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

September 26, 2017

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

RE: **Notice of Exempt Modification for Sprint2.5 Crown Site BU: 806358**
Sprint Site ID: CT54XC718
1432 Old Waterbury Road, Southbury, CT 06488
Latitude: 41° 29' 36.92"/ Longitude: -73° 9' 54.98"

Dear Ms. Bachman:

Sprint currently maintains three (3) antennas at the 177-foot level of the existing 226-foot monopole tower at 1432 Old Waterbury Road in Southbury, CT. The tower and property is owned by Crown Castle. Sprint now intends to replace install three (3) antennas, one (1) hybrid, and three (3) new RRHs.

This facility was approved by the Connecticut Siting Council in Docket No. 88 on March 3, 1988. This approval included the conditions that:

1. The monopole tower at the Southbury site shall be no taller than necessary to provide the proposed service, and in no event shall exceed a total height of 243 feet, including antennas and associated equipment, or violate the air space of Oxford Airport as determined by the Federal Aviation Administration (FAA).
2. The facility shall be constructed in accordance with all applicable federal, state, and municipal laws and regulations.
3. Unless necessary to comply with condition number 2, above, no lights shall be installed on this tower.

This modification complies with all aforementioned conditions.

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

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

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

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

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

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

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

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

Sincerely,

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

Attachments:

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

cc: Mr. Jeff Manville, First-Selectman
Town of Southbury
501 Main Street
Southbury, CT 06488

Planning Department
Town of Southbury
501 Main Street
Southbury, CT 06488

DOCKET NO. 88 - AN APPLICATION OF METRO MOBILE CTS OF NEW HAVEN, INC., FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR CELLULAR TELEPHONE ANTENNAS AND ASSOCIATED EQUIPMENT IN THE TOWN OF SOUTHBURY, CONNECTICUT	:	CONNECTICUT SITING COUNCIL
	:	MARCH 3, 1988

D E C I S I O N A N D O R D E R

Pursuant to the forgoing opinion, the Connecticut Siting Council hereby directs that a Certificate of Environmental Compatibility and Public Need as provided by Section 16-50k of the General Statutes of Connecticut (CGS) be issued to Metro Mobile CTS of New Haven, Inc. for the construction, operation, and maintenance of a cellular telephone tower site and associated equipment at the "M/A-Southbury" alternative site on Old Waterbury Road in the Town of Southbury, Connecticut. The "M-Southbury" site on Luther Drive is hereby denied.

The facility shall be constructed, operated, and maintained as specified in the Council's record in this matter, and subject to the following conditions:

1. The monopole tower at the Southbury site shall be no taller than necessary to provide the proposed service, and in no event shall exceed a total height of 243 feet, including antennas and associated equipment, or violate the air space of Oxford Airport as determined by the Federal Aviation Administration (FAA).
2. The facility shall be constructed in accordance with all applicable federal, state, and municipal laws and regulations.
3. Unless necessary to comply with condition number 2, above, no lights shall be installed on this tower.

4. The Certificate Holder shall prepare a development and management (D&M) plan for the Southbury site in compliance with sections 16-50j-75 through 16-50j-77 of the Regulations of State Agencies. The D&M plan shall provide for permanent evergreen screening around the outside perimeter of the eight-foot chain link fence which will surround the site. The D&M shall also document the final height of the tower as approved by the FAA.
5. The Certificate Holder or its successor shall notify the Council if and when directional antennas or any equipment other than that listed in this application is added to this facility.
6. The Certificate Holder or its successor shall permit public or private entities to share space on the Southbury tower for due consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.
7. If this facility does not provide or permanently ceases to provide cellular service following completion of construction, this Decision and Order shall be void, and the tower and all associated equipment in this application shall be dismantled and removed or reapplication for any new use shall be made to the Council before any such new use is made.

8. The Certificate Holder shall comply with any future radio frequency (RF) standards promulgated by State or federal regulatory agencies. Upon the establishment of any new governmental RF standards, the facility granted in this Decision and Order shall be brought into compliance with such standards.

9. Unless otherwise approved by the Council, this Decision and Order shall be void if all construction authorized herein is not completed within three years of the issuance of this Decision and Order, or within three years of the completion of any appeal taken in this Decision and Order.

Pursuant to CGS Section 16-50p, we hereby direct that a copy of this Decision and Order be served on each person listed below. A notice of the issuance shall be published in the Waterbury Republican and Newtown Bee.

By this Decision and Order, the Council disposes of the legal rights, duties, and privileges of each party named or admitted to the proceeding in accordance with Section 16-50j-17 of the Regulations of State Agencies.

The parties or intervenors to this proceeding are:

Metro Mobile CTS of New Haven, Inc. (applicant)
50 Rockland Road
South Norwalk, CT 06854

Mr. Howard L. Slater, Esq. (its representative)
Ms. Jennifer Young Gaudet
Byrne, Slater, Sandler,
Shulman & Rouse, P.C.
330 Main Street
P.O. Box 3216
Hartford, CT 06103

Fleishman and Walsh, P.C. (party)
1725 N Street, N.W.
Washington, D.C. 20036

SNET Cellular, Inc. (intervenor)
Peter J. Tyrrell, Esq.
227 Church Street
New Haven, CT 06506

Dennis Roberts (intervenor)
Martha J. Roberts
306 Luther Drive
Southbury, CT 06488

Carol A. Herskowitz (intervenor)
First Selectman
Town of Southbury
Town Hall
501 Main Street South
Southbury, CT 06488

Duncan M. Graham (party)
Executive Director
Council of Governments
Of The Central Naugatuck Valley
20 East Main Street
Waterbury, CT 06702

1033E

CERTIFICATION

The undersigned members of the Connecticut Siting Council hereby certify that they have heard this case in Docket 88 or read the record thereof, and that we voted as follows:

Dated at New Britain, Connecticut the 3rd day of March, 1988.

Council Members	Vote Cast
Gloria Dibble Pond Chairperson	Yes
Commissioner Peter Boucher Designee: Roland Miller	Yes
Commissioner Leslie Carothers Designee: Brian Emerick	Yes
Owen L. Clark	Absent
Fred J. Doocy	Yes
Mortimer A. Gelston	Yes
James G. Horsfall	Yes
William H. Smith	Yes
Colin C. Tait	Absent

1432 OLD WATERBURY ROAD

Location	1432 OLD WATERBURY ROAD	**Mblu**	46/ 8/ 10A/ /
Acct#	00537702	**Owner**	CROWN ATLANTIC CO LLC
Assessment	$66,080	**Appraisal**	$94,400
PID	6366	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$14,400	$80,000	$94,400
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$10,080	$56,000	$66,080

Owner of Record

Owner	CROWN ATLANTIC CO LLC
Co-Owner	4017 WASHINGTON RD
Address	P M BOX 353 MCMURRAY, PA 15317
Sale Price	$220,000
Certificate	
Book & Page	484/ 720
Sale Date	04/11/2005
Instrument	24

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
CROWN ATLANTIC CO LLC	$220,000		484/ 720	24	04/11/2005
VOLPE BUILDERS INC	$0		297/1245	25	06/28/1995
C/O NEXTEL DBA SMART OF NY			0/ 0	25	

Building Information

Building 1 : Section 1

Year Built:	
Living Area:	0
Replacement Cost:	$0
Building Percent Good:	
Replacement Cost Less Depreciation:	$0

Building Attributes	
Field	**Description**
Style	Outbuildings
Model	
Grade:	
Stories	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Percent	
Total Bedrooms:	
Full Bthrms:	
Half Baths:	
Extra Fixtures	
Total Rooms:	
Bath Style:	
Kitchen Style:	
Num Kitchens	
Pln FPL:	
Det FPL:	
Gas Fireplace(s)	
% Attic Fin	
LF Dormer	
Foundation	
Bsmt Gar(s)	
Bsmt %	
SF FBM	
Fin Bsmt Qual	
Bsmt Access	

Building Photo

(http://images.vgsi.com/photos/SouthburyCTPhotos//default.jpg)

Building Layout

Building Layout

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend

No Data for Extra Features

Land

Land Use

Use Code	302
Description	Industrial OB
Zone	M-2
Neighborhood	
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	0
Frontage	0
Depth	0
Assessed Value	$56,000
Appraised Value	$80,000

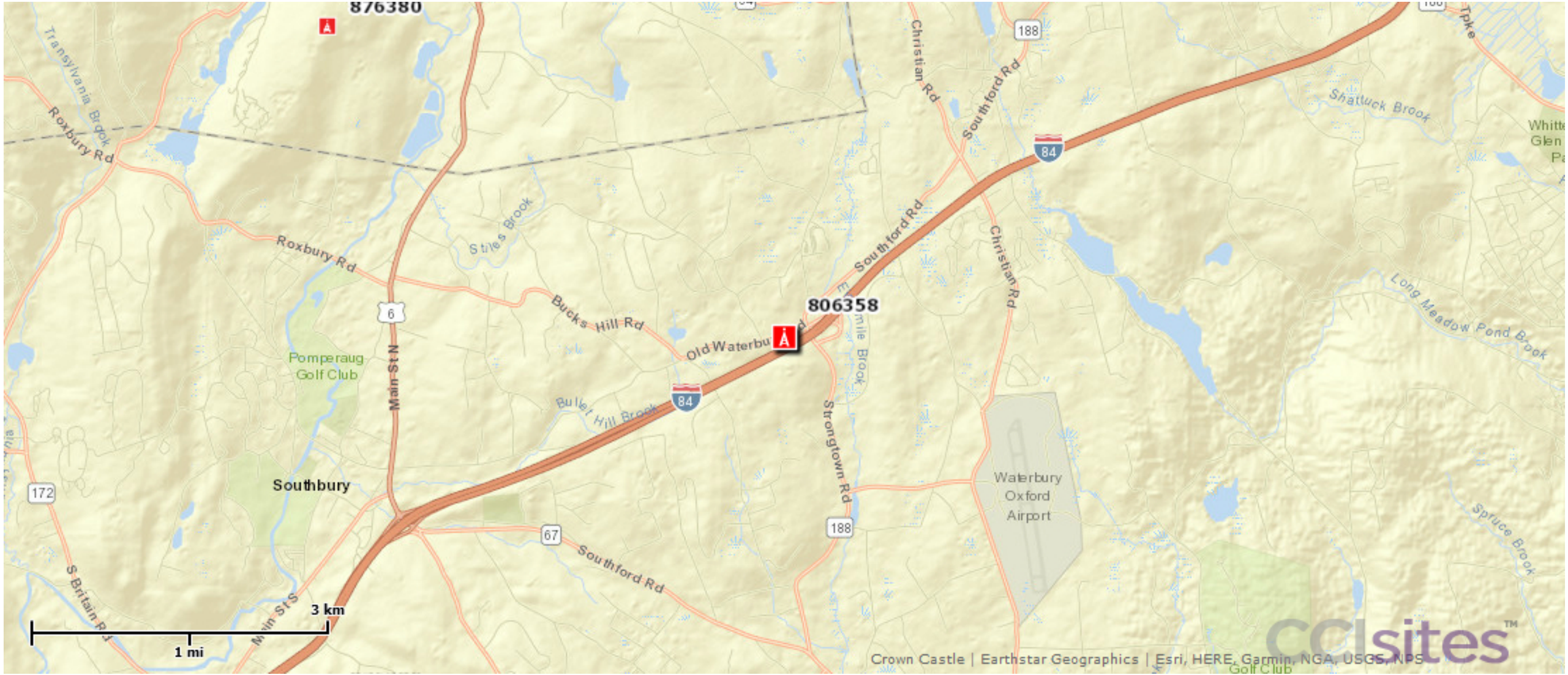
Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
SHD1	Shed Cell	CEL	Cell	360 S.F.	$14,400	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2011	$8,730	$107,290	$116,020

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2011	$6,110	$75,100	$81,210


876380
806358
Transylvania Brook
Roxbury Rd
Stiles Brook
Roxbury Rd
Bucks Hill Rd
Old Waterbu
Pomperaug
Golf Club
Main St N
Bullet Hill Brook
Southbury
172
67
Southford Rd
S Britain Rd
Main St S
3 km
1 mi
Christian Rd
Southford Rd
188
84
Shattuck Brook
Southford Rd
Christian Rd
Long Meadow Pond Brook
Strongtown Rd
188
Waterbury
Oxford
Airport
Spruce Brook
Crown Castle | Earthstar Geographics | Esri, HERE, Garmin, NGA, USGS, NPS
cclsites™

Confirm azimuths with final RFDS - RFDS supersedes CD's

Sprint

2.5 EQUIPMENT DEPLOYMENT

SITE NUMBER:

CT54XC718

SITE NAME:

MIDDLEBURY–CROWN

SITE ADDRESS:

1432 OLD WATERBURY ROAD
SOUTHBURY, CT 06488

CROWN ID#: 806358

CROWN SITE NAME: NHV 109 943107

APPROVED
By Craig Koppang at 12:18 pm, Aug 15, 2017

APPROVED
By Ray Perry at 8:42 am, Oct 13, 2014

SHEET INFORMATION

SITE NUMBER:	CT54XC718
SITE NAME:	MIDDLEBURY–CROWN
SITE ADDRESS:	1432 OLD WATERBURY ROAD SOUTHBURY, CT 06488
COUNTY:	NEW HAVEN
COORDINATES: (NAD 83)	41° 29' 36.92" N 73° 9' 54.98" W
GROUND ELEV:	646'± AMSL
STRUCTURE TYPE:	MONOPOLE
STRUCTURE HEIGHT:	226'–0"± AGL
STRUCTURE RAD CENTER:	175'–0"± AGL
ZONING CLASSIFICATION:	M–2
PARCEL ID:	46/8/10A//

LANDLORD:	CROWN CASTLE USA 2000 CORPORATE DRIVE CANONSBURG, PA
LOCAL POWER COMPANY:	CONNECTICUT LIGHT AND POWER CONTACT CUSTOMER SERVICE (800) 286–2000
APPLICANT:	SPRINT 6580 SPRINT PARKWAY OVERLAND PARK, KANSAS 66251
ENGINEER:	JAMES QUICKSELL (845) 567–6656 EXT. 2835 JQuicksell@tectonicengineering.com
SPRINT CM:	ANDY CLARK Andrew.Clark@sprint.com
CROWN CM:	JASON D'AMICO (860) 209–0104 jason.d'amico@crowncastle.com
AAV:	AT&T

VICINITY MAP (NOT TO SCALE)

SHEET INDEX

SHT. NO.	SHEET DESCRIPTION
T–1	TITLE SHEET
SP–1	GENERAL NOTES
SP–2	GENERAL NOTES
A–1	SITE PLAN
A–2	ELEVATION
A–3	ENLARGED EQUIPMENT LAYOUT PLANS
A–4	ANTENNA LAYOUT PLANS
A–5	RAN WIRING DIAGRAM
A–6	CABLE DETAILS
S–1	EQUIPMENT DETAILS
S–2	EQUIPMENT SCHEMATIC DETAILS
E–1	ELECTRICAL & GROUNDING PLANS
E–2	GROUNDING DETAILS & NOTES

GENERAL NOTES

1. THIS IS AN UNMANNED TELECOMMUNICATION FACILITY AND NOT FOR HUMAN HABITATION:
   HANDICAP ACCESS REQUIREMENTS ARE NOT REQUIRED.
   FACILITY HAS NO PLUMBING OR REFRIGERANTS.
   THIS FACILITY SHALL MEET OR EXCEED ALL FAA AND FCC REGULATOR REQUIREMENTS.
2. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE PROJECT OWNER'S REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.
3. DEVELOPMENT AND USE OF THIS SITE WILL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES.
   - 2005 STATE OF CONNECTICUT BUILDING CODE
   - ANSI/TIA/EIA–222–F–1996.
   - NATIONAL ELECTRICAL CODE, LATEST EDITION.

PROJECT DESCRIPTION

1. (1) NEW 2.5 EQUIPMENT RACK INSIDE EXIST MMBTS CABINET.
2. (3) NEW RFS APXVTM14–C–120 ANTENNAS.
3. (3) NEW TD–RRH8x20–25 RRH.
4. (1) NEW 1–1/4" HYBRID CABLE.
5. (3) NEW SECTOR FIBER JUMPERS.

AERIAL VIEW (NOT TO SCALE)

APPROVALS

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR MODIFICATIONS.

