21401	97
(2) 1900MHz RRH (65MHz)	134	(2) LGP21401	97
Pipe Mount [PM 601-3]	134	(2) RRUS-11	97
(4) DB844H90E-XY w/ Mount Pipe	127	(2) RRUS-11	97
(4) DB844H90E-XY w/ Mount Pipe	127	(2) RRUS-11	97
(4) DB844H90E-XY w/ Mount Pipe	127	DC6-48-60-18-8F	97
HSS 4"x4"x4'	127	2.4" x 4-ft pipe	97
HSS 4"x4"x4'	127	2.4" x 4-ft pipe	97
HSS 4"x4"x4'	127	2.4" x 4-ft pipe	97
HSS 4"x4"x4'	127	Pipe Mount [PM 601-3]	97
HSS 4"x4"x4'	127	800 10504 w/ Mount Pipe	87
HSS 4"x4"x4'	127	800 10504 w/ Mount Pipe	87
Sector Mount [SM 411-3]	127	800 10504 w/ Mount Pipe	87
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	117	860 10118	87
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	117	860 10118	87
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	117	860 10118	87
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	117	2.4" x 6-ft pipe	87
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	117	2.4" x 6-ft pipe	87
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	117	2.4" x 6-ft pipe	87
KRY 112 144/1	117	Sector Mount [SM 104-3]	87
KRY 112 144/1	117	GPS_A	80
KRY 112 144/1	117	Side Arm Mount [SO 701-1]	80
Sector Mount [SM 411-3]	117	GPS_A	72
BXA-80063/4CF	107	GPS_A	72
BXA-80063/4CF	107	Side Arm Mount [SO 701-1]	72
BXA-80063/4CF	107	Side Arm Mount [SO 701-1]	72
BXA-70063/6CF	107		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	Pirod 105244 w/ 1 1/4" Reinforcement	D	1 @ 2.375
B	4 1/2 X 3/8	E	1 @ 2.01042
C	1 @ 2.70833		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

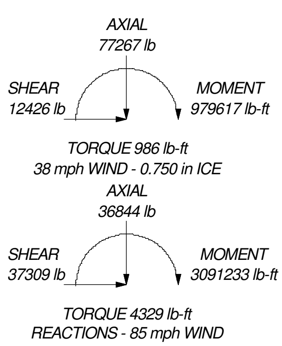
TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 89.1%

MAX. CORNER REACTIONS AT BASE:

DOWN: 267241 lb
SHEAR: 25620 lb

UPLIFT: -239285 lb
SHEAR: 23294 lb



Tower Engineering Professionals 326 Tryon Rd. Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job: Waterford (BU 876338)			
	Project: TEP No. 25598.19255			
	Client: Crown Castle	Drawn by: myoung	App'd:	
	Code: TIA/EIA-222-F	Date: 05/19/14	Scale: NTS	
	Path: C:\Users\myoung\Desktop\tnx\876338-Waterford\New top girt\876338_LC7.eri		Dwg No. E-1	

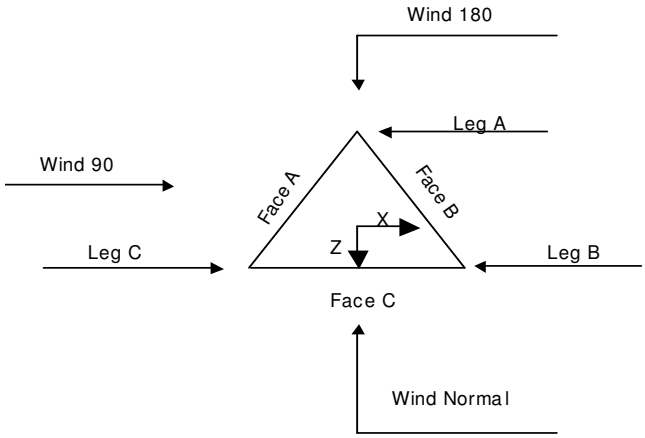
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 136.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 4.000 ft at the top and 14.000 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in New London County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.750 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	136.00-132.92			4.000	1	3.08
T2	132.92-130.00			4.000	1	2.92
T3	130.00-110.00			4.000	1	20.00
T4	110.00-94.94			4.500	1	15.06
T5	94.94-92.59			4.876	1	2.35
T6	92.59-90.00			4.935	1	2.59
T7	90.00-80.00			5.000	1	10.00
T8	80.00-60.00			6.000	1	20.00
T9	60.00-40.00			8.000	1	20.00
T10	40.00-20.00			10.000	1	20.00
T11	20.00-0.00			12.000	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	136.00-132.92	2.708	K Brace Down	No	Yes	4.500	0.000
T2	132.92-130.00	2.375	X Brace	No	No	0.000	6.500
T3	130.00-110.00	2.380	X Brace	No	No	10.000	1.500
T4	110.00-94.94	2.350	X Brace	No	No	11.500	0.000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T5	94.94-92.59	2.350	X Brace	No	Yes	0.000	0.000
T6	92.59-90.00	2.010	X Brace	No	Yes	0.000	7.000
T7	90.00-80.00	10.000	X Brace	No	No	0.000	0.000
T8	80.00-60.00	10.000	X Brace	No	No	0.000	0.000
T9	60.00-40.00	10.000	X Brace	No	No	0.000	0.000
T10	40.00-20.00	10.000	X Brace	No	No	0.000	0.000
T11	20.00-0.00	10.000	X Brace	No	No	0.000	0.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 136.00-132.92	Solid Round	1 1/2	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T2 132.92-130.00	Solid Round	1 1/2	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T3 130.00-110.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T4 110.00-94.94	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T5 94.94-92.59	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T6 92.59-90.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T7 90.00-80.00	Truss Leg	Pirod 105244 w/ 1 1/4" Reinforcement	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T8 80.00-60.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T9 60.00-40.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T10 40.00-20.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T11 20.00-0.00	Truss Leg	Pirod 105219	A572-50 (50 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 136.00-132.92	Flat Bar	4 1/2 X 3/8	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T2 132.92-130.00	Solid Round	7/8	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T3 130.00-110.00	Solid Round	7/8	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T4 110.00-94.94	Solid Round	1	A572-50 (50 ksi)	Solid Round		A572-50 (50 ksi)
T6 92.59-90.00	Solid Round		A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 136.00-132.92	None	Solid Round		A572-50 (50 ksi)	Flat Bar	3 x 3/8	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T5 94.94-92.59	Solid Round	1 1/2	A572-50 (50 ksi)	Solid Round		A572-50 (50 ksi)
T6 92.59-90.00	Solid Round	1 1/2	A572-50 (50 ksi)	Solid Round		A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

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
T1 136.00-132.92	0.00	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T2 132.92-130.00	0.00	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T3 130.00-110.00	0.00	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T4 110.00-94.94	0.00	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T5 94.94-92.59	0.00	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T6 92.59-90.00	0.00	0.000	A36 (36 ksi)	1	1	1	36.000	36.000
T7 90.00-80.00	0.00	0.500	A36 (36 ksi)	1.03	1	1.05	36.000	36.000
T8 80.00-60.00	0.00	0.500	A36 (36 ksi)	1.03	1	1.05	36.000	36.000
T9 60.00-40.00	0.00	0.500	A36 (36 ksi)	1.03	1	1.05	36.000	36.000
T10 40.00-20.00	0.00	0.500	A36 (36 ksi)	1.03	1	1.05	36.000	36.000
T11 20.00-0.00	0.00	0.500	A36 (36 ksi)	1.03	1	1.05	36.000	36.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Brace Diags X	K Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
T1	Yes	Yes	1	1		1		1		1		1		1		1	
136.00-132.92				1		1		1		1		1		1		1	
T2	Yes	Yes	1	1		1		1		1		1		1		1	
132.92-130.00				1		1		1		1		1		1		1	
T3	Yes	Yes	1	1		1		1		1		1		1		1	
130.00-110.00				1		1		1		1		1		1		1	
T4	Yes	Yes	1	1		1		1		1		1		1		1	
110.00-94.94				1		1		1		1		1		1		1	
T5	Yes	Yes	1	1		1		1		1		1		1		1	
94.94-92.59				1		1		1		1		1		1		1	
T6	Yes	Yes	1	1		1		1		1		1		1		1	
92.59-90.00				1		1		1		1		1		1		1	
T7	Yes	Yes	1	1		1		1		1		1		1		1	
90.00-80.00				1		1		1		1		1		1		1	
T8	Yes	Yes	1	1		1		1		1		1		1		1	
80.00-60.00				1		1		1		1		1		1		1	
T9	Yes	Yes	1	1		1		1		1		1		1		1	
60.00-40.00				1		1		1		1		1		1		1	
T10	Yes	Yes	1	1		1		1		1		1		1		1	
40.00-20.00				1		1		1		1		1		1		1	
T11	Yes	Yes	1	1		1		1		1		1		1		1	
20.00-0.00				1		1		1		1		1		1		1	

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Truss-Leg K Factors: Truss-Legs Used As Leg Members — Leg Panels	X Brace Diagonals	Z Brace Diagonals	Truss-Legs Used As Inner Members — Leg Panels	X Brace Diagonals	Z Brace Diagonals
T7	1	0.5	0.7	1	0.5	0.85
90.00-80.00						
T8	1	0.5	0.7	1	0.5	0.85
80.00-60.00						
T9	1	0.5	0.7	1	0.5	0.85
60.00-40.00						
T10	1	0.5	0.7	1	0.5	0.85
40.00-20.00						
T11	1	0.5	0.76	1	0.5	0.85
20.00-0.00						

