Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

October 25, 2017

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

RE: **Notice of Exempt Modification for Sprint 2.5 Rework Crown Site BU: 876313**
Sprint Site ID: CT03XC015
1394 Meriden Waterbury Turnpike, Southington, CT 06489
Latitude: 41° 33′ 51.39″/ Longitude: -72° 53′ 30.70″

Dear Ms. Bachman:

Sprint currently maintains three (3) antennas at the 148-foot level of the existing 160-foot monopole tower at 1394 Meriden Waterbury Turnpike in Southington, CT. The tower and property is owned by Crown Castle. Sprint now intends to install three (3) antennas new antennas. These antennas would be installed at the 148-foot level of the tower. Sprint also intends to install three (3) RRH's and one (1) hybrid cable.

The Town of Southington has not responded to a request for original zoning documents, at this time.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to Mr. Garry Brumback, Town Manager, Town of Southington, as well as the property owner, and Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, Sprint respectfully submits that 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: Jeffrey Barbadora.

Sincerely,

Jeffrey Barbadora
Real Estate Specialist
12 Gill Street, Suite 5800, Woburn, MA 01801
781-729-0053
Jeff.Barbadora@crowncastle.com

Attachments:

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

cc: Mr. Garry Brumback, Town Manager
Town of Southington
75 Main Street
Southington, CT 06489

Planning & Zoning
Town of Southington
Municipal Center
196 North Main Street
Southington, CT 06489

Town of Southington, CT
Property Listing Report

GIS PIN 0321030004 Account 18522

Property Information

Property Location	1394 MERIDEN WATERBURY TPKE
Owner	SOUTHINGTON TOWER DEVELOPMENT LLC
Co-Owner	%GLOBAL SIGNAL
Mailing Address	PMB331 CANONSBURG PA 15317-252
Land Use	391 Vac Com Lnd wAcc
Land Class	C
Water Service	

Sewer Service	
Census Tract	4303
Neighborhood	1135
Zoning Code	B
Acreage	0.83
Book / Page	997/1112
Lot Setting/Desc	Level
Trash Day	

Photo

No Photo Available

Sketch

Primary Construction Details

Year Built	
Stories	
Building Style	
Building Use	
Building Condition	
Floors	
Total Rooms	

Bedrooms	0
Full Bathrooms	
Half Bathrooms	
Bath Style	
Kitchen Style	
Roof Style	
Roof Cover	

Exterior Walls	
Interior Walls	
Heating Type	
Heating Fuel	
AC Type	
Gross Bldg Area	0
Total Living Area	0

Report Created On 5/4/2017

Town of Southington, CT
Property Listing Report

GIS PIN 0321030004 Account 18522

Valuation Summary (Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings		0
Outbuildings	0	0
Improvements	0	0
Extras	0	0
Land	204320	143020
Total	204320	143020

Outbuilding and Extra Items

Type	Description

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Total Area	0	0

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
SOUTHINGTON TOWER DEVELOPMENT LLC	997/1112	2005-01-18	90000

Report Created On 5/4/2017

EX-21 4 ex21123110.htm SUBSIDIARIES OF CROWN CASTLE INTERNATIONAL CORP

EXHIBIT 21

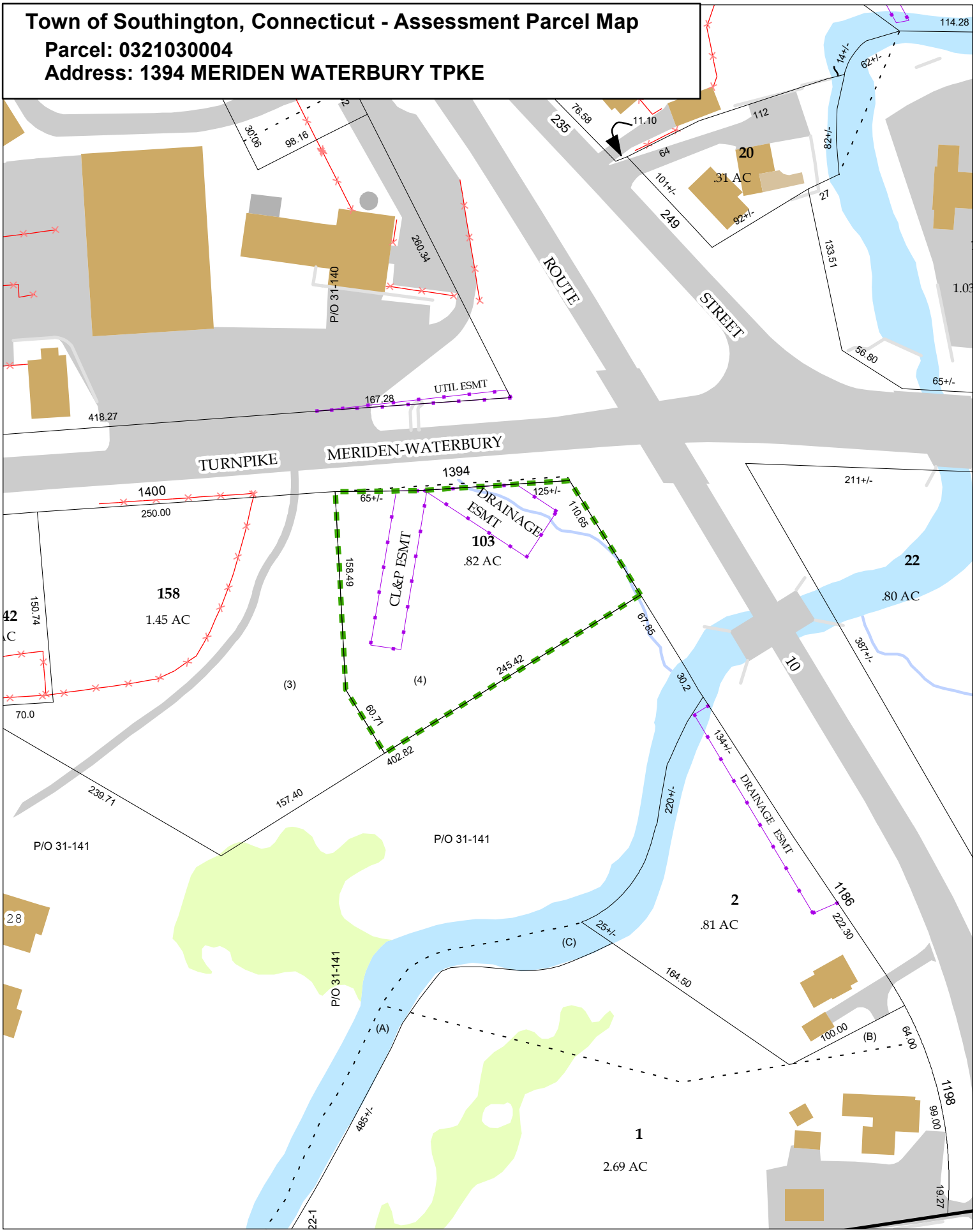
CROWN CASTLE INTERNATIONAL CORP. SUBSIDIARIES

Subsidiary	Jurisdiction of Incorporation
CC Holdings GS V LLC	Delaware
CC Towers Guarantor LLC	Delaware
CC Towers Holding LLC	Delaware
CCGS Holdings Corp.	Delaware
Crown Atlantic Company LLC	Delaware
Crown Castle Atlantic LLC	Delaware
Crown Castle Australia Holdings Pty Limited	Australia
Crown Castle Australia Pty Ltd	Australia
Crown Castle CA Corp.	Delaware
Crown Castle GT Company LLC	Delaware
Crown Castle GT Corp.	Delaware
Crown Castle GT Holding Sub LLC	Delaware
Crown Castle Investment Corp.	Delaware
Crown Castle Operating Company	Delaware
Crown Castle Operating LLC	Delaware
Crown Castle PT Inc.	Delaware
Crown Castle South LLC	Delaware
Crown Castle Towers 05 LLC	Delaware
Crown Castle Towers LLC	Delaware
Crown Castle USA Inc.	Pennsylvania
Crown Communication LLC (f/k/a Crown Communication Inc. d/b/a/ Crown Communications and CrownCom)	Delaware
Global Signal Acquisitions II LLC	Delaware
Global Signal Acquisitions III LLC	Delaware
Global Signal Acquisitions IV LLC	Delaware
Global Signal Acquisitions LLC	Delaware
Global Signal GP LLC	Delaware
Global Signal Holdings III LLC	Delaware
Global Signal Operating Partnership, L.P.	Delaware
Pinnacle Towers Acquisition LLC	Delaware
Pinnacle Towers Acquisitions Holdings LLC	Delaware
Pinnacle Towers LLC	Delaware

Town of Southington, Connecticut - Assessment Parcel Map

Parcel: 0321030004

Address: 1394 MERIDEN WATERBURY TPKE



Approximate Scale:

20 0 20 40 60 80 Feet

Disclaimer: This map is for informational purposes only.
All information is subject to verification by any user.
The Town of Southington and its mapping contractors
assume no legal responsibility for the information contained herein.

Map Produced April 2017

Sprint

CROWN CASTLE

PROJECT:	2.5 EQUIPMENT DEPLOYMENT
SITE NAME:	WEST JOHNSON AVE. BURNT HOUSE
SITE CASCADE:	CT03XC015
SITE NUMBER:	876313
SITE ADDRESS:	1394 ROUTE 322 (MERIDEN WATERBURY TPK) SOUTHINGTON, CT 06489
SITE TYPE:	MONOPOLE TOWER
MARKET:	NORTHERN CONNECTICUT

Confirm azimuths with final RFDS - RFDS supersedes CD's

SITE INFORMATION

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

LATITUDE (NAD83):
41° 33' 51.39" N
41.564275°

LONGITUDE (NAD83):
72° 53' 30.7" W
-72.891861°

COUNTY:
HARTFORD

ZONING JURISDICTION:
CONNECTICUT SITING COUNCIL

ZONING DISTRICT:
MR-1

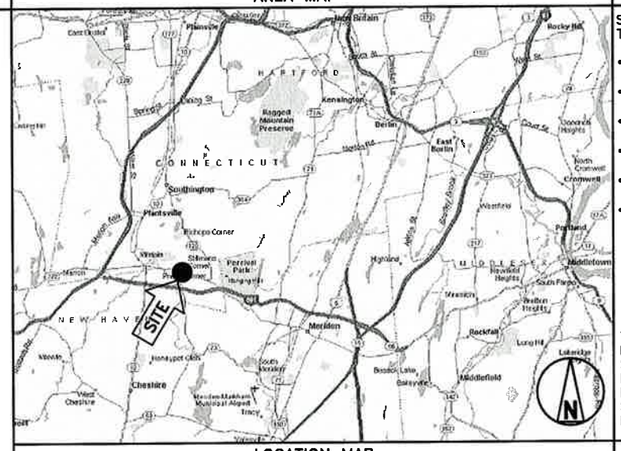
POWER COMPANY:
CONNECTICUT LIGHT & POWER
(860) 947-2000

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

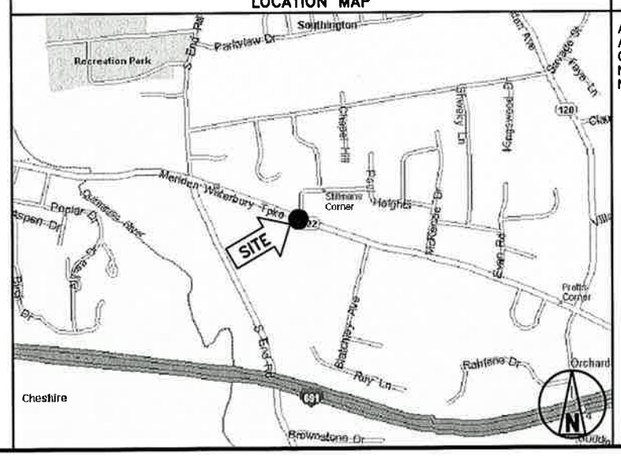
SPRINT CM:
PETER CULBERT
(603) 203-6446
(603) 969-0686
peter.culbert@sprint.com

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

AREA MAP



LOCATION MAP



PROJECT DESCRIPTION

SPRINT PROPOSES TO MODIFY AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY.

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

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

APPLICABLE CODES

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

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

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

DRAWING INDEX

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

APPROVED
By Craig Koppang at 12:28 pm, Aug 09, 2017

APPROVED
By Jeff Barbadora at 10:44 am, Jul 01, 2014

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:
THESE DOCUMENTS ARE CONFIDENTIAL AND ARE THE SOLE PROPERTY OF SPRINT AND MAY NOT BE REPRODUCED, DISSEMINATED OR REDISTRIBUTED WITHOUT THE EXPRESS WRITTEN CONSENT OF SPRINT.

REVISIONS:

DESCRIPTION	DATE	BY	REV
FOR PERMIT	6/25/14	AJD	0

SITE NAME:
WEST JOHNSON AVE.
BURNT HOUSE

SITE CASCADE:
CT03XC015

SITE ADDRESS:
1394 ROUTE 322
(MERIDEN WATERBURY TPK)
SOUTHINGTON, CT 06489

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:
THESE DOCUMENTS ARE CONFIDENTIAL AND ARE THE SOLE PROPERTY OF SPRINT AND MAY NOT BE REPRODUCED, DISSEMINATED OR REDISTRIBUTED WITHOUT THE EXPRESS WRITTEN CONSENT OF SPRINT.

REVISIONS:

DESCRIPTION	DATE	BY	REV
FOR PERMIT	6/25/14	AJD	0

SITE NAME:
WEST JOHNSON AVE.
BURNT HOUSE

SITE CASCADE:
CT03XC015

SITE ADDRESS:
1394 ROUTE 322
(MERIDEN WATERBURY TPK)
SOUTHINGTON, CT 06489

SHEET DESCRIPTION:
SPRINT SPECIFICATIONS

SHEET NUMBER:
SP-1

CONTINUE FROM SP-1

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

3.2 GENERAL REQUIREMENTS FOR CIVIL CONSTRUCTION:

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

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

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

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

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

E. CONDUCT TESTING AS REQUIRED HEREIN.

3.3 DELIVERABLES:

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

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

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

SECTION 01 400 – SUBMITTALS & TESTS

PART 1 – GENERAL

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

1.2 RELATED DOCUMENTS:

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

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

1.3 SUBMITTALS:

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

B. SUBMIT THE FOLLOWING TO COMPANY REPRESENTATIVE FOR APPROVAL.

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

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

1.4 TESTS AND INSPECTIONS:

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

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

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

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

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

1.5 COMMISSIONING: PERFORM ALL COMMISSIONING AS REQUIRED BY APPLICABLE MOPs

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 REQUIREMENTS FOR TESTING:

A. THIRD PARTY TESTING AGENCY:

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

3.2 REQUIRED TESTS:

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

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

3.3 REQUIRED INSPECTIONS

A. SCHEDULE INSPECTIONS WITH COMPANY REPRESENTATIVE.

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

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

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.

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
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SOUTHINGTON, CT 06489

SHEET DESCRIPTION:

SPRINT SPECIFICATIONS

SHEET NUMBER:

SP-2

CONTINUE FROM SP-2

7. VERIFICATION DOCUMENTED WITH THE ANTENNA CHECKLIST REPORT, BY A&E, SITE DEVELOPMENT REP, OR RF REP.

8. FINAL INSPECTION CHECKLIST AND HANDOFF WALK (HOC.). SIGNED FORM SHOWING ACCEPTANCE BY FIELD OPS IS TO BE UPLOADED INTO SMS.

9. COAX SWEEP AND FIBER TESTING DOCUMENTS SUBMITTED VIA SMS FOR RF APPROVAL.

10. SCAN-ABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT

11. ALL AVAILABLE JURISDICTIONAL INFORMATION

12. PDF SCAN OF REDLINES PRODUCED IN FIELD

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

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

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

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

1. CONCRETE MIX AND CYLINDER BREAK REPORTS.

2. STRUCTURAL BACKFILL COMPACTION REPORTS.

3. SITE RESISTANCE TO EARTH TEST.

4. ANTENNA AZIMUTH AND DOWN TILT VERIFICATION

5. TOWER ERECTION INSPECTIONS AND MEASUREMENTS DOCUMENTING TOWER INSTALLED PER SUPPLIER'S REQUIREMENTS AND THE APPLICABLE SECTIONS HEREIN.

6. COAX CABLE SWEEP TESTS PER COMPANY'S "ANTENNA LINE ACCEPTANCE STANDARDS".

B. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES THE FOLLOWING;

1. TEST WELLS AND TRENCHES: PHOTOGRAPHS OF ALL TEST WELLS; PHOTOGRAPHS SHOWING ALL OPEN EXCAVATIONS AND TRENCHING PRIOR TO BACKFILLING SHOWING A TAPE MEASURE VISIBLE IN THE EXCAVATIONS INDICATING DEPTH.

2. CONDUITS, CONDUCTORS AND GROUNDING: PHOTOGRAPHS SHOWING TYPICAL INSTALLATION OF CONDUCTORS AND CONNECTORS; PHOTOGRAPHS SHOWING TYPICAL BEND RADIUS OF INSTALLED GROUND WIRES AND GROUND ROD SPACING;

3. CONCRETE FORMS AND REINFORCING: CONCRETE FORMING AT TOWER AND EQUIPMENT/SHELTER PAD/FOUNDATIONS – PHOTOGRAPHS SHOWING ALL REINFORCING STEEL, UTILITY AND CONDUIT STUB OUTS; PHOTOGRAPHS SHOWING CONCRETE POUR OF SHELTER SLAB/FOUNDATION, TOWER FOUNDATION AND GUY ANCHORS WITH VIBRATOR IN USE; PHOTOGRAPHS SHOWING EACH ANCHOR ON GUYED TOWERS, BEFORE CONCRETE POUR.

4. TOWER, ANTENNAS AND MAINLINE: INSPECTION AND PHOTOGRAPHS OF SECTION STACKING; INSPECTION AND PHOTOGRAPHS OF PLATFORM COMPONENT ATTACHMENT POINTS; PHOTOGRAPHS OF TOWER TOP GROUNDING; PHOTOS OF TOWER COAX LINE COLOR CODING AT THE TOP AND AT GROUND LEVEL; INSPECTION AND PHOTOGRAPHS OF OPERATIONAL OF TOWER LIGHTING, AND PLACEMENT OF FAA REGISTRATION SIGN; PHOTOGRAPHS SHOWING ADDITIONAL GROUNDING POINTS FOR TOWERS GREATER THAN 200 FEET.; PHOTOS OF ANTENNA GROUND BAR, EQUIPMENT GROUND BAR, AND MASTER GROUND BAR; PHOTOS OF GPS ANTENNA(S); PHOTOS OF EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA; PHOTOS OF COAX WEATHERPROOFING – TOP AND BOTTOM; PHOTOS OF COAX GROUNDING---TOP AND BOTTOM; PHOTOS OF ANTENNA AND MAST GROUNDING; PHOTOS OF COAX CABLE ENTRY INTO SHELTER; PHOTOS OF PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.

5. ROOF TOPS: PRE-CONSTRUCTION AND POST-CONSTRUCTION VISUAL INSPECTION AND PHOTOGRAPHS OF THE ROOF AND INTERIOR TO DETERMINE AND DOCUMENT CONDITIONS; ROOF TOP CONSTRUCTION INSPECTIONS AS REQUIRED BY THE JURISDICTION; PHOTOGRAPHS OF CABLE TRAY AND/OR ICE BRIDGE; PHOTOGRAPHS OF DOGHOUSE/CABLE EXIT FROM ROOF;

6. SITE LAYOUT – PHOTOGRAPHS OF THE OVERALL COMPOUND, INCLUDING EQUIPMENT PLATFORM FROM ALL FOUR CORNERS.

7. FINISHED UTILITIES: CLOSE-UP PHOTOGRAPHS OF THE PPC BREAKER PANEL; CLOSE-UP PHOTOGRAPH OF THE INSIDE OF THE TELCO PANEL AND NIU; CLOSE-UP PHOTOGRAPH OF THE POWER METER AND DISCONNECT; PHOTOS OF POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE; PHOTOGRAPHS AT METER BOX AND/OR FACILITY DISTRIBUTION PANEL.

8. REQUIRED MATERIALS CERTIFICATIONS: CONCRETE MIX DESIGNS; MILL CERTIFICATION FOR ALL REINFORCING AND STRUCTURAL STEEL; AND ASPHALT PAVING MIX DESIGN.

9. ANY AND ALL SUBMITTALS BY THE JURISDICTION OR COMPANY.

SECTION 01 400 – SUBMITTALS & TESTS

PART 1 – GENERAL

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

1.2 RELATED DOCUMENTS:

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

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 WEEKLY REPORTS:

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

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

3.2 PROJECT CONFERENCE CALLS:

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

3.3 PROJECT TRACKING IN SMS:

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

3.4 ADDITIONAL REPORTING:

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

3.5 PROJECT PHOTOGRAPHS:

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

1. 1SHELTER AND TOWER OVERVIEW.

2. TOWER FOUNDATION(S) – FORMS AND STEEL BEFORE POUR (EACH ANCHOR ON GUYED TOWERS).

3. TOWER FOUNDATION(S) POUR WITH VIBRATOR IN USE (EACH ANCHOR ON GUYED TOWERS).

4. TOWER STEEL AS BEING INSTALLED INTO HOLE (SHOW ANCHOR STEEL ON GUYED TOWERS).

5. PHOTOS OF TOWER SECTION STACKING.

6. CONCRETE TESTING / SAMPLES.

7. PLACING OF ANCHOR BOLTS IN TOWER FOUNDATION.

8. BUILDING/WATER TANK FROM ROAD FOR TENANT IMPROVEMENTS OR COMMENTS.

9. SHELTER FOUNDATION--FORMS AND STEEL BEFORE POURING.

10. SHELTER FOUNDATION POUR WITH VIBRATOR IN USE.

11. COAX CABLE ENTRY INTO SHELTER.

12. PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.

13. ROOFTOP PRE AND POST CONSTRUCTION PHOTOS TO INCLUDE PENETRATIONS AND INTERIOR CEILING.

14. PHOTOS OF TOWER TOP COAX LINE COLOR CODING AND COLOR CODING AT GROUND LEVEL.

15. PHOTOS OF ALL APPROPRIATE COMPANY OR REGULATORY SIGNAGE.

16. PHOTOS OF EQUIPMENT BOLT DOWN INSIDE SHELTER.

17. POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE AND POWER AND TELCO SUPPLY LOCATIONS INCLUDING METER/DISCONNECT.

