CROWN CASTLE

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

August 7, 2018

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

RE: **Notice of Exempt Modification for Sprint DO Macro: 806387**
Sprint Site ID: CT33XC547
14 Route 80, Killingworth, CT 06419
Latitude: 41° 21' 26.43"/ Longitude: -72° 31' 11.83"

Dear Ms. Bachman:

Sprint currently maintains six (6) antennas at the 144-foot level of the existing 160-foot self-support tower located at 14 Route 80, Killingworth, CT. The tower is owned by Crown Castle. The property is owned by 14 Route 80 LLC. Sprint now intends to replace six (6) antennas with six (6) new antennas. These antennas would be installed at the 144-foot level of the tower. Sprint also intends to install twelve (12) RRH's, add four (4) Hybrid cables and remove six (6) existing coaxial cables

On August 7th, an email was sent to the Land Use Department inquiring on the original zoning or planning approval of the tower in the town of Killingworth, CT.

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 the First Selectwomen, Ms. Catherine Lino, Zoning Enforcement Officer, Ms. Cathie Jefferson, the land owner, 14 Route 80 LLC. 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: Ms. Catherine Lino
Town of Killingworth-First Selectwomen
323 Route 81
Killingworth, CT 06419
(860) 663-1765

Ms. Cathie Jefferson
Zoning Enforcement Officer
323 Route 81
Killingworth, CT 06419
(860) 663-1765 ext. 505

14 Route 80 LLC
93A Glenwood Road
Clinton, CT 06413

Barbadora, Jeff

From: Barbadora, Jeff
Sent: Tuesday, August 7, 2018 3:09 PM
To: 'cjefferson@townofkillingworth.com'
Subject: 14 Route 80 - Cell Tower

Good Afternoon Ms. Jefferson,

I have an inquiry regarding original zoning documents for a tower and I am hoping you can provide more information.

We are applying for CSC Zoning Approval for tower modifications and new requirements ask that we procure original zoning documents from the jurisdiction, if possible. However, if these documents are not available, please let me know.

The tower is located at 14 Route 80 and according to lease documents this may have been approved around 1999– The property is owned by 14 Route 80 LLC, Map/Block 34-36A.

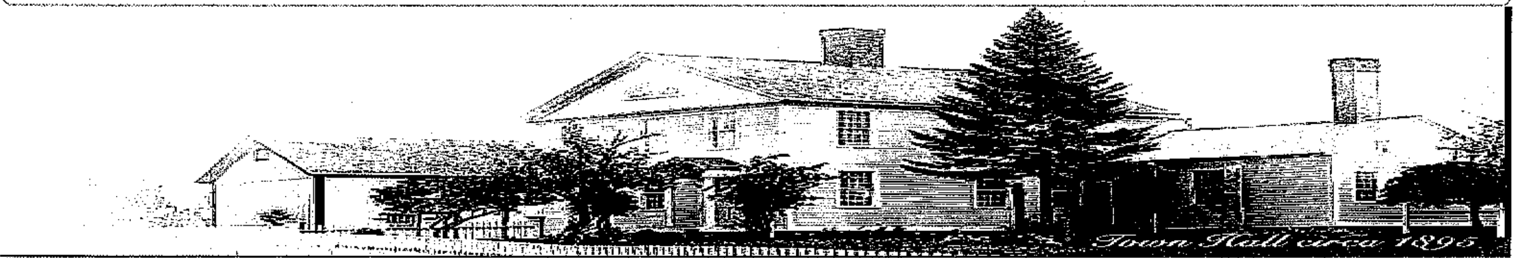
If you have any questions, please don't hesitate to call or e-mail me.

Thank you for your time,

Thanks,

Jeffrey Barbadora
781-970-0053
12 Gill Street, Suite 5800, Woburn, MA 01801
CrownCastle.com

The Assessor's office is responsible for the maintenance of records on the ownership of properties. Assessments are computed at 70% of the estimated market value of real property at the time of the last revaluation which was 2016.



Information on the Property Records for the Municipality of Killingworth was last updated on 8/4/2018.

Parcel Information

Location:	14 ROUTE 80	Property Use:	Industrial	Primary Use:	Light Industrial
Unique ID:	00218500	Map Block Lot:	34-36A	Acres:	2.00
490 Acres:	0.00	Zone:	ID	Volume / Page:	0225/0110
Developers Map / Lot:	DEV MP 312	Census:	6401		

Value Information

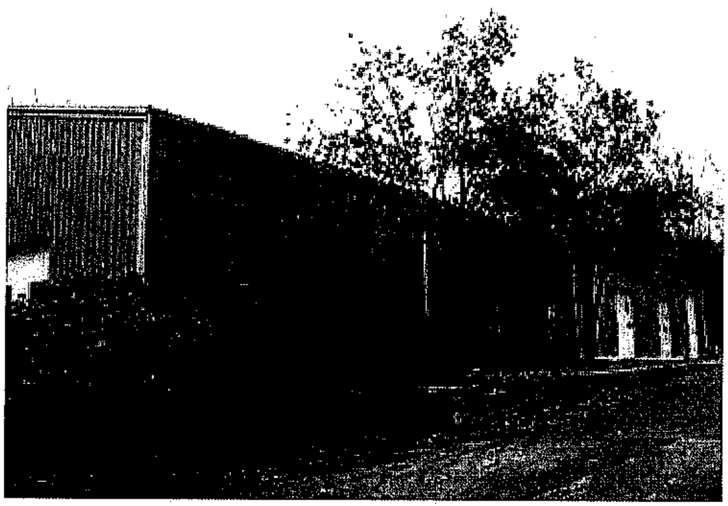
	Appraised Value	Assessed Value
Land	200,000	140,000
Buildings	252,719	176,900
Detached Outbuildings	251,459	176,020
Total	704,178	492,920

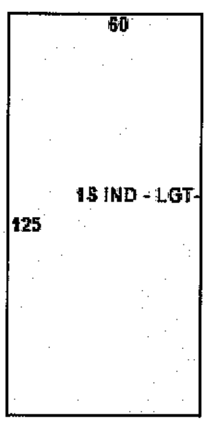
Owner's Information

Owner's Data

14 ROUTE 80 LLC
93A GLENWOOD RD
CLINTON CT 06413

Building 1





Category:	Industrial	Use:	Light Industrial	GLA:	7,508
Stories:	1.00	Construction:	Average	Year Built:	1969
Heating:	Susp. Space	Fuel:	Oil	Cooling Percent:	0%
Siding:	Metal	Roof Material:	Arch Shingles	Beds/Units:	0

Special Features

Attached Components

Detached Outbuildings

Type:	Year Built:	Length:	Width:	Area:
Fencing	1999	9	234	2,106
Concrete/Masonry Patio	1999			432
Concrete/Masonry Patio	1999	8	20	160
Cell Tower	2000			1

Owner History - Sales

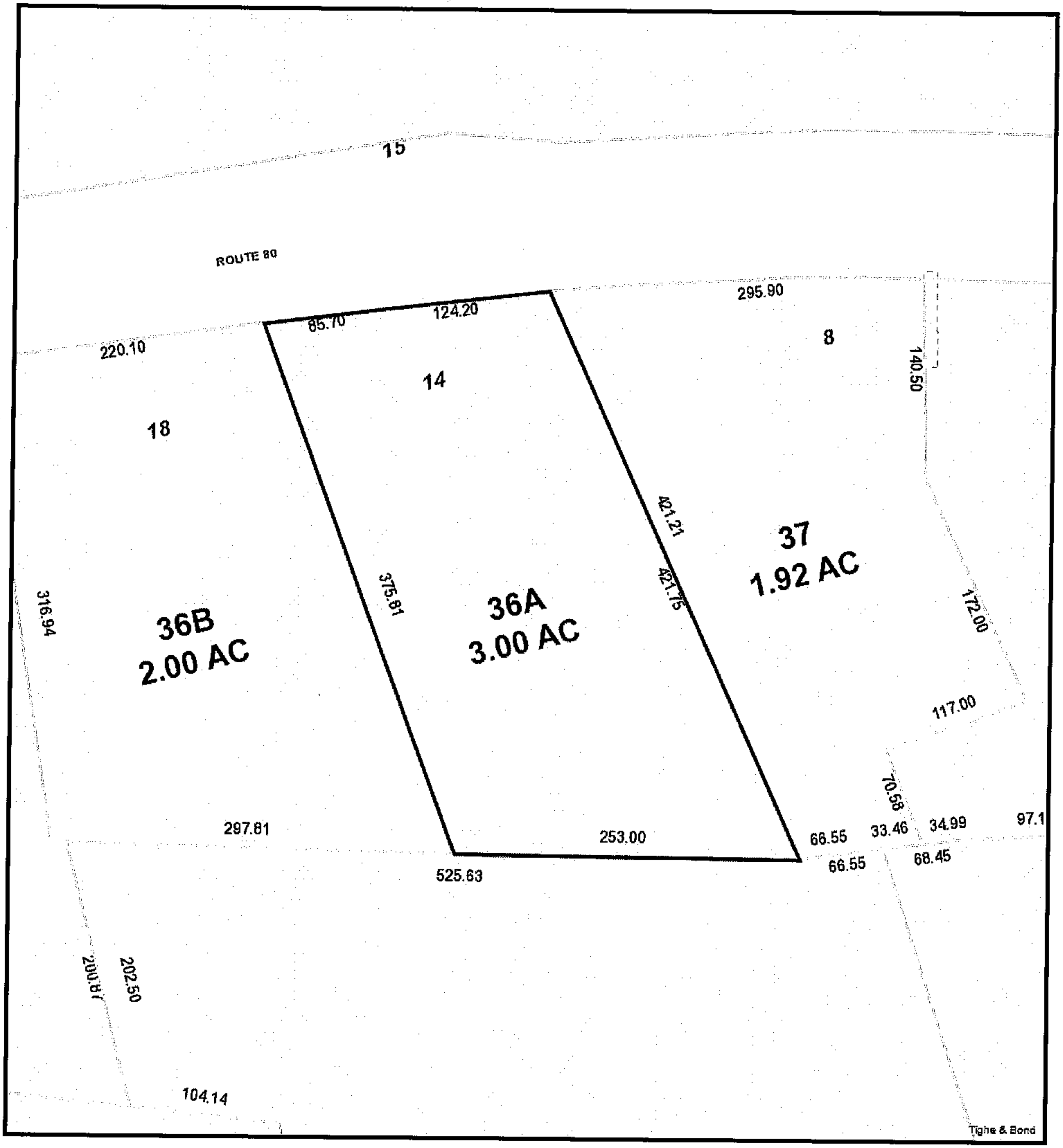
Owner Name	Volume	Page	Sale Date	Deed Type	Valid Sale	Sale Price
14 ROUTE 80 LLC	0225	0110	06/14/2007	Quit Claim	No	$0

Building Permits

Permit Number	Permit Type	Date Opened	Date Closed	Permit Status	Reason
		11/07/2017			
12-410	Commercial	04/12/2013		Closed	CELL TOWER MAINTENANCE
12-394	Comm Renovations	12/11/2012		Closed	CELL TOWER MAINTENANCE
11-C006	Commercial	12/22/2011		Needs Visit	ANTENNA REPLACEMENT

Permit Number	Permit Type	Date Opened	Date Closed	Permit Status	Reason
08-E018		04/13/2008		Closed	ELECTRICAL SERVICE PANEL INSTALLATION; ELECTRICAL SERVICE PANEL INSTALLATION;
99-099		04/01/1999		Closed	TELECOMMUNICATIONS-UTILITY BLDG,TOWER;

Information Published With Permission From The Assessor



14 Route 80

8/7/2018 2:59:35 PM

Scale: 1"=100'

Scale is approximate

The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

Sprint

CROWN CASTLE

PROJECT:	DO MACRO UPGRADE
SITE NAME:	W. DEEP RIVER
SITE CASCADE:	CT33XC547
SITE NUMBER:	806387
SITE ADDRESS:	14 ROUTE 80 KILLINGWORTH, CT 06419
SITE TYPE:	SELF SUPPORT TOWER
MARKET:	N. ENGLAND

SITE INFORMATION

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

LATITUDE (NAD83):
N 41° 21' 26.43"
41.357342

LONGITUDE (NAD83):
W 72° 31' 11.83"
-72.519953

COUNTY:
MIDDLESEX

ZONING JURISDICTION:
CONNECTICUT SITING COUNCIL

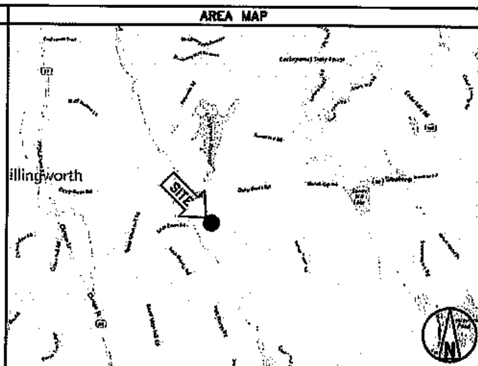
ZONING DISTRICT:
ID

POWER COMPANY:
EVERSOURCE
(800) 592-2000

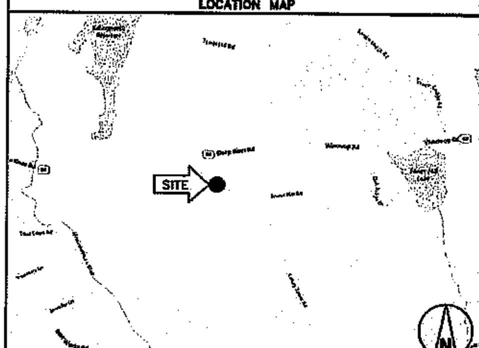
SPRINT CONSTRUCTION:
TBD

CROWN PM:
SCOTT WIATROSKI
(201) 236-9228

AREA MAP



LOCATION MAP



PROJECT DESCRIPTION

SPRINT PROPOSES TO MODIFY AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY.

- INSTALL 2.5 EQUIPMENT INSIDE EXISTING N.V. MMBS CABINET
- INSTALL (6) PANEL ANTENNAS (3 800/1900, 3 2500)
- REMOVE (6) PANEL ANTENNAS
- INSTALL (12) RRHs (6 800, 3 1900, 3 2500)
- INSTALL (4) HYBRID CABLES
- REMOVE (6) EXISTING COAX

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 STRUCTURE 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 (2015 IBC)
2. TIA-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. LOCAL BUILDING CODE
7. CITY/COUNTY ORDINANCES

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

DRAWING INDEX

SHEET NO.	SHEET TITLE	REV.
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A-2	TOWER ELEVATION & CABLE PLAN	1
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A-4	COLOR CODING & NOTES	1
A-5	EQUIPMENT & MOUNTING DETAILS	1
A-6	CIVIL DETAILS	1
E-1	ELECTRICAL & GROUNDING PLAN	1
E-2	ELECTRICAL & GROUNDING DETAILS	1

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

PLANS PREPARED BY:
INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com
JOB NUMBER 526-103

MLA PARTNER:
CROWN CASTLE

ENGINEERING LICENSE:
STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
JUL 23 2018

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	06/26/18	RCD	1
ISSUED FOR CONSTRUCTION	01/30/18	RWF	0

SITE NAME:
W. DEEP RIVER

SITE CASCADE:
CT33XC547

SITE ADDRESS:
14 ROUTE 80
KILLINGWORTH, CT 06419

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.

1.8 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

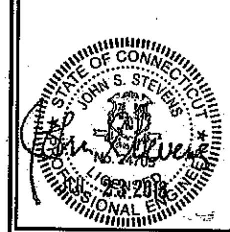
PLANS PREPARED BY:

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com
JOB NUMBER 526-103

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:



DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	06/26/18	RCD	1
ISSUED FOR CONSTRUCTION	03/30/18	RMF	0

SITE NAME:

W. DEEP RIVER

SITE CASCADE:

CT33XC547

SITE ADDRESS:

14 ROUTE 80
KILLINGWORTH, CT 06419

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 CURRENT VERSION OF SPRINT'S TS-0200 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, AASHTO, AND OTHER METHODS IS NEEDED.
   4. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASHTO, 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
FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
www.infinigy.com

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
LICENSED PROFESSIONAL ENGINEER

DRAWING NOTICE:

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REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	06/26/18	RCD	1
ISSUED FOR CONSTRUCTION	01/30/18	RMF	0

SITE NAME:

W. DEEP RIVER

SITE CASCADE:

CT33XC547

SITE ADDRESS:

14 ROUTE 80
KILLINGWORTH, CT 06419

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:
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FROM ZERO TO INFINIGY
the solutions are endless
1033 Watervliet Shaker Rd | Albany, NY 12205
Phone: 518-690-0790 | Fax: 518-690-0793
www.infinigy.com
JOB NUMBER [illegible]

MLA PARTNER:
CROWN CASTLE

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

REVISIONS:

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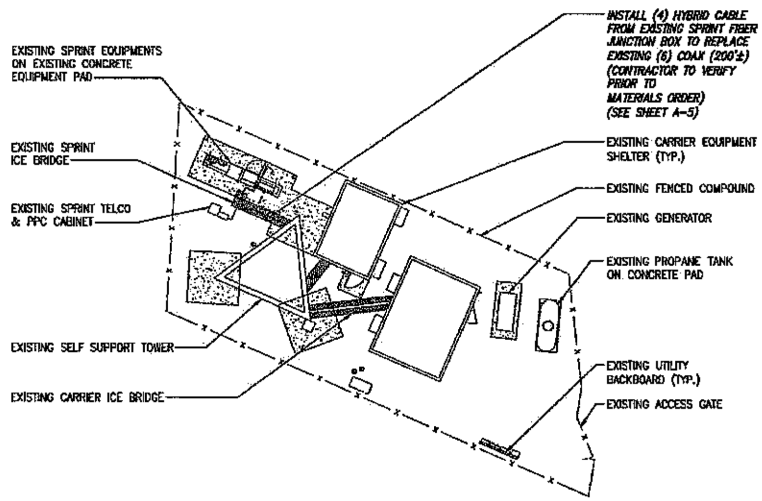
SHEET DESCRIPTION:
SPRINT SPECIFICATIONS

SHEET NUMBER:
SP-3

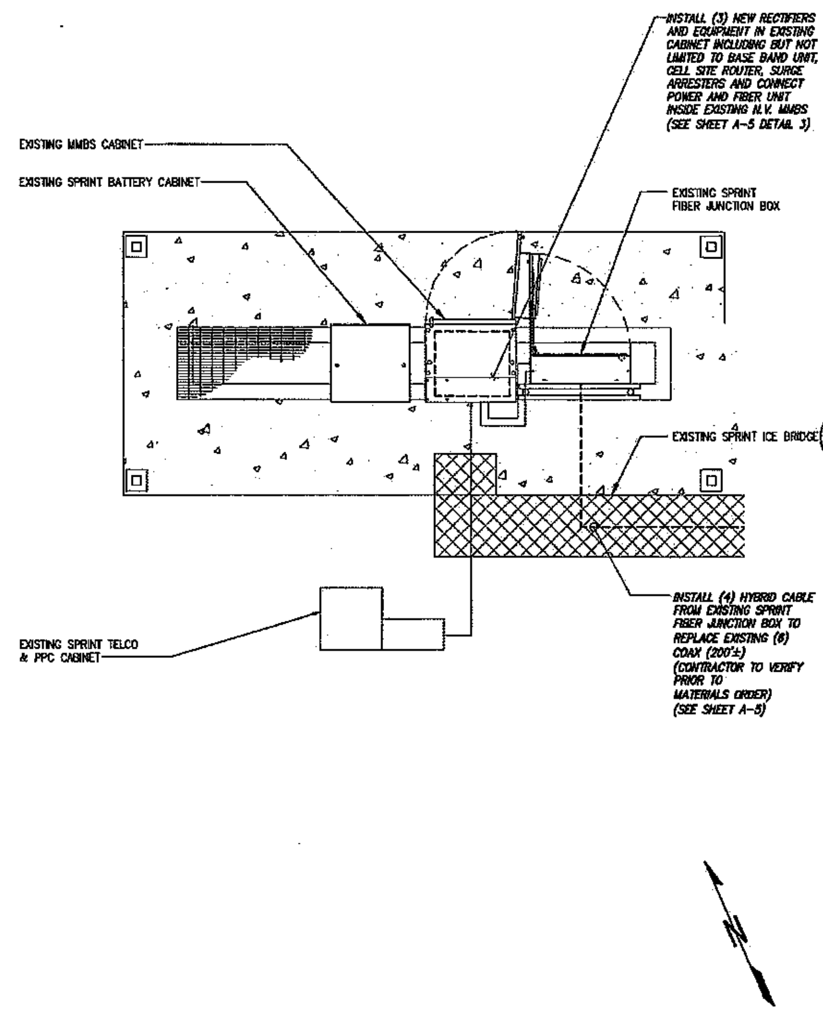


INFORMATION CONTAINED WITHIN DRAWINGS ARE BASED ON PROVIDED INFORMATION AND ARE NOT THE RESULT OF A FIELD SURVEY.

SCALE: 22"x34" SHEET 1" = 1'-0"
SCALE: 11"x17" SHEET 1" = 2'-0"

6" 0 6" 1' 2' (IN FEET)

OVERALL SITE PLAN | SCALE: AS NOTED | 1



NOTE:
NO LIQUID TIGHT FLEXIBLE METALLIC CONDUIT IS TO EXCEED 6 FEET PER SP-2 SECTION 26 200 ITEM E.