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 136.00-132.92	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1
T2 132.92-130.00	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1
T3 130.00-110.00	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1
T4 110.00-94.94	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1
T5 94.94-92.59	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1
T6 92.59-90.00	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1	0.000	1
T7 90.00-80.00	0.000	1	0.000	0.75	0.000	0.75	0.000	1	0.000	1	0.000	1	0.000	1
T8 80.00-60.00	0.000	1	0.000	0.75	0.000	0.75	0.000	1	0.000	1	0.000	1	0.000	1
T9 60.00-40.00	0.000	1	0.000	0.75	0.000	0.75	0.000	1	0.000	1	0.000	1	0.000	1
T10 40.00-20.00	0.000	1	0.000	0.75	0.000	0.75	0.000	1	0.000	1	0.000	1	0.000	1
T11 20.00-0.00	0.000	1	0.000	0.75	0.000	0.75	0.000	1	0.000	1	0.000	1	0.000	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 136.00-132.92	Sleeve DS	0.625 A325N	0	1.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T2 132.92-130.00	Sleeve DS	0.625 A325N	0	1.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T3 130.00-110.00	Sleeve DS	0.750 A325N	0	1.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T4 110.00-94.94	Sleeve DS	0.750 A325N	0	1.000 A325N	0	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T5 94.94-92.59	Flange	1.000 A325N	0	1.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T6 92.59-90.00	Flange	1.000 A325N	6	1.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T7 90.00-80.00	Flange	1.000 A325N	6	1.000 A325N	1	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T8 80.00-60.00	Flange	1.000 A325N	6	1.000 A325N	1	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T9 60.00-40.00	Flange	1.000 A325N	6	1.000 A325N	1	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T10 40.00-20.00	Flange	1.000 A325N	6	1.000 A325N	1	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T11 20.00-0.00	Flange	1.250 A687	6	1.250 A325N	1	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF4-50A(1/2") *	A	No	Ar (Leg)	72.00 - 0.00	0.000	0.15	2	2	0.500	0.630		0.150
LDF6-50A(1-1/4")	A	No	Ar (Leg)	127.00 - 0.00	0.000	0.1	12	7	0.500 1.500	1.550		0.660
T-Brackets (Af) *	A	No	Af (Leg)	127.00 - 0.00	0.000	0.1	1	1	1.000	1.000	4.000	8.400
LDF7-50A(1-5/8")	B	No	Ar (Leg)	97.00 - 0.00	0.000	0.1	10	6	0.500	1.980		0.820
HB114-1-08U4-M5J(1 1/4")	B	No	Ar (Leg)	136.00 - 97.00	0.000	0.05	4	4	0.500	1.540		1.080
T-Brackets (Af) *	B	No	Af (Leg)	136.00 - 0.00	0.000	0.1	1	1	1.000	1.000	4.000	8.400
LDF7-50A(1-5/8") *	B	No	Ar (Leg)	107.00 - 0.00	0.000	0.15	13	8	0.500	1.980		0.820
FB-L98-002-XXX(3/8)	B	No	Ar (Leg)	97.00 - 0.00	0.000	0.1	1	1	0.394	0.394		0.065
WR-VG82ST-BRDA(5/8") *	B	No	Ar (Leg)	97.00 - 0.00	0.000	0.12	2	2	0.500	0.645		0.307
FLC 12-50J(1/2") *	B	No	Ar (Leg)	80.00 - 0.00	0.000	0.05	1	1	0.500	0.640		0.170
LDF7-50A(1-5/8")	C	No	Ar (Leg)	117.00 - 0.00	0.000	0.1	13	6	0.500	1.980		0.820
T-Brackets (Af) *	C	No	Af (Leg)	117.00 - 0.00	0.000	0.1	1	1	1.000	1.000	4.000	8.400
FXL 780 PE(7/8)	A	Yes	Ar (CfAe)	87.00 - 0.00	0.000	-0.1	6	6	1.500 0.500	1.090		0.250
Feedline Ladder (Af)	A	Yes	Af (CfAe)	87.00 - 0.00	0.000	0	1	1	3.000	3.000	12.000	8.400
Safety Line 3/8	C	Yes	Ar (CfAe)	136.00 - 0.00	0.000	0.5	1	1	0.375	0.375		0.220
Ladder Rung SR 3/4 (48"w 26"s)	C	Yes	Ar (CfAe)	136.00 - 90.00	0.000	0	1	1	1.350	1.350		2.706

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 lb
T1	136.00-132.92	A	0.000	0.000	0.000	0.000	0.000
		B	1.583	0.257	0.000	0.000	39.220
		C	2.026	0.257	0.000	0.000	9.022
T2	132.92-130.00	A	0.000	0.000	0.000	0.000	0.000
		B	1.497	0.243	0.000	0.000	37.100
		C	1.916	0.243	0.000	0.000	8.534

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 lb
T3	130.00-110.00	A	22.301	2.000	0.000	0.000	277.440
		B	25.637	3.083	0.000	0.000	254.400
		C	20.072	2.250	0.000	0.000	191.940
T4	110.00-94.94	A	28.520	2.509	0.000	0.000	245.723
		B	38.526	2.509	0.000	0.000	329.417
		C	41.983	2.509	0.000	0.000	331.033
T5	94.94-92.59	A	4.451	0.392	0.000	0.000	38.347
		B	7.882	0.392	0.000	0.000	65.647
		C	8.421	0.392	0.000	0.000	51.660
T6	92.59-90.00	A	4.913	0.432	0.000	0.000	42.330
		B	8.701	0.432	0.000	0.000	72.465
		C	9.296	0.432	0.000	0.000	57.026
T7	90.00-80.00	A	22.757	3.417	0.000	0.000	232.500
		B	33.545	1.667	0.000	0.000	279.385
		C	34.716	1.667	0.000	0.000	192.800
T8	80.00-60.00	A	50.043	8.333	0.000	0.000	528.000
		B	69.416	3.333	0.000	0.000	562.170
		C	70.498	3.333	0.000	0.000	385.600
T9	60.00-40.00	A	50.883	8.333	0.000	0.000	530.400
		B	70.256	3.333	0.000	0.000	562.170
		C	70.498	3.333	0.000	0.000	385.600
T10	40.00-20.00	A	50.883	8.333	0.000	0.000	530.400
		B	70.256	3.333	0.000	0.000	562.170
		C	70.498	3.333	0.000	0.000	385.600
T11	20.00-0.00	A	50.883	8.333	0.000	0.000	530.400
		B	70.256	3.333	0.000	0.000	562.170
		C	70.498	3.333	0.000	0.000	385.600

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 lb
T1	136.00-132.92	A	0.888	0.000	0.000	0.000	0.000	0.000
		B		0.852	2.134	0.000	0.000	72.802
		C		2.207	2.134	0.000	0.000	20.727
T2	132.92-130.00	A	0.885	0.000	0.000	0.000	0.000	0.000
		B		0.805	2.017	0.000	0.000	68.776
		C		2.085	2.017	0.000	0.000	19.562
T3	130.00-110.00	A	0.876	6.854	28.993	0.000	0.000	803.837
		B		10.162	34.308	0.000	0.000	469.113
		C		16.375	22.310	0.000	0.000	462.577
T4	110.00-94.94	A	0.859	8.742	36.376	0.000	0.000	707.045
		B		12.748	47.210	0.000	0.000	839.864
		C		19.764	47.336	0.000	0.000	802.186
T5	94.94-92.59	A	0.850	1.357	5.672	0.000	0.000	109.918
		B		2.947	9.295	0.000	0.000	189.596
		C		4.035	9.315	0.000	0.000	124.588
T6	92.59-90.00	A	0.847	1.496	6.260	0.000	0.000	121.196
		B		3.247	10.259	0.000	0.000	208.965
		C		4.446	10.281	0.000	0.000	137.330
T7	90.00-80.00	A	0.840	7.358	34.075	0.000	0.000	668.690
		B		12.459	39.538	0.000	0.000	802.344
		C		14.530	39.621	0.000	0.000	477.902
T8	80.00-60.00	A	0.821	18.180	77.686	0.000	0.000	1527.301
		B		30.669	80.120	0.000	0.000	1619.774
		C		32.475	79.156	0.000	0.000	946.465
T9	60.00-40.00	A	0.788	19.261	78.222	0.000	0.000	1520.111

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 lb
		B		31.426	80.729	0.000	0.000	1588.631
		C		31.718	79.012	0.000	0.000	930.915
T10	40.00-20.00	A	0.750	18.750	77.967	0.000	0.000	1333.143
		B		30.531	80.558	0.000	0.000	1552.270
		C		30.823	78.842	0.000	0.000	912.767
T11	20.00-0.00	A	0.750	18.750	77.967	0.000	0.000	1333.143
		B		30.531	80.558	0.000	0.000	1552.270
		C		30.823	78.842	0.000	0.000	912.767

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	136.00-132.92	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.015	0.221	0.054	0.165
T2	132.92-130.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.042	0.408	0.000	0.000
T3	130.00-110.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.213	1.939	0.000	0.000
T4	110.00-94.94	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.173	1.405	0.000	0.000
T5	94.94-92.59	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.045	0.327	0.000	0.000
T6	92.59-90.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.056	0.416	0.000	0.000
T7	90.00-80.00	A	0.000	0.691	0.577	1.233
		B	0.000	0.000	0.000	0.000
		C	0.000	0.099	0.032	0.178
T8	80.00-60.00	A	0.000	1.622	1.159	2.469
		B	0.000	0.000	0.000	0.000
		C	0.000	0.161	0.046	0.245
T9	60.00-40.00	A	0.000	1.324	1.191	2.520
		B	0.000	0.000	0.000	0.000
		C	0.000	0.128	0.047	0.244
T10	40.00-20.00	A	0.000	1.130	1.076	2.259
		B	0.000	0.000	0.000	0.000
		C	0.000	0.106	0.042	0.211
T11	20.00-0.00	A	0.000	1.054	1.004	2.108
		B	0.000	0.000	0.000	0.000
		C	0.000	0.099	0.039	0.197

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	136.00-132.92	3.167	2.375	1.628	1.813
T2	132.92-130.00	3.783	2.882	1.566	1.693
T3	130.00-110.00	0.839	-1.044	0.275	-0.535
T4	110.00-94.94	1.347	1.280	0.736	0.922
T5	94.94-92.59	2.541	1.879	1.700	1.338
T6	92.59-90.00	2.518	1.857	1.672	1.288
T7	90.00-80.00	1.645	1.374	0.878	0.934
T8	80.00-60.00	1.828	1.529	0.934	1.077
T9	60.00-40.00	2.247	1.766	1.152	1.273
T10	40.00-20.00	2.699	2.128	1.378	1.541
T11	20.00-0.00	3.076	2.429	1.541	1.742

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
APXVSPP18-C-A20 w/ Mount Pipe	A	From Centroid-Face	4.00 8.000 1.000	20.000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	82.550 150.561 226.532 405.983 908.948
APXVSPP18-C-A20 w/ Mount Pipe	B	From Centroid-Face	4.00 8.000 1.000	20.000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	82.550 150.561 226.532 405.983 908.948
APXVSPP18-C-A20 w/ Mount Pipe	C	From Centroid-Face	4.00 8.000 1.000	20.000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	82.550 150.561 226.532 405.983 908.948
IBC1900BB-1	A	From Centroid-Face	4.00 8.000 0.000	20.000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.13 1.27 1.43 1.76 2.53	0.53 0.65 0.77 1.04 1.69	22.000 29.710 39.309 64.953 147.469
IBC1900BB-1	B	From Centroid-Face	4.00 8.000 0.000	20.000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.13 1.27 1.43 1.76 2.53	0.53 0.65 0.77 1.04 1.69	22.000 29.710 39.309 64.953 147.469
IBC1900BB-1	C	From Centroid-Face	4.00 8.000 0.000	20.000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.13 1.27 1.43 1.76 2.53	0.53 0.65 0.77 1.04 1.69	22.000 29.710 39.309 64.953 147.469
IBC1900HG-2A	A	From Centroid-Face	4.00 8.000 0.000	20.000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.13 1.27 1.43 1.76 2.53	0.53 0.65 0.77 1.04 1.69	22.000 29.710 39.309 64.953 147.469