18. ELECTRICAL TRENCH(S) WITH ELECTRICAL / CONDUIT BEFORE BACKFILL.

19. ELECTRICAL TRENCH(S) WITH FOIL-BACKED TAPE BEFORE FURTHER BACKFILL.

20. TELCO TRENCH WITH TELEPHONE / CONDUIT BEFORE BACKFILL.

21. TELCO TRENCH WITH FOIL-BACKED TAPE BEFORE FURTHER BACKFILL.

22. SHELTER GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).

23. TOWER GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).

24. FENCE GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).

25. ALL BTS GROUND CONNECTIONS.

26. ALL GROUND TEST WELLS.

27. ANTENNA GROUND BAR AND EQUIPMENT GROUND BAR.

28. ADDITIONAL GROUNDING POINTS ON TOWERS ABOVE 200'.

29. HVAC UNITS INCLUDING CONDENSERS ON SPLIT SYSTEMS.

30. GPS ANTENNAS.

31. CABLE TRAY AND/OR WAVEGUIDE BRIDGE.

32. DOGHOUSE/CABLE EXIT FROM ROOF.

33. EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA.

34. MASTER BUS BAR.

35. TELCO BOARD AND NIU.

36. ELECTRICAL DISTRIBUTION WALL.

37. CABLE ENTRY WITH SURGE SUPPRESSION.

38. ENTRANCE TO EQUIPMENT ROOM.

39. COAX WEATHERPROOFING-TOP AND BOTTOM OF TOWER.

40. COAX GROUNDING -TOP AND BOTTOM OF TOWER.

41. ANTENNA AND MAST GROUNDING.

42. LANDSCAPING – WHERE APPLICABLE.

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

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.

1033 Watervliet Shaker Rd
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Office # (518) 690-0790
Fax # (518) 690-0793

JOB NUMBER 353-000

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
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LICENSED PROFESSIONAL ENGINEER

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SHEET DESCRIPTION:

SPRINT SPECIFICATIONS

SHEET NUMBER:

SP-3

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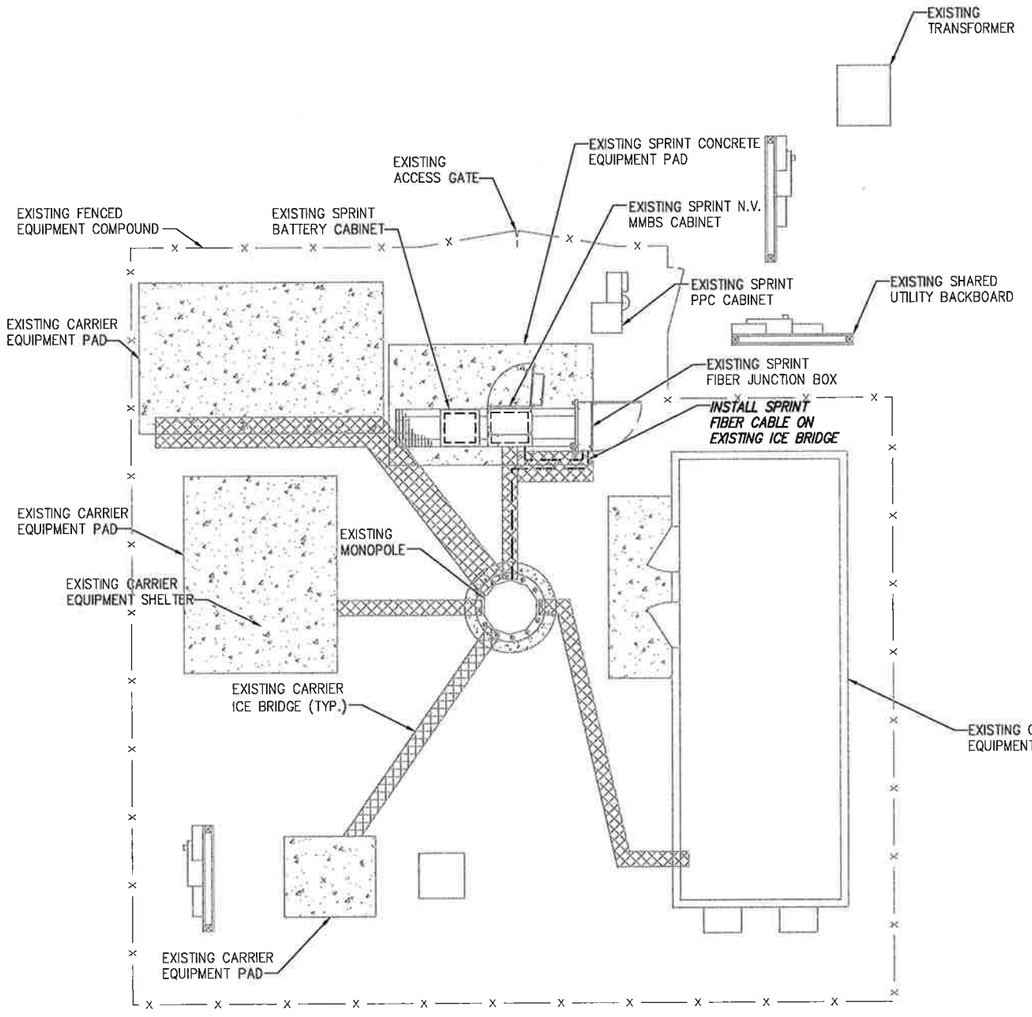
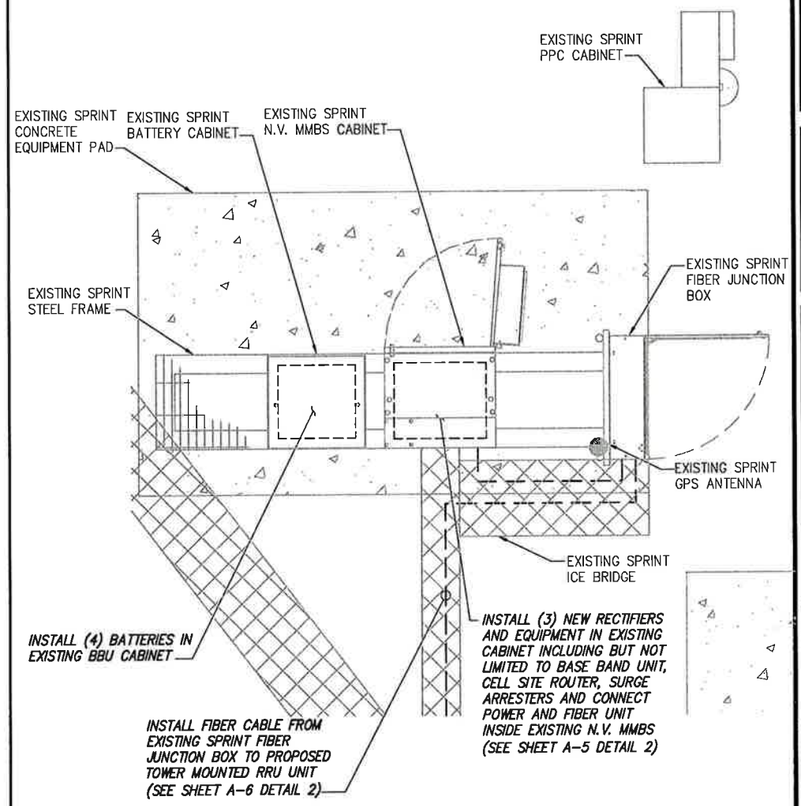


OVERALL SITE PLAN | SCALE: AS NOTED | 1



SPRINT EQUIPMENT PLAN | SCALE: AS NOTED | 2

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.

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

JOB NUMBER 353-000

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

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

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REVISIONS:

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SITE NAME:

WEST JOHNSON AVE.
BURNT HOUSE

SITE CASCADE:

CT03XC015

SITE ADDRESS:

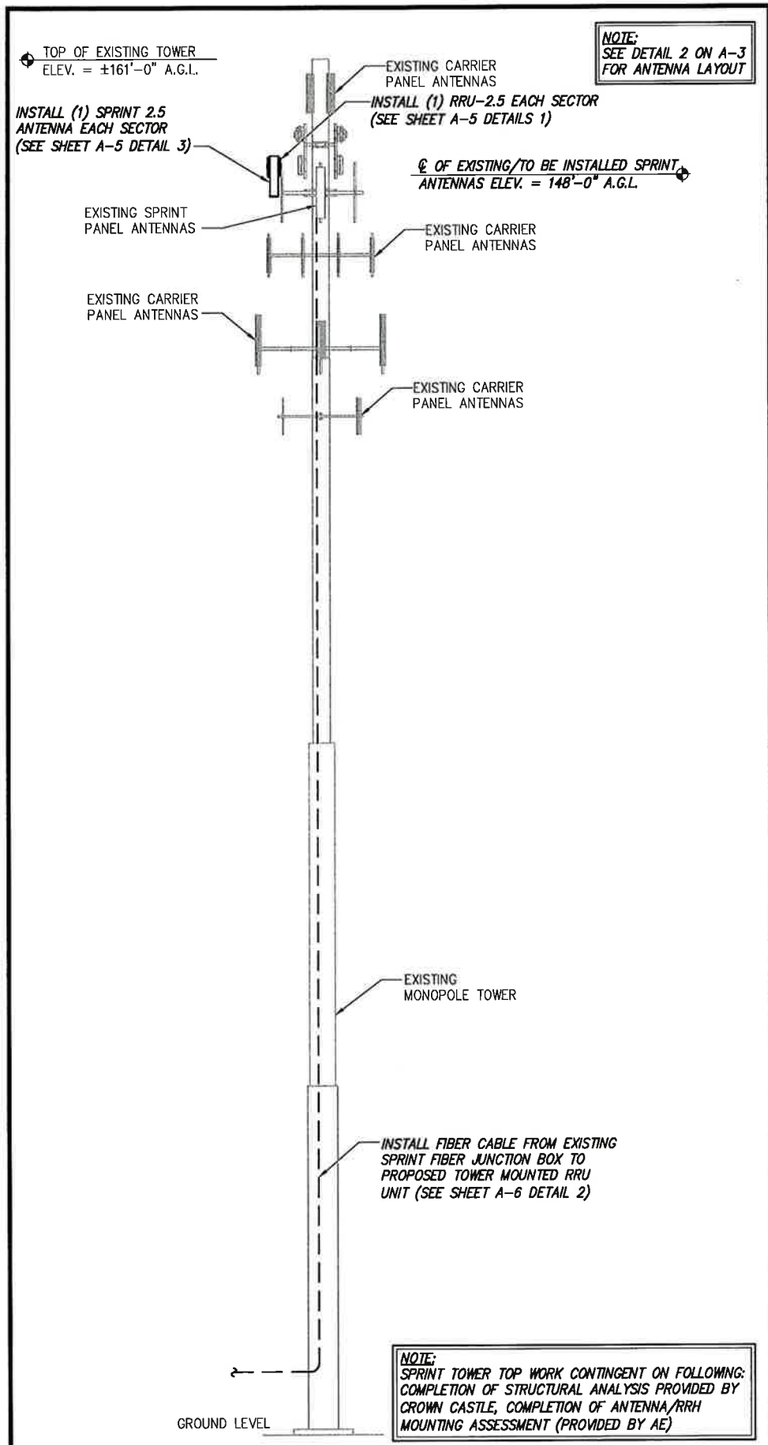
1394 ROUTE 322
(MERIDEN WATERBURY TPK)
SOUTHINGTON, CT 06489

SHEET DESCRIPTION:

SITE PLAN

SHEET NUMBER:

A-1



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

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

TOWER ELEVATION | NO SCALE | 1

DETAIL NOT USED | NO SCALE | 2

DETAIL NOT USED | NO SCALE | 3

DETAIL NOT USED | NO SCALE | 4

PLANS PREPARED FOR:

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SITE ADDRESS:

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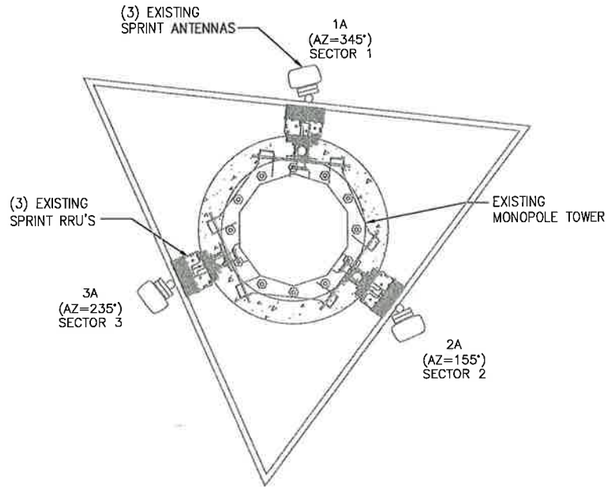
(MERIDEN WATERBURY TPK)
SOUTHINGTON, CT 06489

SHEET DESCRIPTION:

TOWER ELEVATION
& CABLE PLAN

SHEET NUMBER:

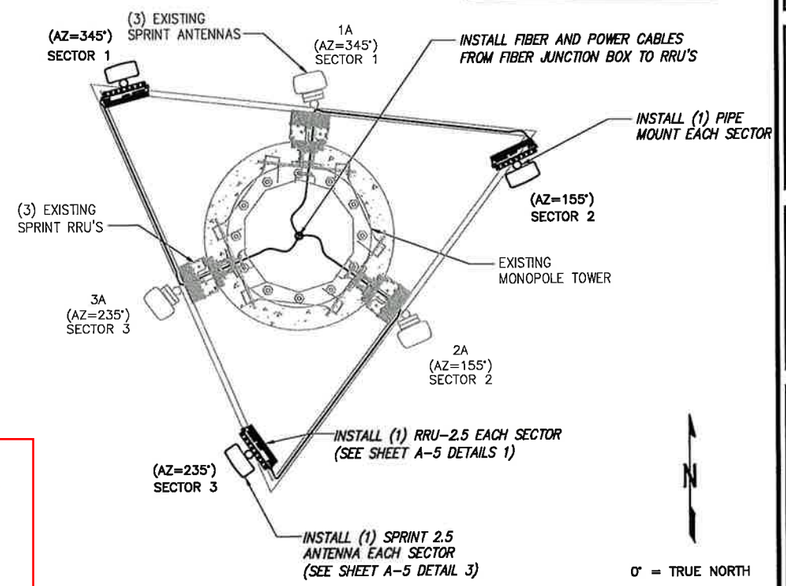
A-2



EXISTING ANTENNA & RRU LAYOUT | NO SCALE | 1

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

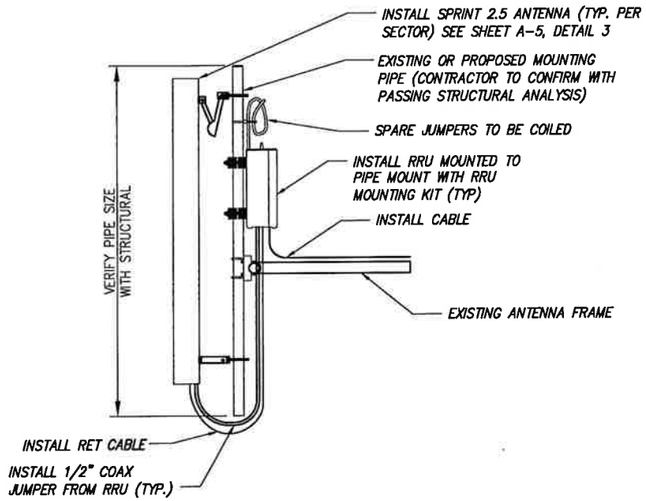
NOTE:
JUMPERS FROM 2.5 RRH TO THE 2.5 ANTENNA CANNOT EXCEED 15 FEET



Confirm azimuths with final RFDS - RFDS supersedes CD's

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

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SHEET DESCRIPTION:

ANTENNA LAYOUT
& MOUNTING DETAILS

SHEET NUMBER:

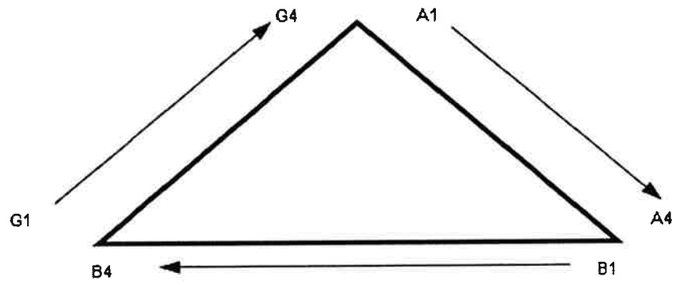
A-3

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

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

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

Figure 1: Antenna Orientation



NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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CT03XC015

SITE ADDRESS:
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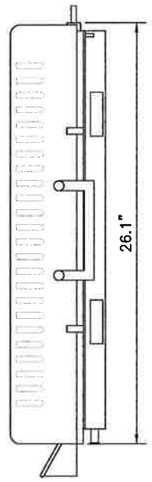
(MERIDEN WATERBURY TPK)
SOUTHINGTON, CT 06489

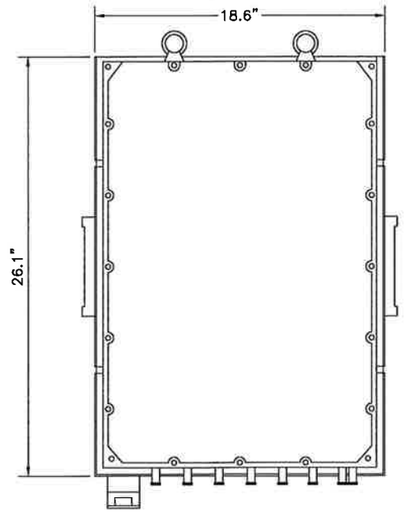
SHEET DESCRIPTION:
COLOR CODING AND NOTES

SHEET NUMBER:
A-4

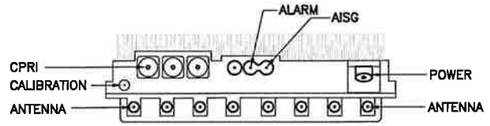
RRU: ALCATEL LUCENT TD-RRH8X20
COLOR: LIGHT GREY
WEIGHT: 70 LBS.



SIDE VIEW



FRONT VIEW

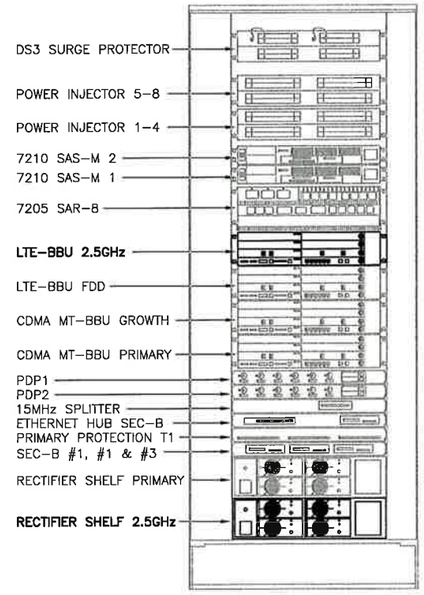


PLAN VIEW

NOTES

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

2.5 RRU	NO SCALE	1

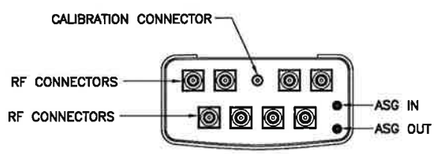


FRONT VIEW

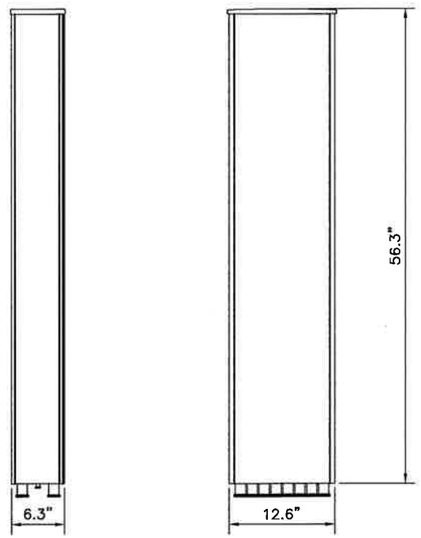
NEW EQUIPMENT IN EXISTING CABINET	NO SCALE	2

ANTENNA: RFS APXVTM14-C-I20

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



PLAN VIEW



2.5 ANTENNA	NO SCALE	3

DETAIL NOT USED	NO SCALE	4

PLANS PREPARED FOR:

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PLANS PREPARED BY:

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CT03XC015

SITE ADDRESS:

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(MERIDEN WATERBURY TPK)
SOUTHINGTON, CT 06489

SHEET DESCRIPTION:

EQUIPMENT &
MOUNTING DETAILS

SHEET NUMBER:

A-5

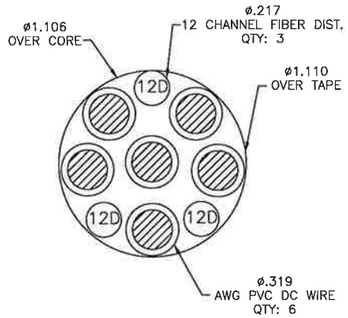
RFS HYBRIFLEX RISER CABLE SCHEDULE

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

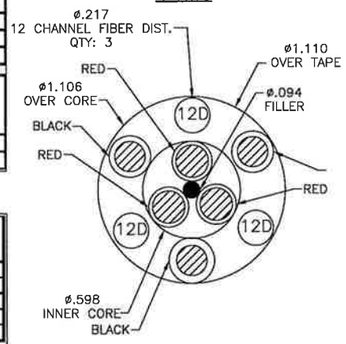
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

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

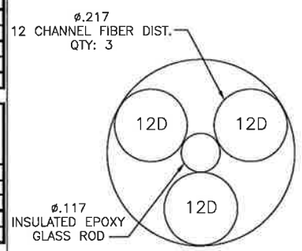
NOTE:
SPRINT CM TO CONFIRM HYBRID OR FIBER RISER CABLE AND HYBRID OR FIBER JUMPER CABLE MODEL NUMBERS IF HYBRID CABLES ARE REQUIRED BEFORE PREPARING BOM.