CONSTRUCTION: _____ DATE: _____

LEASING/
SITE ACQUISITION: _____ DATE: _____

LANDLORD/
PROPERTY OWNER: _____ DATE: _____

R.F. ENGINEER: _____ DATE: _____

Sprint
2.5 EQUIPMENT DEPLOYMENT
6850 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

CROWN CASTLE

TECTONIC
• PLANNING
• ENGINEERING
• SURVEYING
• CONSTRUCTION MANAGEMENT

TECTONIC Engineering & Surveying Consultants P.C.
1279 Route 300
Newburgh, NY 12550
Phone: (845) 567–6656
Fax: (845) 567–8703
www.tectonicengineering.com

SUBMITTALS

PROJECT NO: 7225.CT54XC718

NO	DATE	DESCRIPTION	BY
0	06/19/14	FOR COMMENT	DS
1	09/23/14	FOR CONSTRUCTION	MP
2	10/10/14	REVISED AZIMUTHS	MP

DATE	REVIEWED BY
10/10/14	TMQ

STATE OF CONNECTICUT
ANTONIO M. GUALTIERI
No. 25406
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT54XC718

SITE NAME:
MIDDLEBURY–CROWN

SITE ADDRESS:
1432 OLD WATERBURY ROAD
SOUTHBURY, CT 06488

SHEET TITLE:
TITLE SHEET

SHEET NO:
T–1

DIVISION 01000–GENERAL NOTES

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.
2. THE ARCHITECT/ENGINEER HAVE MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.
3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE PROJECT OWNER'S REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK.
4. THE SCOPE OF WORK SHALL INCLUDE FURNISHING ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.
5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
6. ONCE THE CONTRACTOR HAS RECEIVED AND ACCEPTED THE NOTICE TO PROCEED, CONTRACTOR WILL CONTACT THE CROWN CASTLE CONSTRUCTION MANAGER OF RECORD (NOTED ON THE FIRST PAGE ON THIS CONSTRUCTION DRAWING) A MINIMUM OF 48 HOURS PRIOR TO WORK START. UPON ARRIVAL TO THE JOB SITE, CONTRACTOR CREW IS REQUIRED CALL 1–800–788–7011 TO NOTIFY THE CROWN CASTLE NOC WORK HAS BEGUN.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S/VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.
8. THE CONTRACTOR SHALL PROVIDE A FULL SET OF CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDUMS OR CLARIFICATIONS AVAILABLE FOR THE USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.
9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY OR LOCAL GOVERNMENT AUTHORITY.
11. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC. DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.
12. THE CONTRACTOR SHALL KEEP THE GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY. PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.
13. THE CONTRACTOR SHALL COMPLY WITH ALL PERTINENT SECTIONS OF THE BASIC STATE BUILDING CODE, LATEST EDITION, AND ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJECT. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK SHALL BE RELOCATED AS DIRECTED BY THE ARCHITECT/ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR PIER DRILLING AROUND OR NEAR UTILITIES. THE CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT LIMITED TO A) FALL PROTECTION, B) CONFINED SPACE, C) ELECTRICAL SAFETY, D) TRENCHING AND EXCAVATION OF ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHICH INTERFERE WITH THE EXECUTION OF THE WORK SHALL BE REMOVED AND OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT THE POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK SUBJECT TO THE APPROVAL OF THE ARCHITECT/ENGINEER.
14. THE CONTRACTOR SHALL NOTIFY THE PROJECT OWNER'S REPRESENTATIVE IN WRITING WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE LESSEE/LICENSEE REPRESENTATIVE.
15. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC. ON THE JOB.
16. THE CONTRACTOR SHALL NOTIFY THE THE RF ENGINEER FOR ANTENNA AZIMUTH VERIFICATION (DURING ANTENNA INSTALLATION) PRIOR TO CONDUCTING SWEEP TESTS.
17. THE CONTRACTOR SHALL SUBMIT AT THE END OF THE PROJECT A COMPLETE SET OF AS–BUILT DRAWINGS TO THE CLIENT REPRESENTATIVE.
18. REFER TO: CONSTRUCTION STANDARDS–SPRINT DOCUMENT EXHIBIT A–STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES REV. 4.0– 02.15.2011.DOCM.
19. REFER TO: WEATHER PROOFING SPECS: EXCERPT EXH A–WIHRPRF–STD CONSTR SPECS._15720111042185549 2.DOCM.
20. REFER TO: COLOR CODING–SPRINT NEXTEL ANT AND LINE COLOR CODING (DRAFT) V3 09–08–11.PDF
21. REFER TO LATEST DOCUMENTATION REVISION.

DIVISION 03000–CONCRETE

1.03 APPLICABLE STANDARDS (USE LATEST EDITIONS)

A. ACI–301 – SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS.
B. ACI–347 GUIDE TO FORM WORK FOR CONCRETE.
C. ASTM C33– CONCRETE AGGREGATE
D. ASTM C94 – READY MIXED CONCRETE e. ASTM C150 – PORTLAND CEMENT.
E. ASTM C260 – AIR–ENTRAINING ADMIXTURES FOR CONCRETE
F. ASTM C309– LIQUID MEMBRANE FORMING COMPOUNDS FOR CURING CONCRETE.
H. ASTM C494 – CHEMICAL ADMIXTURES FOR CONCRETE
I. ASTM A615– DEFORMED AND PLAIN BILLET–STEEL BARS FOR CONCRETE REINFORCEMENT
J. ASTM A185– STEEL WELDED WIRE FABRIC (PLAIN) FOR CONCRETE REINFORCEMENT

1.04 QUALITY ASSURANCE

CONCRETE MATERIALS AND OPERATIONS SHALL BE TESTED AND INSPECTED BY THE ARCHITECT/ENGINEER AS DIRECTED BY THE CLIENT'S REPRESENTATIVE.

3.04 SURFACE FINISHES

A. SURFACES AGAINST WHICH BACKFILL OR CONCRETE SHALL BE PLACED REQUIRE NO TREATMENT EXCEPT REPAIR OF DEFECTIVE AREAS.

B. SURFACES THAT WILL BE PERMANENTLY EXPOSED SHALL PRESENT A UNIFORM FINISH PROVIDED BY THE REMOVAL OF FINS AND THE FILLING HOLES AND OTHER IRREGULARITIES WITH DRY PACK GROUT, OR BY SACKING WITH UTILITY OR ORDINARY GROUT.

C. SURFACES THAT WOULD NORMALLY BE LEVEL AND WHICH WILL BE PERMANENTLY EXPOSED TO THE WEATHER SHALL BE SLOPED FOR DRAINAGE. UNLESS ENGINEER'S DESIGN DRAWING SPECIFIES A HORIZONTAL SURFACE OR SURFACES SUCH AS STAIR TREADS, WALLS, CURBS, AND PARAPETS SHALL BE SLOPED APPROXIMATELY 1/4" PER FOOT.

D. SURFACES THAT WILL BE COVERED BY BACKFILL OR CONCRETE SHALL BE SMOOTH SCREENED.

E. EXPOSED SLAB SURFACES SHALL BE CONSOLIDATED, SCREENED, FLOATED, AND STEEL TROWELED. HAND OR POWER–DRIVEN EQUIPMENT MAY BE USED FOR FLOATING. FLOATING SHALL BE STARTED AS SOON AS THE SCREENED SURFACE HAS ATTAINED A STIFFNESS TO PERMIT FINISHING OPERATIONS. OPERATIONS. ALL EDGES MUST HAVE A 3/4" CHAMFER.

1.04 QUALITY ASSURANCE CONCRETE MATERIALS AND OPERATIONS SHALL BE TESTED AND INSPECTED BY THE ENGINEER.

3.05 PATCHING

THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY UPON REMOVAL OF THE FORMS TO OBSERVE CONCRETE SURFACE CONDITIONS. IMPERFECTIONS SHALL BE PATCHED ACCORDING TO THE ENGINEER'S DIRECTION.

3.06 DEFECTIVE CONCRETE

THE CONTRACTOR SHALL NOTIFY OR REPLACE CONCRETE NOT CONFORMING TO REQUIRED LEVELS AND LINES, DETAILS, AND ELEVATIONS AS SPECIFIED IN ACI 301.

3.07 PROTECTION

A. IMMEDIATELY AFTER PLACEMENT. THE CONTRACTOR SHALL PROTECT THE CONCRETE FROM PREMATURE DRYING, EXCESSIVELY HOT OR COLD TEMPERATURES, AND MECHANICAL INJURY. FINISHED WORK SHALL BE PROTECTED.

B. CONCRETE SHALL BE MAINTAINED WITH MINIMAL MOISTURE LOSS AT RELATIVELY CONSTANT TEMPERATURE FOR PERIOD NECESSARY FOR HYDRATION OF CEMENT AND HARDENING OF CONCRETE.

C. ALL CONCRETE SHALL BE WATER CURED PER ACCEPTABLE PRACTICES SPECIFIED BY ACI CODE (LATEST EDITION)

DIVISION 05000 – METALS

PART 1 – GENERAL

1.01 WORK INCLUDED

A. THE WORK CONSISTS OF THE FABRICATION AND INSTALLATION OF ALL MATERIALS TO BE FURNISHED. AND WITHOUT LIMITING THE GENERALITY THEREOF, INCLUDING ALL EQUIPMENT, LABOR AND SERVICES REQUIRED FOR ALL STRUCTURAL STEEL WORK AND ALL ITEMS INCIDENTAL AS SPECIFIED AND AS SHOWN ON THE DRAWINGS:

1. STEEL FRAMING INCLUDING BEAMS, ANGLES, CHANNELS AND PLATES.
2. WELDING AND BOLTING OF ATTACHMENTS.

1.02 REFERENCE STANDARDS

A. THE WORK SHALL CONFORM TO THE CODES AND STANDARDS OF THE FOLLOWING AGENCIES AS FURTHER CITED HEREIN:

1. ASTM: AMERICAN SOCIETY FOR TESTING AND MATERIALS AS PUBLISHED IN "COMPILATION OF ASTM STANDARDS IN BUILDING CODES" OR LATEST EDITION.
2. AWS: AMERICAN WELDING SOCIETY CODE OR LATEST EDITION.
3. AISC: AMERICAN INSTITUTE OF STEEL CONSTRUCTION, "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" (LATEST EDITION).

PART 2 – PRODUCTS

2.01 MATERIALS

A. STRUCTURAL STEEL: SHALL COMPLY WITH THE REQUIREMENTS OF ASTM A36 AND A992 FOR STRUCTURAL STEEL.

ALL PROPOSED STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH AISC CODE AND ASTM SPECIFICATIONS (LATEST EDITION) ALL NEW STEEL SHALL CONFORM TO THE FOLLOWING.

1. STRUCTURAL WIDE FLANGE: ASTM A992 Fy=50KSI.
2. MISCELLANEOUS STEEL (PLATES), CHANNELS, ANGLES, ETC): ASTM A36 (Fy=36KSI).
3. STRUCTURAL TUBING: ASTM A500 Gr. B (Fy=46KSI).
4. STEEL PIPE: ASTM A53 Gr B (Fy=35KSI).

2.02 WELDING

A. ALL WELDING SHALL BE DONE BY CERTIFIED WELDERS. CERTIFICATION DOCUMENTS SHALL BE MADE AVAILABLE FOR ENGINEER'S AND/OR OWNER'S REVIEW IF REQUESTED.

B. WELDING ELECTRODES FOR MANUAL SHIELDED METAL ARC WELDING SHALL CONFORM TO ASTM 1–233, E70 SERIES. BARE ELECTRODES AND GRANULAR FLUX USED IN THE SUBMERGED ARC PROCESS SHALL CONFORM TO AISC SPECIFICATIONS.

C. FIELD WELDING SHALL BE DONE AS PER AWS D1.1 REQUIREMENTS VISUAL INSPECTION IS ACCEPTABLE.

D. STUD WELDING SHALL BE ACCOMPLISHED BY CAPACITOR DISCHARGE (CD) WELDING TECHNIQUE USING CAPACITOR DISCHARGE STUD WELDER.

E. PROVIDE STUD FASTENERS OF MATERIALS AND SIZES SHOWN ON DRAWINGS OR AS RECOMMENDED BY THE MANUFACTURER FOR STRUCTURAL LOADINGS REQUIRED.

F. FOLLOW MANUFACTURERS SPECIFICATIONS AND INSTRUCTIONS TO PROPERLY SELECT AND INSTALL STUD WELDS.

2.03 BOLTING

A. BOLTS SHALL BE CONFORMING TO ASTM A35 HIGH STRENGTH HOT DIP GALVANIZED WITH ASTM A153 HEAVY HEX TYPE NUTS.

B. BOLTS SHALL BE 3/4" (MINIMUM) CONFORMING TO ASTM A325, HOT DIP GALVANIZED, ASTM A153 NUTS SHALL BE HEAVY HEX TYPE.

C. ALL CONNECTIONS SHALL BE 2 BOLTS MINIMUM.

D. EXCEPT WHERE SHOWN, ALL BEAM TO BEAM AND BEAM TO COLUMN CONNECTIONS TO BE DOUBLE ANGLED CONNECTIONS WITH HIGH STRENGTH BOLTS (THREADS EXCLUDED FROM SHEAR PLANE) AND HARDENED WASHERS.

E. STANDARD, OVERSIZED OR HORIZONTAL SHORT SLOTTED HOLES.

F. SNUG–TIGHT STRENGTH BEARING BOLTS MAY BE USED IN STANDARD HOLES CONFORMING TO ACIS, USING THE TURN OF THE NUT METHOD.

H. FULLY–TENSIONED HIGH STRENGTH (SLIP CRITICAL) SHALL BE USED IN OVERSIZED SLOT HOLES (RESPECTIVE OF SLOT ORIENTATION).

I. ALL BRACED CONNECTION, MOMENT CONNECTION AND CONNECTIONS NOTED AS "SLIP CRITICAL" SHALL BE BE SLIP CRITICAL JOINTS WITH CLASS A SURFACE CONDITIONS, UNLESS OTHERWISE NOTED.

J. EPOXY ANCHOR ASSEMBLIES SHALL BE AS MANUFACTURED BY HILTI OR ENGINEER APPROVED EQUAL, AS FOLLOWS:

BASE MATERIAL	ANCHOR SYSTEM
CONCRETE	HILTI HIT–HY 200
HOLLOW & GROUTED CMU OR BRICK	HILTI HIT–HY 70

2.04 FABRICATION

A. FABRICATION OF STEEL SHALL CONFORM TO THE AISC AND AWS

2.05 FINISH

A. STRUCTURAL STEEL EXPOSED TO WEATHER SHALL BE HOT–DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. (LATEST EDITION) UNLESS OTHERWISE NOTED.

2.06 PROTECTION

A. UPON COMPLETION OF ERECTION, INSPECT ALL GALVANIZED STEEL AND PAINT ANY FIELD CUTS, WELDS OR GALVANIZED BREAKS WITH (2) COATS OF ZINC–RICH COLD GALVANIZING PAINT.

PART 3 – ERECTION

A. PROVIDE ALL ERECTION, EQUIPMENT, BRACING, PLANKING, FIELD BOLTS, NUTS, WASHERS, DRIFT PINS, AND SIMILAR MATERIALS WHICH DO NOT FORM A PART OF THE COMPLETED CONSTRUCTION, BUT ARE NECESSARY FOR ITS PROPER ERECTION.

B. ERECT AND ANCHOR ALL STRUCTURAL STEEL IN ACCORDANCE WITH AISC REFERENCE STANDARDS. ALL WORK SHALL BE ACCURATELY SET TO ESTABLISHED SUITABLE ATTACHMENTS TO THE CONSTRUCTION OF THE BUILDING

C. TEMPORARY BRACING, GUYING, AND SUPPORT SHALL BE PROVIDED TO KEEP THE STRUCTURE SET AND ALIGNED AT ALL TIMES DURING CONSTRUCTION, AND TO PREVENT DANGER TO PERSONS AND PROPERTY. CHECK ALL TEMPORARY LOADS AND STAY WITHIN SAFE CAPACITY OF ALL BUILDING COMPONENTS.

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SUBMITTALS

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DATE	REVIEWED BY
10/10/14	

STATE OF CONNECTICUT
ANTONIO A. GUALTIERI
SEAL
No. 25406
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT54XC718

SITE NAME:
MIDDLEBURY–CROWN

SITE ADDRESS:
1432 OLD WATERBURY ROAD
SOUTHBURY, CT 06488

SHEET TITLE:
GENERAL NOTES

SHEET NO:
SP–1

DIVISION 13000–SPECIAL CONSTRUCTION ANTENNA INSTALLATION

PART 1 – GENERAL

1.01 WORK INCLUDED

A. ANTENNAS AND HYBRIFLEX CABLES ARE FURNISHED BY CLIENT'S REPRESENTATIVE UNDER SEPARATE CONTRACT. THE CONTRACTOR SHALL ASSIST ANTENNA INSTALLATION CONTRACTOR IN TERMS OF COORDINATION AND SITE ACCESS. ERECTION SUBCONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPERTY.

B. INSTALL ANTENNAS AS INDICATED ON DRAWINGS AND CLIENT'S REPRESENTATIVE SPECIFICATIONS.

C. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS.

D. INSTALL FURNISHED GALVANIZED STEEL OR ALUMINUM WAVEGUIDE AND PROVIDE PRINTOUT OF THAT RESULT

F. INSTALL HYBRIFLEX CABLES AND TERMINATIONS BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTORS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURER'S REQUIREMENTS.

G. ANTENNA AND HYBRIFLEX CABLE GROUNDING:

1. ALL EXTERIOR #6 GREEN GROUND WIRE DAISY CHAIN CONNECTIONS ARE TO BE WEATHER SEALED WITH ANDREWS CONNECTOR/SPLICE WEATHERPROOFING KIT TYPE 3221213 OR EQUIVALENT.

2. ALL HYBRIFLEX CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF HYBRIFLEX CABLE (NOT WITHIN BENDS). 1.02 RELATED WORK FURNISH THE FOLLOWING WORK AS SPECIFIED UNDER CONSTRUCTION DOCUMENTS, BUT COORDINATE WITH QOTHER TRADES PRIOR TO BID:

   1. FLASHING OF OPENING INTO OUTSIDE WALLS.
   2. SEALING AND CAULKING ALL OPENINGS.
   3. PAINTING.
   4. CUTTING AND PATCHING.

1.03 REQUIREMENTS OF REGULATOR AGENCIES

A. FURNISH U.L. LISTED EQUIPMENT WHERE SUCH LABEL IS AVAILABLE. INSTALL IN CONFORMANCE WITH U.L. STANDARDS WHERE APPLICABLE.
B. INSTALL ANTENNA, ANTENNA CABLES, GROUNDING SYSTEM IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS IN EFFECT AT PROJECT LOCATION AND RECOMMENDATIONS OF STATE AND LOCAL BUILDING CODES HAVING JURISDICTION OVER SPECIFIC PORTIONS OF WORK. THIS WORK INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING:

1. EIA – ELECTRONIC INDUSTRIES ASSOCIATION RS–22. STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES.

2. FAA – FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULAR AC 70/7480–IH, CONSTRUCTION MARKING AND LIGHTING.

3. FCC – FEDERAL COMMUNICATION COMMISSION RULES AND REGULATIONS FORM 715, OBSTRUCTION MARKING AND LIGHTING SPECIFICATION FOR ANTENNA STRUCTURES

4. AISC – AMERICAN INSTITUTE OF STEEL CONSTRUCTION FOR STRUCTURAL JOINTS USING ASTM 1325 OR A490 BOLTS.

5. NEC – NATIONAL ELECTRIC CODE – ON TOWER LIGHTING KITS.

6. UL – UNDERWRITER'S LABORATORIES APPROVED ELECTRICAL PRODUCTS.

7. IN ALL CASES, PART 77 OF THE FAA RULES AND PARTS 17 AND 22 OF THE FCC RULES ARE APPLICABLE AND IN THE EVENT OF CONFLICT, SUPERSEDE ANY OTHER STANDARDS OR SPECIFICATIONS.