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
IBC1900HG-2A	B	From Centroid-Face	4.00 8.000 0.000	20.000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.13 1.27 1.43 1.76 2.53	0.53 0.65 0.77 1.04 1.69	22.000 29.710 39.309 64.953 147.469
IBC1900HG-2A	C	From Centroid-Face	4.00 8.000 0.000	20.000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.13 1.27 1.43 1.76 2.53	0.53 0.65 0.77 1.04 1.69	22.000 29.710 39.309 64.953 147.469
APXVTM14-C-120 w/ Mount Pipe	A	From Centroid-Face	4.00 -8.000 1.000	20.000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	76.775 131.384 192.678 338.476 752.452
APXVTM14-C-120 w/ Mount Pipe	B	From Centroid-Face	4.00 -8.000 1.000	20.000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	76.775 131.384 192.678 338.476 752.452
APXVTM14-C-120 w/ Mount Pipe	C	From Centroid-Face	4.00 -8.000 1.000	20.000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	76.775 131.384 192.678 338.476 752.452
TD-RRH8x20-25	A	From Centroid-Face	4.00 -8.000 1.000	20.000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	70.000 97.151 127.829 200.542 396.842
TD-RRH8x20-25	B	From Centroid-Face	4.00 -8.000 1.000	20.000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	70.000 97.151 127.829 200.542 396.842
TD-RRH8x20-25	C	From Centroid-Face	4.00 -8.000 1.000	20.000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	70.000 97.151 127.829 200.542 396.842
2.4" x 6-ft pipe	A	From Centroid-Face	4.00 0.000 0.000	0.000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.44 1.93 2.30 3.07 4.71	1.44 1.93 2.30 3.07 4.71	21.960 32.883 47.869 90.638 231.642
2.4" x 6-ft pipe	B	From Centroid-Face	4.00 0.000 0.000	0.000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.44 1.93 2.30 3.07 4.71	1.44 1.93 2.30 3.07 4.71	21.960 32.883 47.869 90.638 231.642
2.4" x 6-ft pipe	C	From Centroid-Face	4.00 0.000 0.000	0.000	136.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.44 1.93 2.30 3.07 4.71	1.44 1.93 2.30 3.07 4.71	21.960 32.883 47.869 90.638 231.642
Platform Mount [LP 405-1]	C	None		0.000	136.00	No Ice 1/2" Ice	20.80 28.10	20.80 28.10	1800.000 2066.000

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 lb
						1" Ice	35.40	35.40	2332.000
						2" Ice	50.00	50.00	2864.000
						4" Ice	79.20	79.20	3928.000
*									
TME-800MHz 2X50W RRH W/FILTER	A	From Leg	1.00 0.000 0.000	80.000	134.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	64.000 86.121 111.302 171.619 337.519
TME-800MHz 2X50W RRH W/FILTER	B	From Leg	1.00 0.000 0.000	80.000	134.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	64.000 86.121 111.302 171.619 337.519
TME-800MHz 2X50W RRH W/FILTER	C	From Leg	1.00 0.000 0.000	80.000	134.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	64.000 86.121 111.302 171.619 337.519
(2) 1900MHz RRH (65MHz)	A	From Leg	1.00 0.000 0.000	80.000	134.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.70 2.94 3.18 3.70 4.85	2.77 3.01 3.26 3.78 4.93	60.000 83.902 111.077 176.024 353.751
(2) 1900MHz RRH (65MHz)	B	From Leg	1.00 0.000 0.000	80.000	134.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.70 2.94 3.18 3.70 4.85	2.77 3.01 3.26 3.78 4.93	60.000 83.902 111.077 176.024 353.751
(2) 1900MHz RRH (65MHz)	C	From Leg	1.00 0.000 0.000	80.000	134.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.70 2.94 3.18 3.70 4.85	2.77 3.01 3.26 3.78 4.93	60.000 83.902 111.077 176.024 353.751
Pipe Mount [PM 601-3]	C	None		0.000	134.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.39 5.48 6.57 8.75 13.11	4.39 5.48 6.57 8.75 13.11	195.000 237.412 279.824 364.648 534.296
**									
(4) DB844H90E-XY w/ Mount Pipe	A	From Face	4.00 0.000 0.000	-10.000	127.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.30 3.69 4.12 5.01 6.92	4.92 5.60 6.28 7.71 10.83	32.250 71.830 117.131 227.808 556.612
(4) DB844H90E-XY w/ Mount Pipe	B	From Face	4.00 0.000 0.000	-10.000	127.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.30 3.69 4.12 5.01 6.92	4.92 5.60 6.28 7.71 10.83	32.250 71.830 117.131 227.808 556.612
(4) DB844H90E-XY w/ Mount Pipe	C	From Face	4.00 0.000 0.000	-10.000	127.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.30 3.69 4.12 5.01 6.92	4.92 5.60 6.28 7.71 10.83	32.250 71.830 117.131 227.808 556.612
HSS 4"x4"x4'	A	From Face	0.00 0.000	0.000	127.00	No Ice 1/2" Ice	2.09 2.39	2.09 2.39	40.000 54.810

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 lb
			1.000			1" Ice	2.70	2.70	73.444
						2" Ice	3.33	3.33	122.963
						4" Ice	4.84	4.84	276.444
HSS 4"x4"x4'	A	From Face	0.00	0.000	127.00	No Ice	2.09	2.09	40.000
			0.000			1/2" Ice	2.39	2.39	54.810
			-1.000			1" Ice	2.70	2.70	73.444
						2" Ice	3.33	3.33	122.963
						4" Ice	4.84	4.84	276.444
HSS 4"x4"x4'	B	From Face	0.00	0.000	127.00	No Ice	2.09	2.09	40.000
			0.000			1/2" Ice	2.39	2.39	54.810
			1.000			1" Ice	2.70	2.70	73.444
						2" Ice	3.33	3.33	122.963
						4" Ice	4.84	4.84	276.444
HSS 4"x4"x4'	B	From Face	0.00	0.000	127.00	No Ice	2.09	2.09	40.000
			0.000			1/2" Ice	2.39	2.39	54.810
			-1.000			1" Ice	2.70	2.70	73.444
						2" Ice	3.33	3.33	122.963
						4" Ice	4.84	4.84	276.444
HSS 4"x4"x4'	C	From Face	0.00	0.000	127.00	No Ice	2.09	2.09	40.000
			0.000			1/2" Ice	2.39	2.39	54.810
			1.000			1" Ice	2.70	2.70	73.444
						2" Ice	3.33	3.33	122.963
						4" Ice	4.84	4.84	276.444
HSS 4"x4"x4'	C	From Face	0.00	0.000	127.00	No Ice	2.09	2.09	40.000
			0.000			1/2" Ice	2.39	2.39	54.810
			-1.000			1" Ice	2.70	2.70	73.444
						2" Ice	3.33	3.33	122.963
						4" Ice	4.84	4.84	276.444
Sector Mount [SM 411-3]	C	None		0.000	127.00	No Ice	21.88	21.88	1069.050
						1/2" Ice	30.68	30.68	1484.970
						1" Ice	39.48	39.48	1900.890
						2" Ice	57.08	57.08	2732.730
						4" Ice	92.28	92.28	4396.410
*									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00	0.000	117.00	No Ice	6.83	5.64	112.183
			-6.000			1/2" Ice	7.35	6.48	169.024
			2.000			1" Ice	7.86	7.26	232.594
						2" Ice	8.93	8.86	383.071
						4" Ice	11.18	12.29	806.819
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00	-10.000	117.00	No Ice	6.83	5.64	112.183
			-6.000			1/2" Ice	7.35	6.48	169.024
			2.000			1" Ice	7.86	7.26	232.594
						2" Ice	8.93	8.86	383.071
						4" Ice	11.18	12.29	806.819
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00	20.000	117.00	No Ice	6.83	5.64	112.183
			-6.000			1/2" Ice	7.35	6.48	169.024
			2.000			1" Ice	7.86	7.26	232.594
						2" Ice	8.93	8.86	383.071
						4" Ice	11.18	12.29	806.819
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00	0.000	117.00	No Ice	6.83	5.64	112.183
			6.000			1/2" Ice	7.35	6.48	169.024
			2.000			1" Ice	7.86	7.26	232.594
						2" Ice	8.93	8.86	383.071
						4" Ice	11.18	12.29	806.819
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00	-10.000	117.00	No Ice	6.83	5.64	112.183
			6.000			1/2" Ice	7.35	6.48	169.024
			2.000			1" Ice	7.86	7.26	232.594

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						2" Ice	8.93	8.86	383.071
						4" Ice	11.18	12.29	806.819
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00 6.000 2.000	20.000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	112.183 169.024 232.594 383.071 806.819
KRY 112 144/1	A	From Leg	4.00 -6.000 2.000	0.000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.60 0.82 1.36	0.19 0.26 0.33 0.51 0.97	11.020 14.118 18.436 31.511 80.864
KRY 112 144/1	B	From Leg	4.00 -6.000 2.000	-10.000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.60 0.82 1.36	0.19 0.26 0.33 0.51 0.97	11.020 14.118 18.436 31.511 80.864
KRY 112 144/1	C	From Leg	4.00 -6.000 2.000	20.000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.60 0.82 1.36	0.19 0.26 0.33 0.51 0.97	11.020 14.118 18.436 31.511 80.864
Sector Mount [SM 411-3]	C	None		0.000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	21.88 30.68 39.48 57.08 92.28	21.88 30.68 39.48 57.08 92.28	1069.050 1484.970 1900.890 2732.730 4396.410
*									
BXA-80063/4CF	A	From Leg	4.00 7.000 0.000	-10.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.16 5.55 5.94 6.75 8.48	2.25 2.55 2.85 3.49 5.04	9.900 37.728 69.839 147.694 363.369
BXA-80063/4CF	B	From Leg	4.00 7.000 0.000	-10.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.16 5.55 5.94 6.75 8.48	2.25 2.55 2.85 3.49 5.04	9.900 37.728 69.839 147.694 363.369
BXA-80063/4CF	C	From Leg	4.00 7.000 0.000	-10.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.16 5.55 5.94 6.75 8.48	2.25 2.55 2.85 3.49 5.04	9.900 37.728 69.839 147.694 363.369
BXA-70063/6CF	A	From Leg	4.00 -2.000 0.000	-10.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.73 8.27 8.81 9.93 12.27	3.76 4.19 4.63 5.53 7.43	17.000 57.600 104.014 215.061 515.478
BXA-70063/6CF	B	From Leg	4.00 2.000 0.000	-10.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.73 8.27 8.81 9.93 12.27	3.76 4.19 4.63 5.53 7.43	17.000 57.600 104.014 215.061 515.478
BXA-70063/6CF	C	From Leg	4.00 2.000 0.000	-10.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.73 8.27 8.81 9.93	3.76 4.19 4.63 5.53	17.000 57.600 104.014 215.061