4 AWG

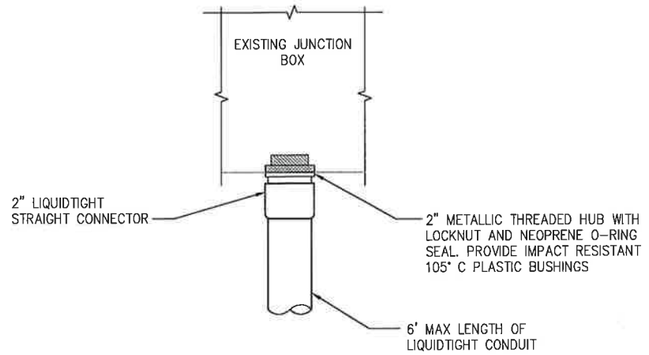


8 & 6 AWG



FIBER ONLY

2.5 CABLE CROSS SECTION DATA | NO SCALE | 1



FIBER JUNCTION BOX PENETRATION | NO SCALE | 2

DETAIL NOT USED | NO SCALE | 3

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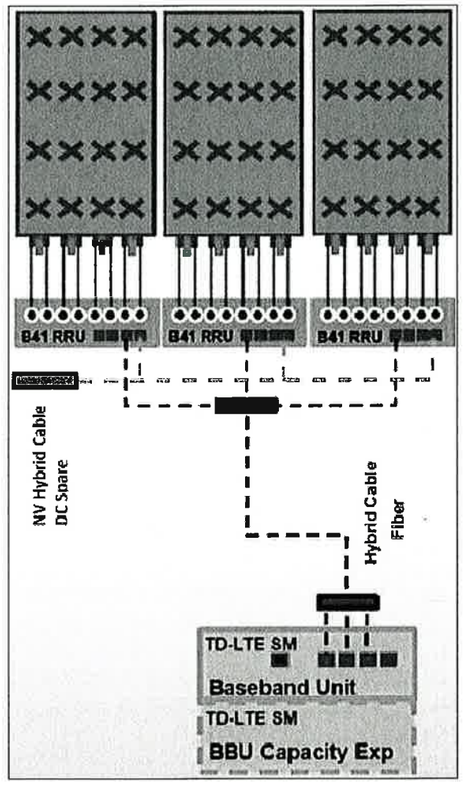
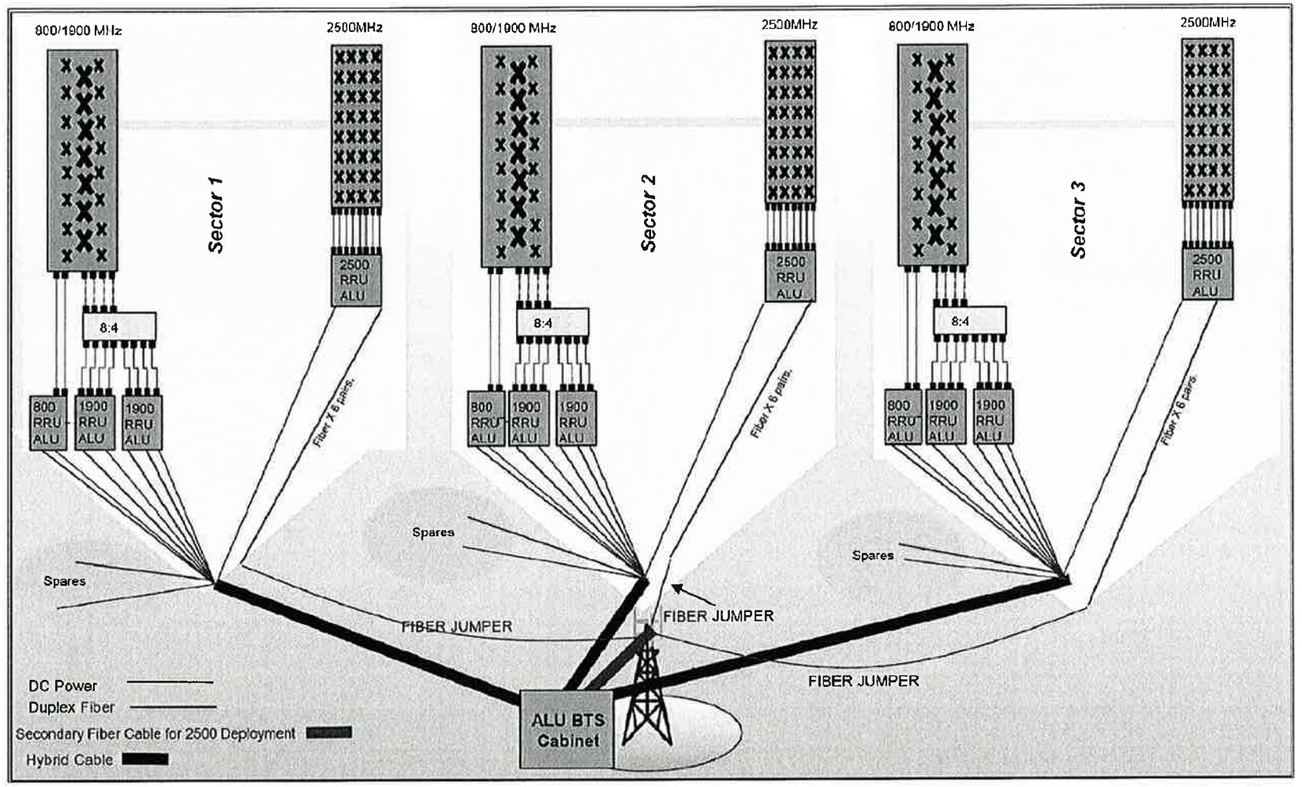
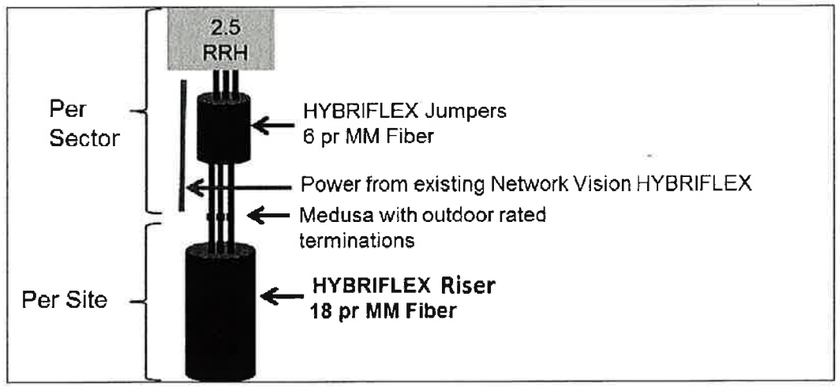
SHEET NUMBER:
A-6



ALU 2.5 ALU SCENARIO 1



RAN WIRING DIAGRAM



RF 2.5 ALU SCENARIO 1

PLUMBING DIAGRAM

NO SCALE

1

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

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

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REVISIONS:

DESCRIPTION	DATE	BY	REV
FOR PERMIT	6/25/14	AJD	0

SITE NAME:

WEST JOHNSON AVE.
BURNT HOUSE

SITE CASCADE:

CT03XC015

SITE ADDRESS:

1394 ROUTE 322
(MERIDEN WATERBURY TPK)
SOUTHINGTON, CT 06489

SHEET DESCRIPTION:

CIVIL DETAILS

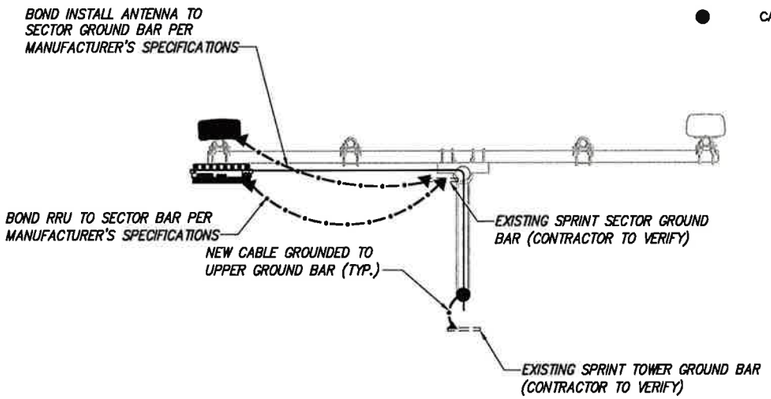
SHEET NUMBER:

A-7

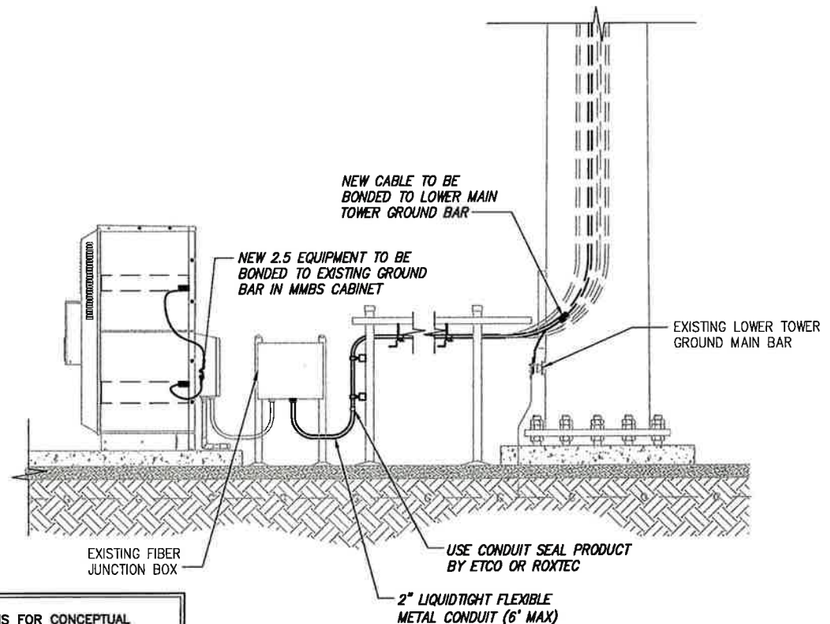
PLAN NOT USED | NO SCALE | 1

LEGEND:

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



TYPICAL ANTENNA GROUNDING PLAN | NO SCALE | 2



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

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

PLANS PREPARED FOR:

Sprint

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
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DESCRIPTION	DATE	BY	REV
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SITE NAME:

WEST JOHNSON AVE.
BURNT HOUSE

SITE CASCADE:

CT03XC015

SITE ADDRESS:

1394 ROUTE 322
(MERIDEN WATERBURY TPK)
SOUTHINGTON, CT 06489

SHEET DESCRIPTION:

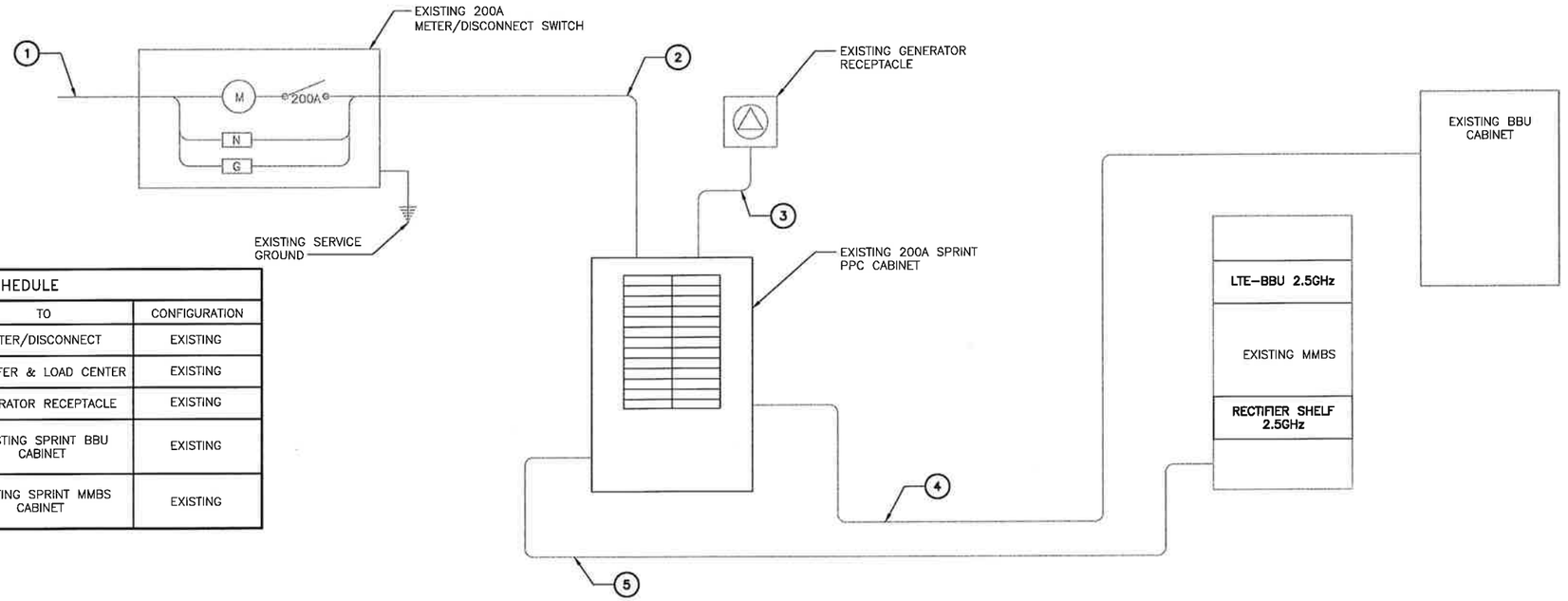
ELECTRICAL & GROUNDING PLAN

SHEET NUMBER:

E-1

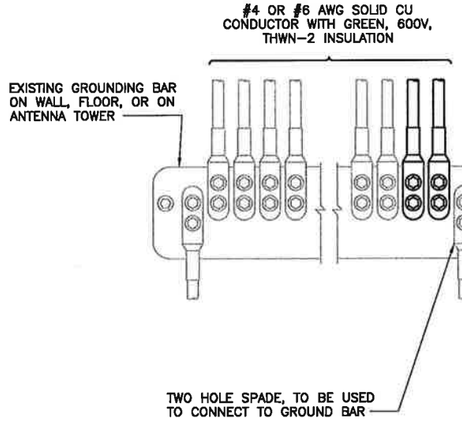
NOTES

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



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

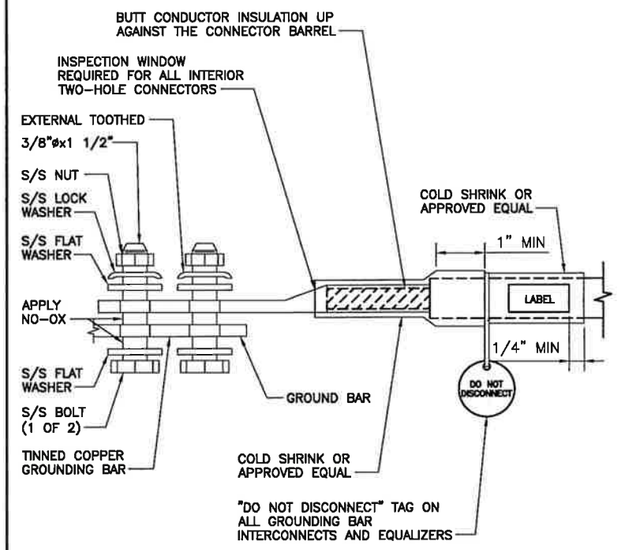
ELECTRICAL ONE–LINE DIAGRAM — NO SCALE — 1



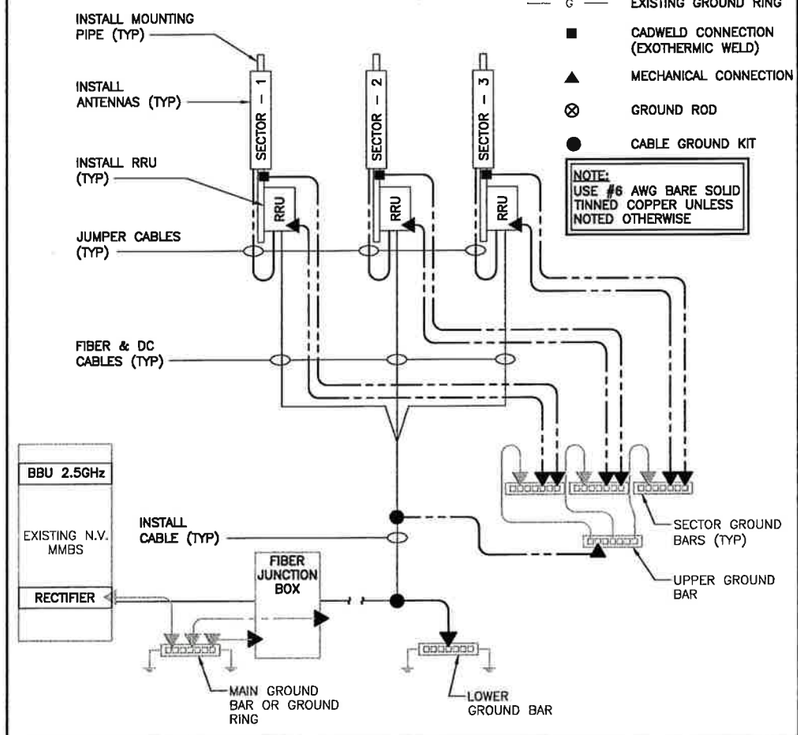
NOTES

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

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



TWO HOLE LUG — NO SCALE — 3



GROUNDING RISER DIAGRAM — NO SCALE — 4

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.

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

JOB NUMBER 353–000

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT
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1394 ROUTE 322
(MERIDEN WATERBURY TPK)
SOUTHINGTON, CT 06489

SHEET DESCRIPTION:

ELECTRICAL & GROUNDING DETAILS

SHEET NUMBER:

E-2

PAUL J. FORD & COMPANY

Date: **August 2, 2017**

Mitzi Dunst
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704.405.6580

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.232.6018
jjohnson@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT03XC015
	Carrier Site Name:	CT03XC015
Crown Castle Designation:	**Crown Castle BU Number:**	876313
	Crown Castle Site Name:	WEST JOHNSON AVE. BURNT HOUSE
	Crown Castle JDE Job Number:	450039
	Crown Castle Work Order Number:	1435743
	Crown Castle Application Number:	398862 Rev. 0
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37517-0193.007.7805
Site Data:	**1394 Meriden Waterbury Tpk, SOUTHINGTON, Hartford County, CT**	
	Latitude *41° 33' 51.39"*, Longitude *-72° 53' 30.7"*	
	160 Foot - Monopole Tower	

Dear Mitzi Dunst,

Paul J Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 1064282, in accordance with application 398862, revision 0.

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

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

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category B and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

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

Respectfully submitted by:

Joshua Johnson, EI
Structural Designer

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER

8.2.17

Date: **August 2, 2017**

Mitzi Dunst
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Paul J Ford and Company
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Columbus, OH 43215
614.232.6018
jjohnson@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT03XC015
	Carrier Site Name:	CT03XC015
Crown Castle Designation:	**Crown Castle BU Number:**	876313
	Crown Castle Site Name:	WEST JOHNSON AVE. BURNT HOUSE
	Crown Castle JDE Job Number:	450039
	Crown Castle Work Order Number:	1435743
	Crown Castle Application Number:	398862 Rev. 0
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Respectfully submitted by:

Joshua Johnson, EI
Structural Designer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 160 ft Monopole tower designed by SUMMIT in August of 1998. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, “Structural Standard for Antenna Supporting Structures and Antennas”, with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category B and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
148.0	148.0	3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe	1	1-1/4	-
		3	alcatel lucent	TD-RRH8x20-25			
		1	tower mounts	Miscellaneous [NA 510-1] (Handrail Kit)			
		1	-	Handrail Bracing			

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
157.0	158.0	3	ericsson	RRUS-11	2 1 6	3/4 3/8 1-5/8	1
		3	kathrein	800 10121 w/ Mount Pipe			
		6	powerwave	LGP21401			
		1	raycap	DC6-48-60-18-8F			
		3	cci antennas	HPA-85R-BUU-H8 w/ Mount Pipe	2 1	3/4 3/8	2
		3	cci antennas	TPA-65R-LCUUUU-H8-K w/ Mount Pipe			
		3	ericsson	RRUS 32			
		3	ericsson	RRUS 32 B2			
		1	raycap	DC6-48-60-18-8F			
	157.0	1	tower mounts	T-Arm Mount [TA 601-3]			
150.0	150.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-	1
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Side Arm Mount [SO 103-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
148.0	148.0	3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe	4	1-1/4	4
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	alcatel lucent	TD-RRH8x20-25			
		3	rfs celwave	IBC1900BB-1			
		3	rfs celwave	IBC1900HG-2A			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1-1/4	1
		3	rfs celwave	IBC1900BB-1			
		3	rfs celwave	IBC1900HG-2A			
		1	tower mounts	Platform Mount [LP 1201-1]			
139.0	140.0	3	alcatel lucent	RRH2X40-AWS	-	-	3
	139.0	1	tower mounts	Side Arm Mount [SO 102-3]			
138.0	142.0	1	lucent	KS24019-L112A	1 7	1/2 1-5/8	1
	138.0	6	antel	LPA-80063-6CF-EDIN-2 w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 1201-1]			
		3	alcatel lucent	RRH2X60-PCS	1	1-5/8	2
		3	alcatel lucent	RRH2x60-700			
		3	alcatel lucent	RRH4X45-AWS4 B66			
		6	andrew	SBNHH-1D65B w/ Mount Pipe			
		2	rfs celwave	DB-T1-6Z-8AB-0Z			
127.0	129.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe	1 6	1-1/4 1-5/8	1
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
		3	ericsson	RRUS 11 B12			
	127.0	1	tower mounts	Platform Mount [LP 1201-1]			
119.0	119.0	3	andrew	HBX-6516DS-VTM w/ Mount Pipe	1 6	3/8 1-5/8	1
		1	tower mounts	T-Arm Mount [TA 602-3]			
48.0	50.0	1	lucent	KS24019-L112A	1	1/2	1
	48.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed
4) SLA Equipment Not controlling, not included in analysis.