SCALE: 22"x34" SHEET 1" = 2'-0"
SCALE: 11"x17" SHEET 1" = 4'-0"

1' 0 1' 2' 4' (IN FEET)

SPRINT EQUIPMENT PLAN | SCALE: AS NOTED | 2

PLANS PREPARED FOR:

Sprint
6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

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JOB NUMBER 626-103

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
PROFESSIONAL ENGINEER
6-28-2018

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REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	06/26/18	RCD	1
ISSUED FOR CONSTRUCTION	01/30/16	RAF	0

SITE NAME:

W. DEEP RIVER

SITE CASCADE:

CT33XC547

SITE ADDRESS:

14 ROUTE 80
KILLINGWORTH, CT 06419

SHEET DESCRIPTION:

SITE PLAN

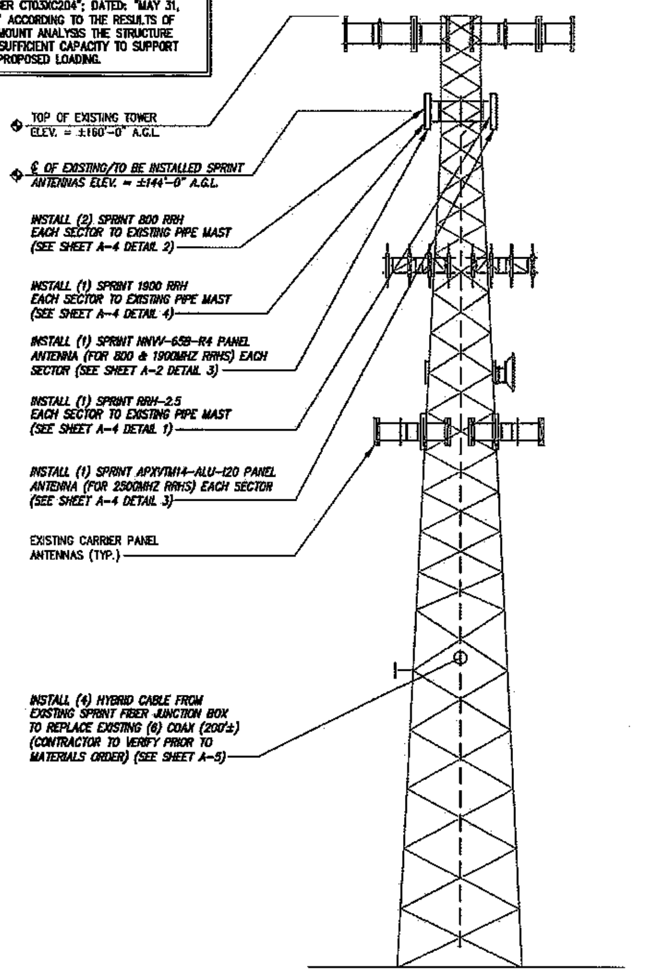
SHEET NUMBER:

A-1

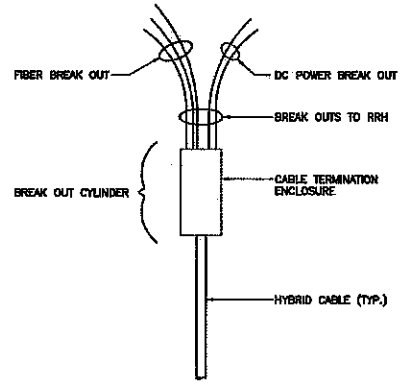
NOTE:

- STRUCTURAL ANALYSIS COMPLETED BY: B+T GROUP. FOR ADDITIONAL INFORMATION SEE REPORT TITLED: "STRUCTURAL ANALYSIS REPORT, CARRIER SITE NUMBER: CT03XC204", DATED: "MAY 31, 2018", B+T GROUP, INC. PROJECT NUMBER: "77921.006.01". ACCORDING TO RESULTS OF STRUCTURAL ANALYSIS THE STRUCTURE HAS SUFFICIENT CAPACITY TO SUPPORT THE PROPOSED LOADING.
- MOUNT ANALYSIS COMPLETED BY INFINIGY. FOR ADDITIONAL INFORMATION SEE REPORT COMPLETED BY INFINIGY TITLED: "MOUNT STRUCTURAL ANALYSIS, CARRIER SITE NUMBER CT03XC204"; DATED: "MAY 31, 2018" ACCORDING TO THE RESULTS OF THE MOUNT ANALYSIS THE STRUCTURE HAS SUFFICIENT CAPACITY TO SUPPORT THE PROPOSED LOADING.

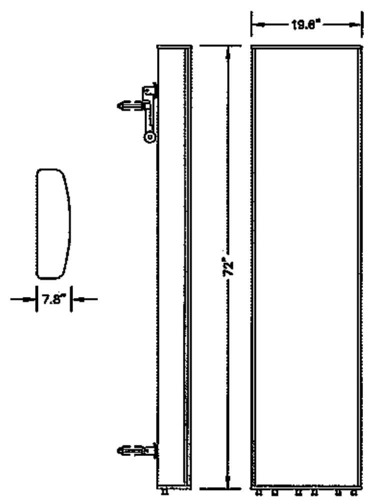
NOTE: SEE DETAIL 2 ON A-3 FOR ANTENNA LAYOUT



TOWER ELEVATION | NO SCALE | 1



HYBRID BREAK OUT DETAIL | NO SCALE | 2



ANTENNA COMMSCOPE NNVV-65B-R4

RADOME MATERIAL:	FIBERGLASS
RADOME COLOR:	LIGHT GREY
DIMENSIONS, HxWxD.In(mm):	72"x19.6"x7.8"
WEIGHT:	77.4 lbs
CONNECTORS:	(8) 4.3-10 DIN FEMALE

ANTENNA | NO SCALE | 3

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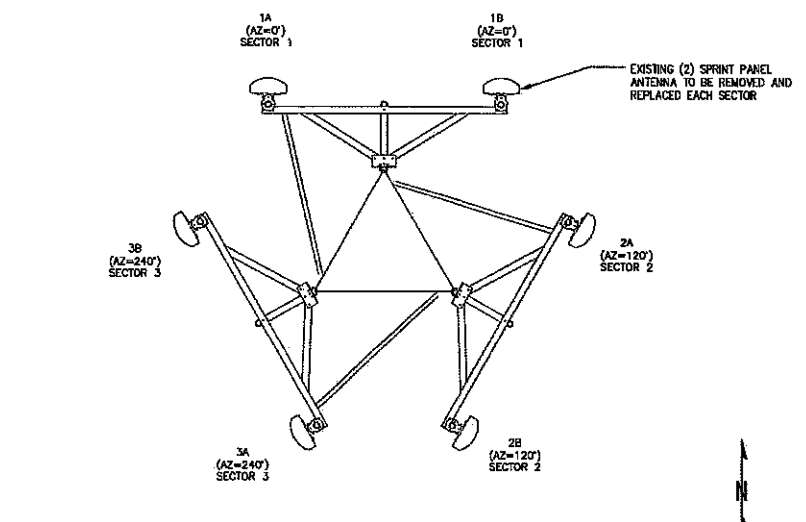
SITE NAME:
W. DEEP RIVER

SITE CASCADE:
CT33XC547

SITE ADDRESS:
14 ROUTE 80
KILLINGWORTH, CT 06419

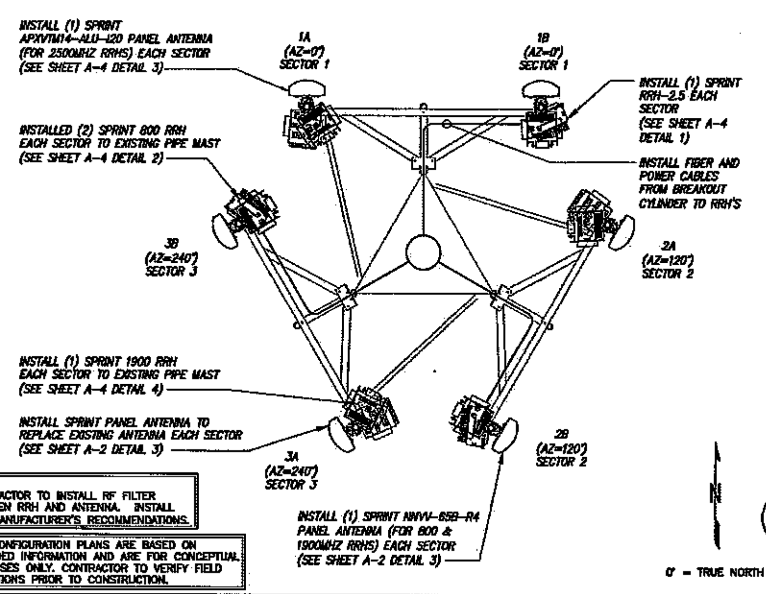
SHEET DESCRIPTION:
TOWER ELEVATION & CABLE PLAN

SHEET NUMBER:
A-2



NOTE:
EXISTING INFORMATION BASED ON N.V. SITE DESIGN DRAWINGS. FIELD VERIFICATION NOT PROVIDED AS PART OF SPRINT 2.5 AUDIT

EXISTING ANTENNA & RRH LAYOUT | NO SCALE | 1



NOTE:
CONTRACTOR TO INSTALL RF FILTER BETWEEN RRH AND ANTENNA. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

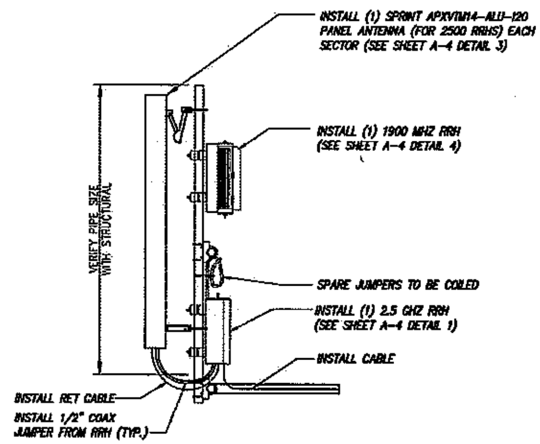
THE CONFIGURATION PLANS ARE BASED ON PROVIDED INFORMATION AND ARE FOR CONCEPTUAL PURPOSES ONLY. CONTRACTOR TO VERIFY FIELD CONDITIONS PRIOR TO CONSTRUCTION.

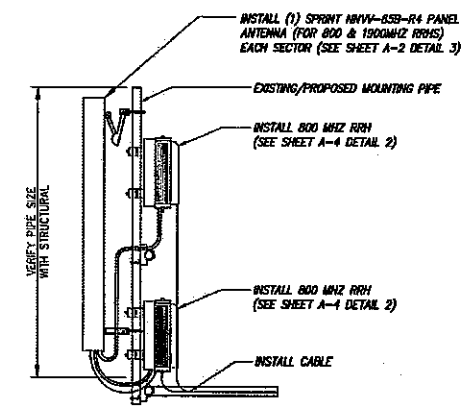
FINAL ANTENNA & RRH LAYOUT | NO SCALE | 2

NOTES:

1. ALL ANTENNA HEIGHTS ARE TO CENTER OF HORIZONTAL ANTENNA.
2. VERIFY AZIMUTH AND CL HEIGHT WITH AS-BUILT DRAWINGS IF AVAILABLE.
3. NO OBJECT IS TO BE WITHIN 45 DEGREES OF BORE-SIGHT OF 2.5G OR ANY OTHER TOWER ANTENNA. IF NECESSARY, 2.5G ANTENNA CAN BE PLACED AT FAR EDGE OF HORIZONTAL ANTENNA MOUNT MEMBER FOR CLEAR LINE OF SITE OR EVEN ON ANOTHER SECTOR FOR CLEAR LINE OF SITE.
4. 2.5G ANTENNA MUST BE AT LEAST 6" FROM 1900MHZ ANTENNA, 30" FROM 800MHZ ANTENNA AND 30MHZ FROM DUAL BAND 1900MHZ AND 800MHZ ANTENNA.
5. IF ANTENNAS ARE MOUNTED ON A FACE SURFACE SUCH AS A BUILDING WALL, PARAPET WALL, OR WATER TOWER WALL, THIS RFDS MUST BE ACCOMPANIED BY A SKETCH PROVIDED BY ITS ORIGINATING RF ENGINEER CALLING OUT THE EXACT LOCATION OF WHERE ANTENNA IS TO BE LOCATED. CONTACT SPRINT RF ENGINEER IF THE SKETCH IS MISSING.
6. GENERAL CONTRACTOR TO FIELD VERIFY AZIMUTH AND CL HEIGHT AND MECHANICAL DOWNTILT. IF DIFFERENT THAN CALLED OUT BELOW, HALT ANTENNA WORK FOR ONE HOUR, CALL SPRINT RF ENGINEER (OR MANAGER IF RF ENGINEER DOES NOT ANSWER, BUT STILL LEAVE A MESSAGE TO RF ENGINEER) USING CONTACT INFORMATION ABOVE FOR FURTHER INSTRUCTIONS. IF SPRINT DOES NOT RESPOND WITHIN ONE HOUR, PLACE 2.5G ANTENNA AT SAME CL HEIGHT AS 1.9G ANTENNA AND EMAIL CORRECT CL HEIGHT AND AZIMUTH TO SPRINT RF ENGINEER. UPDATE AS-BUILD DRAWING WITH CORRECT CL HEIGHT. ALSO EMAIL CORRECT 1900 MHZ AND 800 MHZ ANTENNA CL HEIGHT, AZIMUTH AND MECHANICAL DOWNTILT TO RF ENGINEER.
7. AISG TESTS TO VERIFY OPERATION IS TO BE PERFORMED AFTER FINAL INSTALLATION OF ANTENNAS AND AISG CABLES HAVE BEEN CONNECTED. VERIFY OPERATION OF ALL EXISTING SPRINT AISG EQUIPMENT INCLUDING 800MHZ, 1.9GHZ AND 2.5G. TEST INCLUDE COMPLETE DOWNTILT, AZIMUTH (IF APPLICABLE) AND BEAMWIDTH SWINGS (IF APPLICABLE). DOCUMENT AISG TEST RESULTS IN COAX SWEEP TEST SPREADSHEET.
8. GENERAL CONTRACTOR MUST INSURE THAT NO OBJECT IS LOCATED IN FRONT OF ANTENNA. THIS MEANS NO OBJECT IS TO BE LOCATED 45 DEGREES LEFT AND RIGHT OF FRONT OF ANTENNA OR 7 DEGREES UP AND DOWN FROM CENTER OF ANTENNA. IF THIS IS NOT POSSIBLE, CONTACT RF ENGINEER FOR FURTHER INSTRUCTION. IN ADDITION, 2.5G ANTENNA IS NOT TO BE PLACED IN FRONT OF ANY OTHER ANTENNA USING THE SAME 45 DEGREE RULE. THIS INCLUDES SPRINT AND NON-SPRINT ANTENNAS.
9. GENERAL CONTRACT IS REQUIRED TO USE A DIGITAL ALIGNMENT TOOL TO SET AZIMUTH, ROLL AND DOWNTILT. AZIMUTH ACCURACY IS TO BE WITHIN 1 DEGREES. DOWNTILT AND ROLL (LEFT TO RIGHT TILT) IS TO BE WITHIN 0.1 DEGREES. IF FOR SOME REASON THIS ACCURACY CANNOT BE ACHIEVED, UPDATE AS-BUILT DRAWINGS AND EMAIL SPRINT RF ENGINEER WITH AS-BUILT SETTINGS. USE 3Z RF ALIGNMENT TOOL OR EQUIVALENT TOOL. HTTP://WWW.3ZTELECOM.COM/ANTENNA-ALIGNMENT-TOOL/

NOTES | NO SCALE | 3





NOTES:

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

NOTE:
CONTRACTOR TO POSITION RRH ON MOUNT BEHIND ANTENNA SUCH THAT THE RRH 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 RRH MOUNTING DETAILS

TYPICAL ANTENNA & RRH MOUNTING DETAILS | NO SCALE | 4

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REVISIONS:

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ISSUED FOR CONSTRUCTION	01/30/18	RMF	0

SITE NAME:
W. DEEP RIVER

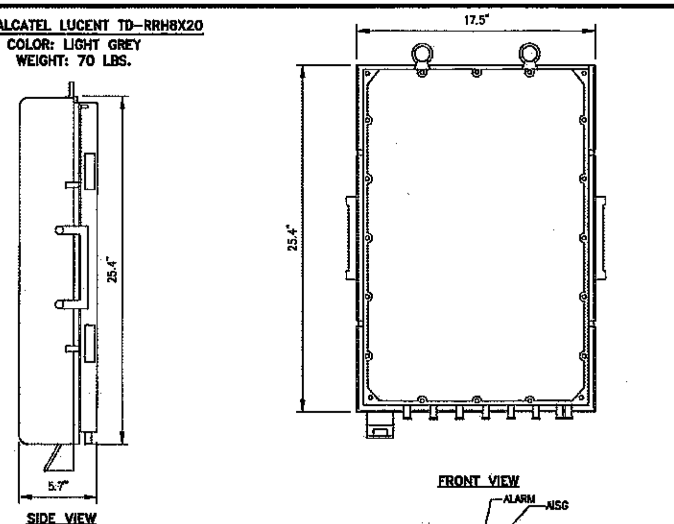
SITE CASCADE:
CT33XC547

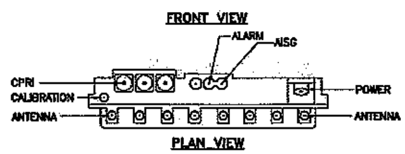
SITE ADDRESS:
14 ROUTE 80
KILLINGWORTH, CT 06419

SHEET DESCRIPTION:
ANTENNA LAYOUT & MOUNTING DETAILS

SHEET NUMBER:
A-3

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



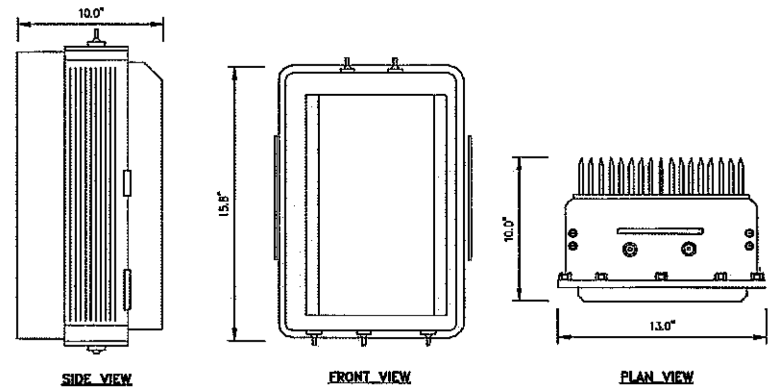


NOTES
COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRH'S RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING. DO NOT OPEN RRH PACKAGES IN THE RAIN.

2.5 RRH'S	NO SCALE	1

RRH: ALCATEL LUCENT RRH 800 MHz 2x50W
COLOR: LIGHT GREY
WEIGHT: 53 LBS.

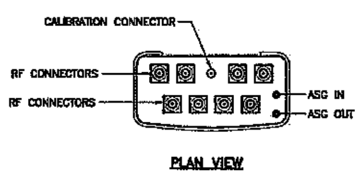
NOTES
COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRH'S RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING. DO NOT OPEN RRH PACKAGES IN THE RAIN.

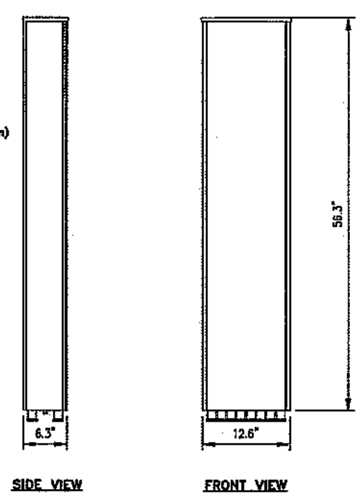


800 RRH'S	NO SCALE	2

ANTENNA RFS APXVTM14-ALU-I20

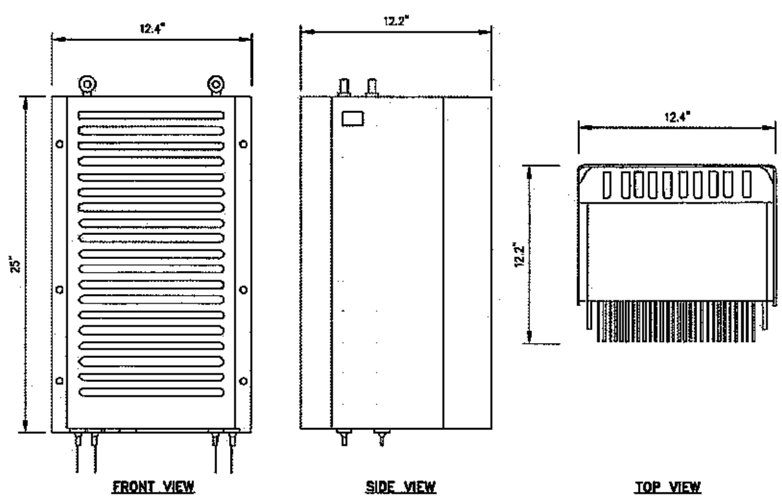
RADOME MATERIAL:	ASA
RADOME COLOR:	LIGHT GREY
DIMENSIONS, HxWxD.in(mm):	56.3"x12.6"x6.3" (1430x320x160mm)
WEIGHT:	56.2 lbs
CONNECTORS:	(8) 4.1/9.5 DIN FEMALE (1) NF – CALIBRATION CONNECTOR





2.5 ANTENNA	NO SCALE	3

RRH: ALCATEL LUCENT 1900 MHz
COLOR: LIGHT GREY
WEIGHT: 70 LBS.
(INCLUDING OPTIONAL SOLAR SHIELD)



1900 RRH'S	NO SCALE	4

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REVISIONS:

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ISSUED FOR CONSTRUCTION	01/30/18	RAF	0

SITE NAME:
W. DEEP RIVER

SITE CASCADE:
CT33XC547

SITE ADDRESS:
14 ROUTE 80
KILLINGWORTH, CT 06419

SHEET DESCRIPTION:
EQUIPMENT & MOUNTING DETAILS

SHEET NUMBER:
A-4

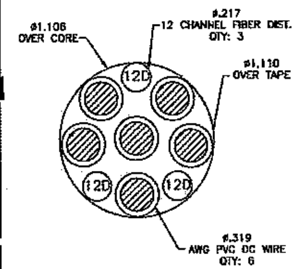
RFS HYBRIFLEX RISER CABLE SCHEDULE

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

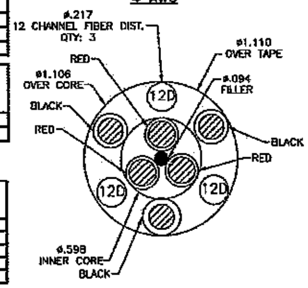
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

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

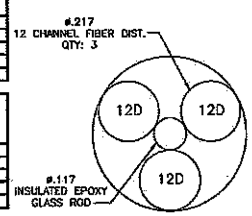
NOTE:
SPRINT CM TO CONFIRM HYBRID OR FIBER RISER CABLE AND HYBRID OR FIBER JUMPER CABLE MODEL NUMBERS IF HYBRID CABLES ARE REQUIRED BEFORE PREPARING BOM.