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 lb
						4" Ice	12.27	7.43	515.478
BXA-185063/8CF	A	From Leg	4.00 2.000 0.000	-10.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.94 3.26 3.60 4.36 5.99	1.79 2.09 2.40 3.04 4.46	10.000 27.080 48.111 102.804 268.159
BXA-185063/8CF	B	From Leg	4.00 -2.000 0.000	-10.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.94 3.26 3.60 4.36 5.99	1.79 2.09 2.40 3.04 4.46	10.000 27.080 48.111 102.804 268.159
BXA-185063/8CF	C	From Leg	4.00 -2.000 0.000	-10.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.94 3.26 3.60 4.36 5.99	1.79 2.09 2.40 3.04 4.46	10.000 27.080 48.111 102.804 268.159
BXA-171063/12CF	A	From Leg	4.00 -7.000 0.000	-10.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.79 5.24 5.70 6.64 8.64	3.62 4.06 4.50 5.42 7.34	15.000 42.452 75.452 158.875 400.853
BXA-171063/12CF	B	From Leg	4.00 -7.000 0.000	-10.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.79 5.24 5.70 6.64 8.64	3.62 4.06 4.50 5.42 7.34	15.000 42.452 75.452 158.875 400.853
BXA-171063/12CF	C	From Leg	4.00 -7.000 0.000	-10.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.79 5.24 5.70 6.64 8.64	3.62 4.06 4.50 5.42 7.34	15.000 42.452 75.452 158.875 400.853
(2) FD9R6004/2C-3L	A	From Leg	4.00 7.000 0.000	-10.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	3.100 5.399 8.787 19.608 62.872
(2) FD9R6004/2C-3L	B	From Leg	4.00 7.000 0.000	-10.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	3.100 5.399 8.787 19.608 62.872
(2) FD9R6004/2C-3L	C	From Leg	4.00 7.000 0.000	-10.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	3.100 5.399 8.787 19.608 62.872
RRH2x40-AWS	A	From Leg	4.00 -7.000 0.000	-10.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.52 2.75 2.99 3.50 4.61	1.59 1.80 2.01 2.46 3.48	44.000 61.396 81.692 131.758 275.237
RRH2x40-AWS	B	From Leg	4.00 -7.000 0.000	-10.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.52 2.75 2.99 3.50 4.61	1.59 1.80 2.01 2.46 3.48	44.000 61.396 81.692 131.758 275.237
RRH2x40-AWS	C	From Leg	4.00	-10.000	107.00	No Ice	2.52	1.59	44.000

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			-7.000			1/2" Ice	2.75	1.80	61.396
			0.000			1" Ice	2.99	2.01	81.692
						2" Ice	3.50	2.46	131.758
						4" Ice	4.61	3.48	275.237
DB-T1-6Z-8AB-0Z	A	From Leg	4.00	-10.000	107.00	No Ice	5.60	2.33	44.000
			-7.000			1/2" Ice	5.92	2.56	80.134
			0.000			1" Ice	6.24	2.79	120.222
						2" Ice	6.91	3.28	213.037
						4" Ice	8.37	4.37	454.667
Sector Mount [SM 307-3]	C	None		0.000	107.00	No Ice	26.22	26.22	1620.000
						1/2" Ice	36.28	36.28	2148.150
						1" Ice	46.34	46.34	2676.300
						2" Ice	66.46	66.46	3732.600
						4" Ice	106.70	106.70	5845.200
*									
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	2.00	-30.000	97.00	No Ice	8.50	6.30	74.050
			-2.000			1/2" Ice	9.15	7.48	139.038
			0.000			1" Ice	9.77	8.37	211.915
						2" Ice	11.03	10.18	384.963
						4" Ice	13.68	14.02	874.268
AM-X-CD-14-65-00T-RET w/ Mount Pipe	B	From Leg	2.00	-40.000	97.00	No Ice	5.74	4.02	49.050
			-2.000			1/2" Ice	6.20	4.63	94.282
			0.000			1" Ice	6.66	5.28	145.444
						2" Ice	7.62	6.68	268.462
						4" Ice	9.67	9.74	624.439
SBNH-1D6565C w/ Mount Pipe	C	From Leg	2.00	-25.000	97.00	No Ice	11.69	9.85	99.254
			-2.000			1/2" Ice	12.42	11.38	189.044
			0.000			1" Ice	13.16	12.94	288.807
						2" Ice	14.63	15.31	522.640
						4" Ice	17.92	20.19	1168.714
7770.00 w/Mount Pipe	A	From Leg	2.00	-25.000	97.00	No Ice	5.92	4.04	50.000
			2.000			1/2" Ice	6.36	4.67	95.674
			0.000			1" Ice	6.81	5.32	147.966
						2" Ice	7.74	6.67	273.476
						4" Ice	9.71	9.81	634.627
7770.00 w/Mount Pipe	B	From Leg	2.00	20.000	97.00	No Ice	5.92	4.04	50.000
			2.000			1/2" Ice	6.36	4.67	95.674
			0.000			1" Ice	6.81	5.32	147.966
						2" Ice	7.74	6.67	273.476
						4" Ice	9.71	9.81	634.627
7770.00 w/Mount Pipe	C	From Leg	2.00	20.000	97.00	No Ice	5.92	4.04	50.000
			2.000			1/2" Ice	6.36	4.67	95.674
			0.000			1" Ice	6.81	5.32	147.966
						2" Ice	7.74	6.67	273.476
						4" Ice	9.71	9.81	634.627
(2) LGP21401	A	From Leg	2.00	-25.000	97.00	No Ice	1.29	0.23	14.100
			2.000			1/2" Ice	1.45	0.31	21.263
			0.000			1" Ice	1.61	0.40	30.319
						2" Ice	1.97	0.61	54.887
						4" Ice	2.79	1.12	135.288
(2) LGP21401	B	From Leg	2.00	20.000	97.00	No Ice	1.29	0.23	14.100
			2.000			1/2" Ice	1.45	0.31	21.263
			0.000			1" Ice	1.61	0.40	30.319
						2" Ice	1.97	0.61	54.887
						4" Ice	2.79	1.12	135.288
(2) LGP21401	C	From Leg	2.00	20.000	97.00	No Ice	1.29	0.23	14.100
			2.000			1/2" Ice	1.45	0.31	21.263

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 lb
			0.000			1" Ice	1.61	0.40	30.319
						2" Ice	1.97	0.61	54.887
						4" Ice	2.79	1.12	135.288
(2) RRUS-11	A	From Leg	2.00	-30.000	97.00	No Ice	2.94	1.25	55.000
			-2.000			1/2" Ice	3.17	1.41	74.320
			0.000			1" Ice	3.41	1.59	96.557
						2" Ice	3.91	1.96	150.558
						4" Ice	5.02	2.82	302.116
(2) RRUS-11	B	From Leg	2.00	-40.000	97.00	No Ice	2.94	1.25	55.000
			-2.000			1/2" Ice	3.17	1.41	74.320
			0.000			1" Ice	3.41	1.59	96.557
						2" Ice	3.91	1.96	150.558
						4" Ice	5.02	2.82	302.116
(2) RRUS-11	C	From Leg	2.00	-25.000	97.00	No Ice	2.94	1.25	55.000
			-2.000			1/2" Ice	3.17	1.41	74.320
			0.000			1" Ice	3.41	1.59	96.557
						2" Ice	3.91	1.96	150.558
						4" Ice	5.02	2.82	302.116
DC6-48-60-18-8F	A	From Leg	2.00	-30.000	97.00	No Ice	1.27	1.27	20.000
			-2.000			1/2" Ice	1.46	1.46	35.116
			0.000			1" Ice	1.66	1.66	52.569
						2" Ice	2.09	2.09	95.095
						4" Ice	3.10	3.10	214.905
2.4" x 4-ft pipe	A	From Leg	1.50	0.000	97.00	No Ice	0.87	0.87	14.670
			0.000			1/2" Ice	1.12	1.12	22.050
			0.000			1" Ice	1.37	1.37	32.271
						2" Ice	1.91	1.91	61.845
						4" Ice	3.24	3.24	161.799
2.4" x 4-ft pipe	B	From Leg	1.50	0.000	97.00	No Ice	0.87	0.87	14.670
			0.000			1/2" Ice	1.12	1.12	22.050
			0.000			1" Ice	1.37	1.37	32.271
						2" Ice	1.91	1.91	61.845
						4" Ice	3.24	3.24	161.799
2.4" x 4-ft pipe	C	From Leg	1.50	0.000	97.00	No Ice	0.87	0.87	14.670
			0.000			1/2" Ice	1.12	1.12	22.050
			0.000			1" Ice	1.37	1.37	32.271
						2" Ice	1.91	1.91	61.845
						4" Ice	3.24	3.24	161.799
Pipe Mount [PM 601-3]	C	None		0.000	97.00	No Ice	4.39	4.39	195.000
						1/2" Ice	5.48	5.48	237.412
						1" Ice	6.57	6.57	279.824
						2" Ice	8.75	8.75	364.648
						4" Ice	13.11	13.11	534.296
*									
800 10504 w/ Mount Pipe	A	From Leg	4.00	-80.000	87.00	No Ice	3.59	3.18	37.745
			-6.000			1/2" Ice	4.01	3.91	70.424
			2.000			1" Ice	4.42	4.58	108.954
						2" Ice	5.34	5.98	206.660
						4" Ice	7.38	8.98	513.562
800 10504 w/ Mount Pipe	B	From Leg	4.00	70.000	87.00	No Ice	3.59	3.18	37.745
			-6.000			1/2" Ice	4.01	3.91	70.424
			2.000			1" Ice	4.42	4.58	108.954
						2" Ice	5.34	5.98	206.660
						4" Ice	7.38	8.98	513.562
800 10504 w/ Mount Pipe	C	From Leg	4.00	60.000	87.00	No Ice	3.59	3.18	37.745
			-6.000			1/2" Ice	4.01	3.91	70.424
			2.000			1" Ice	4.42	4.58	108.954