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH Velocitel, 15CAYC1600, 02/23/2016	5939573	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 128444, 04/12/2013	3846956	CCISITES
4-POST-MODIFICATION INSPECTION	SGS, 130340, 10/18/2013	4077468	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 25560.9690, 03/13/2014	4600286	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 25560, 10/30/2014	5380973	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 25560_25075, 03/30/2015	5617077	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PJF, 29298-582, 08/27/1998	1633746	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PJF, 29298-582, 08/27/1998	2134246	CCISITES
MOUNT ANALYSIS	INFINIGY, 10/1/2014	-	Crown Castle

3.1) Analysis Method

tnxTower (version 7.0.5.1), 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) For existing modifications: monopole was modified in conformance with the referenced modification drawings.
5) Mount modifications will be installed in accordance with the mount analysis referenced in Table 3 above by Infinigy, dated 10/1/2014.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	160 - 148.5	Pole	TP10.75x10.75x0.349	1	-3.07	359.22	55.5	Pass
L2	148.5 - 148	Pole	TP23x10.75x0.349	2	-3.07	359.22	55.4	Pass
L3	148 - 111	Pole	TP28.994x23x0.25	3	-17.99	1498.80	76.4	Pass
L4	111 - 105.25	Pole	TP29.4254x27.8865x0.3125	4	-19.91	1980.34	75.7	Pass
L5	105.25 - 76.75	Pole	TP34.042x29.4254x0.4446	5	-25.59	2272.54	99.4	Pass
L6	76.75 - 70.75	Pole	TP34.3889x32.4643x0.4785	6	-29.05	2778.39	93.4	Pass
L7	70.75 - 70	Pole	TP34.5104x34.3889x0.6626	7	-29.31	3444.72	76.7	Pass
L8	70 - 43	Pole	TP38.884x34.5104x0.5356	8	-36.09	3200.82	99.4	Pass
L9	43 - 28	Pole	TP40.5641x37.0028x0.6536	9	-45.07	3930.07	95.0	Pass
L10	28 - 27.25	Pole	TP40.6856x40.5641x0.6528	10	-45.38	4240.93	88.4	Pass
L11	27.25 - 16	Pole	TP42.508x40.6856x0.6551	11	-49.96	4468.34	89.2	Pass
L12	16 - 14.5	Pole	TP42.751x42.508x0.8063	12	-50.70	5023.02	80.6	Pass
L13	14.5 - 12.25	Pole	TP43.1155x42.751x0.6431	13	-51.63	4427.64	91.7	Pass
L14	12.25 - 10	Pole	TP43.48x43.1155x0.8213	14	-52.77	5007.94	82.7	Pass
L15	10 - 0	Pole	TP45.1x43.48x0.661	15	-57.12	5109.46	84.3	Pass
							Summary	
						Pole (L8)	99.4	Pass
						RATING =	**99.4**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	77.2	Pass
1	Base Plate	0	65.8	Pass
1	Base Foundation Structural Steel	0	69.9	Pass
1	Base Foundation Soil Interaction	0	99.2	Pass
1	Extension Connection	148	30.6	Pass

Structure Rating (max from all components) =	**99.2%**

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

4.1) Recommendations

The monopole and its foundation have sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

1) Tower is located in Hartford County, Connecticut.
2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
3) Basic wind speed of 97.0 mph.
4) Structure Class II.
5) Exposure Category B.
6) Topographic Category 1.
7) Crest Height 0.00 ft.
8) Nominal ice thickness of 1.0000 in.
9) Ice thickness is considered to increase with height.
10) Ice density of 56 pcf.
11) A wind speed of 50.0 mph is used in combination with ice.
12) Temperature drop of 50 °F.
13) Deflections calculated using a wind speed of 60.0 mph.
14) A non-linear (P-delta) analysis was used.
15) Pressures are calculated at each section.
16) Stress ratio used in pole design is 1.
17) 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		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*	*Sides*	*in*	*in*	*in*	*in*	
L1	160.00-148.50	11.50	0.00	Round	10.7500	10.7500	0.3490		A53-B-35 (35 ksi)
L2	148.50-148.00	0.50	0.00	Round	10.7500	23.0000	0.3490		A53-B-35 (35 ksi)
L3	148.00-111.00	37.00	3.75	18	23.0000	28.9940	0.2500	1.0000	A607-60 (60 ksi)
L4	111.00-105.25	9.50	0.00	18	27.8865	29.4254	0.3125	1.2500	A607-60

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
									(60 ksi)
L5	105.25-76.75	28.50	4.25	18	29.4254	34.0420	0.4446	1.7785	Reinf 42.81 ksi (43 ksi)
L6	76.75-70.75	10.25	0.00	18	32.4643	34.3889	0.4785	1.9139	Reinf 47.20 ksi (47 ksi)
L7	70.75-70.00	0.75	0.00	18	34.3889	34.5104	0.6625	2.6502	Reinf 42.34 ksi (42 ksi)
L8	70.00-43.00	27.00	5.00	18	34.5104	38.8840	0.5356	2.1425	Reinf 43.88 ksi (44 ksi)
L9	43.00-28.00	20.00	0.00	18	37.0028	40.5641	0.6536	2.6143	Reinf 41.53 ksi (42 ksi)
L10	28.00-27.25	0.75	0.00	18	40.5641	40.6856	0.6528	2.6113	Reinf 44.73 ksi (45 ksi)
L11	27.25-16.00	11.25	0.00	18	40.6856	42.5080	0.6551	2.6205	Reinf 44.92 ksi (45 ksi)
L12	16.00-14.50	1.50	0.00	18	42.5080	42.7510	0.8063	3.2251	Reinf 40.94 ksi (41 ksi)
L13	14.50-12.25	2.25	0.00	18	42.7510	43.1155	0.6431	2.5725	Reinf 44.68 ksi (45 ksi)
L14	12.25-10.00	2.25	0.00	18	43.1155	43.4800	0.8213	3.2852	Reinf 39.40 ksi (39 ksi)
L15	10.00-0.00	10.00		18	43.4800	45.1000	0.6610	2.6438	Reinf 47.95 ksi (48 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	10.7500	11.4038	154.3829	3.6794	5.3750	28.7224	308.7659	5.6985	0.0000	0
	10.7500	11.4038	154.3829	3.6794	5.3750	28.7224	308.7659	5.6985	0.0000	0
L2	10.7500	11.4038	154.3829	3.6794	5.3750	28.7224	308.7659	5.6985	0.0000	0
	23.0000	24.8349	1593.1275	8.0093	11.5000	138.5328	3186.2550	12.4100	0.0000	0
L3	23.3548	18.0521	1180.3983	8.0762	11.6840	101.0269	2362.3498	9.0278	3.6080	14.432
	29.4413	22.8084	2380.8169	10.2041	14.7290	161.6420	4764.7665	11.4063	4.6629	18.652
L4	28.9335	27.3500	2627.2035	9.7888	14.1663	185.4539	5257.8639	13.6776	4.3580	13.946
	29.8793	28.8763	3092.0742	10.3351	14.9481	206.8541	6188.2170	14.4409	4.6289	14.812
L5	29.8793	40.8992	4339.8228	10.2882	14.9481	290.3262	8685.3560	20.4535	4.3963	9.888
	34.5672	47.4145	6761.7480	11.9271	17.2933	391.0031	13532.3933	23.7117	5.2088	11.715
L6	33.7754	48.5767	6278.8516	11.3550	16.4919	380.7243	12565.9652	24.2930	4.8716	10.181
	34.9194	51.4997	7481.8536	12.0382	17.4696	428.2789	14973.5520	25.7547	5.2103	10.889
L7	34.9194	70.9244	10192.3095	11.9729	17.4696	583.4318	20398.0304	35.4689	4.8864	7.375
	35.0428	71.1798	10302.8517	12.0160	17.5313	587.6833	20619.2602	35.5967	4.9077	7.407
L8	35.0428	57.7602	8423.2559	12.0611	17.5313	480.4696	16857.5952	28.8856	5.1311	9.58
	39.4838	65.1957	12112.9519	13.6137	19.7531	613.2186	24241.8423	32.6040	5.9009	11.017
L9	38.4777	75.4052	12587.2000	12.9040	18.7974	669.6234	25190.9625	37.7097	5.3622	8.204
	41.1898	82.7928	16661.1118	14.1682	20.6065	808.5350	33344.1468	41.4043	5.9890	9.163
L10	41.1898	82.6981	16642.6886	14.1685	20.6065	807.6410	33307.2761	41.3569	5.9903	9.176
	41.3132	82.9499	16795.1455	14.2116	20.6683	812.6055	33612.3906	41.4828	6.0117	9.209
L11	41.3132	83.2386	16851.6576	14.2108	20.6683	815.3397	33725.4890	41.6272	6.0076	9.17
	43.1638	87.0282	19259.6561	14.8578	21.5941	891.8952	38544.6545	43.5224	6.3284	9.66
L12	43.1638	106.7203	23447.3141	14.8041	21.5941	1085.8214	46925.4807	53.3703	6.0624	7.519
	43.4105	107.3422	23859.5963	14.8904	21.7175	1098.6334	47750.5876	53.6813	6.1051	7.572

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
L13	43.4105	85.9546	19254.5729	14.9483	21.7175	886.5916	38534.4815	42.9855	6.3923	9.939
	43.7807	86.6987	19758.9357	15.0777	21.9027	902.1237	39543.8708	43.3576	6.4564	10.039
L14	43.7807	110.2529	24916.6449	15.0145	21.9027	1137.6067	49866.0758	55.1369	6.1428	7.479
	44.1508	111.2030	25566.4045	15.1438	22.0879	1157.4872	51166.4499	55.6121	6.2070	7.558
L15	44.1508	89.8282	20807.7284	15.2008	22.0879	942.0441	41642.8362	44.9226	6.4892	9.818
	45.7957	93.2267	23259.8697	15.7759	22.9108	1015.2360	46550.3454	46.6222	6.7743	10.249

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
FB-L98B-002-75000(3/8")	C	No	Inside Pole	157.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	157.00 - 0.00	2	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
LDF7-50A(1-5/8")	C	No	Inside Pole	157.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
2" (Nominal) Conduit	C	No	Inside Pole	157.00 - 0.00	1	No Ice	0.00	0.72
						1/2" Ice	0.00	0.72
						1" Ice	0.00	0.72
FB-L98B-034-XXX(3/8")	C	No	Inside Pole	157.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	157.00 - 0.00	2	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
2" (Nominal) Conduit	C	No	Inside Pole	157.00 - 0.00	1	No Ice	0.00	0.72
						1/2" Ice	0.00	0.72
						1" Ice	0.00	0.72
***								
HB114-1-08U4-M5J(1-1/4")	C	No	Inside Pole	148.00 - 0.00	3	No Ice	0.00	1.08
						1/2" Ice	0.00	1.08
						1" Ice	0.00	1.08
HB114-1-08U4-M5J(1-1/4")	C	No	Inside Pole	148.00 - 0.00	1	No Ice	0.00	1.08
						1/2" Ice	0.00	1.08
						1" Ice	0.00	1.08
***								
LDF4-50A(1/2")	C	No	Inside Pole	138.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
HB158-1-08U8-S8J18(1-5/8")	C	No	Inside Pole	138.00 - 0.00	1	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
AL7-50(1-5/8")	C	No	Inside Pole	138.00 - 0.00	6	No Ice	0.00	0.52
						1/2" Ice	0.00	0.52
						1" Ice	0.00	0.52
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	138.00 - 0.00	1	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
***								
MLE Hybrid 3Power/6Fiber RL 2(1-1/4")	C	No	CaAa (Out Of Face)	127.00 - 0.00	1	No Ice	0.00	0.68
						1/2" Ice	0.00	1.75
						1" Ice	0.00	3.43
LDF7-50A(1-5/8")	C	No	Inside Pole	127.00 - 0.00	1	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	127.00 - 0.00	4	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.00	4.46
561(1-5/8")	C	No	Inside Pole	127.00 - 0.00	1	No Ice	0.00	1.35
						1/2" Ice	0.00	1.35
						1" Ice	0.00	1.35
***								
FXL-1873(1-5/8")	C	No	CaAa (Out Of Face)	119.00 - 0.00	1	No Ice	0.00	0.67
						1/2" Ice	0.00	2.18
						1" Ice	0.00	4.31
FXL-1873(1-5/8")	C	No	CaAa (Out Of Face)	119.00 - 0.00	5	No Ice	0.00	0.67
						1/2" Ice	0.00	2.18
						1" Ice	0.00	4.31
860 10033(3/8")	C	No	CaAa (Out Of Face)	119.00 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.50
						1" Ice	0.00	1.61
***								
LDF4-50A(1/2")	C	No	Inside Pole	48.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
***								
Aero MP3-06	C	No	CaAa (Out Of Face)	30.50 - 0.00	1	No Ice	0.43	0.00
						1/2" Ice	0.55	0.00
						1" Ice	0.66	0.00
Aero MP3-05	C	No	CaAa (Out Of Face)	73.00 - 43.00	1	No Ice	0.35	0.00
						1/2" Ice	0.40	0.00
						1" Ice	0.66	0.00
Aero MP3-04	C	No	CaAa (Out Of Face)	106.75 - 76.75	1	No Ice	0.27	0.00
						1/2" Ice	0.38	0.00
						1" Ice	0.49	0.00
***								
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	49.50 - 24.50	1	No Ice	0.21	0.00
						1/2" Ice	0.32	0.00
						1" Ice	0.43	0.00
***								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	18.00 - 8.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
***								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	82.50 - 67.50	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
***								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.00-148.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.07
L2	148.50-148.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L3	148.00-111.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.77
L4	111.00-105.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.404	0.17
L5	105.25-76.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	8.626	0.83
L6	76.75-70.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.783	0.17
L7	70.75-70.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	0.000	0.386	0.02
L8	70.00-43.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	11.161	0.79
L9	43.00-28.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.211	0.44
L10	28.00-27.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.482	0.02
L11	27.25-16.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.792	0.33
L12	16.00-14.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.901	0.04
L13	14.50-12.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.352	0.07
L14	12.25-10.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.352	0.07
L15	10.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.677	0.29

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	160.00-148.50	A	2.333	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.07
L2	148.50-148.00	A	2.324	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L3	148.00-111.00	A	2.292	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	2.41
L4	111.00-105.25	A	2.252	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.168	1.00
L5	105.25-76.75	A	2.213	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	25.467	4.68
L6	76.75-70.75	A	2.167	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.034	0.99
L7	70.75-70.00	A	2.157	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.170	0.12
L8	70.00-43.00	A	2.109	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	30.374	4.12
L9	43.00-28.00	A	2.014	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	12.414	2.29
L10	28.00-27.25	A	1.965	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.137	0.10
L11	27.25-16.00	A	1.917	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	12.608	1.51
L12	16.00-14.50	A	1.851	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.136	0.19

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
L13	14.50-12.25	A	1.827	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.180	0.29
L14	12.25-10.00	A	1.794	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.146	0.28
L15	10.00-0.00	A	1.655	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	9.090	1.16

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	160.00-148.50	0.0000	0.0000	0.0000	0.0000
L2	148.50-148.00	0.0000	0.0000	0.0000	0.0000
L3	148.00-111.00	0.0000	0.0000	0.0000	0.0000
L4	111.00-105.25	-0.0883	0.0510	-0.2122	0.1225
L5	105.25-76.75	-0.3502	0.2022	-0.7843	0.4528
L6	76.75-70.75	-0.3459	0.1997	-0.8723	0.5036
L7	70.75-70.00	-0.5594	0.3230	-1.2032	0.6947
L8	70.00-43.00	-0.4683	0.2704	-0.9790	0.5652
L9	43.00-28.00	-0.3335	0.1926	-0.7853	0.4534
L10	28.00-27.25	-0.6927	0.3999	-1.2624	0.7288
L11	27.25-16.00	-0.5743	0.3316	-1.0168	0.5871
L12	16.00-14.50	-0.6591	0.3805	-1.2305	0.7105
L13	14.50-12.25	-0.6597	0.3809	-1.2275	0.7087
L14	12.25-10.00	-0.6605	0.3813	-1.2225	0.7058
L15	10.00-0.00	-0.5314	0.3068	-0.8820	0.5092

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
HPA-85R-BUU-H8 w/ Mount Pipe	A	From Leg	3.00 0.00 1.00	0.000	157.00	No Ice 1/2" Ice 1" Ice	12.98 13.67 14.36	9.32 10.79 12.24	0.10 0.20 0.30
HPA-85R-BUU-H8 w/ Mount Pipe	B	From Leg	3.00 0.00 1.00	0.000	157.00	No Ice 1/2" Ice 1" Ice	12.98 13.67 14.36	9.32 10.79 12.24	0.10 0.20 0.30
HPA-85R-BUU-H8 w/ Mount Pipe	C	From Leg	3.00 0.00 1.00	0.000	157.00	No Ice 1/2" Ice 1" Ice	12.98 13.67 14.36	9.32 10.79 12.24	0.10 0.20 0.30
RRUS 32	A	From Leg	3.00 0.00 1.00	0.000	157.00	No Ice 1/2" Ice 1" Ice	2.86 3.08 3.32	1.78 1.97 2.17	0.06 0.08 0.10
RRUS 32	B	From Leg	3.00 0.00 1.00	0.000	157.00	No Ice 1/2" Ice 1" Ice	2.86 3.08 3.32	1.78 1.97 2.17	0.06 0.08 0.10
RRUS 32	C	From Leg	3.00 0.00 1.00	0.000	157.00	No Ice 1/2" Ice 1" Ice	2.86 3.08 3.32	1.78 1.97 2.17	0.06 0.08 0.10
DC6-48-60-18-8F	A	From Leg	3.00 0.00	0.000	157.00	No Ice 1/2"	0.92 1.46	0.92 1.46	0.02 0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			1.00			Ice	1.64	1.64	0.06
						1" Ice			
TPA-65R-LCUUUU-H8-K w/ Mount Pipe	A	From Leg	3.00	0.000	157.00	No Ice	13.54	10.96	0.13
			0.00			1/2"	14.24	12.49	0.23
			1.00			Ice	14.95	14.04	0.34
						1" Ice			
TPA-65R-LCUUUU-H8-K w/ Mount Pipe	B	From Leg	3.00	0.000	157.00	No Ice	13.54	10.96	0.13
			0.00			1/2"	14.24	12.49	0.23
			1.00			Ice	14.95	14.04	0.34
						1" Ice			
TPA-65R-LCUUUU-H8-K w/ Mount Pipe	C	From Leg	3.00	0.000	157.00	No Ice	13.54	10.96	0.13
			0.00			1/2"	14.24	12.49	0.23
			1.00			Ice	14.95	14.04	0.34
						1" Ice			
RRUS 32 B2	A	From Leg	3.00	0.000	157.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			1.00			Ice	3.18	2.05	0.10
						1" Ice			
RRUS 32 B2	B	From Leg	3.00	0.000	157.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			1.00			Ice	3.18	2.05	0.10
						1" Ice			
RRUS 32 B2	C	From Leg	3.00	0.000	157.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			1.00			Ice	3.18	2.05	0.10
						1" Ice			
T-Arm Mount [TA 601-3]	C	None		0.000	157.00	No Ice	10.90	10.90	0.73
						1/2"	14.65	14.65	0.93
						Ice	18.40	18.40	1.13
						1" Ice			
800 10121 w/ Mount Pipe	A	From Leg	3.00	0.000	157.00	No Ice	5.74	4.95	0.07
			0.00			1/2"	6.34	6.02	0.12
			1.00			Ice	6.86	6.81	0.18
						1" Ice			
800 10121 w/ Mount Pipe	B	From Leg	3.00	0.000	157.00	No Ice	5.74	4.95	0.07
			0.00			1/2"	6.34	6.02	0.12
			1.00			Ice	6.86	6.81	0.18
						1" Ice			
800 10121 w/ Mount Pipe	C	From Leg	3.00	0.000	157.00	No Ice	5.74	4.95	0.07
			0.00			1/2"	6.34	6.02	0.12
			1.00			Ice	6.86	6.81	0.18
						1" Ice			
DC6-48-60-18-8F	A	From Leg	3.00	0.000	157.00	No Ice	0.92	0.92	0.02
			0.00			1/2"	1.46	1.46	0.04
			1.00			Ice	1.64	1.64	0.06
						1" Ice			
(2) LGP21401	A	From Leg	3.00	0.000	157.00	No Ice	1.10	0.35	0.01
			0.00			1/2"	1.24	0.44	0.02
			1.00			Ice	1.38	0.54	0.03
						1" Ice			
(2) LGP21401	B	From Leg	3.00	0.000	157.00	No Ice	1.10	0.35	0.01
			0.00			1/2"	1.24	0.44	0.02
			1.00			Ice	1.38	0.54	0.03
						1" Ice			
(2) LGP21401	C	From Leg	3.00	0.000	157.00	No Ice	1.10	0.35	0.01
			0.00			1/2"	1.24	0.44	0.02
			1.00			Ice	1.38	0.54	0.03
						1" Ice			
RRUS-11	A	From Leg	3.00	0.000	157.00	No Ice	2.79	1.19	0.05
			0.00			1/2"	3.00	1.34	0.07
			1.00			Ice	3.21	1.50	0.09
						1" Ice			
RRUS-11	B	From Leg	3.00	0.000	157.00	No Ice	2.79	1.19	0.05
			0.00			1/2"	3.00	1.34	0.07
			1.00			Ice	3.21	1.50	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
RRUS-11	C	From Leg	3.00 0.00 1.00	0.000	157.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.19 1.34 1.50	0.05 0.07 0.09
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800MHz 2X50W RRH W/FILTER	A	From Leg	2.00 0.00 0.00	0.000	150.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
800MHz 2X50W RRH W/FILTER	B	From Leg	2.00 0.00 0.00	0.000	150.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
800MHz 2X50W RRH W/FILTER	C	From Leg	2.00 0.00 0.00	0.000	150.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
PCS 1900MHz 4x45W-65MHz	A	From Leg	2.00 0.00 0.00	0.000	150.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
PCS 1900MHz 4x45W-65MHz	B	From Leg	2.00 0.00 0.00	0.000	150.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
PCS 1900MHz 4x45W-65MHz	C	From Leg	2.00 0.00 0.00	0.000	150.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
Side Arm Mount [SO 103-3]	C	None		0.000	150.00	No Ice 1/2" Ice 1" Ice	9.50 11.80 14.10	9.50 11.80 14.10	0.22 0.32 0.41
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APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
IBC1900HG-2A	A	From Leg	4.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice	0.97 1.09 1.22	0.46 0.56 0.66	0.02 0.03 0.04
IBC1900HG-2A	B	From Leg	4.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice	0.97 1.09 1.22	0.46 0.56 0.66	0.02 0.03 0.04
IBC1900HG-2A	C	From Leg	4.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice	0.97 1.09 1.22	0.46 0.56 0.66	0.02 0.03 0.04
IBC1900BB-1	A	From Leg	4.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice	0.97 1.09 1.22	0.46 0.56 0.66	0.02 0.03 0.04
IBC1900BB-1	B	From Leg	4.00 0.00	0.000	148.00	No Ice 1/2"	0.97 1.09	0.46 0.56	0.02 0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	1.22	0.66	0.04
						1" Ice			
IBC1900BB-1	C	From Leg	4.00	0.000	148.00	No Ice	0.97	0.46	0.02
			0.00			1/2"	1.09	0.56	0.03
			0.00			Ice	1.22	0.66	0.04
						1" Ice			
Platform Mount [LP 1201-1]	C	None		0.000	148.00	No Ice	23.10	23.10	2.10
						1/2"	26.80	26.80	2.50
						Ice	30.50	30.50	2.90
						1" Ice			
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00	0.000	148.00	No Ice	6.58	4.96	0.08
			0.00			1/2"	7.03	5.75	0.13
			0.00			Ice	7.47	6.47	0.19
						1" Ice			
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00	0.000	148.00	No Ice	6.58	4.96	0.08
			0.00			1/2"	7.03	5.75	0.13
			0.00			Ice	7.47	6.47	0.19
						1" Ice			
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00	0.000	148.00	No Ice	6.58	4.96	0.08
			0.00			1/2"	7.03	5.75	0.13
			0.00			Ice	7.47	6.47	0.19
						1" Ice			
TD-RRH8x20-25	A	From Leg	4.00	0.000	148.00	No Ice	4.05	1.53	0.07
			0.00			1/2"	4.30	1.71	0.10
			0.00			Ice	4.56	1.90	0.13
						1" Ice			
TD-RRH8x20-25	B	From Leg	4.00	0.000	148.00	No Ice	4.05	1.53	0.07
			0.00			1/2"	4.30	1.71	0.10
			0.00			Ice	4.56	1.90	0.13
						1" Ice			
TD-RRH8x20-25	C	From Leg	4.00	0.000	148.00	No Ice	4.05	1.53	0.07
			0.00			1/2"	4.30	1.71	0.10
			0.00			Ice	4.56	1.90	0.13
						1" Ice			
Miscellaneous [NA 510-1]	C	None		0.000	148.00	No Ice	6.00	6.00	0.26
						1/2"	8.50	8.50	0.34
						Ice	11.00	11.00	0.42
						1" Ice			
Handrail Bracing	C	None		0.000	148.00	No Ice	3.00	3.00	0.04
						1/2"	4.00	4.00	0.05
						Ice	5.00	5.00	0.06
						1" Ice			
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(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00	0.000	138.00	No Ice	8.42	7.42	0.08
			0.00			1/2"	8.96	8.45	0.15
			0.00			Ice	9.48	9.35	0.23
						1" Ice			
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00	0.000	138.00	No Ice	8.42	7.42	0.08
			0.00			1/2"	8.96	8.45	0.15
			0.00			Ice	9.48	9.35	0.23
						1" Ice			
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00	0.000	138.00	No Ice	8.42	7.42	0.08
			0.00			1/2"	8.96	8.45	0.15
			0.00			Ice	9.48	9.35	0.23
						1" Ice			
RRH4X45-AWS4 B66	A	From Leg	4.00	0.000	138.00	No Ice	2.66	1.59	0.06
			0.00			1/2"	2.88	1.77	0.08
			0.00			Ice	3.10	1.96	0.11
						1" Ice			
RRH4X45-AWS4 B66	B	From Leg	4.00	0.000	138.00	No Ice	2.66	1.59	0.06
			0.00			1/2"	2.88	1.77	0.08
			0.00			Ice	3.10	1.96	0.11
						1" Ice			
RRH4X45-AWS4 B66	C	From Leg	4.00	0.000	138.00	No Ice	2.66	1.59	0.06
			0.00			1/2"	2.88	1.77	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	3.10	1.96	0.11
						1" Ice			
RRH2X60-PCS	A	From Leg	4.00	0.000	138.00	No Ice	2.20	1.72	0.06
			0.00			1/2"	2.39	1.90	0.08
			0.00			Ice	2.59	2.09	0.10
						1" Ice			
RRH2X60-PCS	B	From Leg	4.00	0.000	138.00	No Ice	2.20	1.72	0.06
			0.00			1/2"	2.39	1.90	0.08
			0.00			Ice	2.59	2.09	0.10
						1" Ice			
RRH2X60-PCS	C	From Leg	4.00	0.000	138.00	No Ice	2.20	1.72	0.06
			0.00			1/2"	2.39	1.90	0.08
			0.00			Ice	2.59	2.09	0.10
						1" Ice			
RRH2x60-700	A	From Leg	4.00	0.000	138.00	No Ice	3.50	1.82	0.06
			0.00			1/2"	3.76	2.05	0.08
			0.00			Ice	4.03	2.29	0.11
						1" Ice			
RRH2x60-700	B	From Leg	4.00	0.000	138.00	No Ice	3.50	1.82	0.06
			0.00			1/2"	3.76	2.05	0.08
			0.00			Ice	4.03	2.29	0.11
						1" Ice			
RRH2x60-700	C	From Leg	4.00	0.000	138.00	No Ice	3.50	1.82	0.06
			0.00			1/2"	3.76	2.05	0.08
			0.00			Ice	4.03	2.29	0.11
						1" Ice			
(2) DB-T1-6Z-8AB-0Z	A	From Leg	4.00	0.000	138.00	No Ice	4.80	2.00	0.04
			0.00			1/2"	5.07	2.19	0.08
			0.00			Ice	5.35	2.39	0.12
						1" Ice			
(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	A	From Leg	4.00	0.000	138.00	No Ice	9.97	10.25	0.05
			0.00			1/2"	10.54	11.42	0.15
			0.00			Ice	11.08	12.31	0.25
						1" Ice			
(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	B	From Leg	4.00	0.000	138.00	No Ice	9.97	10.25	0.05
			0.00			1/2"	10.54	11.42	0.15
			0.00			Ice	11.08	12.31	0.25
						1" Ice			
(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	C	From Leg	4.00	0.000	138.00	No Ice	9.97	10.25	0.05
			0.00			1/2"	10.54	11.42	0.15
			0.00			Ice	11.08	12.31	0.25
						1" Ice			
KS24019-L112A	C	From Leg	4.00	0.000	138.00	No Ice	0.14	0.14	0.01
			0.00			1/2"	0.20	0.20	0.01
			4.00			Ice	0.26	0.26	0.01
						1" Ice			
Platform Mount [LP 1201-1]	C	None		0.000	138.00	No Ice	23.10	23.10	2.10
						1/2"	26.80	26.80	2.50
						Ice	30.50	30.50	2.90
						1" Ice			
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ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00	0.000	127.00	No Ice	6.32	5.63	0.11
			0.00			1/2"	6.76	6.42	0.17
			2.00			Ice	7.20	7.12	0.23
						1" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00	0.000	127.00	No Ice	6.32	5.63	0.11
			0.00			1/2"	6.76	6.42	0.17
			2.00			Ice	7.20	7.12	0.23
						1" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00	0.000	127.00	No Ice	6.32	5.63	0.11
			0.00			1/2"	6.76	6.42	0.17
			2.00			Ice	7.20	7.12	0.23
						1" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00	0.000	127.00	No Ice	6.33	5.64	0.11
			0.00			1/2"	6.78	6.43	0.17

