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October 16, 2014

Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051
Attn: Ms. Melanie Bachman, Executive Director

Re: 20 Antolini Road – New Hartford, CT

Dear Ms. Bachman,

On behalf of Sprint Nextel Corporation ("Sprint"), enclosed for filing are One (1) original and two (2) copies of Sprint's Notice of Exempt Modification for Proposed Modifications to an Existing Telecommunications Facility located at the above-referenced site.

I also enclose herewith a check in the amount of $625.00 representing the fee for the Notice of Exempt Modification.

If you have any questions, please feel free to contact me.

Thank you,

By: _____

Name: Paul F. Sagristano
Vertical Development LLC, an authorized representative of Sprint Nextel
Vertical Development LLC
20 Commercial Street
Branford, CT 06405
Phone – 917-841-0247
Fax – 401-633-6202
psagristano@verticaldevelopmentllc.com

CC: Mr. Daniel V. Jerram, First Selectman
New Hartford Town Hall
530 Main St.
P.O. Box 316
New Hartford, CT 06057

South End Fire District
20 Antolini Road
New Hartford, CT 06057

Notice of Exempt Modification

20 Antolini Road, New Hartford, CT

Sprint Nextel Corporation ("Sprint") submits this Notice of Exempt Modification to the Connecticut Siting Council ("Council") pursuant to Sections 16-50j-73 and 16-50j-72(b) of the Regulations of Connecticut State Agencies (“Regulations”) in connection with Sprint’s planned modification of antennas and associated equipment on an existing 145’ Monopole tower located at 20 Antolini Road in the Town of New Hartford. More particularly, Sprint plans to upgrade this site by adding 4G LTE technology to its facilities. The proposed modifications will not increase the tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six (6) decibels, or add radio frequency sending or receiving capability which increases the total radio frequency electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to Connecticut General Statutes § 22a-162.

To better meet the growing voice and data demands of its wireless customers, Sprint is upgrading their network nationwide to include the 2500 MHz band to its current 4G technology, which will provide faster service and better overall performance. Pursuant to the 2.5 upgrade at this site, Sprint will add antennas, install RRHs, and install related equipment to its equipment area within the fenced compound at the base of the tower.

The 145’ guyed tower located at 20 Antolini Road in the Town of New Hartford (lat. 41.828019, long. -73.015663) is owned by Verizon Towers. It is in an approx. 2500+ square foot fenced compound. Sprint currently has six (3) antennas, one (1) per sector), behind which, mounted to the same pipe, are one (1) of each ALU 800 MHz RRH and ALU 1900 MHz RRH for a total of six (6) at a centerline of 147’ installed on the tower and associated transmission lines (one (1) per antenna). Sprint's base station equipment is located adjacent to the base of the tower within the fenced compound. A site plan depicting this is attached.

Sprint plans to add three (3) RFS APXVTM14-C-120 antennas, one (1) per sector, all with a centerline of 147', and associated transmission lines (one (1) per antenna). Connected to each new RFS antenna will be one (1) ALU-TD-RRH8x20 25 RRH located behind the antenna on a pipe mount. The height of the tower will not need to be increased. Sprint also plans to install new batteries within an existing cabinet inside their existing equipment space within the tower compound's fenced border, and to extend the ice bridge and retrofit the existing BTS cabinet. The compound's boundaries will not need to be extended. Other than brief, construction-related noise, these modifications will not increase noise levels at the tower site boundary by six (6) decibels.

Sprint commissioned Centek Engineering, LLC, to perform a structural analysis of the tower to verify that it can support the proposed loading. The tower "Passes with completed modifications (96.7.0% Capacity)" (see page 7 of Structural Analysis Report, September 24, 2014).

The proposed modifications will not add radio frequency sending or receiving capability which increases the total radio frequency electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to Connecticut General Statutes § 22a-162. A radio frequency emissions analysis prepared by EBI Consulting indicates that the proposed final configuration (including other carriers on the tower) will emit 86.59% of the allowable FCC established general public limit sampled at the ground level (see the 5th page of Radio Frequency Emissions Analysis Report - Evaluation of Human Exposure Potential to Non-Ionizing Emissions, October 15, 2014). Emission values for the Sprint antennas have been calculated from the sample point, which is the top of a six foot person standing at the base of the tower. Emissions values for additional carriers were based upon values listed in Connecticut Siting Council active database (see the 3rd and 4th page of Radio Frequency Emissions Analysis Report - Evaluation of Human Exposure Potential to Non-Ionizing Emissions, October 15, 2014). The information used in the 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 (see the second page of Radio Frequency Emissions Analysis Report - Evaluation of Human Exposure Potential to Non-Ionizing Emissions, October 15, 2014).

In conclusion, Sprint's proposed modifications do not constitute a modification subject to the Council's review because Sprint will not change the height of the tower, will not extend the boundaries of the compound, will not increase the noise levels at the site, and will not increase the total radio frequency electromagnetic radiation power density at the site to levels above applicable standards. Therefore, Sprint respectfully requests that the Council acknowledge that this Notice of Exempt Modification meets the Council's exemption criteria.

Sprint

PROJECT:	2.5 EQUIPMENT DEPLOYMENT
SITE NAME:	NEW HARTFORD (VERIZON)
SITE CASCADE:	CT33XC022
SITE ADDRESS:	20 ANTOLINI RD NEW HARTFORD, CT 06057
SITE TYPE:	MONOPOLE TOWER
MARKET:	SOUTHERN CONNECTICUT

SITE INFORMATION

PROPERTY OWNER:
SOUTH END FIRE DISTRICT
C/O VERIZON WIRLESS
180 WASHINGTON VALLEY RD
BEDMINSTER, NJ 07921

LATITUDE (NAD83):
41° 49' 40.9764" N
41.828049°

LONGITUDE (NAD83):
73° 0' 56.3868" W
-73.015663°

COUNTY:
LITCHFIELD

ZONING JURISDICTION:
CONNECTICUT SITING COUNCIL
TOWN OF NEW HARTFORD

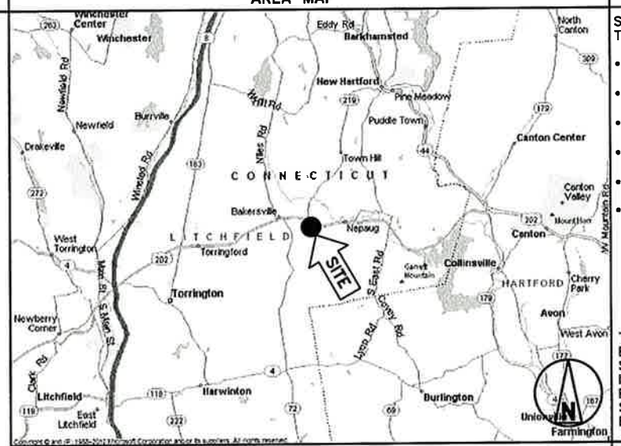
ZONING DISTRICT:
TBD

POWER COMPANY:
CPL
(866) 322-5563

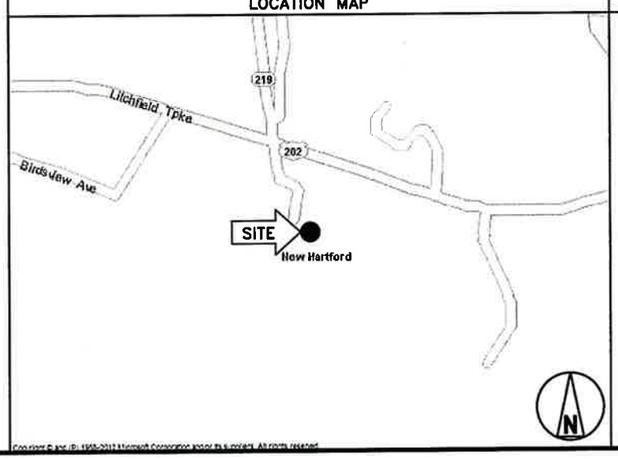
AAV PROVIDER:
AT&T
(800) 288-2020

SPRINT CM:
GARY WOOD
PHONE: (860) 940-9168
gary.wood@sprint.com

AREA MAP



LOCATION MAP



PROJECT DESCRIPTION

SPRINT PROPOSES TO MODIFY AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY.

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

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

APPLICABLE CODES

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

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

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

DRAWING INDEX

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

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

PLANS PREPARED BY:
INFINIGY Design. Build. Deliver.
1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793
JOB NUMBER 333-000

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

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR PERMIT	10/8/14	AHS	0

SITE NAME:
NEW HARTFORD (VERIZON)

SITE CASCADE:
CT33XC022

SITE ADDRESS:
20 ANTOLINI RD
NEWHARTFOR, CT 06057

SHEET DESCRIPTION:
TITLE SHEET & PROJECT DATA

SHEET NUMBER:
T-1

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

SECTION 01 100 – SCOPE OF WORK

PART 1 – GENERAL

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

1.2 RELATED DOCUMENTS:

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

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

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

1.4 NATIONALLY RECOGNIZED CODES AND STANDARDS:

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

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

1.5 DEFINITIONS:

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

B. COMPANY: SPRINT CORPORATION

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

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

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

F. OFCI: OWNER FURNISHED, CONTRACTOR INSTALLED EQUIPMENT.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1.15 USE OF ELECTRONIC PROJECT MANAGEMENT SYSTEMS:

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

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

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

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

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

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

SECTION 01 200 – COMPANY FURNISHED MATERIAL AND EQUIPMENT

PART 1 – GENERAL

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

1.2 RELATED DOCUMENTS:

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

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 RECEIPT OF MATERIAL AND EQUIPMENT:

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

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

1 ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.
2. VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.
3. TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.
4. RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY-FOUR HOURS AFTER RECEIPT, REPORT TO SPRINT OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.
5. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.
6. COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF-LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

3.2 DELIVERABLES:

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

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

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

SECTION 01 300 – CELL SITE CONSTRUCTION CO.

PART 1 – GENERAL

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

1.2 RELATED DOCUMENTS:

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

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

1.3 NOTICE TO PROCEED

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

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 FUNCTIONAL REQUIREMENTS:

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

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

C. MANAGE AND CONDUCT ALL FIELD CONSTRUCTION SERVICE RELATED ACTIVITIES

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

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.

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

JOB NUMBER 333-000

ENGINEERING LICENSE:

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

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR PERMIT	10/8/14	AHS	0

SITE NAME:

NEW HARTFORD
(VERIZON)

SITE CASCADE:

CT33XC022

SITE ADDRESS:

20 ANTOLINI RD
NEWHARTFOR, CT 06057

SHEET DESCRIPTION:

SPRINT SPECIFICATIONS

SHEET NUMBER:

SP-1

CONTINUE FROM SP-1

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

3.2 GENERAL REQUIREMENTS FOR CIVIL CONSTRUCTION:

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

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

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

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

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

E. CONDUCT TESTING AS REQUIRED HEREIN.

3.3 DELIVERABLES:

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

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

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

SECTION 01 400 – SUBMITTALS & TESTS

PART 1 – GENERAL

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

1.2 RELATED DOCUMENTS:

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

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

1.3 SUBMITTALS:

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

B. SUBMIT THE FOLLOWING TO COMPANY REPRESENTATIVE FOR APPROVAL.

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

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

1.4 TESTS AND INSPECTIONS:

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

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

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

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

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

1.5 COMMISSIONING: PERFORM ALL COMMISSIONING AS REQUIRED BY APPLICABLE MOPs

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 REQUIREMENTS FOR TESTING:

A. THIRD PARTY TESTING AGENCY:

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

3.2 REQUIRED TESTS:

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

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

3.3 REQUIRED INSPECTIONS

A. SCHEDULE INSPECTIONS WITH COMPANY REPRESENTATIVE.

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

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

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.

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

JOB NUMBER 333-000

ENGINEERING LICENSE:

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

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR PERMIT	10/8/14	AHS	0

SITE NAME:

NEW HARTFORD
(VERIZON)

SITE CASCADE:

CT33XC022

SITE ADDRESS:

20 ANTOLINI RD
NEWHARTFOR, CT 06057

SHEET DESCRIPTION:

SPRINT SPECIFICATIONS

SHEET NUMBER:

SP-2

CONTINUE FROM SP-2

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

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

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

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

11. ALL AVAILABLE JURISDICTIONAL INFORMATION

12. PDF SCAN OF REDLINES PRODUCED IN FIELD

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

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

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

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

1. CONCRETE MIX AND CYLINDER BREAK REPORTS.

2. STRUCTURAL BACKFILL COMPACTION REPORTS.

3. SITE RESISTANCE TO EARTH TEST.

4. ANTENNA AZIMUTH AND DOWN TILT VERIFICATION

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

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

B. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES THE FOLLOWING;

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

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

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

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

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

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

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

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

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

SECTION 01 400 – SUBMITTALS & TESTS

PART 1 – GENERAL

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

1.2 RELATED DOCUMENTS:

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

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 WEEKLY REPORTS:

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

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

3.2 PROJECT CONFERENCE CALLS:

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

3.3 PROJECT TRACKING IN SMS:

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

3.4 ADDITIONAL REPORTING:

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

3.5 PROJECT PHOTOGRAPHS:

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

1. 1SHELTER AND TOWER OVERVIEW.

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

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

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

5. PHOTOS OF TOWER SECTION STACKING.

6. CONCRETE TESTING / SAMPLES.

7. PLACING OF ANCHOR BOLTS IN TOWER FOUNDATION.

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

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

10. SHELTER FOUNDATION POUR WITH VIBRATOR IN USE.

11. COAX CABLE ENTRY INTO SHELTER.

12. PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.

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

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

15. PHOTOS OF ALL APPROPRIATE COMPANY OR REGULATORY SIGNAGE.

16. PHOTOS OF EQUIPMENT BOLT DOWN INSIDE SHELTER.

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

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

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

20. TELCO TRENCH WITH TELEPHONE / CONDUIT BEFORE BACKFILL.

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

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

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

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

25. ALL BTS GROUND CONNECTIONS.

26. ALL GROUND TEST WELLS.

27. ANTENNA GROUND BAR AND EQUIPMENT GROUND BAR.

28. ADDITIONAL GROUNDING POINTS ON TOWERS ABOVE 200'.

29. HVAC UNITS INCLUDING CONDENSERS ON SPLIT SYSTEMS.

30. GPS ANTENNAS.

31. CABLE TRAY AND/OR WAVEGUIDE BRIDGE.

32. DOGHOUSE/CABLE EXIT FROM ROOF.

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

34. MASTER BUS BAR.

35. TELCO BOARD AND NIU.

36. ELECTRICAL DISTRIBUTION WALL.

37. CABLE ENTRY WITH SURGE SUPPRESSION.

38. ENTRANCE TO EQUIPMENT ROOM.

39. COAX WEATHERPROOFING–TOP AND BOTTOM OF TOWER.

40. COAX GROUNDING –TOP AND BOTTOM OF TOWER.

41. ANTENNA AND MAST GROUNDING.

42. LANDSCAPING – WHERE APPLICABLE.

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

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.

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

JOB NUMBER 333-000

ENGINEERING LICENSE:

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

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR PERMIT	10/8/14	AHS	0

SITE NAME:

NEW HARTFORD
(VERIZON)

SITE CASCADE:

CT33XC022

SITE ADDRESS:

20 ANTOLINI RD
NEWHARTFOR, CT 06057

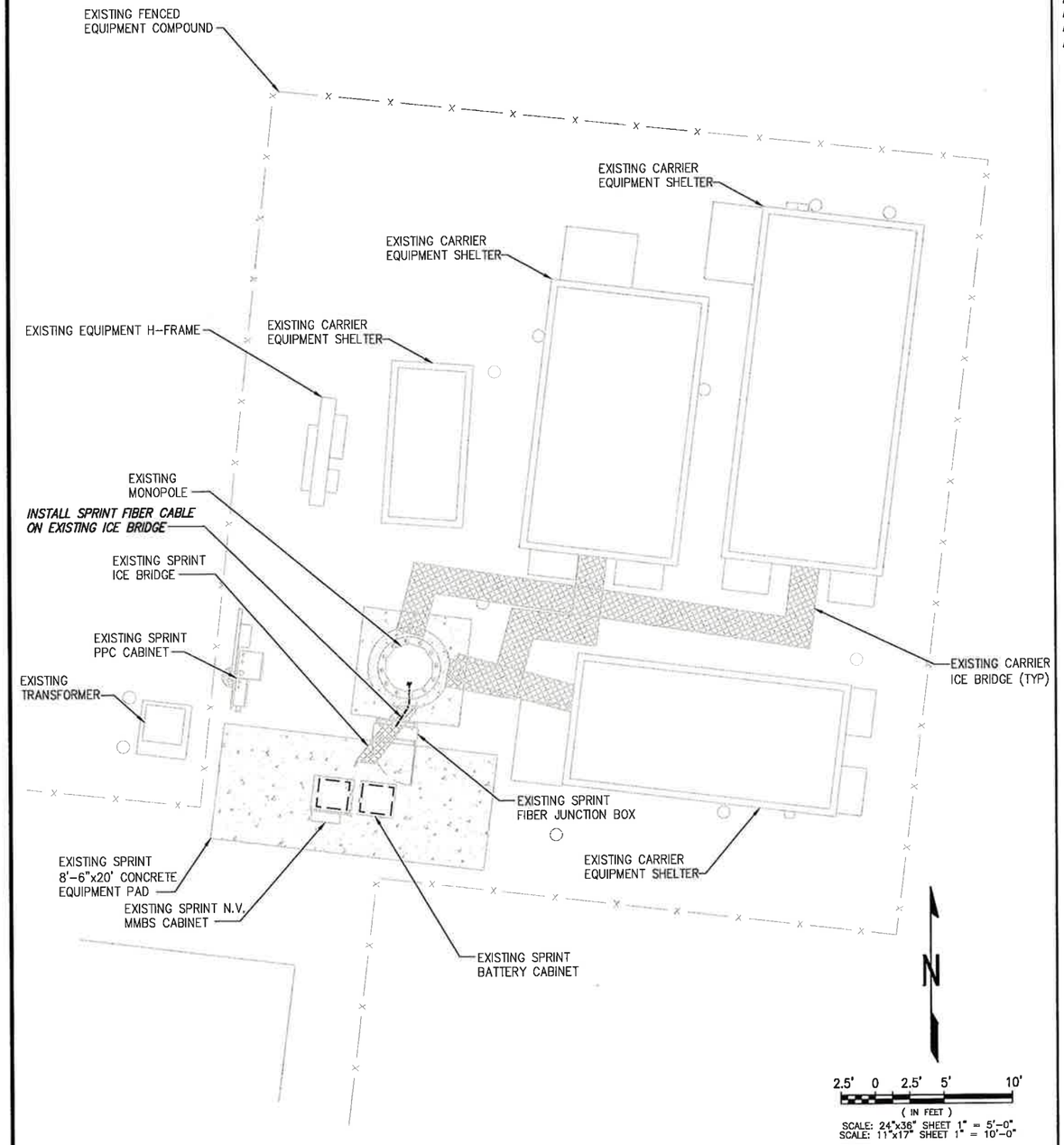
SHEET DESCRIPTION:

SPRINT SPECIFICATIONS

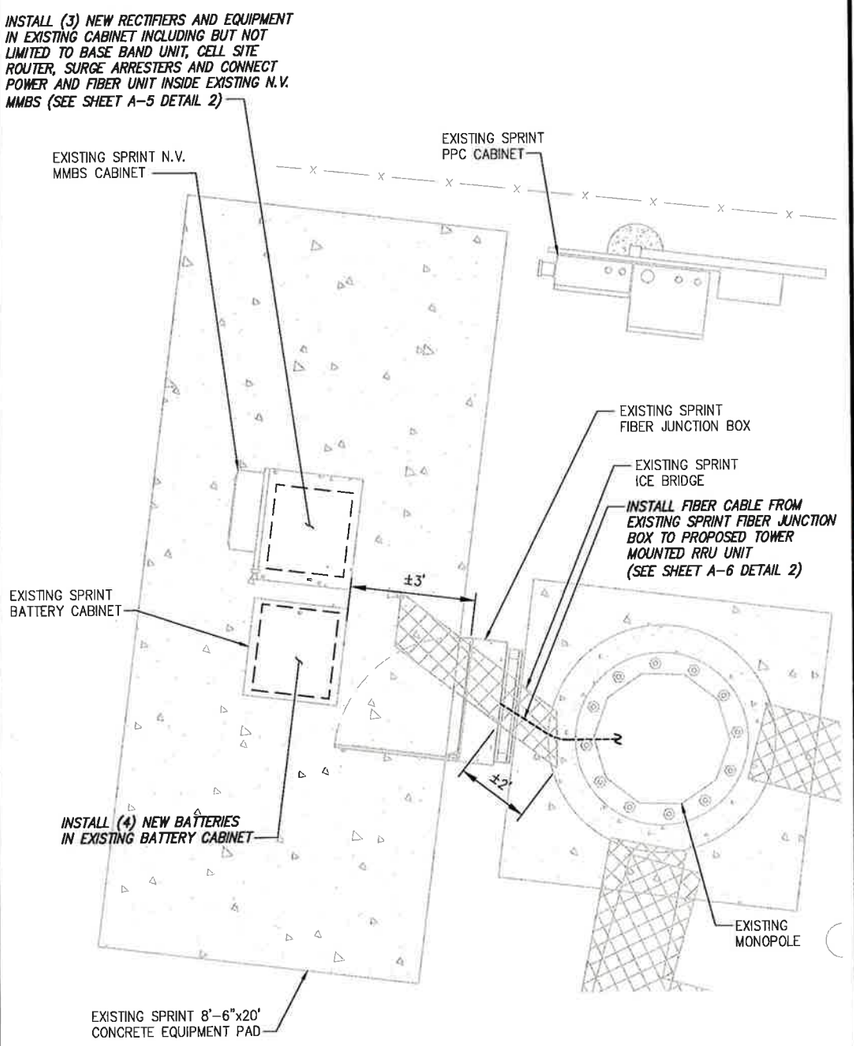
SHEET NUMBER:

SP-3

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



OVERALL SITE PLAN | SCALE: AS NOTED | 1



SPRINT EQUIPMENT PLAN | SCALE: AS NOTED | 2

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.