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 lb
						2" Ice	5.34	5.98	206.660
						4" Ice	7.38	8.98	513.562
860 10118	A	From Leg	4.00 -6.000 2.000	-80.000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.04 0.07 0.11 0.22 0.54	0.14 0.21 0.28 0.46 0.91	1.160 2.751 5.301 14.057 51.635
860 10118	B	From Leg	4.00 -6.000 2.000	70.000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.04 0.07 0.11 0.22 0.54	0.14 0.21 0.28 0.46 0.91	1.160 2.751 5.301 14.057 51.635
860 10118	C	From Leg	4.00 -6.000 2.000	60.000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.04 0.07 0.11 0.22 0.54	0.14 0.21 0.28 0.46 0.91	1.160 2.751 5.301 14.057 51.635
2.4" x 6-ft pipe	A	From Leg	4.00 0.000 1.000	0.000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.44 1.93 2.30 3.07 4.71	1.44 1.93 2.30 3.07 4.71	21.960 32.883 47.869 90.638 231.642
2.4" x 6-ft pipe	B	From Leg	4.00 0.000 1.000	0.000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.44 1.93 2.30 3.07 4.71	1.44 1.93 2.30 3.07 4.71	21.960 32.883 47.869 90.638 231.642
2.4" x 6-ft pipe	C	From Leg	4.00 0.000 1.000	0.000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.44 1.93 2.30 3.07 4.71	1.44 1.93 2.30 3.07 4.71	21.960 32.883 47.869 90.638 231.642
Sector Mount [SM 104-3]	C	None		0.000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	30.02 40.48 50.94 71.86 113.70	30.02 40.48 50.94 71.86 113.70	953.000 1405.000 1857.000 2761.000 4569.000
*									
GPS_A	C	From Leg	3.00 0.000 0.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.30 0.37 0.46 0.65 1.15	0.30 0.37 0.46 0.65 1.15	0.870 4.658 9.758 24.672 78.797
Side Arm Mount [SO 701-1]	C	From Leg	1.50 0.000 0.000	0.000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	65.000 79.000 93.000 121.000 177.000
*									
GPS_A	B	From Leg	3.00 0.000 0.000	0.000	72.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.30 0.37 0.46 0.65 1.15	0.30 0.37 0.46 0.65 1.15	0.870 4.658 9.758 24.672 78.797
GPS_A	C	From Leg	3.00 0.000 0.000	0.000	72.00	No Ice 1/2" Ice 1" Ice	0.30 0.37 0.46	0.30 0.37 0.46	0.870 4.658 9.758

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						2" Ice	0.65	0.65	24.672
						4" Ice	1.15	1.15	78.797
Side Arm Mount [SO 701-1]	B	From Leg	1.50	0.000	72.00	No Ice	0.85	1.67	65.000
			0.000			1/2" Ice	1.14	2.34	79.000
			0.000			1" Ice	1.43	3.01	93.000
						2" Ice	2.01	4.35	121.000
						4" Ice	3.17	7.03	177.000
Side Arm Mount [SO 701-1]	C	From Leg	1.50	0.000	72.00	No Ice	0.85	1.67	65.000
			0.000			1/2" Ice	1.14	2.34	79.000
			0.000			1" Ice	1.43	3.01	93.000
						2" Ice	2.01	4.35	121.000
						4" Ice	3.17	7.03	177.000
*									

Truss-Leg Properties

Section Designation	Area in^2	Area Ice in^2	Self Weight lb	Ice Weight lb	Equiv. Diameter in	Equiv. Diameter Ice in	Leg Area in^2
Pirod 105244 w/ 1 1/4" Reinforcement	2261.822	4388.829	595.247	789.730	7.854	15.239	5.829
Pirod 105217	2312.617	5036.140	595.078	962.789	8.030	17.487	5.301
Pirod 105218	2441.683	5107.836	730.212	924.080	8.478	17.736	7.216
Pirod 105218	2441.683	4911.696	730.212	854.158	8.478	17.054	7.216
Pirod 105219	2634.349	5405.468	1105.097	925.691	9.147	18.769	9.425

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T6	92.5938	Leg	A325N	1.000	6	16995.301	34467.199	0.493	1.333	Bolt Tension
T7	90	Leg	A325N	1.000	6	18103.900	34557.102	0.524	1.333	Bolt Tension
		Diagonal	A325N	1.000	1	7184.790	6796.880	1.057	1.333	Member Block Shear
T8	80	Leg	A325N	1.000	6	24858.301	34557.500	0.719	1.333	Bolt Tension
		Diagonal	A325N	1.000	1	7162.750	7748.440	0.924	1.333	Member Block Shear
T9	60	Leg	A325N	1.000	6	30218.500	34557.500	0.874	1.333	Bolt Tension
		Diagonal	A325N	1.000	1	6363.970	8428.130	0.755	1.333	Member Block Shear
T10	40	Leg	A325N	1.000	6	34758.102	34557.398	1.006	1.333	Bolt Tension
		Diagonal	A325N	1.000	1	6066.360	8428.130	0.720	1.333	Member Block Shear
T11	20	Leg	A687	1.250	6	38654.602	50621.398	0.764	1.333	Bolt Tension
		Diagonal	A325N	1.250	1	7383.340	17220.600	0.429	1.333	Member Block

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
										Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio P / P_a
T1	136 - 132.917	1 1/2	3.08	2.71	86.7 K=1.00	17.646	1.767	-1850.280	31183.699	0.059*
T2	132.917 - 130	1 1/2	2.92	2.38	76.0 K=1.00	19.800	1.767	-7465.340	34989.699	0.213
T3	130 - 110	2	20.00	2.38	57.1 K=1.00	23.201	3.142	-49563.398	72888.703	0.680
T4	110 - 94.9434	2 1/4	15.06	2.35	50.1 K=1.00	24.330	3.976	-91349.500	96738.000	0.944
T5	94.9434 - 92.5938	2 1/4	2.35	1.18	25.2 K=1.00	27.724	3.976	-99769.703	110233.000	0.905
T6	92.5938 - 90	2 1/4	2.59	1.01	21.6 K=1.00	28.133	3.976	-112448.000	111860.000	1.005
T7	90 - 80	Pirod 105244 w/ 1 1/4" Reinforcement	10.02	10.02	36.1 K=1.00	26.370	5.829	-119065.000	153715.000	0.775
T8	80 - 60	Pirod 105217	20.03	10.02	37.8 K=1.00	26.132	5.301	-163313.000	138539.000	1.179
T9	60 - 40	Pirod 105218	20.03	10.02	32.4 K=1.00	26.848	7.216	-199247.000	193727.000	1.028
T10	40 - 20	Pirod 105218	20.03	10.02	32.4 K=1.00	26.848	7.216	-230065.000	193727.000	1.188
T11	20 - 0	Pirod 105219	20.03	10.02	28.4 K=1.00	27.351	9.425	-258009.000	257781.000	1.001

* DL controls

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V lb	Allow. V_a lb	Stress Ratio
T7	90 - 80	0.5	1.47	98.6	13.154	0.196	1001.240	2890.770	0.346
T8	80 - 60	0.5	1.47	98.8	13.124	0.196	424.116	2884.080	0.147
T9	60 - 40	0.5	1.46	98.0	13.227	0.196	143.105	2906.840	0.049
T10	40 - 20	0.5	1.46	98.0	13.227	0.196	471.066	2906.840	0.162
T11	20 - 0	0.625	1.45	84.4	18.113	0.307	1035.97	6219.43	0.167

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V lb	Allow. V_a lb	Stress Ratio
							0	0	

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	136 - 132.917	3/4	3.37	3.26	146.1 K=0.70	6.994	0.442	-1845.000	3090.020	0.597
T2	132.917 - 130	3/4	4.65	2.25	129.8 K=0.90	8.865	0.442	-1857.780	3916.380	0.474
T3	130 - 110	7/8	5.06	2.45	121.1 K=0.90	10.179	0.601	-4274.680	6120.820	0.698
T4	110 - 94.9434	1	5.39	2.61	112.6 K=0.90	11.788	0.785	-5620.610	9258.360	0.607
T5	94.9434 - 92.5938	1	5.44	2.63	113.7 K=0.90	11.551	0.785	-5735.430	9072.260	0.632
T6	92.5938 - 90	1	5.35	2.59	111.8 K=0.90	11.942	0.785	-6225.880	9379.450	0.664
T7	90 - 80	L3x3x3/16	11.42	5.02	105.9 K=1.05	12.036	1.090	-7906.770	13119.000	0.603
T8	80 - 60	L2 1/2x2 1/2x3/16	12.50	5.63	136.4 K=1.00	8.025	0.902	-7111.440	7238.110	0.982
T9	60 - 40	L3x3x3/16	13.80	6.33	127.4 K=1.00	9.200	1.090	-6569.730	10028.400	0.655
T10	40 - 20	L3x3x3/16	15.24	7.08	142.6 K=1.00	7.345	1.090	-6477.040	8006.180	0.809
T11	20 - 0	L3x3x5/16	16.80	7.81	159.0 K=1.00	5.905	1.780	-8138.250	10510.500	0.774

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T5	94.9434 - 92.5938	1 1/2	4.91	4.72	105.7 K=0.70	13.363	1.767	-1728.200	23614.500	0.073
T6	92.5938 - 90	1 1/2	4.96	4.77	106.9 K=0.70	13.067	1.767	-1947.800	23090.500	0.084

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	136 - 132.917	4 1/2 X 3/8	4.00	3.88	429.5 K=1.00	0.809	1.688	-1244.890	1365.750	0.912

KL/R > 200 (C) - 4

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T2	132.917 - 130	7/8	4.00	3.88	148.8 K=0.70	6.744	0.601	-191.691	4055.560	0.047
T3	130 - 110	7/8	4.02	3.85	148.0 K=0.70	6.818	0.601	-901.980	4099.530	0.220
T4	110 - 94.9434	1	4.52	4.34	145.7 K=0.70	7.034	0.785	-1491.300	5524.510	0.270

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T2	132.917 - 130	7/8	4.00	3.88	148.8 K=0.70	6.744	0.601	-773.059	4055.560	0.191
T3	130 - 110	7/8	4.50	4.33	166.3 K=0.70	5.401	0.601	-1971.210	3247.710	0.607
T6	92.5938 - 90	1	4.99	4.80	161.2 K=0.70	5.746	0.785	-972.726	4513.020	0.216

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	136 - 132.917	1 1/2	3.08	2.71	86.7	30.000	1.767	0.004	53014.398	0.000
T2	132.917 - 130	1 1/2	2.92	2.38	76.0	30.000	1.767	4957.770	53014.398	0.094
T3	130 - 110	2	20.00	2.38	57.1	30.000	3.142	43307.602	94247.797	0.460
T4	110 - 94.9434	2 1/4	15.06	2.35	50.1	30.000	3.976	82045.102	119282.000	0.688
T5	94.9434 - 92.5938	2 1/4	2.35	1.18	25.2	30.000	3.976	89882.297	119282.000	0.754
T6	92.5938 - 90	2 1/4	2.59	1.01	21.6	30.000	3.976	101972.000	119282.000	0.855
T7	90 - 80	Pirod 105244 w/ 1 1/4" Reinforcement	10.02	10.02	36.1	30.000	5.829	108624.000	174878.000	0.621
T8	80 - 60	Pirod 105217	20.03	10.02	37.8	30.000	5.301	149150.000	159043.000	0.938
T9	60 - 40	Pirod 105218	20.03	10.02	32.4	30.000	7.216	181311.000	216475.000	0.838
T10	40 - 20	Pirod 105218	20.03	10.02	32.4	30.000	7.216	208548.000	216475.000	0.963
T11	20 - 0	Pirod 105219	20.03	10.02	28.4	30.000	9.425	231928.000	282743.000	0.820

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V lb	Allow. V_a lb	Stress Ratio
T7	90 - 80	0.5	1.47	98.6	13.154	0.196	1001.24	2890.77	0.346

