Crown Castle
3530 Toringdon Way
Suite 300
Charlotte, NC 28277

Tel: 704-405-6600

www.crowncastle.com

March 21, 2014

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

RE: **Sprint PCS-Exempt Modification - Crown Site BU: 876363**
Sprint PCS Site ID: CT23XC550
Located at: 219 New Park Road, Hartford, CT 06106-2949

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 The Honorable Pedro E. Segarra, Mayor for the City of Hartford.

Sprint plans to modify the existing wireless communications facility owned by Crown Castle and located at **219 New Park Road, Hartford, CT 06106-2949**. 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: The Honorable Pedro E. Segarra, Mayor
City of Hartford
550 Main Street, Room 200
Hartford, CT 06103

Sprint

CROWN CASTLE

PROJECT:	2.5 EQUIPMENT DEPLOYMENT
SITE NAME:	HARTFORD NU (SSUSA)
SITE CASCADE:	CT23XC550
SITE NUMBER:	876363
SITE ADDRESS:	219 NEW PARK ROAD HARTFORD, CT 06106
SITE TYPE:	MONOPOLE TOWER
MARKET:	NORTHERN CONNECTICUT

SITE INFORMATION

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

LATITUDE (NAD83):
41° 45' 2.808" N
41.75078°

LONGITUDE (NAD83):
72° 42' 48.996" W
-72.71361°

COUNTY:
HARTFORD

ZONING JURISDICTION:
CONNECTICUT SITING COUNCIL

ZONING DISTRICT:
I-2 INDUSTRIAL DISTICT

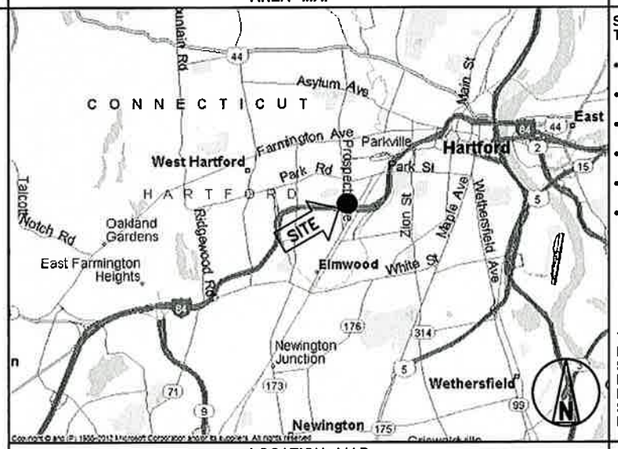
POWER COMPANY:
CONNECTICUT LIGHTS AND POWER
(860) 947-2000

AAV PROVIDER:
AT&T
(800) 246-2020

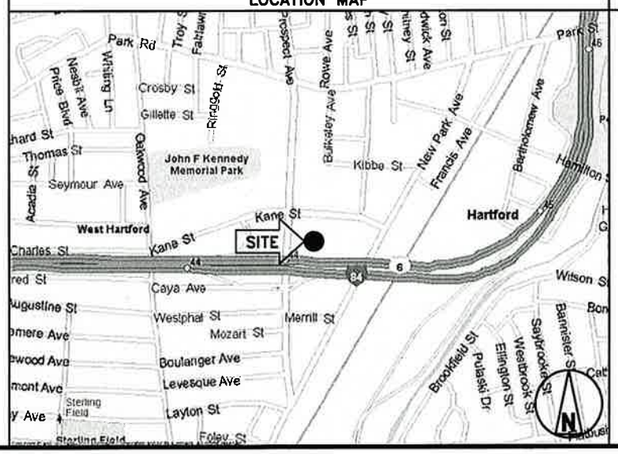
SPRINT CM:
PETER CULBERT
(603) 203-6446
(603) 969-0686
PETER.CULBERT@SPRINT.COM

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 (1) 9929 GROWTH CABINET
- INSTALL (3) PANEL ANTENNAS
- INSTALL (3) RRU'S TO TOWER
- INSTALL (27) JUMPER CABLES
- INSTALL (1) HYBRID CABLE
- INSTALL (8) 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-F 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
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A-2	TOWER ELEVATION & CABLE PLAN	B
A-3	ANTENNA LAYOUT & MOUNTING DETAILS	B
A-4	COLOR CODING & NOTES	B
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E-1	ELECTRICAL & GROUNDING PLAN	B
E-2	ELECTRICAL & GROUNDING DETAILS	B

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
REVISED PER COMMENT	2/14/14	MAP	B
ISSUED FOR REVIEW	2/4/14	MAP	A

SITE NAME:
HARTFORD NU (SSUSA)

SITE CASCADE:
CT23XC550

SITE ADDRESS:
219 NEW PARK ROAD
HARTFORD, CT 06106

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
REVISED PER COMMENT	2/14/14	MAP	B
ISSUED FOR REVEW	2/4/14	MAP	A

SITE NAME:

HARTFORD NU (SSUSA)

SITE CASCADE:

CT23XC550

SITE ADDRESS:

219 NEW PARK ROAD
HARTFORD, CT 06106

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)

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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

DRAWING NOTICE:

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SITE ADDRESS:

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HARTFORD, CT 06106

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.

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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

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
REVISED PER COMMENT	2/14/14	MAP	B
ISSUED FOR REVIEW	2/4/14	MAP	A

SITE NAME:

HARTFORD NU (SSUSA)

SITE CASCADE:

CT23XC550

SITE ADDRESS:

219 NEW PARK ROAD
HARTFORD, CT 06106

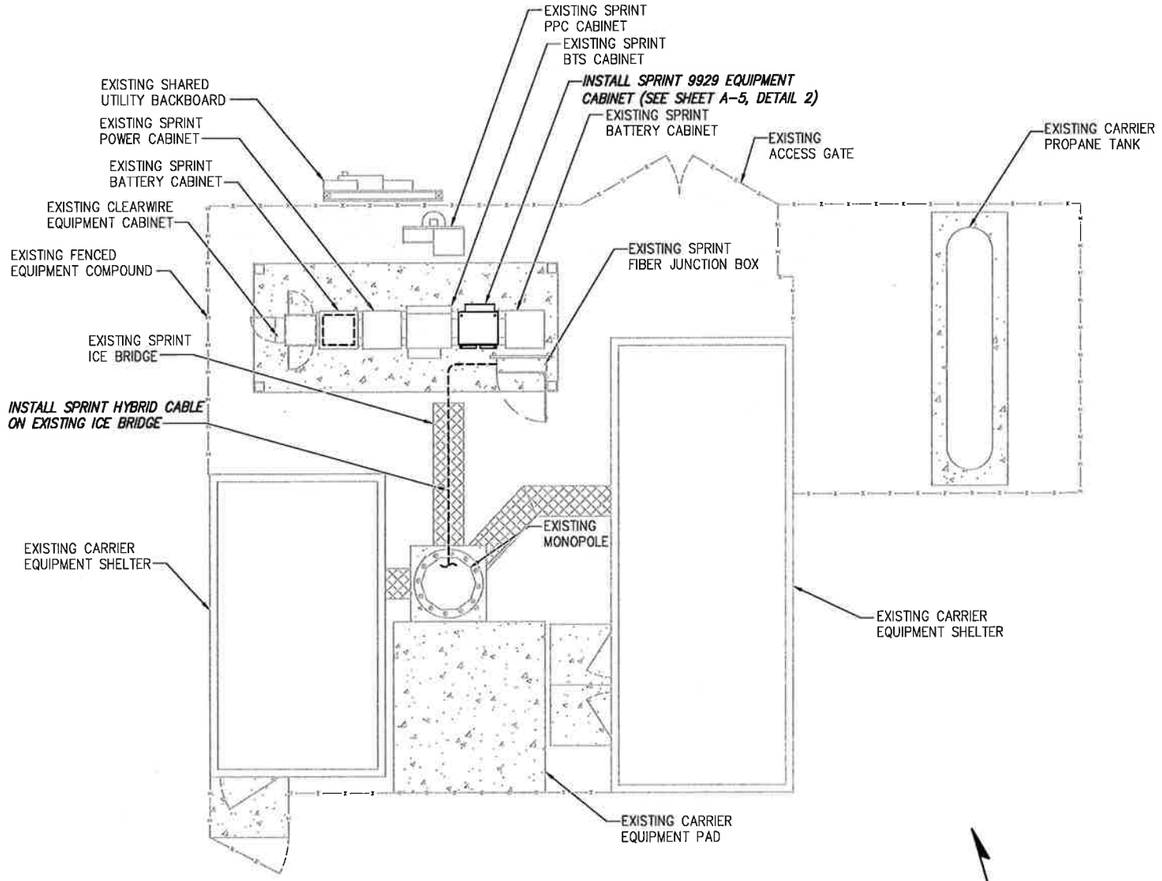
SHEET DESCRIPTION:

SPRINT SPECIFICATIONS

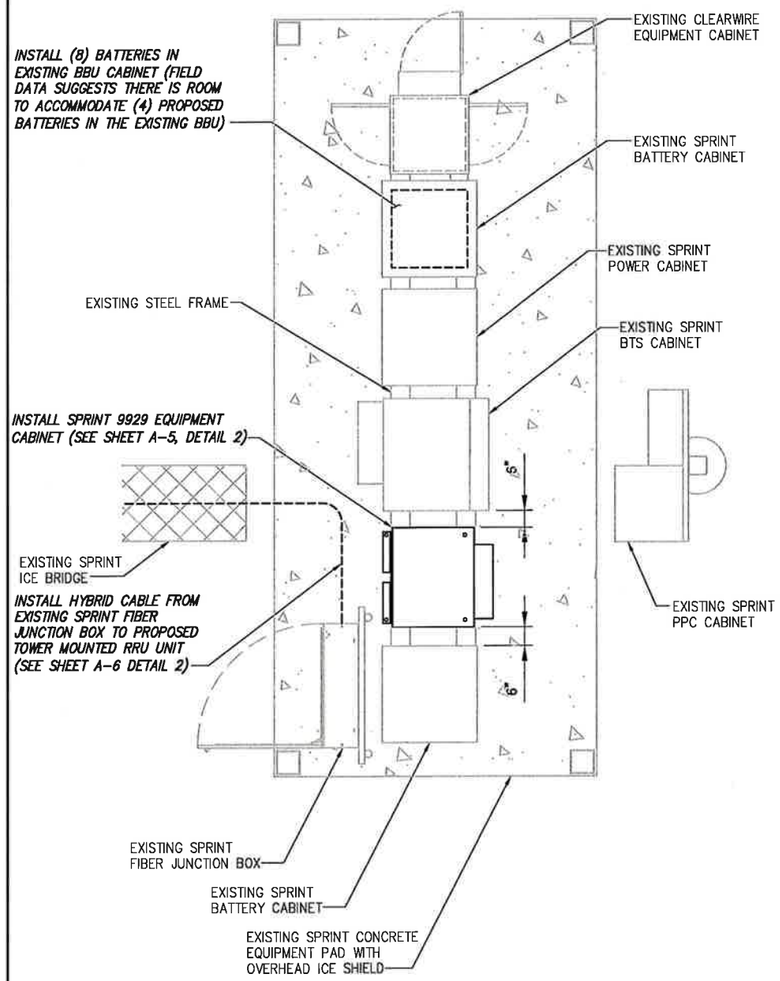
SHEET NUMBER:

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:

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Overland Park, Kansas 66251

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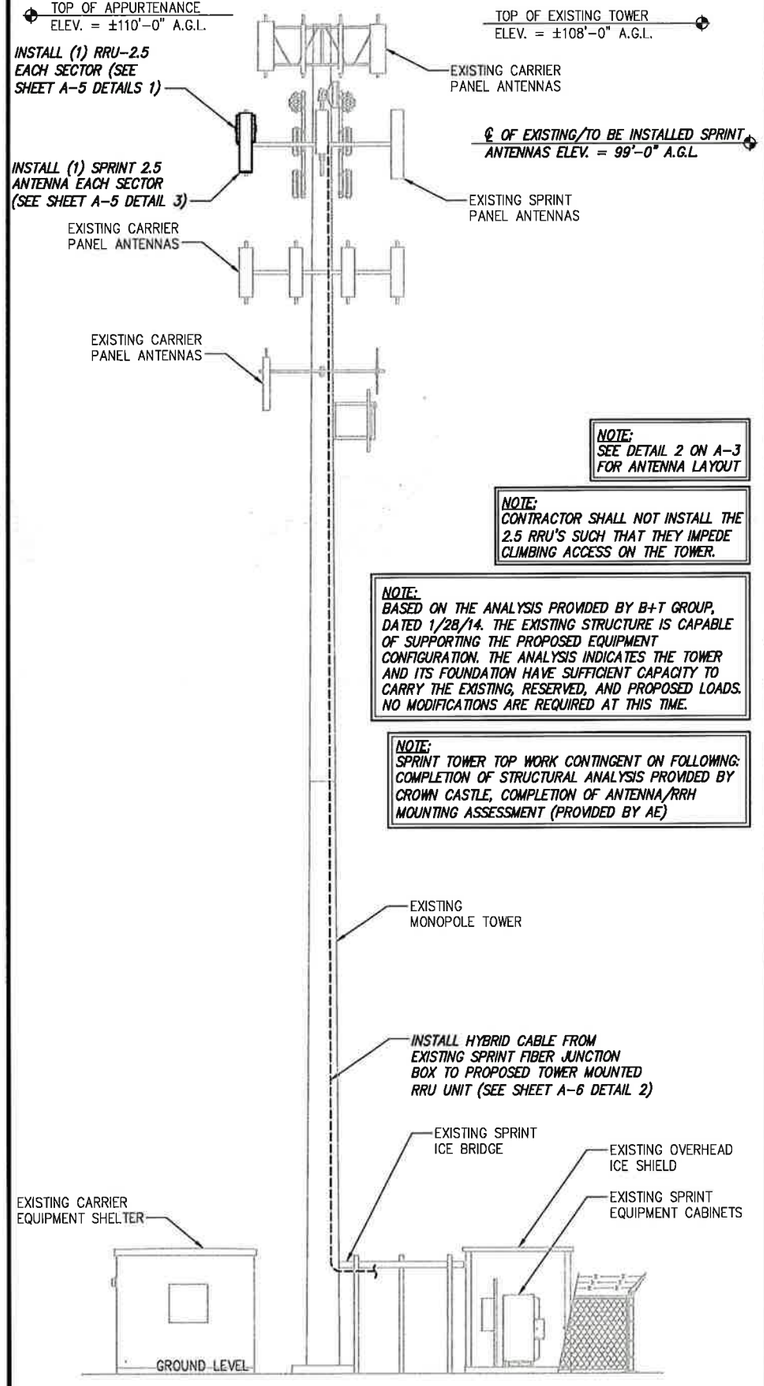
HARTFORD, CT 06106

SHEET DESCRIPTION:

SITE PLAN

SHEET NUMBER:

A-1



TOWER ELEVATION | NO SCALE | 1

DETAIL NOT USED | NO SCALE | 3

DETAIL NOT USED | NO SCALE | 4

DETAIL NOT USED | NO SCALE | 2

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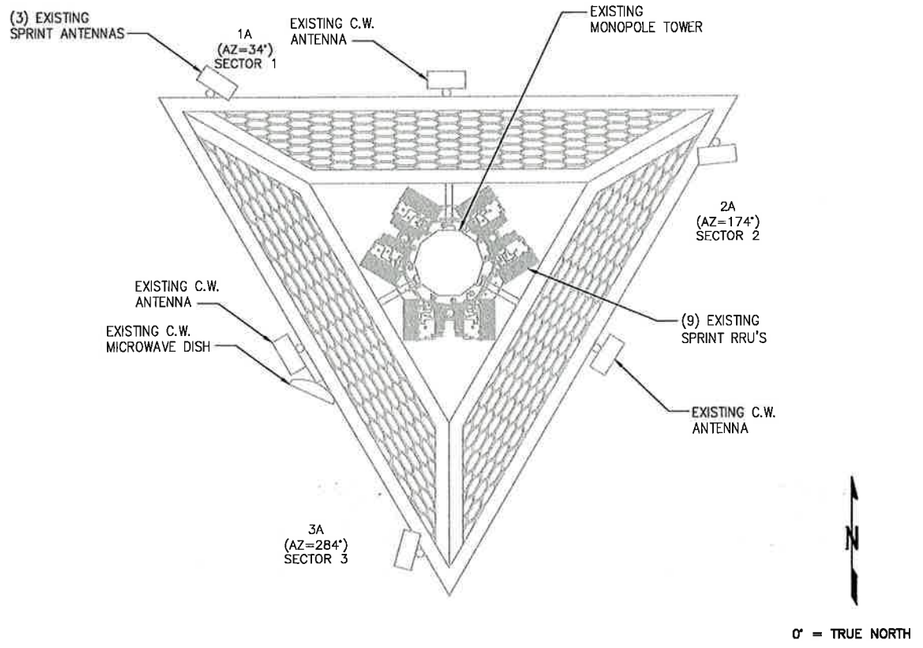
219 NEW PARK ROAD
HARTFORD, CT 06106

SHEET DESCRIPTION:

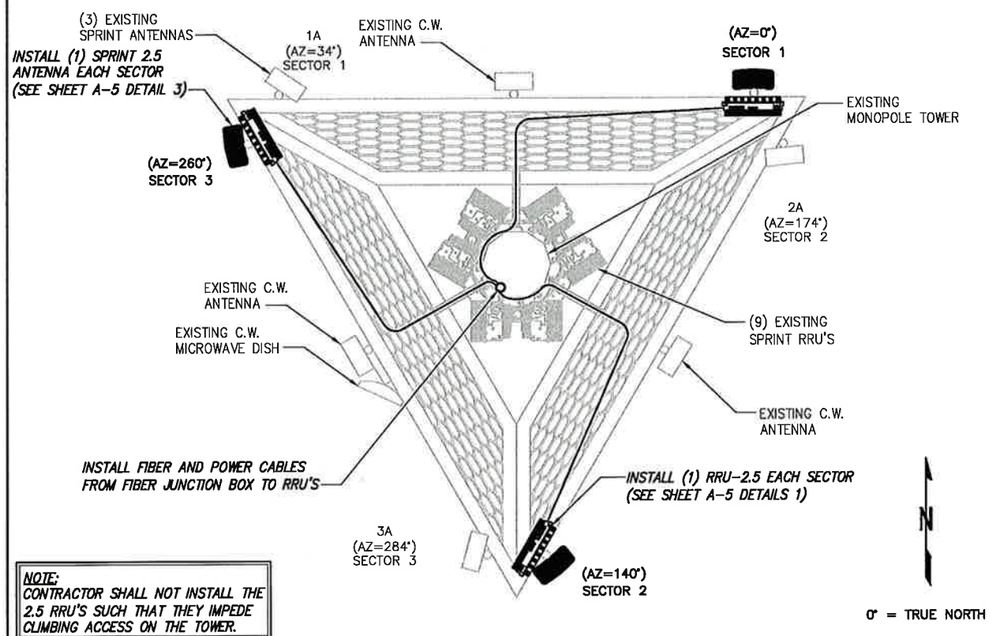
TOWER ELEVATION & CABLE PLAN

SHEET NUMBER:

A-2

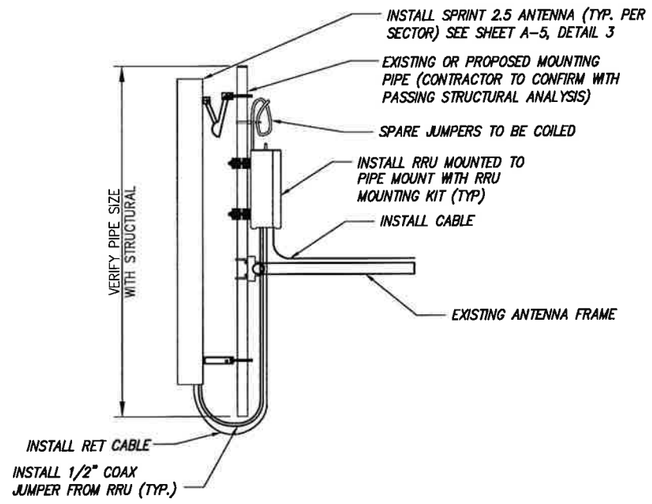


EXISTING ANTENNA & RRU LAYOUT | NO SCALE | 1



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
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

REVISIONS:

DESCRIPTION	DATE	BY	REV
REVISED PER COMMENT	2/14/14	MAP	B
ISSUED FOR REVIEW	2/4/14	MAP	A

SITE NAME:
HARTFORD NU (SSUSA)

SITE CASCADE:
CT23XC550

SITE ADDRESS:
219 NEW PARK ROAD
HARTFORD, CT 06106

SHEET DESCRIPTION:
ANTENNA LAYOUT & MOUNTING DETAILS

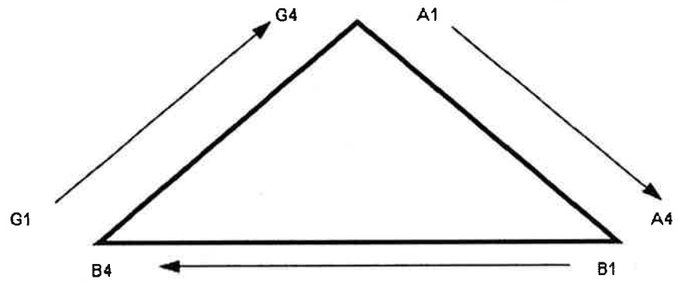
SHEET NUMBER:
A-3

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	Brown	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	Brown	Brown	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	Brown	Brown	Brown
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

COLOR CODING AND NOTES | NO SCALE | A

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CT23XC550

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HARTFORD, CT 06106

SHEET DESCRIPTION:

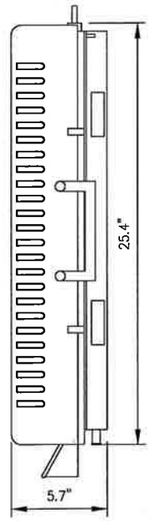
COLOR CODING AND NOTES

SHEET NUMBER:

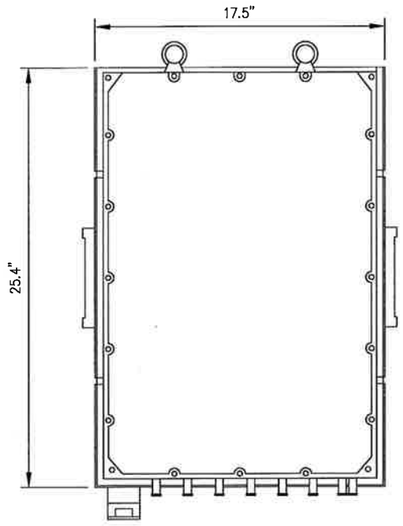
A-4

RRU: ALCATEL LUCENT TD-RRH8X20

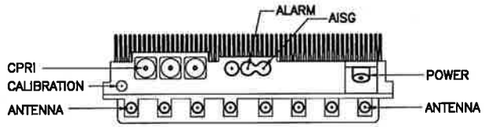
COLOR: LIGHT GREY
WEIGHT: 70 LBS.