1033 Watervliet Shaker Rd
Albany, NY 12205
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STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR PERMIT	10/8/14	AHS	0

SITE NAME:

NEW HARTFORD (VERIZON)

SITE CASCADE:

CT33XC022

SITE ADDRESS:

20 ANTOLINI RD
NEWHARTFOR, CT 06057

SHEET DESCRIPTION:

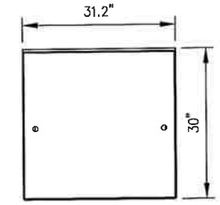
SITE PLAN

SHEET NUMBER:

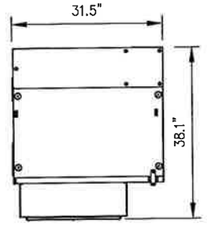
A-1

EXISTING CABINET LAYOUT | SCALE: AS NOTED | 1

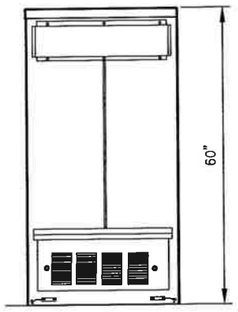
EXISTING BATTERY CABINET | SCALE: AS NOTED | 2



TOP VIEW



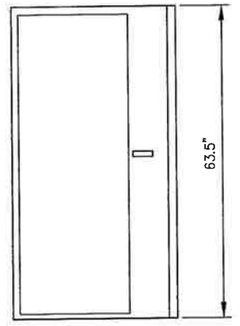
TOP VIEW



REAR VIEW

MANUFACTURER: TBD
MODEL: 60ECv2

BATTERY CABINET



FRONT VIEW

MANUFACTURER: ALU
MODEL: 9927

N.V. MMBS CABINET

EXISTING CABINETS | SCALE: AS NOTED | 3

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

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

JOB NUMBER 333-000

ENGINEERING LICENSE:

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

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR PERMIT	10/8/14	AHS	0

SITE NAME:

NEW HARTFORD
(VERIZON)

SITE CASCADE:

CT33XC022

SITE ADDRESS:

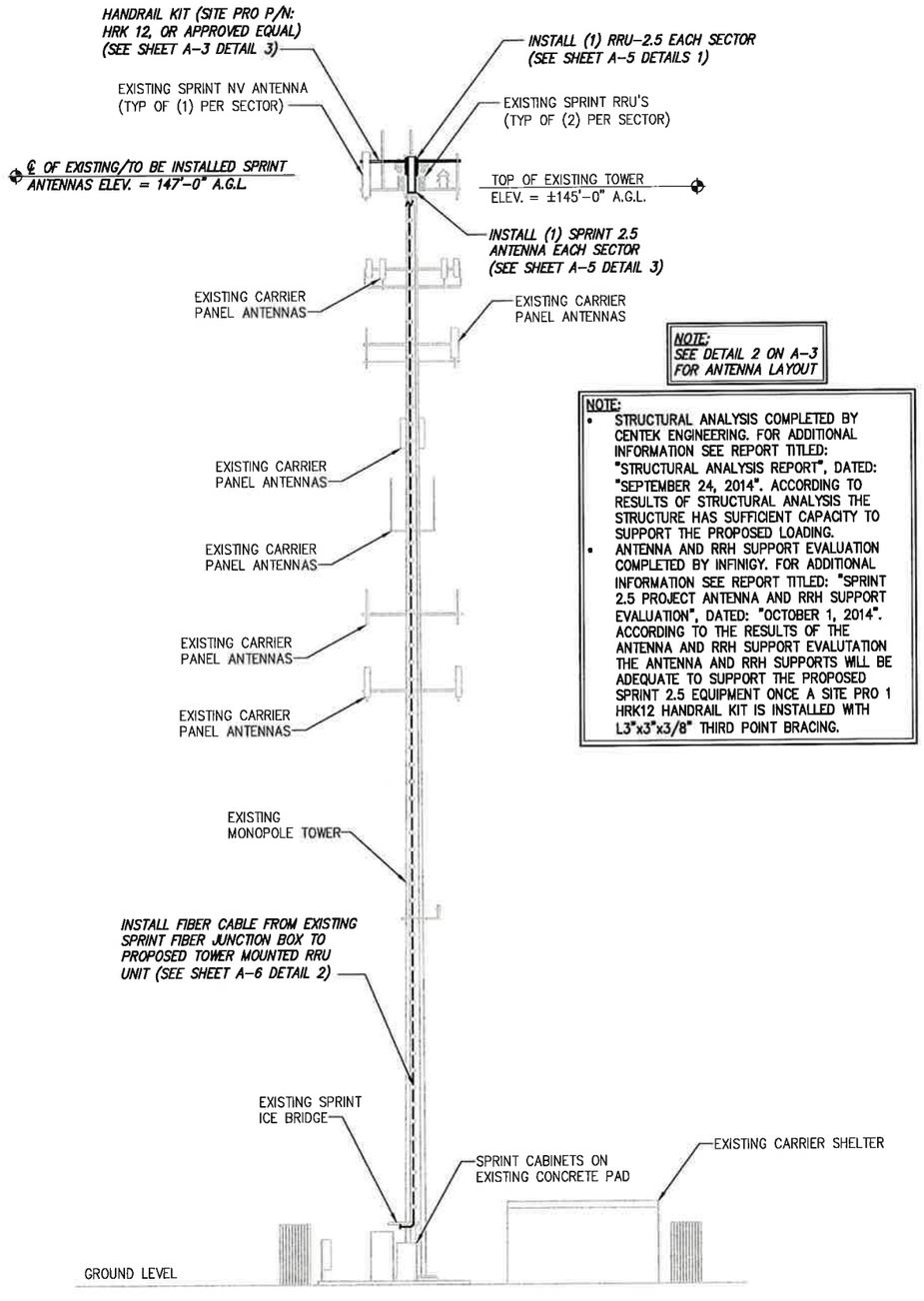
20 ANTOLINI RD
NEWHARTFOR, CT 06057

SHEET DESCRIPTION:

EXISTING EQUIPMENT DETAILS

SHEET NUMBER:

A-1A

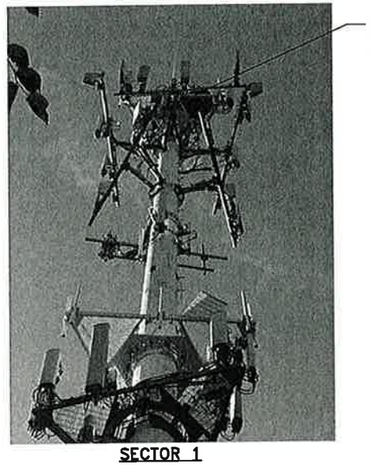


NOTE:
SEE DETAIL 2 ON A-3 FOR ANTENNA LAYOUT

NOTE:

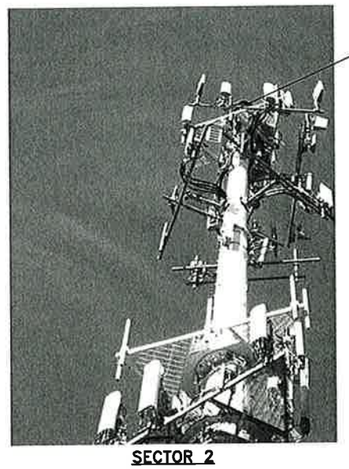
- STRUCTURAL ANALYSIS COMPLETED BY CENTEK ENGINEERING. FOR ADDITIONAL INFORMATION SEE REPORT TITLED: "STRUCTURAL ANALYSIS REPORT", DATED: "SEPTEMBER 24, 2014". ACCORDING TO RESULTS OF STRUCTURAL ANALYSIS THE STRUCTURE HAS SUFFICIENT CAPACITY TO SUPPORT THE PROPOSED LOADING.
- ANTENNA AND RRH SUPPORT EVALUATION COMPLETED BY INFINIGY. FOR ADDITIONAL INFORMATION SEE REPORT TITLED: "SPRINT 2.5 PROJECT ANTENNA AND RRH SUPPORT EVALUATION", DATED: "OCTOBER 1, 2014". ACCORDING TO THE RESULTS OF THE ANTENNA AND RRH SUPPORT EVALUTATION THE ANTENNA AND RRH SUPPORTS WILL BE ADEQUATE TO SUPPORT THE PROPOSED SPRINT 2.5 EQUIPMENT ONCE A SITE PRO 1 HRK12 HANDRAIL KIT IS INSTALLED WITH L3"x3"x3/8" THIRD POINT BRACING.

TOWER ELEVATION | NO SCALE | 1



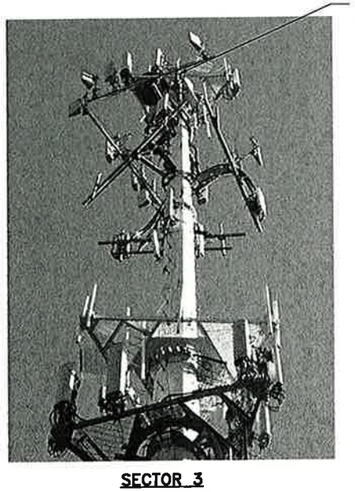
INSTALL (1) SPRINT 2.5 ANTENNA EACH SECTOR WITH 2.5 RRU BEHIND (SEE SHEET A-5 DETAIL 3)

SECTOR 1



INSTALL (1) SPRINT 2.5 ANTENNA EACH SECTOR WITH 2.5 RRU BEHIND (SEE SHEET A-5 DETAIL 3)

SECTOR 2



INSTALL (1) SPRINT 2.5 ANTENNA EACH SECTOR WITH 2.5 RRU BEHIND (SEE SHEET A-5 DETAIL 3)

SECTOR 3

TOWER PHOTOS | NO SCALE | 2

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NEW HARTFORD (VERIZON)

SITE CASCADE:

CT33XC022

SITE ADDRESS:

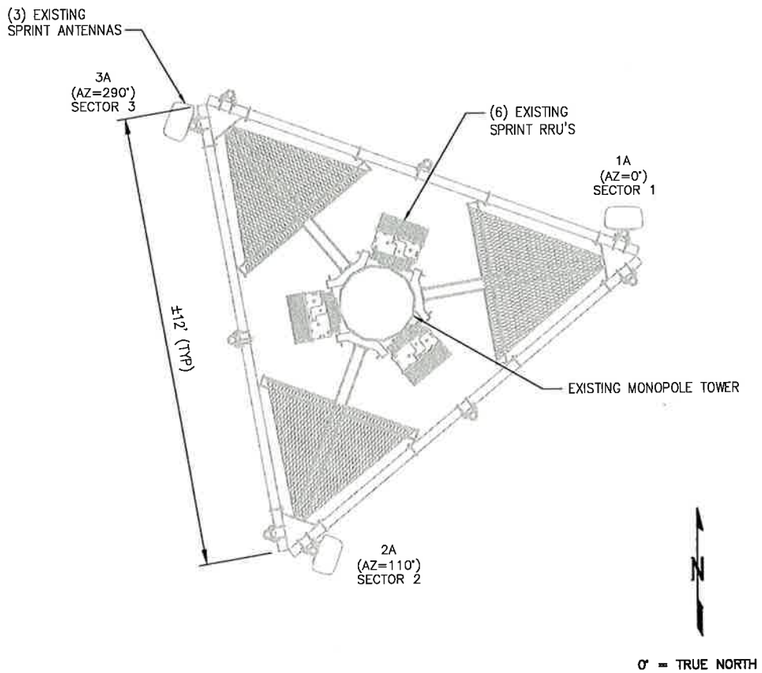
20 ANTOLINI RD
NEWHARTFOR, CT 06057

SHEET DESCRIPTION:

TOWER ELEVATION & CABLE PLAN

SHEET NUMBER:

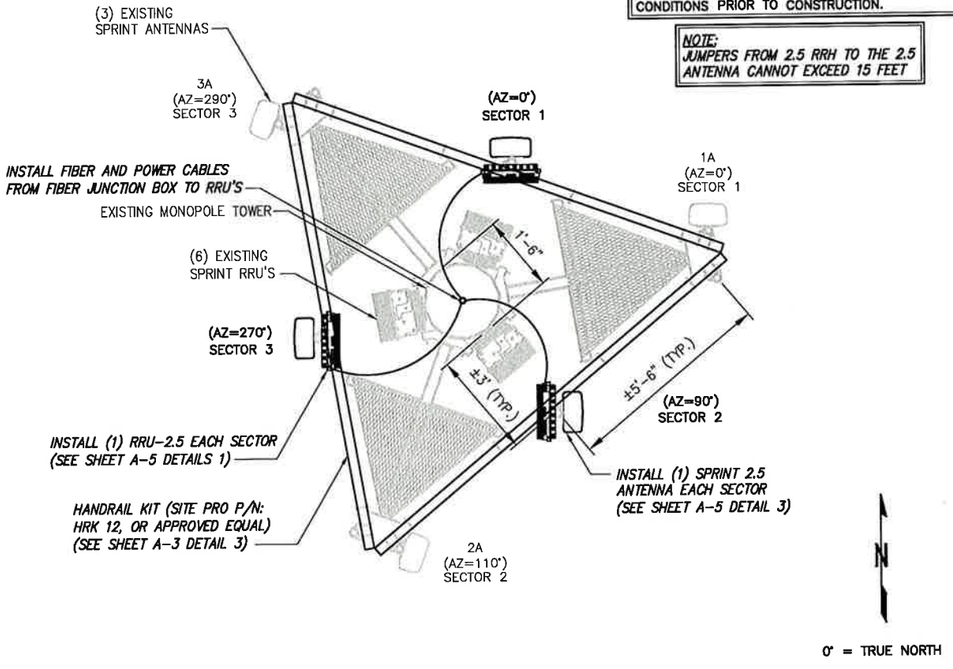
A-2



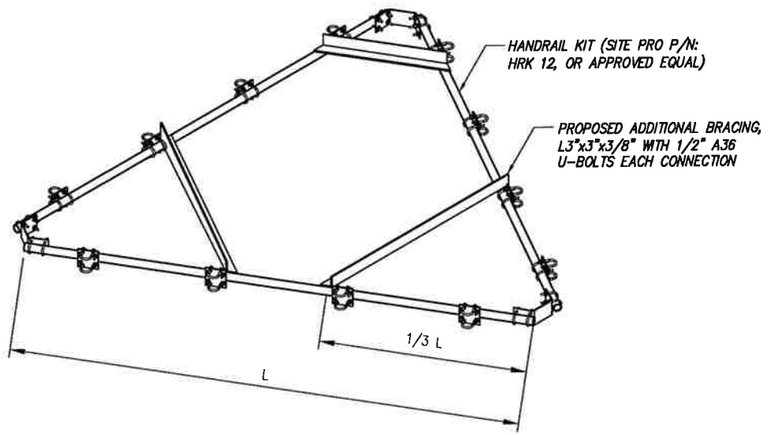
EXISTING ANTENNA & RRU LAYOUT | NO SCALE | 1

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

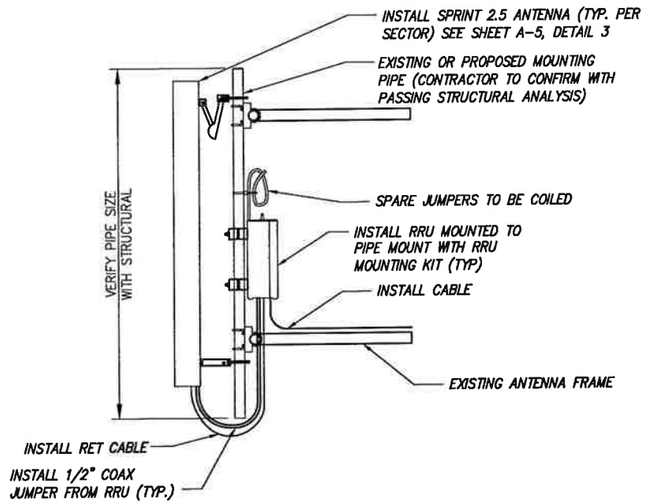
NOTE:
JUMPERS FROM 2.5 RRH TO THE 2.5 ANTENNA CANNOT EXCEED 15 FEET



FINAL ANTENNA LAYOUT | NO SCALE | 2



NO SCALE | 3



NOTES:

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

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

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

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

TYPICAL ANTENNA & RRU MOUNTING DETAILS | NO SCALE | 4

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SITE NAME:

NEW HARTFORD
(VERIZON)

SITE CASCADE:

CT33XC022

SITE ADDRESS:

20 ANTOLINI RD
NEWHARTFOR, CT 06057

SHEET DESCRIPTION:

ANTENNA LAYOUT
& MOUNTING DETAILS

SHEET NUMBER:

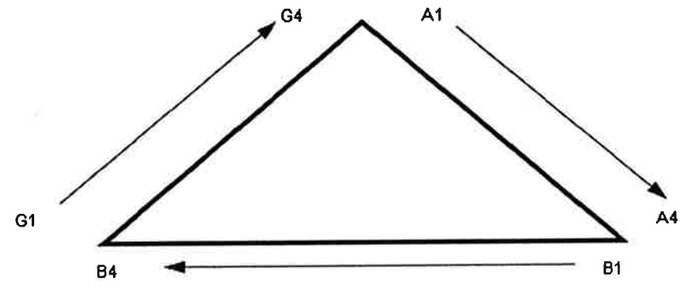
A-3

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

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

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

Figure 1: Antenna Orientation



NOTES:

1. ALL CABLES SHALL BE MARKED WITH 2" WIDE, UV STABILIZED, UL APPROVED TAPE.
2. THE FIRST RING SHALL BE CLOSEST TO THE END OF THE CABLE AND SPACED APPROXIMATELY 2" FROM THE END CONNECTOR, WEATHERPROOFING, OR BREAK-OUT CYLINDER. THERE SHALL BE A 1" SPACE BETWEEN EACH RING FOR THE CABLE IDENTIFIER, AND NO SPACES BETWEEN THE FREQUENCY BANDS.
3. A 2" GAP SHALL SEPARATE THE CABLE COLOR CODE FROM THE FREQUENCY COLOR CODE. THE 2" COLOR RINGS FOR THE FREQUENCY CODE SHALL BE PLACED NEXT TO EACH OTHER WITH NO SPACES.
4. THE 2" COLORED TAPE(S) SHALL EACH BE WRAPPED A MINIMUM OF 3 TIMES AROUND THE INDIVIDUAL CABLES, AND THE TAPE SHALL BE KEPT IN THE SAME LOCATION AS MUCH AS POSSIBLE.
5. SITES WITH MORE THAN FOUR (4) SECTORS WILL REQUIRE ADDITIONAL RINGS FOR EACH SECTOR, FOLLOWING THE PATTERN. HIGH CAPACITY SITES WILL USE THE NEXT COLOR IN THE SEQUENCE FOR ADDITIONAL CABLES IN EACH SECTOR.
6. HYBRID FIBER CABLE SHALL BE SECTOR IDENTIFIED INSIDE THE CABINET ON FREQUENCY BUNDLES, ON THE SEALTITE, ON THE MAIN LINE UPON EXIT OF SEALTITE, AND BEFORE AND AFTER THE BREAKOUT UNIT (MEDUSA), AS WELL AS BEFORE AND AFTER ANY ENTRANCE OR EXIT.
7. HFC "MAIN TRUNK" WILL NOT BE MARKED WITH THE FREQUENCY CODES, AS IT CONTAINS ALL FREQUENCIES.
8. INDIVIDUAL POWER PAIRS AND FIBER BUNDLES SHALL BE LABELED WITH BOTH THE CABLE AND FREQUENCY.