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V lb	Allow. V_a lb	Stress Ratio
							0	0	
T8	80 - 60	0.5	1.47	98.8	13.124	0.196	424.116	2884.080	0.147
T9	60 - 40	0.5	1.46	98.0	13.227	0.196	143.105	2906.840	0.049
T10	40 - 20	0.5	1.46	98.0	13.227	0.196	471.066	2906.840	0.162
T11	20 - 0	0.625	1.45	84.4	18.113	0.307	1035.970	6219.430	0.167

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	136 - 132.917	3/4	3.37	3.26	208.7	30.000	0.442	1799.620	13253.600	0.136
T2	132.917 - 130	3/4	4.65	2.25	144.2	30.000	0.442	1770.640	13253.600	0.134
T3	130 - 110	7/8	5.06	2.45	134.6	30.000	0.601	4317.690	18039.600	0.239
T4	110 - 94.9434	1	5.39	2.61	125.1	30.000	0.785	5579.030	23561.900	0.237
T5	94.9434 - 92.5938	1	5.44	2.63	126.3	30.000	0.785	5687.870	23561.900	0.241
T6	92.5938 - 90	1	5.35	2.59	124.2	30.000	0.785	6087.230	23561.900	0.258
T7	90 - 80	L3x3x3/16	11.42	5.02	66.3	29.000	0.659	7184.790	19119.600	0.376
T8	80 - 60	L2 1/2x2 1/2x3/16	11.93	5.38	86.2	29.000	0.518	7162.750	15030.600	0.477
T9	60 - 40	L3x3x3/16	13.13	6.02	79.5	29.000	0.659	6363.970	19119.600	0.333
T10	40 - 20	L3x3x3/16	14.50	6.73	88.6	29.000	0.659	6066.360	19119.600	0.317
T11	20 - 0	L3x3x5/16	16.80	7.81	105.3	29.000	1.013	7383.340	29369.301	0.251

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T5	94.9434 - 92.5938	1 1/2	4.91	4.72	151.0	30.000	1.767	1728.200	53014.398	0.033
T6	92.5938 - 90	1 1/2	4.96	4.77	152.7	30.000	1.767	1947.800	53014.398	0.037

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	136 - 132.917	4 1/2 X 3/8	4.00	3.88	429.5	21.600	1.688	1258.040	36450.000	0.035
T2	132.917 - 130	7/8	4.00	3.88	212.6	30.000	0.601	308.589	18039.600	0.017
T3	130 - 110	7/8	4.02	3.85	211.4	30.000	0.601	930.210	18039.600	0.052
T4	110 - 94.9434	1	4.52	4.34	208.1	30.000	0.785	1607.970	23561.900	0.068

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T2	132.917 - 130	7/8	4.00	3.88	212.6	30.000	0.601	824.550	18039.600	0.046
T3	130 - 110	7/8	4.50	4.33	237.5	30.000	0.601	1917.490	18039.600	0.106
T6	92.5938 - 90	1	4.99	4.80	230.3	30.000	0.785	1043.090	23561.900	0.044

Section Capacity Table

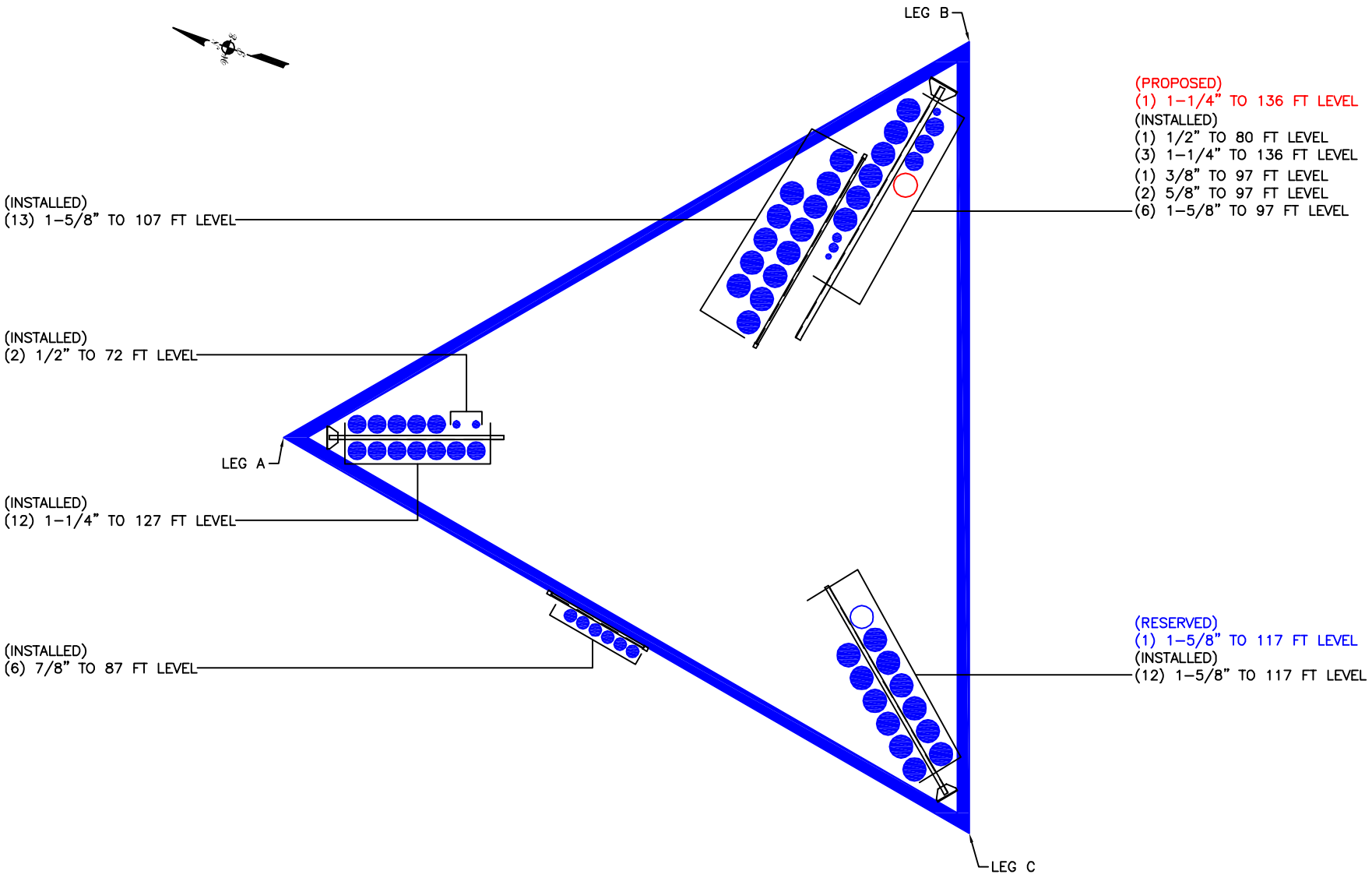
Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T1	136 - 132.917	Leg	1 1/2	2	-1850.280	31183.699	5.9	Pass
T2	132.917 - 130	Leg	1 1/2	14	-7465.340	46641.267	16.0	Pass
T3	130 - 110	Leg	2	29	-49563.398	97160.637	51.0	Pass
T4	110 - 94.9434	Leg	2 1/4	86	-91349.500	128951.749	70.8	Pass
T5	94.9434 - 92.5938	Leg	2 1/4	128	-99769.703	146940.583	67.9	Pass
T6	92.5938 - 90	Leg	2 1/4	140	-112448.000	149109.374	75.4	Pass
T7	90 - 80	Leg	Pirod 105244 w/ 1 1/4" Reinforcement	Note 1	Note 1	Note 1	61.6	Pass
T8	80 - 60	Leg	Pirod 105217	164	-163313.000	184672.479	88.4	Pass
T9	60 - 40	Leg	Pirod 105218	179	-199247.000	258238.080	77.2	Pass
T10	40 - 20	Leg	Pirod 105218	194	-230065.000	258238.080	89.1	Pass
T11	20 - 0	Leg	Pirod 105219	209	-258009.000	343622.059	75.1	Pass
T1	136 - 132.917	Diagonal	3/4	7	-1845.000	4118.997	44.8	Pass
T2	132.917 - 130	Diagonal	3/4	22	-1857.780	5220.534	35.6	Pass
T3	130 - 110	Diagonal	7/8	37	-4274.680	8159.052	52.4	Pass
T4	110 - 94.9434	Diagonal	1	95	-5620.610	12341.394	45.5	Pass
T5	94.9434 - 92.5938	Diagonal	1	135	-5735.430	12093.322	47.4	Pass
T6	92.5938 - 90	Diagonal	1	149	-6225.880	12502.807	49.8	Pass
T7	90 - 80	Diagonal	L3x3x3/16	158	-7906.770	17487.626	45.2 79.3 (b)	Pass
T8	80 - 60	Diagonal	L2 1/2x2 1/2x3/16	167	-7111.440	9648.400	73.7	Pass
T9	60 - 40	Diagonal	L3x3x3/16	182	-6569.730	13367.857	49.1 56.6 (b)	Pass
T10	40 - 20	Diagonal	L3x3x3/16	197	-6477.040	10672.238	60.7	Pass
T11	20 - 0	Diagonal	L3x3x5/16	211	-8138.250	14010.496	58.1	Pass
T5	94.9434 - 92.5938	Secondary Horizontal	1 1/2	136	-1728.200	31478.127	5.5	Pass
T6	92.5938 - 90	Secondary Horizontal	1 1/2	151	-1947.800	30779.635	6.3	Pass
T1	136 - 132.917	Top Girt	4 1/2 X 3/8	4	-1244.890	1820.545	68.4	Pass
T2	132.917 - 130	Top Girt	7/8	18	-191.691	5406.061	3.5	Pass
T3	130 - 110	Top Girt	7/8	33	-901.980	5464.673	16.5	Pass
T4	110 - 94.9434	Top Girt	1	90	-1491.300	7364.171	20.3	Pass
T2	132.917 - 130	Bottom Girt	7/8	21	-773.059	5406.061	14.3	Pass
T3	130 - 110	Bottom Girt	7/8	36	-1971.210	4329.197	45.5	Pass
T6	92.5938 - 90	Bottom Girt	1	144	-972.726	6015.855	16.2	Pass
						Summary		
						Leg (T10)	89.1	Pass
						Diagonal (T7)	79.3	Pass
						Secondary Horizontal (T6)	6.3	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
						Top Girt (T1)	68.4	Pass
						Bottom Girt (T3)	45.5	Pass
						Bolt Checks	79.3	Pass
						RATING =	**89.1**	**Pass**

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

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876338 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Project Name:	Waterford	**Engineer:**	MGY
Project Number:	25598.19255	**Check:**	DTS
Client Site Number:	876338	**Date:**	05/19/14

PiRod Leg Splice Connections

Input - Properties

Elevation:	130	ft - elevation of leg splice connection
F_y:	50.00	ksi - yield stress of leg
F_u:	65.00	ksi - tensile stress of leg
D_t:	1.50	in - diameter of leg above splice
D_b:	2.00	in - diameter of leg below splice
d_{bolt}:	0.625	in - bolt diameter
Type:	A325-N	- bolt type (X - threads excluded, N - threads included)
n:	5	- number of bolts