SIDE VIEW



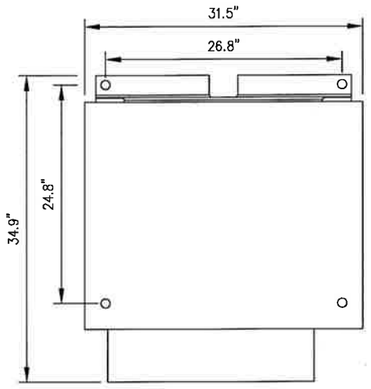
FRONT VIEW



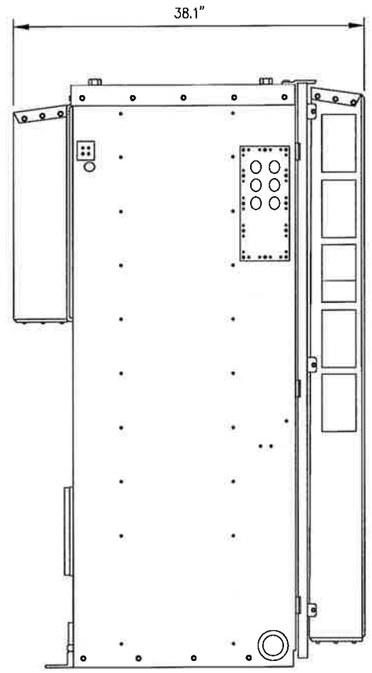
PLAN VIEW

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'S | NO SCALE | 1



BOTTOM VIEW

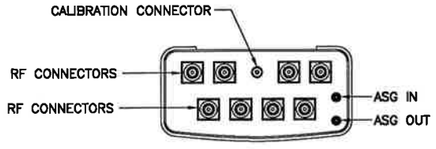


SIDE VIEW

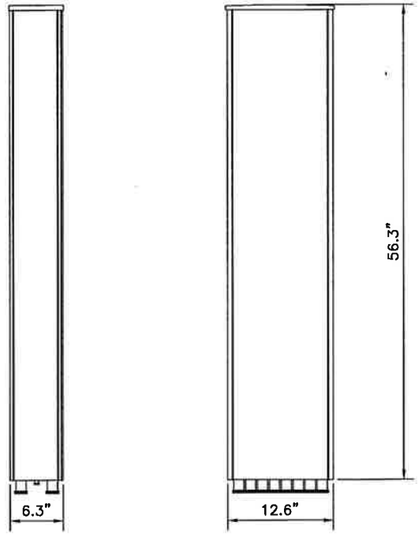
9929 GROWTH CABINET | NO SCALE | 2

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:

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CROWN CASTLE

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JOHN S. STEVENS
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HARTFORD, CT 06106

SHEET DESCRIPTION:

EQUIPMENT & MOUNTING DETAILS

SHEET NUMBER:

A-5

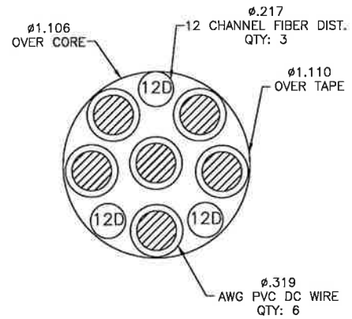
RFS HYBRIFLEX RISER CABLE SCHEDULE

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

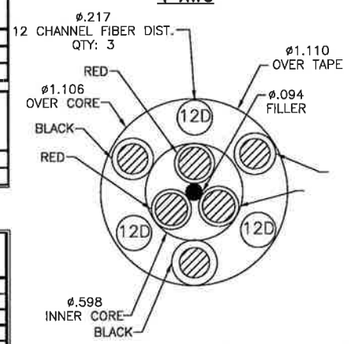
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

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

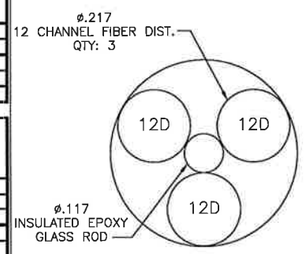
NOTE:
SPRINT CM TO CONFIRM HYBRID OR FIBER RISER CABLE AND HYBRID OR FIBER JUMPER CABLE MODEL NUMBERS IF HYBRID CABLES ARE REQUIRED BEFORE PREPARING BOM.



4 AWG

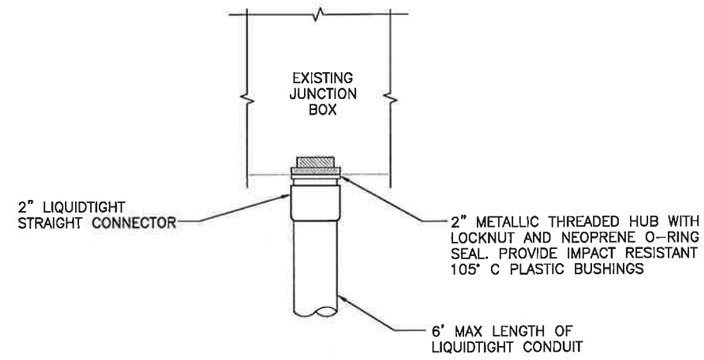


8 & 6 AWG

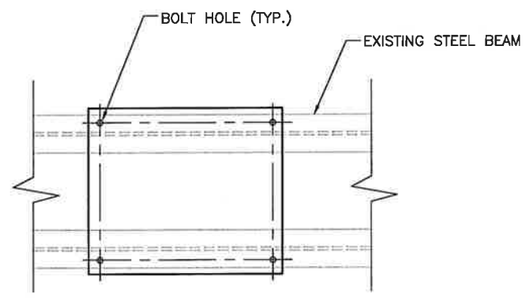


FIBER ONLY

2.5 CABLE CROSS SECTION DATA | NO SCALE | 1



FIBER JUNCTION BOX PENETRATION | NO SCALE | 2



1. VERIFY BOLT HOLE SPACING WITH EQUIPMENT CUT SHEETS.
2. NEW EQUIPMENT CABINET TO BE MOUNTED TO EXISTING SUPPORT SURFACE WITH BOLT-DOWN SYSTEM PER MANUFACTURER'S SPECIFICATION AND FIELD DRILL HOLES THROUGH EXISTING STEEL BEAMS AS REQUIRED.
3. MAINTAIN A MINIMUM OF 1" DISTANCE FROM CENTER OF BOLT HOLE TO EDGE OF FLANGE.

CABINET MOUNT DETAIL | NO SCALE | 3

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

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HARTFORD, CT 06106

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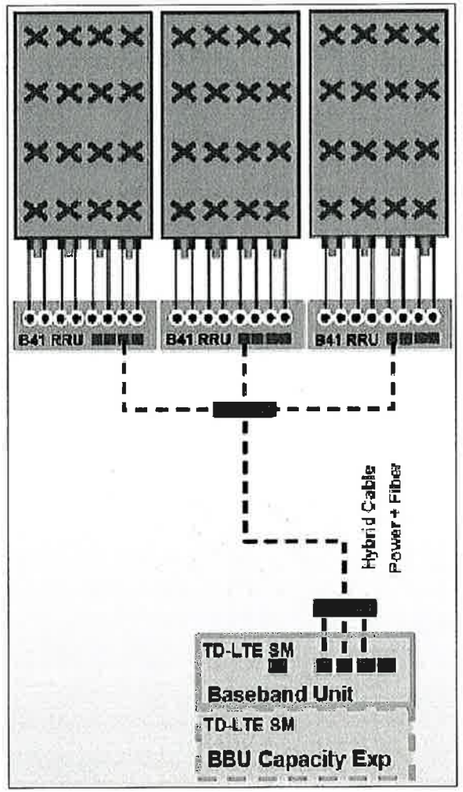
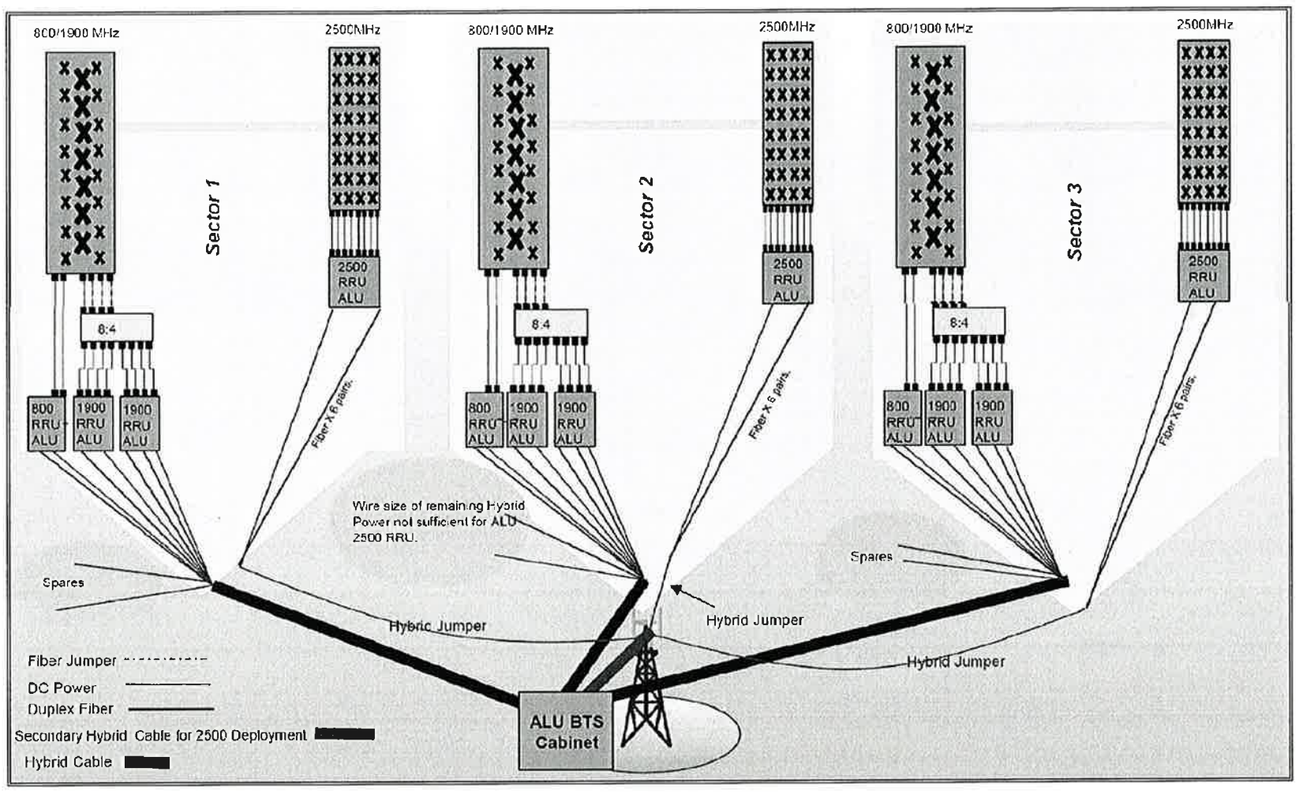
CIVIL DETAILS

SHEET NUMBER:

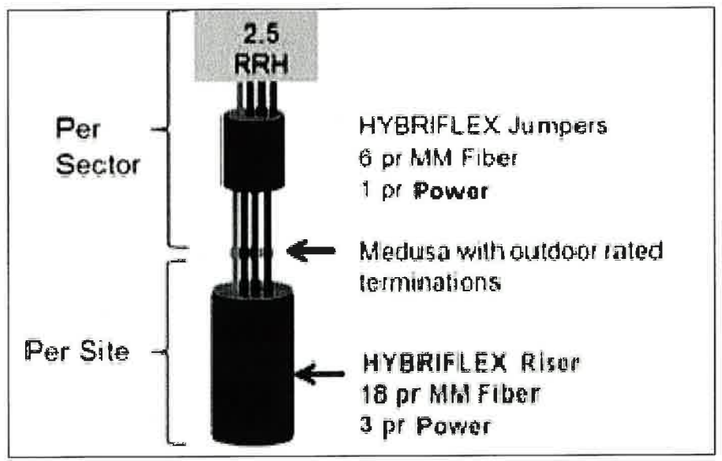
A-6



ALU 2.5 ALU SCENARIO 1



RAN WIRING DIAGRAM



RF 2.5 ALU SCENARIO 1

PLUMBING DIAGRAM | NO SCALE | 1

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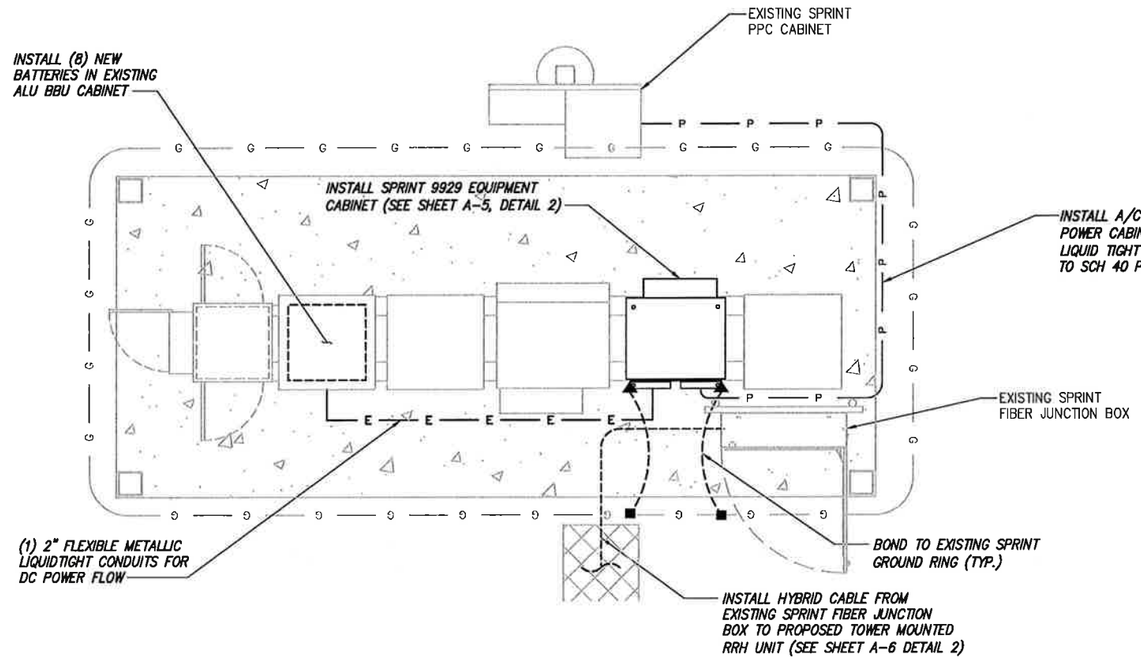
PLUMBING DIAGRAM

SHEET NUMBER:

A-7



NOTE:
CONTRACTOR IS TO ENSURE THE INSTALLATION INSTRUCTIONS FOR EACH CABINET ARE FOLLOWED AND THAT THE MANUFACTURER'S REQUIREMENTS ARE MET.