8. LIFE SAFETY CODE NFPA, LATEST EDITION.

DIVISION 13000–EARTHWORK

PART 1 GENERAL

1.01 WORK INCLUDED: REFER TO SURVEY AND SITE PLAN FOR WORK INCLUDED.

1.02 RELATED WORK

A. CONSTRUCTION OF EQUIPMENT FOUNDATIONS
B. INSTALLATION OF ANTENNA SYSTEM

PART 2 PRODUCTS

2.01 MATERIALS

A. ROAD AND SITE MATERIALS; FILL MATERIAL SHALL BE ACCEPTABLE, SELECT FILL SHALL BE IN ACCORDANCE WITH LOCAL DEPARTMENT OF HIGHWAY AND PUBLIC TRANSPORTATION STANDARD SPECIFICATIONS.

B. SOIL STERILIZER SHALL BE EPA REGISTERED OF LIQUID COMPOSITION AND OF PRE–EMERGENCE DESIGN.

C. SOIL STABILIZER FABRIC SHALL BE MIRAFI OR EQUAL – 600X AT ACCESS ROAD AND COMPOUND.

D. GRAVEL FILL; WELL GRADED, HARD, DURABLE, NATURAL SAND AND GRAVEL, FREE FROM ICE AND SNOW, ROOTS, SOD RUBBISH, AND OTHER DELETERIOUS OR ORGANIC MATTER.

MATERIAL SHALL CONFORM TO THE FOLLOWING GRADATION REQUIREMENTS.

GRAVEL FILL TO BE PLACED IN LIFTS OF 9" MAXIMUM THICKNESS AND 90 % DENSITY. COMPACTED TO 95

E. NO FILL OR EMBANKMENT MATERIALS SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OF EMBANKMENT

2.02 EQUIPMENT

A. COMPACTION SHALL BE ACCOMPLISHED BY MECHANICAL MEANS. LARGER AREAS SHALL BE COMPACTED BY SHEEPS FOOT, VIBRATORY OR RUBBER TIED ROLLERS WEIGHING AT LEAST FIVE TONS. SMALLER AREAS SHALL BE COMPACTED BY POWER–DRIVER, HAND HELD TAMPERS.

B. PRIOR TO OTHER EXCAVATION AND CONSTRUCTION EFFORTS GRUB ORGANIC MATERIAL TO A MINIMUM OF 6" BELOW ORIGINAL GROUND LEVEL.

C. UNLESS OTHERWISE INSTRUCTED BY CLIENT'S REPRESENTATIVE. REMOVE TREES, BRUSH AND DEBRIS FROM THE PROPERTY TO AN AUTHORIZED DISPOSAL LOCATION.

D. PRIOR TO PLACEMENT OF FILL OR BASE MATERIALS, ROLL THE SOIL.

E. WHERE UNSTABLE SOIL CONDITIONS ARE ENCOUNTERED, LINE THE GRUBBED AREAS WITH STABILIZER MAT PRIOR TO PLACEMENT OF FILL OR BASE MATERIAL.

3.03 INSTALLATION

A. THE SITE AND TURNAROUND AREAS SHALL BE AT THE SUB–BASE COURSE ELEVATION PRIOR TO FORMING FOUNDATIONS. GRADE OR FILL THE SITE AND ACCESS ROAD AS REQUIRED TO PRODUCE EVEN DISTRIBUTION OF SPOILS RESULTING FROM FOUNDATION EXCAVATIONS. THE RESULTING GRADE SHALL CORRESPOND WITH SAID SUB–BASE COURSE, ELEVATIONS ARE TO BE CALCULATED FORM FINISHED GRADES OR SLOPES INDICATED.

B. THE ACCESS ROAD SHALL BE BROUGHT TO BASE COURSE ELEVATION PRIOR TO FOUNDATION CONSTRUCTION.

C. DO NOT CREATE DEPRESSIONS WHERE WATER MAY POND.

D. THE CONTRACT INCLUDES ALL NECESSARY GRADING, BANKING, DITCHING AND COMPLETE SURFACE COURSE FOR ACCESS ROAD. ALL ROADS OR ROUTES UTILIZED FOR ACCESS TO PUBLIC THOROUGHFARE IS INCLUDED IN SCOPE OF WORK UNLESS OTHERWISE INDICATED.

E. WHEN IMPROVING AN EXISTING ACCESS ROAD, GRADE THE EXISTING ROAD TO REMOVE ANY ORGANIC MATTER AND SMOOTH THE SURFACE BEFORE PLACING FILL OR STONE.

F. PLACE FILL OR STONE IN 3" MAXIMUM LIFTS AND COMPACT BEFORE PLACING NEXT LIFT.

G. THE FINISH GRADE, INCLUDING TOP SURFACE COURSE, SHALL EXTEND A MINIMUM OF 12" BEYOND THE SITE FENCE AND SHALL COVER THE AREA AS INDICATED.

H. RIPRAP SHALL BE APPLIED TO THE SIDE SLOPES OF ALL FENCED AREAS, PARKING AREAS AND TO ALL OTHER SLOPES GREATER THAN 2:1.

I. RIPRAP SHALL BE APPLIED TO THE SIDES OF DITCHES OR DRAINAGE SWALES AS INDICATED ON PLANS.

J. RIPRAP ENTIRE DITCH FOR 6'–0" IN ALL DIRECTIONS AT CULVERT OPENINGS.

K. SEED, FERTILIZER AND STRAW COVER SHALL BE APPLIED TO ALL OTHER DISTURBED AREAS AND DITCHES, DRAINAGE, SWALES, NOT OTHERWISE RIP–RAPPED.

L. UNDER NO CIRCUMSTANCES SHALL DITCHES, SWALES OR CULVERTS BE PLACED SO THEY DIRECT WATER TOWARDS, OR PERMIT STANDING WATER IMMEDIATELY ADJACENT TO SITE. IF OWNER DESIGNS OR IF DESIGN ELEVATIONS CONFLICT WITH THIS GUIDANCE ADVISE THE OWNER IMMEDIATELY.

M. IF A DITCH LIES WITH SLOPE GREATER THAN TEN PERCENT, MOUND DIVERSIONARY HEADWALL IN THE DITCH AT CULVERT ENTRANCES. RIP–RAP THE UPSTREAM SIDE OF THE HEADWALL AS WELL AS THE DITCH FOR 6'–0" ABOVE THE CULVERT.

N. IF A DITCH LIES WITH SLOPES GREATER THAN TEN PERCENT, MOUND DIVERSIONARY HEADWALLS IN THE DITCH FOR 6'–0" ABOVE THE CULVERT ENTRANCE.

O. SEED AND FERTILIZER SHALL BE APPLIED TO SURFACE CONDITIONS WHICH WILL ENCOURAGE ROOTING. RAKE AREAS TO BE SEEDED TO EVEN THE SURFACE AND TO LOOSEN THE SOIL.

P. SOW SEED IN TWO DIRECTIONS IN TWICE THE QUANTITY RECOMMENDED BY THE SEED PRODUCER.

Q. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE GROWTH OF SEEDED AND LANDSCAPED AREAS BY WATERING UP TO THE POINT OF RELEASE FROM THE CONTRACT. CONTINUE TO REWORK BARE AREAS UNTIL COMPLETE COVERAGE IS OBTAINED.

3.04 FIELD QUALITY CONTROL

A. COMPACTION SHALL BE D–1557 FOR SITE WORK AND 95 % MAXIMUM DENSITY UNDER SLAB AREAS. AREAS OF SETTLEMENT WILL BE EXCAVATED AND REFILLED AT CONTRACTOR'S EXPENSE. REQUIRED. USE OF EROSION CONTROL MESH OR MULCH NET SHALL BE AN ACCEPTABLE ALTERNATIVE.

B. THE COMPACTION TEST RESULTS SHALL BE AVAILABLE PRIOR TO THE CONCRETE POUR.

3.05 PROTECTION

A. PROTECT SEEDED AREAS FORM EROSION BY SPREADING STRAW TO A UNIFORM LOOSE DEPTH OF 1"–2". STAKE AND TIE DOWN AS REQUIRED. USE OF EROSION CONTROL MESH OR MULCH NET SHALL BE AN ACCEPTABLE ALTERNATIVE.

B. ALL TREES PLACED IN CONJUNCTION WITH A LANDSCAPE CONTRACT SHALL BE WRAPPED, TIED WITH HOSE PROTECTED WIRE AND SECURED TO STAKES EXTENDING 2'–0" INTO THE GROUND ON FOUR SIDES OF THE TREE.

C. ALL EXPOSED AREAS SHALL BE PROTECTED AGAINST WASHOUTS AND SOIL EROSION. STRAW BALES SHALL BE PLACED AT THE INLET APPROACH TO ALL NEW OR EXISTING CULVERTS. REFER TO DETAILS ON DRAWINGS

SYMBOLS	ABBREVIATIONS
— — — G — — — G —	GROUND WIRE
— — — E — — — E —	ELECTRIC
— — — T — — — T —	TELEPHONE
OHW OHW OHW OHW OHW	OVERHEAD WIRE
——— — — ———	PROPERTY LINE
—X———X———X———	CHAIN LINK FENCE
A–1	ANTENNA MARK
(E)	EXISTING
(P)	PROPOSED DETAIL
DET # / SHT #	REFERENCE
	SURFACE ELEVATION

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SUBMITTALS

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DATE	REVIEWED BY
10/10/14	

STATE OF CONNECTICUT · ANTONIO A. GUALTIERI · No. 25406 · LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT54XC718

SITE NAME:
MIDDLEBURY–CROWN

SITE ADDRESS:
1432 OLD WATERBURY ROAD
SOUTHBURY, CT 06488

SHEET TITLE:
GENERAL NOTES

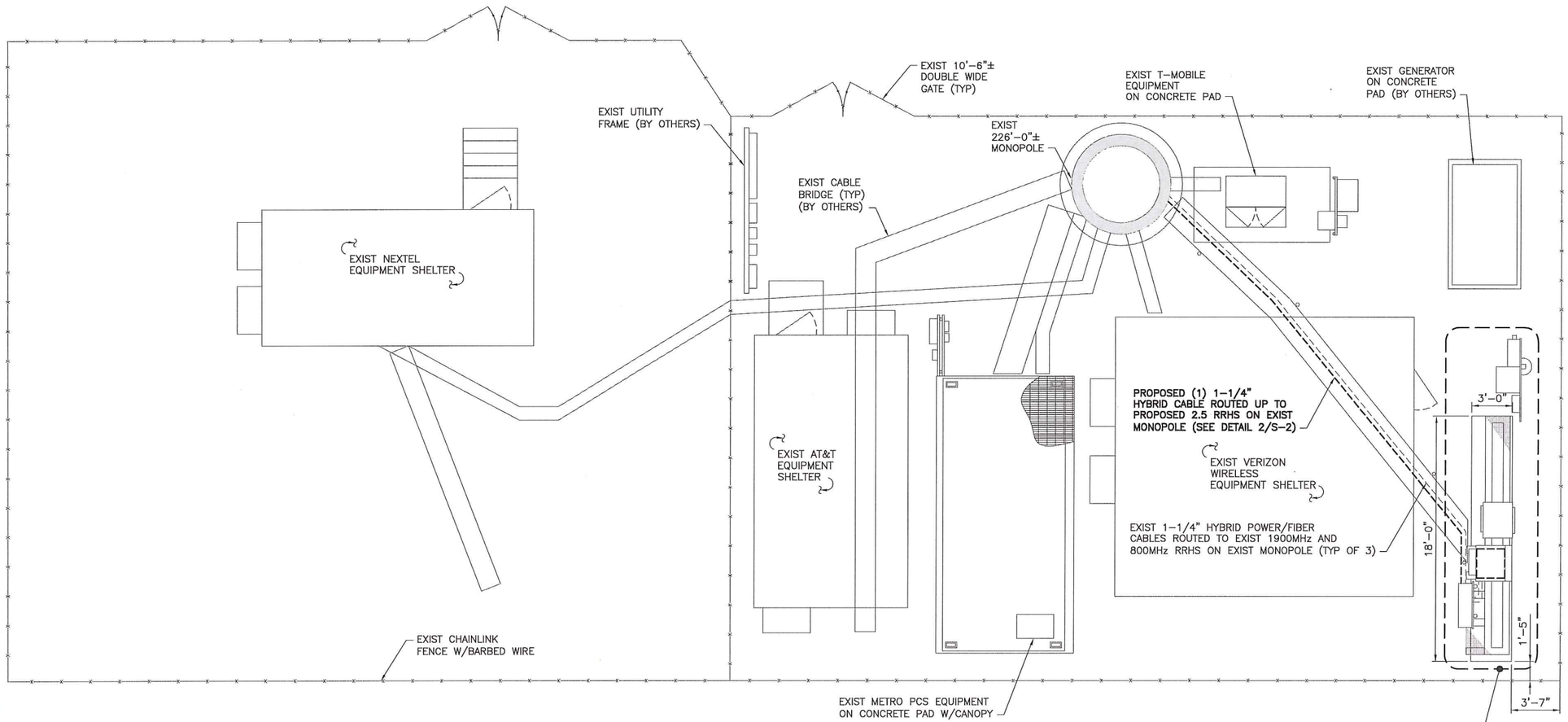
SHEET NO:
SP–2

NORTH NOTE:

NORTH SHOWN HAS BEEN ESTABLISHED USING THE USGS QUADRANGLE 7.5 MINUTE MAPS AND IS APPROXIMATE. VERIFY TRUE NORTH PRIOR TO INSTALLATION OF ANTENNAS.

N

APPROX.



1 A-1 SITE PLAN

SCALE: 1/4" = 1'-0"

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STATE OF CONNECTICUT
ANTONIO A. GUALTIERI
No. 25406
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
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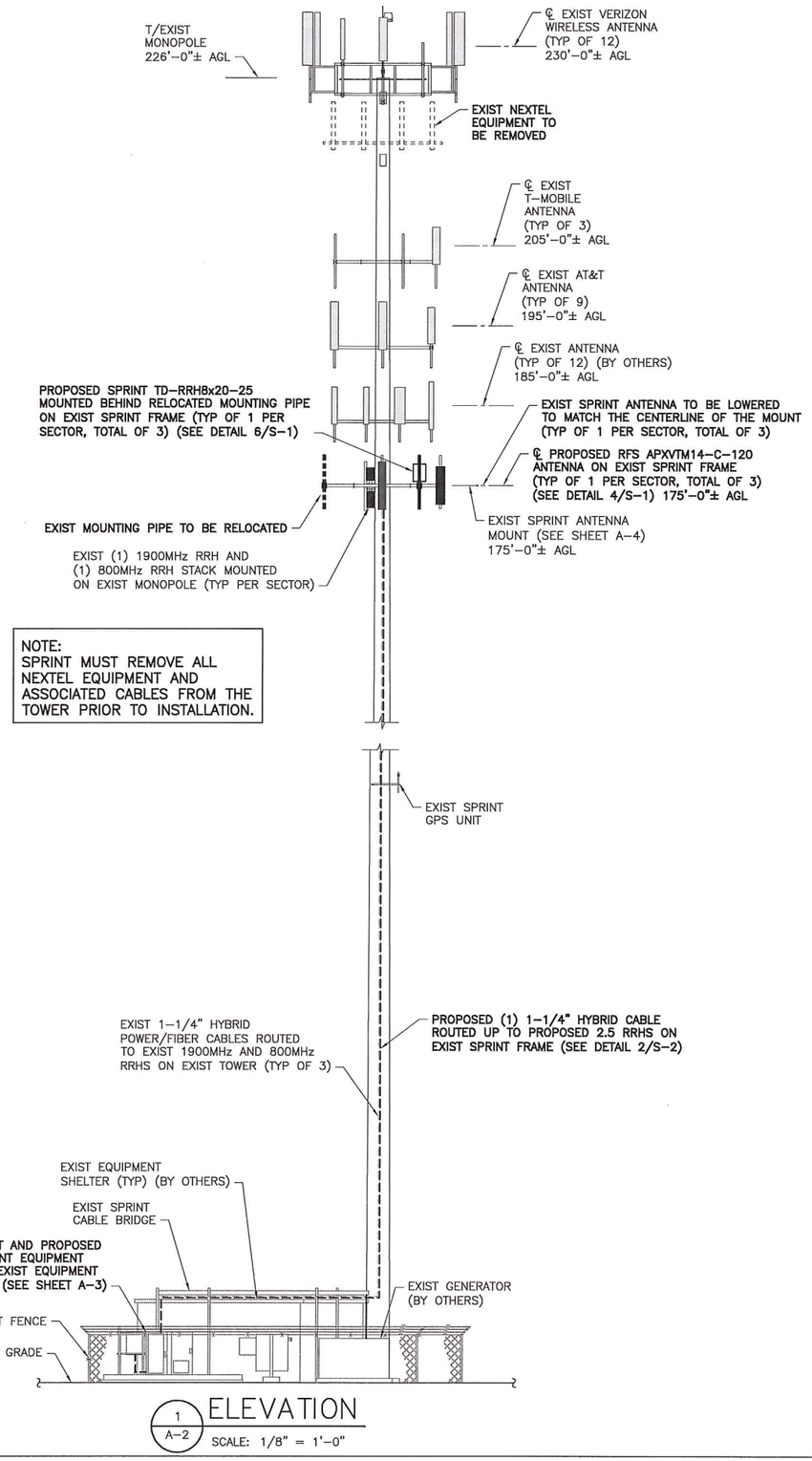
SHEET TITLE:
SITE PLAN

SHEET NO:
A-1



NOTE:
SPRINT MUST REMOVE ALL NEXTEL EQUIPMENT AND ASSOCIATED CABLES FROM THE TOWER PRIOR TO INSTALLATION.