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

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

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

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

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

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

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SITE CASCADE:
CT33XC022

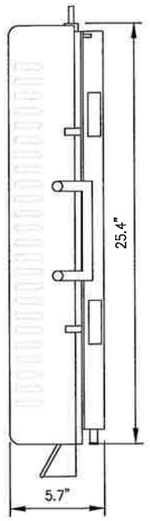
SITE ADDRESS:
20 ANTOLINI RD
NEWHARTFOR, CT 06057

SHEET DESCRIPTION:
COLOR CODING
AND NOTES

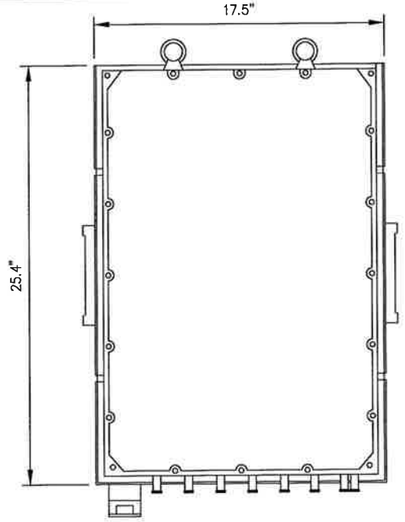
SHEET NUMBER:
A-4

RRU: ALCATEL LUCENT TD-RRH8X20

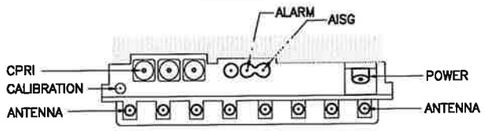
COLOR: LIGHT GREY
WEIGHT: 70 LBS.



SIDE VIEW



FRONT VIEW

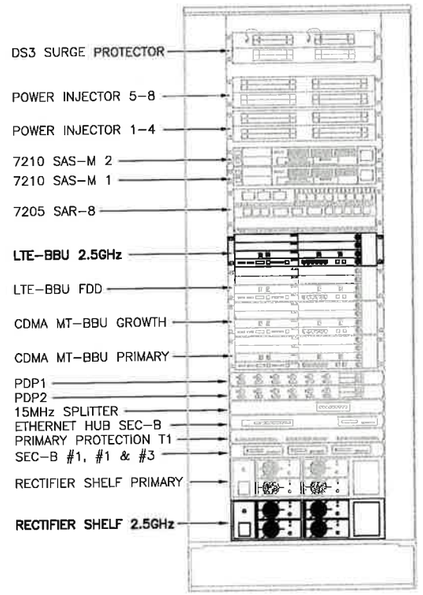


PLAN VIEW

NOTES

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

2.5 RRU'S | NO SCALE | 1

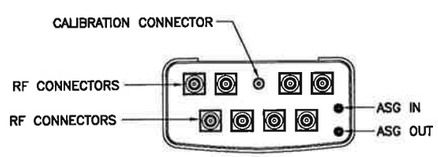


FRONT VIEW

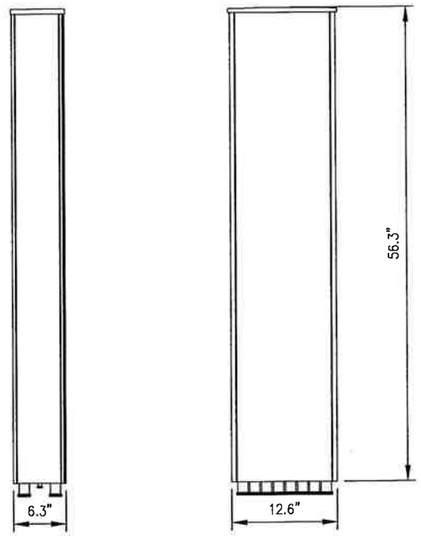
2.5 EQUIPMENT IN EXISTING N.V. MMBS | NO SCALE | 2

ANTENNA RFS APXVTM14-C-I20

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

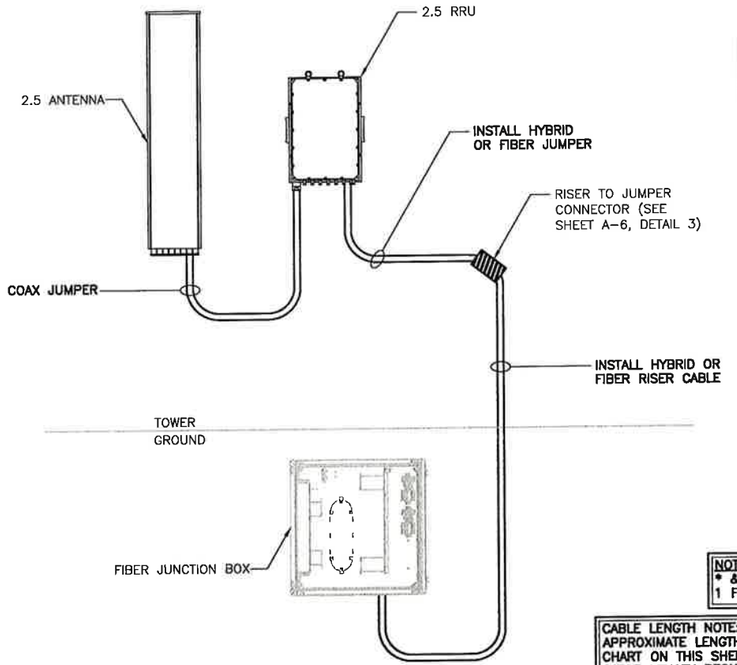


PLAN VIEW



SIDE VIEW FRONT VIEW

2.5 ANTENNA | NO SCALE | 3



INFINIGY ESTIMATES

*	*Riser Cable Length Estimate		Units
	At Grade	2	Feet
	Vertical Rise	147	Feet
	At Sprint Centerline	0	Feet
	Sub-Total	149	Feet
	15% Buffer	23	Feet
	Total	172	Feet

ABOVE LENGTH IS AN ESTIMATE AND SHOULD BE VERIFIED IN FIELD PRIOR TO ORDERING MATERIALS.

**	Hybrid/Fiber Jumper Length Estimate		Units
	From Connector To RRU	20	Feet

ABOVE LENGTH IS AN ESTIMATE AND SHOULD BE VERIFIED IN FIELD PRIOR TO ORDERING MATERIALS.

	Coax Jumper Length Estimate		Units
	From RRU to Antenna	5	Feet

ABOVE LENGTH IS AN ESTIMATE AND SHOULD BE VERIFIED IN FIELD PRIOR TO ORDERING MATERIALS.

NOTE:
* & **: REFERENCE SHEET A-6, DETAIL 1 FOR CORRESPONDING PART NUMBERS.

CABLE LENGTH NOTE:
APPROXIMATE LENGTH OF NEW CABLE IS SHOWN IN CHART ON THIS SHEET. CONTRACTOR TO CONFIRM EXACT CABLE LENGTH REQUIRED PRIOR TO ORDERING MATERIALS.

CABLING SCHEMATIC | NO SCALE | 4

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SHEET DESCRIPTION:
EQUIPMENT & MOUNTING DETAILS

SHEET NUMBER:
A-5

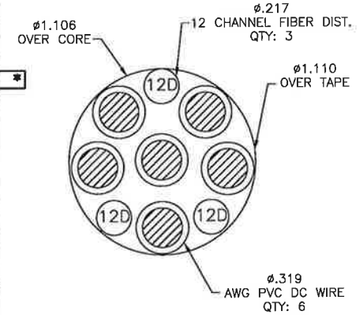
RFS HYBRIFLEX RISER CABLE SCHEDULE

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

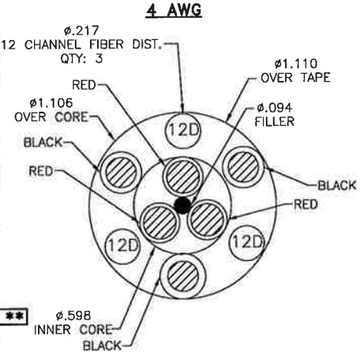
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

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

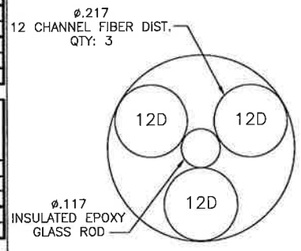
NOTE:
SPRINT CM TO CONFIRM HYBRID OR FIBER RISER CABLE AND HYBRID OR FIBER JUMPER CABLE MODEL NUMBERS IF HYBRID CABLES ARE REQUIRED BEFORE PREPARING BOM.



4 AWG

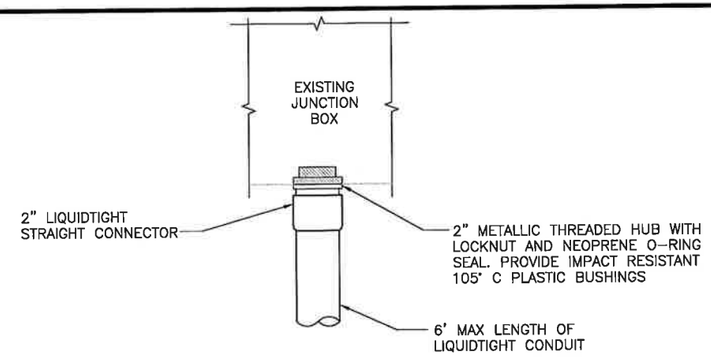


8 & 6 AWG



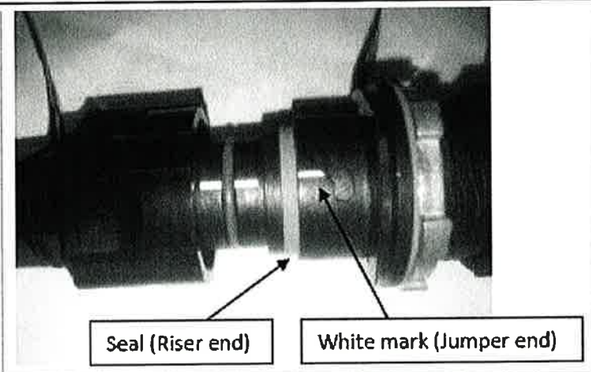
FIBER ONLY

2.5 CABLE CROSS SECTION DATA | NO SCALE | 1

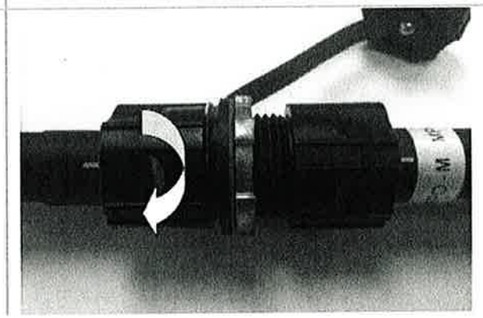


FIBER JUNCTION BOX PENETRATION | NO SCALE | 2

IMPORTANT!! Line up white markings on jumper and riser IP-MPO connectors and slide the riser connector to the jumper connector. Push the white mark on the jumper connector flush again the red seal on the riser connector.

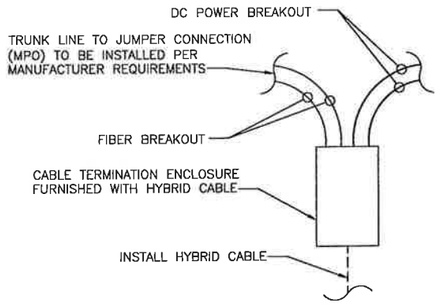


IMPORTANT!! Rotate the bayonet housing clock wise until you hear a click sound (means a good connection is in place).

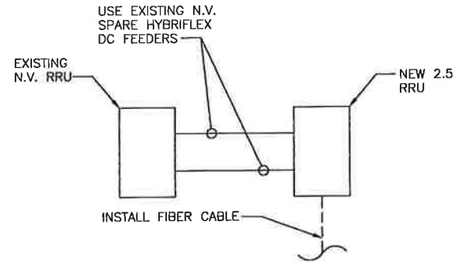


INFORMATION BASED ON PROVIDED INFORMATION FROM ALCATEL-LUCENT 2.5 GHz UPGRADE INSTALLATION GUIDE.

HYBRIFLEX RISER/JUMPER CONNECTION DETAIL | NO SCALE | 3



2.5 HYBRID RISER CABLE (FIBER AND DC FEEDERS)



FIBER ONLY RISER CABLE

TRUNK LINE DETAIL (TYP.) | NO SCALE | 4

PLANS PREPARED FOR:

Sprint
6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

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

JOB NUMBER 333-000

ENGINEERING LICENSE:

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

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR PERMIT	10/8/14	AHS	0

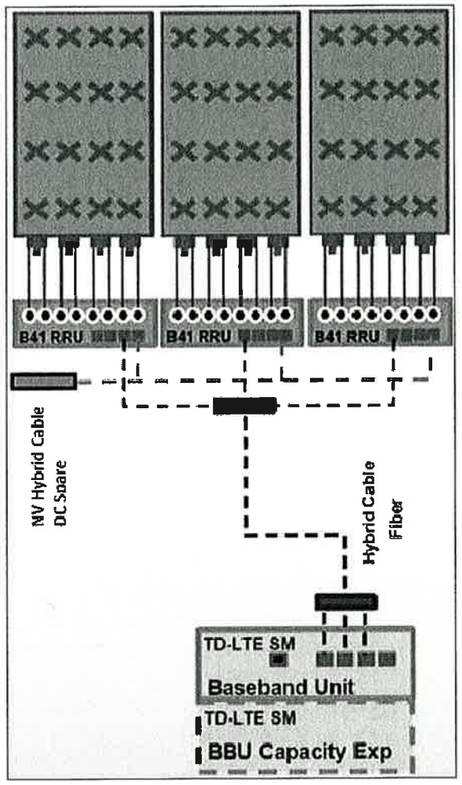
SITE NAME:
NEW HARTFORD (VERIZON)

SITE CASCADE:
CT33XC022

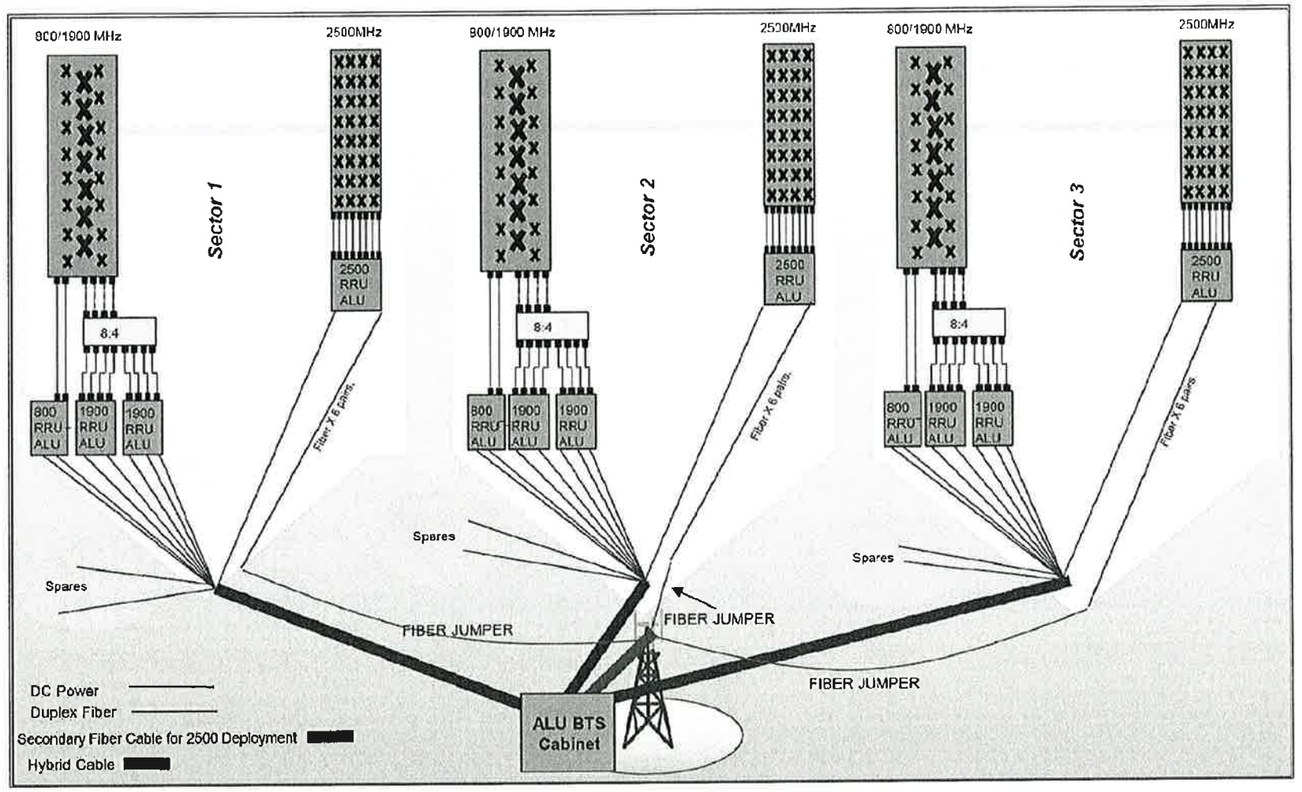
SITE ADDRESS:
20 ANTOLINI RD
NEWHARTFOR, CT 06057

SHEET DESCRIPTION:
CIVIL DETAILS

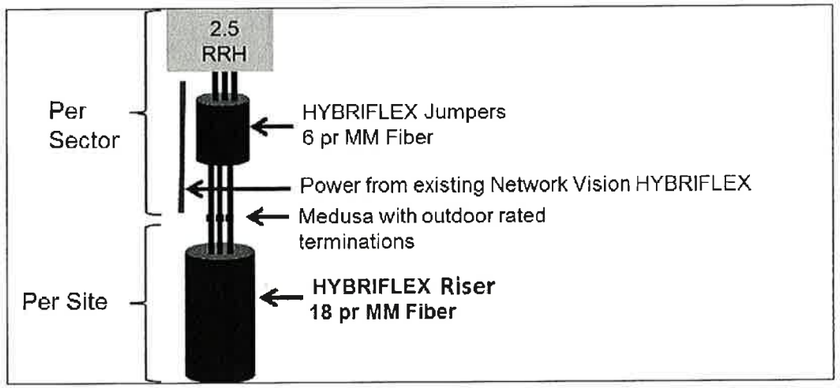
SHEET NUMBER:
A-6



ALU 2.5 ALU SCENARIO 1



RAN WIRING DIAGRAM



RF 2.5 ALU SCENARIO 1

PLUMBING DIAGRAM | NO SCALE | 1

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Sprint
6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

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

JOB NUMBER 333-000

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JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

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ISSUED FOR PERMIT	10/8/14	AHS	0

SITE NAME:

NEW HARTFORD (VERIZON)

SITE CASCADE:

CT33XC022

SITE ADDRESS:

20 ANTOLINI RD
NEWHARTFOR, CT 06057

SHEET DESCRIPTION:

PLUMBING DIAGRAM

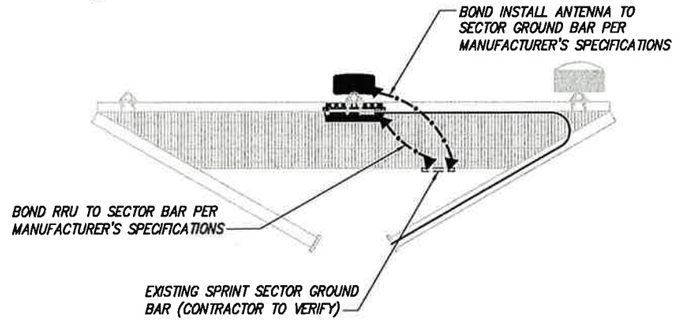
SHEET NUMBER:

A-7

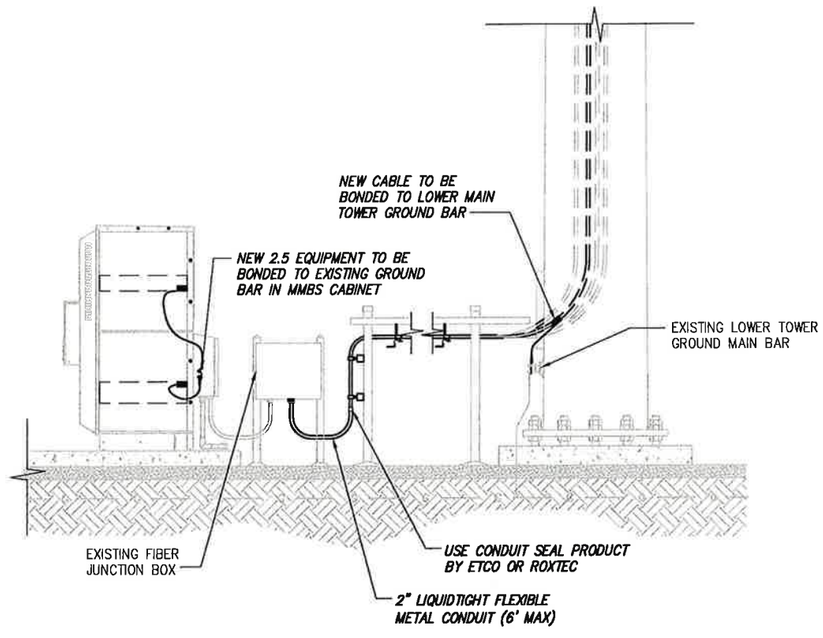
PLAN NOT USED | NO SCALE | 1

LEGEND:

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

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No. 24705
LICENSED PROFESSIONAL ENGINEER

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR PERMIT	10/8/14	AHS	0

SITE NAME:

NEW HARTFORD (VERIZON)

SITE CASCADE:

CT33XC022

SITE ADDRESS:

20 ANTOLINI RD
NEWHARTFOR, CT 06057

SHEET DESCRIPTION:

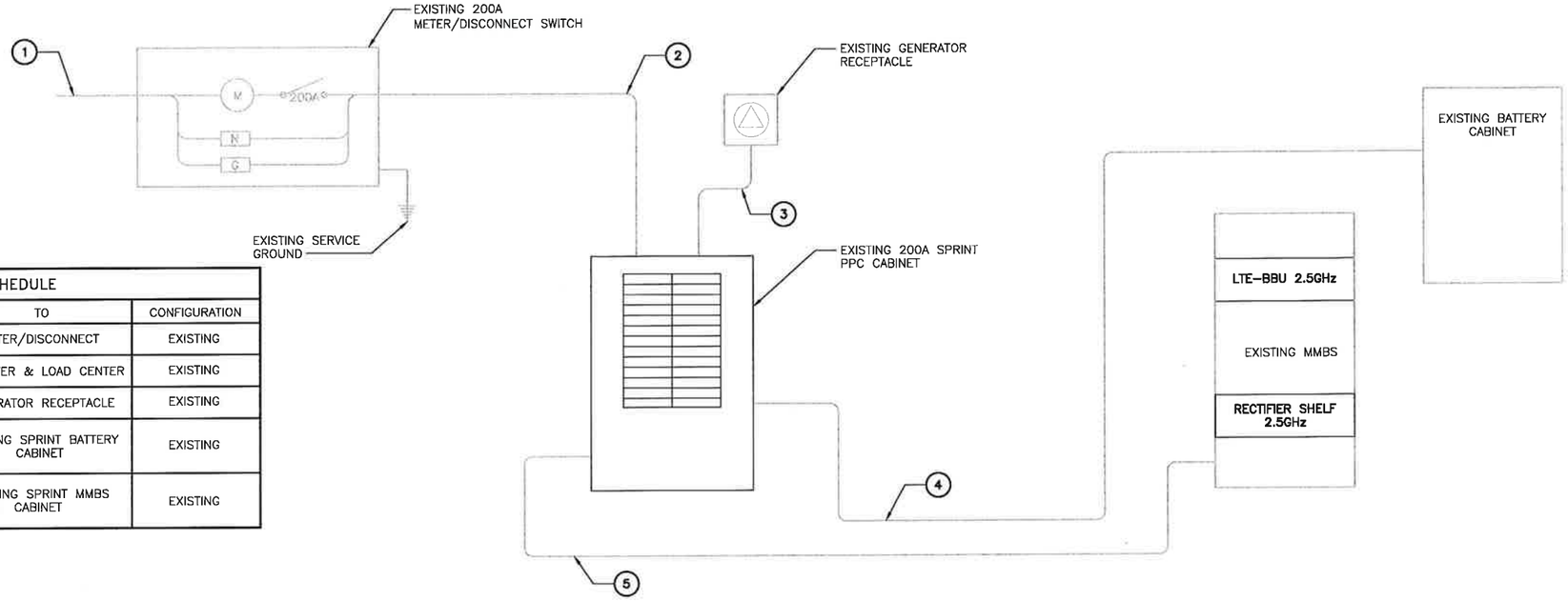
ELECTRICAL & GROUNDING PLAN

SHEET NUMBER:

E-1

NOTES

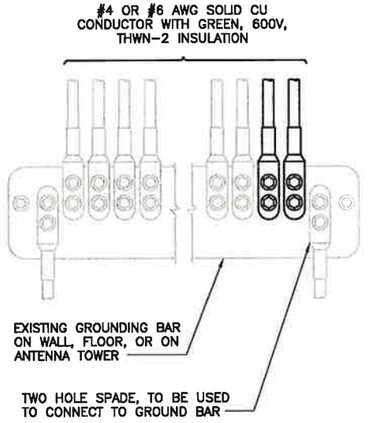
CG SHALL REFERENCE ALL SPECS FOR "CONNECTING THE POWER SUPPLY" OF THE NEW INSTALLATION DOCUMENTS, FOR ALL CONNECTION SPECIFICATIONS.



CIRCUIT SCHEDULE

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

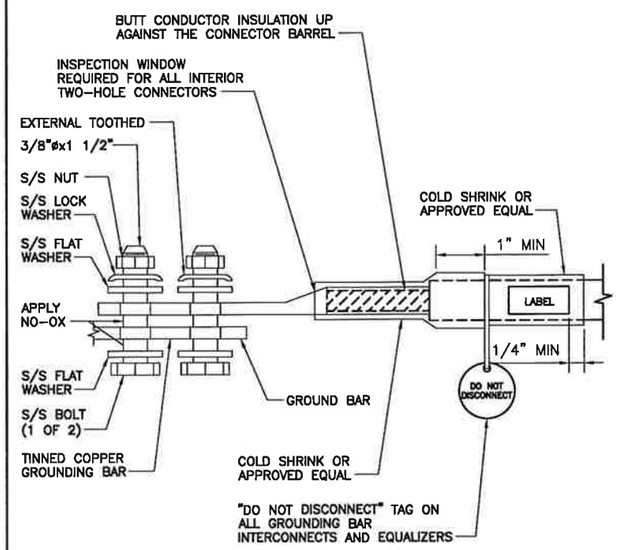
ELECTRICAL ONE–LINE DIAGRAM — NO SCALE — 1



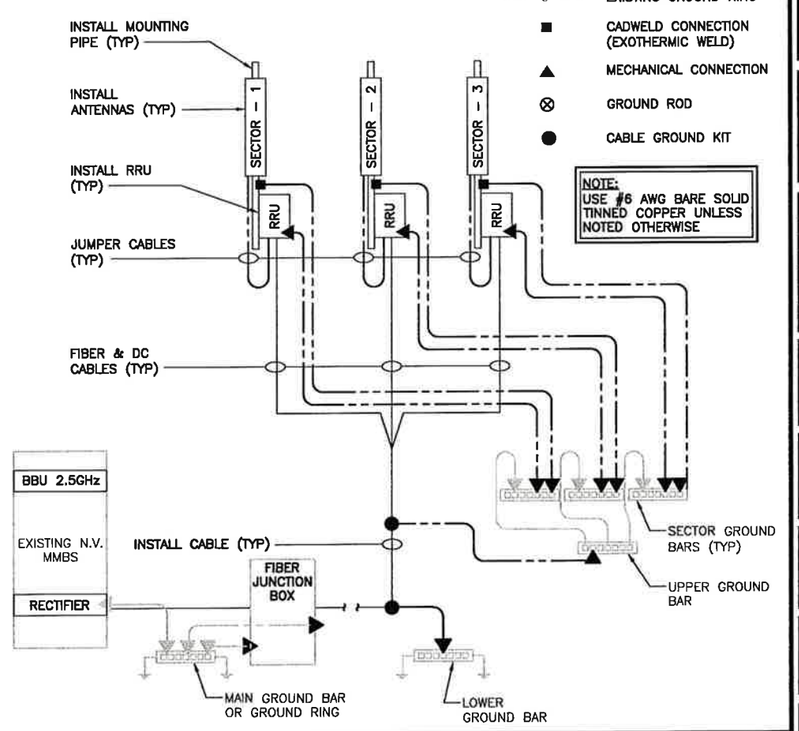
NOTES

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

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



TWO HOLE LUG — NO SCALE — 3



GROUNDING RISER DIAGRAM — NO SCALE — 4

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.

1033 Watervliet Shaker Rd
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ENGINEERING LICENSE:

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SITE NAME:

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SITE CASCADE:

CT33XC022

SITE ADDRESS:

20 ANTOLINI RD
NEWHARTFOR, CT 06057

SHEET DESCRIPTION:

ELECTRICAL & GROUNDING DETAILS

SHEET NUMBER:

E-2

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

145-ft Existing EEI Monopole

Proposed Sprint
Antenna Upgrade

Sprint Site Ref: CT33XC022

Verizon Site Ref: New Hartford

20 Antolini Road
New Hartford, CT

CENTEK Project No. 14033.016

Date: September 24, 2014

Prepared for:
Sprint Nextel
8 Airline Drive, Suite 105
Albany, NY 12205

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Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by Sprint on the existing monopole (tower) owned and operated by Verizon Wireless, located in New Hartford, CT.

The host tower is a 145-ft tall, four-section, eighteen sided, tapered monopole, originally designed and manufactured by EEI job no; 8859, dated February 21, 2002. The tower geometry and structure member sizes were obtained from the aforementioned EEI design documents. The foundation system information was obtained from drawing S-1 prepared by URS Corporation for AT&T, dated October 13, 2000. Subsurface information was taken from a geotechnical report prepared by Clarence D. Welti, P.E., P.C., dated March 27, 2000.

Antenna and appurtenance information were obtained from a previous structural analysis report prepared by Centek job no. 14033.013 dated August 25, 2014, a tower mapping report prepared by JWB Tower Services, LLC dated March 2, 2014 and a Sprint RF data sheet.

The tower consists of four (4) tapered vertical steel sections conforming to ASTM A572-65 (65ksi). The bottom three (3) sections are slip joint connected and the top section is flange connected. The diameter of the pole (flat-flat) is 18.00-in at the top and 49.75-in at the base.

Sprint proposes the installation of three (3) panel antennas and three (3) remote radio heads mounted to the existing three (3) T-Arms. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

The existing, proposed and future loads considered in this analysis consist of the following:

- TOWN (Existing):
  Antennas: One (1) 12-ft x1.5" dia. Omni-directional whip antenna, one (1) Celwave PD620 Omni-driectional whip antenna and one (1) siren mounted on the Sprint platform to the top of the tower.
  Coax Cables: Two (2) 1-5/8" ∅ coax cables and one (1) 1" flex conduit running within the monopole.
- VERIZON WIRELESS (Existing/Reserved):
  Antennas: Six (6) Antel LPA-80063-6CF panel antennas, six (6) Antel BXA-70063-6CF panel antennas, six (6) LPA-171063-12CF panel antennas, six (6) RFS FD9R6004/2C-3L diplexers, six (6) RRH's and one (1) main distribution box mounted on a low profile platform with a RAD center elevation of 139-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the inside of the existing tower and six (6) 1-5/8" ∅ coax cables and two (2) 1-5/8" ∅ fiber cables running on the exterior of the existing tower.
- T-MOBILE (Existing):
  Antenna: Three (3) RFS APX16DWV-16DWVS-E-A20 panel antennas, three (3) Andrew LNX-6515DS panel antennas, three (3) RFS AMAA1412D-1A20 TMA's and three (3) RFS ATM1900D-1CWA TMA's mounted to three (3) T-Arms with a RAD center elevation of 125-ft above exiting grade.
  Coax Cable: Eighteen (18) 1-5/8" ∅ coax cables running on the inside of the existing tower.

- METROPCS (Existing):
  Antennas: Three (3) RFS APXV18-206517S panel antennas flush mounted with a RAD center elevation of 113-ft above exiting grade.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running within the monopole.
- VACANT (Existing):
  Antennas: One (1) 12-ft low profile platform with a RAD center elevation of 92-ft above exiting grade.
- AT&T (Existing / Reserved):
  Antennas: Six (6) Powerwave 7770 panel antennas, six (6) Powerwave LGP21401 TMA's, six (6) Powerwave LGP21901 Diplexers, three (3) Bias-T, two (2) KMW AM-X-CD-16-65-00T-RET panel antennas, one (1) Powerwave P65-17-XLH-RR panel antenna, six (6) Ericsson RRUS-11 and one (1) Raycap DC6-48-60-18-8F surge arrestor mounted on a 12-ft low profile platform with a RAD center elevation of 80-ft above exiting grade.
  Coax Cables: Twelve (12) 7/8" ∅ coax cables, one (1) fiber cable and two (2) dc control cables running within the monopole.
- SPRINT (Existing):
  Antennas: One (1) GPS antenna on a 3-ft standoff with an elevation of 51-ft above exiting grade.
  Coax Cables: One (1) 1/2" ∅ coax cable running on the exterior of the existing monopole.
- SPRINT (Existing to Remain):
  Antennas: Three (3) RFS APXVSPP18-C-A20 panel antennas, three (3) ALU 1900 MHz RRH's and three (3) ALU 800 MHz RRH's mounted on a 12-ft low profile platform with a RAD center elevation of 147-ft above exiting grade.
  Coax Cables: Three (3) 1-1/4" ∅ Hybriflex cables running within the monopole.
- **SPRINT (Proposed):**
  Antennas: Three (3) RFS APXVTM14-C-I20 panel antennas and three (3) Alcatel-Lucent TD-RRH8x20 remote radio heads mounted on a 12-ft low profile platform with a RAD center elevation of 147-ft above exiting grade.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All existing coax cables to be installed as indicated in this report.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower shaft, and the model assumes that the shaft members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (fastest mile) with no ice and a 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix K of the CSBC[1] and the wind speed data available in the TIA/EIA-222-F-96 Standard. The higher of the two wind speeds is utilized in preparation on the tower analysis.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice on the tower structure and its components.

Basic Wind Speed:	Litchfield; v = 80 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	New Hartford; v = 90 mph (3 second gust) equivalent to v = 75 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	TIA-EIA-222-F wind speed controls.	
Load Cases:	Load Case 1; 80 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 2; 69 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 69 mph wind speed velocity represents 75% of the wind pressure generated by the 80 mph wind speed.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

[1] The 2005 Connecticut State Building Code as amended by the 2009 CT State Supplement. (CSBC)

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

- Calculated stresses were found to be within allowable limits. In Load Case 1, per tnxTower "Section Capacity Table", the maximum tower steel usage was found to be at **87.1%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L1)	114.00'-145.00'	96.7%	**PASS**
Pole Shaft (L2)	78.67'-114.00'	88.5%	**PASS**
Pole Shaft (L3)	43.17'-78.67'	92.9%	**PASS**
Pole Shaft (L4)	0.00'-43.17'	87.3%	**PASS**

Foundation and Anchors

The existing foundation consists of a 7-ft 6in ∅ x 18-ft long reinforced concrete caisson with a 4.0-ft thick x 22-ft square reinforced concrete pad. The base of the monopole tower is connected to the foundation by means of (20) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 5-ft into the concrete foundation structure.

The original foundation design information was obtained from drawing S-1 prepared by URS Corporation for AT&T, dated October 13, 2000. Subsurface information was taken from a geotechnical report prepared by Clarence D. Welti, P.E., P.C., dated March 27, 2000.

Review of the foundation design consisted of a comparison of the proposed reactions at the base of the monopole tower; from governing Load Case 1 with the original design base reactions from the aforementioned URS drawing. The calculated reactions at the base of the monopole tower were less than the original design reactions. Therefore, the foundation is deemed to have adequate structural capacity to support the existing and proposed loads and hence was found to be within allowable limits.

The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Base Reactions	Vector	Original Design Reactions [1]	Proposed Load
Base	Shear	**29.16 kips**	**29 kips**
	Axial	**31.0 kips**	**38 kips**
	Moment	**3128.4 ft-kips**	**3108 ft-kips**

Note 1: Original design reactions base on a factor of safety of 2.0.

- The flange bolts and flange plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Flange Bolts	Tension	62.0%	**PASS**
Flange Plate	Bending	35.4%	**PASS**

- The anchor bolts and base plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Combined Axial and Bending	56.5%	**PASS**
Base Plate	Bending	96.4%	**PASS**

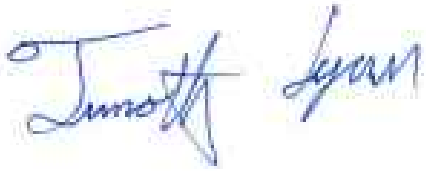
Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

The analysis is based, in part, on the information provided to this office by Sprint. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

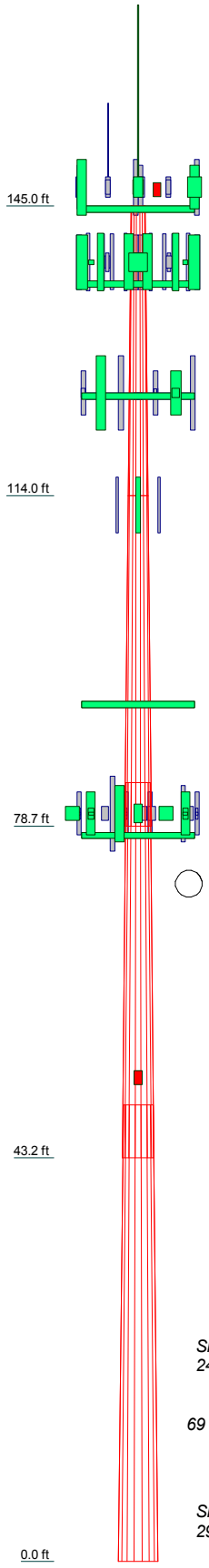
tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly RISATower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

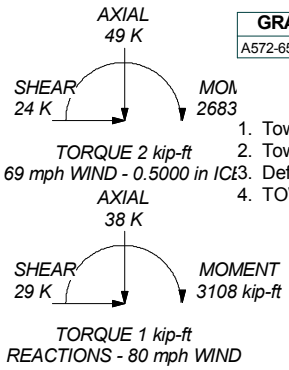
tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

Section	1	2	3	4
Length (ft)	31.00	35.33	40.17	48.83
Number of Sides	18	18	18	18
Thickness (in)	0.1875	0.3125	0.3750	0.4375
Socket Length (ft)		4.67	5.67	
Top Dia (in)	18.0000	25.1400	31.5710	38.6535
Bot Dia (in)	25.1400	33.2700	40.6900	49.7500
Grade	A572-65			
Weight (K)	1.3	3.4	5.8	10.1

Total Weight (K) 20.7





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
PD620 (Town - Existing)	156.5	EEI Low Profile Platform (Verizon - Reserved)	137
12' x 1-1/2" Dia Omni (Town - Existing)	151	APX16DWV-16DWVS-E-A20 (T-Mobile - Existing)	125
APXVSPP18-C-A20 (Sprint - Existing)	147	APX16DWV-16DWVS-E-A20 (T-Mobile - Existing)	125
APXVSPP18-C-A20 (Sprint - Existing)	147	APX16DWV-16DWVS-E-A20 (T-Mobile - Existing)	125
APXVSPP18-C-A20 (Sprint - Existing)	147	ATM1900D-1CWA (T-Mobile - Existing)	125
FD-RRH 2x50 800 (Sprint - Existing)	147	ATM1900D-1CWA (T-Mobile - Existing)	125
FD-RRH 2x50 800 (Sprint - Existing)	147	ATM1900D-1CWA (T-Mobile - Existing)	125
FD-RRH 2x50 800 (Sprint - Existing)	147	ATMAP1412D-1A20 (T-Mobile - Existing)	125
FD-RRH 4x45 1900 (Sprint - Existing)	147	ATMAP1412D-1A20 (T-Mobile - Existing)	125
FD-RRH 4x45 1900 (Sprint - Existing)	147	ATMAP1412D-1A20 (T-Mobile - Existing)	125
FD-RRH 4x45 1900 (Sprint - Existing)	147	LNX-6515DS (T-Mobile - Existing)	125
APXVTM14 (Sprint - Proposed)	147	LNX-6515DS (T-Mobile - Existing)	125
APXVTM14 (Sprint - Proposed)	147	LNX-6515DS (T-Mobile - Existing)	125
APXVTM14 (Sprint - Proposed)	147	Valmont T-Arm (1) (T-Mobile - Existing)	125
TD-RRH8x20-25 (Sprint - Proposed)	147	Valmont T-Arm (1) (T-Mobile - Existing)	125
TD-RRH8x20-25 (Sprint - Proposed)	147	Valmont T-Arm (1) (T-Mobile - Existing)	125
TD-RRH8x20-25 (Sprint - Proposed)	147	APXV18-206517S (MetroPCS - Existing)	113
Siren (Town - Existing)	146	APXV18-206517S (MetroPCS - Existing)	113
EEI 12-ft Low Profile Platform (Sprint - Existing)	145	APXV18-206517S (MetroPCS - Existing)	113
LPA-80063/6CF (Verizon - Reserved)	139	Uni-Tri Bracket (MetroPCS - Existing)	113
LPA-171063-12CF (Verizon - Reserved)	139	EEI 12-ft Low Profile Platform (Vacant)	92
BXA-70063/6CF (Verizon - Reserved)	139	(2) 7770.00 (ATI - Existing)	80
BXA-70063/6CF (Verizon - Reserved)	139	(2) 7770.00 (ATI - Existing)	80
LPA-171063-12CF (Verizon - Reserved)	139	(2) 7770.00 (ATI - Existing)	80
LPA-80063/6CF (Verizon - Reserved)	139	(2) LPG21401 TMA (ATI - Existing)	80
LPA-80063/6CF (Verizon - Reserved)	139	(2) LPG21401 TMA (ATI - Existing)	80
LPA-171063-12CF (Verizon - Reserved)	139	(2) LPG21401 TMA (ATI - Existing)	80
BXA-70063/6CF (Verizon - Reserved)	139	(2) LGP21901 Diplexer (ATI - Existing)	80
BXA-70063/6CF (Verizon - Reserved)	139	(2) LGP21901 Diplexer (ATI - Existing)	80
LPA-171063-12CF (Verizon - Reserved)	139	(2) LGP21901 Diplexer (ATI - Existing)	80
LPA-80063/6CF (Verizon - Reserved)	139	Bias T (ATI - Existing)	80
(2) FD9R6004/2C-3L Diplexer (Verizon - Reserved)	139	Bias T (ATI - Existing)	80
(2) FD9R6004/2C-3L Diplexer (Verizon - Reserved)	139	Bias T (ATI - Existing)	80
(2) FD9R6004/2C-3L Diplexer (Verizon - Reserved)	139	P65-17-XLH-RR (ATI - Reserved)	80
RRH2x40-AWS (Verizon - Reserved)	139	AM-X-CD-16-65-00T-RET(72") (ATI - Reserved)	80
RRH2x40-AWS (Verizon - Reserved)	139	AM-X-CD-16-65-00T-RET(72") (ATI - Reserved)	80
RRH2x40-AWS (Verizon - Reserved)	139	(2) RRUS-11 (ATI - Reserved)	80
RRH2x40-07-U (Verizon - Reserved)	139	(2) RRUS-11 (ATI - Reserved)	80
RRH2x40-07-U (Verizon - Reserved)	139	(2) RRUS-11 (ATI - Reserved)	80
RRH2x40-07-U (Verizon - Reserved)	139	DC6-48-60-18-8F Surge Arrestor (ATI - Reserved)	80
DB-T1-6Z-8AB-0Z (Verizon - Reserved)	139	PiROD 12' Low Profile Circular Platform (ATI - Existing)	78
		GPS (Sprint - Existing)	51
		GPS Mount (Sprint - Existing)	50