4 AWG

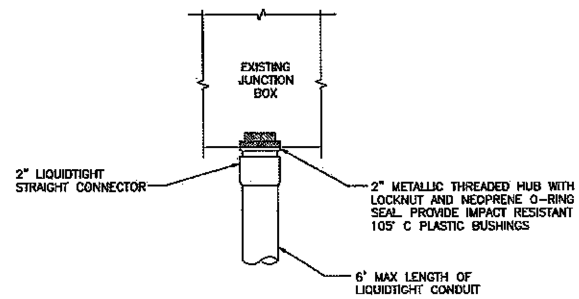


8 & 6 AWG

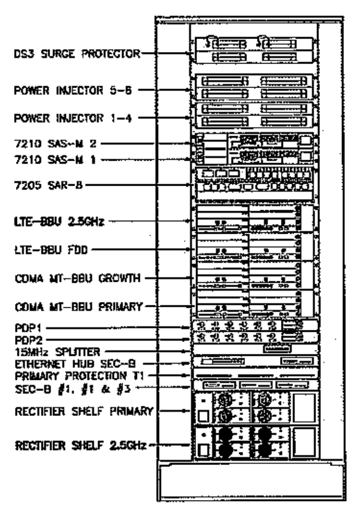


FIBER ONLY

2.5 CABLE CROSS SECTION DATA | NO SCALE | 1



FIBER JUNCTION BOX PENETRATION | NO SCALE | 2



CABINET LAYOUT | NO SCALE | 3

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2/8/2018

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CIVIL DETAILS

SHEET NUMBER:
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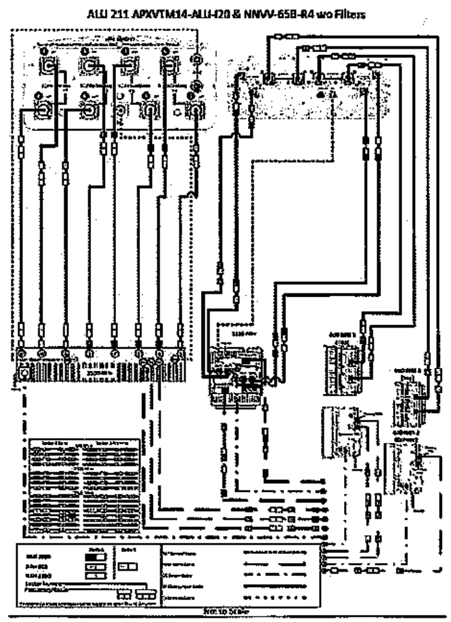

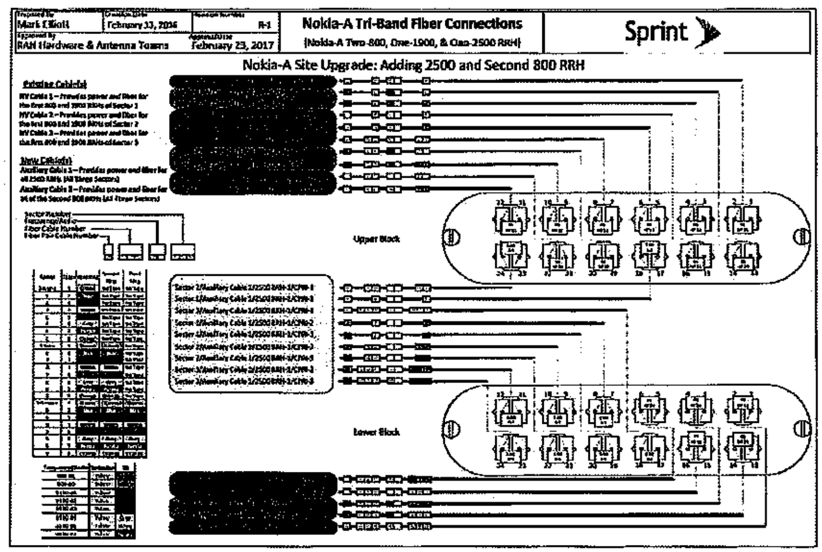

PLUMBING DIAGRAM

NO SCALE | 1

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JUL 23 2018

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REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	06/26/18	RCD	1
ISSUED FOR CONSTRUCTION	01/30/18	RMF	0

SITE NAME:

W. DEEP RIVER

SITE CASCADE:

CT33XC547

SITE ADDRESS:

14 ROUTE 80
KILLINGWORTH, CT 06419

SHEET DESCRIPTION:

PLUMBING DIAGRAM

SHEET NUMBER:

A-6

FINAL EQUIPMENT CONFIGURATION

SECTOR	ANTENNA MANUFACTURER	ANTENNA MODEL	RAD CENTER	AZIMUTH	RRH/ODU MAKE AND MODEL
1	RFS	APXVTM14-ALU-I20	144'	0°	(1) ALU 2.5GHZ RRH8X20-25
	COMMSCOPE	NNVV-65B-R4	144'	0°	(2) ALU 800MHZ 2x50-800 (1) ALU 1900MHZ 4X45W
2	RFS	APXVTM14-ALU-I20	144'	120°	(1) ALU 2.5GHZ RRH8X20-25
	COMMSCOPE	NNVV-65B-R4	144'	120°	(2) ALU 800MHZ 2x50-800 (1) ALU 1900MHZ 4X45W
3	RFS	APXVTM14-ALU-I20	144'	240°	(1) ALU 2.5GHZ RRH8X20-25
	COMMSCOPE	NNVV-65B-R4	144'	240°	(2) ALU 800MHZ 2x50-800 (1) ALU 1900MHZ 4X45W

FEEDER CABLES

MANUFACTURER	MODEL	LENGTH	QTY
RFS	HB114-13U3M12-200F	175'±	(1)
RFS	HB114-08U4-M5F-200F	175'±	(3)

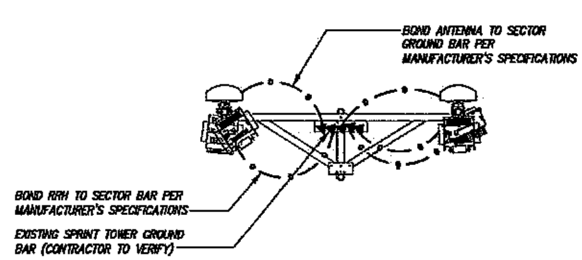
LEGEND
EXISTING
PROPOSED

NOTES:
1. CONTRACTOR TO VERIFY PROPOSED ANTENNA INFORMATION IS THE MOST CURRENT DATA AT TIME OF CONSTRUCTION.
2. CONTRACTOR TO CONFIRM CABLE LENGTHS PRIOR TO CONSTRUCTION.

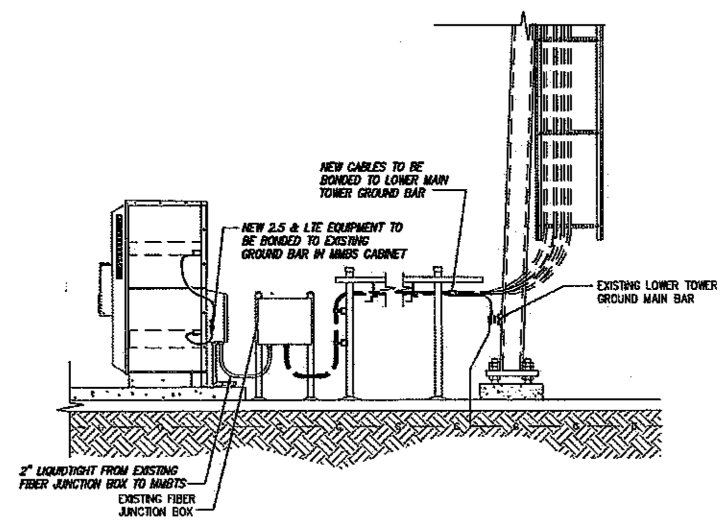
ANTENNA/CABLE SCHEDULE — NO SCALE

LEGEND:

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



TYPICAL ANTENNA GROUNDING PLAN — NO SCALE — 2



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

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

PLANS PREPARED BY:
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JOB NUMBER 526-103

MLA PARTNER:
CROWN CASTLE

ENGINEERING LICENSE:
STATE OF CONNECTICUT
JOHN S. STEVENS
LICENSED PROFESSIONAL ENGINEER
JUL 23 2018

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	06/26/18	WCD	1
ISSUED FOR CONSTRUCTION	03/30/18	RMF	0

SITE NAME: W. DEEP RIVER

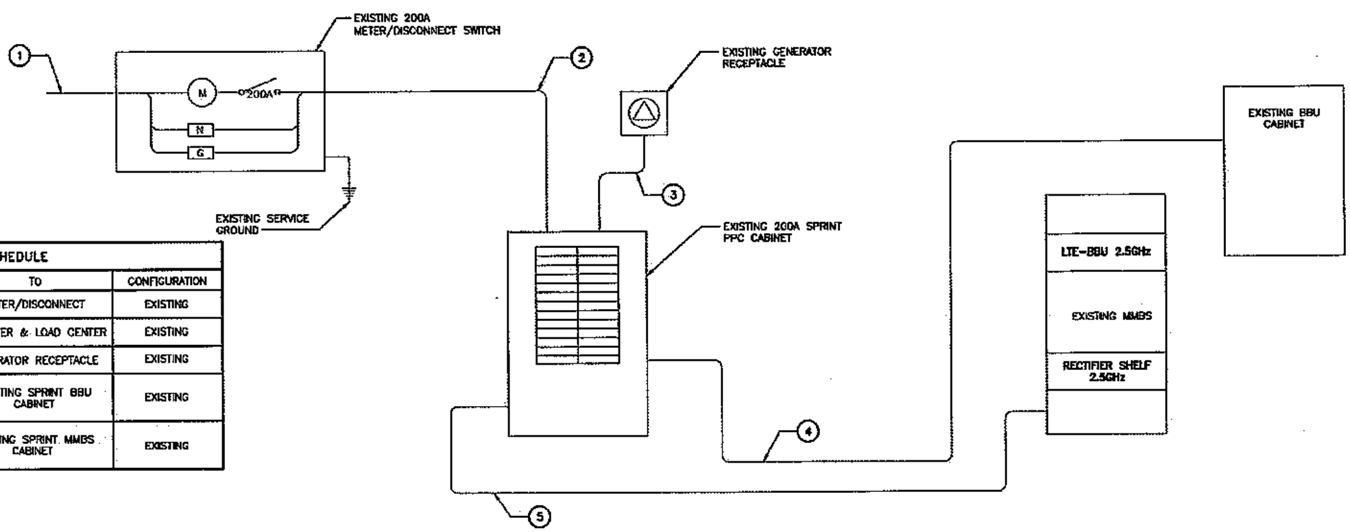
SITE CASCADE: CT33XC547

SITE ADDRESS: 14 ROUTE 80 KILLINGWORTH, CT 06419

SHEET DESCRIPTION: ELECTRICAL & GROUNDING DETAILS

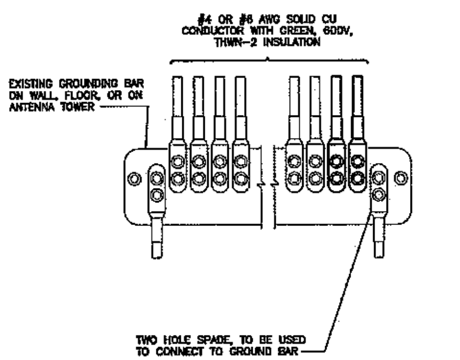
SHEET NUMBER: E-1

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



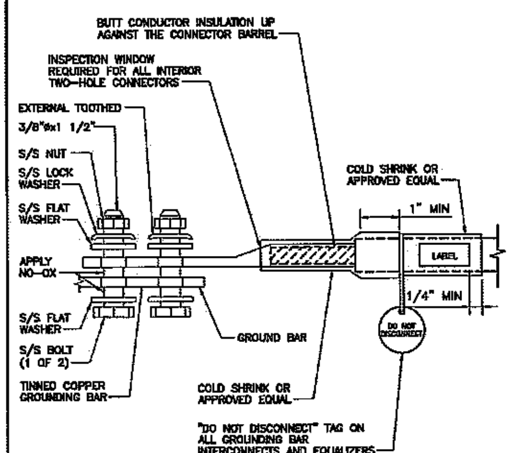
CIRCUIT SCHEDULE			
NO	FROM	TO	CONFIGURATION
1	UTILITY SOURCE	METER/DISCONNECT	EXISTING
2	METER/DISCONNECT	TRANSFER & LOAD CENTER	EXISTING
3	TRANSFER & LOAD CENTER	GENERATOR RECEPTACLE	EXISTING
4	TRANSFER & LOAD CENTER	EXISTING SPRINT BBU CABINET	EXISTING
5	TRANSFER & LOAD CENTER	EXISTING SPRINT MMBS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

ELECTRICAL ONE-LINE DIAGRAM — NO SCALE — 1

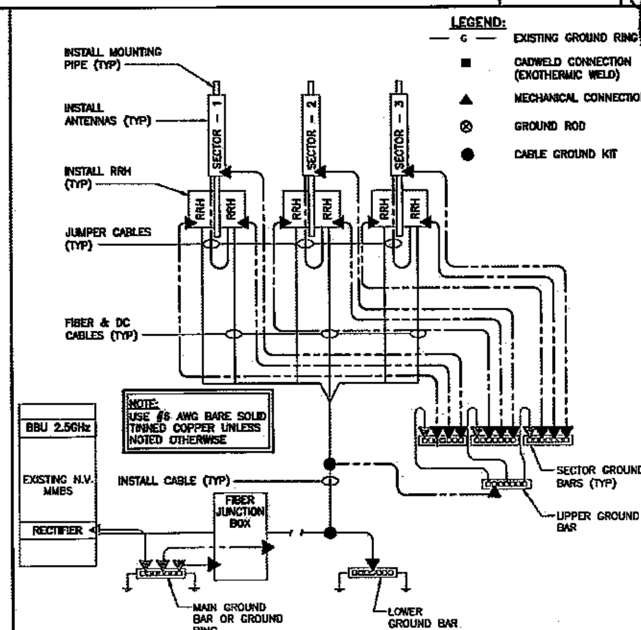


NOTES
1. APPLY NO-OX TO LUG AND BAR CONTACT SURFACE. DO NOT COAT INLINE LUG.
2. IF STOLEN GROUND BARS ARE ENCOUNTERED, CONTACT SPRINT CM FOR REPLACEMENT THREADED ROD KIT.

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



TWO HOLE LUG — NO SCALE — 3



GROUNDING RISER DIAGRAM — NO SCALE — 4

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MLA PARTNER:
CROWN CASTLE

ENGINEERING LICENSE:
STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
JUN 29 2018

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SITE NAME: W. DEEP RIVER

SITE CASCADE: CT33XC547

SITE ADDRESS: 14 ROUTE 80, KILLINGWORTH, CT 06419

SHEET DESCRIPTION: ELECTRICAL & GROUNDING DETAILS

SHEET NUMBER: E-2

PJF PAUL J. FORD & COMPANY

Date: **June 15, 2018**

Rebecca Klein
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
1-704-405-6525

Paul J. Ford and Company
250 East Broad st., Suite 600
Columbus, OH 43215
(614) 221-6679
jjacobs@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT33XC547
	Carrier Site Name:	CT33XC547
Crown Castle Designation:	**Crown Castle BU Number:**	806387
	Crown Castle Site Name:	HRT 088 943629
	Crown Castle JDE Job Number:	505982
	Crown Castle Work Order Number:	1589524
	Crown Castle Order Number:	441482 Rev. 0
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37518-2158-002-8700
Site Data:	**#14 Route 80, KILLINGWORTH, Middlesex County, CT** **Latitude *41° 21' 26.43"*, Longitude *-72° 31' 11.83"*** **160 Foot - Self Support Tower**	

Dear Ms. Klein,

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 1204283, in accordance with order 441482, 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:

LC4.7: Modified Structure: 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 130 mph converted to a nominal 3-second gust wind speed of 101 mph per section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B with a topographic category 1 and crest height of 0 feet, and Risk Category II were used in this analysis.

All modifications and equipment proposed in this report shall be installed in accordance with the drawings stated in Table 3, for the determined available structural capacity to be effective.

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.

Structural analysis prepared by:

Joseph Jacobs, PE, SE
Project Manager

tnxTower Report - version 7.0.5.1

STATE OF CONNECTICUT JOSEPH ZACHARIAH JACOBS No. PEN 22731 LICENSED PROFESSIONAL ENGINEER

JUN 15 2018

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1) INTRODUCTION

This tower is a 160 ft Self Support tower designed by ROHN
The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 100.7 mph with no ice, 50 mph with 0.75 inch ice thickness and 60 mph under service loads, exposure category B with topographic category 1 and crest height of 0 feet.

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)
144.0	144.0	3	alcatel lucent	PCS 1900MHZ 4X45W-65MHZ	1 3	7/8 1 1/4
		6	alcatel lucent	RRH2X50-800		
		3	alcatel lucent	TD-RRH8X20-25		
		3	commscope	NNVV-65B-R4 w/ Mount Pipe		
		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe		

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
157.0	157.0	3		B13 RRH 4X30	2	1 5/8	2
		3		B5 4T4R RRH4X40 AIRSCALE			
		3		B66A RRH4X45			
		6	antel	LPA-80080/6CF w/ Mount Pipe	10	1 5/8	1
		6	commscope	JAHH-65B-R3B w/ Mount Pipe			2
		2	raycap	RC3DC-3315-PF-48			
		1	tower mounts	Sector Mount [SM 508-3]			1
144.0	144.0	6	decibel	DB978H90T2E-M w/ Mount Pipe	6	1 5/8	3
		1	tower mounts	Sector Mount [SM 506-3]			1
118.0	118.0	12	decibel	DB844H90E-XY w/ Mount Pipe	-	-	1
		1	tower mounts	Sector Mount [SM 404-3]			
109.0	115.0	1	celwave	PD1110			1
	109.0	1	tower mounts	Side Arm Mount [SO 308-	1	1 1/4	1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
				1]			
90.0	90.0	6	ericsson	RRUS-11	12 1 2	7/8 3/8 7/16	1
		2	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		6	powerwave technologies	LGP21901			
		1	powerwave technologies	P45-16-XLH-RR w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Pipe Mount [PM 601-3]			
		1	tower mounts	Sector Mount [SM 802-3]			
50.0	50.0	1	lucent	KS24019-L112A	1	1/2	1
		1	tower mounts	Side Arm Mount [SO 306-1]			

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

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	JGI Eastern 05204G March 25, 2005	1237256	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Rohn/ HEB Civil Engineers	821498	CCISITES
Tower manufacturer drawing	PJF 41706-0238 Dec 18, 2006 As built Drawing Phase 1	2281721	CCISITES
Partial PMI	PJF 41706-0238 Dec 18, 2006 As built Drawing Phase 1	1296500	CCISITES
PMI	PJF 37518-0397 Dated June 22, 2009	2340021	CCISITES
Reinforcement Drawing	PJF 37517-3262-003-8800 12-4-2017	7235023	CCISITES

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) The existing base plate grout was considered in this analysis. Grout must be maintained and inspected periodically, and must be replaced if damaged or cracked. Refer to crown document PRC-10012, Base Plate Grout Inspection & Classification.

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
T1	160 - 156	Leg	Rohn 2.375" x 0.218" (2 EH)	2	-4.14	49.90	8.3	Pass
		Diagonal	L 1.5 x 1.5 x 1/8	10	-0.87	4.36	20.0 24.1 (b)	Pass
		Top Girt	L 2 x 2 x 1/8	6	-0.41	3.21	12.7	Pass
T2	156 - 152	Leg	Rohn 2.375" x 0.218" (2 EH)	14	-5.46	49.90	10.9	Pass
		Diagonal	L 1.5 x 1.5 x 1/8	16	-2.38	4.35	54.7 69.8 (b)	Pass
T3	152 - 148	Leg	Rohn 2.375" x 0.218" (2 EH)	23	-8.64	49.90	17.3	Pass
		Diagonal	L 1.5 x 1.5 x 1/8	25	-2.40	4.34	55.2 67.8 (b)	Pass
T4	148 - 144	Leg	Rohn 2.375" x 0.218" (2 EH)	32	-12.89	49.90	25.8	Pass
		Diagonal	L 1.5 x 1.5 x 1/8	34	-2.59	4.33	59.8 76.5 (b)	Pass
T5	144 - 140	Leg	Rohn 2.375" x 0.218" (2 EH)	41	-19.93	49.90	39.9	Pass
		Diagonal	L 2 x 2 x 1/4	44	-4.14	16.48	25.1 53.8 (b)	Pass
T6	140 - 120	Leg	Rohn 2.875" x 0.276" (2.5 EH)	50	-48.88	74.43	65.7	Pass
		Diagonal	2L 1.5 x 1.5 x 1/8 (3/16)	61	-3.62	10.20	35.5 57.7 (b)	Pass
		Top Girt	L 2 x 2 x 1/8	54	-0.27	3.17	8.7	Pass
T7	120 - 100	Leg	Rohn 4" x 0.318" (3.5 EH)	80	-76.39	125.73	60.8	Pass
		Diagonal	2L 2 x 2 x 3/16 (3/16)	82	-4.72	21.96	21.5 62.6 (b)	Pass
T8	100 - 80	Leg	Rohn 4" x 0.318" (3.5 EH) (GR)	101	-105.52	148.29	71.2	Pass
		Diagonal	2L 2.5 x 2.5 x 3/16 (3/16)	103	-5.98	27.16	22.0	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
							47.8 (b)	
T9	80 - 60	Leg	ROHN 4 EH (GR)	122	-134.95	192.91	70.0	Pass
		Diagonal	2L 3 x 3 x 3/16 (1/4)	124	-6.14	38.73	15.9 49.3 (b)	Pass
T10	60 - 40	Leg	Rohn 5.563" x 0.375" (5 EH) (GR)	143	-161.06	246.97	65.2	Pass
		Diagonal	2L 3 x 3 x 3/16 (1/4)	145	-7.25	28.70	25.3 47.7 (b)	Pass
T11	40 - 20	Leg	Rohn 5.563" x 0.375" (5 EH) (GR)	158	-188.02	246.94	76.1	Pass
		Diagonal	2L 3 x 3 x 1/4 (1/4)	160	-7.31	35.24	20.7 48.3 (b)	Pass
T12	20 - 0	Leg	Rohn 6.625" x 0.432" (6 EH) (GR)	173	-214.46	381.11	56.3 56.5 (b)	Pass
		Diagonal	2L 3.5 x 3.5 x 1/4 (1/4)	175	-8.11	50.21	16.2 52.7 (b)	Pass
							Summary	
						Leg (T11)	76.1	Pass
						Diagonal (T4)	76.5	Pass
						Top Girt (T1)	12.7	Pass
						Bolt Checks	76.5	Pass
						Rating =	76.5	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	% Capacity	Pass / Fail
1	Anchor Rods	66.9	Pass
1	Base Foundation	31.3	Pass
1	Base Foundation Soil Interaction	68.1	Pass

Structure Rating (max from all components) =	76.5%

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

4.1) Recommendations

Please see cci doc 7235023

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 160.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 6.52 ft at the top and 20.86 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

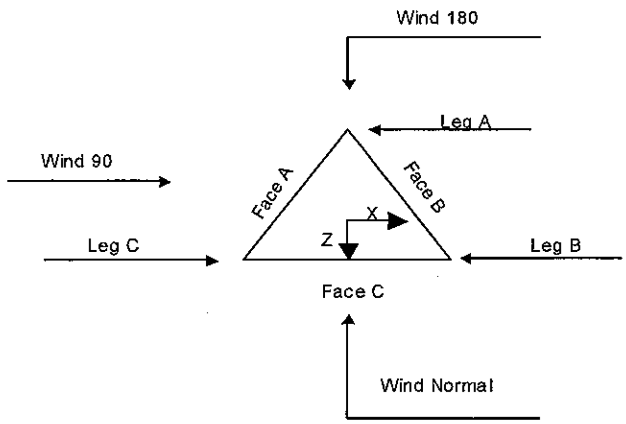
1) Tower is located in Middlesex County, Connecticut.
2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
3) Basic wind speed of 101 mph.
4) Structure Class II.
5) Exposure Category B.
6) Topographic Category 1.
7) Crest Height 0.00 ft.
8) Nominal ice thickness of 0.7500 in.
9) Ice thickness is considered to increase with height.
10) Ice density of 56 pcf.
11) A wind speed of 50 mph is used in combination with ice.
12) Deflections calculated using a wind speed of 60 mph.
13) Grouted pipe f'_c is 7 ksi.
14) Pressures are calculated at each section.
15) Stress ratio used in tower member design is 1.