1 A-2 ELEVATION

SCALE: 1/8" = 1'-0"

THE EXISTING MONOPOLE SHALL BE ANALYZED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT (TO BE COORDINATED BY OTHERS).

THE EXISTING MOUNT HAS BEEN ANALYZED BY TECTONIC ENGINEERING AND FOUND TO BE ADEQUATE TO SUPPORT THE PROPOSED SPRINT UPGRADE ONCE THE PROPOSED MODIFICATIONS HAVE BEEN COMPLETED AS DETAILED IN THE STRUCTURAL ANALYSIS EVALUATION LETTER DATED 09/22/14.

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10/10/14	TMG

STATE OF CONNECTICUT
SEAL
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NORTH NOTE:

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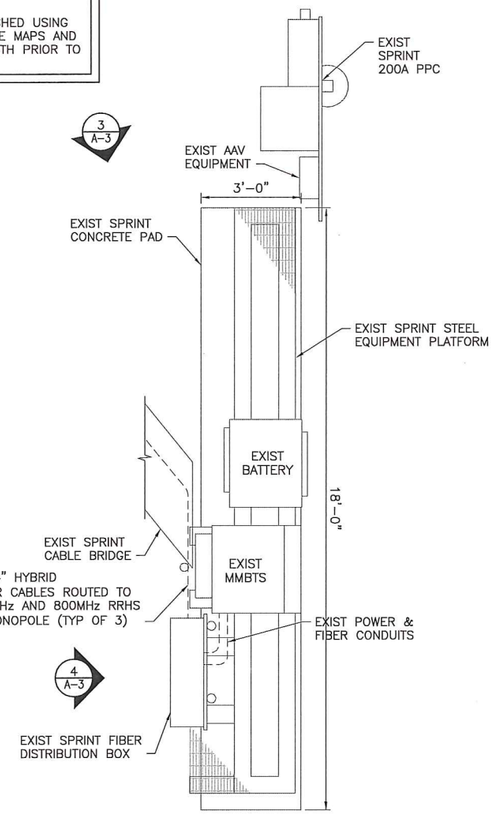
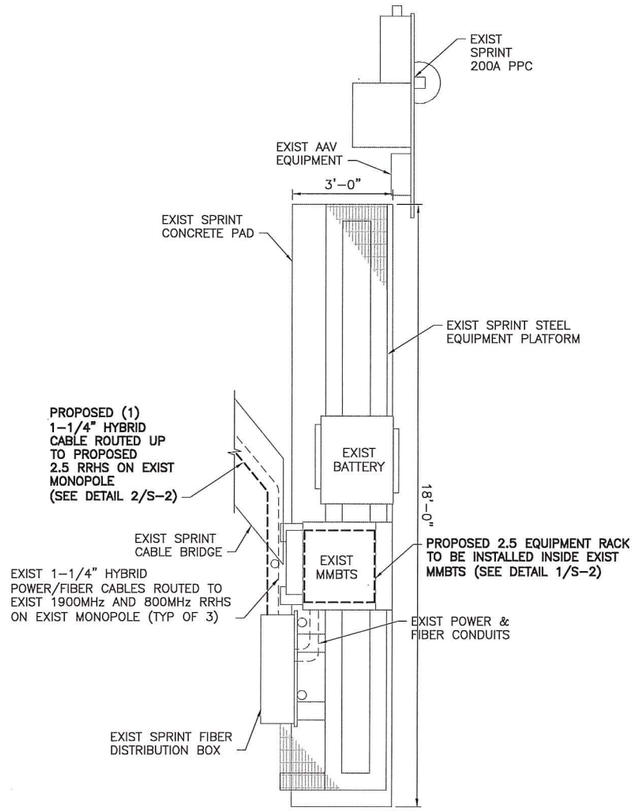
N

APPROX.



1 A-3 ENLARGED EQUIPMENT LAYOUT PLAN (EXIST)

SCALE: 1/2" = 1'-0"



2 A-3 ENLARGED EQUIPMENT LAYOUT PLAN (FINAL)

SCALE: 1/2" = 1'-0"

3 A-3 EXIST EQUIPMENT PAD

SCALE: NTS

4 A-3 EXIST FIBER DISTRIBUTION BOX

SCALE: NTS

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10/10/14	JMQ

SEAL
STATE OF CONNECTICUT
ANTONIO A. GIUALTIERI
No. 25406
LICENSED PROFESSIONAL ENGINEER

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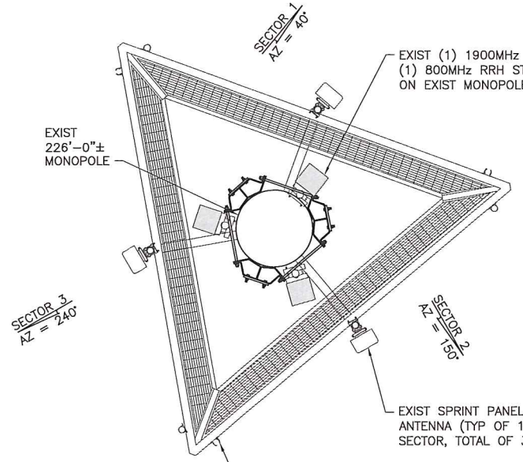
SHEET TITLE:
ENLARGED EQUIPMENT LAYOUT PLANS

SHEET NO:
A-3

N

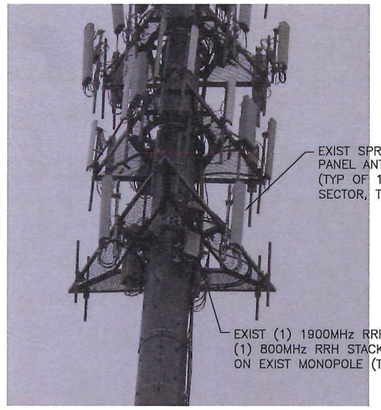
APPROX.



1 / A-4 ANTENNA LAYOUT PLAN (EXIST)

SCALE: 3/8" = 1'-0"

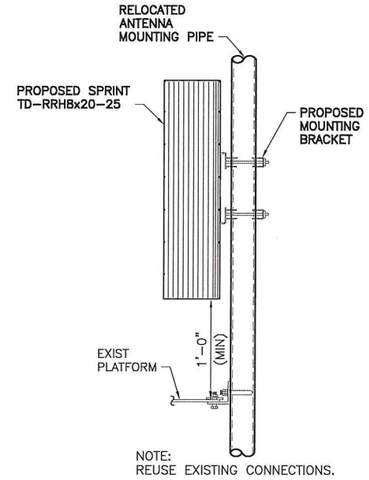
NOTE:
SPRINT MUST REMOVE ALL NEXTEL EQUIPMENT AND ASSOCIATED CABLES FROM THE TOWER PRIOR TO INSTALLATION.



THE EXISTING MONOPOLE SHALL BE ANALYZED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT (TO BE COORDINATED BY OTHERS).

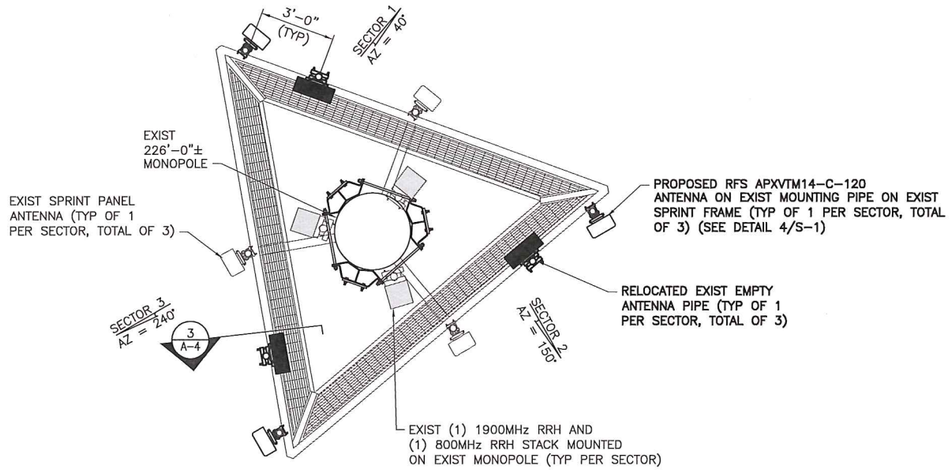
THE EXISTING MOUNT HAS BEEN ANALYZED BY TECTONIC ENGINEERING AND FOUND TO BE ADEQUATE TO SUPPORT THE PROPOSED SPRINT UPGRADE ONCE THE PROPOSED MODIFICATIONS HAVE BEEN COMPLETED AS DETAILED IN THE STRUCTURAL ANALYSIS EVALUATION LETTER DATED 09/22/14.

Confirm azimuths with final RFDS - RFDS supersedes CD's



3 / A-4 RRH MOUNTING DETAIL

SCALE: 1 1/2" = 1'-0"



2 / A-4 ANTENNA LAYOUT PLAN (FINAL)

SCALE: 3/8" = 1'-0"

ANTENNA DATA

Status	Exist	Proposed
Antenna Manufacturer	RFS-CEL WAVE	RFS-CEL WAVE
Antenna Model Number	APXVSPP18C-A20	APXVTM14-C-120
Number of Antennas	3	3
Antenna RAD Center	175'	175'
Antenna Azimuth	40/150/240	40/150/240
Antenna RRH Model Number	1900MHz/800MHz RRHS	TD-RRH8x20-25
Number of RRH	3	3

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PROJECT NO: 7225.CT54XC718

NO	DATE	DESCRIPTION	BY
0	06/19/14	FOR COMMENT	DS
1	09/23/14	FOR CONSTRUCTION	MP
2	10/10/14	REVISED AZIMUTHS	MP

DATE	REVIEWED BY
10/10/14	

STATE OF CONNECTICUT
ANTONIO A. GUALTIERI
No. 25406
LICENSED
PROFESSIONAL ENGINEER

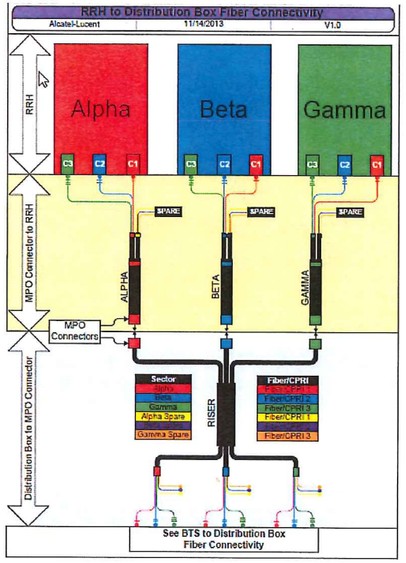
SITE NUMBER:
CT54XC718

SITE NAME:
MIDDLEBURY-CROWN

SITE ADDRESS:
1432 OLD WATERBURY ROAD
SOUTHBURY, CT 06488

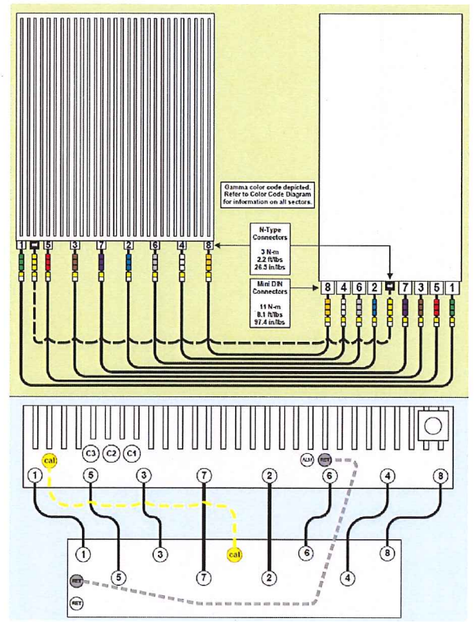
SHEET TITLE:
ANTENNA LAYOUT PLANS

SHEET NO:
A-4



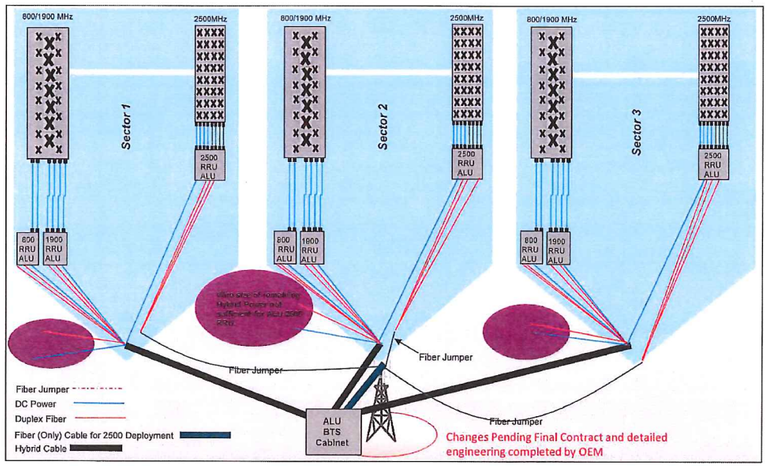
1 A–5 2.5 CABLE COLOR CODING

SCALE: N.T.S.



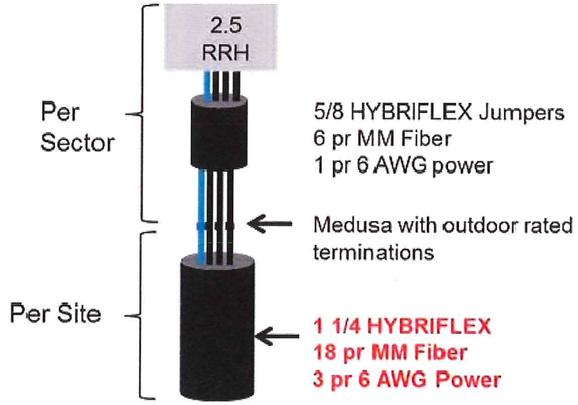
2 A–5 RRH CONNECTIVITY

SCALE: N.T.S.



3 A–5 RAN WIRING

SCALE: N.T.S.



4 A–5 CABLE SCENARIO

SCALE: N.T.S.

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SITE ADDRESS:
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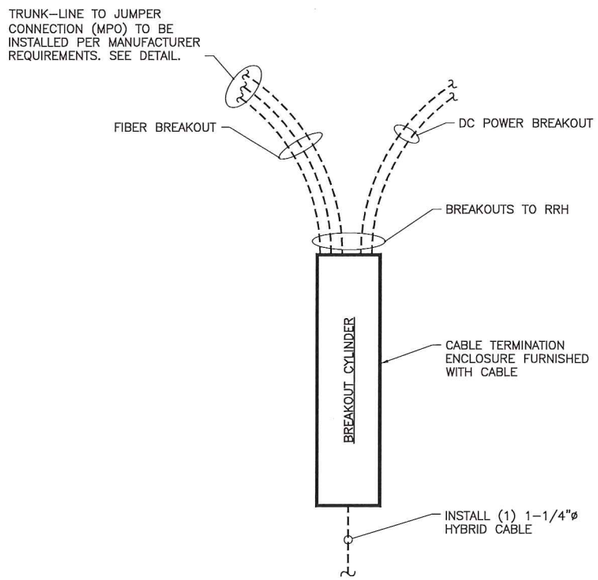
SOUTHBURY, CT 06488

SHEET TITLE:
RAN WIRING DIAGRAM

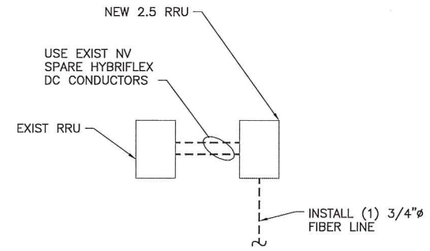
SHEET NO:
A–5

1 A-6 HYBRIFLEX RISER/JUMPER CONNECTION DETAILS

SCALE: N.T.S.



2.5 HYBRID CABLE W/FIBER & DC FEEDERS



FIBER ONLY TRUNK LINES

2 A-6 TRUNK LINE DETAILS (TYPICAL)

SCALE: N.T.S.

SPECIAL NOTES: CABLE MARKINGS AT RAD CENTER AND ALL WALL/BLDG. PENETRATIONS

- ALL COLOR CODE TAPE SHALL BE 3M-35 AND SHALL BE INSTALLED USING A MINIMUM OF (3) WRAPS OF TAPE.
- ALL COLOR BANDS INSTALLED AT THE TOWER TOP SHALL BE A MINIMUM OF 3" WIDE AND SHALL HAVE A MINIMUM OF 3/4" OF SPACING BETWEEN EACH COLOR.
- ALL COLOR BANDS INSTALLED AT OR NEAR THE GROUND MAY BE ONLY 3/4" WIDE. EACH TOP-JUMPER SHALL BE COLOR CORDED WITH (1) SET OF 3" WIDE BANDS.
- EACH MAIN COAX SHALL BE COLOR CODED WITH (1) SET OF 3" BANDS NEAR THE TOP-JUMPER CONNECTION AND WITH 3/4" COLOR BANDS JUST PRIOR TO ENTERING THE BTS OR TRANSMITTER BUILDING.
- ALL BOTTOM JUMPERS SHALL BE COLOR CODED WITH (1) SET OF 3/4" BANDS ON EACH END OF THE BOTTOM JUMPER.
- ALL COLOR CODES SHALL BE INSTALLED SO AS TO ALIGN NEATLY WITH ONE ANOTHER FROM SIDE-TO-SIDE.
- EACH COLOR BAND SHALL HAVE A MINIMUM OF (3) WRAPS AND SHALL BE NEATLY TRIMMED AND SMOOTHED OUT AS TO AVOID UNRAVELING.
- X-POLE ANTENNAS SHOULD USE "XX-1" FOR THE "+45" PORT, "XX-2" FOR THE "-45" PORT.
- COLOR BAND #4 REFERS TO THE FREQUENCY BAND: ORANGE=850, VIOLET=1900. USED ON JUMPERS ONLY.
- RF FEEDLINE SHALL BE IDENTIFIED WITH A METAL TAG (STAINLESS OR BRASS) AND STAMPED WITH THE SECTOR, ANTENNA POSITION, AND CABLE NUMBER.
- ANTENNAS MUST BE IDENTIFIED, USING THE SECTOR LETTER AND ANTENNA NUMBER, WITH A BLACK MARKER PRIOR TO INSTALLATION.