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. TOWER RATING: 96.7%

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: **14033.016 - CT33XC022**			
Project: ***145' EEI Monopole - 20 Antolini Rd., New Hartford, CT***			
Client: Sprint	Drawn by: TJL	App'd:	
Code: TIA/EIA-222-F	Date: 09/24/14	Scale: NTS	
Path: J:\Jobs\14033\00.WI\016 - CT33XC022\04_Structural\Backup Documentation\ER Files\145' EEI Monopole_New Hartford_CT.eri		Dwg No. E-1	

Tower Input Data

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

Basic wind speed of 80 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 69 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Splice Length* *ft*	*Number of Sides*	*Top Diameter* *in*	*Bottom Diameter* *in*	*Wall Thickness* *in*	*Bend Radius* *in*	*Pole Grade*
L1	145.00-114.00	31.00	0.00	18	18.0000	25.1400	0.1875	0.5416	A572-65 (65 ksi)
L2	114.00-78.67	35.33	4.67	18	25.1400	33.2700	0.3125	1.2500	A572-65 (65 ksi)
L3	78.67-43.17	40.17	5.67	18	31.5710	40.6900	0.3750	1.5000	A572-65 (65 ksi)
L4	43.17-0.00	48.83		18	38.6535	49.7500	0.4375	1.7500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	18.2777	10.6007	424.9328	6.3234	9.1440	46.4712	850.4248	5.3013	2.9113	15.527
	25.5278	14.8499	1168.1210	8.8581	12.7711	91.4658	2337.7791	7.4263	4.1680	22.229
L2	25.5278	24.6258	1917.7561	8.8138	12.7711	150.1635	3838.0356	12.3152	3.8746	12.399
	33.7832	32.6897	4485.9784	11.6999	16.9012	265.4243	8977.8595	16.3480	5.3055	16.978
L3	33.1339	37.1311	4565.3532	11.0746	16.0381	284.6569	9136.7136	18.5691	4.8965	13.057
	41.3177	47.9849	9853.1622	14.3118	20.6705	476.6770	19719.2895	23.9970	6.5014	17.337
L4	40.5574	53.0677	9791.7311	13.5667	19.6360	498.6622	19596.3464	26.5389	6.0330	13.79
	50.5175	68.4766	21037.4691	17.5059	25.2730	832.4089	42102.6199	34.2448	7.9860	18.254

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 145.00-114.00				1	1	1		
L2 114.00-78.67				1	1	1		
L3 78.67-43.17				1	1	1		
L4 43.17-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1 5/8	C	No	Inside Pole	145.00 - 6.00	2	No Ice	0.00	1.04
(Town - Existing)						1/2" Ice	0.00	1.04
1" Flex Conduit	C	No	Inside Pole	145.00 - 6.00	1	No Ice	0.00	0.70
(Town - Existing)						1/2" Ice	0.00	0.70
HYBRIFLEX 1-1/4"	C	No	Inside Pole	145.00 - 3.00	3	No Ice	0.00	1.30
(Sprint - Existing)						1/2" Ice	0.00	1.30
1 5/8	C	No	Inside Pole	135.00 - 6.00	12	No Ice	0.00	1.04
(Verizon - Existing)						1/2" Ice	0.00	1.04
1 5/8	C	No	CaAa (Out Of Face)	135.00 - 6.00	1	No Ice	0.20	1.04
(Verizon - Reserved)						1/2" Ice	0.30	2.55
1 5/8	C	No	CaAa (Out Of Face)	135.00 - 6.00	5	No Ice	0.00	1.04
(Verizon - Reserved)						1/2" Ice	0.00	2.55
HYBRIFLEX 1-5/8"	C	No	CaAa (Out Of Face)	135.00 - 6.00	2	No Ice	0.00	1.90
(Verizon - Reserved)						1/2" Ice	0.00	3.41
1 5/8	C	No	Inside Pole	125.00 - 6.00	12	No Ice	0.00	1.04
(T-Mobile - Existing)						1/2" Ice	0.00	1.04
1 5/8	C	No	Inside Pole	113.00 - 6.00	6	No Ice	0.00	1.04
(MetroPCS - Existing)						1/2" Ice	0.00	1.04
7/8	C	No	Inside Pole	80.00 - 3.00	12	No Ice	0.00	0.54
(AT&T - Existing)						1/2" Ice	0.00	0.54
RG6-Fiber	C	No	Inside Pole	80.00 - 3.00	1	No Ice	0.00	1.00
(AT&T - Existing)						1/2" Ice	0.00	1.00
#8 AWG Copper WIre	C	No	Inside Pole	80.00 - 3.00	2	No Ice	0.00	0.05
(AT&T - Existing)						1/2" Ice	0.00	0.05
1/2	C	No	CaAa (Out Of Face)	50.00 - 6.00	1	No Ice	0.06	0.25
(Sprint - Existing)						1/2" Ice	0.16	0.91
1 5/8	C	No	CaAa (Out Of Face)	125.00 - 6.00	1	No Ice	0.20	1.04
(T-Mobile - Existing)						1/2" Ice	0.30	2.55

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1 5/8 (T-Mobile - Existing)	C	No	CaAa (Out Of Face)	125.00 - 6.00	5	No Ice	0.00	1.04
						1/2" Ice	0.00	2.55

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	145.00-114.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.336	0.89
L2	114.00-78.67	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	13.991	1.92
L3	78.67-43.17	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	14.456	2.19
L4	43.17-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	16.874	2.34

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	145.00-114.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	9.536	1.24
L2	114.00-78.67	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	21.056	2.66
L3	78.67-43.17	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	22.239	2.95
L4	43.17-0.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	28.024	3.15

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	145.00-114.00	-0.2555	0.1475	-0.3518	0.2031
L2	114.00-78.67	-0.4424	0.2554	-0.6053	0.3495
L3	78.67-43.17	-0.4679	0.2701	-0.6632	0.3829
L4	43.17-0.00	-0.4527	0.2614	-0.6944	0.4009

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
12' x 1-1/2" Dia Omni	A	From Face	3.00	0.0000	151.00	No Ice	1.80	1.80	0.03
(Town - Existing)			0.00			1/2" Ice	3.02	3.02	0.04
			0.00						
PD620	C	From Face	3.00	0.0000	156.50	No Ice	4.27	4.27	0.05
(Town - Existing)			0.00			1/2" Ice	7.68	7.68	0.10
			0.00						
Siren	C	From Face	1.00	0.0000	146.00	No Ice	4.80	0.00	0.20
(Town - Existing)			-2.00			1/2" Ice	5.20	4.80	0.30
			0.00						
APXVSPP18-C-A20	A	From Face	3.00	0.0000	147.00	No Ice	8.26	5.28	0.06
(Sprint - Existing)			6.00			1/2" Ice	8.81	5.74	0.11
			0.00						
APXVSPP18-C-A20	B	From Face	3.00	0.0000	147.00	No Ice	8.26	5.28	0.06
(Sprint - Existing)			6.00			1/2" Ice	8.81	5.74	0.11
			0.00						
APXVSPP18-C-A20	C	From Face	3.00	0.0000	147.00	No Ice	8.26	5.28	0.06
(Sprint - Existing)			6.00			1/2" Ice	8.81	5.74	0.11
			0.00						
FD-RRH 2x50 800	A	From Face	3.00	0.0000	147.00	No Ice	2.40	2.25	0.06
(Sprint - Existing)			0.00			1/2" Ice	2.61	2.46	0.09
			0.00						
FD-RRH 2x50 800	B	From Face	3.00	0.0000	147.00	No Ice	2.40	2.25	0.06
(Sprint - Existing)			0.00			1/2" Ice	2.61	2.46	0.09
			0.00						
FD-RRH 2x50 800	C	From Face	3.00	0.0000	147.00	No Ice	2.40	2.25	0.06
(Sprint - Existing)			0.00			1/2" Ice	2.61	2.46	0.09
			0.00						
FD-RRH 4x45 1900	A	From Face	3.00	0.0000	147.00	No Ice	2.71	2.78	0.06
(Sprint - Existing)			0.00			1/2" Ice	2.94	3.02	0.08
			0.00						
FD-RRH 4x45 1900	B	From Face	3.00	0.0000	147.00	No Ice	2.71	2.78	0.06
(Sprint - Existing)			0.00			1/2" Ice	2.94	3.02	0.08
			0.00						
FD-RRH 4x45 1900	C	From Face	3.00	0.0000	147.00	No Ice	2.71	2.78	0.06
(Sprint - Existing)			0.00			1/2" Ice	2.94	3.02	0.08
			0.00						
EEI 12-ft Low Profile Platform	C	None		0.0000	145.00	No Ice	15.00	15.00	1.50
(Sprint - Existing)						1/2" Ice	18.40	18.40	1.75
APXVTM14	A	From Face	3.00	0.0000	147.00	No Ice	6.90	3.61	0.06
(Sprint - Proposed)			-6.00			1/2" Ice	7.35	3.97	0.10
			0.00						
APXVTM14	B	From Face	3.00	0.0000	147.00	No Ice	6.90	3.61	0.06
(Sprint - Proposed)			-6.00			1/2" Ice	7.35	3.97	0.10
			0.00						
APXVTM14	C	From Face	3.00	0.0000	147.00	No Ice	6.90	3.61	0.06
(Sprint - Proposed)			-6.00			1/2" Ice	7.35	3.97	0.10
			0.00						
TD-RRH8x20-25	A	From Face	3.00	0.0000	147.00	No Ice	4.72	1.70	0.07
(Sprint - Proposed)			-6.00			1/2" Ice	5.01	1.92	0.10
			0.00						
TD-RRH8x20-25	B	From Face	3.00	0.0000	147.00	No Ice	4.72	1.70	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(Sprint - Proposed)			-6.00 0.00			1/2" Ice	5.01	1.92	0.10
TD-RRH8x20-25	C	From Face	3.00	0.0000	147.00	No Ice	4.72	1.70	0.07
(Sprint - Proposed)			-6.00 0.00			1/2" Ice	5.01	1.92	0.10
LPA-80063/6CF	A	From Face	3.00	0.0000	139.00	No Ice	10.31	9.01	0.03
(Verizon - Reserved)			6.00 0.00			1/2" Ice	10.87	9.55	0.10
LPA-171063-12CF	A	From Face	3.00	0.0000	139.00	No Ice	5.99	6.05	0.01
(Verizon - Reserved)			4.00 0.00			1/2" Ice	6.46	6.52	0.06
BXA-70063/6CF	A	From Face	3.00	0.0000	139.00	No Ice	7.73	4.16	0.02
(Verizon - Reserved)			1.00 0.00			1/2" Ice	8.27	4.60	0.06
BXA-70063/6CF	A	From Face	3.00	0.0000	139.00	No Ice	7.73	4.16	0.02
(Verizon - Reserved)			-1.00 0.00			1/2" Ice	8.27	4.60	0.06
LPA-171063-12CF	A	From Face	3.00	0.0000	139.00	No Ice	5.99	6.05	0.01
(Verizon - Reserved)			-4.00 0.00			1/2" Ice	6.46	6.52	0.06
LPA-80063/6CF	A	From Face	3.00	0.0000	139.00	No Ice	10.31	9.01	0.03
(Verizon - Reserved)			-6.00 0.00			1/2" Ice	10.87	9.55	0.10
LPA-80063/6CF	B	From Face	3.00	0.0000	139.00	No Ice	10.31	9.01	0.03
(Verizon - Reserved)			6.00 0.00			1/2" Ice	10.87	9.55	0.10
LPA-171063-12CF	B	From Face	3.00	0.0000	139.00	No Ice	5.99	6.05	0.01
(Verizon - Reserved)			4.00 0.00			1/2" Ice	6.46	6.52	0.06
BXA-70063/6CF	B	From Face	3.00	0.0000	139.00	No Ice	7.73	4.16	0.02
(Verizon - Reserved)			1.00 0.00			1/2" Ice	8.27	4.60	0.06
BXA-70063/6CF	B	From Face	3.00	0.0000	139.00	No Ice	7.73	4.16	0.02
(Verizon - Reserved)			-1.00 0.00			1/2" Ice	8.27	4.60	0.06
LPA-171063-12CF	B	From Face	3.00	0.0000	139.00	No Ice	5.99	6.05	0.01
(Verizon - Reserved)			-4.00 0.00			1/2" Ice	6.46	6.52	0.06
LPA-80063/6CF	B	From Face	3.00	0.0000	139.00	No Ice	10.31	9.01	0.03
(Verizon - Reserved)			-6.00 0.00			1/2" Ice	10.87	9.55	0.10
LPA-80063/6CF	C	From Face	3.00	0.0000	139.00	No Ice	10.31	9.01	0.03
(Verizon - Reserved)			6.00 0.00			1/2" Ice	10.87	9.55	0.10
LPA-171063-12CF	C	From Face	3.00	0.0000	139.00	No Ice	5.99	6.05	0.01
(Verizon - Reserved)			4.00 0.00			1/2" Ice	6.46	6.52	0.06
BXA-70063/6CF	C	From Face	3.00	0.0000	139.00	No Ice	7.73	4.16	0.02
(Verizon - Reserved)			1.00 0.00			1/2" Ice	8.27	4.60	0.06
BXA-70063/6CF	C	From Face	3.00	0.0000	139.00	No Ice	7.73	4.16	0.02
(Verizon - Reserved)			-1.00 0.00			1/2" Ice	8.27	4.60	0.06
LPA-171063-12CF	C	From Face	3.00	0.0000	139.00	No Ice	5.99	6.05	0.01
(Verizon - Reserved)			-4.00 0.00			1/2" Ice	6.46	6.52	0.06
LPA-80063/6CF	C	From Face	3.00	0.0000	139.00	No Ice	10.31	9.01	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(Verizon - Reserved)			-6.00 0.00			1/2" Ice	10.87	9.55	0.10
(2) FD9R6004/2C-3L	A	From Face	3.00	0.0000	139.00	No Ice	0.37	0.08	0.00
Diplexer			0.00			1/2" Ice	0.45	0.14	0.01
(Verizon - Reserved)			0.00						
(2) FD9R6004/2C-3L	B	From Face	3.00	0.0000	139.00	No Ice	0.37	0.08	0.00
Diplexer			0.00			1/2" Ice	0.45	0.14	0.01
(Verizon - Reserved)			0.00						
(2) FD9R6004/2C-3L	C	From Face	3.00	0.0000	139.00	No Ice	0.37	0.08	0.00
Diplexer			0.00			1/2" Ice	0.45	0.14	0.01
(Verizon - Reserved)			0.00						
RRH2x40-AWS	A	From Face	3.00	0.0000	139.00	No Ice	2.52	1.59	0.04
(Verizon - Reserved)			0.00			1/2" Ice	2.75	1.80	0.06
			0.00						
RRH2x40-AWS	B	From Face	3.00	0.0000	139.00	No Ice	2.52	1.59	0.04
(Verizon - Reserved)			0.00			1/2" Ice	2.75	1.80	0.06
			0.00						
RRH2x40-AWS	C	From Face	3.00	0.0000	139.00	No Ice	2.52	1.59	0.04
(Verizon - Reserved)			0.00			1/2" Ice	2.75	1.80	0.06
			0.00						
RRH2x40-07-U	A	From Face	3.00	0.0000	139.00	No Ice	2.25	1.23	0.05
(Verizon - Reserved)			0.00			1/2" Ice	2.45	1.39	0.07
			0.00						
RRH2x40-07-U	B	From Face	3.00	0.0000	139.00	No Ice	2.25	1.23	0.05
(Verizon - Reserved)			0.00			1/2" Ice	2.45	1.39	0.07
			0.00						
RRH2x40-07-U	C	From Face	3.00	0.0000	139.00	No Ice	2.25	1.23	0.05
(Verizon - Reserved)			0.00			1/2" Ice	2.45	1.39	0.07
			0.00						
DB-T1-6Z-8AB-0Z	C	From Face	3.00	0.0000	139.00	No Ice	5.60	2.33	0.04
(Verizon - Reserved)			0.00			1/2" Ice	5.92	2.56	0.08
			0.00						
EEI Low Profile Platform	C	None		0.0000	137.00	No Ice	22.50	22.50	1.50
(Verizon - Reserved)						1/2" Ice	28.20	28.20	2.25
APX16DWV-16DWVS-E-A	A	From Face	3.50	0.0000	125.00	No Ice	7.07	2.15	0.04
20			-4.00			1/2" Ice	7.52	2.49	0.07
(T-Mobile - Existing)			0.00						
APX16DWV-16DWVS-E-A	B	From Face	3.50	0.0000	125.00	No Ice	7.07	2.15	0.04
20			-4.00			1/2" Ice	7.52	2.49	0.07
(T-Mobile - Existing)			0.00						
APX16DWV-16DWVS-E-A	C	From Face	3.50	0.0000	125.00	No Ice	7.07	2.15	0.04
20			-4.00			1/2" Ice	7.52	2.49	0.07
(T-Mobile - Existing)			0.00						
ATM1900D-1CWA	A	From Face	3.50	0.0000	125.00	No Ice	0.85	0.27	0.01
(T-Mobile - Existing)			-4.00			1/2" Ice	0.98	0.36	0.01
			0.00						
ATM1900D-1CWA	B	From Face	3.50	0.0000	125.00	No Ice	0.85	0.27	0.01
(T-Mobile - Existing)			-4.00			1/2" Ice	0.98	0.36	0.01
			0.00						
ATM1900D-1CWA	C	From Face	3.50	0.0000	125.00	No Ice	0.85	0.27	0.01
(T-Mobile - Existing)			-4.00			1/2" Ice	0.98	0.36	0.01
			0.00						
ATMAP1412D-1A20	A	From Face	3.50	0.0000	125.00	No Ice	1.17	0.47	0.01
(T-Mobile - Existing)			-4.00			1/2" Ice	1.31	0.57	0.02
			0.00						
ATMAP1412D-1A20	B	From Face	3.50	0.0000	125.00	No Ice	1.17	0.47	0.01
(T-Mobile - Existing)			-4.00			1/2" Ice	1.31	0.57	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
ATMAP1412D-1A20	C	From Face	3.50	0.0000	125.00	No Ice	1.17	0.47	0.01
(T-Mobile - Existing)			-4.00			1/2" Ice	1.31	0.57	0.02
			0.00						
LNX-6515DS	A	From Face	3.50	0.0000	125.00	No Ice	11.45	7.70	0.06
(T-Mobile - Existing)			4.00			1/2" Ice	12.06	8.29	0.12
			0.00						
LNX-6515DS	B	From Face	3.50	0.0000	125.00	No Ice	11.45	7.70	0.06
(T-Mobile - Existing)			4.00			1/2" Ice	12.06	8.29	0.12
			0.00						
LNX-6515DS	C	From Face	3.50	0.0000	125.00	No Ice	11.45	7.70	0.06
(T-Mobile - Existing)			4.00			1/2" Ice	12.06	8.29	0.12
			0.00						
Valmont T-Arm (1)	A	From Face	2.00	0.0000	125.00	No Ice	10.54	10.54	0.34
(T-Mobile - Existing)			0.00			1/2" Ice	14.45	14.45	0.41
			0.00						
Valmont T-Arm (1)	B	From Face	2.00	0.0000	125.00	No Ice	10.54	10.54	0.34
(T-Mobile - Existing)			0.00			1/2" Ice	14.45	14.45	0.41
			0.00						
Valmont T-Arm (1)	C	From Face	2.00	0.0000	125.00	No Ice	10.54	10.54	0.34
(T-Mobile - Existing)			0.00			1/2" Ice	14.45	14.45	0.41
			0.00						
APXV18-206517S	A	From Face	1.50	0.0000	113.00	No Ice	5.17	3.04	0.03
(MetroPCS - Existing)			0.00			1/2" Ice	5.62	3.47	0.05
			0.00						
APXV18-206517S	B	From Face	1.50	0.0000	113.00	No Ice	5.17	3.04	0.03
(MetroPCS - Existing)			0.00			1/2" Ice	5.62	3.47	0.05
			0.00						
APXV18-206517S	C	From Face	1.50	0.0000	113.00	No Ice	5.17	3.04	0.03
(MetroPCS - Existing)			0.00			1/2" Ice	5.62	3.47	0.05
			0.00						
Uni-Tri Bracket	C	None		0.0000	113.00	No Ice	1.75	1.75	0.00
(MetroPCS - Existing)						1/2" Ice	1.94	1.94	0.00
EEI 12-ft Low Profile Platform	C	None		0.0000	92.00	No Ice	15.00	15.00	1.50
(Vacant)						1/2" Ice	18.40	18.40	1.75
(2) 7770.00	A	From Face	3.00	0.0000	80.00	No Ice	5.88	2.93	0.04
(AT&T - Existing)			0.00			1/2" Ice	6.31	3.27	0.07
			0.00						
(2) 7770.00	B	From Face	3.00	0.0000	80.00	No Ice	5.88	2.93	0.04
(AT&T - Existing)			0.00			1/2" Ice	6.31	3.27	0.07
			0.00						
(2) 7770.00	C	From Face	3.00	0.0000	80.00	No Ice	5.88	2.93	0.04
(AT&T - Existing)			0.00			1/2" Ice	6.31	3.27	0.07
			0.00						
(2) LPG21401 TMA	A	From Face	3.00	0.0000	80.00	No Ice	0.95	0.37	0.02
(AT&T - Existing)			0.00			1/2" Ice	1.09	0.48	0.02
			0.00						
(2) LPG21401 TMA	B	From Face	3.00	0.0000	80.00	No Ice	0.95	0.37	0.02
(AT&T - Existing)			0.00			1/2" Ice	1.09	0.48	0.02
			0.00						
(2) LPG21401 TMA	C	From Face	3.00	0.0000	80.00	No Ice	0.95	0.37	0.02
(AT&T - Existing)			0.00			1/2" Ice	1.09	0.48	0.02
			0.00						
(2) LGP21901 Diplexer	A	From Face	3.00	0.0000	80.00	No Ice	0.23	0.12	0.01
(AT&T - Existing)			0.00			1/2" Ice	0.30	0.17	0.01
			0.00						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) LGP21901 Diplexer	B	From Face	3.00	0.0000	80.00	No Ice	0.23	0.12	0.01
(AT&T - Existing)			0.00			1/2" Ice	0.30	0.17	0.01
			0.00						
(2) LGP21901 Diplexer	C	From Face	3.00	0.0000	80.00	No Ice	0.23	0.12	0.01
(AT&T - Existing)			0.00			1/2" Ice	0.30	0.17	0.01
			0.00						
Bias T	A	From Face	3.00	0.0000	80.00	No Ice	0.16	0.08	0.00
(AT&T - Existing)			0.00			1/2" Ice	0.21	0.12	0.00
			0.00						
Bias T	B	From Face	3.00	0.0000	80.00	No Ice	0.16	0.08	0.00
(AT&T - Existing)			0.00			1/2" Ice	0.21	0.12	0.00
			0.00						
Bias T	C	From Face	3.00	0.0000	80.00	No Ice	0.16	0.08	0.00
(AT&T - Existing)			0.00			1/2" Ice	0.21	0.12	0.00
			0.00						
P65-17-XLH-RR	A	From Face	3.00	0.0000	80.00	No Ice	11.47	6.80	0.06
(AT&T - Reserved)			2.00			1/2" Ice	12.08	7.38	0.12
			0.00						
AM-X-CD-16-65-00T-RET(72")	B	From Face	3.00	0.0000	80.00	No Ice	8.26	4.64	0.05
			2.00			1/2" Ice	8.81	5.09	0.10
(AT&T - Reserved)			0.00						
AM-X-CD-16-65-00T-RET(72")	C	From Face	3.00	0.0000	80.00	No Ice	8.26	4.64	0.05
			2.00			1/2" Ice	8.81	5.09	0.10
(AT&T - Reserved)			0.00						
(2) RRUS-11	A	From Face	1.00	0.0000	80.00	No Ice	2.99	1.25	0.05
(AT&T - Reserved)			2.00			1/2" Ice	3.23	1.41	0.07
			0.00						
(2) RRUS-11	B	From Face	1.00	0.0000	80.00	No Ice	2.99	1.25	0.05
(AT&T - Reserved)			2.00			1/2" Ice	3.23	1.41	0.07
			0.00						
(2) RRUS-11	C	From Face	1.00	0.0000	80.00	No Ice	2.99	1.25	0.05
(AT&T - Reserved)			2.00			1/2" Ice	3.23	1.41	0.07
			0.00						
DC6-48-60-18-8F Surge Arrestor	C	From Face	0.50	0.0000	80.00	No Ice	2.23	2.23	0.02
			0.00			1/2" Ice	2.45	2.45	0.04
(AT&T - Reserved)			0.00						
PiROD 12' Low Profile Circular Platform	C	None		0.0000	78.00	No Ice	15.20	15.20	1.55
						1/2" Ice	19.60	19.60	1.81
(AT&T - Existing)									
GPS	C	From Face	2.00	0.0000	51.00	No Ice	1.00	1.00	0.01
(Sprint - Existing)			0.00			1/2" Ice	1.50	1.50	0.01
			0.00						
GPS Mount	C	From Face	1.00	0.0000	50.00	No Ice	0.78	0.68	0.03
(Sprint - Existing)			0.00			1/2" Ice	1.10	1.10	0.03
			0.00						

Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	128.78	1.476	24	55.722	A	0.000	55.722	55.722	100.00	0.000	0.000
145.00-114.00					B	0.000	55.722		100.00	0.000	0.000
					C	0.000	55.722		100.00	0.000	6.336
L2	95.75	1.356	22	85.984	A	0.000	85.984	85.984	100.00	0.000	0.000
114.00-78.67					B	0.000	85.984		100.00	0.000	0.000
					C	0.000	85.984		100.00	0.000	13.991
L3 78.67-43.17	60.64	1.19	19	108.462	A	0.000	108.462	108.462	100.00	0.000	0.000
					B	0.000	108.462		100.00	0.000	0.000
					C	0.000	108.462		100.00	0.000	14.456
L4 43.17-0.00	20.80	1	16	161.321	A	0.000	161.321	161.321	100.00	0.000	0.000
					B	0.000	161.321		100.00	0.000	0.000
					C	0.000	161.321		100.00	0.000	16.874

Tower Pressure - With Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	128.78	1.476	18	0.5000	58.306	A	0.000	58.306	58.306	100.00	0.000	0.000
145.00-114.00						B	0.000	58.306		100.00	0.000	0.000
						C	0.000	58.306		100.00	0.000	9.536
L2 114.00-78.67	95.75	1.356	17	0.5000	88.929	A	0.000	88.929	88.929	100.00	0.000	0.000
						B	0.000	88.929		100.00	0.000	0.000
						C	0.000	88.929		100.00	0.000	21.056
L3 78.67-43.17	60.64	1.19	15	0.5000	111.421	A	0.000	111.421	111.421	100.00	0.000	0.000
						B	0.000	111.421		100.00	0.000	0.000
						C	0.000	111.421		100.00	0.000	22.239
L4 43.17-0.00	20.80	1	12	0.5000	164.918	A	0.000	164.918	164.918	100.00	0.000	0.000
						B	0.000	164.918		100.00	0.000	0.000
						C	0.000	164.918		100.00	0.000	28.024

Tower Pressure - Service

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	128.78	1.476	9	55.722	A	0.000	55.722	55.722	100.00	0.000	0.000
145.00-114.00					B	0.000	55.722		100.00	0.000	0.000
					C	0.000	55.722		100.00	0.000	6.336
L2	95.75	1.356	9	85.984	A	0.000	85.984	85.984	100.00	0.000	0.000
114.00-78.67					B	0.000	85.984		100.00	0.000	0.000
					C	0.000	85.984		100.00	0.000	13.991
L3 78.67-43.17	60.64	1.19	8	108.462	A	0.000	108.462	108.462	100.00	0.000	0.000
					B	0.000	108.462		100.00	0.000	0.000
					C	0.000	108.462		100.00	0.000	14.456
L4 43.17-0.00	20.80	1	6	161.321	A	0.000	161.321	161.321	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					B	0.000	161.321		100.00	0.000	0.000
					C	0.000	161.321		100.00	0.000	16.874

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.89	1.34	A	1	0.65	1	1	1	55.722	1.74	56.05	C
145.00-114.00			B	1	0.65	1	1	1	55.722			
			C	1	0.65	1	1	1	55.722			
L2	1.92	3.45	A	1	0.65	1	1	1	85.984	2.62	74.13	C
114.00-78.67			B	1	0.65	1	1	1	85.984			
			C	1	0.65	1	1	1	85.984			
L3	2.19	5.82	A	1	0.65	1	1	1	108.462	2.79	78.53	C
78.67-43.17			B	1	0.65	1	1	1	108.462			
			C	1	0.65	1	1	1	108.462			
L4 43.17-0.00	2.34	10.10	A	1	0.65	1	1	1	161.321	3.37	78.08	C
			B	1	0.65	1	1	1	161.321			
			C	1	0.65	1	1	1	161.321			
Sum Weight:	7.34	20.70						OTM	713.68 kip-ft	10.52		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.89	1.34	A	1	0.65	1	1	1	55.722	1.74	56.05	C
145.00-114.00			B	1	0.65	1	1	1	55.722			
			C	1	0.65	1	1	1	55.722			
L2	1.92	3.45	A	1	0.65	1	1	1	85.984	2.62	74.13	C
114.00-78.67			B	1	0.65	1	1	1	85.984			
			C	1	0.65	1	1	1	85.984			
L3	2.19	5.82	A	1	0.65	1	1	1	108.462	2.79	78.53	C
78.67-43.17			B	1	0.65	1	1	1	108.462			
			C	1	0.65	1	1	1	108.462			
L4 43.17-0.00	2.34	10.10	A	1	0.65	1	1	1	161.321	3.37	78.08	C
			B	1	0.65	1	1	1	161.321			
			C	1	0.65	1	1	1	161.321			
Sum Weight:	7.34	20.70						OTM	713.68 kip-ft	10.52		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.89	1.34	A	1	0.65	1	1	1	55.722	1.74	56.05	C
145.00-114.00			B	1	0.65	1	1	1	55.722			
			C	1	0.65	1	1	1	55.722			
L2	1.92	3.45	A	1	0.65	1	1	1	85.984	2.62	74.13	C
114.00-78.67			B	1	0.65	1	1	1	85.984			
			C	1	0.65	1	1	1	85.984			
L3	2.19	5.82	A	1	0.65	1	1	1	108.462	2.79	78.53	C
78.67-43.17			B	1	0.65	1	1	1	108.462			
			C	1	0.65	1	1	1	108.462			
L4 43.17-0.00	2.34	10.10	A	1	0.65	1	1	1	161.321	3.37	78.08	C
			B	1	0.65	1	1	1	161.321			
			C	1	0.65	1	1	1	161.321			
Sum Weight:	7.34	20.70						OTM	713.68 kip-ft	10.52		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.89	1.34	A	1	0.65	1	1	1	55.722	1.74	56.05	C
145.00-114.00			B	1	0.65	1	1	1	55.722			
			C	1	0.65	1	1	1	55.722			
L2	1.92	3.45	A	1	0.65	1	1	1	85.984	2.62	74.13	C
114.00-78.67			B	1	0.65	1	1	1	85.984			
			C	1	0.65	1	1	1	85.984			
L3	2.19	5.82	A	1	0.65	1	1	1	108.462	2.79	78.53	C
78.67-43.17			B	1	0.65	1	1	1	108.462			
			C	1	0.65	1	1	1	108.462			
L4 43.17-0.00	2.34	10.10	A	1	0.65	1	1	1	161.321	3.37	78.08	C
			B	1	0.65	1	1	1	161.321			
			C	1	0.65	1	1	1	161.321			
Sum Weight:	7.34	20.70						OTM	713.68 kip-ft	10.52		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	1.24	1.76	A	1	0.65	1	1	1	58.306	1.45	46.86	C
145.00-114.00			B	1	0.65	1	1	1	58.306			
			C	1	0.65	1	1	1	58.306			
L2	2.66	4.09	A	1	0.65	1	1	1	88.929	2.22	62.75	C
114.00-78.67			B	1	0.65	1	1	1	88.929			
			C	1	0.65	1	1	1	88.929			
L3	2.95	6.63	A	1	0.65	1	1	1	111.421	2.33	65.62	C
78.67-43.17			B	1	0.65	1	1	1	111.421			
			C	1	0.65	1	1	1	111.421			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L4 43.17-0.00	3.15	11.31	A	1	0.65	1	1	1	164.918	2.81	65.05	C
			B	1	0.65	1	1	1	164.918			
			C	1	0.65	1	1	1	164.918			
Sum Weight:	10.00	23.80						OTM	598.98 kip-ft	8.81		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	1.24	1.76	A	1	0.65	1	1	1	58.306	1.45	46.86	C
145.00-114.00			B	1	0.65	1	1	1	58.306			
			C	1	0.65	1	1	1	58.306			
L2	2.66	4.09	A	1	0.65	1	1	1	88.929	2.22	62.75	C
114.00-78.67			B	1	0.65	1	1	1	88.929			
			C	1	0.65	1	1	1	88.929			
L3	2.95	6.63	A	1	0.65	1	1	1	111.421	2.33	65.62	C
78.67-43.17			B	1	0.65	1	1	1	111.421			
			C	1	0.65	1	1	1	111.421			
L4 43.17-0.00	3.15	11.31	A	1	0.65	1	1	1	164.918	2.81	65.05	C
			B	1	0.65	1	1	1	164.918			
			C	1	0.65	1	1	1	164.918			
Sum Weight:	10.00	23.80						OTM	598.98 kip-ft	8.81		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	1.24	1.76	A	1	0.65	1	1	1	58.306	1.45	46.86	C
145.00-114.00			B	1	0.65	1	1	1	58.306			
			C	1	0.65	1	1	1	58.306			
L2	2.66	4.09	A	1	0.65	1	1	1	88.929	2.22	62.75	C
114.00-78.67			B	1	0.65	1	1	1	88.929			
			C	1	0.65	1	1	1	88.929			
L3	2.95	6.63	A	1	0.65	1	1	1	111.421	2.33	65.62	C
78.67-43.17			B	1	0.65	1	1	1	111.421			
			C	1	0.65	1	1	1	111.421			
L4 43.17-0.00	3.15	11.31	A	1	0.65	1	1	1	164.918	2.81	65.05	C
			B	1	0.65	1	1	1	164.918			
			C	1	0.65	1	1	1	164.918			
Sum Weight:	10.00	23.80						OTM	598.98 kip-ft	8.81		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	1.24	1.76	A	1	0.65	1	1	1	58.306	1.45	46.86	C
145.00-114.00			B	1	0.65	1	1	1	58.306			
			C	1	0.65	1	1	1	58.306			
L2	2.66	4.09	A	1	0.65	1	1	1	88.929	2.22	62.75	C
114.00-78.67			B	1	0.65	1	1	1	88.929			
			C	1	0.65	1	1	1	88.929			
L3	2.95	6.63	A	1	0.65	1	1	1	111.421	2.33	65.62	C
78.67-43.17			B	1	0.65	1	1	1	111.421			
			C	1	0.65	1	1	1	111.421			
L4 43.17-0.00	3.15	11.31	A	1	0.65	1	1	1	164.918	2.81	65.05	C
			B	1	0.65	1	1	1	164.918			
			C	1	0.65	1	1	1	164.918			
Sum Weight:	10.00	23.80						OTM	598.98 kip-ft	8.81		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.89	1.34	A	1	0.65	1	1	1	55.722	0.68	21.89	C
145.00-114.00			B	1	0.65	1	1	1	55.722			
			C	1	0.65	1	1	1	55.722			
L2	1.92	3.45	A	1	0.65	1	1	1	85.984	1.02	28.96	C
114.00-78.67			B	1	0.65	1	1	1	85.984			
			C	1	0.65	1	1	1	85.984			
L3	2.19	5.82	A	1	0.65	1	1	1	108.462	1.09	30.67	C
78.67-43.17			B	1	0.65	1	1	1	108.462			
			C	1	0.65	1	1	1	108.462			
L4 43.17-0.00	2.34	10.10	A	1	0.65	1	1	1	161.321	1.32	30.50	C
			B	1	0.65	1	1	1	161.321			
			C	1	0.65	1	1	1	161.321			
Sum Weight:	7.34	20.70						OTM	278.78 kip-ft	4.11		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.89	1.34	A	1	0.65	1	1	1	55.722	0.68	21.89	C
145.00-114.00			B	1	0.65	1	1	1	55.722			
			C	1	0.65	1	1	1	55.722			
L2	1.92	3.45	A	1	0.65	1	1	1	85.984	1.02	28.96	C
114.00-78.67			B	1	0.65	1	1	1	85.984			
			C	1	0.65	1	1	1	85.984			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L3	2.19	5.82	A	1	0.65	1	1	1	108.462	1.09	30.67	C
78.67-43.17			B	1	0.65	1	1	1	108.462			
			C	1	0.65	1	1	1	108.462			
L4 43.17-0.00	2.34	10.10	A	1	0.65	1	1	1	161.321	1.32	30.50	C
			B	1	0.65	1	1	1	161.321			
			C	1	0.65	1	1	1	161.321			
Sum Weight:	7.34	20.70						OTM	278.78 kip-ft	4.11		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.89	1.34	A	1	0.65	1	1	1	55.722	0.68	21.89	C
145.00-114.00			B	1	0.65	1	1	1	55.722			
			C	1	0.65	1	1	1	55.722			
L2	1.92	3.45	A	1	0.65	1	1	1	85.984	1.02	28.96	C
114.00-78.67			B	1	0.65	1	1	1	85.984			
			C	1	0.65	1	1	1	85.984			
L3	2.19	5.82	A	1	0.65	1	1	1	108.462	1.09	30.67	C
78.67-43.17			B	1	0.65	1	1	1	108.462			
			C	1	0.65	1	1	1	108.462			
L4 43.17-0.00	2.34	10.10	A	1	0.65	1	1	1	161.321	1.32	30.50	C
			B	1	0.65	1	1	1	161.321			
			C	1	0.65	1	1	1	161.321			
Sum Weight:	7.34	20.70						OTM	278.78 kip-ft	4.11		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.89	1.34	A	1	0.65	1	1	1	55.722	0.68	21.89	C
145.00-114.00			B	1	0.65	1	1	1	55.722			
			C	1	0.65	1	1	1	55.722			
L2	1.92	3.45	A	1	0.65	1	1	1	85.984	1.02	28.96	C
114.00-78.67			B	1	0.65	1	1	1	85.984			
			C	1	0.65	1	1	1	85.984			
L3	2.19	5.82	A	1	0.65	1	1	1	108.462	1.09	30.67	C
78.67-43.17			B	1	0.65	1	1	1	108.462			
			C	1	0.65	1	1	1	108.462			
L4 43.17-0.00	2.34	10.10	A	1	0.65	1	1	1	161.321	1.32	30.50	C
			B	1	0.65	1	1	1	161.321			
			C	1	0.65	1	1	1	161.321			
Sum Weight:	7.34	20.70						OTM	278.78 kip-ft	4.11		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	20.70					
Bracing Weight	0.00					
Total Member Self-Weight	20.70			2.24	2.31	
Total Weight	38.36			2.24	2.31	
Wind 0 deg - No Ice		-0.02	-28.64	-2991.63	3.60	-0.39
Wind 30 deg - No Ice		14.14	-24.79	-2589.88	-1469.85	0.20
Wind 45 deg - No Ice		20.01	-20.24	-2113.83	-2080.31	0.49
Wind 60 deg - No Ice		24.51	-14.30	-1493.57	-2548.84	0.74
Wind 90 deg - No Ice		28.31	0.02	3.53	-2944.25	1.08
Wind 120 deg - No Ice		24.53	14.33	1500.29	-2550.14	1.13
Wind 135 deg - No Ice		20.03	20.26	2120.13	-2082.14	1.04
Wind 150 deg - No Ice		14.17	24.81	2595.65	-1472.09	0.88
Wind 180 deg - No Ice		0.02	28.64	2996.10	1.01	0.39
Wind 210 deg - No Ice		-14.14	24.79	2594.35	1474.47	-0.20
Wind 225 deg - No Ice		-20.01	20.24	2118.30	2084.93	-0.49
Wind 240 deg - No Ice		-24.51	14.30	1498.05	2553.46	-0.74
Wind 270 deg - No Ice		-28.31	-0.02	0.94	2948.87	-1.08
Wind 300 deg - No Ice		-24.53	-14.33	-1495.82	2554.76	-1.13
Wind 315 deg - No Ice		-20.03	-20.26	-2115.66	2086.76	-1.04
Wind 330 deg - No Ice		-14.17	-24.81	-2591.17	1476.71	-0.88
Member Ice	3.09					
Total Weight Ice	48.51			4.65	5.58	
Wind 0 deg - Ice		-0.01	-24.26	-2536.52	6.49	-0.57
Wind 30 deg - Ice		12.07	-21.01	-2195.61	-1256.51	0.31
Wind 45 deg - Ice		17.08	-17.15	-1791.59	-1779.75	0.73
Wind 60 deg - Ice		20.92	-12.12	-1265.15	-2181.33	1.11
Wind 90 deg - Ice		24.16	0.01	5.56	-2520.17	1.61
Wind 120 deg - Ice		20.93	12.14	1276.02	-2182.23	1.68
Wind 135 deg - Ice		17.09	17.17	1802.17	-1781.03	1.55
Wind 150 deg - Ice		12.09	21.02	2205.82	-1258.08	1.30
Wind 180 deg - Ice		0.01	24.26	2545.81	4.67	0.57
Wind 210 deg - Ice		-12.07	21.01	2204.91	1267.67	-0.31
Wind 225 deg - Ice		-17.08	17.15	1800.88	1790.91	-0.73
Wind 240 deg - Ice		-20.92	12.12	1274.44	2192.49	-1.11
Wind 270 deg - Ice		-24.16	-0.01	3.74	2531.32	-1.61
Wind 300 deg - Ice		-20.93	-12.14	-1266.72	2193.39	-1.68
Wind 315 deg - Ice		-17.09	-17.17	-1792.87	1792.19	-1.55
Wind 330 deg - Ice		-12.09	-21.02	-2196.52	1269.24	-1.30
Total Weight	38.36			2.24	2.31	
Wind 0 deg - Service		-0.01	-11.19	-1168.73	0.23	-0.15
Wind 30 deg - Service		5.52	-9.68	-1011.80	-575.34	0.08
Wind 45 deg - Service		7.82	-7.91	-825.84	-813.80	0.19
Wind 60 deg - Service		9.57	-5.59	-583.56	-996.82	0.29
Wind 90 deg - Service		11.06	0.01	1.25	-1151.28	0.42
Wind 120 deg - Service		9.58	5.60	585.92	-997.32	0.44
Wind 135 deg - Service		7.82	7.91	828.05	-814.51	0.41
Wind 150 deg - Service		5.54	9.69	1013.80	-576.21	0.34
Wind 180 deg - Service		0.01	11.19	1170.22	-0.78	0.15
Wind 210 deg - Service		-5.52	9.68	1013.29	574.79	-0.08
Wind 225 deg - Service		-7.82	7.91	827.33	813.25	-0.19
Wind 240 deg - Service		-9.57	5.59	585.05	996.27	-0.29
Wind 270 deg - Service		-11.06	-0.01	0.24	1150.73	-0.42
Wind 300 deg - Service		-9.58	-5.60	-584.43	996.77	-0.44
Wind 315 deg - Service		-7.82	-7.91	-826.56	813.96	-0.41