Options

Consider Moments - Legs
Consider Moments - Horizontals
Consider Moments - Diagonals
Use Moment Magnification
√ Use Code Stress Ratios
√ Use Code Safety Factors - Guys
Escalate Ice
Always Use Max Kz
Use Special Wind Profile
√ Include Bolts In Member Capacity
Leg Bolts Are At Top Of Section
√ Secondary Horizontal Braces Leg
Use Diamond Inner Bracing (4 Sided)
SR Members Have Cut Ends
SR Members Are Concentric

Distribute Leg Loads As Uniform
Assume Legs Pinned
Assume Rigid Index Plate
√ Use Clear Spans For Wind Area
√ Use Clear Spans For KL/r
√ Retension Guys To Initial Tension
Bypass Mast Stability Checks
√ Use Azimuth Dish Coefficients
√ Project Wind Area of Appurt.
Autocalc Torque Arm Areas
Add IBC .6D+W Combination
Sort Capacity Reports By Component
√ Triangulate Diamond Inner Bracing
Treat Feed Line Bundles As Cylinder

Use ASCE 10 X-Brace Ly Rules
√ Calculate Redundant Bracing Forces
Ignore Redundant Members in FEA
SR Leg Bolts Resist Compression
All Leg Panels Have Same Allowable
Offset Girt At Foundation
√ Consider Feed Line Torque
√ Include Angle Block Shear Check
Use TIA-222-G Bracing Resist. Exemption
Use TIA-222-G Tension Splice Exemption
Poles
Include Shear-Torsion Interaction
Always Use Sub-Critical Flow
Use Top Mounted Sockets



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	160.00-156.00			6.52	1	4.00
T2	156.00-152.00			6.53	1	4.00
T3	152.00-148.00			6.54	1	4.00
T4	148.00-144.00			6.55	1	4.00
T5	144.00-140.00			6.55	1	4.00
T6	140.00-120.00			6.56	1	20.00
T7	120.00-100.00			8.60	1	20.00
T8	100.00-80.00			10.64	1	20.00
T9	80.00-60.00			12.68	1	20.00
T10	60.00-40.00			14.77	1	20.00
T11	40.00-20.00			16.77	1	20.00
T12	20.00-0.00			18.85	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	160.00-156.00	4.00	X Brace	No	No	0.0000	0.0000
T2	156.00-152.00	4.00	X Brace	No	No	0.0000	0.0000
T3	152.00-148.00	4.00	X Brace	No	No	0.0000	0.0000
T4	148.00-144.00	4.00	X Brace	No	No	0.0000	0.0000
T5	144.00-140.00	4.00	X Brace	No	No	0.0000	0.0000
T6	140.00-120.00	5.00	X Brace	No	No	0.0000	0.0000
T7	120.00-100.00	6.67	X Brace	No	No	0.0000	0.0000
T8	100.00-80.00	6.67	X Brace	No	No	0.0000	0.0000
T9	80.00-60.00	6.67	X Brace	No	No	0.0000	0.0000
T10	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T11	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section	*Tower Elevation* *ft*	*Diagonal Spacing* *ft*	*Bracing Type*	*Has K Brace End Panels*	*Has Horizontals*	*Top Girt Offset* *in*	*Bottom Girt Offset* *in*
T12	20.00-0.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation *ft*	*Leg Type*	*Leg Size*	*Leg Grade*	*Diagonal Type*	*Diagonal Size*	*Diagonal Grade*
T1 160.00-156.00	Pipe	Rohn 2.375" x 0.218" (2 EH)	A572-50 (50 ksi)	Single Angle	L 1.5 x 1.5 x 1/8	A36 (36 ksi)
T2 156.00-152.00	Pipe	Rohn 2.375" x 0.218" (2 EH)	A572-50 (50 ksi)	Single Angle	L 1.5 x 1.5 x 1/8	A36 (36 ksi)
T3 152.00-148.00	Pipe	Rohn 2.375" x 0.218" (2 EH)	A572-50 (50 ksi)	Single Angle	L 1.5 x 1.5 x 1/8	A36 (36 ksi)
T4 148.00-144.00	Pipe	Rohn 2.375" x 0.218" (2 EH)	A572-50 (50 ksi)	Single Angle	L 1.5 x 1.5 x 1/8	A36 (36 ksi)
T5 144.00-140.00	Pipe	Rohn 2.375" x 0.218" (2 EH)	A572-50 (50 ksi)	Single Angle	L 2 x 2 x 1/4	A36 (36 ksi)
T6 140.00-120.00	Pipe	Rohn 2.875" x 0.276" (2.5 EH)	A572-50 (50 ksi)	Double Angle	2L 1.5 x 1.5 x 1/8 (3/16)	A36 (36 ksi)
T7 120.00-100.00	Pipe	Rohn 4" x 0.318" (3.5 EH)	A572-50 (50 ksi)	Double Angle	2L 2 x 2 x 3/16 (3/16)	A36 (36 ksi)
T8 100.00-80.00	Grouted Pipe	Rohn 4" x 0.318" (3.5 EH)	A572-50 (50 ksi)	Double Angle	2L 2.5 x 2.5 x 3/16 (3/16)	A36 (36 ksi)
T9 80.00-60.00	Grouted Pipe	ROHN 4 EH	A572-50 (50 ksi)	Double Angle	2L 3 x 3 x 3/16 (1/4)	A36 (36 ksi)
T10 60.00-40.00	Grouted Pipe	Rohn 5.563" x 0.375" (5 EH)	A572-50 (50 ksi)	Double Angle	2L 3 x 3 x 3/16 (1/4)	A36 (36 ksi)
T11 40.00-20.00	Grouted Pipe	Rohn 5.563" x 0.375" (5 EH)	A572-50 (50 ksi)	Double Angle	2L 3 x 3 x 1/4 (1/4)	A36 (36 ksi)
T12 20.00-0.00	Grouted Pipe	Rohn 6.625" x 0.432" (6 EH)	A572-50 (50 ksi)	Double Angle	2L 3.5 x 3.5 x 1/4 (1/4)	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation *ft*	*Top Girt Type*	*Top Girt Size*	*Top Girt Grade*	*Bottom Girt Type*	*Bottom Girt Size*	*Bottom Girt Grade*
T1 160.00-156.00	Equal Angle	L 2 x 2 x 1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T6 140.00-120.00	Equal Angle	L 2 x 2 x 1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation *ft*	*Gusset Area (per face)* ft^2	*Gusset Thickness* *in*	*Gusset Grade*	*Adjust. Factor* A_f	*Adjust. Factor* A_r	*Weight Mult.*	*Double Angle Stitch Bolt Spacing Diagonals* *in*	*Double Angle Stitch Bolt Spacing Horizontals* *in*	*Double Angle Stitch Bolt Spacing Redundants* *in*
T1 160.00-156.00	0.00	0.1875	A36 (36 ksi)	1.03	1	1.05	30.0000	30.0000	36.0000
T2 156.00-152.00	0.00	0.1875	A36 (36 ksi)	1.03	1	1.05	30.0000	30.0000	36.0000
T3 152.00-148.00	0.00	0.1875	A36 (36 ksi)	1.03	1	1.05	30.0000	30.0000	36.0000
T4 148.00-	0.00	0.1875	A36	1.03	1	1.05	30.0000	30.0000	36.0000

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
144.00			(36 ksi)						
T5 144.00-140.00	0.00	0.1875	A36 (36 ksi)	1.03	1	1.05	30.0000	30.0000	36.0000
T6 140.00-120.00	0.00	0.1875	A36 (36 ksi)	1.03	1	1.05	30.0000	30.0000	36.0000
T7 120.00-100.00	0.00	0.1875	A36 (36 ksi)	1.03	1	1.05	36.0000	30.0000	36.0000
T8 100.00-80.00	0.00	0.4375	A36 (36 ksi)	1.03	1	1.05	48.0000	30.0000	36.0000
T9 80.00-60.00	0.00	0.4375	A36 (36 ksi)	1.03	1	1.05	48.0000	30.0000	36.0000
T10 60.00-40.00	0.00	0.2500	A36 (36 ksi)	1.03	1	1.05	60.0000	30.0000	36.0000
T11 40.00-20.00	0.00	0.2500	A36 (36 ksi)	1.03	1	1.05	60.0000	30.0000	36.0000
T12 20.00-0.00	0.00	0.2500	A36 (36 ksi)	1.03	1	1.05	60.0000	30.0000	36.0000

Tower Section Geometry *(cont'd)*

			K Factors[1]							
Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 160.00-156.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 156.00-152.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 152.00-148.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 148.00-144.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 144.00-140.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 140.00-120.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 120.00-100.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 100.00-80.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 80.00-60.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T10 60.00-40.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T11 40.00-20.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T12 20.00-0.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 160.00-156.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 156.00-152.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 152.00-148.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 148.00-144.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 144.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T12 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T1 160.00-156.00	2.5000	3.5000	2.5000	3.5000	0.0000	0.0000	0.0000	0.0000
T2 156.00-152.00	2.5000	3.5000	2.5000	3.5000	0.0000	0.0000	0.0000	0.0000
T3 152.00-148.00	2.5000	3.5000	2.5000	3.5000	0.0000	0.0000	0.0000	0.0000
T4 148.00-144.00	2.5000	3.5000	2.5000	3.5000	0.0000	0.0000	0.0000	0.0000
T5 144.00-140.00	2.5000	3.5000	2.5000	3.5000	0.0000	0.0000	0.0000	0.0000
T6 140.00-120.00	2.5000	4.4000	2.5000	4.4000	0.0000	0.0000	0.0000	0.0000
T7 120.00-100.00	2.5000	4.9000	2.5000	4.9000	0.0000	0.0000	0.0000	0.0000
T8 100.00-80.00	2.5000	4.9000	2.5000	4.9000	0.0000	0.0000	0.0000	0.0000
T9 80.00-60.00	2.5000	4.8000	2.5000	4.8000	0.0000	0.0000	0.0000	0.0000
T10 60.00-40.00	2.5000	5.3000	2.5000	5.3000	0.0000	0.0000	0.0000	0.0000
T11 40.00-20.00	2.5000	5.4000	2.5000	5.4000	0.0000	0.0000	0.0000	0.0000
T12 20.00-0.00	2.5000	5.4000	2.5000	5.4000	0.0000	0.0000	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 160.00-156.00	Flange	0.6250 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 156.00-152.00	Flange	0.6250 A325N	0	0.5000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 152.00-148.00	Flange	0.6250 A325N	0	0.5000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 148.00-144.00	Flange	0.6250 A325N	0	0.5000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 144.00-140.00	Flange	0.6250 A325N	0	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 140.00-120.00	Flange	0.6250 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 120.00-100.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 100.00-80.00	Flange	0.8750 A325N	4	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.5000 A325N	1
T9 80.00-60.00	Flange	1.0000 A325N	6	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.5000 A325N	1
T10 60.00-40.00	Flange	1.0000 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T11 40.00-20.00	Flange	1.0000 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.5000 A325N	1
T12 20.00-0.00	Flange	1.0000 A449	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Grouted Pipe Properties

Size	F_y ksi	A_s in^2	A_c in^2	Wt plf	E_c ksi	E_m ksi	F_{ym} ksi
Rohn 4" x 0.318" (3.5 EH) (GR)	50	3.6784	8.8880	31.033	4769	38218	64
ROHN 4 EH (GR)	50	4.4074	11.4969	38.949	4769	38952	66
Rohn 5.563" x 0.375" (5 EH) (GR)	50	6.1120	18.1937	58.701	4769	40357	68
Rohn 6.625" x 0.432" (6 EH) (GR)	50	8.4049	26.0667	82.906	4769	40832	68

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
FACE C												
LDF4-50A(1/2")	A	No	Ar (CaAa)	50.00 - 0.00	0.0000	0.42	1	1	0.6300	0.6300		0.15
1.5" flat Cable Ladder Rail	A	No	Af (CaAa)	150.00 - 0.00	0.0000	0.42	2	2	12.0000 1.5000	1.5000		1.80
FACE B												
LDF7-50A(1-5/8") (INCLUDING	B	No	Ar (CaAa)	157.00 - 0.00	0.0000	0.4	12	12	1.0000 0.5200	1.9800		0.82

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
PROPOSED)												
1.5" flat Cable Ladder Rail	B	No	Af (CaAa)	160.00 - 0.00	0.0000	0.42	2	2	12.0000 1.5000	1.5000		1.80
FACE C												
LEG C												
LDF5-50A(7/8")	C	No	Ar (CaAa)	90.00 - 5.00	-2.0000	0.45	12	4	1.0900	1.0900		0.33
T-Brackets (Af)	C	No	Af (CaAa)	90.00 - 5.00	-2.0000	0.45	1	1	1.0000	1.0000		8.40
2" (Nominal) Conduit	C	No	Ar (CaAa)	90.00 - 5.00	-2.0000	0.45	1	1	2.3750	2.3750		0.72
FB-L98B-002-75000(3/8) (Installed)	C	No	Ar (CaAa)	90.00 - 0.00	-2.0000	0.45	1	1	0.3937	0.3937		0.06
WR-VG122ST-BRDA(7/16) (Installed)	C	No	Ar (CaAa)	90.00 - 0.00	-2.0000	0.45	2	2	0.4600	0.4600		0.14
Safety Line 3/8	B	No	Ar (CaAa)	160.00 - 0.00	0.0000	0.5	1	1	0.3750	0.3750		0.22
HB114-08U3M12-xxxF(7/8) (Proposed)	A	No	Ar (CaAa)	144.00 - 0.00	0.0000	0.42	1	1	1.1100	1.1100		0.68
HB114-1-08U4-M5F(1-1/4) (Proposed)	A	No	Ar (CaAa)	144.00 - 0.00	0.0000	0.42	3	3	1.5400	1.5400		1.08
HB114-1-08U4-M5F(1-1/4) (Proposed)	C	No	Ar (CaAa)	109.00 - 0.00	0.0000	-0.42	1	1	1.5400	1.5400		1.08

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight K
(2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice	4.56 5.11 5.61	10.26 11.43 12.31	0.05 0.11 0.19
(2) LPA-80080/6CF w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice	4.56 5.11 5.61	10.26 11.43 12.31	0.05 0.11 0.19
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice	4.56 5.11 5.61	10.26 11.43 12.31	0.05 0.11 0.19
Sector Mount [SM 508-3]	C	None		0.0000	157.00	No Ice 1/2" Ice 1" Ice	36.69 52.22 67.75	36.69 52.22 67.75	1.78 2.41 3.04
*									
Sector Mount [SM 506-3]	C	None		0.0000	144.00	No Ice 1/2"	35.47 50.60	35.47 50.60	1.74 2.35

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert (ft, ft, ft)	Azimuth Adjustment (°)	Placement (ft)		C_AA_A Front (ft²)	C_AA_A Side (ft²)	Weight (K)
						1" Ice	65.73	65.73	2.95
(3) 4' x 2" Pipe Mount	A	From Leg	4.00	0.0000	144.00	No Ice	0.79	0.79	0.03
			0.00			1/2" Ice	1.03	1.03	0.04
			0.00			1" Ice	1.28	1.28	0.04
(3) 4' x 2" Pipe Mount	B	From Leg	4.00	0.0000	144.00	No Ice	0.79	0.79	0.03
			0.00			1/2" Ice	1.03	1.03	0.04
			0.00			1" Ice	1.28	1.28	0.04
(3) 4' x 2" Pipe Mount	C	From Leg	4.00	0.0000	144.00	No Ice	0.79	0.79	0.03
			0.00			1/2" Ice	1.03	1.03	0.04
			0.00			1" Ice	1.28	1.28	0.04
*									
*									
*									
(4) DB844H90E-XY w/ Mount Pipe (ABANDONED)	A	From Leg	4.00	0.0000	118.00	No Ice	3.30	4.80	0.03
			0.00			1/2" Ice	3.67	5.42	0.07
			0.00			1" Ice	4.03	6.04	0.12
(4) DB844H90E-XY w/ Mount Pipe (ABANDONED)	B	From Leg	4.00	0.0000	118.00	No Ice	3.30	4.80	0.03
			0.00			1/2" Ice	3.67	5.42	0.07
			0.00			1" Ice	4.03	6.04	0.12
(4) DB844H90E-XY w/ Mount Pipe (ABANDONED)	C	From Leg	4.00	0.0000	118.00	No Ice	3.30	4.80	0.03
			0.00			1/2" Ice	3.67	5.42	0.07
			0.00			1" Ice	4.03	6.04	0.12
Sector Mount [SM 404-3] (ABANDONED)	C	None		0.0000	118.00	No Ice	20.47	20.47	0.92
						1/2" Ice	28.97	28.97	1.34
						1" Ice	37.47	37.47	1.75
*									
*									
*									
(2) 7770.00 w/ Mount Pipe (x)	A	From Leg	4.00	0.0000	90.00	No Ice	5.75	4.25	0.06
			0.00			1/2" Ice	6.18	5.01	0.10
			0.00			1" Ice	6.61	5.71	0.16
(2) LGP21401	A	From Leg	4.00	0.0000	90.00	No Ice	1.10	0.35	0.01
			0.00			1/2" Ice	1.24	0.44	0.02
			0.00			1" Ice	1.38	0.54	0.03
(2) LGP21901	A	From Leg	4.00	0.0000	90.00	No Ice	0.23	0.16	0.01
			0.00			1/2" Ice	0.29	0.21	0.01
			0.00			1" Ice	0.36	0.28	0.01
(2) 7770.00 w/ Mount Pipe (x)	B	From Leg	4.00	0.0000	90.00	No Ice	5.75	4.25	0.06
			0.00			1/2" Ice	6.18	5.01	0.10
			0.00			1" Ice	6.61	5.71	0.16
(2) LGP21401	B	From Leg	4.00	0.0000	90.00	No Ice	1.10	0.35	0.01
			0.00			1/2" Ice	1.24	0.44	0.02
			0.00			1" Ice	1.38	0.54	0.03
(2) LGP21901	B	From Leg	4.00	0.0000	90.00	No Ice	0.23	0.16	0.01
			0.00			1/2" Ice	0.29	0.21	0.01
			0.00			1" Ice	0.36	0.28	0.01
(2) 7770.00 w/ Mount Pipe (x)	C	From Leg	4.00	0.0000	90.00	No Ice	5.75	4.25	0.06
			0.00			1/2" Ice	6.18	5.01	0.10
			0.00			1" Ice	6.61	5.71	0.16
(2) LGP21401	C	From Leg	4.00	0.0000	90.00	No Ice	1.10	0.35	0.01

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft²*	*C_AA_A Side* *ft²*	*Weight* *K*
			0.00 0.00			1/2" Ice 1" Ice	1.24 1.38	0.44 0.54	0.02 0.03
(2) LGP21901	C	From Leg	4.00 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	0.23 0.29 0.36	0.16 0.21 0.28	0.01 0.01 0.01
Sector Mount [SM 802-3]	C	None		0.0000	90.00	No Ice 1/2" Ice 1" Ice	24.41 31.39 38.37	24.41 31.39 38.37	0.93 1.36 1.79
* *									
KS24019-L112A (x)	B	From Leg	4.00 0.00 0.00	0.0000	50.00	No Ice 1/2" Ice 1" Ice	0.14 0.20 0.26	0.14 0.20 0.26	0.01 0.01 0.01
Side Arm Mount [SO 306-1] (x)	B	From Leg	2.00 0.00 0.00	0.0000	50.00	No Ice 1/2" Ice 1" Ice	0.98 1.70 2.42	2.18 3.80 5.42	0.04 0.06 0.08
(2) RRUS-11 (Proposed)	A	From Leg	4.00 0.00 0.00	0.0000	90.00	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
P45-16-XLH-RR w/ Mount Pipe (Proposed)	A	From Leg	4.00 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	8.24 8.70 9.16	4.83 5.57 6.27	0.04 0.10 0.17
(2) RRUS-11 (Proposed)	B	From Leg	4.00 0.00 0.00	0.0000	90.00	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
AM-X-CD-16-65-00T-RET w/ Mount Pipe (Proposed)	B	From Leg	4.00 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.30 7.48 8.37	0.07 0.14 0.21
DC6-48-60-18-8F (Proposed)	B	From Leg	4.00 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	0.92 1.46 1.64	0.92 1.46 1.64	0.02 0.04 0.06
Pipe Mount [PM 601-3] (x)	B	None		0.0000	90.00	No Ice 1/2" Ice 1" Ice	4.39 5.48 6.57	4.39 5.48 6.57	0.20 0.24 0.28
(2) RRUS-11 (Proposed)	C	From Leg	4.00 0.00 0.00	0.0000	90.00	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
AM-X-CD-16-65-00T-RET w/ Mount Pipe (Proposed)	C	From Leg	4.00 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.30 7.48 8.37	0.07 0.14 0.21
***									
B13 RRH 4X30 (Proposed/ shielded)	A	From Leg	4.00 0.00 0.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.32 1.48 1.64	0.06 0.07 0.09
B66A RRH4X45 (Proposed/ shielded)	A	From Leg	4.00 0.00 0.00	0.0000	157.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.63 1.81 2.00	0.07 0.09 0.11
(2) JAHH-65B-R3B w/ Mount Pipe (Proposed)	A	From Leg	4.00 0.00 0.00	0.0000	157.00	No Ice 1/2" Ice	12.57 13.19 13.79	11.82 13.09 14.14	0.09 0.20 0.32