LEGEND:

- EXISTING GROUND RING
- CADWELD CONNECTION (EXOTHERMIC WELD)
- MECHANICAL CONNECTION
- GROUND ROD
- CABLE GROUND KIT

ELECTRICAL AND GROUNDING PLAN

NO SCALE | 1

LEGEND:

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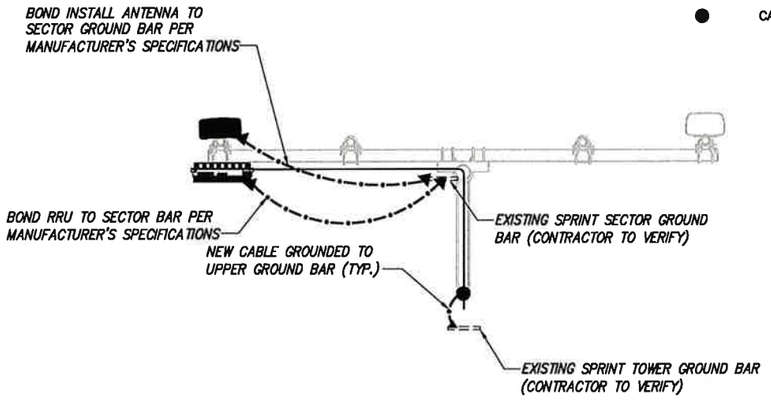
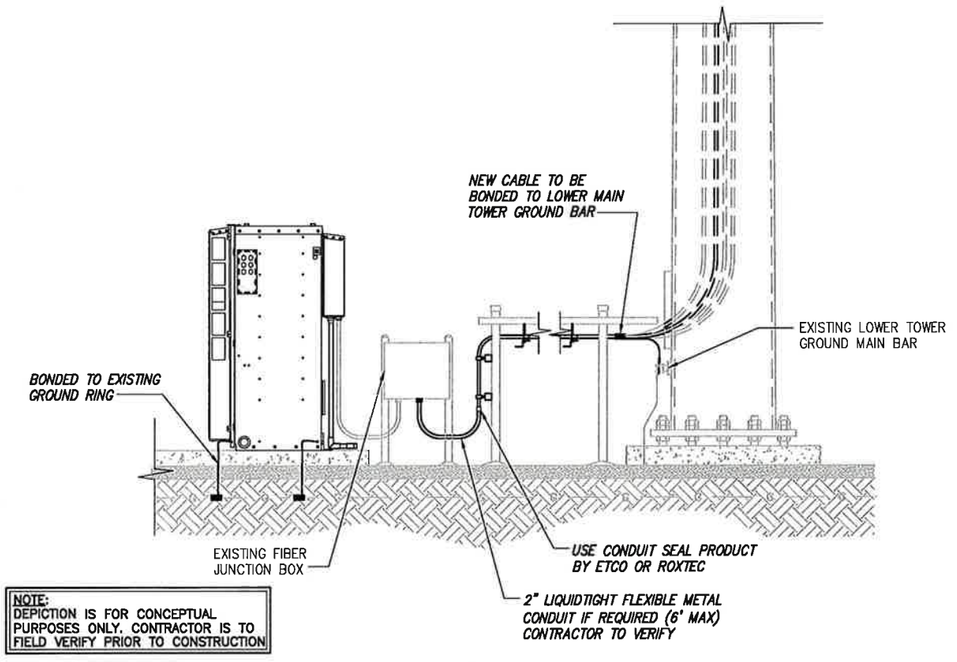
- CADWELD CONNECTION (EXOTHERMIC WELD)
- MECHANICAL CONNECTION
- GROUND ROD
- CABLE GROUND KIT



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

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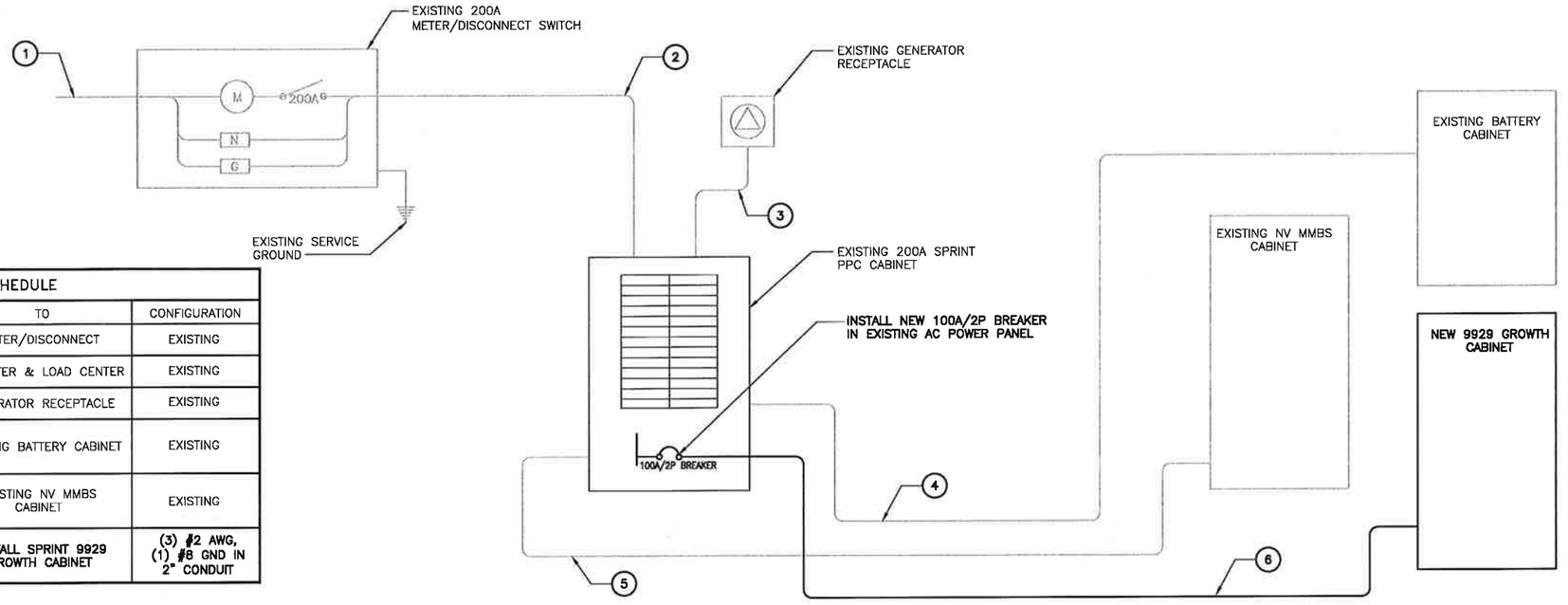
HARTFORD, CT 06106

SHEET DESCRIPTION:
ELECTRICAL & GROUNDING PLAN

SHEET NUMBER:
E-1

NOTES

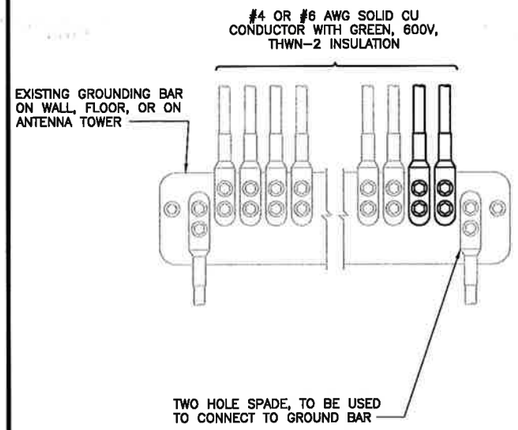
GC SHALL REFERENCE ALL SPECS FOR "CONNECTING THE POWER SUPPLY" OF THE NEW INSTALLATION DOCUMENTS, FOR ALL CONNECTION SPECIFICATIONS.



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 BATTERY CABINET	EXISTING
5	TRANSFER & LOAD CENTER	EXISTING NV MMBS CABINET	EXISTING
6	TRANSFER & LOAD CENTER	INSTALL SPRINT 9929 GROWTH CABINET	(3) #2 AWG, (1) #8 GND IN 2" CONDUIT

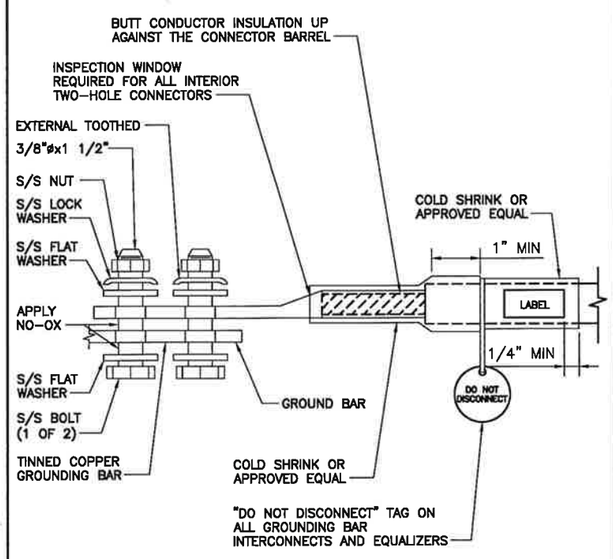
ELECTRICAL ONE-LINE DIAGRAM — NO SCALE — 1



NOTES

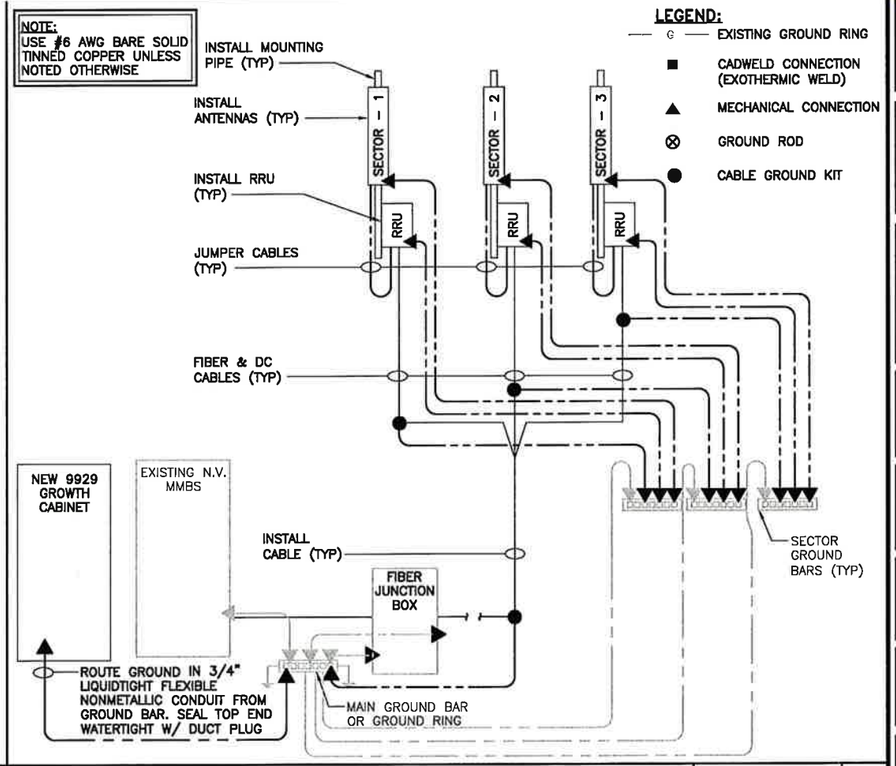
1. APPLY NO-OX TO LUG AND BAR CONTACT SURFACE. DO NOT COAT INLINE LUG.
2. IF STOLEN GROUND BARS ARE ENCOUNTERED, CONTACT SPRINT CM FOR REPLACEMENT THREADED ROD KIT.

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



TWO HOLE LUG — NO SCALE — 3

NOTE:
USE #6 AWG BARE SOLID TINNED COPPER UNLESS NOTED OTHERWISE



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
REVISED PER COMMENT	2/14/14	MAP	B
ISSUED FOR REVIEW	2/4/14	MAP	A

SITE NAME:

HARTFORD NU (SSUSA)

SITE CASCADE:

CT23XC550

SITE ADDRESS:

219 NEW PARK ROAD
HARTFORD, CT 06106

SHEET DESCRIPTION:

ELECTRICAL & GROUNDING DETAILS

SHEET NUMBER:

E-2

January 28, 2014

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

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
btwo@btgrp.com

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Sprint PCS* Co-Locate – Scenario A**	
	Carrier Site Number:	CT23XC550
	Carrier Site Name:	Hartford - NU (SSUSA)
Crown Castle Designation:	**Crown Castle BU Number:**	876363
	Crown Castle Site Name:	Hartford - NU (SSUSA)
	Crown Castle JDE Job Number:	253012
	Crown Castle Work Order Number:	696080
	Crown Castle Application Number:	208263 Rev. 4
Engineering Firm Designation:	**B+T Group Project Number:**	85565.005.01
Site Data:	**219 New Park Rd., HARTFORD, Hartford County, CT** **Latitude *41° 45' 2.79"*, Longitude *-72° 42' 49.23"*** **108 Foot - Monopole Tower**	

Dear Patrick Byrum,

B+T Group are 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 607281, in accordance with application 208263, revision 4.

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

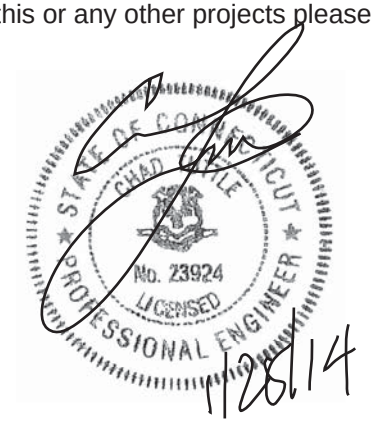
LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard, the 2005 CT State Building Code and IBC 2006 based upon a wind speed of 80 mph fastest mile.

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

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

Respectfully submitted by:
B+T Engineering, Inc.



Jennifer Barnat
Project Engineer

Chad E. Tuttle, P.E.
President

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 108 ft Monopole tower designed by Summit in October of 2000. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F. This tower has been modified multiple times and is incorporated in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
98.0	99.0	3	Alcatel Lucent	TD-RRH8x20-25	1	5/8	--
		3	RFS Celwave	APXVTM14-C-120			

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
105.0	105.0	3	Alcatel Lucent	RRH2X40-AWS	1	1 5/8	2
		3	Antel	BXA-171063-12BF			
		3	Antel	BXA-70063/6CF			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			
		3	Antel	BXA-171063-12BF	18	1 5/8	1
		3	Antel	BXA-70063/6CF			
		1	--	Sector Mount [SM 401-3]			
98.0	102.0	1	Dragonwave	A-ANT-23G-1-C	3 2 3	1 1/4 1/2 5/16	1
		1	Dragonwave	A-ANT-18G-2-C			
		2	Dragonwave	HORIZON COMPACT			
	99.0	3	Argus Tech	LLPX310R			
		1	RFS Celwave	APXV9ERR18-C-A20			
		2	RFS Celwave	APXVSPP18-C-A20			
		3	Samsung	WIMAX DAP HEAD			
	98.0	3	RFS Celwave	IBC1900BB-1			
		3	RFS Celwave	IBC1900HG-2A			
		1	--	Platform Mount [LP 712-1]			
96.0	96.0	3	Alcatel Lucent	800MHz 2X50W RRH W/FILTER	--	--	1
		3	Alcatel Lucent	PCS 1900MHz 4x45W-65MHz			
		1	--	Side Arm Mount [SO 102-3]			
	95.0	3	Alcatel Lucent	PCS 1900MHz 4x45W-65MHz			
88.0	88.0	12	Decibel	844G65VTZAS	12	1 1/4	3
		1	--	Platform Mount [LP 304-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
81.0	81.0	1	--	T-Arm Mount [TA 602-3]	6 1	7/8 5/16	1
	80.0	3	Andrew	HBX-6516DS-VTM			
74.0	76.0	1	Lucent	KS24019-L112A	1	1/2	1
	74.0	1	--	Side Arm Mount [SO 702-1]			

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

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
98	98	12	Dapa	48000 PCS Panel	--	--
		1	Generic	14' Low Profile Platform		
88	88	12	Dapa	48000 PCS Panel	--	--
		1	Generic	14' Low Profile Platform		
76	76		GPS	Antenna w/ Mount	--	--

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Sprint Co-locate, Revision# 4	208263	CCI Sites
Tower Manufacturing Drawing	Summit, Job No.11049	1947570	CCI Sites
Tower Modification Drawing	B+T GRP, Project No. 85565.003.01	3716190	CCI Sites
Post Modification Inspection	PJF, Project No: 67310-0013	2445631	CCI Sites
Post Modification Inspection	PJF, Project No. 67309-0057	2445632	CCI Sites
Modification Inspection	TEP Project Number 128633	Date: 12/20/2013	On File
Foundation Drawing	Summit, Job No.11049	1613616	CCI Sites
Geotech Report	FDH, Project No: 08-10012E G1	2337384	CCI Sites
Antenna Configuration	Crown CAD Package	Date:01/02/2014	CCI Sites

3.1) Analysis Method

tnxTower (version 6.1.3.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
5) Mount areas and weights are assumed based on photographs provided.
6) The existing base plate grout was not considered in this analysis.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	108 - 98.5	Pole	TP8.625x8.625x0.313	1	-1.405	228.444	63.4	Pass
L2	98.5 - 98	Pole	TP16.5x8.625x0.313	2	-1.409	228.444	17.9	Pass
L3	98 - 83.25	Pole	TP18.861x16.5x0.313	3	-7.004	956.439	51.7	Pass
L4	83.25 - 76.75	Pole	TP19.901x18.861x0.49	4	-8.878	1255.166	55.2	Pass
L5	76.75 - 60.5	Pole	TP22.502x19.901x0.683	5	-12.331	1702.881	69.1	Pass
L6	60.5 - 59.5	Pole	TP22.662x22.502x0.852	6	-12.599	2111.245	57.9	Pass
L7	59.5 - 47	Pole	TP24.663x22.662x0.826	7	-15.126	2287.734	63.7	Pass
L8	47 - 40.5	Pole	TP25.127x23.518x0.799	8	-18.461	2310.635	74.8	Pass
L9	40.5 - 29.75	Pole	TP26.901x25.127x0.764	9	-21.549	2380.511	82.4	Pass
L10	29.75 - 13	Pole	TP29.665x26.901x0.746	10	-26.670	2769.414	82.6	Pass
L11	13 - 10	Pole	TP30.16x29.665x0.728	11	-27.622	3003.142	95.9	Pass
L12	10 - 0	Pole	TP31.81x30.16x0.751	12	-31.026	3097.492	92.1	
							Summary	
						Pole (L10)	95.9	Pass
						Rating =	95.9	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	78.5	Pass
1	Base Plate	Base	82.6	Pass
1	Flange Connection	98	57.7	Pass
1	Base Foundation	Base	72.0	Pass

Structure Rating (max from all components) =	**95.9%**

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

4.1) Recommendations

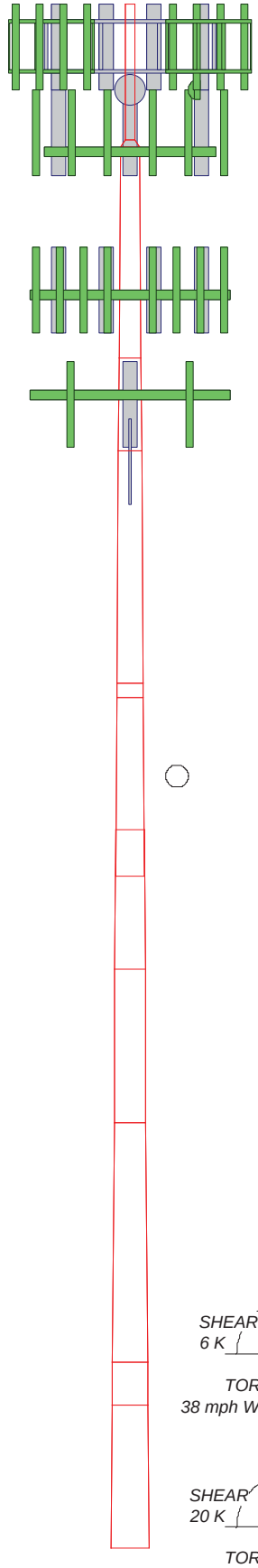
The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4	5	6	7	8	9	10	11	12
Length (ft)	9.500	0.500	14.750	6.500	16.250	1.000	12.500	9.750	10.750	16.750	3.000	10.000
Number of Sides	1	1	18	18	18	18	18	18	18	18	18	18
Thickness (in)	0.313	0.313	0.313	0.490	0.683	0.852	0.826	0.799	0.764	0.746	0.728	0.751
Socket Length (ft)							3.250					
Top Dia (in)	8.625	8.625	16.500	18.861	19.901	22.502	22.662	23.518	25.127	26.901	29.665	30.160
Bot Dia (in)	8.625	8.625	18.861	19.901	22.502	22.662	24.663	25.127	26.901	29.665	30.160	31.810
Grade	A53-B-35	A53-B-35	A607-65	A607-65	51.963609ksi	44.987891ksi	44.774765ksi	46.785377ksi	46.853692ksi	46.962635ksi	50.54006ksi	52.314555ksi
Weight (K)	0.3	0.0	0.9	0.6	2.4	0.2	2.4	1.9	2.1	3.6	0.7	2.5

108.0 ft
98.5 ft
83.3 ft
76.8 ft
60.5 ft
47.0 ft
40.5 ft
29.8 ft
13.0 ft
10.0 ft
0.0 ft