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SITE NAME:
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SITE ADDRESS:
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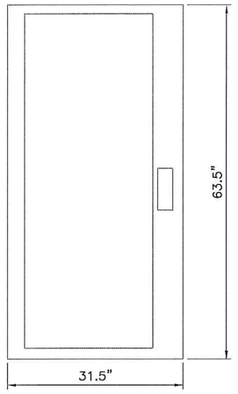
SOUTHBURY, CT 06488

SHEET TITLE:
CABLE DETAILS

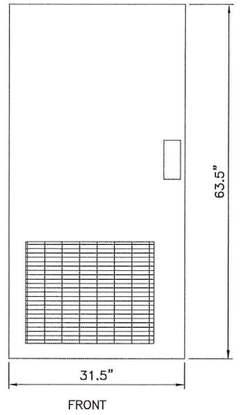
SHEET NO:
A-6



9927 MMBTS MODULAR CELL
SPECIFICATIONS:
HEIGHT: 63.5"
WIDTH: 31.5"
DEPTH: 38.0"

1/S-1 (EXIST) MMBTS CABINET

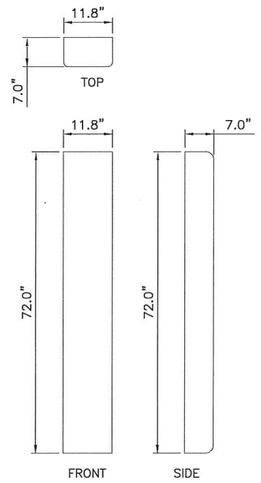
SCALE: 1" = 1'-0"



BATTERY
SPECIFICATIONS:
HEIGHT: 63.5"
WIDTH: 31.5"
DEPTH: 28.0"

2/S-1 (EXIST) BATTERY CABINET

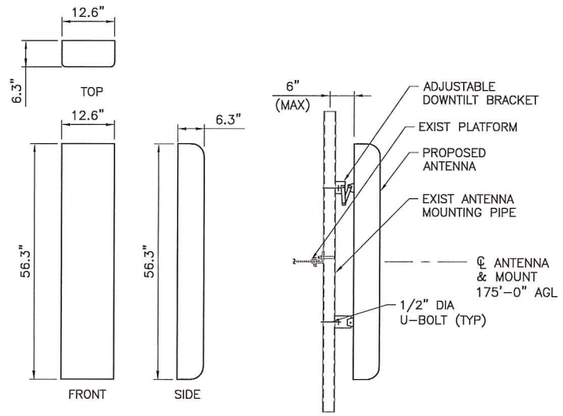
SCALE: 1" = 1'-0"



APXVSPP18-C-A20

3/S-1 (EXIST) ANTENNA DETAILS

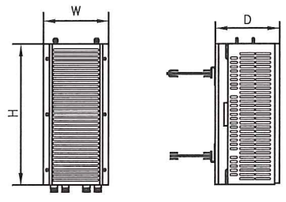
SCALE: 3/4" = 1'-0"



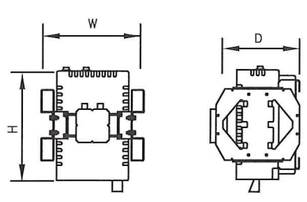
APXVTM14-C-120

4/S-1 (PROPOSED) ANTENNA DETAIL

SCALE: 3/4" = 1'-0"



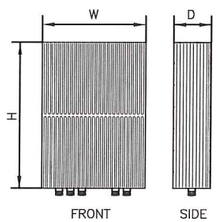
TYPE: 1900 MHz 4x45W
MODEL #: RRH 1900 4X45 65MHz
HEIGHT: 25.0"
WIDTH: 11.1"
DEPTH: 11.4"
WEIGHT: ±60 LBS.



TYPE: 800 MHz 2x50W
MODEL #: FD-RRH-2x50-800
HEIGHT: 19.7"
WIDTH: 13"
DEPTH: 10.8"
WEIGHT: ±53 LBS

5/S-1 (EXIST) RRH DETAILS

SCALE: 1" = 1'-0"



TYPE: 2.5 RRH
MODEL #: TD-RRH8x20-25
HEIGHT: 26.1"
WIDTH: 18.6"
DEPTH: 6.7"
WEIGHT: ±70 LBS

6/S-1 (PROPOSED) RRH DETAIL

SCALE: N.T.S.

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STATE OF CONNECTICUT
ANTONIO A. GUALTIERI
No. 25406
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT54XC718

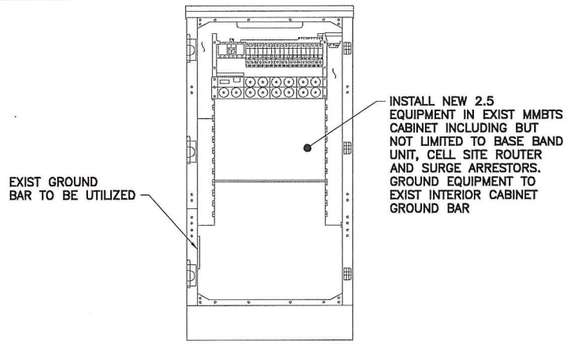
SITE NAME:
MIDDLEBURY-CROWN

SITE ADDRESS:
1432 OLD WATERBURY ROAD
SOUTHBURY, CT 06488

SHEET TITLE:
EQUIPMENT DETAILS

SHEET NO:
S-1

NOTE:
LOCATIONS SHOWN FOR INSTALLATION OF NEW EQUIPMENT IN EXISTING CABINET ARE APPROXIMATE. ACTUAL SPACE AVAILABLE TO BE VERIFIED IN FIELD ON A SITE BY SITE BASIS.

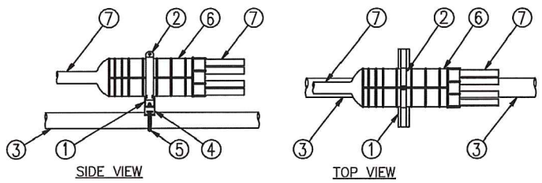


FRONT ELEVATION
(CABINET INTERIOR)

1 S-2 MMBTS INTERIOR DETAIL

SCALE: N.T.S.

LEGEND:
1. P1000T-HG UNISTRUT, 12" LONG.
2. 6" PIPE HANGER.
3. EXISTING SUPPORT PIPE.
4. NEW STANDOFF BRACKET, ANDREW PART# 30848-4.
5. NEW ROUND MEMBER ADAPTER SIZED FOR EXISTING PIPE SUPPORT.
6. BREAKOUT UNIT.
7. CABLE.



3 S-2 MEDUSA HEAD DETAIL

SCALE: NTS

RFS HYBRIFLEX RISER CABLES 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, 50ft	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, 50ft	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 pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable,225ft	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: HB114-21U3M12-225F 3x 6 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable,225ft	325 ft
	MN: HB114-21U3M12-350F	350 ft
	MN: HB114-21U3M12-375F	375 ft

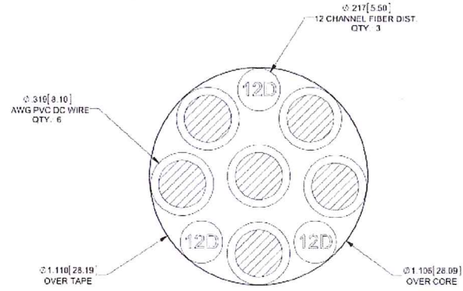
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

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

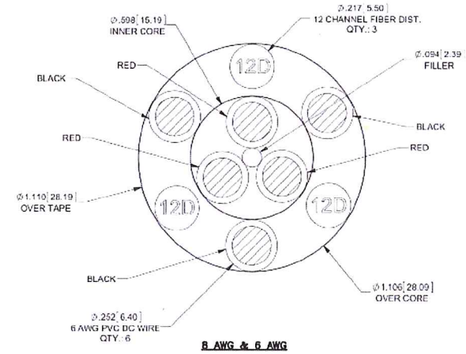
2 S-2 2.5 HYBRID CABLE X-SECTION AND DATA

SCALE: NTS

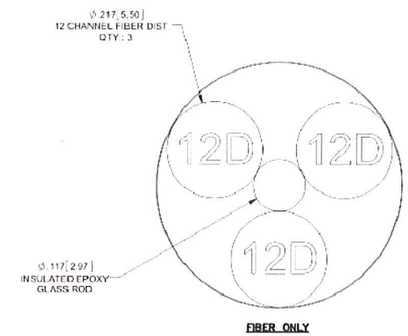
HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE			
MANUF:	RFS		
CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
FIBER ONLY	VARIES	USE NV HYBRIFLEX	7/8"
HYBRIFLEX	<200'	8 AWG	1-1/4"
HYBRIFLEX	225-300'	6 AWG	1-1/4"
HYBRIFLEX	325-375'	4 AWG	1-1/4"



4 AWG



8 AWG & 6 AWG



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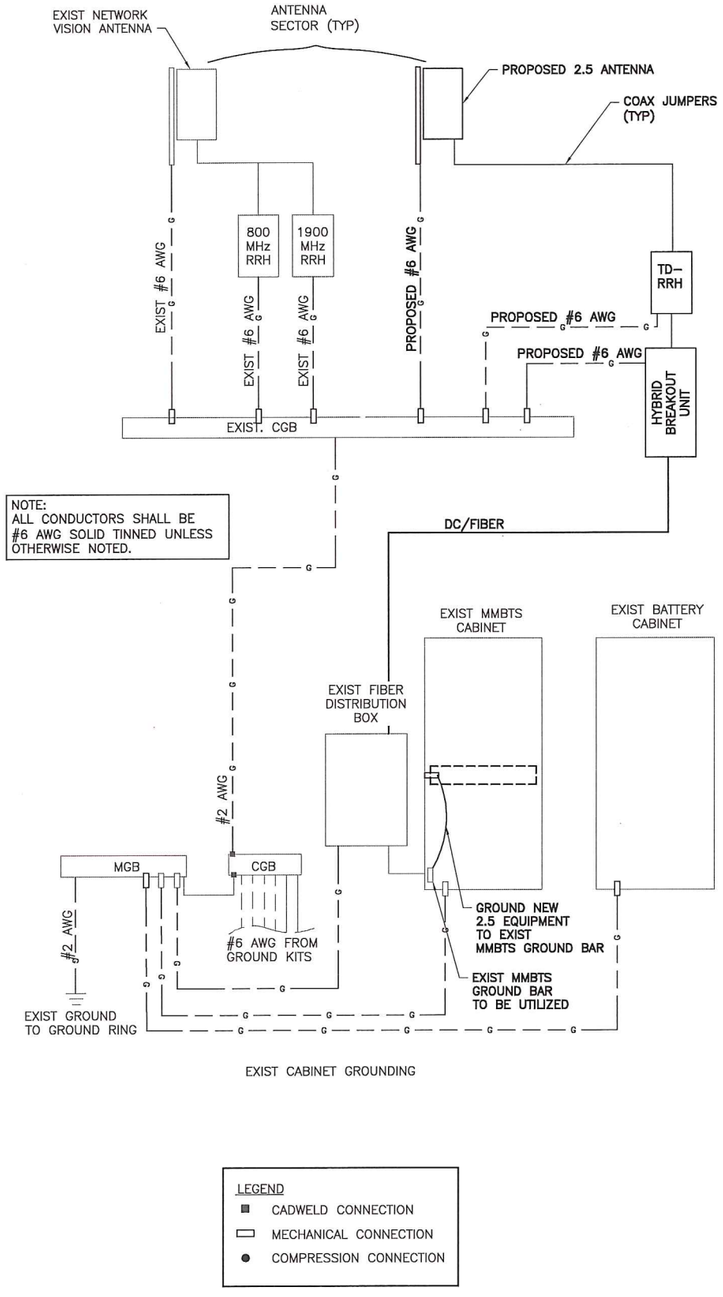
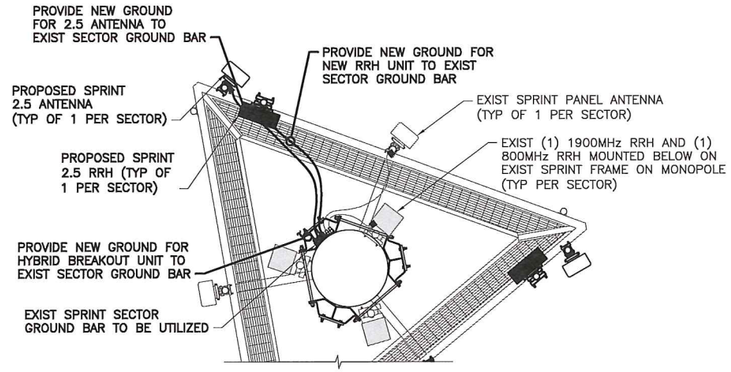
SHEET TITLE:
EQUIPMENT SCHEMATIC DETAILS

SHEET NO:
S-2



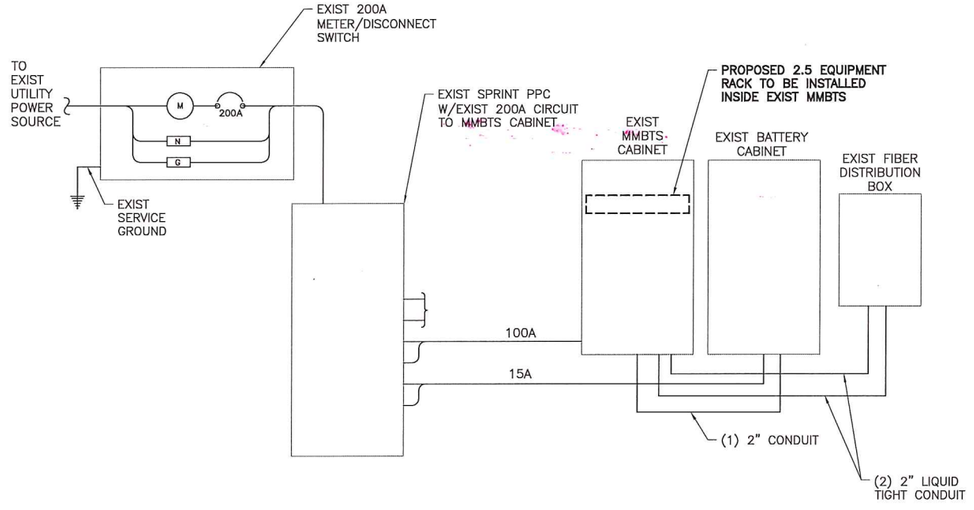
1 E-1 TYPICAL GROUNDING ONE LINE DIAGRAM

SCALE: NTS



2 E-1 TYPICAL ANTENNA GROUNDING PLAN

SCALE: NTS



3 E-1 TYPICAL ELECTRICAL & TELCO PLAN

SCALE: NTS

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OVERLAND PARK, KANSAS 66251

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TECTONIC Engineering & Surveying Consultants P.C.

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SUBMITTALS

PROJECT NO: 7225.CT54XC718

NO	DATE	DESCRIPTION	BY
0	06/19/14	FOR COMMENT	DS
1	09/23/14	FOR CONSTRUCTION	MP
2	10/10/14	REVISED AZIMUTHS	MP

DATE	REVIEWED BY
10/10/14	

STATE OF CONNECTICUT
ANTONIO A. GUALTIERI
No. 25406
LICENSED PROFESSIONAL ENGINEER

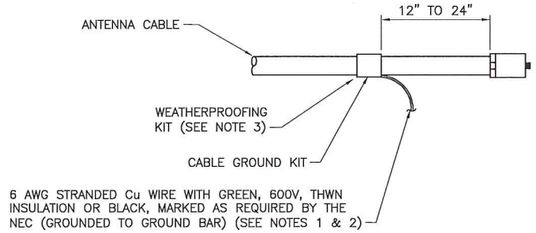
SITE NUMBER:
CT54XC718

SITE NAME:
MIDDLEBURY-CROWN

SITE ADDRESS:
1432 OLD WATERBURY ROAD
SOUTHBURY, CT 06488

SHEET TITLE:
ELECTRICAL & GROUNDING PLANS

SHEET NO:
E-1



CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

NOTES:

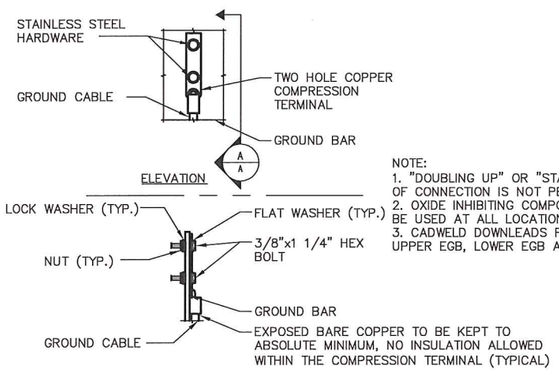
DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.

WEATHER PROOFING SHALL BE (TYPE AND PART NUMBER) AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER AND APPROVED BY CONTRACTOR.

1 E-2 CABLE GROUNDING KIT DETAIL

SCALE: N.T.S.