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			
B5 4T4R RRH4X40	A	From Leg	4.00	0.0000	157.00	No Ice	0.00	0.75	0.05
AIRSCALE			0.00			1/2"	0.00	0.86	0.06
(Proposed/ shielded)			0.00			Ice	0.00	0.98	0.07
						1" Ice			
B13 RRH 4X30	B	From Leg	4.00	0.0000	157.00	No Ice	0.00	1.32	0.06
(Proposed/ shielded)			0.00			1/2"	0.00	1.48	0.07
			0.00			Ice	0.00	1.64	0.09
						1" Ice			
B66A RRH4X45	B	From Leg	4.00	0.0000	157.00	No Ice	0.00	1.63	0.07
(Proposed/ shielded)			0.00			1/2"	0.00	1.81	0.09
			0.00			Ice	0.00	2.00	0.11
						1" Ice			
(2) JAHH-65B-R3B w/	B	From Leg	4.00	0.0000	157.00	No Ice	12.57	11.82	0.09
Mount Pipe			0.00			1/2"	13.19	13.09	0.20
(Proposed)			0.00			Ice	13.79	14.14	0.32
						1" Ice			
B5 4T4R RRH4X40	B	From Leg	4.00	0.0000	157.00	No Ice	0.00	0.75	0.05
AIRSCALE			0.00			1/2"	0.00	0.86	0.06
(Proposed/ shielded)			0.00			Ice	0.00	0.98	0.07
						1" Ice			
B13 RRH 4X30	C	From Leg	4.00	0.0000	157.00	No Ice	0.00	1.32	0.06
(Proposed/ shielded)			0.00			1/2"	0.00	1.48	0.07
			0.00			Ice	0.00	1.64	0.09
						1" Ice			
B66A RRH4X45	C	From Leg	4.00	0.0000	157.00	No Ice	0.00	1.63	0.07
(Proposed/ shielded)			0.00			1/2"	0.00	1.81	0.09
			0.00			Ice	0.00	2.00	0.11
						1" Ice			
(2) JAHH-65B-R3B w/	C	From Leg	4.00	0.0000	157.00	No Ice	12.57	11.82	0.09
Mount Pipe			0.00			1/2"	13.19	13.09	0.20
(Proposed)			0.00			Ice	13.79	14.14	0.32
						1" Ice			
B5 4T4R RRH4X40	C	From Leg	4.00	0.0000	157.00	No Ice	0.00	0.75	0.05
AIRSCALE			0.00			1/2"	0.00	0.86	0.06
(Proposed/ shielded)			0.00			Ice	0.00	0.98	0.07
						1" Ice			
RC3DC-3315-PF-48	B	From Leg	4.00	0.0000	157.00	No Ice	3.79	2.51	0.03
(Proposed/ not shielded)			0.00			1/2"	4.04	2.72	0.06
			0.00			Ice	4.30	2.94	0.10
						1" Ice			
RC3DC-3315-PF-48	C	From Leg	4.00	0.0000	157.00	No Ice	3.79	2.51	0.03
(Proposed/ not shielded)			0.00			1/2"	4.04	2.72	0.06
			0.00			Ice	4.30	2.94	0.10
						1" Ice			
*									
PCS 1900MHZ 4X45W-	A	From Leg	4.00	0.0000	144.00	No Ice	2.32	2.24	0.06
65MHZ			0.00			1/2"	2.53	2.44	0.08
(Proposed)			0.00			Ice	2.74	2.65	0.11
						1" Ice			
(2) RRH2X50-800	A	From Leg	4.00	0.0000	144.00	No Ice	1.70	1.28	0.05
(Proposed)			0.00			1/2"	1.86	1.43	0.07
			0.00			Ice	2.03	1.58	0.09
						1" Ice			
TD-RRH8X20-25	A	From Leg	4.00	0.0000	144.00	No Ice	4.05	1.53	0.07
(Proposed)			0.00			1/2"	4.30	1.71	0.10
			0.00			Ice	4.56	1.90	0.13
						1" Ice			
NNVV-65B-R4 w/ Mount	A	From Leg	4.00	0.0000	144.00	No Ice	12.51	7.41	0.10
Pipe			0.00			1/2"	13.11	8.60	0.19
(Proposed)			0.00			Ice	13.67	9.50	0.29
						1" Ice			
APXVTM14-ALU-I20 w/	A	From Leg	4.00	0.0000	144.00	No Ice	6.58	4.96	0.08
Mount Pipe			0.00			1/2"	7.03	5.75	0.13
(Proposed)			0.00			Ice	7.47	6.47	0.19

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft²*	*C_AA_A Side* *ft²*	*Weight* *K*
						1" Ice			
PCS 1900MHZ 4X45W-65MHZ (Proposed)	B	From Leg	4.00 0.00 0.00	0.0000	144.00	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
(2) RRH2X50-800 (Proposed)	B	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	1.70 1.86 2.03	1.28 1.43 1.58	0.05 0.07 0.09
TD-RRH8X20-25 (Proposed)	B	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
NNVV-65B-R4 w/ Mount Pipe (Proposed)	B	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	12.51 13.11 13.67	7.41 8.60 9.50	0.10 0.19 0.29
APXVTM14-ALU-I20 w/ Mount Pipe (Proposed)	B	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
PCS 1900MHZ 4X45W-65MHZ (Proposed)	C	From Leg	4.00 0.00 0.00	0.0000	144.00	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
(2) RRH2X50-800 (Proposed)	C	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	1.70 1.86 2.03	1.28 1.43 1.58	0.05 0.07 0.09
TD-RRH8X20-25 (Proposed)	C	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
NNVV-65B-R4 w/ Mount Pipe (Proposed)	C	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	12.51 13.11 13.67	7.41 8.60 9.50	0.10 0.19 0.29
APXVTM14-ALU-I20 w/ Mount Pipe (Proposed)	C	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
**									
PD1110	C	From Leg	0.00 0.00 6.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice	2.50 3.84 5.20	2.50 3.84 5.20	0.02 0.04 0.07
Side Arm Mount [SO 308-1]	C	From Leg	0.00 0.00 0.00	0.0000	109.00	No Ice 1/2" Ice 1" Ice	0.98 1.70 2.42	3.03 5.22 7.41	0.05 0.08 0.10

Maximum Tower Deflections - Service Wind

Section No.	*Elevation* *ft*	*Horz. Deflection* *in*	*Gov. Load Comb.*	*Tilt* *°*	*Twist* *°*
T1	160 - 156	2.892	43	0.1733	0.0074
T2	156 - 152	2.747	43	0.1733	0.0073
T3	152 - 148	2.595	43	0.1724	0.0070
T4	148 - 144	2.448	43	0.1701	0.0065

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T5	144 - 140	2.301	43	0.1664	0.0059
T6	140 - 120	2.161	43	0.1610	0.0057
T7	120 - 100	1.527	43	0.1307	0.0038
T8	100 - 80	1.021	43	0.1044	0.0029
T9	80 - 60	0.628	43	0.0774	0.0021
T10	60 - 40	0.343	43	0.0526	0.0014
T11	40 - 20	0.149	43	0.0340	0.0008
T12	20 - 0	0.039	43	0.0144	0.0004

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
157.00	(2) LPA-80080/6CF w/ Mount Pipe	43	2.784	0.1733	0.0073	52758
144.00	Sector Mount [SM 506-3]	43	2.301	0.1664	0.0059	32201
118.00	(4) DB844H90E-XY w/ Mount Pipe	43	1.470	0.1279	0.0036	34335
109.00	PD1110	43	1.233	0.1159	0.0032	38969
90.00	(2) 7770.00 w/ Mount Pipe	43	0.811	0.0910	0.0025	43844
50.00	KS24019-L112A	43	0.236	0.0430	0.0011	56813

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	160 - 156	12.996	10	0.7759	0.0333
T2	156 - 152	12.347	10	0.7761	0.0331
T3	152 - 148	11.667	10	0.7720	0.0316
T4	148 - 144	11.007	10	0.7620	0.0296
T5	144 - 140	10.348	10	0.7459	0.0269
T6	140 - 120	9.720	10	0.7220	0.0257
T7	120 - 100	6.872	10	0.5870	0.0172
T8	100 - 80	4.596	10	0.4692	0.0130
T9	80 - 60	2.829	10	0.3484	0.0095
T10	60 - 40	1.546	10	0.2369	0.0065
T11	40 - 20	0.674	10	0.1529	0.0037
T12	20 - 0	0.176	10	0.0649	0.0017

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
157.00	(2) LPA-80080/6CF w/ Mount Pipe	10	12.513	0.7763	0.0333	11745
144.00	Sector Mount [SM 506-3]	10	10.348	0.7459	0.0269	7259
118.00	(4) DB844H90E-XY w/ Mount Pipe	10	6.618	0.5744	0.0165	7668
109.00	PD1110	10	5.551	0.5210	0.0144	8698
90.00	(2) 7770.00 w/ Mount Pipe	10	3.651	0.4094	0.0113	9775
50.00	KS24019-L112A	10	1.063	0.1938	0.0050	12626

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	160	Leg	A325N	0.6250	4	0.34	20.71	0.017 ✔	1	Bolt Tension
		Diagonal	A325N	0.5000	1	0.83	3.47	0.241 ✔	1	Member Block Shear
		Top Girt	A325N	0.5000	1	0.43	4.13	0.103 ✔	1	Member Bearing
T2	156	Diagonal	A325N	0.5000	1	2.42	3.47	0.698 ✔	1	Member Block Shear
T3	152	Diagonal	A325N	0.5000	1	2.35	3.47	0.678 ✔	1	Member Block Shear
T4	148	Diagonal	A325N	0.5000	1	2.65	3.47	0.765 ✔	1	Member Block Shear
T5	144	Diagonal	A325N	0.5000	1	4.04	7.50	0.538 ✔	1	Gusset Bearing
T6	140	Leg	A325N	0.6250	4	10.41	20.71	0.503 ✔	1	Bolt Tension
		Diagonal	A325N	0.5000	1	3.61	6.25	0.577 ✔	1	Member Block Shear
		Top Girt	A325N	0.5000	1	0.27	4.13	0.066 ✔	1	Member Bearing
T7	120	Leg	A325N	0.7500	4	16.51	29.82	0.554 ✔	1	Bolt Tension
		Diagonal	A325N	0.5000	1	4.70	7.50	0.626 ✔	1	Gusset Bearing
T8	100	Leg	A325N	0.8750	4	22.59	40.59	0.556 ✔	1	Bolt Tension
		Diagonal	A325N	0.5000	1	5.93	12.40	0.478 ✔	1	Member Bearing
T9	80	Leg	A325N	1.0000	6	19.26	53.01	0.363 ✔	1	Bolt Tension
		Diagonal	A325N	0.5000	1	6.11	12.40	0.493 ✔	1	Member Bearing
T10	60	Leg	A325N	1.0000	6	22.91	53.01	0.432 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	1	7.06	14.79	0.477 ✔	1	Gusset Bearing
T11	40	Leg	A325N	1.0000	6	26.55	53.01	0.501 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	1	7.15	14.79	0.483 ✔	1	Gusset Bearing
T12	20	Leg	A449	1.0000	6	29.94	53.01	0.565 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	1	7.79	14.79	0.527 ✔	1	Gusset Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	160 - 156	Rohn 2.375" x 0.218" (2 EH)	4.00	4.00	62.6 K=1.00	1.4773	-4.14	49.90	0.083 [1] ✔
T2	156 - 152	Rohn 2.375" x 0.218" (2 EH)	4.00	4.00	62.6 K=1.00	1.4773	-5.46	49.90	0.109 [1] ✔
T3	152 - 148	Rohn 2.375" x 0.218" (2 EH)	4.00	4.00	62.6 K=1.00	1.4773	-8.64	49.90	0.173 [1] ✔
T4	148 - 144	Rohn 2.375" x 0.218" (2 EH)	4.00	4.00	62.6 K=1.00	1.4773	-12.89	49.90	0.258 [1] ✔
T5	144 - 140	Rohn 2.375" x 0.218" (2	4.00	4.00	62.6	1.4773	-19.93	49.90	0.399 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
		EH)			K=1.00				✔
T6	140 - 120	Rohn 2.875" x 0.276" (2.5 EH)	20.03	5.01	65.0 K=1.00	2.2535	-48.88	74.43	0.657 [1] ✔
T7	120 - 100	Rohn 4" x 0.318" (3.5 EH)	20.03	6.68	61.3 K=1.00	3.6784	-76.39	125.73	0.608 [1] ✔
T8	100 - 80	Rohn 4" x 0.318" (3.5 EH) (GR)	20.03	6.68	61.3 K=1.00	3.6784	-105.52	148.29	0.712 [1] ✔
T9	80 - 60	ROHN 4 EH (GR)	20.04	6.68	54.3 K=1.00	4.4074	-134.95	192.91	0.700 [1] ✔
T10	60 - 40	Rohn 5.563" x 0.375" (5 EH) (GR)	20.03	10.02	65.4 K=1.00	6.1120	-161.06	246.97	0.652 [1] ✔
T11	40 - 20	Rohn 5.563" x 0.375" (5 EH) (GR)	20.04	10.02	65.4 K=1.00	6.1120	-188.02	246.94	0.761 [1] ✔
T12	20 - 0	Rohn 6.625" x 0.432" (6 EH) (GR)	20.03	10.02	54.8 K=1.00	8.4049	-214.46	381.11	0.563 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	160 - 156	L 1.5 x 1.5 x 1/8	6.94	3.37	136.4 K=1.00	0.3594	-0.87	4.36	0.200 [1] ✔
T2	156 - 152	L 1.5 x 1.5 x 1/8	6.95	3.37	136.6 K=1.00	0.3594	-2.38	4.35	0.547 [1] ✔
T3	152 - 148	L 1.5 x 1.5 x 1/8	6.95	3.37	136.7 K=1.00	0.3594	-2.40	4.34	0.552 [1] ✔
T4	148 - 144	L 1.5 x 1.5 x 1/8	6.96	3.38	136.9 K=1.00	0.3594	-2.59	4.33	0.598 [1] ✔
T5	144 - 140	L 2 x 2 x 1/4	6.97	3.38	107.8 K=1.04	0.9380	-4.14	16.48	0.251 [1] ✔
T6	140 - 120	2L 1.5 x 1.5 x 1/8 (3/16)	8.46	4.26	125.3 K=1.00	0.7188	-3.62	10.20	0.355 [1] ✔
T7	120 - 100	2L 'a' > 24.4215 in - 61 2L 2 x 2 x 3/16 (3/16)	11.36	5.76	119.1 K=1.00	1.4297	-4.72	21.96	0.215 [1] ✔
T8	100 - 80	2L 'a' > 33.0734 in - 82 2L 2.5 x 2.5 x 3/16 (3/16)	13.11	6.63	120.7 K=1.00	1.8047	-5.98	27.16	0.220 [1] ✔
T9	80 - 60	2L 'a' > 37.9460 in - 103 2L 3 x 3 x 3/16 (1/4)	14.99	7.57	105.5 K=1.00	2.1797	-6.14	38.73	0.159 [1] ✔
T10	60 - 40	2L 'a' > 43.2580 in - 124 2L 3 x 3 x 3/16 (1/4)	18.13	9.22	130.5 K=1.00	2.1797	-7.25	28.70	0.253 [1] ✔
T11	40 - 20	2L 'a' > 52.6982 in - 145 2L 3 x 3 x 1/4 (1/4)	19.90	10.11	135.8 K=1.00	2.8750	-7.31	35.24	0.207 [1] ✔
T12	20 - 0	2L 'a' > 57.9396 in - 160 2L 3.5 x 3.5 x 1/4 (1/4)	21.70	11.00	121.6 K=1.00	3.3750	-8.11	50.21	0.162 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	160 - 156	L 2 x 2 x 1/8	6.52	6.11	184.6 K=1.00	0.4844	-0.41	3.21	0.127 [1] ✔
T6	140 - 120	L 2 x 2 x 1/8	6.56	6.16	185.8 K=1.00	0.4844	-0.27	3.17	0.087 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	160 - 156	Rohn 2.375" x 0.218" (2 EH)	4.00	4.00	62.6	1.4773	0.01	66.48	0.000 [1] ✔
T2	156 - 152	Rohn 2.375" x 0.218" (2 EH)	4.00	4.00	62.6	1.4773	1.61	66.48	0.024 [1] ✔
T3	152 - 148	Rohn 2.375" x 0.218" (2 EH)	4.00	4.00	62.6	1.4773	5.93	66.48	0.089 [1] ✔
T4	148 - 144	Rohn 2.375" x 0.218" (2 EH)	4.00	4.00	62.6	1.4773	9.84	66.48	0.148 [1] ✔
T5	144 - 140	Rohn 2.375" x 0.218" (2 EH)	4.00	4.00	62.6	1.4773	14.48	66.48	0.218 [1] ✔
T6	140 - 120	Rohn 2.875" x 0.276" (2.5 EH)	20.03	5.01	65.0	2.2535	41.65	101.41	0.411 [1] ✔
T7	120 - 100	Rohn 4" x 0.318" (3.5 EH)	20.03	6.68	61.3	3.6784	66.03	165.53	0.399 [1] ✔
T8	100 - 80	Rohn 4" x 0.318" (3.5 EH) (GR)	20.03	6.68	61.3	3.6784	90.34	165.53	0.546 [1] ✔
T9	80 - 60	ROHN 4 EH (GR)	20.04	6.68	54.3	4.4074	115.54	198.34	0.583 [1] ✔
T10	60 - 40	Rohn 5.563" x 0.375" (5 EH) (GR)	20.03	10.02	65.4	6.1120	137.44	275.04	0.500 [1] ✔
T11	40 - 20	Rohn 5.563" x 0.375" (5 EH) (GR)	20.04	10.02	65.4	6.1120	159.31	275.04	0.579 [1] ✔
T12	20 - 0	Rohn 6.625" x 0.432" (6 EH) (GR)	20.03	10.02	54.8	8.4049	179.65	378.22	0.475 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	160 - 156	L 1.5 x 1.5 x 1/8	6.94	3.37	89.6	0.2109	0.83	9.18	0.091 [1] ✔
T2	156 - 152	L 1.5 x 1.5 x 1/8	6.95	3.37	89.6	0.2109	2.42	9.18	0.264 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T3	152 - 148	L 1.5 x 1.5 x 1/8	6.95	3.37	89.7	0.2109	2.35	9.18	0.256 [1] ✔
T4	148 - 144	L 1.5 x 1.5 x 1/8	6.96	3.38	89.8	0.2109	2.65	9.18	0.289 [1] ✔
T5	144 - 140	L 2 x 2 x 1/4	6.97	3.38	68.7	0.5863	4.04	25.50	0.158 [1] ✔
T6	140 - 120	2L 1.5 x 1.5 x 1/8 (3/16)	8.03	4.05	107.2	0.4219	3.61	18.35	0.197 [1] ✔
T7	120 - 100	2L 'a' > 23.2191 in - 68 2L 2 x 2 x 3/16 (3/16)	10.80	5.48	108.6	0.8965	4.70	39.00	0.121 [1] ✔
T8	100 - 80	2L 'a' > 31.4884 in - 89 2L 2.5 x 2.5 x 3/16 (3/16)	13.11	6.63	103.8	1.1777	5.93	51.23	0.116 [1] ✔
T9	80 - 60	2L 'a' > 37.9460 in - 104 2L 3 x 3 x 3/16 (1/4)	14.99	7.57	98.1	1.4590	6.11	63.47	0.096 [1] ✔
T10	60 - 40	2L 'a' > 43.2580 in - 125 2L 3 x 3 x 3/16 (1/4)	18.13	9.22	119.4	1.4238	7.06	61.94	0.114 [1] ✔
T11	40 - 20	2L 'a' > 52.6982 in - 146 2L 3 x 3 x 1/4 (1/4)	19.90	10.11	132.0	1.8750	7.15	81.56	0.088 [1] ✔
T12	20 - 0	2L 'a' > 57.9396 in - 161 2L 3.5 x 3.5 x 1/4 (1/4)	21.70	11.00	122.2	2.2500	7.79	97.88	0.080 [1] ✔

[1] $P_u / \phi P_n$ controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	160 - 156	L 2 x 2 x 1/8	6.52	6.11	121.2	0.3047	0.43	13.25	0.032 [1] ✔
T6	140 - 120	L 2 x 2 x 1/8	6.56	6.16	122.0	0.3047	0.27	13.25	0.021 [1] ✔