SHEAR 6 K
TORQUE
38 mph WIND - 1.000 in ICE
AXIAL 31 K
SHEAR 20 K
MOMENT 1612 kip-ft
TORQUE 1 kip-ft
REACTIONS - 80 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
BXA-70063/6CF (E)	105	IBC1900HG-2A (E)	98
BXA-70063/6CF (E)	105	IBC1900BB-1 (E)	98
BXA-70063/6CF (E)	105	IBC1900BB-1 (E)	98
BXA-171063-12BF w/ Mount Pipe (E)	105	IBC1900BB-1 (E)	98
BXA-171063-12BF w/ Mount Pipe (E)	105	APXVTM14-C-120 w/ Mount Pipe (P)	98
BXA-171063-12BF w/ Mount Pipe (E)	105	APXVTM14-C-120 w/ Mount Pipe (P)	98
BXA-70063/6CF (R)	105	APXVTM14-C-120 w/ Mount Pipe (P)	98
BXA-70063/6CF (R)	105	TD-RRH8x20-25 (P)	98
BXA-70063/6CF (R)	105	TD-RRH8x20-25 (P)	98
BXA-171063-12BF w/ Mount Pipe (R)	105	TD-RRH8x20-25 (P)	98
BXA-171063-12BF w/ Mount Pipe (R)	105	Platform Mount [LP 712-1] (E)	98
BXA-171063-12BF w/ Mount Pipe (R)	105	A-ANT-18G-2-C (E)	98
RRH2X40-AWS (R)	105	A-ANT-23G-1-C (E)	98
RRH2X40-AWS (R)	105	PCS 1900MHz 4x45W-65MHz (E)	96
RRH2X40-AWS (R)	105	PCS 1900MHz 4x45W-65MHz (E)	96
DB-T1-6Z-8AB-0Z (R)	105	PCS 1900MHz 4x45W-65MHz (E)	96
Sector Mount [SM 401-3] (E- 2 Pipes/ Sector)	105	PCS 1900MHz 4x45W-65MHz (E)	96
LLPX310R w/ Mount Pipe (E-Clearwave)	98	800MHz 2X50W RRH W/FILTER (E)	96
LLPX310R w/ Mount Pipe (E-Clearwave)	98	800MHz 2X50W RRH W/FILTER (E)	96
LLPX310R w/ Mount Pipe (E-Clearwave)	98	800MHz 2X50W RRH W/FILTER (E)	96
WIMAX DAP HEAD (E-Clearwave)	98	Side Arm Mount [SO 102-3] (E)	96
WIMAX DAP HEAD (E-Clearwave)	98	PCS 1900MHz 4x45W-65MHz (E)	96
WIMAX DAP HEAD (E-Clearwave)	98	PCS 1900MHz 4x45W-65MHz (E)	96
HORIZON COMPACT (E-Clearwave)	98	(4) 844G65VTZAS w/ Mount Pipe (E)	88
HORIZON COMPACT (E-Clearwave)	98	Platform Mount [LP 304-1] (E)	88
APXV9ERR18-C-A20 w/ Mount Pipe (E)	98	(4) 844G65VTZAS w/ Mount Pipe (E)	88
APXVSPP18-C-A20 w/ Mount Pipe (E)	98	(4) 844G65VTZAS w/ Mount Pipe (E)	88
APXVSPP18-C-A20 w/ Mount Pipe (E)	98	HBX-6516DS-VTM w/ Mount Pipe (E)	81
IBC1900HG-2A (E)	98	6' x 2" Mount Pipe (E)	81
IBC1900HG-2A (E)	98	6' x 2" Mount Pipe (E)	81
		6' x 2" Mount Pipe (E)	81
		T-Arm Mount [TA 602-3]	81
		HBX-6516DS-VTM w/ Mount Pipe (E)	81
		HBX-6516DS-VTM w/ Mount Pipe (E)	81
		KS24019-L112A (E)	74
		Side Arm Mount [SO 702-1] (E)	74

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	63 ksi	46.853692ksi	47 ksi	62 ksi
A607-65	65 ksi	80 ksi	46.962635ksi	47 ksi	62 ksi
51.963609ksi	52 ksi	67 ksi	50.54006ksi	51 ksi	66 ksi
44.987891ksi	45 ksi	60 ksi	55.229363ksi	55 ksi	70 ksi
44.774765ksi	45 ksi	60 ksi	52.314555ksi	52 ksi	67 ksi
46.785377ksi	47 ksi	62 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 95.9%

B+T Group
1717 South Boulder Ave, Suite 300
Tulsa, OK - 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

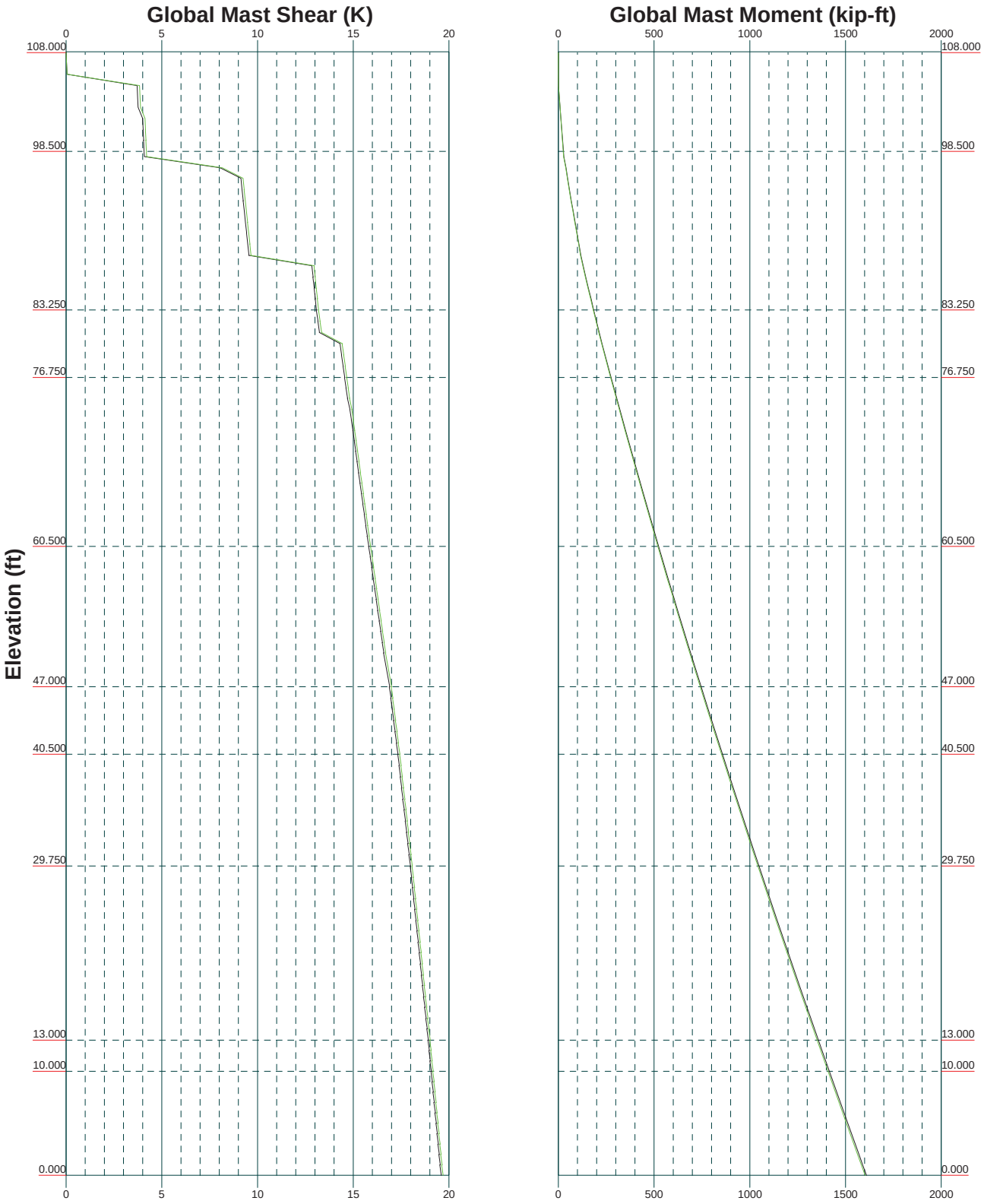
Job: 85565.005.01- HARTFORD - NU (SSUSA), CT (BU# 87636			
Project:			
Client: Crown Castle	Drawn by: JBarnat	App'd:	
Code: TIA/EIA-222-F	Date: 01/28/14	Scale: NTS	
Path: S:\Projects\Crown Castle\85565_876363_Hartford\Engineering\tnxTower\85565_004_Hartford_CT_AS.eri		Dwg No. E-1	

TIA/EIA-222-F - 80 mph/38 mph 1.000 in Ice

Vx Vz

Maximum Values

Mx Mz



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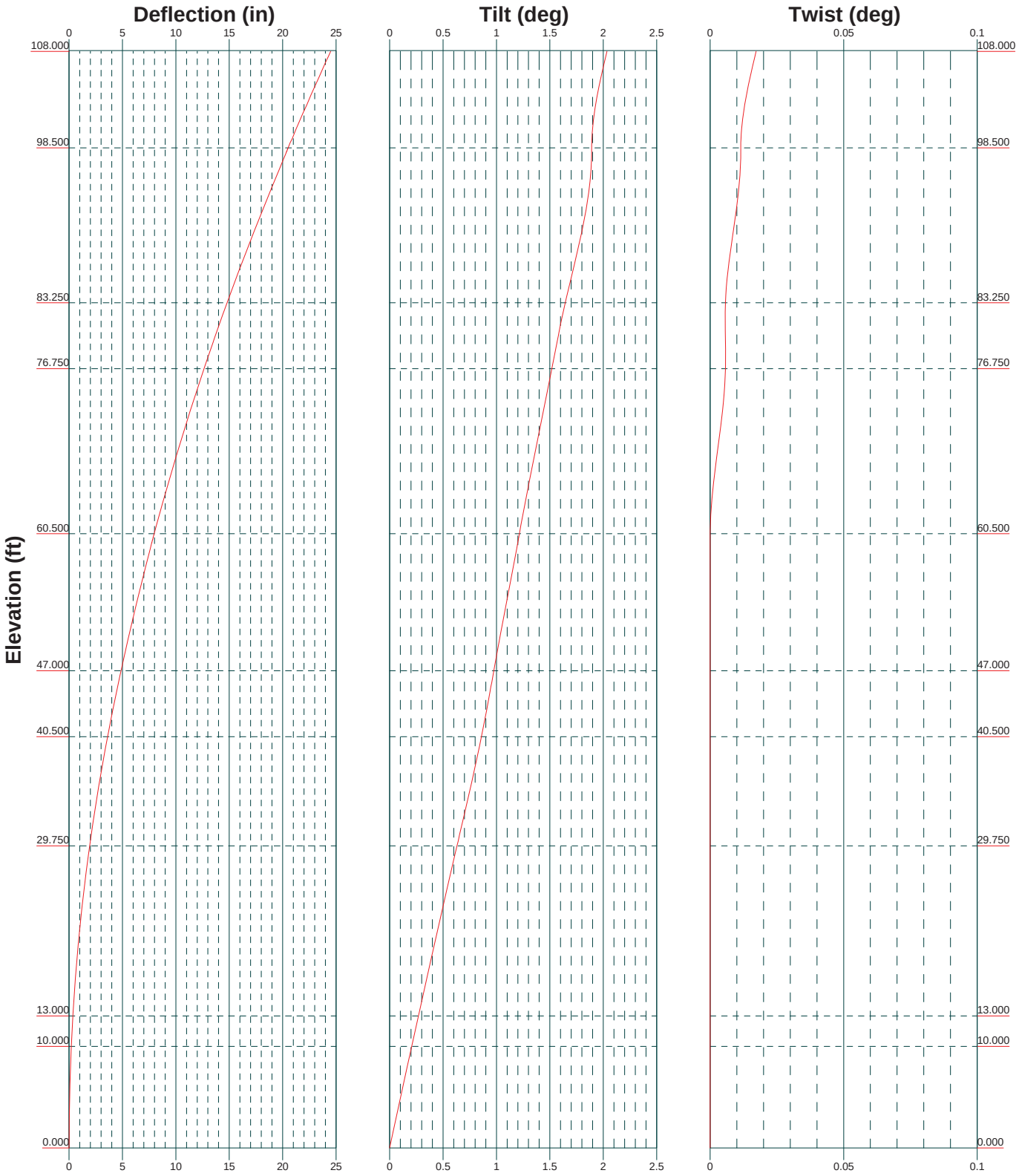
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 85565.005.01- HARTFORD - NU (SSUSA), CT (BU# 87636		
Project:		
Client: Crown Castle	Drawn by: JBarnat	App'd:
Code: TIA/EIA-222-F	Date: 01/28/14	Scale: NTS
Path: S:\Projects\Crown Castle\85565_876363_Hartford\Engineering\tnxTower\85565_004_Hartford_CT_AS.eri		Dwg No. E-4

TIA/EIA-222-F - Service - 50 mph

Maximum Values



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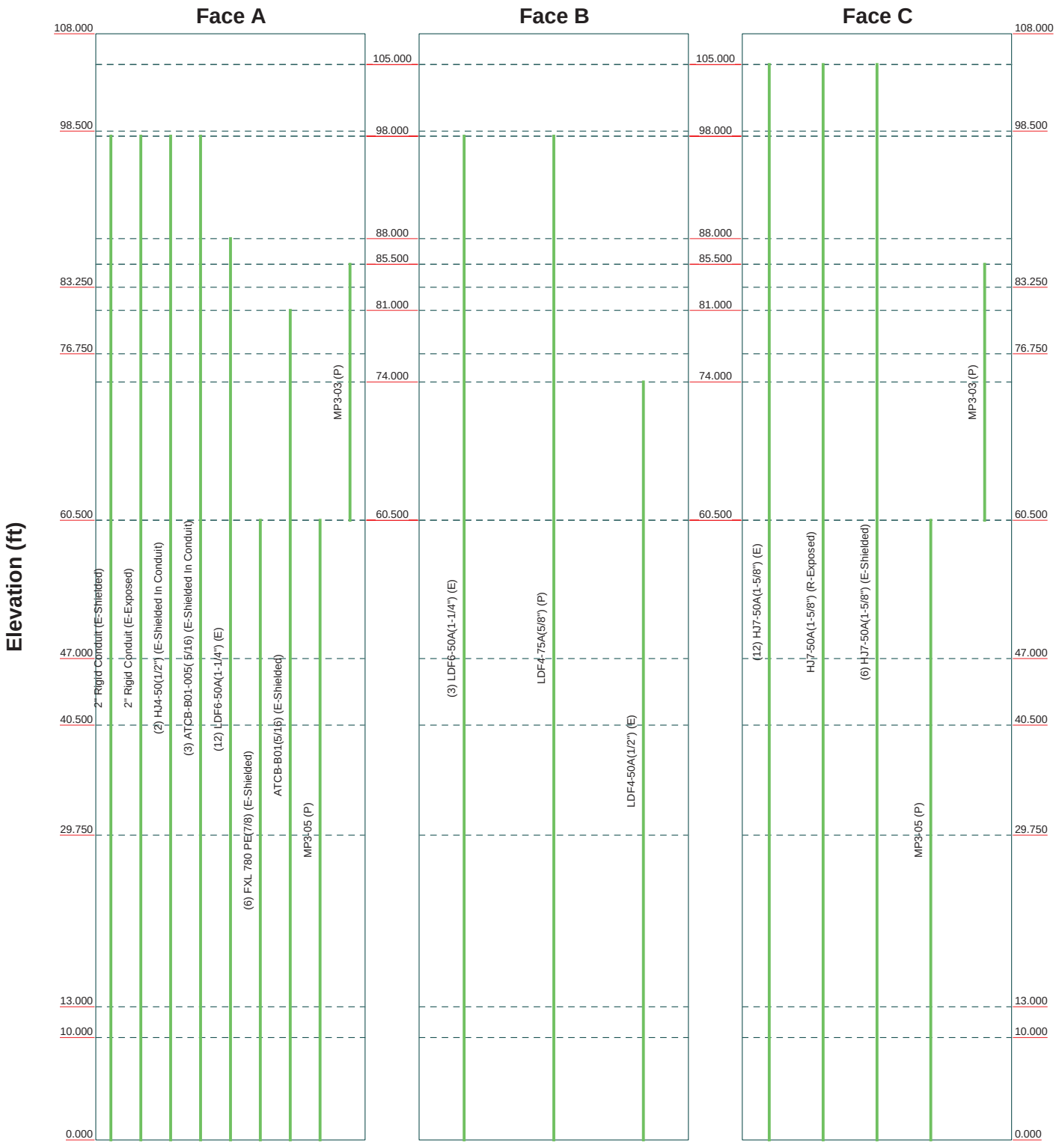
FAX: (918) 295-0265

Job:	***85565.005.01- HARTFORD - NU (SSUSA), CT (BU# 87636***		
Project:			
Client: Crown Castle		Drawn by: JBarnat	App'd:
Code: TIA/EIA-222-F		Date: 01/28/14	Scale: NTS
Path: S:\Projects\Crown Castle\85565_876363_Hartford\Engineering\tnxTower\85565_004_Hartford_CT_AS.eri			Dwg No. E-5

Feed Line Distribution Chart
0' - 108'

Round | Flat | App In Face | App Out Face | Truss Leg



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FAX: (918) 295-0265

Job: ***85565.005.01- HARTFORD - NU (SSUSA), CT (BU# 87636***		
Project:		
Client: Crown Castle	Drawn by: JBarnat	App'd:
Code: TIA/EIA-222-F	Date: 01/28/14	Scale: NTS
Path: S:\Projects\Crown Castle\85565_876363_Hartford\Engineering\tnxTower\85565_004_Hartford_CT_AS.eri		Dwg No. E-7

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 50 mph.
TOWER RATING: 95.9%.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole 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	

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	108.000-98.500	9.500	0.000	Round	8.625	8.625	0.313		A53-B-35 (35 ksi)
L2	98.500-98.000	0.500	0.000	Round	8.625	16.500	0.313		A53-B-35 (35 ksi)
L3	98.000-83.250	14.750	0.000	18	16.500	18.861	0.313	1.250	A607-65 (65 ksi)
L4	83.250-76.750	6.500	0.000	18	18.861	19.901	0.490	1.961	51.963609ksi

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
									(52 ksi)
L5	76.750-60.500	16.250	0.000	18	19.901	22.502	0.683	2.734	44.987891ksi (45 ksi)
L6	60.500-59.500	1.000	0.000	18	22.502	22.662	0.852	3.407	44.774765ksi (45 ksi)
L7	59.500-47.000	12.500	3.250	18	22.662	24.663	0.826	3.304	46.785377ksi (47 ksi)
L8	47.000-40.500	9.750	0.000	18	23.518	25.127	0.799	3.194	46.853692ksi (47 ksi)
L9	40.500-29.750	10.750	0.000	18	25.127	26.901	0.764	3.056	46.962635ksi (47 ksi)
L10	29.750-13.000	16.750	0.000	18	26.901	29.665	0.746	2.986	50.54006ksi (51 ksi)
L11	13.000-10.000	3.000	0.000	18	29.665	30.160	0.728	2.911	55.229363ksi (55 ksi)
L12	10.000-0.000	10.000		18	30.160	31.810	0.751	3.004	52.314555ksi (52 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	8.625	8.161	70.586	2.941	4.313	16.368	141.172	4.078	0.000	0
	8.625	8.161	70.586	2.941	4.313	16.368	141.172	4.078	0.000	0
L2	8.625	8.161	70.586	2.941	4.313	16.368	141.172	4.078	0.000	0
	16.500	15.892	520.728	5.724	8.250	63.119	1041.456	7.941	0.000	0
L3	16.755	16.056	531.537	5.747	8.382	63.414	1063.774	8.030	2.354	7.533
	19.152	18.398	799.671	6.585	9.581	83.461	1600.395	9.201	2.770	8.862
L4	19.152	28.582	1218.665	6.522	9.581	127.192	2438.934	14.294	2.457	5.012
	20.208	30.201	1437.661	6.891	10.110	142.204	2877.214	15.103	2.640	5.385
L5	20.208	41.685	1945.040	6.822	10.110	192.391	3892.640	20.847	2.300	3.365
	22.849	47.327	2846.473	7.746	11.431	249.011	5696.692	23.668	2.758	4.035
L6	22.849	58.523	3465.794	7.686	11.431	303.189	6936.149	29.267	2.462	2.89
	23.012	58.956	3543.230	7.743	11.512	307.774	7091.122	29.483	2.490	2.923
L7	23.012	57.256	3449.147	7.752	11.512	299.602	6902.832	28.634	2.535	3.068
	25.043	62.502	4486.751	8.462	12.529	358.115	8979.406	31.257	2.887	3.494
L8	24.425	57.582	3755.055	8.065	11.947	314.308	7515.051	28.797	2.734	3.423
	25.514	61.660	4610.662	8.637	12.764	361.213	9227.390	30.836	3.017	3.778
L9	25.514	59.076	4429.980	8.649	12.764	347.058	8865.790	29.544	3.078	4.029
	27.316	63.378	5469.846	9.279	13.666	400.265	10946.890	31.695	3.390	4.437
L10	27.316	61.964	5355.037	9.285	13.666	391.864	10717.121	30.988	3.421	4.583
	30.122	68.513	7238.600	10.266	15.070	480.341	14486.724	34.263	3.907	5.235
L11	30.122	66.843	7071.332	10.273	15.070	469.242	14151.968	33.428	3.940	5.414
	30.625	67.987	7440.507	10.448	15.321	485.635	14890.804	34.000	4.027	5.534
L12	30.625	70.096	7659.318	10.440	15.321	499.917	15328.714	35.055	3.986	5.309
	32.301	74.030	9022.355	11.026	16.159	558.332	18056.581	37.022	4.277	5.695