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			2.00			Ice 1" Ice	7.21	7.13	0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
KRY 112 144/1	A	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.17 0.23 0.30	0.01 0.01 0.02
KRY 112 144/1	B	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.17 0.23 0.30	0.01 0.01 0.02
KRY 112 144/1	C	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.17 0.23 0.30	0.01 0.01 0.02
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
RRUS 11 B12	A	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
RRUS 11 B12	B	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
RRUS 11 B12	C	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
Platform Mount [LP 1201-1]	C	None		0.000	127.00	No Ice 1/2" Ice 1" Ice	23.10 26.80 30.50	23.10 26.80 30.50	2.10 2.50 2.90
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HBX-6516DS-VTM w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	119.00	No Ice 1/2" Ice 1" Ice	3.60 4.00 4.39	3.24 3.91 4.56	0.03 0.06 0.10
HBX-6516DS-VTM w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	119.00	No Ice 1/2" Ice 1" Ice	3.60 4.00 4.39	3.24 3.91 4.56	0.03 0.06 0.10
HBX-6516DS-VTM w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	119.00	No Ice 1/2" Ice 1" Ice	3.60 4.00 4.39	3.24 3.91 4.56	0.03 0.06 0.10
2.375" OD x 5' Mount Pipe	A	From Leg	4.00 0.00	0.000	119.00	No Ice 1/2"	1.19 1.50	1.19 1.50	0.02 0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	1.81	1.81	0.04
						1" Ice			
2.375" OD x 5' Mount Pipe	B	From Leg	4.00	0.000	119.00	No Ice	1.19	1.19	0.02
			0.00			1/2"	1.50	1.50	0.03
			0.00			Ice	1.81	1.81	0.04
						1" Ice			
2.375" OD x 5' Mount Pipe	C	From Leg	4.00	0.000	119.00	No Ice	1.19	1.19	0.02
			0.00			1/2"	1.50	1.50	0.03
			0.00			Ice	1.81	1.81	0.04
						1" Ice			
T-Arm Mount [TA 602-3]	C	None		0.000	119.00	No Ice	11.59	11.59	0.77
						1/2"	15.44	15.44	0.99
						Ice	19.29	19.29	1.21
						1" Ice			
***									
KS24019-L112A	A	From Leg	3.00	0.000	48.00	No Ice	0.14	0.14	0.01
			0.00			1/2"	0.20	0.20	0.01
			2.00			Ice	0.26	0.26	0.01
						1" Ice			
Side Arm Mount [SO 701-1]	A	None		0.000	48.00	No Ice	0.85	1.67	0.07
						1/2"	1.14	2.34	0.08
						Ice	1.43	3.01	0.09
						1" Ice			

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 160.00-148.50	154.25	1.119	26	10.302	A	0.000	10.302	10.302	100.00	0.000	0.000
					B	0.000	10.302		100.00	0.000	0.000
					C	0.000	10.302		100.00	0.000	0.000
L2 148.50-148.00	148.22	1.106	25	0.703	A	0.000	0.703	0.703	100.00	0.000	0.000
					B	0.000	0.703		100.00	0.000	0.000
					C	0.000	0.703		100.00	0.000	0.000
L3 148.00-111.00	128.98	1.063	24	81.394	A	0.000	81.394	81.394	100.00	0.000	0.000
					B	0.000	81.394		100.00	0.000	0.000
					C	0.000	81.394		100.00	0.000	0.000
L4 111.00-105.25	108.11	1.01	23	14.091	A	0.000	14.091	14.091	100.00	0.000	0.000
					B	0.000	14.091		100.00	0.000	0.000
					C	0.000	14.091		100.00	0.000	0.404
L5 105.25-76.75	90.65	0.961	22	76.530	A	0.000	76.530	76.530	100.00	0.000	0.000
					B	0.000	76.530		100.00	0.000	0.000
					C	0.000	76.530		100.00	0.000	8.626
L6 76.75-70.75	73.73	0.906	21	17.174	A	0.000	17.174	17.174	100.00	0.000	0.000
					B	0.000	17.174		100.00	0.000	0.000
					C	0.000	17.174		100.00	0.000	1.783
L7 70.75-70.00	70.37	0.894	20	2.186	A	0.000	2.186	2.186	100.00	0.000	0.000
					B	0.000	2.186		100.00	0.000	0.000
					C	0.000	2.186		100.00	0.000	0.386
L8 70.00-43.00	56.23	0.838	19	83.842	A	0.000	83.842	83.842	100.00	0.000	0.000
					B	0.000	83.842		100.00	0.000	0.000
					C	0.000	83.842		100.00	0.000	11.161
L9 43.00-28.00	35.41	0.735	17	49.792	A	0.000	49.792	49.792	100.00	0.000	0.000
					B	0.000	49.792		100.00	0.000	0.000
					C	0.000	49.792		100.00	0.000	4.211
L10 28.00-27.25	27.62	0.7	16	2.578	A	0.000	2.578	2.578	100.00	0.000	0.000
					B	0.000	2.578		100.00	0.000	0.000
					C	0.000	2.578		100.00	0.000	0.482
L11 27.25-	21.58	0.7	16	39.599	A	0.000	39.599	39.599	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
16.00					B	0.000	39.599		100.00	0.000	0.000
					C	0.000	39.599		100.00	0.000	5.792
L12 16.00-14.50	15.25	0.7	16	5.411	A	0.000	5.411	5.411	100.00	0.000	0.000
					B	0.000	5.411		100.00	0.000	0.000
					C	0.000	5.411		100.00	0.000	0.901
L13 14.50-12.25	13.37	0.7	16	8.174	A	0.000	8.174	8.174	100.00	0.000	0.000
					B	0.000	8.174		100.00	0.000	0.000
					C	0.000	8.174		100.00	0.000	1.352
L14 12.25-10.00	11.12	0.7	16	8.244	A	0.000	8.244	8.244	100.00	0.000	0.000
					B	0.000	8.244		100.00	0.000	0.000
					C	0.000	8.244		100.00	0.000	1.352
L15 10.00-0.00	4.97	0.7	16	37.478	A	0.000	37.478	37.478	100.00	0.000	0.000
					B	0.000	37.478		100.00	0.000	0.000
					C	0.000	37.478		100.00	0.000	4.677

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 160.00-148.50	154.25	1.119	7	2.3335	14.775	A	0.000	14.775	14.775	100.00	0.000	0.000
						B	0.000	14.775		100.00	0.000	0.000
						C	0.000	14.775		100.00	0.000	0.000
L2 148.50-148.00	148.22	1.106	7	2.3242	0.897	A	0.000	0.897	0.897	100.00	0.000	0.000
						B	0.000	0.897		100.00	0.000	0.000
						C	0.000	0.897		100.00	0.000	0.000
L3 148.00-111.00	128.98	1.063	6	2.2921	95.528	A	0.000	95.528	95.528	100.00	0.000	0.000
						B	0.000	95.528		100.00	0.000	0.000
						C	0.000	95.528		100.00	0.000	0.000
L4 111.00-105.25	108.11	1.01	6	2.2520	16.287	A	0.000	16.287	16.287	100.00	0.000	0.000
						B	0.000	16.287		100.00	0.000	0.000
						C	0.000	16.287		100.00	0.000	1.168
L5 105.25-76.75	90.65	0.961	6	2.2127	87.040	A	0.000	87.040	87.040	100.00	0.000	0.000
						B	0.000	87.040		100.00	0.000	0.000
						C	0.000	87.040		100.00	0.000	25.467
L6 76.75-70.75	73.73	0.906	6	2.1674	19.386	A	0.000	19.386	19.386	100.00	0.000	0.000
						B	0.000	19.386		100.00	0.000	0.000
						C	0.000	19.386		100.00	0.000	6.034
L7 70.75-70.00	70.37	0.894	5	2.1573	2.456	A	0.000	2.456	2.456	100.00	0.000	0.000
						B	0.000	2.456		100.00	0.000	0.000
						C	0.000	2.456		100.00	0.000	1.170
L8 70.00-43.00	56.23	0.838	5	2.1095	93.335	A	0.000	93.335	93.335	100.00	0.000	0.000
						B	0.000	93.335		100.00	0.000	0.000
						C	0.000	93.335		100.00	0.000	30.374
L9 43.00-28.00	35.41	0.735	4	2.0142	55.066	A	0.000	55.066	55.066	100.00	0.000	0.000
						B	0.000	55.066		100.00	0.000	0.000
						C	0.000	55.066		100.00	0.000	12.414
L10 28.00-27.25	27.62	0.7	4	1.9648	2.824	A	0.000	2.824	2.824	100.00	0.000	0.000
						B	0.000	2.824		100.00	0.000	0.000
						C	0.000	2.824		100.00	0.000	1.137
L11 27.25-16.00	21.58	0.7	4	1.9169	43.193	A	0.000	43.193	43.193	100.00	0.000	0.000
						B	0.000	43.193		100.00	0.000	0.000
						C	0.000	43.193		100.00	0.000	12.608
L12 16.00-14.50	15.25	0.7	4	1.8514	5.874	A	0.000	5.874	5.874	100.00	0.000	0.000
						B	0.000	5.874		100.00	0.000	0.000
						C	0.000	5.874		100.00	0.000	2.136
L13 14.50-12.25	13.37	0.7	4	1.8273	8.859	A	0.000	8.859	8.859	100.00	0.000	0.000
						B	0.000	8.859		100.00	0.000	0.000
						C	0.000	8.859		100.00	0.000	3.180
L14 12.25-10.00	11.12	0.7	4	1.7939	8.916	A	0.000	8.916	8.916	100.00	0.000	0.000
						B	0.000	8.916		100.00	0.000	0.000
						C	0.000	8.916		100.00	0.000	3.146
L15 10.00-0.00	4.97	0.7	4	1.6550	40.236	A	0.000	40.236	40.236	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						B	0.000	40.236		100.00	0.000	0.000
						C	0.000	40.236		100.00	0.000	9.090

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 160.00-148.50	154.25	1.119	9	10.302	A	0.000	10.302	10.302	100.00	0.000	0.000
					B	0.000	10.302		100.00	0.000	0.000
					C	0.000	10.302		100.00	0.000	0.000
L2 148.50-148.00	148.22	1.106	9	0.703	A	0.000	0.703	0.703	100.00	0.000	0.000
					B	0.000	0.703		100.00	0.000	0.000
					C	0.000	0.703		100.00	0.000	0.000
L3 148.00-111.00	128.98	1.063	8	81.394	A	0.000	81.394	81.394	100.00	0.000	0.000
					B	0.000	81.394		100.00	0.000	0.000
					C	0.000	81.394		100.00	0.000	0.000
L4 111.00-105.25	108.11	1.01	8	14.091	A	0.000	14.091	14.091	100.00	0.000	0.000
					B	0.000	14.091		100.00	0.000	0.000
					C	0.000	14.091		100.00	0.000	0.404
L5 105.25-76.75	90.65	0.961	8	76.530	A	0.000	76.530	76.530	100.00	0.000	0.000
					B	0.000	76.530		100.00	0.000	0.000
					C	0.000	76.530		100.00	0.000	8.626
L6 76.75-70.75	73.73	0.906	7	17.174	A	0.000	17.174	17.174	100.00	0.000	0.000
					B	0.000	17.174		100.00	0.000	0.000
					C	0.000	17.174		100.00	0.000	1.783
L7 70.75-70.00	70.37	0.894	7	2.186	A	0.000	2.186	2.186	100.00	0.000	0.000
					B	0.000	2.186		100.00	0.000	0.000
					C	0.000	2.186		100.00	0.000	0.386
L8 70.00-43.00	56.23	0.838	7	83.842	A	0.000	83.842	83.842	100.00	0.000	0.000
					B	0.000	83.842		100.00	0.000	0.000
					C	0.000	83.842		100.00	0.000	11.161
L9 43.00-28.00	35.41	0.735	6	49.792	A	0.000	49.792	49.792	100.00	0.000	0.000
					B	0.000	49.792		100.00	0.000	0.000
					C	0.000	49.792		100.00	0.000	4.211
L10 28.00-27.25	27.62	0.7	5	2.578	A	0.000	2.578	2.578	100.00	0.000	0.000
					B	0.000	2.578		100.00	0.000	0.000
					C	0.000	2.578		100.00	0.000	0.482
L11 27.25-16.00	21.58	0.7	5	39.599	A	0.000	39.599	39.599	100.00	0.000	0.000
					B	0.000	39.599		100.00	0.000	0.000
					C	0.000	39.599		100.00	0.000	5.792
L12 16.00-14.50	15.25	0.7	5	5.411	A	0.000	5.411	5.411	100.00	0.000	0.000
					B	0.000	5.411		100.00	0.000	0.000
					C	0.000	5.411		100.00	0.000	0.901
L13 14.50-12.25	13.37	0.7	5	8.174	A	0.000	8.174	8.174	100.00	0.000	0.000
					B	0.000	8.174		100.00	0.000	0.000
					C	0.000	8.174		100.00	0.000	1.352
L14 12.25-10.00	11.12	0.7	5	8.244	A	0.000	8.244	8.244	100.00	0.000	0.000
					B	0.000	8.244		100.00	0.000	0.000
					C	0.000	8.244		100.00	0.000	1.352
L15 10.00-0.00	4.97	0.7	5	37.478	A	0.000	37.478	37.478	100.00	0.000	0.000
					B	0.000	37.478		100.00	0.000	0.000
					C	0.000	37.478		100.00	0.000	4.677

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice

Comb. No.	Description
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	160 - 148.5	Pole	Max Tension	2	0.00	-0.00	-0.00
			Max. Compression	26	-12.78	0.07	0.93
			Max. Mx	20	-3.07	53.88	0.14
			Max. My	2	-3.07	0.00	54.07
			Max. Vy	20	-6.71	53.88	0.14
			Max. Vx	2	-6.72	0.00	54.07
			Max. Torque	20			-0.26
L2	148.5 - 148	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-12.85	0.08	0.93
			Max. Mx	20	-3.12	57.24	0.15
			Max. My	2	-3.11	0.01	57.43
			Max. Vy	20	-6.74	57.24	0.15
			Max. Vx	2	-6.74	0.01	57.43
			Max. Torque	20			-0.26
L3	148 - 111	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-55.69	2.72	2.58
			Max. Mx	20	-18.03	645.47	0.52
			Max. My	2	-17.99	0.17	650.83
			Max. Vy	20	-23.87	645.47	0.52
			Max. Vx	2	-24.08	0.17	650.83
			Max. Torque	9			0.93
L4	111 - 105.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-59.55	4.17	1.89
			Max. Mx	20	-19.95	875.27	0.49
			Max. My	2	-19.91	0.26	882.51
			Max. Vy	20	-24.48	875.27	0.49
			Max. Vx	2	-24.69	0.26	882.51
			Max. Torque	9			0.93
L5	105.25 - 76.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-70.24	9.04	-0.62
			Max. Mx	20	-25.61	1489.96	0.37
			Max. My	2	-25.59	0.53	1501.86
			Max. Vy	20	-26.22	1489.96	0.37
			Max. Vx	2	-26.43	0.53	1501.86
			Max. Torque	9			0.92
L6	76.75 - 70.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-76.28	11.13	-1.73
			Max. Mx	20	-29.08	1763.10	0.31
			Max. My	2	-29.05	0.66	1776.96
			Max. Vy	20	-27.01	1763.10	0.31
			Max. Vx	2	-27.21	0.66	1776.96
			Max. Torque	19			-0.81
L7	70.75 - 70	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-76.69	11.29	-1.82
			Max. Mx	20	-29.34	1783.38	0.31
			Max. My	2	-29.31	0.67	1797.38
			Max. Vy	20	-27.07	1783.38	0.31
			Max. Vx	2	-27.28	0.67	1797.38
			Max. Torque	19			-0.81
L8	70 - 43	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-87.86	15.75	-4.23
			Max. Mx	20	-36.10	2394.29	0.16
			Max. My	2	-36.09	0.95	2412.42
			Max. Vy	20	-28.47	2394.29	0.16
			Max. Vx	2	-28.68	0.95	2412.42
			Max. Torque	17			-1.00
L9	43 - 28	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-101.52	19.84	-6.41
			Max. Mx	20	-45.08	2977.90	0.03
			Max. My	2	-45.07	1.22	2999.73
			Max. Vy	20	-29.66	2977.90	0.03
			Max. Vx	14	29.87	1.22	-2999.64
			Max. Torque	15			-1.19
L10	28 - 27.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-101.95	19.98	-6.49
			Max. Mx	20	-45.39	3000.16	0.03
			Max. My	2	-45.38	1.23	3022.12
			Max. Vy	20	-29.71	3000.16	0.03
			Max. Vx	14	29.91	1.23	-3022.04
			Max. Torque	15			-1.21
L11	27.25 - 16	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-108.60	22.02	-7.65
			Max. Mx	20	-49.97	3337.37	-0.06
			Max. My	14	-49.96	1.39	-3361.46
			Max. Vy	20	-30.25	3337.37	-0.06
			Max. Vx	14	30.45	1.39	-3361.46
			Max. Torque	15			-1.45
L12	16 - 14.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-109.61	22.27	-7.80
			Max. Mx	20	-50.70	3382.81	-0.08
			Max. My	14	-50.70	1.41	-3407.18
			Max. Vy	20	-30.35	3382.81	-0.08