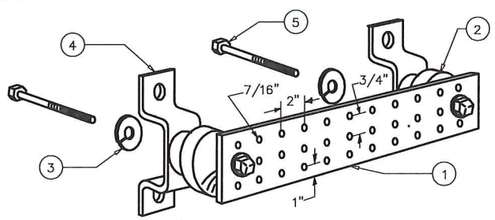


NOTE:
1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB AND MGB.

SECTION "A–A"

2 E-2 GROUNDING BAR CONN. DETAIL

SCALE: NTS



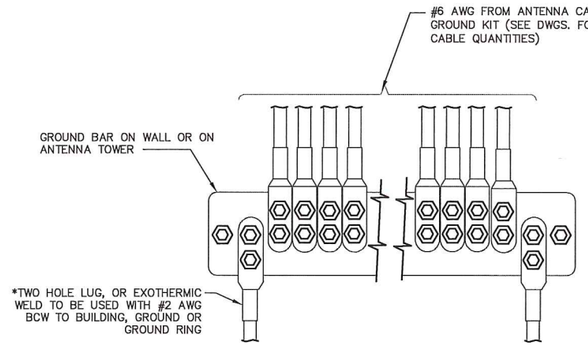
LEGEND

1– COPPER TINNED GROUND BAR, 1/4"X 4"X 20", OR OTHER LENGTH AS REQUIRED, HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION
2– INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061–4 OR EQUAL
3– 5/8" LOCKWASHERS OR EQUAL
4– WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A–6056 OR EQUAL
5– 5/8–11 X 1" H.H.C.S.BOLTS

NOTE:
ALL BOLTS, NUTS, WASHERS AND LOCK WASHERS SHALL BE 18–8 STAINLESS STEEL.

3 E-2 GROUNDING BAR DETAIL

SCALE: NTS



* – GROUND BARS AT THE BOTTOM OF TOWERS/MONOPOLES SHALL ONLY USE EXOTHERMIC WELDS.

– ATTACH "DO NOT DISCONNECT" LABELS TO GROUND BARS. CAN USE BRASS TAG "DO NOT DISCONNECT" AT EACH HYBRID GROUND POINT OR BACK–A–LITE PLATE LABEL ON GROUND BAR.

– CONNECT SEQUENCE– BOLT/WASHER/NO–OX/GROUND BAR/NO–OX/WASHER/LOCK–WASHER/NUT. THIS IS REPEATED FOR EACH LUG CONNECTION POINT.

4 E-2 ANTENNA GROUND BAR DETAIL

SCALE: NTS

GROUNDING NOTES:

1. GROUNDING SHALL BE IN ACCORDANCE WITH NEC ARTICLE 250–GROUNDING AND BONDING.
2. ALL GROUND WIRES SHALL BE #2 AWG UNLESS NOTED OTHERWISE.
3. ALL GROUNDING WIRES SHALL PROVIDE A STRAIGHT, DOWNWARD PATH TO GROUND WITH GRADUAL BENDS AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
4. EACH EQUIPMENT CABINET SHALL BE CONNECTED TO THE MASTER ISOLATION GROUND BAR (MGB) WITH #2 AWG INSULATED STRANDED COPPER WIRE. EQUIPMENT CABINETS WALL HAVE (2) CONNECTIONS.
5. PROVIDE DEDICATED #2 AWG COPPER GROUND WIRE FROM EACH ANTENNA MOUNTING PIPE TO ASSOCIATED CIGBE.
6. THE CONTRACTOR SHALL VERIFY THAT THE EXISTING GROUND BARS HAVE ENOUGH SPACE/HOLES FOR ADDITIONAL TWO HOLE LUGS.
7. ALL CONDUITS SHALL BE RIGID GALVANIZED STEEL AND SHALL BE PROVIDED WITH GROUNDING BUSHINGS.
8. PROVIDE GROUND CONNECTIONS FOR ALL METALLIC STRUCTURES, ENCLOSURES, RACEWAYS AND OTHER CONDUCTIVE ITEMS ASSOCIATED WITH THE INSTALLATION OF CARRIER'S EQUIPMENT.
9. WHEN CABLE LENGTH IS OVER 20' THE MANUFACTURERS GROUND KIT MUST BE INSTALLED PER THE MANUFACTURERS SPECIFICATIONS.
10. REFER TO "ANTI–THEFT UPDATE TO SPRINT GROUNDING 082412.PDF" FOR GUIDELINE TO SUSPECTED OR ACTUAL THEFT OF GROUNDING.
11. HOME RUN GROUNDS ARE NOT APPROVED BY CROWN CASTLE CONSTRUCTION STANDARDS AND THAT ANTENNA BUSS BARS SHOULD BE INSTALLED DIRECTLY TO TOWER STEEL WITHOUT INSULATORS OR DOWN CONDUCTORS.

PROTECTIVE GROUNDING SYSTEM GENERAL NOTES:

1. AT ALL TERMINATIONS AT EQUIPMENT ENCLOSURES, PANEL, AND FRAMES OF EQUIPMENT AND WHERE EXPOSED FOR GROUNDING. CONDUCTOR TERMINATION SHALL BE PERFORMED UTILIZING TWO HOLE BOLTED TONGUE COMPRESSION TYPE LUGS WITH STAINLESS STEEL SELF–TAPPING SCREWS.
2. ALL CLAMPS AND SUPPORTS USED TO SUPPORT THE GROUNDING SYSTEM CONDUCTORS AND PVC CONDUITS SHALL BE PVC TYPE (NON CONDUCTIVE). DO NOT USE METAL BRACKETS OR SUPPORTS WHICH WOULD FORM A COMPLETE RING AROUND ANY GROUNDING CONDUCTOR.
3. ALL GROUNDING CONNECTIONS SHALL BE COATED WITH A COPPER SHIELD ANTI–CORROSIVE AGENT SUCH AS T&B KOPR SHIELD. VERIFY PRODUCT WITH PROJECT MANAGER.
4. ALL BOLTS, WASHERS, AND NUTS USED ON GROUNDING CONNECTIONS SHALL BE STAINLESS STEEL.
5. INSTALL GROUND BUSHING ON ALL METALLIC CONDUITS AND BOND TO THE EQUIPMENT GROUND BUS IN THE PANEL BOARD.
6. GROUND ANTENNA BASES, FRAMES, CABLE RACKS, AND OTHER METALLIC COMPONENTS WITH #2 INSULATED TINNED STRANDED COPPER GROUNDING CONDUCTORS AND CONNECT TO INSULATED SURFACE MOUNTED GROUND BARS. CONNECTION DETAILS SHALL FOLLOW MANUFACTURER'S SPECIFICATIONS FOR GROUNDING.
7. GROUND HYBRID CABLE SHIELD AT BOTH ENDS USING MANUFACTURER'S GUIDELINES.

ELECTRICAL AND GROUNDING NOTES

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
3. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
4. BURIED CONDUIT SHALL BE SCHEDULE 40 PVC.
5. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THNN INSULATION.
6. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON THIS DRAWING PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
7. WHERE CONDUIT BETWEEN BTS AND PROJECT OWNER CELL SITE PPC AND BETWEEN BTS AND PROJECT OWNER CELL SITE TELCO SERVICE CABINET ARE UNDERGROUND USE PVC, SCHEDULE 40 CONDUIT. ABOVE THE GROUND PORTION OF THESE CONDUITS SHALL BE PVC CONDUIT.
8. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
9. GROUNDING SHALL COMPLY WITH NEC ART. 250.
10. GROUND HYBRID CABLE SHIELDS AT 3 LOCATIONS USING MANUFACTURER'S HYBRID CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
11. USE #2 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.
12. ALL GROUND CONNECTIONS TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
13. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #2 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 6 FEET OF PROJECT OWNER EQUIPMENT OR CABINET TO MASTER GROUND BAR OR GROUNDING RING.
14. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
15. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
16. BOND ANTENNA MOUNTING BRACKETS, HYBRID CABLE GROUND KITS, AND RRHs TO EGB PLACED NEAR THE ANTENNA LOCATION.
17. BOND ANTENNA EGB'S AND MGB TO GROUND RING.
18. CONTRACTOR SHALL TEST COMPLETED GROUND SYSTEM AND RECORD RESULT FOR PROJECT CLOSE–OUT DOCUMENTATION. 5 OHMS MINIMUM RESISTANCE REQUIRED.
19. CONTRACTOR SHALL CONDUCT ANTENNA, HYBRID CABLES, GPS COAX AND RRH RETURN–LOSS AND DISTANCE– TO–FAULT MEASUREMENTS (SWEEP TESTS) AND RECORD RESULTS FOR PROJECT CLOSE OUT.
20. CONTRACTOR SHALL CHECK CAPACITY OF EXISTING SERVICE & PANEL ON SITE TO DETERMINE IF CAPACITY EXISTS TO ACCOMMODATE THE ADDED LOAD OF THIS PROJECT. ADVISE ENGINEER OF ANY DISCREPANCY.
21. LOCATION OF ALL OUTLET, BOXES, ETC, AND THE TYPE OF CONNECTION (PLUG OR DIRECT) SHALL BE CONFIRMED WITH THE OWNER'S REPRESENTATIVE PRIOR TO ROUGH–IN.
22. ELECTRICAL CHARACTERISTICS OF ALL EQUIPMENT (NEW AND EXISTING) SHALL BE FIELD VERIFIED WITH THE OWNERS REPRESENTATIVE AND EQUIPMENT SUPPLIER PRIOR TO ROUGH–IN OF CONDUIT AND WIRE. ALL EQUIPMENT SHALL BE PROPERLY CONNECTED ACCORDING TO THE NAMEPLATE DATA FURNISHED ON THE EQUIPMENT.

Sprint
2.5 EQUIPMENT DEPLOYMENT
6850 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

CROWN CASTLE

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STATE OF CONNECTICUT
ANTONIO A. GUAGLIERI
No. 25406
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT54XC718

SITE NAME:
MIDDLEBURY–CROWN

SITE ADDRESS:
1432 OLD WATERBURY ROAD
SOUTHBURY, CT 06488

SHEET TITLE:
GROUNDING DETAILS & NOTES

SHEET NO:
E–2

PJF PAUL J. FORD & COMPANY

Date: **August 02, 2017**

Charles McGuirt
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704.405.6607

Paul J. Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
jmeinerding@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT54XC718
	Carrier Site Name:	CT54XC718
Crown Castle Designation:	**Crown Castle BU Number:**	806358
	Crown Castle Site Name:	NHV 109 943107
	Crown Castle JDE Job Number:	450830
	Crown Castle Work Order Number:	1437208
	Crown Castle Application Number:	399493 Rev. 1
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37517-0065.002.7805
Site Data:	**1432 Old Waterbury Road, SOUTHBURY, New Haven County, CT**	
	Latitude *41° 29' 36.92"*, Longitude *-73° 9' 54.98"*	
	226 Foot - Monopole Tower	

Dear Charles McGuirt,

Paul J. Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 1064338, in accordance with application 399493, revision 1.

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

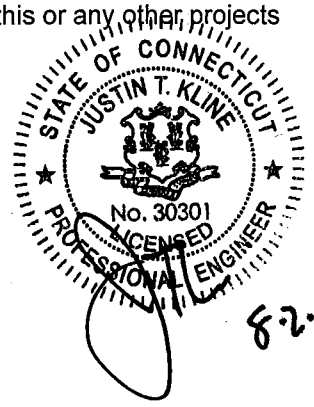
LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II and Exposure Category B were used in this analysis.

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

Respectfully submitted by:

Joey Meinerding, E.I.
Structural Designer



tnxTower Report - version 7.0.5.1

Date: **August 02, 2017**

Charles McGuirt
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704.405.6607

Paul J. Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
jmeinerding@pjfweb.com

Subject: Structural Analysis Report

Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT54XC718
	Carrier Site Name:	CT54XC718
Crown Castle Designation:	**Crown Castle BU Number:**	806358
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	Crown Castle JDE Job Number:	450830
	Crown Castle Work Order Number:	1437208
	Crown Castle Application Number:	399493 Rev. 1
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37517-0065.002.7805
Site Data:	**1432 Old Waterbury Road, SOUTHBURY, New Haven County, CT** **Latitude *41° 29' 36.92"*, Longitude *-73° 9' 54.98"*** **226 Foot - Monopole Tower**	

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Respectfully submitted by:

Joey Meinerding, E.I.
Structural Designer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 226 ft. monopole tower designed by Engineered Endeavors, Inc. in July of 1999. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, “Structural Standard for Antenna Supporting Structures and Antennas”, with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II and Exposure Category B were used in this analysis.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
175.0	175.0	3	alcatel lucent	TD-RRH8x20-25	1	1-1/4	--
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			

Table 2 - Existing Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
226.0	228.0	3	alcatel lucent	RRH2X60-1900	24	1-5/8	1
		3	alcatel lucent	RRH2x60-700			
		3	alcatel lucent	RRH4X45-AWS4 B66			
		6	antel	LPA-80080/6CF w/ Mount Pipe			
		6	commscope	SBNHH-1D65B w/ Mount Pipe			
		2	rfs celwave	DB-T1-6Z-8AB-0Z			
		12	rfs celwave	FD9R6004/2C-3L			
	226.0	1	tower mounts	Platform Mount [LP 602-1]			
		1	tower mounts	Side Arm Mount [SO 203-3]			
205.0	207.0	3	commscope	ATSBT-TOP-MF-4G	12	1-5/8	1
		3	commscope	LNX-6515DS-A1M w/ Mount Pipe			
		3	rfs celwave	APXV18-206516S-C-A20 w/ Mount Pipe			
		3	rfs celwave	ATMPP1412D-1CWA			
	205.0	1	tower mounts	Platform Mount [LP 601-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
193.0	195.0	6	cci antennas	DTMABP7819VG12A	2 2 12	3/8 5/8 1-1/4	1
		3	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe			
		3	ericsson	RRUS 11			
		3	ericsson	RRUS 12-B2			
		3	ericsson	RRUS A2 MODULE			
		3	kathrein	800 10121 w/ Mount Pipe			
		6	kathrein	860 10025			
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
	193.0	1	tower mounts	Platform Mount [LP 601-1]			
185.0	187.0	3	decibel	978QNB120E-M w/ Mount Pipe	1 12	1/2 1-5/8	1
		6	ems wireless	FV90-16-02DP w/ Mount Pipe			
		3	nokia	CS72993.07			
		3	rfs celwave	APXV18-206517S-C w/ Mount Pipe			
	185.0	1	tower mounts	Platform Mount [LP 601-1]			
177.0	177.0	3	alcatel lucent	1900MHz RRH (65MHz)	--	--	1
		3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	alcatel lucent	800MHZ RRH			
		9	rfs celwave	ACU-A20-N			
		1	tower mounts	Side Arm Mount [SO 102-3]			
175.0	175.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER	--	--	2
		9	rfs celwave	ACU-A20-N			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1-1/4	1
		1	tower mounts	Platform Mount [LP 1201-1]			
72.0	73.0	1	gps	GPS_A	1	1/2	1
	72.0	1	tower mounts	Side Arm Mount [SO 701-1]			

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

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	East Coast Drilling & Boring, 88268, 05/18/1988	217688	CCISITES
4-POST-MODIFICATION INSPECTION	Vertical Structures, 2007-209-001, 01/22/2007	1863184	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 128360, 03/12/2013	4062849	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI, 5262, 08/23/1999	821496	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	EEI, 5262, 07/09/1999	821492	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI, 5262, 07/09/1999	821494	CCISITES

3.1) Analysis Method

tnxTower (version 7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) At the time of analysis the referenced geotechnical report did not provide definitive values for the soil properties. The soil properties were estimated off the boring logs.
5) Monopole was modified in conformance with the referenced modification drawings.
6) The existing monopole shaft has been reinforced using a Crown-approved system in accordance with the above referenced documents. However, in this analysis we found that the existing pole shaft without modifications has adequate capacity according to TIA-222-G-2 (addendum 2) and therefore, we did not consider the existing shaft reinforcing elements in the strength calculations.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	226 - 197.96	Pole	TP28.67x21.5x0.1875	1	-6.71	1072.42	40.4	Pass
L2	197.96 - 162.91	Pole	TP37.12x27.2517x0.375	2	-22.40	3134.05	43.4	Pass
L3	162.91 - 120.29	Pole	TP47.14x35.0662x0.4375	3	-36.50	4616.12	54.0	Pass
L4	120.29 - 79.21	Pole	TP56.63x44.643x0.5	4	-54.61	6258.12	53.9	Pass
L5	79.21 - 39.13	Pole	TP65.75x53.7146x0.5625	5	-77.48	8104.46	51.0	Pass
L6	39.13 - 0	Pole	TP74.5x62.4159x0.5625	6	-109.77	9035.61	54.6	Pass
							Summary	
						Pole (L6)	54.6	Pass
						Rating =	54.6	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	60.3	Pass
1	Base Plate	0	42.4	Pass
1	Base Foundation Structural Steel	0	58.1	Pass
1	Base Foundation Soil Interaction	0	19.0	Pass

Structure Rating (max from all components) =	60.3%

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

4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

1) Tower is located in New Haven County, Connecticut.
2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
3) Basic wind speed of 93.00 mph.
4) Structure Class II.
5) Exposure Category B.
6) Topographic Category 1.
7) Crest Height 0.0000 ft.
8) Nominal ice thickness of 0.7500 in.
9) Ice thickness is considered to increase with height.
10) Ice density of 56.00 pcf.
11) A wind speed of 50.00 mph is used in combination with ice.
12) Temperature drop of 50.00 °F.
13) Deflections calculated using a wind speed of 60.00 mph.
14) A non-linear (P-delta) analysis was used.
15) Pressures are calculated at each section.
16) Stress ratio used in pole design is 1.
17) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation* *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	226.0000-197.9600	28.0400	4.08	18	21.5000	28.6700	0.1875	0.7500	A572-65 (65 ksi)
L2	197.9600-162.9100	39.1300	5.17	18	27.2517	37.1200	0.3750	1.5000	A572-65 (65 ksi)
L3	162.9100-120.2900	47.7900	6.42	18	35.0662	47.1400	0.4375	1.7500	A572-65 (65 ksi)
L4	120.2900-79.2100	47.5000	7.59	18	44.6430	56.6300	0.5000	2.0000	A572-65 (65 ksi)
L5	79.2100-39.1300	47.6700	8.75	18	53.7146	65.7500	0.5625	2.2500	A572-65 (65 ksi)
L6	39.1300-	47.8800		18	62.4159	74.5000	0.5625	2.2500	A572-65