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 108.000-98.500				1	1	1		

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L2 98.500-98.000				1	1	1		
L3 98.000-83.250				1	1	1		
L4 83.250-76.750				1	1	0.933614		
L5 76.750-60.500				1	1	0.967696		
L6 60.500-59.500				1	1	0.91861		
L7 59.500-47.000				1	1	0.932896		
L8 47.000-40.500				1	1	0.940845		
L9 40.500-29.750				1	1	0.943148		
L10 29.750-13.000				1	1	0.960476		
L11 13.000-10.000				1	1	0.975136		
L12 10.000-0.000				1	1	1.00643		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
**										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
HJ7-50A(1-5/8") (E)	C	No	Inside Pole	105.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
HJ7-50A(1-5/8") (R-Exposed)	C	No	CaAa (Out Of Face)	105.000 - 0.000	1	No Ice	0.198	0.001
						1/2" Ice	0.298	0.003
						1" Ice	0.398	0.005
						2" Ice	0.598	0.011
						4" Ice	0.998	0.030
HJ7-50A(1-5/8") (E-Shielded)	C	No	CaAa (Out Of Face)	105.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.003
						1" Ice	0.000	0.005
						2" Ice	0.000	0.011
						4" Ice	0.000	0.030
$$ LDF6-50A(1-1/4")	B	No	Inside Pole	98.000 - 0.000	3	No Ice	0.000	0.001

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
(E)						1/2" Ice	0.001	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
LDF4-75A(5/8")	B	No	Inside Pole	98.000 - 0.000	1	No Ice	0.000	0.000
(P)						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
LDF4-50A(1/2")	B	No	Inside Pole	74.000 - 0.000	1	No Ice	0.000	0.000
(E)						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
**								
2" Rigid Conduit	A	No	CaAa (Out Of	98.000 - 0.000	1	No Ice	0.000	0.003
(E-Shielded)			Face)			1/2" Ice	0.000	0.004
						1" Ice	0.000	0.006
						2" Ice	0.000	0.013
						4" Ice	0.000	0.032
2" Rigid Conduit	A	No	CaAa (Out Of	98.000 - 0.000	1	No Ice	0.200	0.003
(E-Exposed)			Face)			1/2" Ice	0.300	0.004
						1" Ice	0.400	0.006
						2" Ice	0.600	0.013
						4" Ice	1.000	0.032
HJ4-50(1/2")	A	No	CaAa (Out Of	98.000 - 0.000	2	No Ice	0.000	0.000
(E-Shielded In Conduit)			Face)			1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.007
						4" Ice	0.000	0.023
ATCB-B01-005(5/16)	A	No	CaAa (Out Of	98.000 - 0.000	3	No Ice	0.000	0.000
(E-Shielded In Conduit)			Face)			1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.021
$$								
LDF6-50A(1-1/4")	A	No	Inside Pole	88.000 - 0.000	12	No Ice	0.000	0.001
(E)						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
$$								
FXL 780 PE(7/8)	A	No	CaAa (Out Of	60.500 - 0.000	6	No Ice	0.000	0.000
(E-Shielded)			Face)			1/2" Ice	0.000	0.001
						1" Ice	0.000	0.003
						2" Ice	0.000	0.008
						4" Ice	0.000	0.025
ATCB-B01(5/16)	A	No	CaAa (Out Of	81.000 - 0.000	1	No Ice	0.000	0.000
(E-Shielded)			Face)			1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.021
$$								
$$								
MP3-05	A	No	CaAa (Out Of	60.500 - 0.000	1	No Ice	0.348	0.019
(P)			Face)			1/2" Ice	0.432	0.021
						1" Ice	0.515	0.023
						2" Ice	0.682	0.029
						4" Ice	1.015	0.044
MP3-05	C	No	CaAa (Out Of	60.500 - 0.000	1	No Ice	0.348	0.019
(P)			Face)			1/2" Ice	0.432	0.021

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						1" Ice	0.515	0.023
						2" Ice	0.682	0.029
						4" Ice	1.015	0.044
**								
MP3-03 (P)	A	No	CaAa (Out Of Face)	85.500 - 60.500	1	No Ice	0.262	0.010
						1/2" Ice	0.345	0.015
						1" Ice	0.428	0.020
						2" Ice	0.595	0.040
						4" Ice	0.928	0.080
MP3-03 (P)	C	No	CaAa (Out Of Face)	85.500 - 60.500	1	No Ice	0.262	0.010
						1/2" Ice	0.345	0.015
						1" Ice	0.428	0.020
						2" Ice	0.595	0.040
						4" Ice	0.928	0.080
**								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	108.000-98.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	1.287	0.128
L2	98.500-98.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.099	0.010
L3	98.000-83.250	A	0.000	0.000	0.000	3.539	0.153
		B	0.000	0.000	0.000	0.000	0.031
		C	0.000	0.000	0.000	3.509	0.314
L4	83.250-76.750	A	0.000	0.000	0.000	3.001	0.157
		B	0.000	0.000	0.000	0.000	0.014
		C	0.000	0.000	0.000	2.988	0.193
L5	76.750-60.500	A	0.000	0.000	0.000	7.502	0.394
		B	0.000	0.000	0.000	0.000	0.036
		C	0.000	0.000	0.000	7.470	0.482
L6	60.500-59.500	A	0.000	0.000	0.000	0.548	0.035
		B	0.000	0.000	0.000	0.000	0.002
		C	0.000	0.000	0.000	0.546	0.039
L7	59.500-47.000	A	0.000	0.000	0.000	6.854	0.438
		B	0.000	0.000	0.000	0.000	0.028
		C	0.000	0.000	0.000	6.829	0.487
L8	47.000-40.500	A	0.000	0.000	0.000	3.564	0.228
		B	0.000	0.000	0.000	0.000	0.015
		C	0.000	0.000	0.000	3.551	0.253
L9	40.500-29.750	A	0.000	0.000	0.000	5.895	0.377
		B	0.000	0.000	0.000	0.000	0.024
		C	0.000	0.000	0.000	5.873	0.419
L10	29.750-13.000	A	0.000	0.000	0.000	9.185	0.587
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	9.151	0.653
L11	13.000-10.000	A	0.000	0.000	0.000	1.645	0.105
		B	0.000	0.000	0.000	0.000	0.007
		C	0.000	0.000	0.000	1.639	0.117
L12	10.000-0.000	A	0.000	0.000	0.000	5.483	0.350
		B	0.000	0.000	0.000	0.000	0.023
		C	0.000	0.000	0.000	5.463	0.390

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	108.000-98.500	A	1.147	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	2.778	0.335
L2	98.500-98.000	A	1.140	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.213	0.026
L3	98.000-83.250	A	1.129	0.000	0.000	0.000	7.291	0.481
		B		0.000	0.000	0.000	0.000	0.031
		C		0.000	0.000	0.000	7.262	0.799
L4	83.250-76.750	A	1.112	0.000	0.000	0.000	5.651	0.374
		B		0.000	0.000	0.000	0.000	0.014
		C		0.000	0.000	0.000	5.638	0.470
L5	76.750-60.500	A	1.092	0.000	0.000	0.000	14.006	0.929
		B		0.000	0.000	0.000	0.000	0.036
		C		0.000	0.000	0.000	13.973	1.153
L6	60.500-59.500	A	1.074	0.000	0.000	0.000	0.942	0.077
		B		0.000	0.000	0.000	0.000	0.002
		C		0.000	0.000	0.000	0.940	0.072
L7	59.500-47.000	A	1.059	0.000	0.000	0.000	11.707	0.955
		B		0.000	0.000	0.000	0.000	0.028
		C		0.000	0.000	0.000	11.682	0.893
L8	47.000-40.500	A	1.034	0.000	0.000	0.000	6.088	0.496
		B		0.000	0.000	0.000	0.000	0.015
		C		0.000	0.000	0.000	6.075	0.464
L9	40.500-29.750	A	1.007	0.000	0.000	0.000	9.865	0.781
		B		0.000	0.000	0.000	0.000	0.024
		C		0.000	0.000	0.000	9.844	0.741
L10	29.750-13.000	A	1.000	0.000	0.000	0.000	15.326	1.207
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	15.293	1.149
L11	13.000-10.000	A	1.000	0.000	0.000	0.000	2.745	0.216
		B		0.000	0.000	0.000	0.000	0.007
		C		0.000	0.000	0.000	2.739	0.206
L12	10.000-0.000	A	1.000	0.000	0.000	0.000	9.150	0.721
		B		0.000	0.000	0.000	0.000	0.023
		C		0.000	0.000	0.000	9.130	0.686

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	108.000-98.500	-0.148	0.085	-0.227	0.131
L2	98.500-98.000	-0.216	0.125	-0.348	0.201
L3	98.000-83.250	-0.236	-0.138	-0.359	-0.209
L4	83.250-76.750	-0.380	-0.221	-0.514	-0.298
L5	76.750-60.500	-0.392	-0.229	-0.538	-0.312
L6	60.500-59.500	-0.449	-0.261	-0.583	-0.338
L7	59.500-47.000	-0.456	-0.265	-0.596	-0.345
L8	47.000-40.500	-0.463	-0.269	-0.607	-0.352
L9	40.500-29.750	-0.472	-0.274	-0.619	-0.359

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L10	29.750-13.000	-0.485	-0.282	-0.642	-0.372
L11	13.000-10.000	-0.493	-0.287	-0.659	-0.382
L12	10.000-0.000	-0.498	-0.290	-0.669	-0.388

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
BXA-70063/6CF (E)	A	From Leg	4.000 0.000 0.000		0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.742 8.280 8.826 9.945 12.286	3.762 4.196 4.638 5.543 7.442	0.017 0.058 0.104 0.215 0.516
BXA-70063/6CF (E)	B	From Leg	4.000 0.000 0.000		0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.742 8.280 8.826 9.945 12.286	3.762 4.196 4.638 5.543 7.442	0.017 0.058 0.104 0.215 0.516
BXA-70063/6CF (E)	C	From Leg	4.000 0.000 0.000		0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.742 8.280 8.826 9.945 12.286	3.762 4.196 4.638 5.543 7.442	0.017 0.058 0.104 0.215 0.516
BXA-171063-12BF w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000		0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.971 5.521 6.036 7.091 9.359	5.228 6.389 7.261 9.046 12.817	0.040 0.086 0.139 0.271 0.671
BXA-171063-12BF w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000		0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.971 5.521 6.036 7.091 9.359	5.228 6.389 7.261 9.046 12.817	0.040 0.086 0.139 0.271 0.671
BXA-171063-12BF w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000		0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.971 5.521 6.036 7.091 9.359	5.228 6.389 7.261 9.046 12.817	0.040 0.086 0.139 0.271 0.671
BXA-70063/6CF (R)	A	From Leg	4.000 0.000 0.000		0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.742 8.280 8.826 9.945 12.286	3.762 4.196 4.638 5.543 7.442	0.017 0.058 0.104 0.215 0.516
BXA-70063/6CF (R)	B	From Leg	4.000 0.000 0.000		0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.742 8.280 8.826 9.945 12.286	3.762 4.196 4.638 5.543 7.442	0.017 0.058 0.104 0.215 0.516
BXA-70063/6CF (R)	C	From Leg	4.000 0.000 0.000		0.000	105.000	No Ice 1/2" Ice 1" Ice	7.742 8.280 8.826	3.762 4.196 4.638	0.017 0.058 0.104

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	9.945	5.543	0.215
						4" Ice	12.286	7.442	0.516
BXA-171063-12BF w/ Mount Pipe (R)	A	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice	4.971	5.228	0.040
						1/2" Ice	5.521	6.389	0.086
						1" Ice	6.036	7.261	0.139
						2" Ice	7.091	9.046	0.271
						4" Ice	9.359	12.817	0.671
BXA-171063-12BF w/ Mount Pipe (R)	B	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice	4.971	5.228	0.040
						1/2" Ice	5.521	6.389	0.086
						1" Ice	6.036	7.261	0.139
						2" Ice	7.091	9.046	0.271
						4" Ice	9.359	12.817	0.671
BXA-171063-12BF w/ Mount Pipe (R)	C	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice	4.971	5.228	0.040
						1/2" Ice	5.521	6.389	0.086
						1" Ice	6.036	7.261	0.139
						2" Ice	7.091	9.046	0.271
						4" Ice	9.359	12.817	0.671
RRH2X40-AWS (R)	A	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice	2.522	1.589	0.044
						1/2" Ice	2.753	1.795	0.061
						1" Ice	2.993	2.010	0.082
						2" Ice	3.499	2.465	0.132
						4" Ice	4.615	3.479	0.275
RRH2X40-AWS (R)	B	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice	2.522	1.589	0.044
						1/2" Ice	2.753	1.795	0.061
						1" Ice	2.993	2.010	0.082
						2" Ice	3.499	2.465	0.132
						4" Ice	4.615	3.479	0.275
RRH2X40-AWS (R)	C	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice	2.522	1.589	0.044
						1/2" Ice	2.753	1.795	0.061
						1" Ice	2.993	2.010	0.082
						2" Ice	3.499	2.465	0.132
						4" Ice	4.615	3.479	0.275
DB-T1-6Z-8AB-0Z (R)	A	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice	5.600	2.333	0.044
						1/2" Ice	5.915	2.558	0.080
						1" Ice	6.240	2.791	0.120
						2" Ice	6.914	3.284	0.213
						4" Ice	8.365	4.373	0.455
Sector Mount [SM 401-3] (E- 2 Pipes/ Sector)	C	None		0.000	105.000	No Ice	17.870	17.870	0.804
						1/2" Ice	25.310	25.310	1.165
						1" Ice	32.750	32.750	1.525
						2" Ice	47.630	47.630	2.245
						4" Ice	77.390	77.390	3.685
$$									
LLPX310R w/ Mount Pipe (E-Clearwave)	A	From Leg	4.000 0.000 1.000	0.000	98.000	No Ice	5.065	2.985	0.045
						1/2" Ice	5.480	3.528	0.083
						1" Ice	5.905	4.087	0.126
						2" Ice	6.788	5.314	0.232
						4" Ice	8.705	8.133	0.544
LLPX310R w/ Mount Pipe (E-Clearwave)	B	From Leg	4.000 0.000 1.000	0.000	98.000	No Ice	5.065	2.985	0.045
						1/2" Ice	5.480	3.528	0.083
						1" Ice	5.905	4.087	0.126
						2" Ice	6.788	5.314	0.232
						4" Ice	8.705	8.133	0.544
LLPX310R w/ Mount Pipe (E-Clearwave)	C	From Leg	4.000 0.000 1.000	0.000	98.000	No Ice	5.065	2.985	0.045
						1/2" Ice	5.480	3.528	0.083
						1" Ice	5.905	4.087	0.126
						2" Ice	6.788	5.314	0.232

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	8.705	8.133	0.544
WIMAX DAP HEAD (E-Clearwave)	A	From Leg	4.000 0.000 1.000	0.000	98.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.804 1.988 2.180 2.589 3.512	0.778 0.918 1.067 1.391 2.143	0.033 0.045 0.058 0.094 0.201
WIMAX DAP HEAD (E-Clearwave)	B	From Leg	4.000 0.000 1.000	0.000	98.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.804 1.988 2.180 2.589 3.512	0.778 0.918 1.067 1.391 2.143	0.033 0.045 0.058 0.094 0.201
WIMAX DAP HEAD (E-Clearwave)	C	From Leg	4.000 0.000 1.000	0.000	98.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.804 1.988 2.180 2.589 3.512	0.778 0.918 1.067 1.391 2.143	0.033 0.045 0.058 0.094 0.201
HORIZON COMPACT (E-Clearwave)	A	From Leg	4.000 0.000 4.000	0.000	98.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.841 0.966 1.099 1.392 2.082	0.429 0.525 0.629 0.863 1.435	0.012 0.018 0.026 0.048 0.122
HORIZON COMPACT (E-Clearwave)	B	From Leg	4.000 0.000 4.000	0.000	98.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.841 0.966 1.099 1.392 2.082	0.429 0.525 0.629 0.863 1.435	0.012 0.018 0.026 0.048 0.122
********									
APXV9ERR18-C-A20 w/ Mount Pipe (E)	A	From Leg	4.000 0.000 1.000	0.000	98.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	7.471 8.656 9.556 11.388 15.527	0.088 0.158 0.237 0.421 0.935
APXVSPP18-C-A20 w/ Mount Pipe (E)	B	From Leg	4.000 0.000 1.000	0.000	98.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.946 8.127 9.021 10.844 14.851	0.083 0.151 0.227 0.406 0.909
APXVSPP18-C-A20 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 1.000	0.000	98.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.946 8.127 9.021 10.844 14.851	0.083 0.151 0.227 0.406 0.909
IBC1900HG-2A (E)	A	From Leg	4.000 0.000 0.000	0.000	98.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.127 1.273 1.427 1.761 2.534	0.533 0.647 0.770 1.041 1.688	0.022 0.030 0.039 0.065 0.147
IBC1900HG-2A (E)	B	From Leg	4.000 0.000 0.000	0.000	98.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.127 1.273 1.427 1.761 2.534	0.533 0.647 0.770 1.041 1.688	0.022 0.030 0.039 0.065 0.147
IBC1900HG-2A (E)	C	From Leg	4.000 0.000 0.000	0.000	98.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.127 1.273 1.427 1.761 2.534	0.533 0.647 0.770 1.041 1.688	0.022 0.030 0.039 0.065 0.147

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
IBC1900BB-1	A	From Leg	4.000	0.000	98.000	No Ice	1.127	0.533	0.022
(E)			0.000			1/2" Ice	1.273	0.647	0.030
			0.000			1" Ice	1.427	0.770	0.039
						2" Ice	1.761	1.041	0.065
						4" Ice	2.534	1.688	0.147
IBC1900BB-1	B	From Leg	4.000	0.000	98.000	No Ice	1.127	0.533	0.022
(E)			0.000			1/2" Ice	1.273	0.647	0.030
			0.000			1" Ice	1.427	0.770	0.039
						2" Ice	1.761	1.041	0.065
						4" Ice	2.534	1.688	0.147
IBC1900BB-1	C	From Leg	4.000	0.000	98.000	No Ice	1.127	0.533	0.022
(E)			0.000			1/2" Ice	1.273	0.647	0.030
			0.000			1" Ice	1.427	0.770	0.039
						2" Ice	1.761	1.041	0.065
						4" Ice	2.534	1.688	0.147
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.000	0.000	98.000	No Ice	7.134	4.959	0.077
			0.000			1/2" Ice	7.662	5.754	0.131
(P)			1.000			1" Ice	8.183	6.472	0.193
						2" Ice	9.256	8.010	0.338
						4" Ice	11.526	11.412	0.752
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.000	0.000	98.000	No Ice	7.134	4.959	0.077
			0.000			1/2" Ice	7.662	5.754	0.131
(P)			1.000			1" Ice	8.183	6.472	0.193
						2" Ice	9.256	8.010	0.338
						4" Ice	11.526	11.412	0.752
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.000	0.000	98.000	No Ice	7.134	4.959	0.077
			0.000			1/2" Ice	7.662	5.754	0.131
(P)			1.000			1" Ice	8.183	6.472	0.193
						2" Ice	9.256	8.010	0.338
						4" Ice	11.526	11.412	0.752
TD-RRH8x20-25	A	From Leg	4.000	0.000	98.000	No Ice	4.720	1.703	0.070
(P)			0.000			1/2" Ice	5.014	1.920	0.097
			1.000			1" Ice	5.316	2.145	0.128
						2" Ice	5.948	2.622	0.201
						4" Ice	7.314	3.680	0.397
TD-RRH8x20-25	B	From Leg	4.000	0.000	98.000	No Ice	4.720	1.703	0.070
(P)			0.000			1/2" Ice	5.014	1.920	0.097
			1.000			1" Ice	5.316	2.145	0.128
						2" Ice	5.948	2.622	0.201
						4" Ice	7.314	3.680	0.397
TD-RRH8x20-25	C	From Leg	4.000	0.000	98.000	No Ice	4.720	1.703	0.070
(P)			0.000			1/2" Ice	5.014	1.920	0.097
			1.000			1" Ice	5.316	2.145	0.128
						2" Ice	5.948	2.622	0.201
						4" Ice	7.314	3.680	0.397
Platform Mount [LP 712-1]	C	None		0.000	98.000	No Ice	24.530	24.530	1.335
(E)						1/2" Ice	29.940	29.940	1.646
						1" Ice	35.350	35.350	1.956
						2" Ice	46.170	46.170	2.577
						4" Ice	67.810	67.810	3.820
$$									
PCS 1900MHz 4x45W-65MHz	A	From Leg	4.000	0.000	96.000	No Ice	2.709	2.611	0.060
			0.000			1/2" Ice	2.948	2.847	0.083
(E)			0.000			1" Ice	3.195	3.092	0.110
						2" Ice	3.716	3.608	0.173
						4" Ice	4.862	4.744	0.347
PCS 1900MHz	B	From Leg	4.000	0.000	96.000	No Ice	2.709	2.611	0.060