[1] $P_u / \phi P_n$ controls

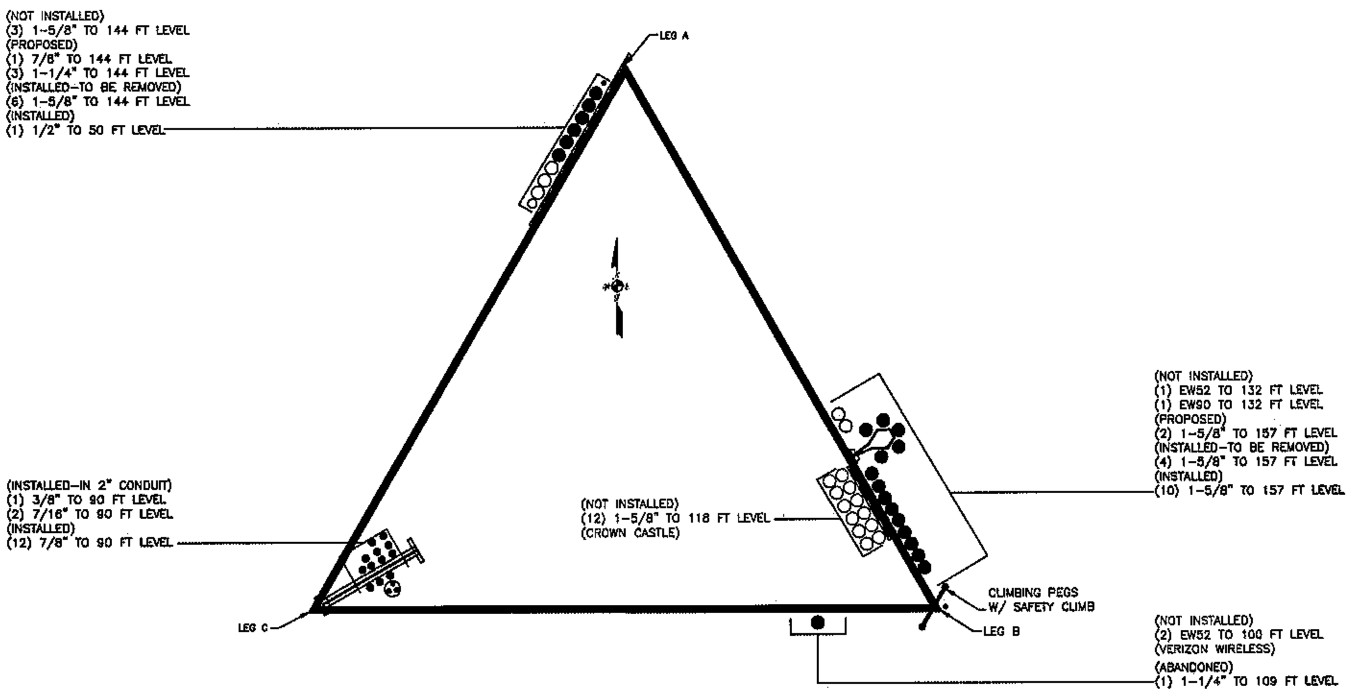
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$øP_{allow}$ K	% Capacity	Pass Fail
T1	160 - 156	Leg	Rohn 2.375" x 0.218" (2 EH)	2	-4.14	49.90	8.3	Pass
		Diagonal	L 1.5 x 1.5 x 1/8	10	-0.87	4.36	20.0 24.1 (b)	Pass
		Top Girt	L 2 x 2 x 1/8	6	-0.41	3.21	12.7	Pass
T2	156 - 152	Leg	Rohn 2.375" x 0.218" (2 EH)	14	-5.46	49.90	10.9	Pass
		Diagonal	L 1.5 x 1.5 x 1/8	16	-2.38	4.35	54.7 69.8 (b)	Pass
T3	152 - 148	Leg	Rohn 2.375" x 0.218" (2 EH)	23	-8.64	49.90	17.3	Pass
		Diagonal	L 1.5 x 1.5 x 1/8	25	-2.40	4.34	55.2 67.8 (b)	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	øP_allow K	% Capacity	Pass Fail
T4	148 - 144	Leg	Rohn 2.375" x 0.218" (2 EH)	32	-12.89	49.90	25.8	Pass
		Diagonal	L 1.5 x 1.5 x 1/8	34	-2.59	4.33	59.8 76.5 (b)	Pass
T5	144 - 140	Leg	Rohn 2.375" x 0.218" (2 EH)	41	-19.93	49.90	39.9	Pass
		Diagonal	L 2 x 2 x 1/4	44	-4.14	16.48	25.1 53.8 (b)	Pass
T6	140 - 120	Leg	Rohn 2.875" x 0.276" (2.5 EH)	50	-48.88	74.43	65.7	Pass
		Diagonal	2L 1.5 x 1.5 x 1/8 (3/16)	61	-3.62	10.20	35.5 57.7 (b)	Pass
		Top Girt	L 2 x 2 x 1/8	54	-0.27	3.17	8.7	Pass
T7	120 - 100	Leg	Rohn 4" x 0.318" (3.5 EH)	80	-76.39	125.73	60.8	Pass
		Diagonal	2L 2 x 2 x 3/16 (3/16)	82	-4.72	21.96	21.5 62.6 (b)	Pass
T8	100 - 80	Leg	Rohn 4" x 0.318" (3.5 EH) (GR)	101	-105.52	148.29	71.2	Pass
		Diagonal	2L 2.5 x 2.5 x 3/16 (3/16)	103	-5.98	27.16	22.0 47.8 (b)	Pass
T9	80 - 60	Leg	ROHN 4 EH (GR)	122	-134.95	192.91	70.0	Pass
		Diagonal	2L 3 x 3 x 3/16 (1/4)	124	-6.14	38.73	15.9 49.3 (b)	Pass
T10	60 - 40	Leg	Rohn 5.563" x 0.375" (5 EH) (GR)	143	-161.06	246.97	65.2	Pass
		Diagonal	2L 3 x 3 x 3/16 (1/4)	145	-7.25	28.70	25.3 47.7 (b)	Pass
T11	40 - 20	Leg	Rohn 5.563" x 0.375" (5 EH) (GR)	158	-188.02	246.94	76.1	Pass
		Diagonal	2L 3 x 3 x 1/4 (1/4)	160	-7.31	35.24	20.7 48.3 (b)	Pass
T12	20 - 0	Leg	Rohn 6.625" x 0.432" (6 EH) (GR)	173	-214.46	381.11	56.3 56.5 (b)	Pass
		Diagonal	2L 3.5 x 3.5 x 1/4 (1/4)	175	-8.11	50.21	16.2 52.7 (b)	Pass
							Summary	
						Leg (T11)	76.1	Pass
						Diagonal (T4)	76.5	Pass
						Top Girt (T1)	12.7	Pass
						Bolt Checks	76.5	Pass
						RATING =	**76.5**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Pier and Pad Foundation

CROWN CASTLE

BU # :	806387
Site Name:	
App. Number:	

TIA-222 Revision:	G
Tower Type:	Self Support

Block Foundation?:	☐

Superstructure Analysis Reactions		
Compression, P_{comp}:	220	kips
Compression Shear, Vu_comp:	30	kips
Uplift, P_{uplift}:	185	kips
Uplift Shear, V_{u_uplift}:	25	kips
Tower Height, H:	162	ft
Base Face Width, BW:	21	ft
BP Dist. Above Fdn, bp_{dist}:	0	in

Foundation Analysis Checks	Capacity	Demand	Rating	Check
Uplift (kips)	276.24	185.00	67.0%	Pass
Lateral (Sliding) (kips)	91.37	30.00	32.8%	Pass
Bearing Pressure (ksf)	13.04	4.30	33.0%	Pass
*Pier Flexure (Comp.) (kip*ft)*	1095.93	315.00	28.7%	Pass
*Pier Flexure (Tension) (kip*ft)*	708.69	262.50	37.0%	Pass
Pier Compression (kip)	2214.70	238.18	10.8%	Pass
*Pad Flexure (kip*ft)*	564.21	103.38	18.3%	Pass
Pad Shear - 1-way (kips)	181.87	31.07	17.1%	Pass
Pad Shear - 2-way (ksi)	0.16	0.05	30.1%	Pass

Soil Rating:	67.0%
Structural Rating:	37.0%

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, dpier:	3.5	ft
Ext. Above Grade, E:	0.5	ft
Pier Rebar Size, Sc:	8	
Pier Rebar Quantity, mc:	16	
Pier Tie/Spiral Size, St:	3	
Pier Tie/Spiral Quantity, mt:	7	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties		
Depth, D:	12.0	ft
Pad Width, W:	9.4	ft
Pad Thickness, T:	2.0	ft
Pad Rebar Size, Sp:	7	
Pad Rebar Quantity, mp:	11	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, Fy:	60000	psi
Concrete Compressive Strength, F'c:	3000	psi
Dry Concrete Density, δc:	150	pcf

Soil Properties		
Total Soil Unit Weight, γ:	115	pcf
Ultimate Net Bearing, Qnet:	16.000	ksf
Cohesion, Cu:	0.000	ksf
Friction Angle, φ:	30	degrees
SPT Blow Count, N_{blows}:	0	
Base Friction, μ:	0	
Neglected Depth, N:	4.0	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, gw:	None	ft

<--Toggle between Gross and Net

Version 2.5.1

Anchor Rod Check for Self Supporting Towers

TIA-222-G, Section 4.9.9

Site Data	
BU#:	
Site Name:	
App #:	

Reactions		
Eta Factor, η	**0.55**	Detail Type
Uplift, Pu:	**185**	kips
Shear, Vu:	**25**	kips

l_{ar}:	**0**	in
$Mu = 0.65*l_{ar}*V_u$		ft-kips

Anchor Rod Data		
Qty:	**6**	
Diam:	**1**	in
Rod Material:	**A449 (1/4 to 1 Incl.)**	
Strength (Fu):	120	ksi
Yield (Fy):	92	ksi

Anchor Rod Results:

Max Rod (Cu+ Vu/η):	38.4	Kips
Allowable Axial, Φ*Fu*Anet:	58.2	Kips
Anchor Rod Stress Ratio:	66.0%	

* Rod Circle:		in
* e:		in
* # of Rods		1 or 2

Mu= Pu x e:		ft-kips

** Enter rod circle, offset (e) and number of anchor rods at the extreme fiber to consider if eccentric load due to leg reinforcement exists.*

If Applicable;

Anchor Rod Results with Bending Considered:

When the clear distance from the top of concrete to the bottom of level nut excceeds 1.0 times the diameter of the anchor rod, the following interaction equation shall also be satisfied (see Figure 4-4 of Rev. G):

$$(V_u/\phi R_{nv})^2 + [(P_u/\phi R_{nt}) + (M_u/\phi R_{nm})]^2 <= 1$$

$\phi R_{nv}=\phi*0.45*F_{ub}*A_b=$		kips
$\phi R_{nt}=\phi*F_u*A_{net}=$		kips
$\phi R_{nm}=\phi*F_y*Z=$		ft-kips

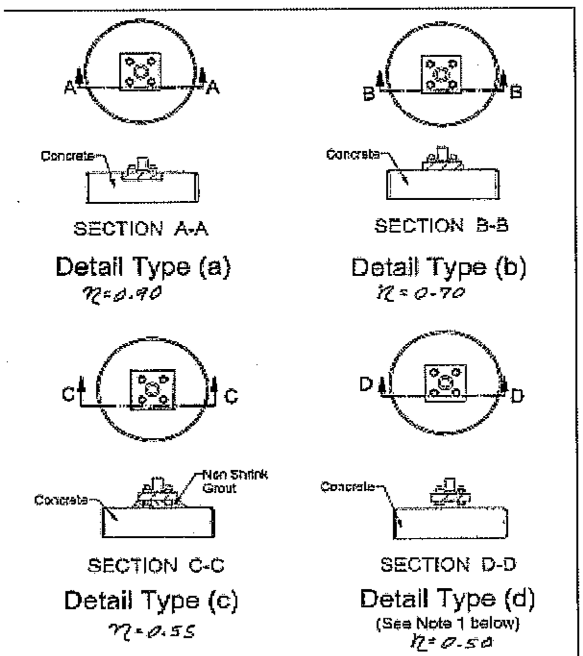
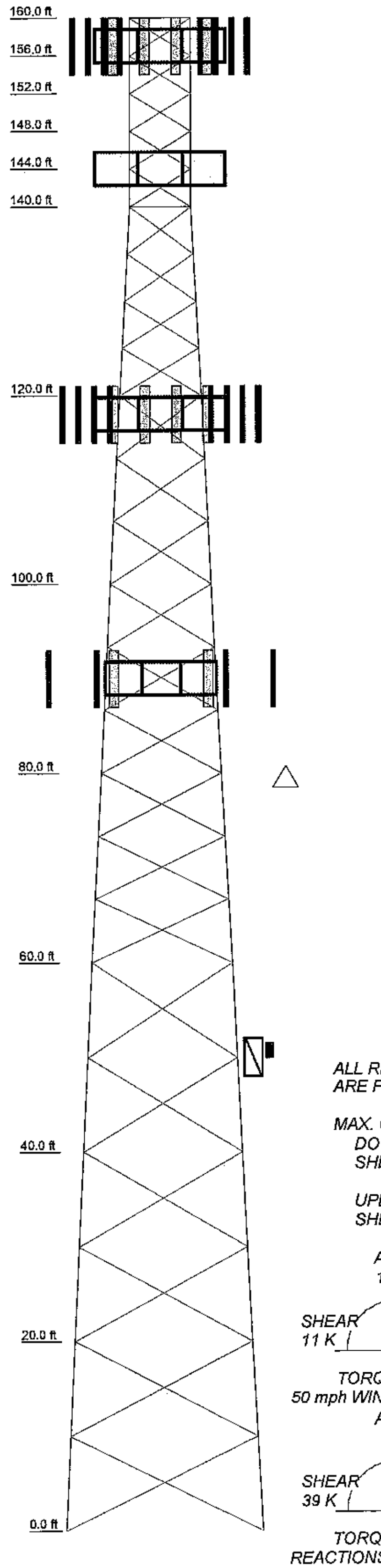


Figure 4-4 of TIA-222-G

Maximum Acceptable Ratio: **105** %

Governing Stress Ratio: **66.0%** **Pass**

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	
Legs	Rohn 2.375" x 0.218" (2 EH)					Rohn 2.875" x 0.276" (2.5 EH)	Rohn 4" x 0.318" (3.5 EH)	Rohn 4" x 0.318" (3.5 EH) (GR)	ROHN 4 EH (GR)	Rohn 5.563" x 0.375" (5 EH) (GR)		A	
Leg Grade	A572-50												
Diagonals	L 1.5 x 1.5 x 1/8				B	2L 1.5 x 1.5 x 1/8 (3/16)	2L 2 x 2 x 3/16 (3/16)	2L 2.5 x 2.5 x 3/16 (3/16)	2L 3 x 3 x 3/16 (1/4)		2L 3 x 3 x 1/4 (1/4)	2L 3.5 x 3.5 x 1/4 (1/4)	
Diagonal Grade	A36												
Top Girts	C	N.A.				L 2 x 2 x 1/8	N.A.						
Face Width (ft)	5.52083 5.52917	5.5375	5.54583	5.55417	6.5625	8.60417	10.6354	12.6771	14.7708	16.7708	18.8542	20.8646	
# Panels @ (ft)	5 @ 4					4 @ 5	9 @ 6.66667			6 @ 10			
Weight (K)	0.2	0.1	0.1	0.1	0.2	1.0	1.8	2.8	3.7	4.2	4.9	6.6	25.7



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) LPA-80080/6CF w/ Mount Pipe	157	APXVTM14-ALU-I20 w/ Mount Pipe (Proposed)	144
(2) LPA-80080/6CF w/ Mount Pipe	157	PCS 1900MHZ 4X45W-65MHZ (Proposed)	144
(2) LPA-80080/6CF w/ Mount Pipe	157	(2) RRH2X50-800 (Proposed)	144
Sector Mount [SM 508-3]	157	TD-RRH8X20-25 (Proposed)	144
B13 RRH 4X30 (Proposed/ shielded)	157	NNVV-65B-R4 w/ Mount Pipe (Proposed)	144
B66A RRH4X45 (Proposed/ shielded)	157	APXVTM14-ALU-I20 w/ Mount Pipe (Proposed)	144
(2) JAHH-65B-R3B w/ Mount Pipe (Proposed)	157	(4) DB844H90E-XY w/ Mount Pipe (ABANDONED)	118
B5 4T4R RRH4X40 AIRSCALE (Proposed/ shielded)	157	(4) DB844H90E-XY w/ Mount Pipe (ABANDONED)	118
B13 RRH 4X30 (Proposed/ shielded)	157	Sector Mount [SM 404-3] (ABANDONED)	118
B66A RRH4X45 (Proposed/ shielded)	157	(4) DB844H90E-XY w/ Mount Pipe (ABANDONED)	118
(2) JAHH-65B-R3B w/ Mount Pipe (Proposed)	157	PD1110	109
B5 4T4R RRH4X40 AIRSCALE (Proposed/ shielded)	157	Side Arm Mount [SO 306-1]	109
B13 RRH 4X30 (Proposed/ shielded)	157	(2) 7770.00 w/ Mount Pipe (x)	90
B66A RRH4X45 (Proposed/ shielded)	157	(2) LGP21401	90
(2) JAHH-65B-R3B w/ Mount Pipe (Proposed)	157	(2) LGP21901	90
B5 4T4R RRH4X40 AIRSCALE (Proposed/ shielded)	157	(2) RRUS-11 (Proposed)	90
RC3DC-3315-PF-48 (Proposed/ not shielded)	157	P45-16-XLH-RR w/ Mount Pipe (Proposed)	90
RC3DC-3315-PF-48 (Proposed/ not shielded)	157	(2) RRUS-11 (Proposed)	90
Sector Mount [SM 506-3]	144	AM-X-CD-16-65-00T-RET w/ Mount Pipe (Proposed)	90
(3) 4' x 2" Pipe Mount	144	DC6-48-60-18-8F (Proposed)	90
(3) 4' x 2" Pipe Mount	144	Pipe Mount [PM 601-3] (x)	90
(3) 4' x 2" Pipe Mount	144	(2) RRUS-11 (Proposed)	90
PCS 1900MHZ 4X45W-65MHZ (Proposed)	144	AM-X-CD-16-65-00T-RET w/ Mount Pipe (Proposed)	90
(2) RRH2X50-800 (Proposed)	144	(2) 7770.00 w/ Mount Pipe (x)	90
TD-RRH8X20-25 (Proposed)	144	(2) LGP21401	90
NNVV-65B-R4 w/ Mount Pipe (Proposed)	144	(2) LGP21901	90
APXVTM14-ALU-I20 w/ Mount Pipe (Proposed)	144	Sector Mount [SM 802-3]	90
PCS 1900MHZ 4X45W-65MHZ (Proposed)	144	(2) 7770.00 w/ Mount Pipe (x)	90
		(2) LGP21401	90
(2) RRH2X50-800 (Proposed)	144	(2) LGP21901	90
TD-RRH8X20-25 (Proposed)	144	Side Arm Mount [SO 306-1] (x)	50
NNVV-65B-R4 w/ Mount Pipe (Proposed)	144	KS24019-L112A (x)	50

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	Rohn 6.625" x 0.432" (6 EH) (GR)	C	L 2 x 2 x 1/8
B	L 2 x 2 x 1/4		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 101 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. Grouted pipe f'c is 7 ksi
9. TOWER RATING: 76.5%

Paul J. Ford and Company 250 East Broad st., Suite 600 Columbus, OH 43215 Phone: (614) 221-6679 FAX:	Job: HRT 088, CT BU#806387		
	Project: PJF JOB #37518-2158-002-8700		
	Client: Crown Castle	Drawn by: jjacobs	App'd:
	Code: TIA-222-G	Date: 06/15/18	Scale: NTS
	Path:		Dwg No. E-1

MODIFIED 160' SELF SUPPORT TOWER

BU #806387; HRT 088 943629

#14 ROUTE 80
KILLINGWORTH, CONNECTICUT 06419
MIDDLESEX COUNTY
LAT: 41° 21' 26.43"; LONG: -72° 31' 11.83"
APP: 396862 REV. 0; WO: 1493848

PROJECT CONTACTS

STRUCTURE OWNER:
CROWN CASTLE
MOD PM: DAN VADNEY AT DAN.VADNEY@CROWNCASTLE.COM
PH: (518) 373-3510
MOD CM: JASON D'AMICO AT JASON.D'AMICO@CROWNCASTLE.COM
PH: (860) 209-0104

ENGINEER OF RECORD:
PJFMOD@PJFWEB.COM

THIS PROJECT INCLUDES THE FOLLOWING ITEMS
REPLACE EXISTING DIAGONALS WITH NEW DIAGONALS

SHEET INDEX	
SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
MI-1	MI CHECKLIST AND NOTES
N-1	GENERAL NOTES
S-1	TOWER ELEVATION
S-2	DIAGONAL REPLACEMENT

WIND DESIGN DATA	
REFERENCE STANDARD	ANSI/TIA-222-G-2-2009
LOCAL CODE	2016 CONNECTICUT BUILDING CODE
ULTIMATE WIND SPEED (3-SECOND GUST)	130 MPH
CONVERTED NOMINAL WIND SPEED (3-SECOND GUST)	101 MPH
ICE THICKNESS	0.75 IN
ICE WIND SPEED	50 MPH
SERVICE WIND SPEED	60 MPH
RISK CATEGORY	II
EXPOSURE CATEGORY	C
Kzt	1.0

TOWER MANUFACTURER: ROHN
TOWER MANUFACTURER #: 2281721

QUALIFIED ENGINEERING SERVICES ARE AVAILABLE FROM PAUL J. FORD AND COMPANY TO ASSIST CONTRACTORS IN CLASS IV RIGGING PLAN REVIEWS. FOR REQUESTED QUALIFIED ENGINEERING SERVICES, PLEASE CONTACT US AT RIGGING@PJFWEB.COM.

ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT (800) 788-7011.