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
	0.0000								(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	21.8317	12.6836	727.8616	7.5659	10.9220	66.6418	1456.6810	6.3430	3.4540	18.421
	29.1123	16.9506	1737.3206	10.1113	14.5644	119.2857	3476.9272	8.4769	4.7159	25.152
L2	28.7169	31.9900	2919.4725	9.5412	13.8439	210.8855	5842.7865	15.9980	4.1363	11.03
	37.6926	43.7357	7460.5423	13.0445	18.8570	395.6387	14930.9013	21.8720	5.8731	15.662
L3	36.9334	48.0862	7285.0028	12.2932	17.8136	408.9571	14579.5915	24.0477	5.4016	12.347
	47.8672	64.8523	17870.7516	16.5794	23.9471	746.2589	35765.0179	32.4323	7.5266	17.204
L4	46.9768	70.0550	17246.4914	15.6708	22.6787	760.4723	34515.6762	35.0341	6.9772	13.954
	57.5036	89.0783	35456.7972	19.9262	28.7680	1232.5065	70960.2494	44.5476	9.0869	18.174
L5	56.4891	94.8964	33871.0284	18.8690	27.2870	1241.2871	67786.6251	47.4572	8.4638	15.047
	66.7643	116.3841	62482.7128	23.1416	33.4010	1870.6839	125047.6419	58.2031	10.5820	18.812
L6	65.6212	110.4314	53377.3243	21.9579	31.7073	1683.4419	106824.8838	55.2262	9.9952	17.769
	75.6493	132.0062	91171.9378	26.2478	37.8460	2409.0244	182463.8419	66.0156	12.1220	21.55

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 226.0000-197.9600				1	1	1			
L2 197.9600-162.9100				1	1	1			
L3 162.9100-120.2900				1	1	1			
L4 120.2900-79.2100				1	1	1			
L5 79.2100-39.1300				1	1	1			
L6 39.1300-0.0000				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
561(1-5/8)	C	No	Inside Pole	226.0000 - 0.0000	22	No Ice	0.0000	1.35
						1/2" Ice	0.0000	1.35
						1" Ice	0.0000	1.35
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	226.0000 - 0.0000	2	No Ice	0.0000	1.30
						1/2" Ice	0.0000	1.30
						1" Ice	0.0000	1.30
***								
LDF7-50A(1-5/8)	C	No	Inside Pole	205.0000 - 0.0000	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
AVA7-50(1-5/8)	C	No	Inside Pole	205.0000 - 0.0000	6	No Ice	0.0000	0.70

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1/2" Ice	0.0000	0.70
						1" Ice	0.0000	0.70
***								
FB-L98B-034-XXX(3/8)	C	No	Inside Pole	193.0000 - 0.0000	2	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
WR-VG82ST-BRDA(5/8)	C	No	Inside Pole	193.0000 - 0.0000	2	No Ice	0.0000	0.31
						1/2" Ice	0.0000	0.31
						1" Ice	0.0000	0.31
2" (Nominal) Conduit	C	No	Inside Pole	193.0000 - 0.0000	1	No Ice	0.0000	0.72
						1/2" Ice	0.0000	0.72
						1" Ice	0.0000	0.72
LDF6-50A(1-1/4)	C	No	Inside Pole	193.0000 - 0.0000	9	No Ice	0.0000	0.60
						1/2" Ice	0.0000	0.60
						1" Ice	0.0000	0.60
LDF6-50A(1-1/4)	C	No	CaAa (Out Of Face)	193.0000 - 0.0000	2	No Ice	0.0000	0.60
						1/2" Ice	0.0000	1.85
						1" Ice	0.0000	3.72
LDF6-50A(1-1/4)	C	No	CaAa (Out Of Face)	185.0000 - 0.0000	1	No Ice	0.0000	0.60
						1/2" Ice	0.0000	1.85
						1" Ice	0.0000	3.72
LDF6-50A(1-1/4)	C	No	CaAa (Out Of Face)	193.0000 - 185.0000	1	No Ice	0.1550	0.60
						1/2" Ice	0.2550	1.85
						1" Ice	0.3550	3.72
***								
LDF7-50A(1-5/8)	C	No	Inside Pole	185.0000 - 0.0000	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
LDF4-50A(1/2)	C	No	CaAa (Out Of Face)	185.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.84
						1" Ice	0.0000	2.14
LDF7-50A(1-5/8)	C	No	CaAa (Out Of Face)	185.0000 - 0.0000	5	No Ice	0.0000	0.82
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.46
LDF7-50A(1-5/8)	C	No	CaAa (Out Of Face)	185.0000 - 0.0000	1	No Ice	0.1980	0.82
						1/2" Ice	0.2980	2.33
						1" Ice	0.3980	4.46
***								
HB114-1-0813U4-M5J(1-1/4)	C	No	Inside Pole	175.0000 - 0.0000	3	No Ice	0.0000	1.20
						1/2" Ice	0.0000	1.20
						1" Ice	0.0000	1.20
HB114-21U3M12-XXXF(1-1/4)	C	No	Inside Pole	175.0000 - 0.0000	1	No Ice	0.0000	1.22
						1/2" Ice	0.0000	1.22
						1" Ice	0.0000	1.22
***								
LDF4-50A(1/2)	C	No	Inside Pole	72.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
***								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	134.0000 - 124.0000	1	No Ice	0.1667	15.00
						1/2" Ice	0.2778	16.80
						1" Ice	0.3889	18.60

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	226.0000-197.9600	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.97
L2	197.9600-162.9100	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.614	1.99
L3	162.9100-120.2900	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	0.000	10.105	2.92
L4	120.2900-79.2100	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	8.134	2.67
L5	79.2100-39.1300	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	7.936	2.61
L6	39.1300-0.0000	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	7.748	2.54

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	226.0000-197.9600	A	1.806	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.97
L2	197.9600-162.9100	A	1.777	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	16.483	3.93
L3	162.9100-120.2900	A	1.734	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	29.202	6.31
L4	120.2900-79.2100	A	1.675	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	22.383	5.77
L5	79.2100-39.1300	A	1.590	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	21.361	5.49
L6	39.1300-0.0000	A	1.420	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	20.191	5.17

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	226.0000-197.9600	0.0000	0.0000	0.0000	0.0000
L2	197.9600-162.9100	-0.1984	0.1145	-0.4803	0.2773
L3	162.9100-120.2900	-0.2878	0.1662	-0.6961	0.4019
L4	120.2900-79.2100	-0.2423	0.1399	-0.5850	0.3377
L5	79.2100-39.1300	-0.2439	0.1408	-0.5887	0.3399
L6	39.1300-0.0000	-0.2451	0.1415	-0.5828	0.3365

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Beacon	C	From Leg	0.0000 0.00 1.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	3.6000 4.0000 4.4000	3.6000 4.0000 4.4000	0.10 0.15 0.20
***									
(2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	4.5639 5.1051 5.6116	10.2588 11.4274 12.3118	0.05 0.11 0.19
(2) LPA-80080/6CF w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	4.5639 5.1051 5.6116	10.2588 11.4274 12.3118	0.05 0.11 0.19
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	4.5639 5.1051 5.6116	10.2588 11.4274 12.3118	0.05 0.11 0.19
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	8.3995 8.9639 9.4943	7.0730 8.2637 9.1753	0.07 0.14 0.21
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	8.3995 8.9639 9.4943	7.0730 8.2637 9.1753	0.07 0.14 0.21
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	8.3995 8.9639 9.4943	7.0730 8.2637 9.1753	0.07 0.14 0.21
RRH4X45-AWS4 B66	A	From Leg	4.0000 0.00 2.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	2.6600 2.8781 3.1037	1.5861 1.7690 1.9588	0.06 0.08 0.11
RRH4X45-AWS4 B66	B	From Leg	4.0000 0.00 2.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	2.6600 2.8781 3.1037	1.5861 1.7690 1.9588	0.06 0.08 0.11
RRH4X45-AWS4 B66	C	From Leg	4.0000 0.00 2.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	2.6600 2.8781 3.1037	1.5861 1.7690 1.9588	0.06 0.08 0.11
(4) FD9R6004/2C-3L	A	From Leg	4.0000 0.00 2.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	0.3142 0.3862 0.4656	0.0762 0.1189 0.1685	0.00 0.01 0.01
(6) FD9R6004/2C-3L	B	From Leg	4.0000 0.00 2.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	0.3142 0.3862 0.4656	0.0762 0.1189 0.1685	0.00 0.01 0.01
(2) FD9R6004/2C-3L	C	From Leg	4.0000 0.00 2.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	0.3142 0.3862 0.4656	0.0762 0.1189 0.1685	0.00 0.01 0.01
(2) RRH2X60-1900	A	From Leg	4.0000 0.00 2.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	1.8741 2.0516 2.2365	1.2177 1.3670 1.5233	0.04 0.06 0.08
RRH2X60-1900	B	From Leg	4.0000 0.00 2.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	1.8741 2.0516 2.2365	1.2177 1.3670 1.5233	0.04 0.06 0.08
RRH2x60-700	A	From Leg	4.0000 0.00 2.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	3.5002 3.7609 4.0285	1.8157 2.0519 2.2894	0.06 0.08 0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RRH2x60-700	B	From Leg	4.0000 0.00 2.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	3.5002 3.7609 4.0285	1.8157 2.0519 2.2894	0.06 0.08 0.11
RRH2x60-700	C	From Leg	4.0000 0.00 2.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	3.5002 3.7609 4.0285	1.8157 2.0519 2.2894	0.06 0.08 0.11
DB-T1-6Z-8AB-0Z	B	From Leg	4.0000 0.00 2.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	4.8000 5.0704 5.3481	2.0000 2.1926 2.3926	0.04 0.08 0.12
DB-T1-6Z-8AB-0Z	C	From Leg	4.0000 0.00 2.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	4.8000 5.0704 5.3481	2.0000 2.1926 2.3926	0.04 0.08 0.12
8-ft Ladder	C	From Leg	2.0000 0.00 -2.00	0.0000	226.0000	No Ice 1/2" Ice 1" Ice	7.0700 9.7300 11.1900	7.0700 9.7300 11.1900	0.04 0.07 0.08
Side Arm Mount [SO 203-3]	C	None		0.0000	226.0000	No Ice 1/2" Ice 1" Ice	7.1200 9.8800 12.6400	7.1200 9.8800 12.6400	0.38 0.46 0.55
Platform Mount [LP 602-1]	C	None		0.0000	226.0000	No Ice 1/2" Ice 1" Ice	32.0300 38.7100 45.3900	32.0300 38.7100 45.3900	1.34 1.80 2.26
***									
APXV18-206516S-C-A20 w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	205.0000	No Ice 1/2" Ice 1" Ice	3.8586 4.2736 4.6737	3.2963 4.0044 4.6717	0.04 0.07 0.11
APXV18-206516S-C-A20 w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	205.0000	No Ice 1/2" Ice 1" Ice	3.8586 4.2736 4.6737	3.2963 4.0044 4.6717	0.04 0.07 0.11
APXV18-206516S-C-A20 w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	205.0000	No Ice 1/2" Ice 1" Ice	3.8586 4.2736 4.6737	3.2963 4.0044 4.6717	0.04 0.07 0.11
LNX-6515DS-A1M w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	205.0000	No Ice 1/2" Ice 1" Ice	11.6828 12.4043 13.1351	9.8418 11.3657 12.9138	0.08 0.17 0.27
LNX-6515DS-A1M w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	205.0000	No Ice 1/2" Ice 1" Ice	11.6828 12.4043 13.1351	9.8418 11.3657 12.9138	0.08 0.17 0.27
LNX-6515DS-A1M w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	205.0000	No Ice 1/2" Ice 1" Ice	11.6828 12.4043 13.1351	9.8418 11.3657 12.9138	0.08 0.17 0.27
ATMPP1412D-1CWA	A	From Leg	4.0000 0.00 2.00	0.0000	205.0000	No Ice 1/2" Ice 1" Ice	1.0005 1.1292 1.2653	0.3823 0.4766 0.5780	0.01 0.02 0.03
ATMPP1412D-1CWA	B	From Leg	4.0000 0.00 2.00	0.0000	205.0000	No Ice 1/2" Ice 1" Ice	1.0005 1.1292 1.2653	0.3823 0.4766 0.5780	0.01 0.02 0.03
ATMPP1412D-1CWA	C	From Leg	4.0000 0.00 2.00	0.0000	205.0000	No Ice 1/2" Ice 1" Ice	1.0005 1.1292 1.2653	0.3823 0.4766 0.5780	0.01 0.02 0.03

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* ft ft ft	*Azimuth Adjustment* °	*Placement* ft		C_AA_A *Front* ft^2	C_AA_A *Side* ft^2	*Weight* K
ATSBT-TOP-MF-4G	A	From Leg	4.0000 0.00 2.00	0.0000	205.0000	No Ice 1/2" Ice 1" Ice	0.1736 0.2291 0.2921	0.0949 0.1399 0.1934	0.00 0.00 0.01
ATSBT-TOP-MF-4G	B	From Leg	4.0000 0.00 2.00	0.0000	205.0000	No Ice 1/2" Ice 1" Ice	0.1736 0.2291 0.2921	0.0949 0.1399 0.1934	0.00 0.00 0.01
ATSBT-TOP-MF-4G	C	From Leg	4.0000 0.00 2.00	0.0000	205.0000	No Ice 1/2" Ice 1" Ice	0.1736 0.2291 0.2921	0.0949 0.1399 0.1934	0.00 0.00 0.01
8-ft Ladder	C	From Leg	2.0000 0.00 -2.00	0.0000	205.0000	No Ice 1/2" Ice 1" Ice	7.0700 9.7300 11.1900	7.0700 9.7300 11.1900	0.04 0.07 0.08
Platform Mount [LP 601-1]	C	None		0.0000	205.0000	No Ice 1/2" Ice 1" Ice	28.4700 33.5900 38.7100	28.4700 33.5900 38.7100	1.12 1.51 1.91
***									
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	6.3042 7.4790 8.3676	0.07 0.14 0.21
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	6.3042 7.4790 8.3676	0.07 0.14 0.21
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	6.3042 7.4790 8.3676	0.07 0.14 0.21
OPA-65R-LCUU-H6 w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	9.8953 10.4700 11.0098	7.1792 8.3621 9.2588	0.10 0.18 0.26
OPA-65R-LCUU-H6 w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	9.8953 10.4700 11.0098	7.1792 8.3621 9.2588	0.10 0.18 0.26
OPA-65R-LCUU-H6 w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	9.8953 10.4700 11.0098	7.1792 8.3621 9.2588	0.10 0.18 0.26
800 10121 w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	5.7362 6.3448 6.8570	4.9479 6.0222 6.8104	0.07 0.12 0.18
800 10121 w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	5.7362 6.3448 6.8570	4.9479 6.0222 6.8104	0.07 0.12 0.18
800 10121 w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	5.7362 6.3448 6.8570	4.9479 6.0222 6.8104	0.07 0.12 0.18
(2) DTMABP7819VG12A	A	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	0.9762 1.1002 1.2316	0.3387 0.4192 0.5098	0.02 0.03 0.04
(2) DTMABP7819VG12A	B	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	0.9762 1.1002 1.2316	0.3387 0.4192 0.5098	0.02 0.03 0.04

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* ft ft ft	*Azimuth Adjustment* °	*Placement* ft		*C_AA_A Front* ft^2	*C_AA_A Side* ft^2	*Weight* K
(2) DTMABP7819VG12A	C	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	0.9762 1.1002 1.2316	0.3387 0.4192 0.5098	0.02 0.03 0.04
RRUS A2 MODULE	A	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	1.6000 1.7581 1.9237	0.3797 0.4701 0.5675	0.02 0.03 0.04
RRUS A2 MODULE	B	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	1.6000 1.7581 1.9237	0.3797 0.4701 0.5675	0.02 0.03 0.04
RRUS A2 MODULE	C	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	1.6000 1.7581 1.9237	0.3797 0.4701 0.5675	0.02 0.03 0.04
RRUS 12-B2	A	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	3.1435 3.3632 3.5904	1.2816 1.4340 1.5955	0.06 0.08 0.11
RRUS 12-B2	B	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	3.1435 3.3632 3.5904	1.2816 1.4340 1.5955	0.06 0.08 0.11
RRUS 12-B2	C	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	3.1435 3.3632 3.5904	1.2816 1.4340 1.5955	0.06 0.08 0.11
(2) 860 10025	A	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	0.1369 0.1901 0.2523	0.1157 0.1669 0.2252	0.00 0.00 0.01
(2) 860 10025	B	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	0.1369 0.1901 0.2523	0.1157 0.1669 0.2252	0.00 0.00 0.01
(2) 860 10025	C	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	0.1369 0.1901 0.2523	0.1157 0.1669 0.2252	0.00 0.00 0.01
RRUS 11	A	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.05 0.07 0.10
RRUS 11	B	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.05 0.07 0.10
RRUS 11	C	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.05 0.07 0.10
DC6-48-60-18-8F	B	From Leg	4.0000 0.00 2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	0.9167 1.4583 1.6431	0.9167 1.4583 1.6431	0.02 0.04 0.06
8-ft Ladder	C	From Leg	2.0000 0.00 -2.00	0.0000	193.0000	No Ice 1/2" Ice 1" Ice	7.0700 9.7300 11.1900	7.0700 9.7300 11.1900	0.04 0.07 0.08
Platform Mount [LP 601-1]	C	None		0.0000	193.0000	No Ice 1/2" Ice 1" Ice	28.4700 33.5900 38.7100	28.4700 33.5900 38.7100	1.12 1.51 1.91