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
4x45W-65MHz			0.000			1/2" Ice	2.948	2.847	0.083
(E)			0.000			1" Ice	3.195	3.092	0.110
						2" Ice	3.716	3.608	0.173
						4" Ice	4.862	4.744	0.347
PCS 1900MHz	C	From Leg	4.000	0.000	96.000	No Ice	2.709	2.611	0.060
4x45W-65MHz			0.000			1/2" Ice	2.948	2.847	0.083
(E)			0.000			1" Ice	3.195	3.092	0.110
						2" Ice	3.716	3.608	0.173
						4" Ice	4.862	4.744	0.347
PCS 1900MHz	A	From Leg	4.000	0.000	96.000	No Ice	2.709	2.611	0.060
4x45W-65MHz			0.000			1/2" Ice	2.948	2.847	0.083
(E)			-1.000			1" Ice	3.195	3.092	0.110
						2" Ice	3.716	3.608	0.173
						4" Ice	4.862	4.744	0.347
PCS 1900MHz	B	From Leg	4.000	0.000	96.000	No Ice	2.709	2.611	0.060
4x45W-65MHz			0.000			1/2" Ice	2.948	2.847	0.083
(E)			-1.000			1" Ice	3.195	3.092	0.110
						2" Ice	3.716	3.608	0.173
						4" Ice	4.862	4.744	0.347
PCS 1900MHz	C	From Leg	4.000	0.000	96.000	No Ice	2.709	2.611	0.060
4x45W-65MHz			0.000			1/2" Ice	2.948	2.847	0.083
(E)			-1.000			1" Ice	3.195	3.092	0.110
						2" Ice	3.716	3.608	0.173
						4" Ice	4.862	4.744	0.347
800MHz 2X50W RRH	A	From Leg	4.000	0.000	96.000	No Ice	2.401	2.254	0.064
W/FILTER			0.000			1/2" Ice	2.613	2.460	0.086
(E)			0.000			1" Ice	2.833	2.675	0.111
						2" Ice	3.300	3.132	0.172
						4" Ice	4.337	4.148	0.338
800MHz 2X50W RRH	B	From Leg	4.000	0.000	96.000	No Ice	2.401	2.254	0.064
W/FILTER			0.000			1/2" Ice	2.613	2.460	0.086
(E)			0.000			1" Ice	2.833	2.675	0.111
						2" Ice	3.300	3.132	0.172
						4" Ice	4.337	4.148	0.338
800MHz 2X50W RRH	C	From Leg	4.000	0.000	96.000	No Ice	2.401	2.254	0.064
W/FILTER			0.000			1/2" Ice	2.613	2.460	0.086
(E)			0.000			1" Ice	2.833	2.675	0.111
						2" Ice	3.300	3.132	0.172
						4" Ice	4.337	4.148	0.338
Side Arm Mount [SO 102-3]	C	None		0.000	96.000	No Ice	3.000	3.000	0.081
(E)						1/2" Ice	3.480	3.480	0.111
						1" Ice	3.960	3.960	0.141
						2" Ice	4.920	4.920	0.201
						4" Ice	6.840	6.840	0.321
$$									
(4) 844G65VTZAS w/ Mount	A	From Leg	4.000	0.000	88.000	No Ice	6.071	5.154	0.034
Pipe			0.000			1/2" Ice	6.529	5.833	0.086
(E)			0.000			1" Ice	6.996	6.523	0.144
						2" Ice	7.963	7.959	0.281
						4" Ice	10.031	11.092	0.667
(4) 844G65VTZAS w/ Mount	B	From Leg	4.000	0.000	88.000	No Ice	6.071	5.154	0.034
Pipe			0.000			1/2" Ice	6.529	5.833	0.086
(E)			0.000			1" Ice	6.996	6.523	0.144
						2" Ice	7.963	7.959	0.281
						4" Ice	10.031	11.092	0.667
(4) 844G65VTZAS w/ Mount	C	From Leg	4.000	0.000	88.000	No Ice	6.071	5.154	0.034
Pipe			0.000			1/2" Ice	6.529	5.833	0.086

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(E)			0.000			1" Ice	6.996	6.523	0.144
						2" Ice	7.963	7.959	0.281
						4" Ice	10.031	11.092	0.667
Platform Mount [LP 304-1]	C	None		0.000	88.000	No Ice	17.460	17.460	1.349
(E)						1/2" Ice	22.440	22.440	1.625
						1" Ice	27.420	27.420	1.900
						2" Ice	37.380	37.380	2.451
						4" Ice	57.300	57.300	3.554
$$									
HBX-6516DS-VTM w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	81.000	No Ice 1/2" Ice	3.598 3.998	3.241 3.914	0.029 0.062
(E)			-1.000			1" Ice	4.435	4.564	0.101
						2" Ice	5.368	5.914	0.199
						4" Ice	7.361	8.877	0.504
HBX-6516DS-VTM w/ Mount Pipe	B	From Leg	4.000 0.000	0.000	81.000	No Ice 1/2" Ice	3.598 3.998	3.241 3.914	0.029 0.062
(E)			-1.000			1" Ice	4.435	4.564	0.101
						2" Ice	5.368	5.914	0.199
						4" Ice	7.361	8.877	0.504
HBX-6516DS-VTM w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	81.000	No Ice 1/2" Ice	3.598 3.998	3.241 3.914	0.029 0.062
(E)			-1.000			1" Ice	4.435	4.564	0.101
						2" Ice	5.368	5.914	0.199
						4" Ice	7.361	8.877	0.504
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	81.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	81.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	81.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
T-Arm Mount [TA 602-3]	C	None		0.000	81.000	No Ice	11.590	11.590	0.774
						1/2" Ice	15.440	15.440	0.990
						1" Ice	19.290	19.290	1.206
						2" Ice	26.990	26.990	1.639
						4" Ice	42.390	42.390	2.503
$$									
KS24019-L112A	A	From Leg	4.000	0.000	74.000	No Ice	0.156	0.156	0.005
(E)			0.000			1/2" Ice	0.225	0.225	0.007
			2.000			1" Ice	0.302	0.302	0.009
						2" Ice	0.484	0.484	0.018
						4" Ice	0.951	0.951	0.056
Side Arm Mount [SO 702-1]	A	From Leg	2.000	0.000	74.000	No Ice	1.000	1.430	0.027
(E)			0.000			1/2" Ice	1.000	2.050	0.038
			0.000			1" Ice	1.000	2.670	0.049
						2" Ice	1.000	3.910	0.071
						4" Ice	1.000	6.390	0.115
$$									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight K
A-ANT-18G-2-C (E)	A	Paraboloid w/o Radome	From Leg	4.000 0.000 4.000	52.000		98.000	2.175	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.715 4.006 4.296 4.876 6.037	0.027 0.048 0.068 0.109 n̂ w
A-ANT-23G-1-C (E)	B	Paraboloid w/Shroud (HP)	From Leg	4.000 0.000 4.000	81.000		98.000	1.275	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.280 1.450 1.620 1.970 2.660	0.007 0.010 0.012 0.013 0.016

$$

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service

Comb. No.	Description
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	108 - 98.5	Pole	Max Tension	2	0.000	0.000	-0.000
			Max. Compression	14	-4.525	0.039	0.850
			Max. Mx	11	-1.413	25.437	-0.339
			Max. My	2	-1.405	-0.081	26.353
			Max. Vy	11	-4.073	25.437	-0.339
			Max. Vx	8	4.194	0.605	-25.968
			Max. Torque	12			-1.203
L2	98.5 - 98	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-4.580	0.049	0.846
			Max. Mx	11	-1.446	27.478	-0.418
			Max. My	2	-1.438	-0.092	28.426
			Max. Vy	11	-4.090	27.478	-0.418
			Max. Vx	8	4.211	0.700	-28.069
			Max. Torque	12			-1.202
L3	98 - 83.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-17.049	0.366	1.122
			Max. Mx	11	-7.020	182.329	-2.529
			Max. My	8	-7.005	3.461	-184.443
			Max. Vy	11	-13.079	182.329	-2.529
			Max. Vx	8	13.191	3.461	-184.443
			Max. Torque	12			-1.358
L4	83.25 - 76.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-20.447	0.663	1.254
			Max. Mx	11	-8.893	272.820	-3.479
			Max. My	8	-8.880	4.761	-275.542
			Max. Vy	11	-14.554	272.820	-3.479
			Max. Vx	8	14.666	4.761	-275.542
			Max. Torque	12			-1.357
L5	76.75 - 60.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-25.496	1.457	1.806
			Max. Mx	11	-12.342	519.969	-5.768
			Max. My	8	-12.332	8.040	-523.885
			Max. Vy	11	-15.814	519.969	-5.768
			Max. Vx	8	15.911	8.040	-523.885
			Max. Torque	12			-1.500
L6	60.5 - 59.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-25.863	1.510	1.847
			Max. Mx	11	-12.611	535.839	-5.908
			Max. My	8	-12.601	8.251	-539.818
			Max. Vy	11	-15.894	535.839	-5.908
			Max. Vx	8	15.991	8.251	-539.818
			Max. Torque	12			-1.498
L7	59.5 - 47	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-29.288	2.013	2.240
			Max. Mx	11	-15.136	686.286	-7.205
			Max. My	8	-15.128	10.205	-690.827

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	11	-16.602	686.286	-7.205
			Max. Vx	8	16.699	10.205	-690.827
			Max. Torque	12			-1.498
L8	47 - 40.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-33.674	2.556	2.663
			Max. Mx	11	-18.469	852.162	-8.573
			Max. My	8	-18.462	12.274	-857.288
			Max. Vy	11	-17.342	852.162	-8.573
			Max. Vx	8	17.439	12.274	-857.288
			Max. Torque	12			-1.497
L9	40.5 - 29.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-37.694	3.164	3.124
			Max. Mx	11	-21.555	1042.246	-10.065
			Max. My	8	-21.550	14.560	-1047.983
			Max. Vy	11	-17.993	1042.246	-10.065
			Max. Vx	8	18.089	14.560	-1047.983
			Max. Torque	12			-1.497
L10	29.75 - 13	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-44.265	4.136	3.849
			Max. Mx	11	-26.673	1351.709	-12.343
			Max. My	8	-26.671	18.111	-1358.323
			Max. Vy	11	-18.925	1351.709	-12.343
			Max. Vx	8	19.020	18.111	-1358.323
			Max. Torque	12			-1.496
L11	13 - 10	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-45.479	4.317	3.984
			Max. Mx	11	-27.625	1408.768	-12.744
			Max. My	8	-27.623	18.743	-1415.529
			Max. Vy	11	-19.083	1408.768	-12.744
			Max. Vx	8	19.178	18.743	-1415.529
			Max. Torque	12			-1.495
L12	10 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-49.771	4.944	4.450
			Max. Mx	11	-31.026	1602.368	-14.060
			Max. My	8	-31.026	20.842	-1609.595
			Max. Vy	11	-19.603	1602.368	-14.060
			Max. Vx	8	19.696	20.842	-1609.595
			Max. Torque	12			-1.495

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	49.771	-0.005	5.976
	Max. H_x	11	31.034	19.589	-0.148
	Max. H_z	2	31.034	-0.018	19.630
	Max. M_x	2	1607.286	-0.018	19.630
	Max. M_z	5	1591.033	-19.518	0.022
	Max. Torsion	5	1.164	-19.518	0.022
	Min. Vert	1	31.034	0.000	0.000
	Min. H_x	5	31.034	-19.518	0.022
	Min. H_z	8	31.034	0.179	-19.683
	Min. M_x	8	-1609.595	0.179	-19.683
	Min. M_z	11	-1602.368	19.589	-0.148
	Min. Torsion	12	-1.495	17.003	9.687

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	31.034	0.000	0.000	-1.583	1.885	-0.000
Dead+Wind 0 deg - No Ice	31.034	0.018	-19.630	-1607.286	0.010	0.073
Dead+Wind 30 deg - No Ice	31.034	9.777	-17.029	-1395.270	-796.412	-0.569
Dead+Wind 60 deg - No Ice	31.034	16.930	-9.852	-808.424	-1380.405	-1.080
Dead+Wind 90 deg - No Ice	31.034	19.518	-0.022	-3.956	-1591.033	-1.164
Dead+Wind 120 deg - No Ice	31.034	16.896	9.777	797.168	-1376.806	-1.092
Dead+Wind 150 deg - No Ice	31.034	9.660	17.010	1389.978	-783.998	-0.303
Dead+Wind 180 deg - No Ice	31.034	-0.179	19.683	1609.595	20.841	0.757
Dead+Wind 210 deg - No Ice	31.034	-9.882	17.038	1392.952	811.390	1.131
Dead+Wind 240 deg - No Ice	31.034	-16.974	9.910	811.301	1388.960	1.325
Dead+Wind 270 deg - No Ice	31.034	-19.589	0.148	14.060	1602.368	1.444
Dead+Wind 300 deg - No Ice	31.034	-17.003	-9.687	-790.937	1392.062	1.495
Dead+Wind 330 deg - No Ice	31.034	-9.687	-16.996	-1391.716	790.749	0.500
Dead+Ice+Temp	49.771	-0.000	-0.000	-4.450	4.944	0.000
Dead+Wind 0 deg+Ice+Temp	49.771	0.005	-5.976	-512.779	4.420	-0.004
Dead+Wind 30 deg+Ice+Temp	49.771	2.984	-5.183	-445.534	-248.470	-0.196
Dead+Wind 60 deg+Ice+Temp	49.771	5.167	-2.998	-259.763	-433.851	-0.340
Dead+Wind 90 deg+Ice+Temp	49.771	5.959	-0.006	-5.192	-500.847	-0.357
Dead+Wind 120 deg+Ice+Temp	49.771	5.158	2.978	248.547	-432.837	-0.321
Dead+Wind 150 deg+Ice+Temp	49.771	2.953	5.178	435.966	-245.024	-0.085
Dead+Wind 180 deg+Ice+Temp	49.771	-0.047	5.989	505.275	10.136	0.225
Dead+Wind 210 deg+Ice+Temp	49.771	-3.011	5.185	436.781	261.436	0.346
Dead+Wind 240 deg+Ice+Temp	49.771	-5.179	3.013	252.422	445.074	0.405
Dead+Wind 270 deg+Ice+Temp	49.771	-5.977	0.039	-0.189	512.843	0.430
Dead+Wind 300 deg+Ice+Temp	49.771	-5.186	-2.954	-254.941	445.893	0.426
Dead+Wind 330 deg+Ice+Temp	49.771	-2.960	-5.174	-444.559	255.759	0.139
Dead+Wind 0 deg - Service	31.034	0.007	-7.710	-633.959	1.180	0.029
Dead+Wind 30 deg - Service	31.034	3.840	-6.689	-550.456	-312.477	-0.223
Dead+Wind 60 deg - Service	31.034	6.650	-3.870	-319.344	-542.465	-0.425
Dead+Wind 90 deg - Service	31.034	7.666	-0.009	-2.543	-625.417	-0.458
Dead+Wind 120 deg - Service	31.034	6.636	3.840	312.948	-541.053	-0.430
Dead+Wind 150 deg - Service	31.034	3.794	6.681	546.390	-307.619	-0.118
Dead+Wind 180 deg - Service	31.034	-0.070	7.731	632.876	9.329	0.299
Dead+Wind 210 deg - Service	31.034	-3.881	6.692	547.565	320.692	0.446
Dead+Wind 240 deg - Service	31.034	-6.667	3.892	318.482	548.172	0.521
Dead+Wind 270 deg - Service	31.034	-7.694	0.058	4.503	632.212	0.567
Dead+Wind 300 deg - Service	31.034	-6.678	-3.805	-312.506	549.377	0.587
Dead+Wind 330 deg - Service	31.034	-3.805	-6.675	-549.061	312.613	0.197

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-31.034	0.000	0.000	31.034	0.000	0.000%
2	0.018	-31.034	-19.630	-0.018	31.034	19.630	0.000%
3	9.777	-31.034	-17.029	-9.777	31.034	17.029	0.000%
4	16.930	-31.034	-9.852	-16.930	31.034	9.852	0.000%
5	19.518	-31.034	-0.022	-19.518	31.034	0.022	0.000%
6	16.896	-31.034	9.777	-16.896	31.034	-9.777	0.000%
7	9.660	-31.034	17.010	-9.660	31.034	-17.010	0.000%
8	-0.179	-31.034	19.683	0.179	31.034	-19.683	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
9	-9.882	-31.034	17.038	9.882	31.034	-17.038	0.000%
10	-16.974	-31.034	9.910	16.974	31.034	-9.910	0.000%
11	-19.589	-31.034	0.148	19.589	31.034	-0.148	0.000%
12	-17.003	-31.034	-9.687	17.003	31.034	9.687	0.000%
13	-9.687	-31.034	-16.996	9.687	31.034	16.996	0.000%
14	0.000	-49.771	0.000	0.000	49.771	0.000	0.000%
15	0.005	-49.771	-5.976	-0.005	49.771	5.976	0.000%
16	2.984	-49.771	-5.183	-2.984	49.771	5.183	0.000%
17	5.167	-49.771	-2.998	-5.167	49.771	2.998	0.000%
18	5.959	-49.771	-0.006	-5.959	49.771	0.006	0.000%
19	5.158	-49.771	2.978	-5.158	49.771	-2.978	0.000%
20	2.953	-49.771	5.178	-2.953	49.771	-5.178	0.000%
21	-0.047	-49.771	5.989	0.047	49.771	-5.989	0.000%
22	-3.011	-49.771	5.185	3.011	49.771	-5.185	0.000%
23	-5.179	-49.771	3.013	5.179	49.771	-3.013	0.000%
24	-5.977	-49.771	0.039	5.977	49.771	-0.039	0.000%
25	-5.186	-49.771	-2.954	5.186	49.771	2.954	0.000%
26	-2.960	-49.771	-5.174	2.960	49.771	5.174	0.000%
27	0.007	-31.034	-7.710	-0.007	31.034	7.710	0.000%
28	3.840	-31.034	-6.689	-3.840	31.034	6.689	0.000%
29	6.650	-31.034	-3.870	-6.650	31.034	3.870	0.000%
30	7.666	-31.034	-0.009	-7.666	31.034	0.009	0.000%
31	6.636	-31.034	3.840	-6.636	31.034	-3.840	0.000%
32	3.794	-31.034	6.681	-3.794	31.034	-6.681	0.000%
33	-0.070	-31.034	7.731	0.070	31.034	-7.731	0.000%
34	-3.881	-31.034	6.692	3.881	31.034	-6.692	0.000%
35	-6.667	-31.034	3.892	6.667	31.034	-3.892	0.000%
36	-7.694	-31.034	0.058	7.694	31.034	-0.058	0.000%
37	-6.678	-31.034	-3.805	6.678	31.034	3.805	0.000%
38	-3.805	-31.034	-6.675	3.805	31.034	6.675	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00039641
3	Yes	5	0.00000001	0.00071950
4	Yes	5	0.00000001	0.00075812
5	Yes	5	0.00000001	0.00006136
6	Yes	5	0.00000001	0.00068959
7	Yes	5	0.00000001	0.00072612
8	Yes	5	0.00000001	0.00005879
9	Yes	5	0.00000001	0.00077093
10	Yes	5	0.00000001	0.00070877
11	Yes	5	0.00000001	0.00005516
12	Yes	5	0.00000001	0.00076956
13	Yes	5	0.00000001	0.00070630
14	Yes	4	0.00000001	0.00007840
15	Yes	5	0.00000001	0.00043362
16	Yes	5	0.00000001	0.00055900
17	Yes	5	0.00000001	0.00056647
18	Yes	5	0.00000001	0.00042440
19	Yes	5	0.00000001	0.00054025
20	Yes	5	0.00000001	0.00054511
21	Yes	5	0.00000001	0.00042722