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	14	30.55	1.41	-3407.18
			Max. Torque	15			-1.49
L13	14.5 - 12.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-110.93	22.65	-8.01
			Max. Mx	20	-51.63	3451.19	-0.09
			Max. My	14	-51.63	1.44	-3476.00
			Max. Vy	20	-30.46	3451.19	-0.09
			Max. Vx	14	30.66	1.44	-3476.00
			Max. Torque	15			-1.55
L14	12.25 - 10	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-112.47	23.02	-8.23
			Max. Mx	20	-52.78	3519.86	-0.11
			Max. My	14	-52.77	1.48	-3545.11
			Max. Vy	20	-30.59	3519.86	-0.11
			Max. Vx	14	30.79	1.48	-3545.11
			Max. Torque	15			-1.61
L15	10 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-118.37	24.55	-9.12
			Max. Mx	20	-57.12	3827.70	-0.20
			Max. My	14	-57.12	1.63	-3854.84
			Max. Vy	20	-30.98	3827.70	-0.20
			Max. Vx	14	31.18	1.63	-3854.84
			Max. Torque	15			-1.82

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	118.37	-0.00	0.00
	Max. H_x	21	42.85	30.96	0.00
	Max. H_z	3	42.85	0.00	31.16
	Max. M_x	2	3854.46	0.00	31.16
	Max. M_z	8	3824.43	-30.96	0.00
	Max. Torsion	3	1.82	0.00	31.16
	Min. Vert	3	42.85	0.00	31.16
	Min. H_x	9	42.85	-30.96	0.00
	Min. H_z	15	42.85	0.00	-31.16
	Min. M_x	14	-3854.84	0.00	-31.16
	Min. M_z	20	-3827.70	30.96	0.00
	Min. Torsion	15	-1.82	0.00	-31.16

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	47.61	0.00	0.00	0.18	1.29	-0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	57.13	-0.00	-31.16	-3854.46	1.63	-1.82
0.9 Dead+1.6 Wind 0 deg - No Ice	42.85	-0.00	-31.16	-3791.48	1.20	-1.82
1.2 Dead+1.6 Wind 30 deg - No Ice	57.13	15.48	-26.99	-3338.77	-1911.75	-1.52
0.9 Dead+1.6 Wind 30 deg - No Ice	42.85	15.48	-26.99	-3283.96	-1880.75	-1.52
1.2 Dead+1.6 Wind 60 deg - No Ice	57.13	26.82	-15.58	-1927.59	-3312.50	-0.82
0.9 Dead+1.6 Wind 60 deg - No Ice	42.85	26.82	-15.58	-1895.97	-3258.50	-0.82
1.2 Dead+1.6 Wind 90 deg - No Ice	57.13	30.96	-0.00	0.20	-3824.43	0.10
0.9 Dead+1.6 Wind 90 deg - No Ice	42.85	30.96	-0.00	0.16	-3762.32	0.10

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
1.2 Dead+1.6 Wind 120 deg - No Ice	57.13	26.82	15.58	1927.99	-3312.50	1.00
0.9 Dead+1.6 Wind 120 deg - No Ice	42.85	26.82	15.58	1896.28	-3258.50	1.00
1.2 Dead+1.6 Wind 150 deg - No Ice	57.13	15.48	26.99	3339.16	-1911.74	1.62
0.9 Dead+1.6 Wind 150 deg - No Ice	42.85	15.48	26.99	3284.27	-1880.75	1.62
1.2 Dead+1.6 Wind 180 deg - No Ice	57.13	-0.00	31.16	3854.84	1.63	1.82
0.9 Dead+1.6 Wind 180 deg - No Ice	42.85	-0.00	31.16	3791.78	1.20	1.82
1.2 Dead+1.6 Wind 210 deg - No Ice	57.13	-15.48	26.99	3339.16	1915.00	1.53
0.9 Dead+1.6 Wind 210 deg - No Ice	42.85	-15.48	26.99	3284.27	1883.15	1.53
1.2 Dead+1.6 Wind 240 deg - No Ice	57.13	-26.82	15.58	1928.00	3315.76	0.82
0.9 Dead+1.6 Wind 240 deg - No Ice	42.85	-26.82	15.58	1896.29	3260.91	0.82
1.2 Dead+1.6 Wind 270 deg - No Ice	57.13	-30.96	-0.00	0.20	3827.70	-0.10
0.9 Dead+1.6 Wind 270 deg - No Ice	42.85	-30.96	-0.00	0.16	3764.73	-0.10
1.2 Dead+1.6 Wind 300 deg - No Ice	57.13	-26.82	-15.58	-1927.60	3315.77	-1.00
0.9 Dead+1.6 Wind 300 deg - No Ice	42.85	-26.82	-15.58	-1895.97	3260.91	-1.00
1.2 Dead+1.6 Wind 330 deg - No Ice	57.13	-15.48	-26.99	-3338.77	1915.00	-1.63
0.9 Dead+1.6 Wind 330 deg - No Ice	42.85	-15.48	-26.99	-3283.97	1883.16	-1.63
1.2 Dead+1.0 Ice+1.0 Temp	118.37	0.00	-0.00	9.12	24.55	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	118.37	0.00	-10.03	-1363.11	24.74	-0.80
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	118.37	4.99	-8.69	-1179.37	-657.65	-0.63
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	118.37	8.65	-5.02	-677.04	-1157.20	-0.28
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	118.37	9.99	-0.00	9.17	-1339.93	0.14
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	118.37	8.65	5.02	695.37	-1157.19	0.52
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	118.37	4.99	8.69	1197.70	-657.65	0.76
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	118.37	0.00	10.03	1381.44	24.74	0.80
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	118.37	-4.99	8.69	1197.69	707.12	0.63
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	118.37	-8.65	5.02	695.36	1206.65	0.28
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	118.37	-9.99	-0.00	9.17	1389.38	-0.14
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	118.37	-8.65	-5.02	-677.03	1206.66	-0.52
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	118.37	-4.99	-8.69	-1179.36	707.12	-0.76
Dead+Wind 0 deg - Service	47.61	0.00	-6.67	-818.94	1.36	-0.00
Dead+Wind 30 deg - Service	47.61	3.32	-5.78	-709.20	-405.15	-0.11
Dead+Wind 60 deg - Service	47.61	5.74	-3.34	-409.39	-702.73	-0.18
Dead+Wind 90 deg - Service	47.61	6.63	0.00	0.16	-811.65	-0.21
Dead+Wind 120 deg - Service	47.61	5.74	3.34	409.71	-702.73	-0.18
Dead+Wind 150 deg - Service	47.61	3.32	5.78	709.52	-405.15	-0.10
Dead+Wind 180 deg - Service	47.61	0.00	6.67	819.26	1.36	0.00
Dead+Wind 210 deg - Service	47.61	-3.32	5.78	709.52	407.86	0.11

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 240 deg - Service	47.61	-5.74	3.34	409.71	705.44	0.18
Dead+Wind 270 deg - Service	47.61	-6.63	0.00	0.16	814.36	0.21
Dead+Wind 300 deg - Service	47.61	-5.74	-3.34	-409.39	705.44	0.18
Dead+Wind 330 deg - Service	47.61	-3.32	-5.78	-709.20	407.86	0.10

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-47.61	0.00	-0.00	47.61	-0.00	0.000%
2	0.00	-57.13	-31.16	0.00	57.13	31.16	0.009%
3	0.00	-42.85	-31.16	0.00	42.85	31.16	0.007%
4	15.48	-57.13	-26.99	-15.48	57.13	26.99	0.000%
5	15.48	-42.85	-26.99	-15.48	42.85	26.99	0.000%
6	26.82	-57.13	-15.58	-26.82	57.13	15.58	0.000%
7	26.82	-42.85	-15.58	-26.82	42.85	15.58	0.000%
8	30.97	-57.13	0.00	-30.96	57.13	0.00	0.009%
9	30.97	-42.85	0.00	-30.96	42.85	0.00	0.007%
10	26.82	-57.13	15.58	-26.82	57.13	-15.58	0.000%
11	26.82	-42.85	15.58	-26.82	42.85	-15.58	0.000%
12	15.48	-57.13	26.99	-15.48	57.13	-26.99	0.000%
13	15.48	-42.85	26.99	-15.48	42.85	-26.99	0.000%
14	0.00	-57.13	31.16	0.00	57.13	-31.16	0.009%
15	0.00	-42.85	31.16	0.00	42.85	-31.16	0.007%
16	-15.48	-57.13	26.99	15.48	57.13	-26.99	0.000%
17	-15.48	-42.85	26.99	15.48	42.85	-26.99	0.000%
18	-26.82	-57.13	15.58	26.82	57.13	-15.58	0.000%
19	-26.82	-42.85	15.58	26.82	42.85	-15.58	0.000%
20	-30.97	-57.13	0.00	30.96	57.13	0.00	0.009%
21	-30.97	-42.85	0.00	30.96	42.85	0.00	0.007%
22	-26.82	-57.13	-15.58	26.82	57.13	15.58	0.000%
23	-26.82	-42.85	-15.58	26.82	42.85	15.58	0.000%
24	-15.48	-57.13	-26.99	15.48	57.13	26.99	0.000%
25	-15.48	-42.85	-26.99	15.48	42.85	26.99	0.000%
26	0.00	-118.37	0.00	-0.00	118.37	0.00	0.000%
27	0.00	-118.37	-10.04	-0.00	118.37	10.03	0.001%
28	5.00	-118.37	-8.69	-4.99	118.37	8.69	0.001%
29	8.65	-118.37	-5.02	-8.65	118.37	5.02	0.001%
30	9.99	-118.37	0.00	-9.99	118.37	0.00	0.001%
31	8.65	-118.37	5.02	-8.65	118.37	-5.02	0.001%
32	5.00	-118.37	8.69	-4.99	118.37	-8.69	0.001%
33	0.00	-118.37	10.04	-0.00	118.37	-10.03	0.001%
34	-5.00	-118.37	8.69	4.99	118.37	-8.69	0.001%
35	-8.65	-118.37	5.02	8.65	118.37	-5.02	0.001%
36	-9.99	-118.37	0.00	9.99	118.37	0.00	0.001%
37	-8.65	-118.37	-5.02	8.65	118.37	5.02	0.001%
38	-5.00	-118.37	-8.69	4.99	118.37	8.69	0.001%
39	0.00	-47.61	-6.67	-0.00	47.61	6.67	0.002%
40	3.32	-47.61	-5.78	-3.32	47.61	5.78	0.002%
41	5.74	-47.61	-3.34	-5.74	47.61	3.34	0.002%
42	6.63	-47.61	0.00	-6.63	47.61	-0.00	0.002%
43	5.74	-47.61	3.34	-5.74	47.61	-3.34	0.002%
44	3.32	-47.61	5.78	-3.32	47.61	-5.78	0.002%
45	0.00	-47.61	6.67	-0.00	47.61	-6.67	0.002%
46	-3.32	-47.61	5.78	3.32	47.61	-5.78	0.002%
47	-5.74	-47.61	3.34	5.74	47.61	-3.34	0.002%
48	-6.63	-47.61	0.00	6.63	47.61	-0.00	0.002%
49	-5.74	-47.61	-3.34	5.74	47.61	3.34	0.002%
50	-3.32	-47.61	-5.78	3.32	47.61	5.78	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	17	0.00010126	0.00011638
3	Yes	17	0.00006518	0.00009571
4	Yes	24	0.00000001	0.00008510
5	Yes	23	0.00000001	0.00011177
6	Yes	24	0.00000001	0.00008643
7	Yes	23	0.00000001	0.00011367
8	Yes	17	0.00010143	0.00014060
9	Yes	17	0.00006529	0.00011986
10	Yes	24	0.00000001	0.00008522
11	Yes	23	0.00000001	0.00011202
12	Yes	24	0.00000001	0.00008567
13	Yes	23	0.00000001	0.00011259
14	Yes	17	0.00010128	0.00011635
15	Yes	17	0.00006518	0.00009569
16	Yes	24	0.00000001	0.00008655
17	Yes	23	0.00000001	0.00011376
18	Yes	24	0.00000001	0.00008491
19	Yes	23	0.00000001	0.00011156
20	Yes	17	0.00010141	0.00014069
21	Yes	17	0.00006528	0.00011604
22	Yes	24	0.00000001	0.00008612
23	Yes	23	0.00000001	0.00011319
24	Yes	24	0.00000001	0.00008597
25	Yes	23	0.00000001	0.00011292
26	Yes	15	0.00000001	0.00003603
27	Yes	21	0.00008966	0.00012431
28	Yes	22	0.00005228	0.00013504
29	Yes	22	0.00005227	0.00013753
30	Yes	21	0.00008968	0.00012132
31	Yes	22	0.00005223	0.00013717
32	Yes	22	0.00005221	0.00013613
33	Yes	21	0.00008953	0.00012481
34	Yes	22	0.00005215	0.00014576
35	Yes	22	0.00005216	0.00014271
36	Yes	21	0.00008955	0.00012538
37	Yes	22	0.00005220	0.00014310
38	Yes	22	0.00005221	0.00014463
39	Yes	17	0.00008409	0.00001958
40	Yes	17	0.00008395	0.00008694
41	Yes	17	0.00008394	0.00009298
42	Yes	17	0.00008409	0.00004348
43	Yes	17	0.00008393	0.00008487
44	Yes	17	0.00008393	0.00009099
45	Yes	17	0.00008407	0.00001955
46	Yes	17	0.00008392	0.00009179
47	Yes	17	0.00008393	0.00008527
48	Yes	17	0.00008408	0.00005250
49	Yes	17	0.00008394	0.00009342
50	Yes	17	0.00008394	0.00008775

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 148.5	30.52	39	1.791	0.003
L2	148.5 - 148	26.27	39	1.693	0.002
L3	148 - 111	26.10	39	1.692	0.002
L4	114.75 - 105.25	15.23	39	1.346	0.001
L5	105.25 - 76.75	12.66	39	1.218	0.001
L6	81 - 70.75	7.28	39	0.891	0.000
L7	70.75 - 70	5.47	39	0.775	0.000
L8	70 - 43	5.35	39	0.767	0.000
L9	48 - 28	2.47	45	0.483	0.000
L10	28 - 27.25	0.82	45	0.286	0.000
L11	27.25 - 16	0.78	45	0.278	0.000

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L12	16 - 14.5	0.27	45	0.157	0.000
L13	14.5 - 12.25	0.22	45	0.144	0.000
L14	12.25 - 10	0.16	45	0.121	0.000
L15	10 - 0	0.11	45	0.102	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
157.00	HPA-85R-BUU-H8 w/ Mount Pipe	39	29.39	1.757	0.003	7345
150.00	800MHz 2X50W RRH W/FILTER	39	26.81	1.698	0.002	4687
148.00	APXVSPP18-C-A20 w/ Mount Pipe	39	26.10	1.692	0.002	6012
138.00	(2) SBNHH-1D65B w/ Mount Pipe	39	22.61	1.635	0.002	7749
127.00	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	39	18.95	1.513	0.001	5037
119.00	HBX-6516DS-VTM w/ Mount Pipe	39	16.47	1.404	0.001	4016
48.00	KS24019-L112A	45	2.47	0.483	0.000	5519

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 148.5	143.43	2	8.414	0.013
L2	148.5 - 148	123.52	2	7.964	0.008
L3	148 - 111	122.69	2	7.959	0.008
L4	114.75 - 105.25	71.67	2	6.338	0.004
L5	105.25 - 76.75	59.58	2	5.740	0.003
L6	81 - 70.75	34.28	2	4.201	0.002
L7	70.75 - 70	25.77	2	3.650	0.002
L8	70 - 43	25.20	2	3.613	0.002
L9	48 - 28	11.64	14	2.276	0.001
L10	28 - 27.25	3.88	14	1.345	0.001
L11	27.25 - 16	3.67	14	1.307	0.001
L12	16 - 14.5	1.26	14	0.741	0.000
L13	14.5 - 12.25	1.04	14	0.680	0.000
L14	12.25 - 10	0.74	14	0.567	0.000
L15	10 - 0	0.50	14	0.478	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
157.00	HPA-85R-BUU-H8 w/ Mount Pipe	2	138.14	8.257	0.011	1659
150.00	800MHz 2X50W RRH W/FILTER	2	126.04	7.989	0.009	1057
148.00	APXVSPP18-C-A20 w/ Mount Pipe	2	122.69	7.959	0.009	1353
138.00	(2) SBNHH-1D65B w/ Mount Pipe	2	106.33	7.693	0.008	1716
127.00	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	2	89.17	7.120	0.006	1108
119.00	HBX-6516DS-VTM w/ Mount Pipe	2	77.51	6.613	0.005	879
48.00	KS24019-L112A	14	11.64	2.276	0.001	1174

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	160 - 148.5 (1)	TP10.75x10.75x0.349	11.50	0.00	0.0	11.4038	-3.07	359.22	0.009
L2	148.5 - 148 (2)	TP23x10.75x0.349	0.50	0.00	0.0	11.4038	-3.07	359.22	0.009
L3	148 - 111 (3)	TP28.994x23x0.25	37.00	0.00	0.0	22.3263	-17.99	1498.80	0.012
L4	111 - 105.25 (4)	TP29.4254x27.8865x0.3125	9.50	0.00	0.0	28.8763	-19.91	1980.34	0.010
L5	105.25 - 76.75 (5)	TP34.042x29.4254x0.4446	28.50	0.00	0.0	46.4429	-25.59	2272.54	0.011
L6	76.75 - 70.75 (6)	TP34.3889x32.4643x0.4785	10.25	0.00	0.0	51.4997	-29.05	2778.39	0.010
L7	70.75 - 70 (7)	TP34.5104x34.3889x0.6626	0.75	0.00	0.0	71.1798	-29.31	3444.72	0.009
L8	70 - 43 (8)	TP38.884x34.5104x0.5356	27.00	0.00	0.0	63.8187	-36.09	3200.82	0.011
L9	43 - 28 (9)	TP40.5641x37.0028x0.6536	20.00	0.00	0.0	82.7928	-45.07	3930.07	0.011
L10	28 - 27.25 (10)	TP40.6856x40.5641x0.6528	0.75	0.00	0.0	82.9499	-45.38	4240.93	0.011
L11	27.25 - 16 (11)	TP42.508x40.6856x0.6551	11.25	0.00	0.0	87.0282	-49.96	4468.34	0.011
L12	16 - 14.5 (12)	TP42.751x42.508x0.8063	1.50	0.00	0.0	107.3420	-50.70	5023.02	0.010
L13	14.5 - 12.25 (13)	TP43.1155x42.751x0.6431	2.25	0.00	0.0	86.6987	-51.63	4427.64	0.012
L14	12.25 - 10 (14)	TP43.48x43.1155x0.8213	2.25	0.00	0.0	111.2030	-52.77	5007.94	0.011
L15	10 - 0 (15)	TP45.1x43.48x0.661	10.00	0.00	0.0	93.2267	-57.12	5109.46	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	160 - 148.5 (1)	TP10.75x10.75x0.349	54.07	99.14	0.545	0.00	99.14	0.000
L2	148.5 - 148 (2)	TP23x10.75x0.349	54.07	99.14	0.545	0.00	99.14	0.000
L3	148 - 111 (3)	TP28.994x23x0.25	650.83	866.29	0.751	0.00	866.29	0.000
L4	111 - 105.25 (4)	TP29.4254x27.8865x0.3125	882.51	1182.18	0.747	0.00	1182.18	0.000
L5	105.25 - 76.75 (5)	TP34.042x29.4254x0.4446	1501.86	1529.28	0.982	0.00	1529.28	0.000
L6	76.75 - 70.75 (6)	TP34.3889x32.4643x0.4785	1776.97	1925.46	0.923	0.00	1925.46	0.000
L7	70.75 - 70 (7)	TP34.5104x34.3889x0.6626	1797.38	2370.06	0.758	0.00	2370.06	0.000
L8	70 - 43 (8)	TP38.884x34.5104x0.5356	2412.42	2455.14	0.983	0.00	2455.14	0.000
L9	43 - 28 (9)	TP40.5641x37.0028x0.6536	2999.72	3198.35	0.938	0.00	3198.35	0.000
L10	28 - 27.25 (10)	TP40.6856x40.5641x0.6528	3022.12	3462.13	0.873	0.00	3462.13	0.000
L11	27.25 - 16 (11)	TP42.508x40.6856x0.6551	3361.46	3816.09	0.881	0.00	3816.09	0.000
L12	16 - 14.5 (12)	TP42.751x42.508x0.8063	3407.18	4284.16	0.795	0.00	4284.16	0.000
L13	14.5 - 12.25 (13)	TP43.1155x42.751x0.6431	3476.01	3839.23	0.905	0.00	3839.23	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L14	12.25 - 10 (14)	TP43.48x43.1155x0.8213	3545.11	4343.88	0.816	0.00	4343.88	0.000
L15	10 - 0 (15)	TP45.1x43.48x0.661	3854.84	4636.82	0.831	0.00	4636.82	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	160 - 148.5 (1)	TP10.75x10.75x0.349	6.72	179.61	0.037	0.00	150.79	0.000
L2	148.5 - 148 (2)	TP23x10.75x0.349	6.74	391.15	0.017	0.00	150.79	0.000
L3	148 - 111 (3)	TP28.994x23x0.25	24.08	749.40	0.032	0.02	1734.71	0.000
L4	111 - 105.25 (4)	TP29.4254x27.8865x0.3125	24.69	990.17	0.025	0.04	2367.23	0.000
L5	105.25 - 76.75 (5)	TP34.042x29.4254x0.4446	26.43	1136.27	0.023	0.36	3062.31	0.000
L6	76.75 - 70.75 (6)	TP34.3889x32.4643x0.4785	27.21	1389.19	0.020	0.50	3855.63	0.000
L7	70.75 - 70 (7)	TP34.5104x34.3889x0.6626	27.28	1722.36	0.016	0.51	4745.92	0.000
L8	70 - 43 (8)	TP38.884x34.5104x0.5356	28.68	1600.41	0.018	0.91	4916.29	0.000
L9	43 - 28 (9)	TP40.5641x37.0028x0.6536	29.87	1965.04	0.015	1.19	6404.52	0.000
L10	28 - 27.25 (10)	TP40.6856x40.5641x0.6528	29.91	2120.46	0.014	1.21	6932.73	0.000
L11	27.25 - 16 (11)	TP42.508x40.6856x0.6551	30.45	2234.17	0.014	1.45	7641.52	0.000
L12	16 - 14.5 (12)	TP42.751x42.508x0.8063	30.55	2511.51	0.012	1.49	8578.83	0.000
L13	14.5 - 12.25 (13)	TP43.1155x42.751x0.6431	30.66	2213.82	0.014	1.55	7687.85	0.000
L14	12.25 - 10 (14)	TP43.48x43.1155x0.8213	30.79	2503.97	0.012	1.61	8698.42	0.000
L15	10 - 0 (15)	TP45.1x43.48x0.661	31.18	2554.73	0.012	1.82	9285.00	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	160 - 148.5 (1)	0.009	0.545	0.000	0.037	0.000	0.555 ✔	1.000	4.8.2 ✔
L2	148.5 - 148 (2)	0.009	0.545	0.000	0.017	0.000	0.554 ✔	1.000	4.8.2 ✔
L3	148 - 111 (3)	0.012	0.751	0.000	0.032	0.000	0.764 ✔	1.000	4.8.2 ✔
L4	111 - 105.25 (4)	0.010	0.747	0.000	0.025	0.000	0.757 ✔	1.000	4.8.2 ✔
L5	105.25 - 76.75 (5)	0.011	0.982	0.000	0.023	0.000	0.994 ✔	1.000	4.8.2 ✔
L6	76.75 - 70.75 (6)	0.010	0.923	0.000	0.020	0.000	0.934 ✔	1.000	4.8.2 ✔
L7	70.75 - 70 (7)	0.009	0.758	0.000	0.016	0.000	0.767 ✔	1.000	4.8.2 ✔
L8	70 - 43 (8)	0.011	0.983	0.000	0.018	0.000	0.994 ✔	1.000	4.8.2 ✔
L9	43 - 28 (9)	0.011	0.938	0.000	0.015	0.000	0.950 ✔	1.000	4.8.2 ✔