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 330 deg - Service		-5.54	-9.69	-1012.31	575.66	-0.34

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service

Comb. No.	Description
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	145 - 114	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-12.57	0.11	-1.50
			Max. Mx	6	-6.86	-368.20	-0.75
			Max. My	10	-6.79	-0.05	-379.14
			Max. Vy	14	-16.17	368.07	-0.74
			Max. Vx	10	16.52	-0.05	-379.14
			Max. Torque	31			1.43
L2	114 - 78.67	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-20.28	1.40	-2.28
			Max. Mx	14	-13.34	921.70	-1.10
			Max. My	10	-13.29	0.48	-943.43
			Max. Vy	14	-19.71	921.70	-1.10
			Max. Vx	10	20.06	0.48	-943.43
			Max. Torque	31			1.48
L3	78.67 - 43.167	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-32.53	3.23	-3.44
			Max. Mx	14	-23.72	1743.75	-1.15
			Max. My	10	-23.69	0.73	-1777.01
			Max. Vy	14	-25.39	1743.75	-1.15
			Max. Vx	10	25.73	0.73	-1777.01
			Max. Torque	31			1.58
L4	43.167 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-48.51	5.78	-4.91
			Max. Mx	14	-38.34	3058.49	-1.01
			Max. My	10	-38.34	1.05	-3107.55
			Max. Vy	14	-28.34	3058.49	-1.01
			Max. Vx	10	28.67	1.05	-3107.55
			Max. Torque	32			1.72

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	48.51	-0.01	-24.27
	Max. H_x	14	38.36	28.31	0.02
	Max. H_z	2	38.36	0.02	28.64
	Max. M_x	2	3102.88	0.02	28.64
	Max. M_z	6	3053.74	-28.31	-0.02
	Max. Torsion	32	1.72	20.93	12.14
	Min. Vert	1	38.36	0.00	0.00
	Min. H_x	6	38.36	-28.31	-0.02
	Min. H_z	10	38.36	-0.02	-28.64
	Min. M_x	10	-3107.55	-0.02	-28.64
	Min. M_z	14	-3058.49	28.31	0.02
	Min. Torsion	24	-1.72	-20.93	-12.14

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	38.36	0.00	0.00	2.29	2.33	-0.00
Dead+Wind 0 deg - No Ice	38.36	-0.02	-28.64	-3102.88	3.71	-0.35
Dead+Wind 30 deg - No Ice	38.36	14.14	-24.79	-2686.26	-1524.43	0.26
Dead+Wind 45 deg - No Ice	38.36	20.01	-20.24	-2192.55	-2157.59	0.55
Dead+Wind 60 deg - No Ice	38.36	24.51	-14.30	-1549.23	-2643.58	0.80
Dead+Wind 90 deg - No Ice	38.36	28.31	0.02	3.67	-3053.74	1.13
Dead+Wind 120 deg - No Ice	38.36	24.53	14.33	1556.20	-2644.90	1.15
Dead+Wind 135 deg - No Ice	38.36	20.03	20.26	2199.09	-2159.47	1.05
Dead+Wind 150 deg - No Ice	38.36	14.17	24.81	2692.26	-1526.73	0.87
Dead+Wind 180 deg - No Ice	38.36	0.02	28.64	3107.55	1.05	0.35
Dead+Wind 210 deg - No Ice	38.36	-14.14	24.79	2690.93	1529.19	-0.26
Dead+Wind 225 deg - No Ice	38.36	-20.01	20.24	2197.21	2162.34	-0.55
Dead+Wind 240 deg - No Ice	38.36	-24.51	14.30	1553.90	2648.33	-0.81
Dead+Wind 270 deg - No Ice	38.36	-28.31	-0.02	1.01	3058.49	-1.13
Dead+Wind 300 deg - No Ice	38.36	-24.53	-14.33	-1551.52	2649.65	-1.15
Dead+Wind 315 deg - No Ice	38.36	-20.03	-20.26	-2194.41	2164.22	-1.04
Dead+Wind 330 deg - No Ice	38.36	-14.17	-24.81	-2687.58	1531.49	-0.87
Dead+Ice+Temp	48.51	-0.00	0.00	4.91	5.78	-0.00
Dead+Wind 0 deg+Ice+Temp	48.51	-0.01	-24.27	-2672.98	6.78	-0.52
Dead+Wind 30 deg+Ice+Temp	48.51	12.07	-21.01	-2313.76	-1324.12	0.40
Dead+Wind 45 deg+Ice+Temp	48.51	17.08	-17.15	-1888.00	-1875.50	0.83
Dead+Wind 60 deg+Ice+Temp	48.51	20.92	-12.12	-1333.23	-2298.69	1.20
Dead+Wind 90 deg+Ice+Temp	48.51	24.16	0.01	5.89	-2655.76	1.69
Dead+Wind 120 deg+Ice+Temp	48.51	20.93	12.14	1344.76	-2299.63	1.72
Dead+Wind 135 deg+Ice+Temp	48.51	17.09	17.17	1899.22	-1876.83	1.56
Dead+Wind 150 deg+Ice+Temp	48.51	12.09	21.02	2324.59	-1325.75	1.29
Dead+Wind 180 deg+Ice+Temp	48.51	0.01	24.27	2682.88	4.90	0.52
Dead+Wind 210 deg+Ice+Temp	48.51	-12.07	21.01	2323.64	1335.80	-0.39
Dead+Wind 225 deg+Ice+Temp	48.51	-17.08	17.15	1897.88	1887.18	-0.82
Dead+Wind 240 deg+Ice+Temp	48.51	-20.92	12.12	1343.12	2310.36	-1.20
Dead+Wind 270 deg+Ice+Temp	48.51	-24.16	-0.01	4.01	2667.42	-1.69
Dead+Wind 300 deg+Ice+Temp	48.51	-20.93	-12.14	-1334.85	2311.30	-1.72
Dead+Wind 315 deg+Ice+Temp	48.51	-17.09	-17.17	-1889.32	1888.51	-1.56
Dead+Wind 330 deg+Ice+Temp	48.51	-12.09	-21.02	-2314.69	1337.43	-1.29
Dead+Wind 0 deg - Service	38.36	-0.01	-11.19	-1212.81	2.90	-0.14
Dead+Wind 30 deg - Service	38.36	5.52	-9.68	-1049.76	-595.09	0.11
Dead+Wind 45 deg - Service	38.36	7.82	-7.91	-856.54	-842.84	0.22
Dead+Wind 60 deg - Service	38.36	9.57	-5.59	-604.79	-1032.99	0.32
Dead+Wind 90 deg - Service	38.36	11.06	0.01	2.87	-1193.47	0.45
Dead+Wind 120 deg - Service	38.36	9.58	5.60	610.39	-1033.51	0.46
Dead+Wind 135 deg - Service	38.36	7.82	7.91	861.98	-843.57	0.41
Dead+Wind 150 deg - Service	38.36	5.54	9.69	1054.98	-595.99	0.34
Dead+Wind 180 deg - Service	38.36	0.01	11.19	1217.52	1.87	0.14
Dead+Wind 210 deg - Service	38.36	-5.52	9.68	1054.46	599.86	-0.11
Dead+Wind 225 deg - Service	38.36	-7.82	7.91	861.25	847.61	-0.22
Dead+Wind 240 deg - Service	38.36	-9.57	5.59	609.49	1037.76	-0.32
Dead+Wind 270 deg - Service	38.36	-11.06	-0.01	1.83	1198.23	-0.45
Dead+Wind 300 deg - Service	38.36	-9.58	-5.60	-605.69	1038.28	-0.46
Dead+Wind 315 deg - Service	38.36	-7.82	-7.91	-857.28	848.34	-0.41
Dead+Wind 330 deg - Service	38.36	-5.54	-9.69	-1050.28	600.76	-0.34

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-38.36	0.00	0.00	38.36	0.00	0.000%
2	-0.02	-38.36	-28.64	0.02	38.36	28.64	0.000%
3	14.14	-38.36	-24.79	-14.14	38.36	24.79	0.000%
4	20.01	-38.36	-20.24	-20.01	38.36	20.24	0.000%
5	24.51	-38.36	-14.30	-24.51	38.36	14.30	0.000%
6	28.31	-38.36	0.02	-28.31	38.36	-0.02	0.000%
7	24.53	-38.36	14.33	-24.53	38.36	-14.33	0.000%
8	20.03	-38.36	20.26	-20.03	38.36	-20.26	0.000%
9	14.17	-38.36	24.81	-14.17	38.36	-24.81	0.000%
10	0.02	-38.36	28.64	-0.02	38.36	-28.64	0.000%
11	-14.14	-38.36	24.79	14.14	38.36	-24.79	0.000%
12	-20.01	-38.36	20.24	20.01	38.36	-20.24	0.000%
13	-24.51	-38.36	14.30	24.51	38.36	-14.30	0.000%
14	-28.31	-38.36	-0.02	28.31	38.36	0.02	0.000%
15	-24.53	-38.36	-14.33	24.53	38.36	14.33	0.000%
16	-20.03	-38.36	-20.26	20.03	38.36	20.26	0.000%
17	-14.17	-38.36	-24.81	14.17	38.36	24.81	0.000%
18	0.00	-48.51	0.00	0.00	48.51	-0.00	0.000%
19	-0.01	-48.51	-24.26	0.01	48.51	24.27	0.000%
20	12.07	-48.51	-21.01	-12.07	48.51	21.01	0.000%
21	17.08	-48.51	-17.15	-17.08	48.51	17.15	0.000%
22	20.92	-48.51	-12.12	-20.92	48.51	12.12	0.000%
23	24.16	-48.51	0.01	-24.16	48.51	-0.01	0.000%
24	20.93	-48.51	12.14	-20.93	48.51	-12.14	0.000%
25	17.09	-48.51	17.17	-17.09	48.51	-17.17	0.000%
26	12.09	-48.51	21.02	-12.09	48.51	-21.02	0.000%
27	0.01	-48.51	24.26	-0.01	48.51	-24.27	0.000%
28	-12.07	-48.51	21.01	12.07	48.51	-21.01	0.000%
29	-17.08	-48.51	17.15	17.08	48.51	-17.15	0.000%
30	-20.92	-48.51	12.12	20.92	48.51	-12.12	0.000%
31	-24.16	-48.51	-0.01	24.16	48.51	0.01	0.000%
32	-20.93	-48.51	-12.14	20.93	48.51	12.14	0.000%
33	-17.09	-48.51	-17.17	17.09	48.51	17.17	0.000%
34	-12.09	-48.51	-21.02	12.09	48.51	21.02	0.000%
35	-0.01	-38.36	-11.19	0.01	38.36	11.19	0.000%
36	5.52	-38.36	-9.68	-5.52	38.36	9.68	0.000%
37	7.82	-38.36	-7.91	-7.82	38.36	7.91	0.000%
38	9.57	-38.36	-5.59	-9.57	38.36	5.59	0.000%
39	11.06	-38.36	0.01	-11.06	38.36	-0.01	0.000%
40	9.58	-38.36	5.60	-9.58	38.36	-5.60	0.000%
41	7.82	-38.36	7.91	-7.82	38.36	-7.91	0.000%
42	5.54	-38.36	9.69	-5.54	38.36	-9.69	0.000%
43	0.01	-38.36	11.19	-0.01	38.36	-11.19	0.000%
44	-5.52	-38.36	9.68	5.52	38.36	-9.68	0.000%
45	-7.82	-38.36	7.91	7.82	38.36	-7.91	0.000%
46	-9.57	-38.36	5.59	9.57	38.36	-5.59	0.000%
47	-11.06	-38.36	-0.01	11.06	38.36	0.01	0.000%
48	-9.58	-38.36	-5.60	9.58	38.36	5.60	0.000%
49	-7.82	-38.36	-7.91	7.82	38.36	7.91	0.000%
50	-5.54	-38.36	-9.69	5.54	38.36	9.69	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001

2	Yes	4	0.00000001	0.00031371
3	Yes	6	0.00000001	0.00004849
4	Yes	6	0.00000001	0.00004996
5	Yes	6	0.00000001	0.00004692
6	Yes	5	0.00000001	0.00004549
7	Yes	6	0.00000001	0.00004893
8	Yes	6	0.00000001	0.00005000
9	Yes	6	0.00000001	0.00004752
10	Yes	4	0.00000001	0.00029945
11	Yes	6	0.00000001	0.00004763
12	Yes	6	0.00000001	0.00005003
13	Yes	6	0.00000001	0.00004891
14	Yes	5	0.00000001	0.00004366
15	Yes	6	0.00000001	0.00004696
16	Yes	6	0.00000001	0.00005002
17	Yes	6	0.00000001	0.00004866
18	Yes	4	0.00000001	0.00003177
19	Yes	5	0.00000001	0.00045446
20	Yes	6	0.00000001	0.00017903
21	Yes	6	0.00000001	0.00019678
22	Yes	6	0.00000001	0.00017315
23	Yes	5	0.00000001	0.00048389
24	Yes	6	0.00000001	0.00018320
25	Yes	6	0.00000001	0.00019821
26	Yes	6	0.00000001	0.00017553
27	Yes	5	0.00000001	0.00045590
28	Yes	6	0.00000001	0.00017753
29	Yes	6	0.00000001	0.00019903
30	Yes	6	0.00000001	0.00018328
31	Yes	5	0.00000001	0.00048398
32	Yes	6	0.00000001	0.00017353
33	Yes	6	0.00000001	0.00019790
34	Yes	6	0.00000001	0.00018137
35	Yes	4	0.00000001	0.00011733
36	Yes	5	0.00000001	0.00015065
37	Yes	5	0.00000001	0.00016908
38	Yes	5	0.00000001	0.00014218
39	Yes	4	0.00000001	0.00027232
40	Yes	5	0.00000001	0.00015351
41	Yes	5	0.00000001	0.00017091
42	Yes	5	0.00000001	0.00014684
43	Yes	4	0.00000001	0.00011736
44	Yes	5	0.00000001	0.00014805
45	Yes	5	0.00000001	0.00017173
46	Yes	5	0.00000001	0.00015396
47	Yes	4	0.00000001	0.00026956
48	Yes	5	0.00000001	0.00014297
49	Yes	5	0.00000001	0.00017025
50	Yes	5	0.00000001	0.00015223

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	145 - 114	43.934	43	2.9908	0.0081
L2	114 - 78.67	25.988	43	2.3491	0.0027
L3	83.337 - 43.167	13.308	43	1.5828	0.0011
L4	48.834 - 0	4.400	43	0.8435	0.0005

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
156.50	PD620	43	43.934	2.9908	0.0081	10638
151.00	12' x 1-1/2" Dia Omni	43	43.934	2.9908	0.0081	10638
147.00	APXVSPP18-C-A20	43	43.934	2.9908	0.0081	10638
146.00	Siren	43	43.934	2.9908	0.0081	10638
145.00	EEI 12-ft Low Profile Platform	43	43.934	2.9908	0.0081	10638
139.00	LPA-80063/6CF	43	40.251	2.8743	0.0069	8865
137.00	EEI Low Profile Platform	43	39.032	2.8351	0.0065	6648
125.00	APX16DWV-16DWVS-E-A20	43	31.932	2.5923	0.0043	2658
113.00	APXV18-206517S	43	25.485	2.3256	0.0026	1772
92.00	EEI 12-ft Low Profile Platform	43	16.379	1.7991	0.0013	2431
80.00	(2) 7770.00	43	12.211	1.5027	0.0011	2838
78.00	PiROD 12' Low Profile Circular Platform	43	11.577	1.4558	0.0010	2800
51.00	GPS	43	4.791	0.8850	0.0005	2350
50.00	GPS Mount	43	4.608	0.8658	0.0005	2350

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	145 - 114	111.744	10	7.6006	0.0310
L2	114 - 78.67	66.192	10	5.9813	0.0102
L3	83.337 - 43.167	33.926	10	4.0343	0.0044
L4	48.834 - 0	11.226	10	2.1516	0.0019

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
156.50	PD620	10	111.744	7.6006	0.0310	4312
151.00	12' x 1-1/2" Dia Omni	10	111.744	7.6006	0.0310	4312
147.00	APXVSPP18-C-A20	10	111.744	7.6006	0.0310	4312
146.00	Siren	10	111.744	7.6006	0.0310	4312
145.00	EEI 12-ft Low Profile Platform	10	111.744	7.6006	0.0310	4312
139.00	LPA-80063/6CF	10	102.400	7.3072	0.0262	3593
137.00	EEI Low Profile Platform	10	99.307	7.2086	0.0247	2694
125.00	APX16DWV-16DWVS-E-A20	10	81.289	6.5964	0.0161	1074
113.00	APXV18-206517S	10	64.914	5.9218	0.0098	713
92.00	EEI 12-ft Low Profile Platform	10	41.749	4.5847	0.0051	967
80.00	(2) 7770.00	10	31.133	3.8306	0.0041	1123
78.00	PiROD 12' Low Profile Circular	10	29.516	3.7111	0.0040	1107