22	Yes	5	0.00000001	0.00057020
23	Yes	5	0.00000001	0.00055864
24	Yes	5	0.00000001	0.00043436
25	Yes	5	0.00000001	0.00057695
26	Yes	5	0.00000001	0.00056541
27	Yes	4	0.00000001	0.00009884
28	Yes	5	0.00000001	0.00006891
29	Yes	5	0.00000001	0.00007705
30	Yes	4	0.00000001	0.00033315
31	Yes	5	0.00000001	0.00006382
32	Yes	5	0.00000001	0.00007102
33	Yes	4	0.00000001	0.00025718
34	Yes	5	0.00000001	0.00007882
35	Yes	5	0.00000001	0.00006649
36	Yes	4	0.00000001	0.00037172
37	Yes	5	0.00000001	0.00008098
38	Yes	5	0.00000001	0.00006742

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	108 - 98.5	24.486	27	2.033	0.020
L2	98.5 - 98	20.513	34	1.892	0.009
L3	98 - 83.25	20.315	34	1.888	0.009
L4	83.25 - 76.75	14.794	34	1.643	0.005
L5	76.75 - 60.5	12.640	34	1.517	0.004
L6	60.5 - 59.5	7.973	34	1.213	0.002
L7	59.5 - 47	7.720	34	1.197	0.002
L8	50.25 - 40.5	5.563	34	1.029	0.002
L9	40.5 - 29.75	3.608	34	0.862	0.001
L10	29.75 - 13	1.930	34	0.629	0.001
L11	13 - 10	0.360	34	0.268	0.000
L12	10 - 0	0.212	34	0.204	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
105.000	BXA-70063/6CF	27	23.200	1.977	0.016	3332
102.000	A-ANT-18G-2-C	34	21.934	1.928	0.012	2890
98.000	LLPX310R w/ Mount Pipe	34	20.315	1.888	0.009	3203
96.000	PCS 1900MHz 4x45W-65MHz	34	19.530	1.872	0.009	4212
88.000	(4) 844G65VTZAS w/ Mount Pipe	34	16.489	1.740	0.006	3070
81.000	HBX-6516DS-VTM w/ Mount Pipe	34	14.027	1.598	0.004	2700
74.000	KS24019-L112A	34	11.779	1.464	0.004	3223

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	108 - 98.5	62.021	9	5.122	0.051
L2	98.5 - 98	52.003	9	4.789	0.024
L3	98 - 83.25	51.503	9	4.782	0.024
L4	83.25 - 76.75	37.522	9	4.167	0.012
L5	76.75 - 60.5	32.065	9	3.849	0.010
L6	60.5 - 59.5	20.233	9	3.080	0.006
L7	59.5 - 47	19.593	9	3.037	0.006
L8	50.25 - 40.5	14.121	9	2.613	0.005
L9	40.5 - 29.75	9.159	9	2.188	0.004
L10	29.75 - 13	4.900	9	1.597	0.002
L11	13 - 10	0.915	9	0.681	0.001
L12	10 - 0	0.539	9	0.518	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
105.000	BXA-70063/6CF	9	58.788	4.990	0.040	1381
102.000	A-ANT-18G-2-C	9	55.601	4.876	0.031	1198
98.000	LLPX310R w/ Mount Pipe	9	51.503	4.782	0.024	1320
96.000	PCS 1900MHz 4x45W-65MHz	9	49.515	4.740	0.022	1723
88.000	(4) 844G65VTZAS w/ Mount Pipe	9	41.816	4.413	0.015	1236
81.000	HBX-6516DS-VTM w/ Mount Pipe	9	35.580	4.055	0.011	1081
74.000	KS24019-L112A	9	29.882	3.715	0.009	1285

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	108 - 98.5 (1)	TP8.625x8.625x0.313	9.500	0.000	0.0	21.000	8.161	-1.405	171.376	0.008
L2	98.5 - 98 (2)	TP16.5x8.625x0.313	0.500	0.000	0.0	21.000	8.161	-1.409	171.376	0.008
L3	98 - 83.25 (3)	TP18.861x16.5x0.313	14.750	0.000	0.0	39.000	18.398	-7.004	717.509	0.010
L4	83.25 - 76.75 (4)	TP19.901x18.861x0.49	6.500	0.000	0.0	31.178	30.201	-8.878	941.610	0.009
L5	76.75 - 60.5 (5)	TP22.502x19.901x0.683	16.250	0.000	0.0	26.993	47.327	-12.331	1277.480	0.010
L6	60.5 - 59.5 (6)	TP22.662x22.502x0.852	1.000	0.000	0.0	26.865	58.956	-12.599	1583.830	0.008
L7	59.5 - 47 (7)	TP24.663x22.662x0.826	12.500	0.000	0.0	28.071	61.138	-15.126	1716.230	0.009
L8	47 - 40.5 (8)	TP25.127x23.518x0.799	9.750	0.000	0.0	28.112	61.660	-18.461	1733.410	0.011
L9	40.5 - 29.75 (9)	TP26.901x25.127x0.764	10.750	0.000	0.0	28.178	63.378	-21.549	1785.830	0.012
L10	29.75 - 13 (10)	TP29.665x26.901x0.746	16.750	0.000	0.0	30.324	68.513	-26.670	2077.580	0.013
L11	13 - 10 (11)	TP30.16x29.665x0.728	3.000	0.000	0.0	33.138	67.987	-27.622	2252.920	0.012
L12	10 - 0 (12)	TP31.81x30.16x0.751	10.000	0.000	0.0	31.389	74.030	-31.026	2323.700	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	108 - 98.5 (1)	TP8.625x8.625x0.313	26.353	19.320	23.100	0.836	0.000	0.000	23.100	0.000
L2	98.5 - 98 (2)	TP16.5x8.625x0.313	26.353	19.320	23.100	0.836	0.000	0.000	23.100	0.000
L3	98 - 83.25 (3)	TP18.861x16.5x0.313	184.598	26.541	39.000	0.681	0.000	0.000	39.000	0.000
L4	83.25 - 76.75 (4)	TP19.901x18.861x0.49	275.813	23.275	31.178	0.747	0.000	0.000	31.178	0.000
L5	76.75 - 60.5 (5)	TP22.502x19.901x0.683	524.524	25.277	26.993	0.936	0.000	0.000	26.993	0.000
L6	60.5 - 59.5 (6)	TP22.662x22.502x0.852	540.484	21.073	26.865	0.784	0.000	0.000	26.865	0.000
L7	59.5 - 47 (7)	TP24.663x22.662x0.826	691.754	24.244	28.071	0.864	0.000	0.000	28.071	0.000
L8	47 - 40.5 (8)	TP25.127x23.518x0.799	858.492	28.520	28.112	1.015	0.000	0.000	28.112	0.000
L9	40.5 - 29.75 (9)	TP26.901x25.127x0.764	1049.508	31.464	28.178	1.117	0.000	0.000	28.178	0.000
L10	29.75 - 13 (10)	TP29.665x26.901x0.746	1360.358	33.985	30.324	1.121	0.000	0.000	30.324	0.000
L11	13 - 10 (11)	TP30.16x29.665x0.728	1417.658	35.030	33.138	1.057	0.000	0.000	33.138	0.000
L12	10 - 0 (12)	TP31.81x30.16x0.751	1612.042	34.647	31.389	1.104	0.000	0.000	31.389	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	108 - 98.5 (1)	TP8.625x8.625x0.313	4.142	0.508	14.000	0.073	0.251	0.089	14.000	0.006
L2	98.5 - 98 (2)	TP16.5x8.625x0.313	4.158	0.510	14.000	0.037	0.250	0.088	14.000	0.006
L3	98 - 83.25 (3)	TP18.861x16.5x0.313	13.202	0.718	26.000	0.055	0.788	0.055	26.000	0.002
L4	83.25 - 76.75 (4)	TP19.901x18.861x0.49	14.678	0.486	20.785	0.047	0.804	0.033	20.785	0.002
L5	76.75 - 60.5 (5)	TP22.502x19.901x0.683	15.927	0.337	17.995	0.037	0.929	0.021	17.995	0.001
L6	60.5 - 59.5 (6)	TP22.662x22.502x0.852	16.007	0.272	17.910	0.030	0.933	0.017	17.910	0.001
L7	59.5 - 47 (7)	TP24.663x22.662x0.826	16.715	0.273	18.714	0.029	0.962	0.016	18.714	0.001
L8	47 - 40.5 (8)	TP25.127x23.518x0.799	17.454	0.283	18.741	0.030	0.994	0.016	18.741	0.001
L9	40.5 - 29.75 (9)	TP26.901x25.127x0.764	18.104	0.286	18.785	0.030	1.028	0.015	18.785	0.001
L10	29.75 - 13 (10)	TP29.665x26.901x0.746	19.035	0.278	20.216	0.027	1.084	0.013	20.216	0.001
L11	13 - 10 (11)	TP30.16x29.665x0.728	19.192	0.282	22.092	0.026	1.094	0.013	22.092	0.001
L12	10 - 0 (12)	TP31.81x30.16x0.751	19.710	0.266	20.926	0.025	1.131	0.012	20.926	0.001

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	108 - 98.5 (1)	0.008	0.836	0.000	0.073	0.006	0.846 ✔	1.333	H1-3+VT ✔
L2	98.5 - 98 (2)	0.008	0.836	0.000	0.037	0.006	0.846 ✔	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L3	98 - 83.25 (3)	0.010	0.681	0.000	0.055	0.002	0.691 ✔	1.333	H1-3+VT ✔
L4	83.25 - 76.75 (4)	0.009	0.747	0.000	0.047	0.002	0.757 ✔	1.333	H1-3+VT ✔
L5	76.75 - 60.5 (5)	0.010	0.936	0.000	0.037	0.001	0.946 ✔	1.333	H1-3+VT ✔
L6	60.5 - 59.5 (6)	0.008	0.784	0.000	0.030	0.001	0.793 ✔	1.333	H1-3+VT ✔
L7	59.5 - 47 (7)	0.009	0.864	0.000	0.029	0.001	0.873 ✔	1.333	H1-3+VT ✔
L8	47 - 40.5 (8)	0.011	1.015	0.000	0.030	0.001	1.025 ✔	1.333	H1-3+VT ✔
L9	40.5 - 29.75 (9)	0.012	1.117	0.000	0.030	0.001	1.129 ✔	1.333	H1-3+VT ✔
L10	29.75 - 13 (10)	0.013	1.121	0.000	0.027	0.001	1.134 ✔	1.333	H1-3+VT ✔
L11	13 - 10 (11)	0.012	1.057	0.000	0.026	0.001	1.070 ✔	1.333	H1-3+VT ✔
L12	10 - 0 (12)	0.013	1.104	0.000	0.025	0.001	1.117 ✔	1.333	H1-3+VT ✔

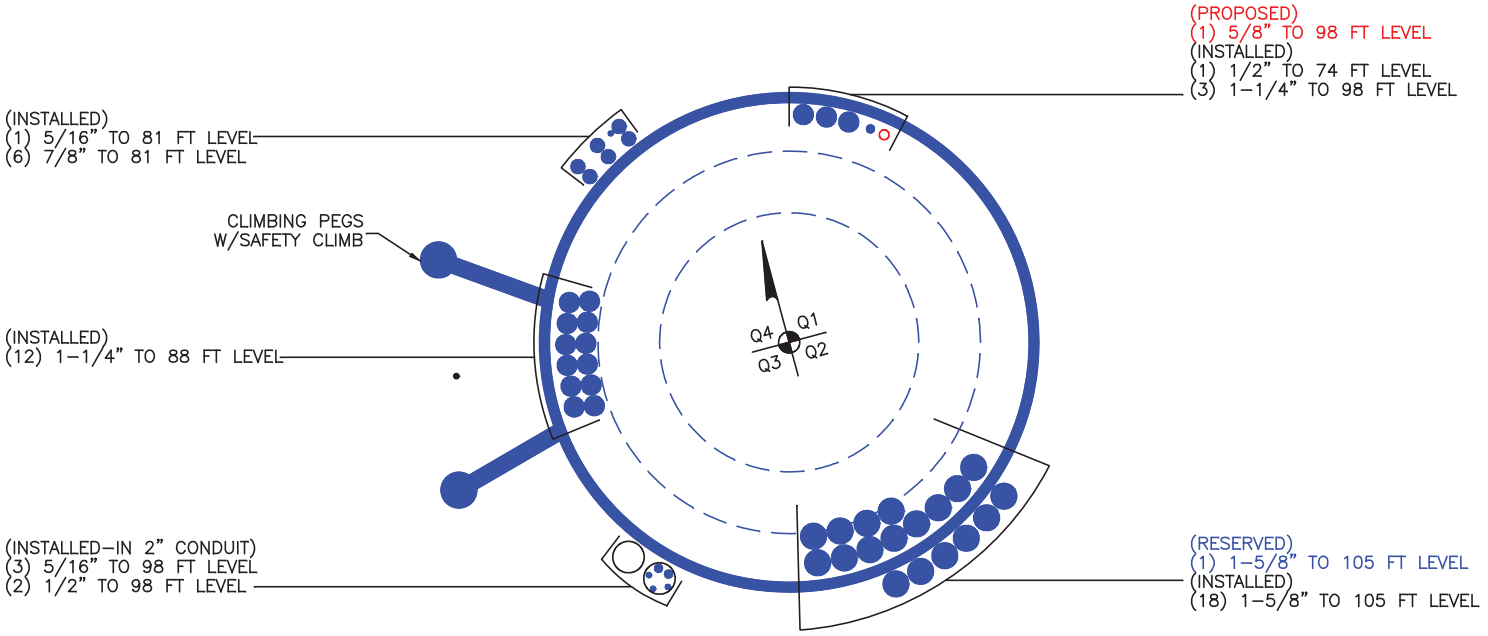
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	108 - 98.5	Pole	TP8.625x8.625x0.313	1	-1.405	228.444	**	**
L2	98.5 - 98	Pole	TP16.5x8.625x0.313	2	-1.409	228.444	**	**
L3	98 - 83.25	Pole	TP18.861x16.5x0.313	3	-7.004	956.439	**	**
L4	83.25 - 76.75	Pole	TP19.901x18.861x0.49	4	-8.878	1255.166	**	**
L5	76.75 - 60.5	Pole	TP22.502x19.901x0.683	5	-12.331	1702.881	**	**
L6	60.5 - 59.5	Pole	TP22.662x22.502x0.852	6	-12.599	2111.245	**	**
L7	59.5 - 47	Pole	TP24.663x22.662x0.826	7	-15.126	2287.734	**	**
L8	47 - 40.5	Pole	TP25.127x23.518x0.799	8	-18.461	2310.635	**	**
L9	40.5 - 29.75	Pole	TP26.901x25.127x0.764	9	-21.549	2380.511	**	**
L10	29.75 - 13	Pole	TP29.665x26.901x0.746	10	-26.670	2769.414	**	**
L11	13 - 10	Pole	TP30.16x29.665x0.728	11	-27.622	3003.142	**	**
L12	10 - 0	Pole	TP31.81x30.16x0.751	12	-31.026	3097.492	**	**
							Summary	
						Pole (L10)	95.9	Pass
						RATING =	**95.9**	**Pass**

**See additional calculations

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876363 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Reinforcement Capacity

AeroSolutions LLC
Optimizing Your Tower Infrastructure
5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Dimensions and Properties														Compression				Axial				
																		ASD-9			LRFD	
Model	Weight (lb/ft)	Area (in^2)	Moment of Inertia (in^4)	Moment of Inertia (in^4)	Centroid from Mating Edge (in)	Centroid from Bolt Hole Center (in)	Web Thickness (in)	Width (in)	Flange Width (in)	Flange Thickness (in)	Hole Diameter (in)	Yield Stress (ksi)	Ultimate Stress (ksi)	Slender. Ratio Coefficient	Unbraced Length (in)	Slender. Ratio Coefficient	Unbraced Length (in)	Allowable Axial (kip)	Allowable Axial w/ increase (kip)	Governing Axial	Design Axial Strength (kip)	Governing Axial
Model	*Wt*	*A*	*Ix*	*Iy*	*Y*	*X*	*Tw*	*W*	*Wf*	*Tf*	*Dh*	*Fy*	*Fu*	*Kx*	*Lx*	*Ky*	*Ly*	*PAll*	*Pall.inc*	*Ptype.ASD*	*phiPn*	*Ptype.LRFD*
MP303	9.9	2.92	0.66	6.57	0.59	0	0.30	4.06	1.57	0.64	1.21875	65	80	0.80	18	1.00	18	96.4	128.6	Rupture	**144.7**	Rupture
MP305	19.2	5.65	2.15	20.79	0.79	0	0.5	5.33	2.09	0.91	1.21875	65	80	0.80	18	1.00	18	194.5	259.3	Rupture	**291.8**	Rupture
VS(1.25x5.25)	22.3	6.56	0.85	15.07	0.625	0	1.25	5.25	0	0	1.21875	65	80	0.80	18	1.00	18	198.4	264.6	Rupture	297.7	Rupture
VS(1.25x4.375)	18.6	5.47	0.71	8.72	0.625	0	1.25	4.375	0	0	1.21875	65	80	0.80	21	1.00	21	154.7	206.3	Rupture	232.0	Rupture
VS(1.25x4)	17.0	5.00	0.65	6.67	0.625	0	1.25	4	0	0	1.21875	65	80	0.80	21	1.00	21	135.9	181.3	Rupture	203.9	Rupture

Rein1

Bottom	Top	Qty	Model	Position	T or T&C
0	10	4	(1.25x5.25)	F	T&C
10	29.75	3	(1.25x5.25)	F	T&C
29.75	59.5	3	..25x4.375)	F	T&C
59.5	76.75	3	VS(1.25x4)	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Flats (Used for relative orientation only. Actual flat numbers may vary.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		1				1					1					1	
				1							1					1	
				1							1					1	
				1							1					1	

Rein2

Bottom	Top	Qty	Model	Position	T or T&C
0	40.5	2	MP305	F	T&C
40.5	60.5	3	MP305	F	T&C
60.5	83.25	3	MP303	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
						1						1					
1						1						1					
1						1						1					

Rein3

Bottom	Top	Qty	Model	Position	T or T&C
0	13	1	MP305	F	T&C
13	40.5	1	MP305	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
							1										
1																	