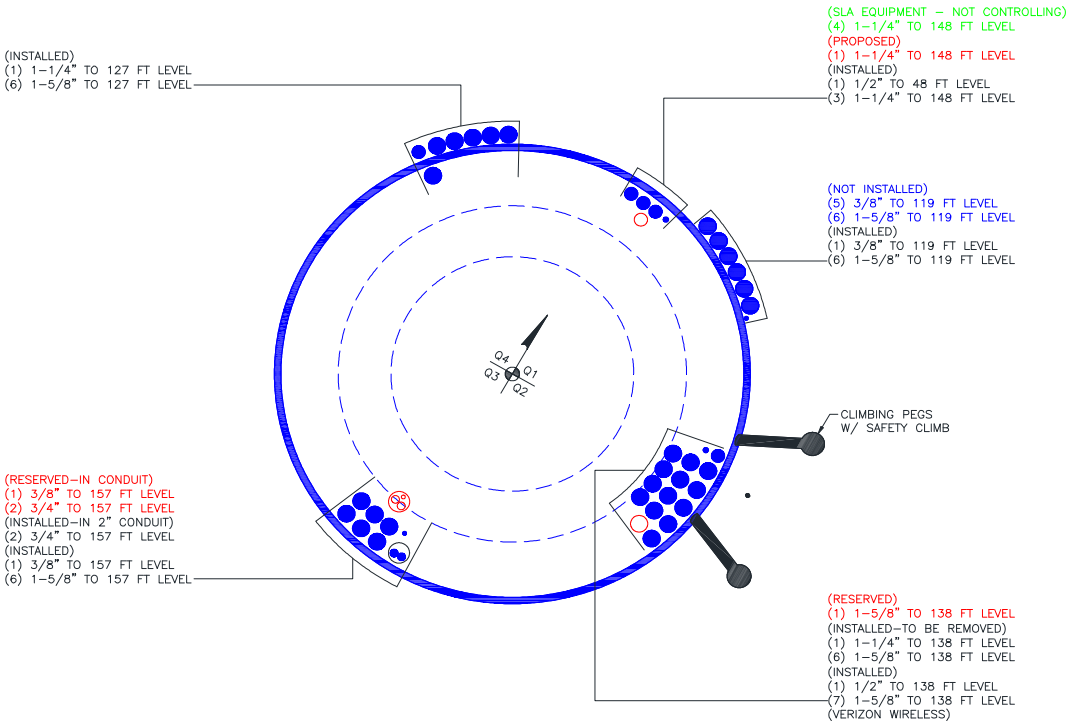
Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L10	28 - 27.25 (10)	0.011	0.873	0.000	0.014	0.000	0.884 ✔	1.000	4.8.2 ✔
L11	27.25 - 16 (11)	0.011	0.881	0.000	0.014	0.000	0.892 ✔	1.000	4.8.2 ✔
L12	16 - 14.5 (12)	0.010	0.795	0.000	0.012	0.000	0.806 ✔	1.000	4.8.2 ✔
L13	14.5 - 12.25 (13)	0.012	0.905	0.000	0.014	0.000	0.917 ✔	1.000	4.8.2 ✔
L14	12.25 - 10 (14)	0.011	0.816	0.000	0.012	0.000	0.827 ✔	1.000	4.8.2 ✔
L15	10 - 0 (15)	0.011	0.831	0.000	0.012	0.000	0.843 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	160 - 148.5	Pole	TP10.75x10.75x0.349	1	-3.07	359.22	55.5	Pass
L2	148.5 - 148	Pole	TP23x10.75x0.349	2	-3.07	359.22	55.4	Pass
L3	148 - 111	Pole	TP28.994x23x0.25	3	-17.99	1498.80	76.4	Pass
L4	111 - 105.25	Pole	TP29.4254x27.8865x0.3125	4	-19.91	1980.34	75.7	Pass
L5	105.25 - 76.75	Pole	TP34.042x29.4254x0.4446	5	-25.59	2272.54	99.4	Pass
L6	76.75 - 70.75	Pole	TP34.3889x32.4643x0.4785	6	-29.05	2778.39	93.4	Pass
L7	70.75 - 70	Pole	TP34.5104x34.3889x0.6626	7	-29.31	3444.72	76.7	Pass
L8	70 - 43	Pole	TP38.884x34.5104x0.5356	8	-36.09	3200.82	99.4	Pass
L9	43 - 28	Pole	TP40.5641x37.0028x0.6536	9	-45.07	3930.07	95.0	Pass
L10	28 - 27.25	Pole	TP40.6856x40.5641x0.6528	10	-45.38	4240.93	88.4	Pass
L11	27.25 - 16	Pole	TP42.508x40.6856x0.6551	11	-49.96	4468.34	89.2	Pass
L12	16 - 14.5	Pole	TP42.751x42.508x0.8063	12	-50.70	5023.02	80.6	Pass
L13	14.5 - 12.25	Pole	TP43.1155x42.751x0.6431	13	-51.63	4427.64	91.7	Pass
L14	12.25 - 10	Pole	TP43.48x43.1155x0.8213	14	-52.77	5007.94	82.7	Pass
L15	10 - 0	Pole	TP45.1x43.48x0.661	15	-57.12	5109.46	84.3	Pass
							Summary	
						Pole (L8)	99.4	Pass
						RATING =	**99.4**	**Pass**

APPENDIX B

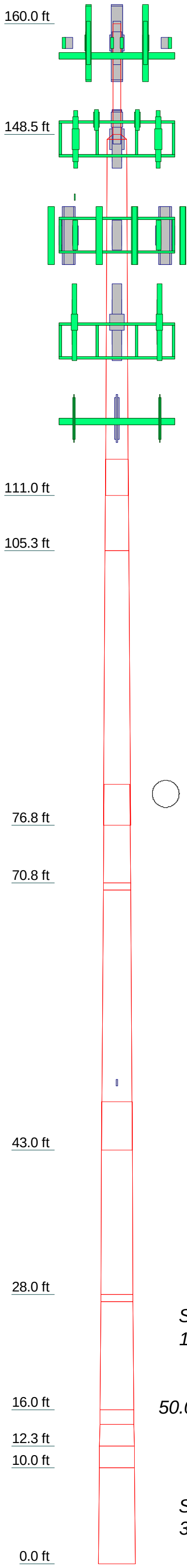
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

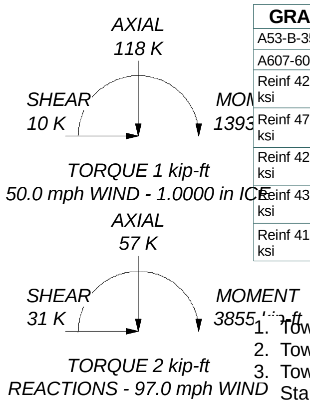
Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	11.50	1	0.3490		10.7500	10.7500	A53-B-35	0.4
2	0.50	1	0.3490		10.7500	23.0000	A53-B-35	0.0
3	37.00	18	0.2500	3.75	23.0000	28.9940	A607-60	2.6
4	9.50	18	0.3125		27.8865	29.4254	A607-60	0.9
5	28.50	18	0.4446	4.25	29.4254	34.0420	Reinf 42.81 ksi	4.3
6	10.25	18	0.4785		[illegible]	34.3889	Reinf 47.20 ksi	1.7
7	0.75	18	[illegible]		[illegible]	[illegible]	Reinf 42.34 ksi	0.2
8	27.00	18	0.5356	5.00	34.5104	38.8840	Reinf 43.88 ksi	5.6
9	20.00	18	0.6536		37.0028	40.5641	Reinf 41.53 ksi	5.4
10	0.75	18	0.6528		40.5641	40.6856	Reinf 44.73 ksi	0.2
11	11.25	18	0.6551		40.6856	42.5080	Reinf 44.92 ksi	3.3
12	5.50	18	[illegible]		[illegible]	[illegible]	[illegible]	0.5
13	2.25	18	[illegible]		[illegible]	[illegible]	[illegible]	0.7
14	2.25	18	[illegible]		[illegible]	[illegible]	[illegible]	0.8
15	10.00	18	0.6610		43.4800	45.1000	Reinf 47.95 ksi	3.1
								29.8



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
HPA-85R-BUU-H8 w/ Mount Pipe	157	(2) SBNHH-1D65B w/ Mount Pipe	138
HPA-85R-BUU-H8 w/ Mount Pipe	157	(2) SBNHH-1D65B w/ Mount Pipe	138
HPA-85R-BUU-H8 w/ Mount Pipe	157	(2) SBNHH-1D65B w/ Mount Pipe	138
RRUS 32	157	RRH4X45-AWS4 B66	138
RRUS 32	157	RRH4X45-AWS4 B66	138
RRUS 32	157	RRH4X45-AWS4 B66	138
DC6-48-60-18-8F	157	RRH2X60-PCS	138
TPA-65R-LCUUUU-H8-K w/ Mount Pipe	157	RRH2X60-PCS	138
		RRH2X60-PCS	138
TPA-65R-LCUUUU-H8-K w/ Mount Pipe	157	RRH2x60-700	138
		RRH2x60-700	138
TPA-65R-LCUUUU-H8-K w/ Mount Pipe	157	RRH2x60-700	138
		(2) DB-T1-6Z-8AB-0Z	138
RRUS 32 B2	157	(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	138
RRUS 32 B2	157		
RRUS 32 B2	157	(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	138
T-Arm Mount [TA 601-3]	157		
800 10121 w/ Mount Pipe	157	(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	138
800 10121 w/ Mount Pipe	157		
800 10121 w/ Mount Pipe	157	KS24019-L112A	138
DC6-48-60-18-8F	157	Platform Mount [LP 1201-1]	138
(2) LGP21401	157	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	127
(2) LGP21401	157		
(2) LGP21401	157	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	127
RRUS-11	157		
RRUS-11	157	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	127
RRUS-11	157		
800MHz 2X50W RRH W/FILTER	150	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	127
800MHz 2X50W RRH W/FILTER	150		
800MHz 2X50W RRH W/FILTER	150	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	127
PCS 1900MHz 4x45W-65MHz	150		
PCS 1900MHz 4x45W-65MHz	150	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	127
PCS 1900MHz 4x45W-65MHz	150	KRY 112 144/1	127
Side Arm Mount [SO 103-3]	150	KRY 112 144/1	127
APXVSPP18-C-A20 w/ Mount Pipe	148	KRY 112 144/1	127
APXVSPP18-C-A20 w/ Mount Pipe	148	LNX-6515DS-VTM w/ Mount Pipe	127
APXVSPP18-C-A20 w/ Mount Pipe	148	LNX-6515DS-VTM w/ Mount Pipe	127
IBC1900HG-2A	148	LNX-6515DS-VTM w/ Mount Pipe	127
IBC1900HG-2A	148	RRUS 11 B12	127
IBC1900HG-2A	148	RRUS 11 B12	127
IBC1900BB-1	148	RRUS 11 B12	127
IBC1900BB-1	148	Platform Mount [LP 1201-1]	127
IBC1900BB-1	148	HBX-6516DS-VTM w/ Mount Pipe	119
Platform Mount [LP 1201-1]	148	HBX-6516DS-VTM w/ Mount Pipe	119
APXVTM14-C-120 w/ Mount Pipe	148	HBX-6516DS-VTM w/ Mount Pipe	119
APXVTM14-C-120 w/ Mount Pipe	148	2.375" OD x 5' Mount Pipe	119
APXVTM14-C-120 w/ Mount Pipe	148	2.375" OD x 5' Mount Pipe	119
TD-RRH8x20-25	148	2.375" OD x 5' Mount Pipe	119
TD-RRH8x20-25	148	T-Arm Mount [TA 602-3]	119
TD-RRH8x20-25	148	KS24019-L112A	48
Miscellaneous [NA 510-1]	148	Side Arm Mount [SO 701-1]	48
Handrail Bracing	148		

ALL REACTIONS ARE FACTORED



MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	60 ksi	Reinf 44.73 ksi	45 ksi	56 ksi
A607-60	60 ksi	75 ksi			
Reinf 42.81 ksi	43 ksi	54 ksi	Reinf 44.92 ksi	45 ksi	57 ksi
Reinf 47.20 ksi	47 ksi	59 ksi	Reinf 40.94 ksi	41 ksi	52 ksi
Reinf 42.34 ksi	42 ksi	53 ksi	Reinf 44.68 ksi	45 ksi	56 ksi
Reinf 43.88 ksi	44 ksi	55 ksi	Reinf 39.40 ksi	39 ksi	50 ksi
Reinf 41.53 ksi	42 ksi	52 ksi	Reinf 47.95 ksi	48 ksi	60 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 97.0 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.0 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.0 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 99.4%

PJF

Paul J. Ford and Company
250 East Broad St., Suite 600
Columbus, Ohio
Phone: 614.221.6679
FAX:

Job: ***160 ft Monopole / West Johnson Ave. Burnt House***		
Project: ***PJF 37517-0193 / BU 876313***		
Client: Crown Castle	Drawn by: jjohnson	App'd:
Code: TIA-222-G	Date: 08/02/17	Scale: NTS
Path: G:\TOWER\375 Crown Castle\2017\37517-0193 876313 WEST JOHNSON AVE. BURNT\37517-0193.007.7805 SA 1435743\37517-0193.007.7805 Reinforced.eri		Dwg No. E-1

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Job Number:	37517-0193.007.7805	**Page:**	1
Site Number:	876313	**Date:**	8/2/2017
Site Name:	WEST JOHNSON AVE. BURNT HOUSE	**Version:**	2.6
By:	JRJ	**Effective:**	12/10/2015

Tube Bypas Analysis

Revision= LRFD Passing= 105% Design/Analysis = Analysis @ 148 ft - 0 in elevation

TNX Tower Output @ Connection:			
Moment	=	54.07	k-ft
Axial	=	3.07	kips
Shear	=	6.74	kips
Design Capacity	=	100.0%	

Extension Geometry:			
Diameter	=	10.75	in
Thickness	=	15/43	in
Height	=	12	ft
Steel Grade	=	A53 Gr. B	
Extension Offset	=		in
Gap Height	=		in
Pole Offset	=		in

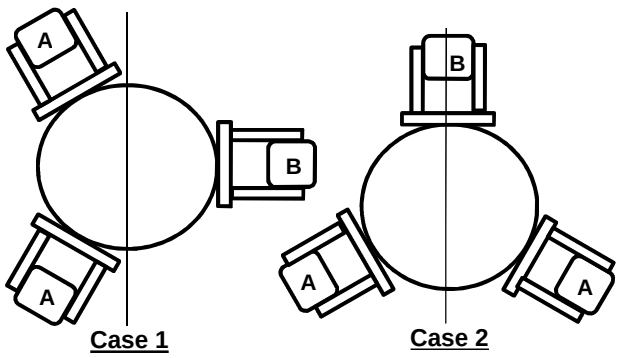
Pole Geometry:			
Diameter	=	23	in
Thickness	=	1/4	in
Steel Grade	=	A572 Gr. 60	
Flange/Mount Diam.	=		in

Tube Bypass Information:			
Number of Legs	=	3	
Unbraced Length	=	94	in
Tube Circle	=	39.5	in
K	=	2.10	

Type	HSS 6x6x1/2	
	Extension	Pole
Blind Bolt	EXISTING AJAX	EXISTING AJAX
Method	Case 2	Case 2
Bolt Qty.	16	16
Spacing (in)	3	3
End Dist. (in)	3	3

New Port Information		
Elevation #1=		ft
Elevation #2=		ft
Elevation #3=		ft
Elevation #4=		ft

Analysis Reactions		
Moment k-ft	Axial kips	Shear kips
54.07	3.07	6.74



Load Distribution	
Moment of Inertia, I in^2	Axial / Leg kips
585.09	1.023

#

Member Forces						
Case	d	Tension (kips)	Comp. (kips)	Mx (k-in)	My (k-in)	M (k-in)
1a	9.88	9.93	11.97	182.89	105.59	211.19
1b	19.75	20.88	22.93	0.00	211.19	211.19
2a	17.10	17.94	19.99	105.59	182.89	211.19
2b	0.00	1.02	1.02	211.19	0.00	211.19

Compression Strength							
Case	$4.71*\sqrt{(E/F\_y)}$	KL/r	F_e ksi	F_{cr} ksi	øcPnc kips	P_{rc} kips	Capacity
1a	118.26	88.52	36.53	27.15	238.04	11.97	5.0%
1b	118.26	88.52	36.53	27.15	238.04	22.93	9.6%
2a	118.26	88.52	36.53	27.15	238.04	19.99	8.4%
2b	118.26	88.52	36.53	27.15	238.04	1.02	0.4%

Flexural Strength						
Case	ø	I_3 in^4	∑I in^4	M k-in	øbMn k-in	Capacity
1a	60.00	48.20	144.60	211.19	819.72	25.8%
1b	0.00	48.20	144.60	211.19	819.72	25.8%
2a	30.00	48.20	144.60	211.19	819.72	25.8%
2b	90.00	48.20	144.60	211.19	819.72	25.8%

Tensile Strength					
Case	P_{n1} kips	P_{n2} kips	øtPnt kips	P_{rt} kips	Capacity
1a	448.04	499.67	374.75	9.93	2.6%
1b	448.04	499.67	374.75	20.88	5.6%
2a	448.04	499.67	374.75	17.94	4.8%
2b	448.04	499.67	374.75	1.02	0.3%

Combined Strength			
Case	Flexure + Tension (H1)		
	Prt / Pnt	Mr / Mn	Capacity
1a	0.013	0.258	27.1%
1b	0.028	0.258	28.5%
2a	0.024	0.258	28.2%
2b	0.001	0.258	25.9%
Case	Flexure + Compression (H1)		
	Prc / Pnc	Mr / Mn	Capacity
1a	0.025	0.258	28.3%
1b	0.048	0.258	30.6%
2a	0.042	0.258	30.0%
2b	0.002	0.258	26.0%

Bolt Check									
Case	Location	Tube Comp. kips	e in	Shear on Bolt kips	Bearing Capacity kips	Shear Capacity kips	Tension on Bolt kips	Tension Capacity kips	Limit Capacity
1a	Ext	11.97	14.375	0.76	42.17	37.00	0.97	30.00	0.1%
	Pole	11.97	8.25	1.65	37.76	37.00	1.13	30.00	0.3%
1b	Ext	22.93	14.375	1.43	42.17	37.00	1.86	30.00	0.5%
	Pole	22.93	8.25	1.43	37.76	37.00	2.23	30.00	0.7%
2a	Ext	19.99	14.375	1.25	42.17	37.00	1.62	30.00	0.4%
	Pole	19.99	8.25	1.51	37.76	37.00	1.93	30.00	0.6%
2b	Ext	1.02	14.375	0.15	42.17	37.00	0.08	30.00	0.0%
	Pole	1.02	8.25	1.69	37.76	37.00	0.04	30.00	0.2%

- All equations based on AISC 13th Edition

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v4.4 - Effective 7-12-13

Date: 8/2/2017
PJF Project: 37517-0193.007.7805
Client Ref. # 876313
Site Name: West Johnson Ave. Burnt House
Description: 148' Pole
Owner: Crown Castle
Engineer: JRJ

Asymmetric Anchor Rod Analysis

Moment =	3855	k-ft	TIA Ref.	G	Location =	Base Plate		
Axial =	57.0	kips	ASIF =	1.0000	η =	0.50	for BP, Rev. G Sect. 4.9.9	
Shear =	31.0	kips	Max Ratio =	105.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	19							

**** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. ****

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	25.0	52.00	0.00	3.98	197.19	190.86	200.63	0.00	260.00	77.2%
2	2.250	#18J A615 Gr 75	75	100	38.0	52.00	0.00	3.98	194.79	188.46	198.23	0.00	260.00	76.2%
3	2.250	#18J A615 Gr 75	75	100	52.0	52.00	0.00	3.98	190.83	184.50	194.27	0.00	260.00	74.7%
4	2.250	#18J A615 Gr 75	75	100	65.0	52.00	0.00	3.98	186.74	180.41	190.19	0.00	260.00	73.1%
5	2.250	#18J A615 Gr 75	75	100	115.0	52.00	0.00	3.98	182.24	175.91	185.69	0.00	260.00	71.4%
6	2.250	#18J A615 Gr 75	75	100	128.0	52.00	0.00	3.98	185.45	179.12	188.89	0.00	260.00	72.7%
7	2.250	#18J A615 Gr 75	75	100	142.0	52.00	0.00	3.98	189.96	183.63	193.40	0.00	260.00	74.4%
8	2.250	#18J A615 Gr 75	75	100	155.0	52.00	0.00	3.98	194.14	187.81	197.58	0.00	260.00	76.0%
9	2.250	#18J A615 Gr 75	75	100	205.0	52.00	0.00	3.98	196.94	190.61	200.38	0.00	260.00	77.1%
10	2.250	#18J A615 Gr 75	75	100	218.0	52.00	0.00	3.98	193.09	186.76	196.53	0.00	260.00	75.6%
11	2.250	#18J A615 Gr 75	75	100	232.0	52.00	0.00	3.98	187.60	181.27	191.05	0.00	260.00	73.5%
12	2.250	#18J A615 Gr 75	75	100	245.0	52.00	0.00	3.98	182.19	175.86	185.63	0.00	260.00	71.4%
13	2.250	#18J A615 Gr 75	75	100	295.0	52.00	0.00	3.98	175.25	168.92	178.70	0.00	260.00	68.7%
14	2.250	#18J A615 Gr 75	75	100	308.0	52.00	0.00	3.98	178.83	172.50	182.27	0.00	260.00	70.1%
15	2.250	#18J A615 Gr 75	75	100	322.0	52.00	0.00	3.98	184.13	177.80	187.57	0.00	260.00	72.1%
16	2.250	#18J A615 Gr 75	75	100	335.0	52.00	0.00	3.98	189.32	182.99	192.76	0.00	260.00	74.1%
17	1.750	Williams R71	127.7	150	100.0	67.10	0.00	2.66	154.71	150.48	157.02	0.00	312.00	50.3%
18	1.750	Williams R71	127.7	150	238.0	67.10	0.00	2.66	159.55	155.31	161.85	0.00	312.00	51.9%
19	1.750	Williams R71	127.7	150	328.0	67.10	0.00	2.66	160.98	156.74	163.28	0.00	312.00	52.3%
								71.67						

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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#: *876313*
Site Name: *West Johnson Ave. Burnt House*
App #:

Base Reactions		
TIA Revision:	G	
Factored Moment, Mu:	3363.1	ft-kips
Factored Axial, Pu:	50.6	kips
Factored Shear, Vu:	27.5	kips

Reactions adjusted to account for additional anchor rods.

Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	52	in
Anchor Spacing:	6	in

Anchor Rod Results

TIA G --> Max Rod (Cu+ Vu/η):	200.6	Kips
Axial Design Strength, Φ*Fu*Anet:	260.0	Kips
Anchor Rod Stress Ratio:	77.2%	**Pass**

Plate Data		
W=Side:	53	in
Thick:	3	in
Grade:	50	ksi
Clip Distance:	16	in

Base Plate Results Flexural Check

Base Plate Stress:	29.6	ksi
PL Design Bending Strength, Φ*Fy:	45.0	ksi
Base Plate Stress Ratio:	65.8%	**Pass**

PL Ref. Data
Yield Line (in): 29.85
Max PL Length: 29.85

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

N/A - Unstiffened

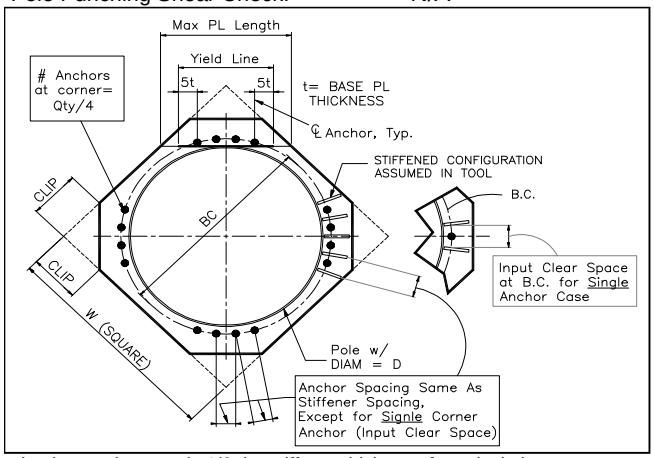
Stiffener Results

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

Pole Data		
Diam:	45.1	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round



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

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Job Number:	37517-0193.007.7805	**Page:**	1
Site Number:	876313	**By:**	JRJ
Site Name:	West Johnson Ave. Burnt House	**Date:**	8/2/2017

DRILLED PIER SOIL AND STEEL ANALYSIS - TIA-222-G

Factored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, Mu =	3425.0		k-ft
Shear, Vu =	33.0		kips
Axial Load, Pu1 =	57.0		kips (from 1.2D + 1.6W)*
Axial Load, Pu2 =	42.8	0.0	kips (from 0.9D + 1.6W)**
OTMu =	3441.5	0.0	k-ft @ Ground

***Axial Load, Pu1 will be used for Soil Compression Analysis.**

****Axial Load, Pu2 will be used for Steel Analysis.**

Safety Factors / Load Factors / Φ Factors

Tower Type =	Monopole DP
ACI Code =	ACI 318-05
Seismic Design Category =	D
Reference Standard =	TIA-222-G
Use 1.3 Load Factor?	No
Load Factor =	1.00

Drilled Pier Parameters

Diameter =	7 ft
Height Above Grade =	0.5 ft
Depth Below Grade =	25.5 ft
fc' =	3 ksi
εc =	0.003 in/in
L / D Ratio =	3.71
Mat Ftdn. Cap Width =	11 ft
Mat Ftdn. Cap Length =	11 ft
Depth Below Grade =	6.5 ft

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

Load Combinations Checked per TIA-222-G

1. (0.75) Ult. Skin Friction + (0.75) Ult. End Bearing + (1.2) Effective Soil Wt. - (1.2) Buoyant Conc. Wt. ≥ Comp.
2. (0.75) Ult. Skin Friction + (0.9) Buoyant Conc. Wt. ≥ Uplift

Steel Parameters

Number of Bars =	20
Rebar Size =	#11
Rebar Fy =	60 ksi
Rebar MOE =	29000 ksi
Tie Size =	#5
Side Clear Cover to Ties =	4 in

Soil Parameters

Water Table Depth =	10.00 ft
Depth to Ignore Soil =	3.50 ft
Depth to Full Cohesion =	0 ft
Full Cohesion Starts at?*	Ground

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

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

Direct Embed Pole Shaft Parameters

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

Maximum Capacity Ratios

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

Note: The drilled pier foundation was analyzed using the methodology in the software 'PLS-Caisson' (Version 8.10, or newer, by Power Line Systems, Inc.). Per the methods in PLS-Caisson, the soil reactions of cohesive soils are calculated using 8CD independent of the depth of the soil layer. The depth of soil to be ignored at the top of the drilled pier is based the recommendations of the site specific geotechnical report. In the absence of any recommendations, the frost depth at the site or one half of the drilled pier diameter (whichever is greater) shall be ignored.

Define Soil Layers

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

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	4	110	0	29	Sand				4
2	2	117	0	31	Sand				6
3	4	120	1000	0	Clay		720		10
4	5	112	550	0	Clay		550		15
5	5	115	700	0	Clay		660		20
6	10	110	600	0	Clay	1700	600		30
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	13.32	ft, from Grade	Shear, Vu =	33.00	kips
Bending Moment, Mu =	3881.15	k-ft, from COR	Resisting Shear, ΦVn =	33.26	kips
Resisting Moment, ΦMn =	3911.38	k-ft, from COR			
MOMENT RATIO =	**99.2%**	**OK**	**SHEAR RATIO =**	**99.2%**	**OK**

Soil Results: Uplift

Uplift, Tu =	0.00	kips
Uplift Capacity, ΦTn =	179.56	kips
UPLIFT RATIO =	**0.0%**	**OK**

Soil Results: Compression

Compression, Cu =	57.00	kips
Comp. Capacity, ΦCn =	167.10	kips
COMPRESSION RATIO =	**34.1%**	**OK**

Steel Results (ACI 318-05):

Minimum Steel Area =	18.47	sq in	Axial Load, Pu =	112.17	kips @ 3.75 ft Below Grade
Actual Steel Area =	31.20	sq in	Moment, Mu =	3564.38	k-ft @ 3.75 ft Below Grade
			Moment, ΦMn =	5100.05	k-ft
Axial, ΦPn (min) =	-1684.80	kips, Where ΦMn = 0 k-ft	**MOMENT RATIO =**	**69.9%**	**OK**
Axial, ΦPn (max) =	8280.46	kips, Where ΦMn = 0 k-ft			

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

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

Site Data

BU#: *876313*
Site Name: *West Johnson Ave. Burnt House*
App #:

Loads Already Factored		
For M (WL)	1	<----Disregard
For P (DL)	1	<----Disregard

Pier Properties

Concrete:

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

Reinforcement:

Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	6.11	ft
Vert. Cage Diameter =	73.34	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	20	
As Total=	31.2	in^2
A s/ Aconc, Rho:	0.0056	0.56%

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

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

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.56%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	8280.46	kips
at Mu=(ϕ=0.65)Mn=	5016.69	ft-kips
Max Tu, (φ=0.9) Tn =	1684.8	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	G	
Max. Factored Shaft Mu:	3564.38	ft-kips **(* Note)**
Max. Factored Shaft Pu:	112.17	kips
Max Axial Force Type:	Comp.	

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

Load Factor	Shaft Factored Loads		
1.00	Mu:	3564.38	ft-kips
1.00	Pu:	112.17	kips

Material Properties

Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	

ACI 318 Code

Select Analysis ACI Code=	2005

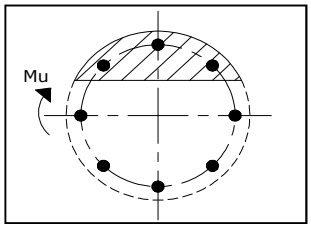
Seismic Properties

Seismic Design Category =	D
Seismic Risk =	**High**

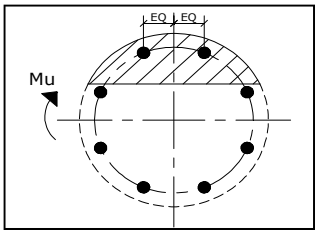
Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **1**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**14.03**	in
Extreme Steel Strain, ϵt:	**0.0138**	
	ϵt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	112.17	kips
Drilled Shaft Moment Capacity, φMn:	**5100.04**	ft-kips
Drilled Shaft Superimposed Mu:	**3564.38**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**69.9%**

foundation loads

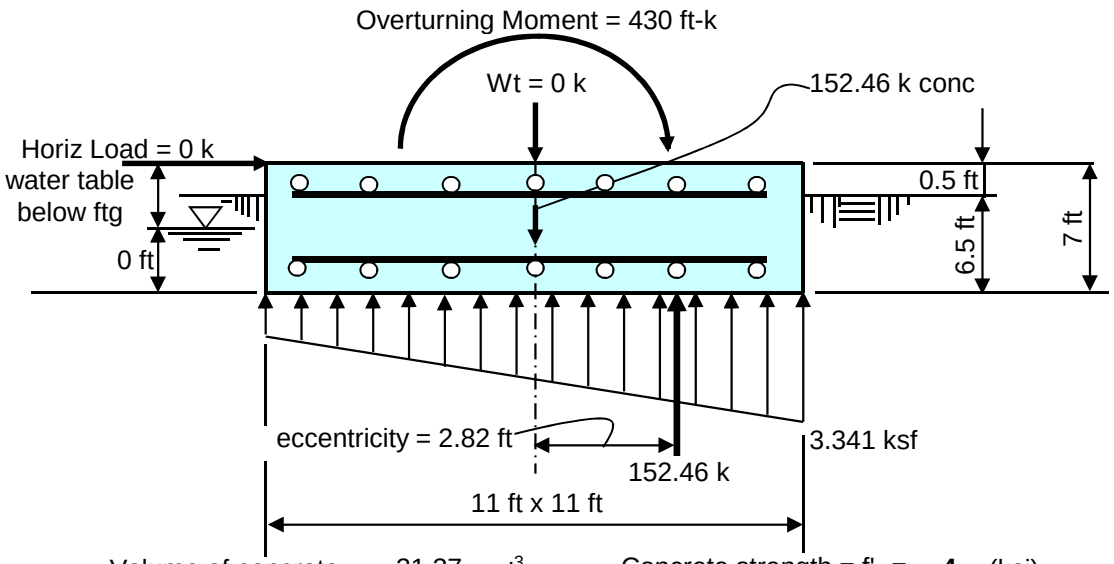
Limit states Tower or Pole Weight =	**0**	kips
limit states total horizontal force =	**0**	kips
limit states overturning moment =	**430**	ft-kips

soil properties

Safety factor against overturning =	**1**	
Soil Density =	**110**	pcf
Ultimate soil bearing =	**3.4**	ksf
Depth to water table =	**10**	ft

mat dimensions

depth to bottom of footing =	**6.5**	ft
Footing thickness =	**7**	ft
Footing Width =	**11**	ft
Footing Length =	**11**	ft
Tower/Pole Center Offset =	**0**	ft



Volume of concrete = 31.37 yd^3 Concrete strength = f'_c = **4** (ksi)

Rebar = (44) #9 bars by 10.5 ft long

reinforcing steel = **(11) #9 @ 12.6 in o.c. ea way top and bottom**

Summary of analysis results

Overturning Moment: (Stress Ratio = 0.684)

Calculated Ultimate Overturning Moment = 430 ft-kips

Resisting Moment = 628.9 ft-kips

Factor of Safety against overturning = 1.463 **> 1 okay**

Rebar strength = F_y = **60** (ksi)

minimum cover over rebar = **3** inches

See next page for soil bearing analysis

Bending Moment (Stress Ratio = 0.054)

Ultimate Bending Moment Resistance = 3889 ft-kips

Calculated Ultimate Bending Moment = 209 **ft-kips < 3889 ft-kips okay**

Bending Shear (Stress Ratio = 0.059)

Ultimate Bending Shear Resistance = 1126 kips

Calculated Ultimate Bending Shear = 67 **kips < 1126 kips okay**

Structure Type:

Type = Pole

Foundation Type:

Type = Mat

Factored Foundation Loads:

Load Combination = LC1 = 1.2 D + 1.0 Dg + 1.6 Wo

Load Combination = LC2 = 0.9 D + 1.0 Dg + 1.6 Wo

	LC1	LC2	
Global Factored Axial Load =	0	0	kips (+Comp)
Global Factored Horiz. Load =	0	0	kips
Factored OTM =	430	430	k-ft

LRFD Resistance and Load Factors:

	Φ	Dead Load Factors	
Soil Bearing =	0.75		
Soil Weight =	0.75	1.2	0.9
Concrete Weight =	0.75	1.2	0.9

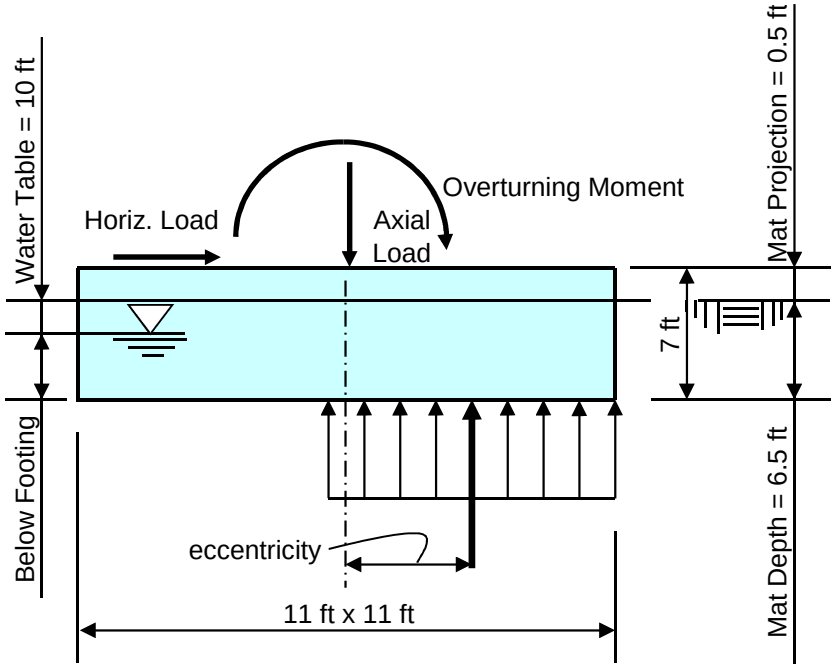
Soil Properties:

Depth to Water Table = 10 ft

Use? (Cohesion or Friction Angle) F

Include Passive Press.? (Yes or No) N (On Pad Only)

Layer Thk ft	Soil Density pcf	Cohesion ksf	Friction Angle degrees	Ult Bearing ksf	Depth ft
4	110		20	4.2	4.00
3	117	0	20	3.4	7.00



Dimensions:

Depth to Bottom of Footing = 6.5 ft

Footing Thickness = 7 ft

Footing Width, B = 11 ft

Footing Length, L = 11 ft

Pier Shape (Round or Square)

Pier Width = ft

Pier Height above Grade = ft

Number of Piers = 0

Structure Offset from Ftdn Centroid = 0 ft, Along Width

Tower (Square or Triangular)

Tower Base Width = ft

Summary Results:

	Required		Available				
Max Net Soil Bearing =	1.71	ksf	2.55	ksf	LC1, Width	Stress Ratio =	66.9% in Soil Bearing
Max Net Soil Bearing =	2.33	ksf	2.55	ksf	LC2, Width	Stress Ratio =	91.3% in Soil Bearing
Max Net Soil Bearing =	1.71	ksf	2.55	ksf	LC1, Length	Stress Ratio =	66.9% in Soil Bearing
Max Net Soil Bearing =	2.33	ksf	2.55	ksf	LC2, Length	Stress Ratio =	91.3% in Soil Bearing
Max Net Soil Bearing =	1.88	ksf	2.55	ksf	LC1, Diagonal	Stress Ratio =	73.6% in Soil Bearing
Max Net Soil Bearing =	2.49	ksf	2.55	ksf	LC2, Diagonal	Stress Ratio =	97.6% in Soil Bearing

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

SPRINT Existing Facility

Site ID: CT03XC015

West Johnson Ave. Burnt House 1394
Route 322 (Meriden Waterbury Turnpike)
Southington, CT 06489

October 16, 2017

EBI Project Number: 6217004508

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	12.23 %

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

October 16, 2017

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

Emissions Analysis for Site: **CT03XC015 – West Johnson Ave. Burnt House**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **1394 Route 322 (Meriden Waterbury Turnpike), Southington, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT Antenna Installation located 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 $\mu W/cm^2$ 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 population 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 population 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 limits for the 850 MHz Band is approximately 567 $\mu W/cm^2$. The general population exposure limit for the 1900 MHz (PCS) and 2500 MHz (BRS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed SPRINT Wireless antenna facility located at **1394 Route 322 (Meriden Waterbury Turnpike), Southington, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since SPRINT is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 1 CDMA channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

2) 2 LTE channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

3) 5 CDMA channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 16 Watts per Channel.

4) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

5) 8 LTE channels (2500 MHz (BRS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

6) 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.

7) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antennas used in this modeling are the **RFS APXVSPP18-C-A20 and the RFS APXVTM14-C-120** for transmission in the 850 MHz, 1900 MHz (PCS) and 2500 MHz (BRS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerlines of the proposed antennas are **148 feet** above ground level (AGL) for **Sector A**, **148 feet** above ground level (AGL) for **Sector B** and **148 feet** above ground level (AGL) for Sector C.

10) 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 calculations were done with respect to uncontrolled / general population threshold limits.

SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS APXVSPP18-C-A20	Make / Model:	RFS APXVSPP18-C-A20	Make / Model:	RFS APXVSPP18-C-A20
Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd
Height (AGL):	**148 feet**	Height (AGL):	**148 feet**	Height (AGL):	**148 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	10	Channel Count	10	Channel Count	10
Total TX Power(W):	220 Watts	Total TX Power(W):	220 Watts	Total TX Power(W):	220 Watts
ERP (W):	7,537.38	ERP (W):	7,537.38	ERP (W):	7,537.38
Antenna A1 MPE%	**1.52 %**	Antenna B1 MPE%	**1.52 %**	Antenna C1 MPE%	**1.52 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVTM14-C-120	Make / Model:	RFS APXVTM14-C-120	Make / Model:	RFS APXVTM14-C-120
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	**148 feet**	Height (AGL):	**148 feet**	Height (AGL):	**148 feet**
Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts
ERP (W):	6,224.72	ERP (W):	6,224.72	ERP (W):	6,224.72
Antenna A2 MPE%	**1.11 %**	Antenna B2 MPE%	**1.11 %**	Antenna C2 MPE%	**1.11 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**2.63 %**
AT&T	1.26 %
MetroPCS	0.95 %
Verizon Wireless	4.73 %
T-Mobile	2.66 %
Site Total MPE %:	**12.23 %**

SPRINT Sector A Total:	2.63 %
SPRINT Sector B Total:	2.63 %
SPRINT Sector C Total:	2.63 %
Site Total:	12.23 %

SPRINT _ Max Values per Frequency Band / Technology Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Sprint 850 MHz CDMA	1	437.55	148	0.78	850 MHz	567	0.14%
Sprint 850 MHz LTE	2	437.55	148	1.56	850 MHz	567	0.28%
Sprint 1900 MHz (PCS) CDMA	5	622.47	148	5.55	1900 MHz (PCS)	1000	0.55%
Sprint 1900 MHz (PCS) LTE	2	1,556.18	148	5.55	1900 MHz (PCS)	1000	0.55%
Sprint 2500 MHz (BRS) LTE	8	778.09	148	11.10	2500 MHz (BRS)	1000	1.11%
						Total:	**2.63%**

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population exposure to RF Emissions.

The anticipated maximum composite contributions from the SPRINT facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

SPRINT Sector	Power Density Value (%)
Sector A:	2.63 %
Sector B:	2.63 %
Sector C:	2.63 %
SPRINT Maximum Total (per sector):	2.63 %
Site Total:	12.23 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **12.23 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon 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.