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
	Platform					
51.00	GPS	10	12.221	2.2574	0.0020	924
50.00	GPS Mount	10	11.754	2.2084	0.0020	924

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	145 - 114 (1)	TP25.14x18x0.1875	31.00	0.00	0.0	39.000	14.8499	-6.79	579.14	0.012
L2	114 - 78.67 (2)	TP33.27x25.14x0.3125	35.33	0.00	0.0	39.000	31.6245	-13.29	1233.36	0.011
L3	78.67 - 43.167 (3)	TP40.69x31.571x0.375	40.17	0.00	0.0	39.000	46.4537	-23.69	1811.70	0.013
L4	43.167 - 0 (4)	TP49.75x38.6535x0.4375	48.83	0.00	0.0	39.000	68.4766	-38.34	2670.59	0.014

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	145 - 114 (1)	TP25.14x18x0.1875	379.14	49.742	39.000	1.275	0.00	0.000	39.000	0.000
L2	114 - 78.67 (2)	TP33.27x25.14x0.3125	943.43	45.590	39.000	1.169	0.00	0.000	39.000	0.000
L3	78.67 - 43.167 (3)	TP40.69x31.571x0.375	1777.01	47.747	39.000	1.224	0.00	0.000	39.000	0.000
L4	43.167 - 0 (4)	TP49.75x38.6535x0.4375	3107.55	44.798	39.000	1.149	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	145 - 114 (1)	TP25.14x18x0.1875	16.52	1.112	26.000	0.086	0.16	0.010	26.000	0.000
L2	114 - 78.67 (2)	TP33.27x25.14x0.3125	20.06	0.634	26.000	0.049	0.08	0.002	26.000	0.000
L3	78.67 - 43.167 (3)	TP40.69x31.571x0.375	25.73	0.554	26.000	0.043	0.20	0.003	26.000	0.000
L4	43.167 - 0 (4)	TP49.75x38.6535x0.4375	28.67	0.419	26.000	0.033	0.35	0.002	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	145 - 114 (1)	0.012	1.275	0.000	0.086	0.000	1.289 ✔	1.333	H1-3+VT ✔
L2	114 - 78.67 (2)	0.011	1.169	0.000	0.049	0.000	1.180 ✔	1.333	H1-3+VT ✔
L3	78.67 - 43.167 (3)	0.013	1.224	0.000	0.043	0.000	1.238 ✔	1.333	H1-3+VT ✔
L4	43.167 - 0 (4)	0.014	1.149	0.000	0.033	0.000	1.163 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	145 - 114	Pole	TP25.14x18x0.1875	1	-6.79	772.00	96.7	Pass
L2	114 - 78.67	Pole	TP33.27x25.14x0.3125	2	-13.29	1644.07	88.5	Pass
L3	78.67 - 43.167	Pole	TP40.69x31.571x0.375	3	-23.69	2415.00	92.9	Pass
L4	43.167 - 0	Pole	TP49.75x38.6535x0.4375	4	-38.34	3559.90	87.3	Pass
							Summary	
							Pole (L1) 96.7	Pass
							RATING = **96.7**	**Pass**

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Subject:	Flange Bolts and Flangeplate Analysis
Location:	145-ft EEI Monopole New Hartford, CT
Rev. 0: 9/24/14	Prepared by: T.J.L. Checked by: C.F.C. Job No. 14033.016

Flange Bolt and Flange Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	OM := 380·ft·kips	(Input From tnxTower)
Shear Force =	Shear := 16.5·kips	(Input From tnxTower)
Axial Force =	Axial := 12.6·kips	(Input From tnxTower)

Flange Bolt Data:

Use ASTM A325

Number of Flange Bolts =	N := 24	(User Input)
Diameter of Bolt Circle =	D_{bc} := 29.0·in	(User Input)
Bolt Ultimate Strength =	F_u := 120·ksi	(User Input)
Bolt Yield Strength =	F_y := 92·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Flange Bolts =	D := 1.0·in	(User Input)
Threads per Inch =	n := 8	(User Input)

Flange Plate Data:

Use ASTM A871 GR 60

Plate Yield Strength =	Fy_{bp} := 60·ksi	(User Input)
Flange Plate Thickness =	t_{bp} := 1.5·in	(User Input)
Flange Plate Diameter =	D_{bp} := 32.0·in	(User Input)
Outer Pole Diameter =	D_{pole} := 25.14·in	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 14.5 \cdot in$

Distance to Bolts = $i := 1 .. N$

$$d_i := \left| \begin{array}{l} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N} \right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{array} \right.$$

$d_1 = 3.75 \cdot in$ $d_7 = 14.01 \cdot in$

$d_2 = 7.25 \cdot in$ $d_8 = 12.56 \cdot in$

$d_3 = 10.25 \cdot in$ $d_9 = 10.25 \cdot in$

$d_4 = 12.56 \cdot in$ $d_{10} = 7.25 \cdot in$

$d_5 = 14.01 \cdot in$ $d_{11} = 3.75 \cdot in$

$d_6 = 14.50 \cdot in$ $d_{12} = 0.00 \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 12.6 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$ $MA_7 = 1.44 \cdot in$

$MA_2 = 0.00 \cdot in$ $MA_8 = 0.00 \cdot in$

$MA_3 = 0.00 \cdot in$ $MA_9 = 0.00 \cdot in$

$MA_4 = 0.00 \cdot in$ $MA_{10} = 0.00 \cdot in$

$MA_5 = 1.44 \cdot in$ $MA_{11} = 0.00 \cdot in$

$MA_6 = 1.93 \cdot in$ $MA_{12} = 0.00 \cdot in$

Effective Width of Flangeplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 15.8 \cdot in$

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 2.523 \times 10^3 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.785 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.606 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 0.878 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.22 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.066 \cdot in^3$

Check Flange Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 25.7 \cdot kips$

Allowable Tensile Force = $T_{ALL.Gross} := 1.333 \cdot \left(0.33 \cdot A_g \cdot F_u\right) = 41.5 \cdot kips$ (1.333 increase allowed per TIA/EIA)

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Gross}} = 62 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Gross}} \le 1.00, "OK", "Overstressed"\right)$

Condition1 = "OK"

Flange Plate Analysis:

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$

$C_1 = 7.3 \cdot kips$ $C_7 = 25.8 \cdot kips$

$C_2 = 13.6 \cdot kips$ $C_8 = 23.2 \cdot kips$

$C_3 = 19.1 \cdot kips$ $C_9 = 19.1 \cdot kips$

$C_4 = 23.2 \cdot kips$ $C_{10} = 13.6 \cdot kips$

$C_5 = 25.8 \cdot kips$ $C_{11} = 7.3 \cdot kips$

$C_6 = 26.7 \cdot kips$ $C_{12} = 0.5 \cdot kips$

Maximum Bending Stress in Plate =

$$f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(B_{eff} \, t_{bp}^{\,2}\right)} = 21.2 \cdot ksi$$

Allowable Bending Stress in Plate = $F_{bp} := 1.33 \cdot 0.75 \cdot Fy_{bp} = 59.9 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 35.4 \cdot \%$

Condition3 = $Condition2 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Condition2 = "Ok"

CENTEK engineering
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Subject:	Anchor Bolt and Base Plate Anlaysis
Location:	145-ft EEI Monopole New Hartford, CT
Rev. 0: 9/24/14	Prepared by: T.J.L. Checked by: C.F.C. Job No. 14033.016

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	OM := 3108·ft·kips	(Input From tnxTower)
Shear Force =	Shear := 29·kips	(Input From tnxTower)
Axial Force =	Axial := 38·kips	(Input From tnxTower)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts =	N := 20	(User Input)
Diameter of Bolt Circle =	D_{bc} := 69·in	(User Input)
Bolt "Column" Distance =	l := 3.0·in	(User Input)
Bolt Ultimate Strength =	F_u := 100·ksi	(User Input)
Bolt Yield Strength =	F_y := 75·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Anchor Bolts =	D := 2.25·in	(User Input)
Threads per Inch =	n := 4.5	(User Input)

Base Plate Data:

Use ASTM A572 60

Plate Yield Strength =	Fy_{bp} := 60·ksi	(User Input)
Base Plate Thickness =	t_{bp} := 2.75·in	(User Input)
Base Plate Diameter =	D_{bp} := 75·in	(User Input)
Outer Pole Diameter =	D_{pole} := 49.75·in	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 34.5 \cdot in$

Distance to Bolts = $i := 1 .. N$

$$d_i := \left| \begin{array}{l} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N} \right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{array} \right.$$

$d_1 = 10.66 \cdot in$ $d_7 = 27.91 \cdot in$

$d_2 = 20.28 \cdot in$ $d_8 = 20.28 \cdot in$

$d_3 = 27.91 \cdot in$ $d_9 = 10.66 \cdot in$

$d_4 = 32.81 \cdot in$ $d_{10} = 0.00 \cdot in$

$d_5 = 34.50 \cdot in$ $d_{11} = -10.66 \cdot in$

$d_6 = 32.81 \cdot in$ etc.

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 24.9 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$ $MA_7 = 3.04 \cdot in$

$MA_2 = 0.00 \cdot in$ $MA_8 = 0.00 \cdot in$

$MA_3 = 3.04 \cdot in$ $MA_9 = 0.00 \cdot in$

$MA_4 = 7.94 \cdot in$ $MA_{10} = 0.00 \cdot in$

$MA_5 = 9.63 \cdot in$ $MA_{11} = 0.00 \cdot in$

$MA_6 = 7.94 \cdot in$ etc

Effective Width of Baseplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 44.9 \cdot in$

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 1.19 \times 10^4 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 2.033 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.508 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.826 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 106.2 \cdot kips$

Allowable Tensile Force = $T_{ALL.Gross} := 1.333 \cdot \left(0.33 \cdot A_g \cdot F_u\right) = 174.9 \cdot kips$ (1.333 increase allowed per TIA/EIA)

$T_{ALL.Net} := 1.333 \cdot \left(0.60 \cdot A_n \cdot F_y\right) = 194.812 \cdot kips$ (1.333 increase allowed per TIA/EIA)

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Net}} \cdot 100 = 55$ Bolts are "upset bolts". Use net area per AISC

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Net}} \le 1.00, "OK", "Overstressed"\right)$

Condition1 = "OK"

Check Anchor Bolt Bending Stress:

Maximum Bending Moment = $M_x := \left(\frac{Shear}{N}\right) \cdot l = 0.362 \cdot ft \cdot kips$

Maximum Bending Stress = $f_{bx} := \frac{M_x}{S_x} = 5.3 \cdot ksi$

Allowable Bending Stress = $F_{bx} := 1.333 \cdot 0.6 \cdot F_y = 60 \cdot ksi$ (1.333 increase allowed per TIA/EIA)

Check Combined Stress Requirement:

Per ASCE Manual 72: "If the clearance between the base plate and concrete does not exceed two times the bolt diameter a bending stress analysis of the bolts is NOT normally required.

$$l := \begin{cases} l & \text{if } l > 2 \cdot D_n \\ 0 & \text{otherwise} \end{cases} = 0 \cdot in$$

$$f_{bx} := \begin{cases} f_{bx} & \text{if } l > 2 \cdot D_n \\ 0 & \text{otherwise} \end{cases} = 0 \cdot ksi$$

Check Anchor Bolt Compression/Combined Stress:

Maximum Compressive Force =

$$C_{Max} := OM \cdot \frac{R_{bc}}{l_p} + \frac{Axial}{N} = 110 \cdot kips$$

Maximum Compressive Stress =

$$f_a := \frac{C_{Max}}{A_n} = 33.9 \cdot ksi$$

$$K := 0.65$$

$$C_c := \sqrt{\frac{2 \cdot \pi^2 \cdot E}{F_y}} = 87.364$$

$$F_a := \begin{cases} \dfrac{\left[1 - \dfrac{\left(\frac{K \cdot l}{r}\right)^2}{2 \cdot C_c^{\,2}}\right] \cdot F_y}{\dfrac{5}{3} + \dfrac{3 \cdot \left(\frac{K \cdot l}{r}\right)}{8 \cdot C_c} - \dfrac{\left(\frac{K \cdot l}{r}\right)^3}{8 \cdot C_c^{\,3}}} & \text{if } \dfrac{K \cdot l}{r} \le C_c \\ \dfrac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K \cdot l}{r}\right)^2} & \text{if } \dfrac{K \cdot l}{r} > C_c \end{cases} = 45 \cdot ksi$$

Allowable Compressive Stress =

$$F_a := 1.333 \cdot F_a = 60 \cdot ksi$$

(1.333 increase allowed per TIA/EIA)

Combined Stress % of Capacity =

$$\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}}\right) \cdot 100 = 56.5$$

Condition 2 =

$$Condition2 := if\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} \le 1.00, "OK", "Overstressed"\right)$$

Condition2 = "OK"

Base Plate Analysis:

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$

$C_1 = 35.3 \cdot kips$ $C_7 = 89.4 \cdot kips$

$C_2 = 65.4 \cdot kips$ $C_8 = 65.4 \cdot kips$

$C_3 = 89.4 \cdot kips$ $C_9 = 35.3 \cdot kips$

$C_4 = 104.7 \cdot kips$ $C_{10} = 1.9 \cdot kips$

$C_5 = 110.0 \cdot kips$ $C_{11} = -31.5 \cdot kips$

$C_6 = 104.7 \cdot kips$ etc.

Maximum Bending Stress in Plate = $f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^2\right)} = 57.7 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 1.33 \cdot 0.75 \cdot Fy_{bp} = 59.9 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} \cdot 100 = 96.4$

Condition3 = $Condition3 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Condition3 = "Ok"

RFDS

Cascade Number	CT33XC022
Site Number	0
Site Name	New Hartford
OEM	ALU
99 Market Name	Southern Connecticut
Cluster ID	Southern Connecticut13
Issue Date	03/07/2014
Solution ID	
PID	25LTECT33XC022
Revision	1
Revision Date	03/07/2014
Status	Draft
Needed Date	
RFDS Engineer	
Sprint RF Engineer	Bill Hastings
RF Engineer Phone	
RF Engineer Email	Bill.M.Hastings@sprint.com
Sprint RF Manager	Jonathan Hull
RF Manager Phone	
RF Manager Email	Jonathan.B.Hull@sprint.com
Project Description	New 2.5G TDD LTE service at existing site. Add new antennas, RRH and RAN equipment.
Process Instance ID	207307

Location

Latitude (decimal only)	
Longitude (decimal only)	
Address	20 Antolini Rd
City	New Hartford
State	CT
Zip Code	6057
County	Litchfield
E911 Phase	

Site Level Design - 2500 MHz

	Number of Sectors	Carrier Count when 2.5G is on air	Tx and Rx start and stop frequencies
LTE 2500	3	3	2496 MHz - 2690 MHz

New Growth Cabinet

Make/Model	None
New Growth Cabinet Quantity	0
New Top Hat Make/Model	None
New Top Hat Cabinet Quantity	0
Incremental Current Draw needed by new Growth Cabinet or Top Hat (amps)	0
Radio Configuration	8T8R
Split Mode	0
Radio Scenario	1
Plumbing Diagram File Name	
RRH / RRU Model	TD-RRH8x20-25
RRH / RRU Qty	3
Power Junction Cylinder Make/Model	None
Power Junction Cylinder Qty	0
Optical Junction Cylinder Make/Model	N/A
Optical Junction Cylinder Qty	0
Use existing 1900Mhz Power for RRH?	false
Use existing 1900Mhz fiber for RRH?	false
Hybrid/Fiber Cable Make/Model	
Hybrid/Fiber Qty	0
Homerun Coax Cable Make/Model	
Homerun Coax Cable Qty	0
Additional GPS antenna required?	false
A&E Drawing Requirements	1) Calculate and call-out hybrid/fiber/coax main line cable route and lengths. 2) Calculate and call-out AISG cable route and lengths. 3) All antenna heights are to center of horizontal antennna. 4) Verify CL height with as-built drawings in Siterra or per Sprint site development. 5) No object is to be located 45 degrees left and right of front of antenna or 67.5 degress from horizontal from top and bottom 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 rules as above. Reference Sprint Antenna Placement Guidelines in Siterra General Library for more details. This includes Sprint and non-Sprint antennas. 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 mount for clear Line Of Site. 6) Horizontally, 2.5G antenna must be at least 18" from 1900Mhz antenna, 30" from 800Mhz antenna and 30Mhz from dual band 1900Mhz and 800Mhz antenna. Reference Sprint Antenna

Special Construction Requirements	Placement Guidelines in Siterra General Library for vertical spacing requirements. 1) AISG tests to verify operation is to be performed AFTER final installation of antennas and AISG cables have been connected. Verfy 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. 3) 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 67.5 degress from horizontal from top and bottom 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 rules as above. This includes Sprint and non-Sprint antennas. 4) General Contract is required to use a digital alignment tool to set azimuth, roll and downtilt. Azimuth accuracy is to be within 3 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/
Additional RF Notes	Site development - if no centerline height and azimuth exists in this RFDS, it means final RFDS has not been completed. If site is already leased and zoned, turn site on per lease. If not yet leased or zoned or if you can easily change the RF configuration, lease and zone, using on-air 1900 CL height and azimuth, mDT=0, eDT=-2 and use antenna called out in this RFDS for leasing and zoning. At some point, the final RFDS will come through. If different than your current configuration, you need to make a judgment call. If you can change the configuration without much delay in turning the site on, then make the change. If not, the build the site with existing configuration. Later one, you will receive funding to release, zone and modify site per final RFDS.

Sector and Antenna - 2500 MHz

Final/New Configuration	Sector 1	Sector 2	Sector 3
Azimuth	15	110	275
Antenna Center Line (ft)			
Antenna Manufacturer	RFS	RFS	RFS
Antenna Model	APXVTM14-ALU-I20	APXVTM14-ALU-I20	APXVTM14-ALU-I20
Antenna Qty	1	1	1
Antenna Mechanical Downtilt	0	0	0
Antenna Electrical Downtilt	0	1	1
Combined with			
Upper Splitter Make/Model			
Upper Splitter Qty	0	0	0
Top Jumper Make/Model	Coax Jumper. Mfg TBD.	Coax Jumper. Mfg TBD.	Coax Jumper. Mfg TBD.
Top Jumper Quantity (individual jumpers, not bunch)	9	9	9
Bottom Jumper Make/Model			
Bottom Jumper Qty	0	0	0
Surge Arrestor			
RF Filter Make/Model	N/A	N/A	N/A
RF Filter Qty	0	0	0

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

Sprint Existing Facility

Site ID: CT33XC022

New Hartford (Verizon)

20 Antolini Road
New Hartford, CT 06057

October 15, 2014

EBI Project Number: 62145544

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

EBI Consulting
environmental | engineering | due diligence

October 15, 2014

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

Re: Radio Frequency Maximum Permissible Exposure (MPE) Assessment for Site:
CT33XC022 - New Hartford (Verizon)

Site Total: 86.59% - MPE% in full compliance

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at **20 Antolini Road, New Hartford, CT**, for the purpose of determining whether the radio frequency (RF) exposure levels from the proposed Sprint equipment upgrades on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed upgrades to the existing Sprint Wireless antenna facility located at **20 Antolini Road, New Hartford, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

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

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

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

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

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

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

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

7) The antenna mounting height centerline for the proposed antennas is **147 feet** above ground level (AGL).

8) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculation were done with respect to uncontrolled / general public threshold limits

Site ID	CT33XC022 - New Hartford (Verizon)
Site Addresss	20 Antolini Road, New Hartford, CT, 06057
Site Type	Monopole

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	5.9	147	141	1/2 "	0.5	0	138.69	0.25%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	147	141	1/2 "	0.5	0	39.00	0.12%
1B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	147	141	1/2 "	0.5	0	138.69	0.44%
														Sector total Power Density Value:		0.82%

Sector 2

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
2a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	5.9	147	141	1/2 "	0.5	0	138.69	0.25%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	147	141	1/2 "	0.5	0	39.00	0.12%
2B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	147	141	1/2 "	0.5	0	138.69	0.44%
														Sector total Power Density Value:		0.82%

Sector 3

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
3a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	5.9	147	141	1/2 "	0.5	0	138.69	0.25%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	147	141	1/2 "	0.5	0	39.00	0.12%
3B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	147	141	1/2 "	0.5	0	138.69	0.44%
														Sector total Power Density Value:		0.82%

Site Composite MPE %	
Carrier	MPE %
Sprint	2.45%
AT&T	50.97%
MetroPCS	5.15%
T-Mobile	0.22%
Nextel	6.57%
South End Fire Dist.	0.61%
Verizon Wireless	20.62%
Total Site MPE %	**86.59%**

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Summary

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

The anticipated Maximum Composite contributions from the Sprint facility are **2.45% (0.82% from sector 1, 0.82% from sector 2 and 0.82% from sector 3)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **86.59%** of the allowable FCC established general public limit sampled at 6 feet above ground level. This total composite site value is based upon MPE values listed in the Connecticut Siting Council database for existing carrier emissions.

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

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