Reinforced Pole Stress
and Effective Thickness Check

AeroSolutions LLC
Optimizing Your Tower Infrastructure
5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Section		Loads				Pole																Unreinforced Pole - Rev. F					Reinforced Pole					Rev. F	Reinforcement 1									Reinforcement 2								Composite							
Section	Elevation (ft)	Moment (ft-kip)	Compression (kip)	Shear (kip)	Torsion (kip-ft)	Number of Sides	OD (in)	Thickness (in)	Yield Strength (ksi)	Flat Width (in)	Area (in^2)	Moment of Inertia (in^4)	Percent of Composite Moment of Inertia	Angle Offset to Pole Flat	Distance to Extreme Fiber (in)	Section Modulus (in^3)	Torsion Constant (in^4)	Polygonal Compact Criterion	Allowable Bending Stress (ksi)	Allowable Bending Moment Strength (ft-kip)	Allowable Axial Stress (ksi)	Allowable Shear Stress (ksi)	Bending Stress (ksi)	Axial Stress (ksi)	Shear Stress (ksi)	Torsion Shear Stress (ksi)	Stress Ratio	Moment in Pole when Reinforced	Bending Stress (ksi)	Axial Stress (ksi)	Shear Stress (ksi)	Torsion Shear Stress (ksi)	Reinforced Pole Stress Ratio	Qty	Model	Position (F-Flat, C-Corner)	Gap Between Pole and Back of Rein. (in)	Tension only or Tension & Comp.	Total Moment of Inertia (in^4)	Axial Force (kip)	Stress Ratio	Qty	Model	Position (F-Flat, C-Corner)	Gap Between Pole and Back of Rein. (in)	Tension only or Tension & Comp.	Total Moment of Inertia (in^4)	Axial Force (kip)	Stress Ratio	Centroid Offset (in)	Area (in^2)	Moment of Inertia (in^4)	Controlling Stress Ratio	Thickness (in)	Weight Multiplier	Derated Yield Stress (ksi)	% Error in Derated Yield Stress
1	108	0.0	0.0	0.0	0.0	Round	8.6250	0.3125	35	0.00	8.2	71	100%	TRUE	4.31	16	141	0	30.8	42.0	28.0	18.7	0.0	0.00	0.00	0.00	0.000	0.0	0.0	0.00	0.00	0.000																			0.000	8.2	71	0.000	0.3125	1.00	35.0	15.6%
2	98.5	26.4	1.4	4.1	0.3	Round	8.6250	0.3125	35	0.00	8.2	71	100%	TRUE	4.31	16	141	0	30.8	42.0	28.0	18.7	19.3	0.17	0.00	0.09	0.634	26.4	19.3	0.17	0.00	0.01	0.634																			0.000	8.2	71	0.634	0.3125	1.00	35.0	0.3%
3	98	28.4	1.4	4.2	0.3	Round	16.5000	0.3125	35	0.00	15.9	521	100%	TRUE	8.25	63	1041	0	30.8	162.0	28.0	18.7	5.4	0.09	0.00	0.02	0.179	28.4	5.4	0.09	0.00	0.00	0.179																			0.000	15.9	521	0.179	0.3125	1.00	35.0	1.2%
4	83.25	184.6	7.0	13.2	0.8	18	18.8609	0.3125	65	2.77	18.4	798	100%	TRUE	9.55	84	1584	72	52.0	362.0	52.0	34.7	26.5	0.38	0.00	0.06	0.517	184.6	26.5	0.38	0.00	0.00	0.517																			0.000	18.4	798	0.517	0.3125	1.00	65.0	0.3%
5	76.75	275.8	8.9	14.7	0.8	18	19.9013	0.3125	65	2.96	19.4	940	65%	0	9.95	94	1866	76	52.0	429.1	52.0	34.7	35.0	0.46	0.00	0.05	0.683	180.4	22.9	0.46	0.00	0.00	0.449									3	MP303	F	0	T&C	497	71.0	0.552	0.000	28.2	1438	0.552	0.4902	0.93	52.0	2.5%
6	60.5	524.5	12.3	15.9	0.9	18	22.5022	0.3125	65	3.42	22.0	1370	48%	10	11.79	116	2712	88	52.0	503.4	52.0	34.7	54.2	0.56	0.00	0.05	1.251	252.5	26.1	0.56	0.00	0.00	0.512	3	VS(1.25x6)	F	0	T&C	850	125.2	0.691	3	MP303	F	0	T&C	626	69.2	0.538	-0.300	45.7	2847	0.691	0.6834	0.97	45.0	2.3%
7	59.5	540.5	12.6	16.0	0.9	18	22.6623	0.3125	65	3.44	22.1	1399	39%	10	11.81	118	2771	89	52.0	513.1	52.0	34.7	54.8	0.57	0.00	0.05	1.264	213.4	21.6	0.57	0.00	0.00	0.427	3	VS(1.25x6)	F	0	T&C	863	104.8	0.579	3	MP305	F	0	T&C	1281	113.1	0.416	-0.332	54.1	3543	0.579	0.8516	0.92	44.8	2.1%
8	50.25	691.8	15.1	16.7	1.0	18	24.1428	0.3125	65	3.71	23.6	1696	40%	10	12.60	135	3359	96	52.0	583.2	52.0	34.7	61.7	0.64	0.00	0.04	1.156	279.4	24.9	0.64	0.00	0.00	0.491	3	VS(1.25x4.375)	F	0	T&C	1065	131.4	0.637	3	MP305	F	0	T&C	1439	129.7	0.509	-0.367	57.0	4200	0.637	0.8261	0.93	46.8	2.2%
9	47	746.5	16.6	17.0	1.0	18	24.6630	0.6250	65	3.25	47.6	3475	57%	10	12.74	273	6897	42	52.0	1182.0	52.0	34.7	32.8	0.35	0.00	0.02	0.638	426.6	18.8	0.35	0.00	0.00	0.368	3	VS(1.25x4.375)	F	0	T&C	1113	100.8	0.489	3	MP305	F	0	T&C	1495	97.6	0.377	-0.263	80.9	6081	0.489	1.1694	0.93	46.3	2.0%
10	40.5	858.5	18.5	17.5	1.0	18	25.1267	0.3125	65	3.88	24.6	1915	42%	10	13.11	146	3792	100	52.0	633.0	52.0	34.7	70.5	0.75	0.00	0.04	1.373	356.6	29.3	0.75	0.00	0.00	0.578	3	VS(1.25x4.375)	F	0	T&C	1148	154.3	0.748	3	MP305	F	0	T&C	1548	152.0	0.586	-0.374	57.9	4611	0.748	0.7985	0.94	46.9	2.2%
11	29.75	1049.5	21.5	18.1	1.0	18	26.3007	0.3125	65	4.19	26.3	2356	43%	10	14.02	168	4665	108	52.0	727.9	52.0	34.7	75.0	0.82	0.00	0.04	1.453	452.0	32.3	0.82	0.00	0.00	0.637	3	VS(1.25x4.375)	F	0	T&C	1305	169.8	0.824	2	MP305	F	0	T&C	943	166.7	0.643	-0.388	59.7	5470	0.824	0.7640	0.94	47.0	2.3%
12	13	1360.4	26.7	19.0	1.1	18	29.6648	0.3125	65	4.68	29.1	3171	44%	10	15.50	205	6275	121	52.0	886.2	52.0	34.7	79.8	0.92	0.00	0.03	1.553	595.9	35.0	0.92	0.00	0.00	0.690	3	VS(1.25x5.25)	F	0	T&C	1802	218.6	0.826	2	MP305	F	0	T&C	1135	179.4	0.692	-0.464	65.7	7239	0.826	0.7464	0.96	50.5	2.5%
13	10	1417.7	27.6	19.2	1.1	18	30.1598	0.3125	65	4.77	29.6	3462	47%	0	17.21	201	6598	123	52.0	871.4	52.0	34.7	84.6	0.93	0.00	0.03	1.645	659.6	39.4	0.93	0.00	0.00	0.775	3	VS(1.25x5.25)	F	0	T&C	2118	253.7	0.959	2	MP305	F	0	T&C	600	131.8	0.508	2.131	66.2	7441	0.959	0.7278	0.98	55.2	16.7%
14	0	1612.0	31.0	19.7	1.1	18	31.8100	0.3125	65	5.06	31.2	3944	44%	10	17.16	230	7754	130	52.0	995.8	52.0	34.7	84.2	0.99	0.00	0.03	1.633	704.7	36.8	0.99	0.00	0.00	0.727	4	VS(1.25x5.25)	F	0	T&C	3824	243.7	0.921	2	MP305	F	0	T&C	1052	163.7	0.631	-1.033	74.4	9022	0.921	0.7509	1.01	52.3	9.6%
																											1.645					0.775																						0.959								

PROJECT	BU 876363
SUBJECT	ANCHOR ROD CAPACITY
DATE 01/28/2014	PAGE 1 OF 1

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

$M = 1612$ k-ft

New Anchor Rods M.O.I. $= 9749.6\ in^4$

$$T_{ACTUAL} = \frac{(1612\ k\text{-}ft)(12\ in/ft)(\frac{43.51}{2}\ in)(3.98\ in^2)}{9749.6\ in^4}$$

$T_{ACTUAL} = 171.8$ kips

$T_{ALLOWED} = (0.33)(125)(3.98)(\frac{4}{3})$

$T_{ALLOWED} = 218.9$ kips

UNITY FOR NEW RODS:

$$= \frac{171.8}{218.9} = 78.5\%$$

$$M_{\substack{\text{NEW RODS} \\ \text{+ EXISTING RODS}}} = \frac{(171.8\ K)(43.51\ in)}{12\ in/ft} = 622.9\ k\text{-}ft$$

$M_{REMAINING} = 1612 - 622.9 = 989.1$ k-ft

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

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

Site Data

BU#: *85565.004.01*
Site Name: *Hartfor-NU,CT*
App #: *193728 REV#0*

Anchor Rod Data		
Qty:	8	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	38	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	36	in
Thick:	2.5	in
Grade:	55	ksi
Clip Distance:	0	in

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

Pole Data		
Diam:	31.81	in
Thick:	0.25	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	989.1	ft-kips
Unfactored Axial, P:	31	kips
Unfactored Shear, V:	20	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	152.3 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	78.1% **Pass**

Base Plate Results Flexural Check

Base Plate Stress:	45.4 ksi
Allowable PL Bending Stress:	55.0 ksi
Base Plate Stress Ratio:	82.6% **Pass**

PL Ref. Data
Yield Line (in):
19.10
Max PL Length:
19.10

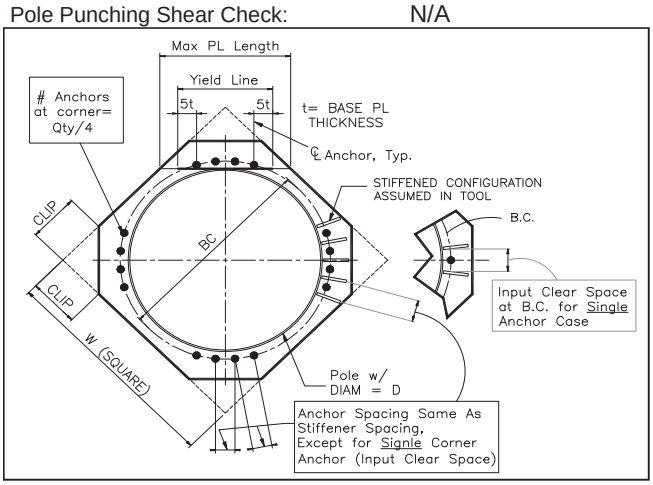
N/A - Unstiffened

Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A



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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *876363*
Site Name: *HARTFORD - NU (SSUSA*
App #: *208263 Rev# 4*

Pole Manufacturer:	Other

Reactions		
Moment:	26.353	ft-kips
Axial:	1.409	kips
Shear:	4.159	kips
Elevation:	98	feet

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

Bolt Data			
Qty:	9		
Diameter (in.):	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	75	<-- Disregard	Bolt Fty:
N/A:	55	<-- Disregard	44.00
Circle (in.):	19.5		

Plate Data		
Diam:	24	in
Thick, t:	1	in
Grade (Fy):	50	ksi
Strength, Fu:	65	ksi
Single-Rod B-eff:	5.82	in

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

Pole Data		
Diam:	16.5	in
Thick:	0.1875	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Flange Bolt Results

			Rigid
Bolt Tension Capacity, **B**:	25.91	kips	Service, ASD
Max Bolt directly applied T:	7.05	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	0.779	in	
Min PL "treq" for actual **T w/ Pry**:	0.298	in	
Min PL "t1" for actual **T w/o Pry**:	0.407	in	
T allowable w/o Prying:	25.91	kips	α'<0 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	7.05	kips	
Non-Prying Bolt Stress Ratio, T/B:	27.2%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	7.3	ksi	Service ASD
Allowable Plate Stress:	50.0	ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	14.6%	**Pass**	Comp. Y.L. Length:
No Prying			10.39
Tension Side Stress Ratio, (treq/t)^2:	8.9%	**Pass**	

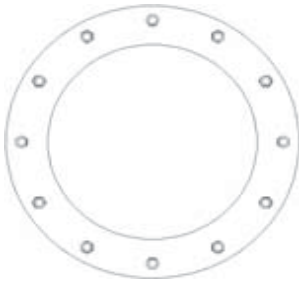
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a



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

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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *876363*
Site Name: *HARTFORD - NU (SSUSA*
App #: *208263 Rev# 4*

Pole Manufacturer:	Other

Reactions		
Moment:	26.353	ft-kips
Axial:	1.409	kips
Shear:	4.159	kips
Elevation:	98	feet

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

Bolt Data			
Qty:	9		
Diameter (in.):	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	75	<-- Disregard	Bolt Fty:
N/A:	55	<-- Disregard	44.00
Circle (in.):	19.5		

Plate Data		
Diam:	24	in
Thick, t:	1	in
Grade (Fy):	50	ksi
Strength, Fu:	65	ksi
Single-Rod B-eff:	3.01	in

Stiffener Data (Welding at Both Sides)		
Config:	2	*
Weld Type:	Groove	
Groove Depth:	0.1875	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0.25	in
Width:	7.5	in
Height:	9	in
Thick:	0.375	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	60	ksi

Pole Data		
Diam:	8.625	in
Thick:	0.3125	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Flange Bolt Results — Stiffened (Service, ASD; Fty*ASIF)

Bolt Tension Capacity, **B**:	25.91 kips	
Max Bolt directly applied T:	7.05 Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	Stiffened in	
Min PL "treq" for actual **T w/ Pry**:	Stiffened in	
Min PL "t1" for actual **T w/o Pry**:	Stiffened in	
T allowable	25.91 kips	<-- B, Stiffened
Prying Force, Q:	0.00 kips	Stiffened
Total Bolt Tension=T+Q:	7.05 kips	
Non-Prying Bolt Stress Ratio, T/B:	27.2% **Pass**	

Exterior Flange Plate Results — Flexural Check — Stiffened (Service, ASD; 0.75*Fy*ASIF; Comp. Y.L. Length: N/A, Roark)

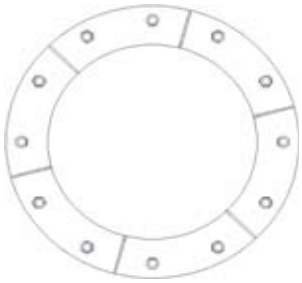
Compression Side Plate Stress:	11.7 ksi	
Allowable Plate Stress:	50.0 ksi	
Compression Plate Stress Ratio:	23.4% **Pass**	
Stiffened		
Tension Side Stress Ratio, (treq/t)^2:	N/A	

Stiffener Results

Horizontal Weld :	20.3% **Pass**
Vertical Weld:	30.6% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	23.9% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	21.5% **Pass**
Plate Comp. (AISC Bracket):	57.7% **Pass**

Pole Results

Pole Punching Shear Check:	17.5% **Pass**



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

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

PROJECT	**876363 - HARTFORD - NU (SSUSA), CT**				
SUBJECT	**Foundation Analysis**				
DATE	**01/28/14**	PAGE	1	OF	1

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

Monopole Pad & Pier Foundation Analysis

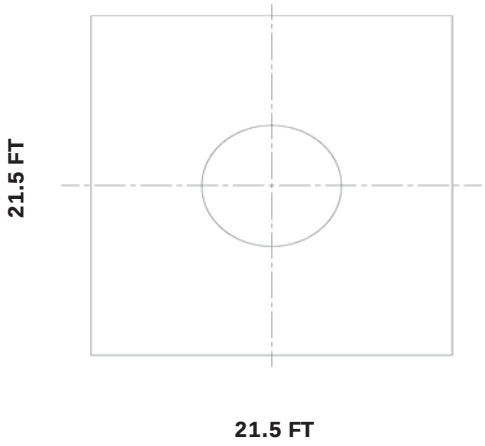
Rev. Type: F

Design Loads:

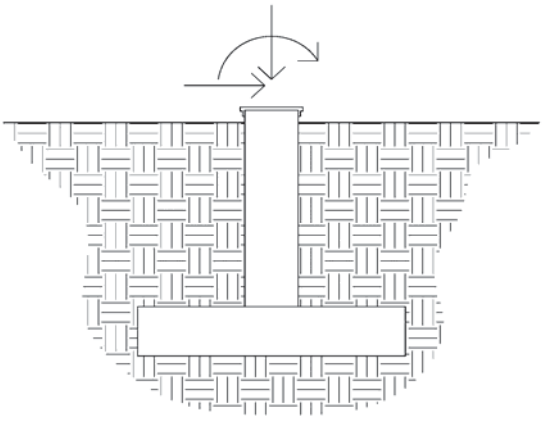
	Input unfactored loads	
Shear:	20.0	kips
Moment:	1,612.0	ft-kips
Tower Height:	108.0	ft
Tower Weight:	31.0	kips

Pad & Pier Dimensions / Properties:

Pole Diameter at Base:	31.81	in
Bearing Depth:	7.0	ft
Pad Width:	21.5	ft
Neglected Depth:	3.3	ft
Thickness:	3.0	ft
Pier Diameter:	5.0	ft
Pier Height Above Grade:	0.5	ft
BP Dist. Above Pier:	0.0	in
Clear Cover:	4.0	in
Pier Rebar Size:	11	
Pier Rebar Quanity:	19	
Pad Rebar Size:	8	
Pad Rebar Quanity:	21	
Pier Tie Size:	5	
Tie Quanity:	12	
Rebar Yield Strength:	60000	psi
Concrete Strength:	3000	psi
Concrete Unit Weight:	0.15	kcf



Elevation Overview



Soil Data:

	Allowable Values	
Soil Unit Weight:	0.115	kcf
Ult. Bearing Capacity:	6.900	ksf
Angle of Friction:	32.000	deg
Cohesion:	0.000	ksf
Passive Pressure:	0.000	ksf
Base Friction:	0.350	

Summary of Results

Req'd Pier Diam.	OK
Overturning	56.6%
Shear Capacity	22.4%
Bearing	44.3%
Pad Shear - 1-way	44.4%
Pad Shear - 2-way	4.6%
Pad Moment Capacity	35.6%
Pier Moment Capacity	72.0%

** Notes:

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

Sprint Existing Facility

Site ID: CT23XC550

Hartford NU

219 New Park Road
Hartford, CT 06106

March 19, 2014

EBI Project Number: 62141238

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

EBI Consulting
environmental | engineering | due diligence

March 19, 2014

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

Re: Radio Frequency Maximum Permissible Exposure (MPE) Assessment for Site:
CT23XC550 – Hartford NU

Site Total: 96.292% - MPE% in full compliance

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 219 New Park Road, Hartford, 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 band 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 219 New Park Road, Hartford, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario. Actual values seen from this site will be dramatically less than those shown in this report. 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) 8 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 was used in this direction.

6) The antennas used in this modeling are the RFS APXVSPP18-C-A20, the RFS APXV9ERR18-C-A20 and the RFS APXVTMM-C-120. 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 APXV9ERR18-C-A20 has a 14.9 dBd gain value at its main lobe at 1900 MHz and 11.9 dBd at its main lobe for 850 MHz. The RFS APXVTMM-C-120 has a 15.9 dBd gain value at its main lobe at 2500 MHz. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario.
7) The antenna mounting height centerline for the proposed is **99 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	CT23XC550 - Hartford NU
Site Addresss	219 New Park Road, Hartford, CT 06106
Site Type	Monopole

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Antenna Height Meters	Cable Size	Cable Loss (dB)	Additional Loss (dB)	Gain Factor	ERP	Power Density Value	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	8	160	15.9	99	93	28.34674	1/2 "	0.5	3	17.378008	2780.4813	115.574	11.55740%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	99	93	28.34674	1/2 "	0.5	3	9.7723722	195.44744	8.124003	1.43280%
1B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	13.4	99	93	28.34674	1/2 "	0.5	3	9.7723722	390.89489	16.24801	2.86561%
																Sector total Power Density Value:		15.856%	

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 in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Antenna Height Meters	Cable Size	Cable Loss (dB)	Additional Loss (dB)	Gain Factor	ERP	Power Density Value	Power Density Percentage
2a	RFS	APXV9ERR18-C-A20	RRH	1900 MHz	CDMA / LTE	20	8	160	14.9	99	93	28.34674	1/2 "	0.5	3	13.803843	2208.6148	91.80367	9.18037%
2a	RFS	APXV9ERR18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	11.9	99	93	28.34674	1/2 "	0.5	3	6.9183097	138.36619	5.751354	1.01435%
2B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	13.4	99	93	28.34674	1/2 "	0.5	3	9.7723722	390.89489	16.24801	2.86561%
																Sector total Power Density Value:		13.060%	

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 in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Antenna Height Meters	Cable Size	Cable Loss (dB)	Additional Loss (dB)	Gain Factor	ERP	Power Density Value	Power Density Percentage
3a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	8	160	15.9	99	93	28.34674	1/2 "	0.5	3	17.378008	2780.4813	115.574	11.55740%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	99	93	28.34674	1/2 "	0.5	3	9.7723722	195.44744	8.124003	1.43280%
3B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	13.4	99	93	28.34674	1/2 "	0.5	3	9.7723722	390.89489	16.24801	2.86561%
																Sector total Power Density Value:		15.856%	

Site Composite MPE %	
Carrier	MPE %
Sprint	44.772%
MetroPCS	19.000%
Clearwire	1.800%
Verizon Wireless	30.720%
Total Site MPE %	**96.292%**

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Summary

All calculations performed for this analysis yielded results that were 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 **44.772% (15.856% from sectors 1&3 and 13.060% from sector 2)** 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 **96.292%** of the allowable FCC established general public limit sampled at 6 feet above ground level. This total composite site value is based upon MPE values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803