REV	DATE	DESCRIPTION

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

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #806387; HRT 088 943629
KILLINGWORTH, CONNECTICUT
MODIFIED 160' SELF SUPPORT TOWER

PROJECT No:	37517-3262.003.8800
DRAWN BY:	D.C.
DESIGNED BY:	J.P.J.
CHECKED BY:	M.R.B.
DATE:	12-4-2017

TITLE SHEET

T-1

37517-3262.003.DWG

POST-MODIFICATION CHECKLIST

REQUIRED	SECTION	REPORT ITEM	BRIEF DESCRIPTION (SEE ENG-SOW-10007)
		PRE-CONSTRUCTION	
X	6.1.1	MI CHECKLIST DRAWING	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT
X	6.1.2	EOR APPROVED SHOP DRAWINGS	FABRICATION DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW. THE CONTRACTOR SHALL PROVIDE THE APPROVED SHOP DRAWINGS TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	6.1.3	FABRICATION INSPECTION	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.1.4	FABRICATOR CERTIFIED WELD INSPECTION	CRITICAL SHOP WELDS THAT REQUIRE TESTING (PER ENG-STD-10068) ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED WELD INSPECTOR SHALL PERFORM NON-DESTRUCTIVE TESTING AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	6.1.5	MATERIAL TEST REPORT (MTR)	MILL CERTIFICATION SHALL BE PROVIDED FOR ALL STEEL WITH A YIELD STRENGTH GREATER THAN 36 KSI AND THIS DOCUMENTATION SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.1.6	FABRICATOR NDE INSPECTION	A VISUAL OBSERVATION OF A PORTION OF THE EXISTING STRUCTURE (AS NOTED ON THESE DRAWINGS) IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.1.7	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)	A VISUAL OBSERVATION OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	6.1.8	PACKING SLIPS	THE MATERIAL SHIPPING LIST SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
		CONSTRUCTION	
X	6.2.1	CONSTRUCTION INSPECTIONS	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.2.2	FOUNDATION INSPECTIONS	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.2.3	CONCRETE COMP. STRENGTH AND SLUMP TESTS	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.2.4	POST INSTALLED ANCHOR ROD VERIFICATION	ANCHOR ROD INSTALLATION SHALL INCLUDE VERIFICATION BY LETTER AND PHOTOGRAPHIC DOCUMENTATION.
NA	6.2.5	BASE PLATE GROUT VERIFICATION	A LETTER FROM THE GENERAL CONTRACTOR SHALL BE PROVIDED TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS INSTALLED IN ACCORDANCE WITH CROWN ENG-PRC-10012 FOR INCLUSION IN THE MI REPORT.
NA	6.2.6	CONTRACTOR'S CERTIFIED WELD INSPECTION	A CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST AS NECESSARY ALL FIELD WELDS AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT. PRE, DURING AND POST WELD INSPECTION IS REQUIRED PER CROWN SOW AND DOCUMENT #ENG-SOW-10007.
NA	6.2.7	EARTHWORK: LIFT AND DENSITY	FOUNDATION SUB-GRADES SHALL BE INSPECTED AND APPROVED BY A GEOTECHNICAL ENGINEER AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	6.2.8	ON SITE COLD GALVANIZING VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON-SITE COLD GALVANIZING WAS APPLIED IN ACCORDANCE WITH ENG-BUL-10149.
NA	6.2.9	GUY WIRE TENSION REPORT	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT TO THE MI INSPECTOR INDICATING THE TEMPERATURE AND TENSION IN EVERY GUY CABLE FOR INCLUSION IN THE MI REPORT.
X	6.2.10	GC AS-BUILT DOCUMENTS	THE GENERAL CONTRACTOR SHALL SUBMIT A COPY OF THE CONTRACT DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD DUE TO FIELD CONDITIONS.
NA	-	MAGNI 565 COATING VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY MAGNI 565 COATING WAS APPLIED IN ACCORDANCE PER ASTM F1136.
NA	-	MICROPILE / ROCK ANCHOR	THE GENERAL CONTRACTOR SHALL PROVIDE INSTALLER'S DRILLING AND INSTALLATION LOGS AND QA/QC DOCUMENTATION TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
		POST-CONSTRUCTION	
X	6.3.1	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTORS REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
NA	6.3.2	POST INSTALLED ANCHOR ROD PULL TESTING	POST INSTALLED ANCHOR RODS SHALL BE TESTED IN ACCORDANCE WITH ENG-PRC-10119 AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	6.3.3	PHOTOGRAPHS	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI WHICH DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
NA	-	POST INSTALLED MICROPILE / ROCK ANCHOR TESTING	POST INSTALLED ANCHORS SHALL BE TESTED AND INSPECTED IN ACCORDANCE WITH SPECIFICATION STATED ON MICROPILE/ROCK ANCHOR NOTES.

NOTE: X DENOTES A DOCUMENT NEEDED FROM THE CONTRACTOR FOR THE MI REPORT
NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT

MODIFICATION INSPECTION NOTES:

GENERAL

THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-BUL-10173 LIST OF APPROVED MI VENDORS.

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC).

REFER TO ENG-SOW-10007 : MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

MI INSPECTOR

THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN.

GENERAL CONTRACTOR

THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AN DENG-SOW-10007.

RECOMMENDATIONS

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING A MI REPORT:

- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLE 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

CANCELLATION OR DELAYS IN SCHEDULED MI

IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

CORRECTION OF FAILING MI'S

IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"), THE GC SHALL WORK WITH CROWN TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

- CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
- OR, WITH CROWN'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION

MI VERIFICATION INSPECTIONS

CROWN RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MI" OR "PASS AS NOTED MI" REPORT FOR THE ORIGINAL PROJECT.

PHOTOGRAPHS

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
  - RAW MATERIALS
  - PHOTOS OF ALL CRITICAL DETAILS
  - FOUNDATION MODIFICATIONS
  - WELD PREPARATION
  - BOLT INSTALLATION AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.

REV	DATE	DESCRIPTION

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

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #806387; HRT 088 943629
KILLINGWORTH, CONNECTICUT
MODIFIED 160' SELF SUPPORT TOWER

PROJECT No:	37517-3262.003.8800
DRAWN BY:	D.C.
DESIGNED BY:	J.P.J.
CHECKED BY:	M.R.B.
DATE:	12-4-2017

MI CHECKLIST AND NOTES

MI-1

37517-3262.003.DWG

GENERAL NOTES:

1. THIS TOWER MODIFICATION DRAWING IS BASED UPON A STRUCTURAL ANALYSIS PERFORMED BY PAUL J. FORD AND COMPANY DATED 12-4-2017.

2. PAUL J. FORD AND COMPANY HAS NOT PERFORMED A FIELD VISIT TO VERIFY THE EXISTING TOWER MEMBER SIZES AND DIMENSIONS. THE MODIFICATIONS SHOWN ON THESE PAGES WERE DEVELOPED USING INFORMATION PROVIDED TO US BY CROWN-CASTLE.

3. THE CONTRACTOR IS EXPECTED TO PERFORM A SITE VISIT BEFORE FABRICATING ANY MATERIAL. IF THE CONTRACTOR DISCOVERS ANY EXISTING CONDITIONS THAT ARE NOT AS REPRESENTED ON THESE DRAWINGS, PAUL J. FORD AND COMPANY SHALL BE CONTACTED IMMEDIATELY TO EVALUATE THE STRUCTURAL SIGNIFICANCE OF THE DEVIATION.

4. THE CONTRACTOR MUST BE EXPERIENCED IN THE PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED ON THESE DRAWINGS. BY ACCEPTANCE OF THIS PROJECT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED AND THAT HE IS PROPERLY LICENSED TO DO THIS WORK IN THE JURISDICTION IN WHICH THE WORK IS TO BE PERFORMED.

5. THESE DRAWINGS INDICATE A REQUIREMENT TO REMOVE AND REPLACE A PRIMARY STRUCTURAL MEMBER. THESE MEMBERS ARE CRITICAL TO THE STABILITY OF THE TOWER. IT IS THE CONTRACTORS SOLE RESPONSIBILITY TO DEVELOP A PROCEDURE TO INSURE THE STABILITY OF THE TOWER DURING THIS MEMBER CHANGE OUT.

6. INSPECTIONS SHALL BE COMPLETED IN ACCORDANCE WITH LOCAL BUILDING CODES.

7. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN STANDARD CED-STD-10253 INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH THE ANSI/TIA-322 (LATEST EDITION).

8. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE ENGINEER OF RECORD.

9. ANY WORK PERFORMED WITHOUT A PREFABRICATION MAPPING IS DONE AT THE RISK OF THE GC AND/OR FABRICATOR.

CONSTRUCTION NOTES:

1. PRIOR TO FABRICATION AND INSTALLATION, CONTRACTOR SHALL FIELD VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY, AND SHALL NOT BE USED FOR FABRICATION.

2. THESE DRAWINGS REQUIRE THE REMOVAL OF EXISTING ASTM A325 BOLTS. THE EXISTING ASTM A325 BOLTS THAT ARE REMOVED MUST BE REPLACED WITH NEW BOLTS.

3. REFER TO CCI DOC ENG-PLN-10015 FOR CUTTING AND WELDING SAFETY PLAN.

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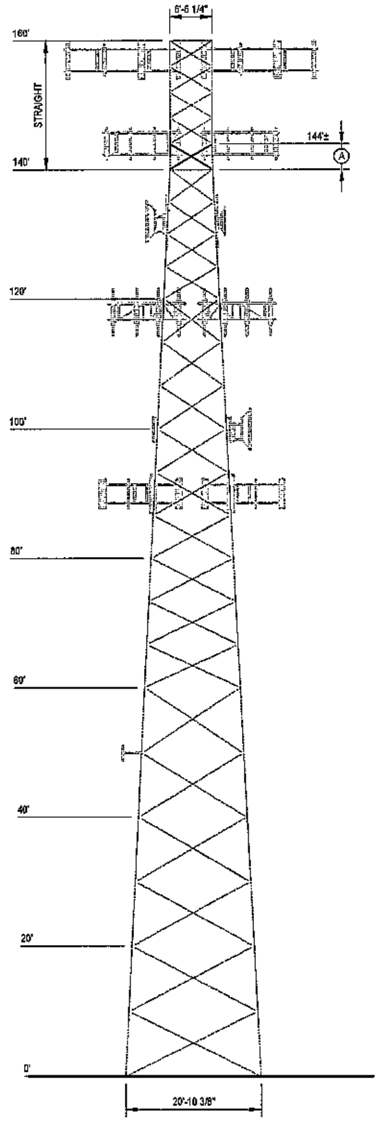
GENERAL NOTES

N-1

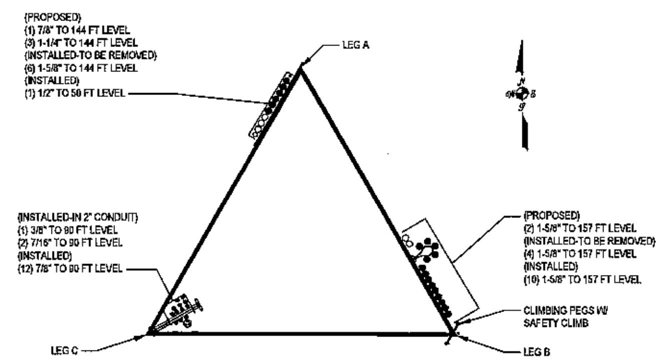
37517-3262.003.DWG



TOWER ELEVATION 1 S-1

TOWER MODIFICATION SCHEDULE

	ELEVATION	TOWER MODIFICATION DESCRIPTION	REFERENCE SHEETS
A	140'± TO 144'±	REPLACE EXISTING DIAGONALS WITH NEW DIAGONALS	S-2



COAX LAYOUT 2 S-1

REV	DATE	DESCRIPTION

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TOWER ELEVATION

S-1

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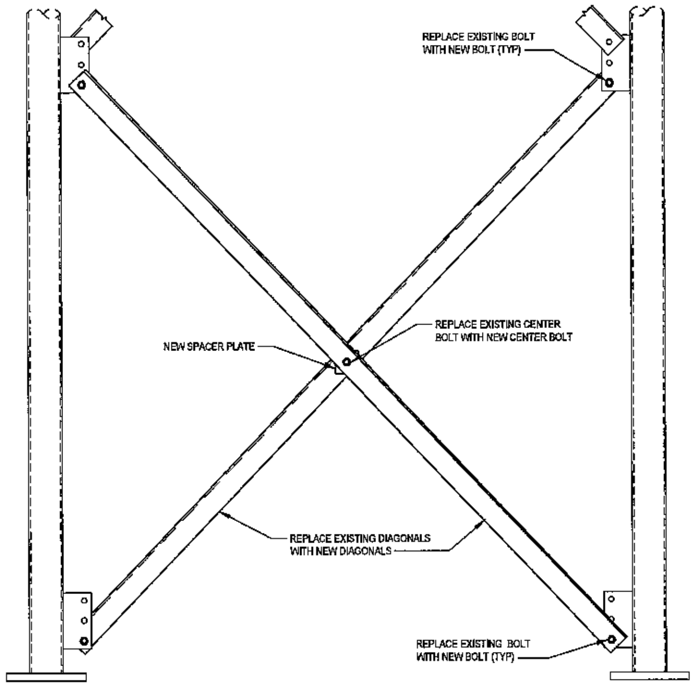
THESE DRAWINGS INDICATE A REQUIREMENT TO REMOVE AND REPLACE THE MAIN DIAGONAL TO THE TOWER GUSSET PLATE. THESE DIAGONALS ARE LOAD CARRYING PRIMARY MEMBERS CRITICAL TO THE STABILITY OF THE TOWER. IT IS THE CONTRACTORS SOLE RESPONSIBILITY TO DEVELOP A PROCEDURE TO INSURE THE STABILITY OF THE TOWER DURING THIS DIAGONAL CHANGE OUT.



(A) DIAGONAL REPLACEMENT (1 / S-2)

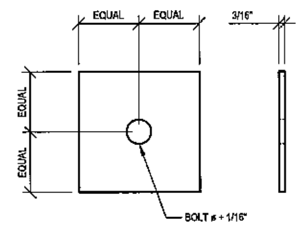
NOTES:
1. EXISTING BOLTS THAT ARE REMOVED CAN NOT BE REUSED.

ELEVATION	K (in)	N (in)
140'± TO 144'±	3/4	9/16

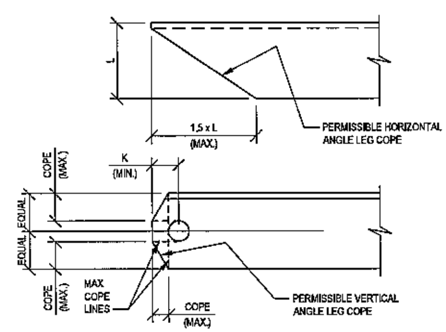
DIAGONAL

DIAGONAL NOTES:

1. FIELD FABRICATION OF THESE PARTS IS PERMITTED.
2. USE BEARING TYPE CONNECTION TO A SNUG TIGHT CONDITION, UNO.



SPACER PLATE



CRITERIA FOR PERMISSIBLE ANGLE COPING

(IF REQUIRED)

REV	DATE	DESCRIPTION

MATERIAL LIST

ELEVATION	QTY	MATERIAL	LENGTH
140'± TO 144'±	6	DIAGONAL L2 x 2 x 1/4	7'-5"±
	3	SPACER PLATE 3/16" x 2"	0'-2"±
	12	1/2"ø BOLTS	1 1/2"
	3	1/2"ø BOLTS	1 3/4"

MATERIAL NOTES:

1. PRIOR TO FABRICATION AND INSTALLATION, CONTRACTOR SHALL FIELD VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY, AND SHALL NOT BE USED FOR FABRICATION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE PROPER FIT AND CLEARANCE OF THE REINFORCING MATERIAL IN THE FIELD. THE CONTRACTOR IS EXPECTED TO PERFORM A SITE VISIT BEFORE FABRICATING ANY MATERIAL.
2. ALL STEEL SHALL CONFORM TO THE FOLLOWING (U.N.O.):
   A. ANGLES, PLATES: ASTM A572 GR 50 (50 KSI YIELD POINT MATERIAL)
3. ALL MATERIAL GRADES GREATER THAN 36 KSI WILL REQUIRE MATERIAL TEST REPORTS.
4. ALL NEW STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH THE "SPECIFICATION FOR ZINC (HOT GALVANIZED) COATING ON PRODUCTS FABRICATED FROM ROLLED, PRESSED AND FORGED STEEL SHAPES, PLATES BAR, AND STRIP" ASTM A123.
5. ALL BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A325. USE BEARING TYPE CONNECTIONS, TIGHTEN TO A SNUG TIGHT CONNECTION, UNO.
6. ALL BOLTS SHALL BE PROVIDED WITH LOCK-WASHERS, OR LOCK-NUTS, OR PAL-NUTS AND SHALL BE GALVANIZED ACCORDING TO ASTM A153/ASTM153M.
7. ALL HOLES IN THE NEW STEEL MEMBERS SHALL BE SIZED 1/16" LARGER THAN THE BOLT DIAMETER. SLOTTED OR OVERSIZED HOLES ARE NOT PERMITTED, UNO.
8. FIELD DRILLED OR CUT MATERIAL OR ANY GALVANIZED SURFACE THAT IS SCRATCHED OR DAMAGED DUE TO THE CONTRACTORS EFFORTS, TO BE COATED WITH TWO BRUSH COATS OF CROWN APPROVED ZINC RICH PAINT IN ACCORDANCE WITH ENG-BUL-10149.
9. REFER TO CCI DOC ENG-PLN-10015 FOR CUTTING AND WELDING SAFETY PLAN.

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DIAGONAL REPLACEMENT

S-2

37517-3262.003.DWG

MODIFIED 160' SELF SUPPORT TOWER

BU #806387; HRT 088 943629

#14 ROUTE 80
KILLINGWORTH, CONNECTICUT 06419
MIDDLESEX COUNTY
LAT: 41° 21' 26.43"; LONG: -72° 31' 11.83"
APP: 396862 REV. 0; WO: 1493848

PROJECT CONTACTS

STRUCTURE OWNER:
CROWN CASTLE
MOD PM: DAN VADNEY AT DAN.VADNEY@CROWNCASTLE.COM
PH: (518) 373-3510
MOD CM: JASON D'AMICO AT JASON.D'AMICO@CROWNCASTLE.COM
PH: (860) 209-0104

ENGINEER OF RECORD:
PJFMOD@PJFWEB.COM

THIS PROJECT INCLUDES THE FOLLOWING ITEMS
REPLACE EXISTING DIAGONALS WITH NEW DIAGONALS

SHEET INDEX

SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
MI-1	MI CHECKLIST AND NOTES
N-1	GENERAL NOTES
S-1	TOWER ELEVATION
S-2	DIAGONAL REPLACEMENT

WIND DESIGN DATA

REFERENCE STANDARD	ANSI/TIA-222-G-2-2009
LOCAL CODE	2016 CONNECTICUT BUILDING CODE
ULTIMATE WIND SPEED (3-SECOND GUST)	130 MPH
CONVERTED NOMINAL WIND SPEED (3-SECOND GUST)	101 MPH
ICE THICKNESS	0.75 IN
ICE WIND SPEED	50 MPH
SERVICE WIND SPEED	60 MPH
RISK CATEGORY	II
EXPOSURE CATEGORY	C
Kzt	1.0

TOWER MANUFACTURER: ROHN
TOWER MANUFACTURER #: 2281721

QUALIFIED ENGINEERING SERVICES ARE AVAILABLE FROM PAUL J. FORD AND COMPANY TO ASSIST CONTRACTORS IN CLASS IV RIGGING PLAN REVIEWS. FOR REQUESTED QUALIFIED ENGINEERING SERVICES, PLEASE CONTACT US AT RIGGING@PJFWEB.COM.

ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT (800) 788-7011.

STATE OF CONNECTICUT ★ JOSEPH ZACHCARAH JACOBS No. PEN 22731 LICENSED PROFESSIONAL ENGINEER ★

DEC 04 2017

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KILLINGWORTH, CONNECTICUT
MODIFIED 160' SELF SUPPORT TOWER

PROJECT No:	37517-3262.003.8800
DRAWN BY:	D.C.
DESIGNED BY:	J.P.J.
CHECKED BY:	M.R.B.
DATE:	12-4-2017

TITLE SHEET

T-1

37517-3262.003.DWG

POST-MODIFICATION CHECKLIST

REQUIRED	SECTION	REPORT ITEM	BRIEF DESCRIPTION (SEE ENG-SOW-10007)
			PRE-CONSTRUCTION
X	6.1.1	MI CHECKLIST DRAWING	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT
X	6.1.2	EOR APPROVED SHOP DRAWINGS	FABRICATION DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW. THE CONTRACTOR SHALL PROVIDE THE APPROVED SHOP DRAWINGS TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	6.1.3	FABRICATION INSPECTION	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.1.4	FABRICATOR CERTIFIED WELD INSPECTION	CRITICAL SHOP WELDS THAT REQUIRE TESTING (PER ENG-STD-10069) ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED WELD INSPECTOR SHALL PERFORM NON-DESTRUCTIVE TESTING AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	6.1.5	MATERIAL TEST REPORT (MTR)	MILL CERTIFICATION SHALL BE PROVIDED FOR ALL STEEL WITH A YIELD STRENGTH GREATER THAN 36 KSI AND THIS DOCUMENTATION SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.1.6	FABRICATOR NDE INSPECTION	A VISUAL OBSERVATION OF A PORTION OF THE EXISTING STRUCTURE (AS NOTED ON THESE DRAWINGS) IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.1.7	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)	A VISUAL OBSERVATION OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	6.1.8	PACKING SLIPS	THE MATERIAL SHIPPING LIST SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
			CONSTRUCTION
X	6.2.1	CONSTRUCTION INSPECTIONS	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.2.2	FOUNDATION INSPECTIONS	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.2.3	CONCRETE COMP. STRENGTH AND SLUMP TESTS	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	6.2.4	POST INSTALLED ANCHOR ROD VERIFICATION	ANCHOR ROD INSTALLATION SHALL INCLUDE VERIFICATION BY LETTER AND PHOTOGRAPHIC DOCUMENTATION.
NA	6.2.5	BASE PLATE GROUT VERIFICATION	A LETTER FROM THE GENERAL CONTRACTOR SHALL BE PROVIDED TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS INSTALLED IN ACCORDANCE WITH CROWN ENG-PRC-10012 FOR INCLUSION IN THE MI REPORT.
NA	6.2.6	CONTRACTOR'S CERTIFIED WELD INSPECTION	A CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST AS NECESSARY ALL FIELD WELDS AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT. PRE, DURING AND POST WELD INSPECTION IS REQUIRED PER CROWN SOW AND DOCUMENT #ENG-SOW-10007.
NA	6.2.7	EARTHWORK: LIFT AND DENSITY	FOUNDATION SUB-GRADES SHALL BE INSPECTED AND APPROVED BY A GEOTECHNICAL ENGINEER AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	6.2.8	ON SITE COLD GALVANIZING VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON-SITE COLD GALVANIZING WAS APPLIED IN ACCORDANCE WITH ENG-BUL-10149.
NA	6.2.9	GUY WIRE TENSION REPORT	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT TO THE MI INSPECTOR INDICATING THE TEMPERATURE AND TENSION IN EVERY GUY CABLE FOR INCLUSION IN THE MI REPORT.
X	6.2.10	GC AS-BUILT DOCUMENTS	THE GENERAL CONTRACTOR SHALL SUBMIT A COPY OF THE CONTRACT DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD DUE TO FIELD CONDITIONS.
NA	-	MAGNI 565 COATING VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY MAGNI 565 COATING WAS APPLIED IN ACCORDANCE PER ASTM F1136.
NA	-	MICROPILE / ROCK ANCHOR	THE GENERAL CONTRACTOR SHALL PROVIDE INSTALLER'S DRILLING AND INSTALLATION LOGS AND QA/QC DOCUMENTATION TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
			POST-CONSTRUCTION
X	6.3.1	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTORS REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
NA	6.3.2	POST INSTALLED ANCHOR ROD PULL TESTING	POST INSTALLED ANCHOR RODS SHALL BE TESTED IN ACCORDANCE WITH ENG-PRC-10119 AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	6.3.3	PHOTOGRAPHS	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI WHICH DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
NA	-	POST INSTALLED MICROPILE / ROCK ANCHOR TESTING	POST INSTALLED ANCHORS SHALL BE TESTED AND INSPECTED IN ACCORDANCE WITH SPECIFICATION STATED ON MICROPILE/ROCK ANCHOR NOTES.