Input - Loads

Code:	TIA-F	- select version of the TIA
T_u:	4.96	kips - maximum leg tension load
P_u:	7.47	kips - maximum leg compression load
ASIF:	1.33	- stress increase factor
U:	1.00	- shear lag coefficient
ϕ_t:	0.90	< = = DISREGARD
ϕ_t:	0.75	< = = DISREGARD
ϕ_b:	0.75	< = = DISREGARD

Leg Capacity:

1.5 inch diameter leg above splice

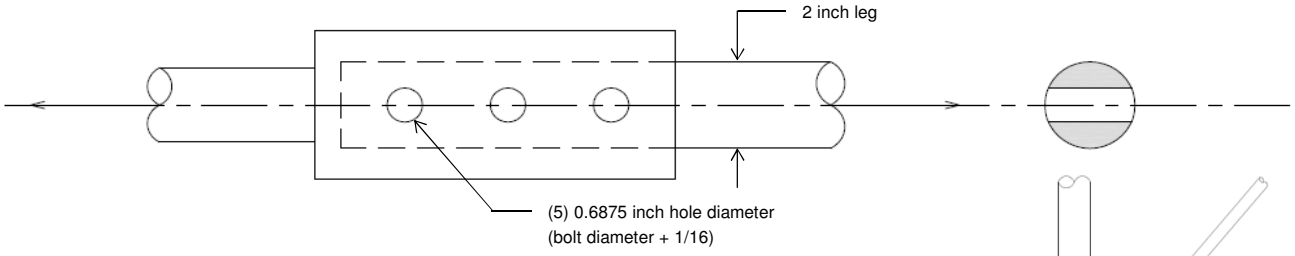
Gross Allowable Tension = ASIF(0.6)(Fy)(Ag) = 1.333(0.6)(50 ksi)(1.7671 in2) = **70.69** kips

2 inch diameter leg below splice

An = Net Area = (Db/2)^2(θ - sin(θ)) = 1.79 in^2

Gross Allowable Tension = ASIF(0.6)(Fy)(Ag) = 1.333(0.6)(50 ksi)(3.1416 in2) = 125.66 kips

Net Allowable Tension = ASIF(0.5)(U)(Fu)(An) = 1.333(0.5)(1)(65 ksi)(1.7942 in2) = **77.75** kips

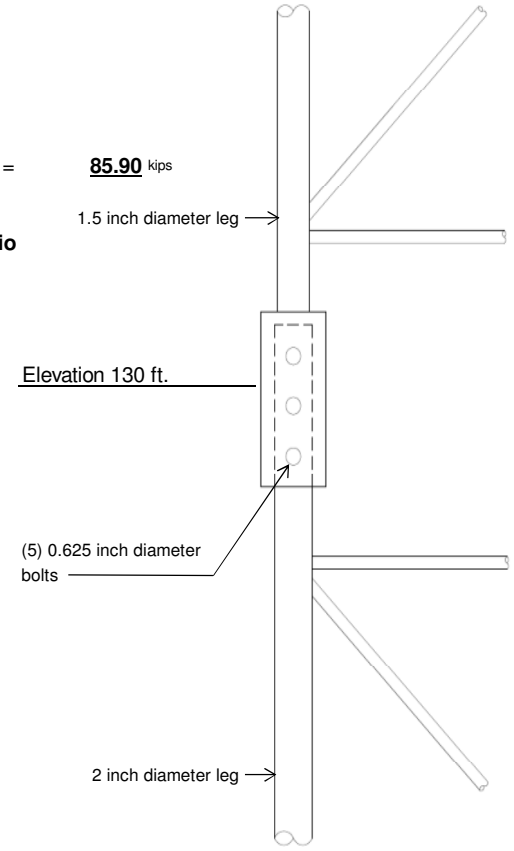


Bolt Capacity:

Allowable Load = (1.333)(21 ksi)(0.307 in2)(5)(2 shear planes) = **85.90** kips

Summary:

		Stress Ratio
Leg Above Tension:	**4.96 < 70.69 (Pass)**	7.0%
Leg Below Tension:	**4.96 < 77.75 (Pass)**	6.4%
Leg Compression:	**7.47 < 85.9 (Pass)**	**8.7%**
Leg Splice Bolts:	**7.47 < 85.9 (Pass)**	**8.7%**



Project Name:	Waterford	**Engineer:**	MGY
Project Number:	25598.19255	**Check:**	DTS
Client Site Number:	876338	**Date:**	05/19/14

PiRod Leg Splice Connections

Input - Properties

Elevation:	110	ft - elevation of leg splice connection
F_y:	50.00	ksi - yield stress of leg
F_u:	65.00	ksi - tensile stress of leg
D_t:	2.00	in - diameter of leg above splice
D_b:	2.25	in - diameter of leg below splice
d_{bolt}:	0.750	in - bolt diameter
Type:	A325-N	- bolt type (X - threads excluded, N - threads included)
n:	5	- number of bolts

Input - Loads

Code:	TIA-F	- select version of the TIA
T_u:	43.31	kips - maximum leg tension load
P_u:	49.56	kips - maximum leg compression load
ASIF:	1.33	- stress increase factor
U:	1.00	- shear lag coefficient
ϕ_t:	0.90	< = = DISREGARD
ϕ_t:	0.75	< = = DISREGARD
ϕ_b:	0.75	< = = DISREGARD

Leg Capacity:

2 inch diameter leg above splice

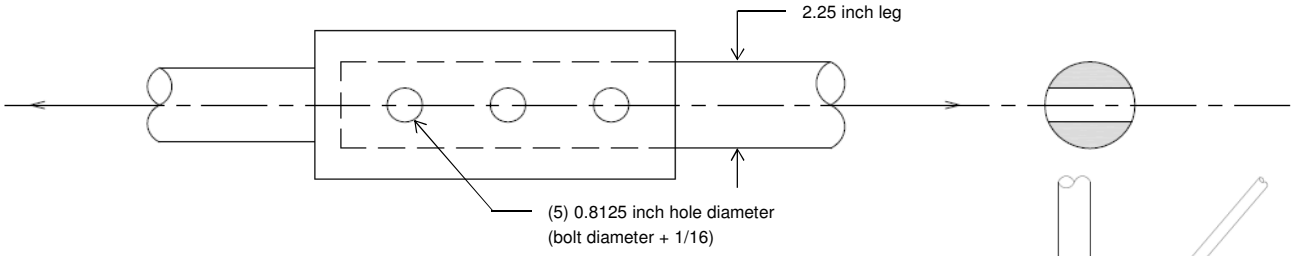
Gross Allowable Tension = ASIF(0.6)(Fy)(Ag) = 1.333(0.6)(50 ksi)(3.1416 in2) = **125.66** kips

2.25 inch diameter leg below splice

An = Net Area = (Db/2)^2(θ - sin(θ)) = 2.19 in^2

Gross Allowable Tension = ASIF(0.6)(Fy)(Ag) = 1.333(0.6)(50 ksi)(3.9761 in2) = 159.04 kips

Net Allowable Tension = ASIF(0.5)(U)(Fu)(An) = 1.333(0.5)(1)(65 ksi)(2.1885 in2) = **94.84** kips

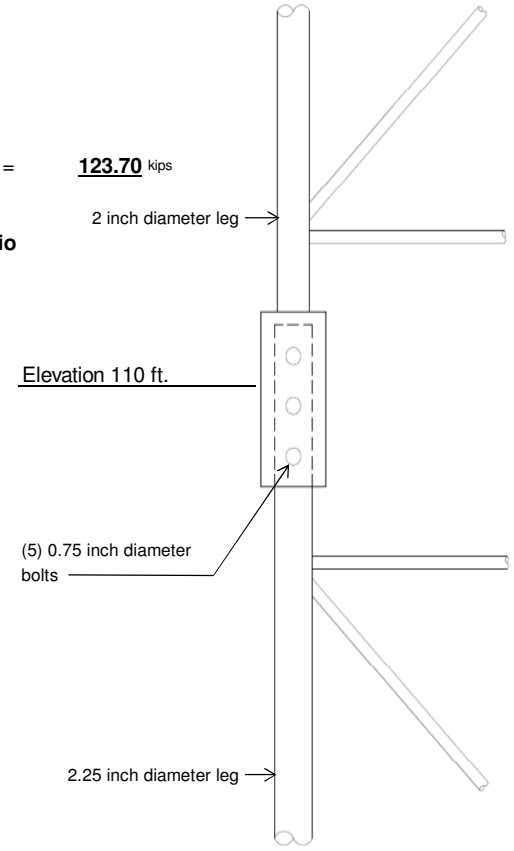


Bolt Capacity:

Allowable Load = (1.333)(21 ksi)(0.442 in2)(5)(2 shear planes) = **123.70** kips

Summary:

		Stress Ratio
Leg Above Tension:	**43.31 < 125.66 (Pass)**	34.5%
Leg Below Tension:	**43.31 < 94.84 (Pass)**	**45.7%**
Leg Compression:	**49.56 < 123.7 (Pass)**	40.1%
Leg Splice Bolts:	**49.56 < 123.7 (Pass)**	40.1%



TRUSS LEG PROPERTIES FOR PiROD SELF-SUPPORT TOWER:

Leg P/N	Elevation (ft)	Exisitng Solid Rod Leg Dia. (in)	Quantity	Area (in^2)	Proposed Rod Dia. (in)
105224	80-90	1.25	3	3.68	1.25

Elevation (ft)	Proposed Qty.	Additional Net Area (in^2)	Total Net Area (in^2)	Equivalent Dia. (in)
80-90	2	2.45	6.1356	1.6137

Leg Component Strength	
Leg (P/N)	105224
Elevation (ft)	80-90
Existing SR (in)	1.25
Existing Area (in^2)	1.23
Existing Circle (in)	13.86
Proposed Circle (in)	10.93
Solid Rod (in)	1.25
Proposed Net Area (in^2)	1.227
Proposed Gross Area (in^2)	1.227
Comp. Load (k)	119.065
Tension Load (k)	108.624
Total Net Area (in^2)	6.14
Total Gross Area (in^2)	6.14
Existing SR	
Unbraced Length	14.2
r	0.3125
KL/r	45.44
Cc	107.00
Fa (K)	40.98
Fb (K)	49.09
% Capacity	**58.11%**
Proposed Solid Rod	
Unbraced Length	14.2
r	0.3125
KL/r	45.44
Cc	107.00
Fa (K)	40.97
Fb (K)	49.08
% Capacity	**58.11%**
Leg Strength	
Unbraced Length	120
$r_{Built\text{-}Up\_net}$	3.997
$r_{Built\text{-}Up\_Gross}$	3.997
KL/r_o	30.02
$a/r_{Indv.\ Leg}$	45.44
$KL/r_{Built\text{-}Up}$	54.46
Cc	107.00
Fa	193.41
Ft	245.44
% Capacity	**61.56%**
Overall % Capacity	**61.56%**
Leg Bolts Capacity	
Number of Leg Bolts	6
Load per Leg Bolt from leg (k)	10.86
Load per Leg Bolt Rod leg (k)	10.86
Total load	21.72
Allowable Leg Bolt Capacity (k)	44.4
% Capacity	**48.93%**