NOTE: X DENOTES A DOCUMENT NEEDED FROM THE CONTRACTOR FOR THE MI REPORT
NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT

MODIFICATION INSPECTION NOTES:

GENERAL
THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-BUL-10173 LIST OF APPROVED MI VENDORS.

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC).

REFER TO ENG-SOW-10007 : MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

MI INSPECTOR
THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN.

GENERAL CONTRACTOR
THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AN DENG-SOW-10007.

RECOMMENDATIONS
THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING A MI REPORT:

- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLE 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

CANCELLATION OR DELAYS IN SCHEDULED MI
IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

CORRECTION OF FAILING MI'S
IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"), THE GC SHALL WORK WITH CROWN TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

- CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
- OR, WITH CROWN'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION

MI VERIFICATION INSPECTIONS
CROWN RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MI" OR "PASS AS NOTED MI" REPORT FOR THE ORIGINAL PROJECT.

PHOTOGRAPHS
BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
  - RAW MATERIALS
  - PHOTOS OF ALL CRITICAL DETAILS
  - FOUNDATION MODIFICATIONS
  - WELD PREPARATION
  - BOLT INSTALLATION AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.

STATE OF CONNECTICUT ★ JOSEPH PACHICARAH JACOBS ★ No. PEN 22731 LICENSED PROFESSIONAL ENGINEER

DEC 04 2017

REV	DATE	DESCRIPTION

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

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #806387; HRT 088 943629
KILLINGWORTH, CONNECTICUT
MODIFIED 160' SELF SUPPORT TOWER

PROJECT No:	37517-3262.003.8800
DRAWN BY:	D.C.
DESIGNED BY:	J.P.J.
CHECKED BY:	M.R.B.
DATE:	12-4-2017

MI CHECKLIST AND NOTES

MI-1

37517-3262.003.DWG

GENERAL NOTES:

1. THIS TOWER MODIFICATION DRAWING IS BASED UPON A STRUCTURAL ANALYSIS PERFORMED BY PAUL J. FORD AND COMPANY DATED 12-4-2017.
2. PAUL J. FORD AND COMPANY HAS NOT PERFORMED A FIELD VISIT TO VERIFY THE EXISTING TOWER MEMBER SIZES AND DIMENSIONS. THE MODIFICATIONS SHOWN ON THESE PAGES WERE DEVELOPED USING INFORMATION PROVIDED TO US BY CROWN-CASTLE.
3. THE CONTRACTOR IS EXPECTED TO PERFORM A SITE VISIT BEFORE FABRICATING ANY MATERIAL. IF THE CONTRACTOR DISCOVERS ANY EXISTING CONDITIONS THAT ARE NOT AS REPRESENTED ON THESE DRAWINGS, PAUL J. FORD AND COMPANY SHALL BE CONTACTED IMMEDIATELY TO EVALUATE THE STRUCTURAL SIGNIFICANCE OF THE DEVIATION.
4. THE CONTRACTOR MUST BE EXPERIENCED IN THE PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED ON THESE DRAWINGS. BY ACCEPTANCE OF THIS PROJECT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED AND THAT HE IS PROPERLY LICENSED TO DO THIS WORK IN THE JURISDICTION IN WHICH THE WORK IS TO BE PERFORMED.
5. THESE DRAWINGS INDICATE A REQUIREMENT TO REMOVE AND REPLACE A PRIMARY STRUCTURAL MEMBER. THESE MEMBERS ARE CRITICAL TO THE STABILITY OF THE TOWER. IT IS THE CONTRACTORS SOLE RESPONSIBILITY TO DEVELOP A PROCEDURE TO INSURE THE STABILITY OF THE TOWER DURING THIS MEMBER CHANGE OUT.
6. INSPECTIONS SHALL BE COMPLETED IN ACCORDANCE WITH LOCAL BUILDING CODES.
7. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN STANDARD CED-STD-10253 INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH THE ANSI/TIA-322 (LATEST EDITION).
8. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE ENGINEER OF RECORD.
9. ANY WORK PERFORMED WITHOUT A PREFABRICATION MAPPING IS DONE AT THE RISK OF THE GC AND/OR FABRICATOR.

CONSTRUCTION NOTES:

1. PRIOR TO FABRICATION AND INSTALLATION, CONTRACTOR SHALL FIELD VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY, AND SHALL NOT BE USED FOR FABRICATION.
2. THESE DRAWINGS REQUIRE THE REMOVAL OF EXISTING ASTM A325 BOLTS. THE EXISTING ASTM A325 BOLTS THAT ARE REMOVED MUST BE REPLACED WITH NEW BOLTS.
3. REFER TO CCI DOC ENG-PLN-10015 FOR CUTTING AND WELDING SAFETY PLAN.

STATE OF CONNECTICUT ★ JOSEPH PACHICARAH JACOBS No. PEN 22731 LICENSED PROFESSIONAL ENGINEER ★

DEC 04 2017

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

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GENERAL NOTES

N-1

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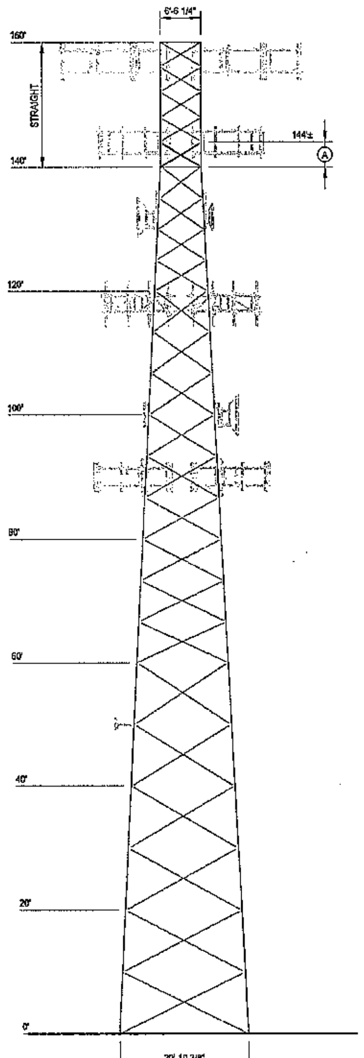
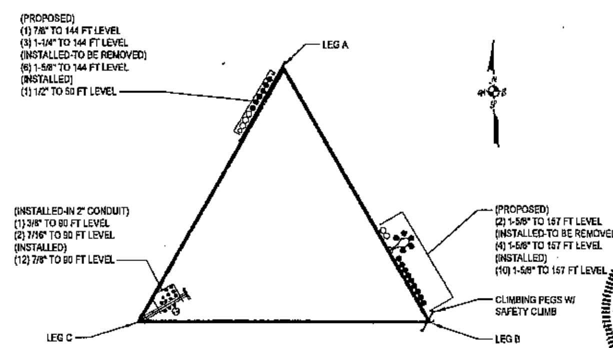
TOWER MODIFICATION SCHEDULE

	ELEVATION	TOWER MODIFICATION DESCRIPTION	REFERENCE SHEETS
A	140'± TO 144'±	REPLACE EXISTING DIAGONALS WITH NEW DIAGONALS	S-2



TOWER ELEVATION 1 S-1



COAX LAYOUT 2 S-1

STATE OF CONNECTICUT ★ JOSEPH PACHICARAH JACOBS No. PEN 22731 LICENSED PROFESSIONAL ENGINEER ★

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TOWER ELEVATION

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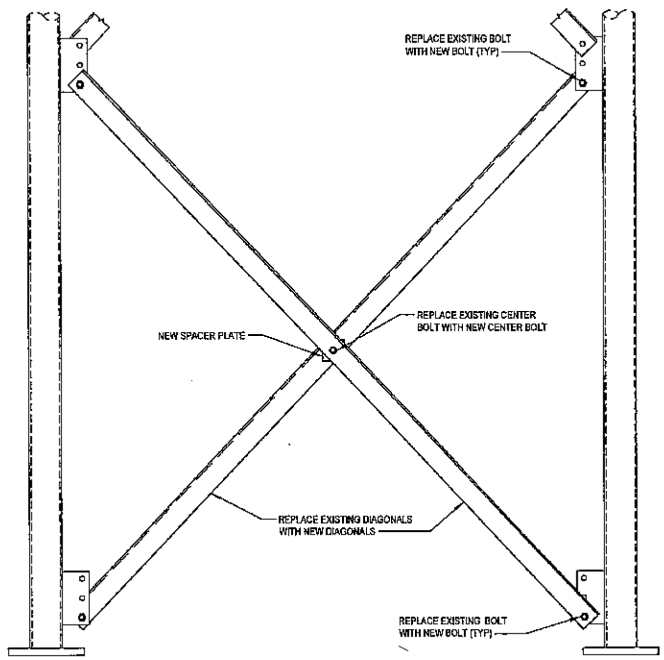
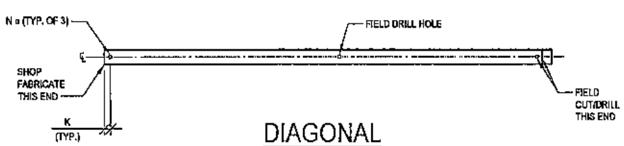
THESE DRAWINGS INDICATE A REQUIREMENT TO REMOVE AND REPLACE THE MAIN DIAGONAL TO THE TOWER GUSSET PLATE. THESE DIAGONALS ARE LOAD CARRYING PRIMARY MEMBERS CRITICAL TO THE STABILITY OF THE TOWER. IT IS THE CONTRACTORS SOLE RESPONSIBILITY TO DEVELOP A PROCEDURE TO INSURE THE STABILITY OF THE TOWER DURING THIS DIAGONAL CHANGE OUT.



A DIAGONAL REPLACEMENT 1 S-2

NOTES:
1. EXISTING BOLTS THAT ARE REMOVED CAN NOT BE REUSED.

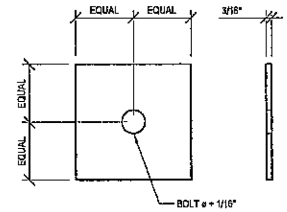
ELEVATION	K (in)	N (in)
140'± TO 144'±	3/4	9/16



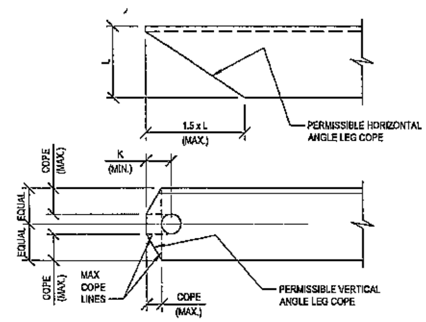
DIAGONAL

DIAGONAL NOTES:

1. FIELD FABRICATION OF THESE PARTS IS PERMITTED.
2. USE BEARING TYPE CONNECTION TO A SNUG TIGHT CONDITION, UNO.



SPACER PLATE



CRITERIA FOR PERMISSIBLE ANGLE COPING

(IF REQUIRED)

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

DEC 04 2017

REV	DATE	DESCRIPTION

MATERIAL LIST			
ELEVATION	QTY	MATERIAL	LENGTH
140'± TO 144'±	6	DIAGONAL L2 x 2 x 1/4	7'-5"±
	3	SPACER PLATE 3/16" x 2"	0'-2"±
	12	1/2"ø BOLTS	1 1/2"
	3	1/2"ø BOLTS	1 3/4"

MATERIAL NOTES:

1. PRIOR TO FABRICATION AND INSTALLATION, CONTRACTOR SHALL FIELD VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY, AND SHALL NOT BE USED FOR FABRICATION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE PROPER FIT AND CLEARANCE OF THE REINFORCING MATERIAL IN THE FIELD. THE CONTRACTOR IS EXPECTED TO PERFORM A SITE VISIT BEFORE FABRICATING ANY MATERIAL.
2. ALL STEEL SHALL CONFORM TO THE FOLLOWING (U.N.O.):
   A. ANGLES, PLATES: ASTM A572 GR 50 (50 KSI YIELD POINT MATERIAL)
3. ALL MATERIAL GRADES GREATER THAN 36 KSI WILL REQUIRE MATERIAL TEST REPORTS.
4. ALL NEW STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH THE "SPECIFICATION FOR ZINC (HOT GALVANIZED) COATING ON PRODUCTS FABRICATED FROM ROLLED, PRESSED AND FORGED STEEL SHAPES, PLATES BAR, AND STRIP" ASTM A123.
5. ALL BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A325. USE BEARING TYPE CONNECTIONS, TIGHTEN TO A SNUG TIGHT CONNECTION, UNO.
6. ALL BOLTS SHALL BE PROVIDED WITH LOCK-WASHERS, OR LOCK-NUTS, OR PAL-NUTS AND SHALL BE GALVANIZED ACCORDING TO ASTM A153/ASTM153M.
7. ALL HOLES IN THE NEW STEEL MEMBERS SHALL BE SIZED 1/16" LARGER THAN THE BOLT DIAMETER. SLOTTED OR OVERSIZED HOLES ARE NOT PERMITTED, UNO.
8. FIELD DRILLED OR CUT MATERIAL OR ANY GALVANIZED SURFACE THAT IS SCRATCHED OR DAMAGED DUE TO THE CONTRACTORS EFFORTS, TO BE COATED WITH TWO BRUSH COATS OF CROWN APPROVED ZINC RICH PAINT IN ACCORDANCE WITH ENG-BUL-10149.
9. REFER TO CCI DOC ENG-PLN-10015 FOR CUTTING AND WELDING SAFETY PLAN.

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DIAGONAL REPLACEMENT

S-2

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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: CT33XC547

W. Deep River
14 Route 80
Killingworth, CT 06419

August 1, 2018

EBI Project Number: 6218005231

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**7.52 %**

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

August 1, 2018

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

Emissions Analysis for Site: **CT33XC547 – W. Deep River**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **14 Route 80, Killingworth, 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.

General population 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.

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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 **14 Route 80, Killingworth, 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 for directional panel antennas, 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 50 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 for directional panel antennas, 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 **Commscope NNVV-65B-R4 and the RFS APXVTM14-ALU-I20** 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 for directional panel antennas, 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 panel antennas are **144 feet** above ground level (AGL) for **Sector A, 144 feet** above ground level (AGL) for **Sector B** and **144 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.

EBI Consulting

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SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4
Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd
Height (AGL):	**144 feet**	Height (AGL):	**144 feet**	Height (AGL):	**144 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):	280 Watts	Total TX Power(W):	280 Watts	Total TX Power(W):	280 Watts
ERP (W):	7,378.61	ERP (W):	7,378.61	ERP (W):	7,378.61
Antenna A1 MPE%	**1.71 %**	Antenna B1 MPE%	**1.71 %**	Antenna C1 MPE%	**1.71 %**
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	RFS APXVTM14-ALU-I20	Make / Model:	RFS APXVTM14-ALU-I20	Make / Model:	RFS APXVTM14-ALU-I20
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	**144 feet**	Height (AGL):	**144 feet**	Height (AGL):	**144 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%	**1.18 %**	Antenna B2 MPE%	**1.18 %**	Antenna C2 MPE%	**1.18 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**2.89 %**
AT&T	1.05 %
Nextel	0.65 %
Verizon Wireless	2.93 %
Site Total MPE %:	**7.52 %**

SPRINT Sector A Total:	2.89 %
SPRINT Sector B Total:	2.89 %
SPRINT Sector C Total:	2.89 %
Site Total:	7.52 %

SPRINT _ Frequency Band / Technology (All Sectors)	# 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	376.73	144	0.71	850 MHz	567	0.12%
Sprint 850 MHz LTE	2	941.82	144	3.56	850 MHz	567	0.63%
Sprint 1900 MHz (PCS) CDMA	5	511.82	144	4.83	1900 MHz (PCS)	1000	0.48%
Sprint 1900 MHz (PCS) LTE	2	1,279.56	144	4.83	1900 MHz (PCS)	1000	0.48%
Sprint 2500 MHz (BRS) LTE	8	778.09	144	11.75	2500 MHz (BRS)	1000	1.18%
						Total:	**2.89%**

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:	2.89 %
Sector B:	2.89 %
Sector C:	2.89 %
SPRINT Maximum MPE % (per sector):	2.89 %
Site Total:	7.52 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **7.52 %** 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.

ORIGIN ID:BEDA (781) 970-0053
JEFF BARBADORA
CROWN CASTLE
12 GILL STREET
SUITE 5800
WOBURN, MA 01801
UNITED STATES US

SHIP DATE: 07AUG18
ACTWGT: 0.50 LB
CAD: 104924191/INET4040

BILL SENDER

TO **14 ROUTE 80 LLC**
14 ROUTE 80 LLC
93A GLENWOOD ROAD

CLINTON CT 06413
(781) 970-0053 REF: 1766.6890
INV:
PO: DEPT:

552J1/3309/DCA5

J182018072201uv

WED - 08 AUG 10:30A
PRIORITY OVERNIGHT

TRK# 0201 **7729 1866 2444**

RES
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BDL
CT-US

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Barbadora, Jeff

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Subject:	FedEx Shipment 772918662444 Delivered

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Ship date:
Tue, 8/7/2018

Jeff Barbadora
Crown Castle
WOBURN, MA 01801
US

Delivered

Delivery date:
Wed, 8/8/2018 10:36 am

14 Route 80 LLC
14 Route 80 LLC
93A Glenwood Road
CLINTON, CT 06413
US

Shipment Facts

Our records indicate that the following package has been delivered.

Tracking number:	772918662444
Status:	Delivered: 08/08/2018 10:36 AM Signed for By: L.GRUM
Reference:	1766.6680
Signed for by:	L.GRUM
Delivery location:	CLINTON, CT
Delivered to:	Receptionist/Front Desk
Service type:	FedEx Priority Overnight®
Packaging type:	FedEx® Envelope
Number of pieces:	1
Weight:	1.00 lb.
Special handling/Services:	Deliver Weekday Residential Delivery
Standard transit:	8/8/2018 by 10:30 am

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JEFF BARBADORA
CROWN CASTLE
12 GILL STREET
SUITE 5800
WOBURN, MA 01801
UNITED STATES US

SHIP DATE: 07AUG18
ACTWGT: 0.50 LB
CAD: 104924191/INET4040

BILL SENDER

TO CATHERINE LINO-FIRST SELECTWOMEN
TOWN OF KILLINGWORTH
323 ROUTE 81
KILLINGWORTH CT 06419
(860) 663-1765 REF: 1786.6680
INV:
PO: DEPT:

552J1/3309/DCA5

FedEx Express

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WED - 08 AUG 12:00P
PRIORITY OVERNIGHT

TRK# 0201 7729 1856 1489

06419
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Barbadora, Jeff

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Ship date:
Tue, 8/7/2018
Jeff Barbadora
Crown Castle
WOBURN, MA 01801
US

Delivered

Delivery date:
Wed, 8/8/2018 12:27 pm
Catherine Lino-First Selectwomen
Town of Killingworth
323 Route 81
KILLINGWORTH, CT 06419
US

Shipment Facts

Our records indicate that the following package has been delivered.

Tracking number:	772918561489
Status:	Delivered: 08/08/2018 12:27 PM Signed for By: M.OTOOLE
Reference:	1766.6680
Signed for by:	M.OTOOLE
Delivery location:	KILLINGWORTH, CT
Delivered to:	Receptionist/Front Desk
Service type:	FedEx Priority Overnight®
Packaging type:	FedEx® Envelope
Number of pieces:	1
Weight:	1.00 lb.
Special handling/Services:	Deliver Weekday
Standard transit:	8/8/2018 by 12:00 pm

ORIGIN ID:BEDA (781) 970-0053
JEFF BARBADORA
CROWN CASTLE
12 GILL STREET
SUITE 5800
WOBURN, MA 01801
UNITED STATES US

SHIP DATE: 07AUG18
ACTWGT: 0.50 LB
CAD: 104924191/INET4040

BILL SENDER

TO MS. CATHIE JEFFERON-ZONING OFFICER
TOWN OF KILLINGWORTH
323 ROUTE 81

KILLINGWORTH CT 06419
(860) 663-1765 REF: 1766.6680
INV:
PO: DEPT:

552J1/3309/DCA5

FedEx Express

J182018072201uv

TRK# 7729 1858 5648
0201

WED - 08 AUG 12:00P
PRIORITY OVERNIGHT

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06419
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Barbadora, Jeff

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Tracking # 772918585648

Ship date:
Tue, 8/7/2018
Jeff Barbadora
Crown Castle
WOBURN, MA 01801
US

Delivered

Delivery date:
Wed, 8/8/2018 12:27 pm
Ms. Cathie Jefferon-Zoning Officer
Town of Killingworth
323 Route 81
KILLINGWORTH, CT 06419
US

Shipment Facts

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Tracking number:	772918585648
Status:	Delivered: 08/08/2018 12:27 PM Signed for By: M.OTOOLE
Reference:	1766.6680
Signed for by:	M.OTOOLE
Delivery location:	KILLINGWORTH, CT
Delivered to:	Receptionist/Front Desk
Service type:	FedEx Priority Overnight®
Packaging type:	FedEx® Envelope
Number of pieces:	1
Weight:	1.00 lb.
Special handling/Services:	Deliver Weekday
Standard transit:	8/8/2018 by 12:00 pm

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