TOWER ENGINEERING PROFESSIONALS

JOB:	Waterford (BU 876338)		
SHEET #:	1	OF	2
CALCULATED BY:	MGY	DATE	5/19/2014

Mat Foundation Design for Self Supporting Tower -TIA-222-F

Q_a, ALLOWABLE SOIL PRESS. (ksf)	4	F'c (ksi)	3
NET OR GROSS BEARING?	NET	F'y (ksi)	60
SOIL DENSITY (pcf)	125		
TOWER FACE WIDTH (ft.)	14.0		
Tower Eccentricity (ft)	2.02	Distance between tower centroid and the foundation centroid	

Base Reactions LC1: Maximum Wind		Base Reactions LC 2: Ice + Ice Wind	
M_u, MOMENT (k-ft)	3091.2	M, MOMENT (k-ft)	979.6
P_t, AXIAL (k)	36.8	P_t, AXIAL (k)	77.3
H, SHEAR (k)	37.3	H, SHEAR (k)	12.4

Try:	L (ft.)	B (ft.)	t (ft.)	Soil depth to TOP of mat (ft.)	Soil depth to BOT. of mat (ft.)	Pier dia./width (ft.)	Pier Height, h (ft.)	Pier Shape
	23	23	3.25	2.75	6	3.00	3.25	Round

W_f, WEIGHT OF FOUNDATION (k) =	268.2	Concrete Volume (cu ft)	66.2
W_s, WEIGHT OF SOIL (k) =	174.6		

CHECK BEARING CAPACITY:	LC1	LC2	
$P = P_t + Wf + Ws =$	479.6 k	520.0 k	
$e = (M_{ot} + P_t * e_t)/P =$	7.11 ft	2.54 ft	
L/6 =	3.83 ft	3.83 ft	
90 Axis: q_{max} =	2.41 ksf	0.88 ksf	
Diag. Axis: q_{max} =	3.56 ksf	1.15 ksf	**Capacity:** 89.1%

CHECK OVERTURNING SF:	LC1	LC2	
$M_{ot} = M+H*(t+h)$ =	3333.7 k-ft	1060.4 k-ft	
$M_{st}=P*(L/2-e_t)+(W_{f+S}*L/2)$ =	5441.2 k-ft	5824.4 k-ft	
$SF = M_{ot}/M_{st}$ =	1.63 > 1.5	5.49 > 1.5	**Capacity:** 91.90%

TOWER ENGINEERING PROFESSIONALS

JOB:	Waterford (BU 876338)		
SHEET NUMBER:	2	OF	2
CALCULATED BY:	MGY	DATE	5/19/2014

CHECK BEAM SHEAR

Vu =	272.2 k
φVc =	778.1 k

Vc > Vu **O.K**

Capacity: **34.99%**

CHECK PUNCHING SHEAR

Vu =	134.2 k
φVc =	1025.2 k

Vc > Vu **O.K**

Capacity: **13.09%**

CALCULATE REINFORCING REQUIRED

F'c = 3.0 ksi F'y = 60.0 ksi

Temp & Shrinkage Reinforcement, As, temp = 0.39 in^2/ft (ACI 318 Sec. 10.5.4)

BOTTOM REINFORCING

Bar Size= 9
Bar Spacing = 6.0 in.
d = 34.3 in.

Mu= -522.6 in-k/ft

φMn=0.9*As*Fy*(d-1/2*As*Fy/(0.85*b*F'c))

Solution: As,req = 0.28 in^2/ft
Check, As= 2.00 in^2/ft

Capacity: **14.22%**

TOP REINFORCING

Bar Size= 9
Bar Spacing = 6.0 in.
d= 34.3 in.

Mu= 101.2 in-k/ft

φMn=0.9*As*Fy*d(1-0.59*As*Fy/(b*d*F'c))

Solution: As,req = 0.05 in^2/ft
Check, As= 2.00 in^2/ft

Capacity: **2.74%**

		PASS	PASS		Waterford (BU 876338)
	Results Summary:	LC1	LC2	TEP #:	25598.19255
	Soil Interaction:	N/A	N/A	Analysis:	MGY 5/19/2014
Drilled Caisson Tool - Input	Foundation Structural:	17.6%	25.4%	Check:	DTS 5/19/2014

Code Revisions: TIA-222-F ACI 318-05

Tower Type: Monopole

	LC1	LC2	
Moment:	83.27	75.71	kip-ft
Axial (download):	267.24		kip
Shear:	25.62	23.29	kip
Axial (uplift):		239.29	kip

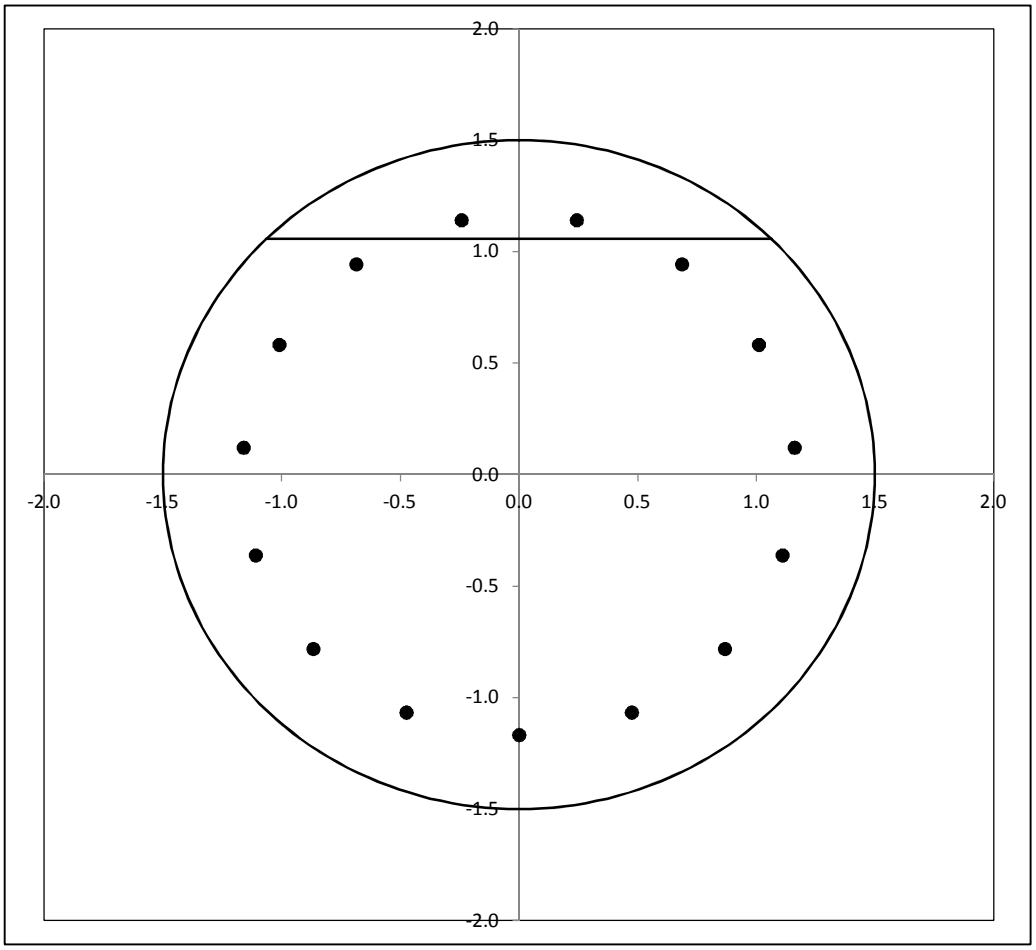
Shaft Information

Diameter:	3.00	ft
Projection:	0.50	ft
Caisson Length:	3.25	ft
f'c:	3.000	ksi
Max εc:	0.003	in/in

Cage 1 Reinforcement

Tie Bar Size:	4	*(fy = 60.0 ksi)*
Clear Cover to Tie:	3.00	*in (Cage Ø = 28.00in)*
Tie Bar Spacing:	6.00	in
Vertical Bar Size:	8	
Vertical Bar Quantity:	15	*(ρ =1.164%)*
fy:	60.0	ksi
E:	29,000	ksi

Reinforcement Capacity



		LC1	LC2	
	Vu =	33.3	33.3	kip
	Vc =	126.1	59.1	kip
fy,tie = 60.0	**Vs =**	126.8	126.8	kip
	ϕVn =	189.7	139.4	kip
	Capacity =	**17.6%**	**23.9%**	
		PASS	**PASS**	

	LC1	LC2	
Mu =	108.2	98.4	kip-ft
ϕMn =	909.5	387.5	kip-ft
Capacity =	**11.9%**	**25.4%**	
	PASS	**PASS**	

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

Sprint Existing Facility

Site ID: CT03XC105

Waterford

41 Manitock Hill Road
Waterford, CT 06385

July 14, 2014

EBI Project Number: 62143968

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

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July 14, 2014

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

Re: Radio Frequency Maximum Permissible Exposure (MPE) Assessment for Site:
CT03XC105 - Waterford

Site Total: 69.98% - MPE% in full compliance

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 41 Manitock Hill Road, Waterford, 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 41 Manitock Hill Road, Waterford, 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) 5 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 **137 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	CT03XC105 - Waterford
Site Addresss	41 Manitock Hill Road, Waterford, CT, 06385
Site Type	Self Support Tower

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	5	100	5.9	137	131	1/2 "	0.5	0	346.74	0.73%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	137	131	1/2 "	0.5	0	39.00	0.14%
1B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	137	131	1/2 "	0.5	0	138.69	0.51%
														Sector total Power Density Value:		1.38%

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	5	100	5.9	137	131	1/2 "	0.5	0	346.74	0.73%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	137	131	1/2 "	0.5	0	39.00	0.14%
2B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	137	131	1/2 "	0.5	0	138.69	0.51%
														Sector total Power Density Value:		1.38%

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	5	100	5.9	137	131	1/2 "	0.5	0	346.74	0.73%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	137	131	1/2 "	0.5	0	39.00	0.14%
3B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	137	131	1/2 "	0.5	0	138.69	0.51%
														Sector total Power Density Value:		1.38%

Site Composite MPE %	
Carrier	MPE %
Sprint	4.15%
Nextel	3.54%
MetroPCS	6.04%
AT&T	21.33%
Verizon Wireless	34.68%
T-Mobile	0.24%
Total Site MPE %	**69.98%**

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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 **4.15% (1.38% from sector 1, 1.38% from sector 2 and 1.38% 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 **69.98%** of the allowable FCC established general public limit sampled at 6 feet above ground level. This total composite site value is based upon MPE values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Scott Heffernan
RF Engineering Director

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