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Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* ft ft ft	*Azimuth Adjustment* °	*Placement* ft		C_AA_A *Front* ft^2	C_AA_A *Side* ft^2	*Weight* K
APXV18-206517S-C w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	185.0000	No Ice 1/2" Ice 1" Ice	5.4042 5.9597 6.4808	4.7000 5.8600 6.7338	0.05 0.10 0.15
APXV18-206517S-C w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	185.0000	No Ice 1/2" Ice 1" Ice	5.4042 5.9597 6.4808	4.7000 5.8600 6.7338	0.05 0.10 0.15
APXV18-206517S-C w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	185.0000	No Ice 1/2" Ice 1" Ice	5.4042 5.9597 6.4808	4.7000 5.8600 6.7338	0.05 0.10 0.15
978QNB120E-M w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	185.0000	No Ice 1/2" Ice 1" Ice	7.8255 8.2838 8.7366	5.1455 5.9157 6.6150	0.06 0.12 0.19
978QNB120E-M w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	185.0000	No Ice 1/2" Ice 1" Ice	7.8255 8.2838 8.7366	5.1455 5.9157 6.6150	0.06 0.12 0.19
978QNB120E-M w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	185.0000	No Ice 1/2" Ice 1" Ice	7.8255 8.2838 8.7366	5.1455 5.9157 6.6150	0.06 0.12 0.19
(2) FV90-16-02DP w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	185.0000	No Ice 1/2" Ice 1" Ice	4.5931 5.0183 5.4362	3.3194 4.0888 4.7844	0.04 0.08 0.12
(2) FV90-16-02DP w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	185.0000	No Ice 1/2" Ice 1" Ice	4.5931 5.0183 5.4362	3.3194 4.0888 4.7844	0.04 0.08 0.12
(2) FV90-16-02DP w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	185.0000	No Ice 1/2" Ice 1" Ice	4.5931 5.0183 5.4362	3.3194 4.0888 4.7844	0.04 0.08 0.12
CS72993.07	A	From Leg	4.0000 0.00 2.00	0.0000	185.0000	No Ice 1/2" Ice 1" Ice	1.2250 1.3648 1.5120	0.3887 0.4841 0.5866	0.02 0.03 0.04
CS72993.07	B	From Leg	4.0000 0.00 2.00	0.0000	185.0000	No Ice 1/2" Ice 1" Ice	1.2250 1.3648 1.5120	0.3887 0.4841 0.5866	0.02 0.03 0.04
CS72993.07	C	From Leg	4.0000 0.00 2.00	0.0000	185.0000	No Ice 1/2" Ice 1" Ice	1.2250 1.3648 1.5120	0.3887 0.4841 0.5866	0.02 0.03 0.04
8-ft Ladder	C	From Leg	2.0000 0.00 -2.00	0.0000	185.0000	No Ice 1/2" Ice 1" Ice	7.0700 9.7300 11.1900	7.0700 9.7300 11.1900	0.04 0.07 0.08
Platform Mount [LP 601-1]	C	None		0.0000	185.0000	No Ice 1/2" Ice 1" Ice	28.4700 33.5900 38.7100	28.4700 33.5900 38.7100	1.12 1.51 1.91
***									
800 EXTERNAL NOTCH FILTER	A	From Leg	2.0000 0.00 0.00	0.0000	177.0000	No Ice 1/2" Ice 1" Ice	0.6601 0.7627 0.8727	0.3211 0.3983 0.4830	0.01 0.02 0.02
800 EXTERNAL NOTCH FILTER	B	From Leg	2.0000 0.00 0.00	0.0000	177.0000	No Ice 1/2" Ice 1" Ice	0.6601 0.7627 0.8727	0.3211 0.3983 0.4830	0.01 0.02 0.02

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft^2*	*C_AA_A Side* *ft^2*	*Weight* *K*
800 EXTERNAL NOTCH FILTER	C	From Leg	2.0000 0.00 0.00	0.0000	177.0000	No Ice 1/2" Ice 1" Ice	0.6601 0.7627 0.8727	0.3211 0.3983 0.4830	0.01 0.02 0.02
1900MHz RRH (65MHz)	A	From Leg	2.0000 0.00 0.00	0.0000	177.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2360 2.4385 2.6485	0.06 0.08 0.11
1900MHz RRH (65MHz)	B	From Leg	2.0000 0.00 0.00	0.0000	177.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2360 2.4385 2.6485	0.06 0.08 0.11
1900MHz RRH (65MHz)	C	From Leg	2.0000 0.00 0.00	0.0000	177.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2360 2.4385 2.6485	0.06 0.08 0.11
800MHZ RRH	A	From Leg	2.0000 0.00 0.00	0.0000	177.0000	No Ice 1/2" Ice 1" Ice	2.1342 2.3195 2.5123	1.7730 1.9461 2.1267	0.05 0.07 0.10
800MHZ RRH	B	From Leg	2.0000 0.00 0.00	0.0000	177.0000	No Ice 1/2" Ice 1" Ice	2.1342 2.3195 2.5123	1.7730 1.9461 2.1267	0.05 0.07 0.10
800MHZ RRH	C	From Leg	2.0000 0.00 0.00	0.0000	177.0000	No Ice 1/2" Ice 1" Ice	2.1342 2.3195 2.5123	1.7730 1.9461 2.1267	0.05 0.07 0.10
(3) ACU-A20-N	A	From Leg	2.0000 0.00 0.00	0.0000	177.0000	No Ice 1/2" Ice 1" Ice	0.0667 0.1037 0.1481	0.1167 0.1620 0.2148	0.00 0.00 0.00
(3) ACU-A20-N	B	From Leg	2.0000 0.00 0.00	0.0000	177.0000	No Ice 1/2" Ice 1" Ice	0.0667 0.1037 0.1481	0.1167 0.1620 0.2148	0.00 0.00 0.00
(3) ACU-A20-N	C	From Leg	2.0000 0.00 0.00	0.0000	177.0000	No Ice 1/2" Ice 1" Ice	0.0667 0.1037 0.1481	0.1167 0.1620 0.2148	0.00 0.00 0.00
2.375" OD x 6' Mount Pipe	A	From Leg	2.0000 0.00 0.00	0.0000	177.0000	No Ice 1/2" Ice 1" Ice	1.4250 1.9250 2.2939	1.4250 1.9250 2.2939	0.03 0.04 0.05
2.375" OD x 6' Mount Pipe	B	From Leg	2.0000 0.00 0.00	0.0000	177.0000	No Ice 1/2" Ice 1" Ice	1.4250 1.9250 2.2939	1.4250 1.9250 2.2939	0.03 0.04 0.05
2.375" OD x 6' Mount Pipe	C	From Leg	2.0000 0.00 0.00	0.0000	177.0000	No Ice 1/2" Ice 1" Ice	1.4250 1.9250 2.2939	1.4250 1.9250 2.2939	0.03 0.04 0.05
Side Arm Mount [SO 102-3]	C	None		0.0000	177.0000	No Ice 1/2" Ice 1" Ice	3.0000 3.4800 3.9600	3.0000 3.4800 3.9600	0.08 0.11 0.14
***									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	175.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	6.9458 8.1266 9.0212	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	175.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	6.9458 8.1266 9.0212	0.08 0.15 0.23

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	175.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	6.9458 8.1266 9.0212	0.08 0.15 0.23
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	175.0000	No Ice 1/2" Ice 1" Ice	6.5799 7.0306 7.4733	4.9591 5.7544 6.4723	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	175.0000	No Ice 1/2" Ice 1" Ice	6.5799 7.0306 7.4733	4.9591 5.7544 6.4723	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	175.0000	No Ice 1/2" Ice 1" Ice	6.5799 7.0306 7.4733	4.9591 5.7544 6.4723	0.08 0.13 0.19
TD-RRH8x20-25	A	From Leg	4.0000 0.00 0.00	0.0000	175.0000	No Ice 1/2" Ice 1" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13
TD-RRH8x20-25	B	From Leg	4.0000 0.00 0.00	0.0000	175.0000	No Ice 1/2" Ice 1" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13
TD-RRH8x20-25	C	From Leg	4.0000 0.00 0.00	0.0000	175.0000	No Ice 1/2" Ice 1" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13
2.375" OD x 6' Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	175.0000	No Ice 1/2" Ice 1" Ice	1.4250 1.9250 2.2939	1.4250 1.9250 2.2939	0.03 0.04 0.05
2.375" OD x 6' Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	175.0000	No Ice 1/2" Ice 1" Ice	1.4250 1.9250 2.2939	1.4250 1.9250 2.2939	0.03 0.04 0.05
2.375" OD x 6' Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	175.0000	No Ice 1/2" Ice 1" Ice	1.4250 1.9250 2.2939	1.4250 1.9250 2.2939	0.03 0.04 0.05
Platform Mount [LP 1201-1]	C	None		0.0000	175.0000	No Ice 1/2" Ice 1" Ice	23.1000 26.8000 30.5000	23.1000 26.8000 30.5000	2.10 2.50 2.90
***									
GPS_A	A	From Leg	3.0000 0.00 1.00	0.0000	72.0000	No Ice 1/2" Ice 1" Ice	0.2550 0.3205 0.3934	0.2550 0.3205 0.3934	0.00 0.00 0.01
Side Arm Mount [SO 701-1]	A	None		0.0000	72.0000	No Ice 1/2" Ice 1" Ice	0.8500 1.1400 1.4300	1.6700 2.3400 3.0100	0.07 0.08 0.09

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2

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 226.0000-197.9600	211.3121	1.224	26	59.520	A	0.000	59.520	59.520	100.00	0.000	0.000
					B	0.000	59.520		100.00	0.000	0.000
					C	0.000	59.520		100.00	0.000	0.000
L2 197.9600-162.9100	179.7664	1.169	25	96.986	A	0.000	96.986	96.986	100.00	0.000	0.000
					B	0.000	96.986		100.00	0.000	0.000
					C	0.000	96.986		100.00	0.000	5.614
L3 162.9100-120.2900	140.9127	1.09	23	150.592	A	0.000	150.592	150.592	100.00	0.000	0.000
					B	0.000	150.592		100.00	0.000	0.000
					C	0.000	150.592		100.00	0.000	10.105
L4 120.2900-79.2100	99.3630	0.986	21	178.836	A	0.000	178.836	178.836	100.00	0.000	0.000
					B	0.000	178.836		100.00	0.000	0.000
					C	0.000	178.836		100.00	0.000	8.134
L5 79.2100-39.1300	59.1030	0.85	18	205.833	A	0.000	205.833	205.833	100.00	0.000	0.000
					B	0.000	205.833		100.00	0.000	0.000
					C	0.000	205.833		100.00	0.000	7.936
L6 39.1300-0.0000	19.1021	0.7	15	230.330	A	0.000	230.330	230.330	100.00	0.000	0.000
					B	0.000	230.330		100.00	0.000	0.000
					C	0.000	230.330		100.00	0.000	7.748

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 226.0000-197.9600	211.3121	1.224	7	1.8061	67.960	A	0.000	67.960	67.960	100.00	0.000	0.000
						B	0.000	67.960		100.00	0.000	0.000
						C	0.000	67.960		100.00	0.000	0.000
L2 197.9600-162.9100	179.7664	1.169	7	1.7771	107.536	A	0.000	107.536	107.536	100.00	0.000	0.000
						B	0.000	107.536		100.00	0.000	0.000
						C	0.000	107.536		100.00	0.000	16.483
L3 162.9100-120.2900	140.9127	1.09	7	1.7343	163.215	A	0.000	163.215	163.215	100.00	0.000	0.000
						B	0.000	163.215		100.00	0.000	0.000
						C	0.000	163.215		100.00	0.000	29.202
L4 120.2900-79.2100	99.3630	0.986	6	1.6748	190.710	A	0.000	190.710	190.710	100.00	0.000	0.000
						B	0.000	190.710		100.00	0.000	0.000
						C	0.000	190.710		100.00	0.000	22.383
L5 79.2100-39.1300	59.1030	0.85	5	1.5900	217.021	A	0.000	217.021	217.021	100.00	0.000	0.000
						B	0.000	217.021		100.00	0.000	0.000
						C	0.000	217.021		100.00	0.000	21.361
L6 39.1300-0.0000	19.1021	0.7	4	1.4202	240.699	A	0.000	240.699	240.699	100.00	0.000	0.000
						B	0.000	240.699		100.00	0.000	0.000
						C	0.000	240.699		100.00	0.000	20.191

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 226.0000-197.9600	211.3121	1.224	10	59.520	A	0.000	59.520	59.520	100.00	0.000	0.000
					B	0.000	59.520		100.00	0.000	0.000
					C	0.000	59.520		100.00	0.000	0.000
L2 197.9600-162.9100	179.7664	1.169	9	96.986	A	0.000	96.986	96.986	100.00	0.000	0.000
					B	0.000	96.986		100.00	0.000	0.000
					C	0.000	96.986		100.00	0.000	5.614
L3 162.9100-	140.9127	1.09	9	150.59	A	0.000	150.592	150.592	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
120.2900				2	B	0.000	150.592		100.00	0.000	0.000
					C	0.000	150.592		100.00	0.000	10.105
L4 120.2900-79.2100	99.3630	0.986	8	178.836	A	0.000	178.836	178.836	100.00	0.000	0.000
					B	0.000	178.836		100.00	0.000	0.000
					C	0.000	178.836		100.00	0.000	8.134
L5 79.2100-39.1300	59.1030	0.85	7	205.833	A	0.000	205.833	205.833	100.00	0.000	0.000
					B	0.000	205.833		100.00	0.000	0.000
					C	0.000	205.833		100.00	0.000	7.936
L6 39.1300-0.0000	19.1021	0.7	5	230.330	A	0.000	230.330	230.330	100.00	0.000	0.000
					B	0.000	230.330		100.00	0.000	0.000
					C	0.000	230.330		100.00	0.000	7.748

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	226 - 197.96	Pole	Max Tension	26	0.00	-0.00	0.00
			Max. Compression	26	-19.71	0.11	-0.67
			Max. Mx	20	-6.71	240.39	0.85
			Max. My	14	-6.73	-0.89	-238.21
			Max. Vy	20	-13.33	240.39	0.85
			Max. Vx	14	13.25	-0.89	-238.21
			Max. Torque	25			1.83
L2	197.96 - 162.91	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.34	2.99	-2.92
			Max. Mx	20	-22.40	971.84	1.70
			Max. My	14	-22.42	-1.73	-966.70
			Max. Vy	20	-29.23	971.84	1.70
			Max. Vx	14	29.14	-1.73	-966.70
			Max. Torque	25			4.04
L3	162.91 - 120.29	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-75.33	9.24	-6.60
			Max. Mx	20	-36.50	2271.27	2.65
			Max. My	14	-36.51	-2.33	-2262.19
			Max. Vy	20	-33.53	2271.27	2.65
			Max. Vx	14	33.44	-2.33	-2262.19
			Max. Torque	25			4.68
L4	120.29 - 79.21	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-100.88	16.06	-10.58
			Max. Mx	20	-54.61	3695.97	3.63
			Max. My	14	-54.61	-3.02	-3683.15
			Max. Vy	20	-37.70	3695.97	3.63
			Max. Vx	14	37.62	-3.02	-3683.15
			Max. Torque	25			5.30
L5	79.21 - 39.13	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-131.66	23.29	-14.68
			Max. Mx	20	-77.48	5243.55	4.56
			Max. My	14	-77.48	-3.63	-5227.11
			Max. Vy	20	-41.57	5243.55	4.56
			Max. Vx	14	41.48	-3.63	-5227.11
			Max. Torque	25			5.88
L6	39.13 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-173.47	32.20	-19.82
			Max. Mx	20	-109.77	7325.91	5.59
			Max. My	14	-109.77	-4.25	-7305.11
			Max. Vy	20	-45.15	7325.91	5.59
			Max. Vx	14	45.07	-4.25	-7305.11
			Max. Torque	25			6.60

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	173.47	-0.00	0.00
	Max. H_x	21	82.34	45.11	0.03
	Max. H_z	3	82.34	0.03	45.03
	Max. M_x	2	7300.62	0.03	45.03

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. M_z	8	7318.71	-45.11	-0.03
	Max. Torsion	25	6.60	22.59	39.02
	Min. Vert	21	82.34	45.11	0.03
	Min. H_x	9	82.34	-45.11	-0.03
	Min. H_z	15	82.34	-0.03	-45.03
	Min. M_x	14	-7305.11	-0.03	-45.03
	Min. M_z	20	-7325.91	45.11	0.03
	Min. Torsion	13	-6.58	-22.59	-39.02

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	91.49	-0.00	0.00	1.78	2.86	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	109.79	-0.03	-45.03	-7300.62	11.37	-5.56
0.9 Dead+1.6 Wind 0 deg - No Ice	82.34	-0.03	-45.03	-7205.48	10.32	-5.56
1.2 Dead+1.6 Wind 30 deg - No Ice	109.79	22.53	-38.98	-6319.00	-3651.67	-3.03
0.9 Dead+1.6 Wind 30 deg - No Ice	82.34	22.53	-38.98	-6236.51	-3604.55	-3.04
1.2 Dead+1.6 Wind 60 deg - No Ice	109.79	39.06	-22.49	-3642.80	-6335.25	0.31
0.9 Dead+1.6 Wind 60 deg - No Ice	82.34	39.06	-22.49	-3595.50	-6252.83	0.30
1.2 Dead+1.6 Wind 90 deg - No Ice	109.79	45.11	0.03	10.03	-7318.71	3.56
0.9 Dead+1.6 Wind 90 deg - No Ice	82.34	45.11	0.03	9.33	-7223.89	3.56
1.2 Dead+1.6 Wind 120 deg - No Ice	109.79	39.09	22.54	3660.76	-6343.04	5.85
0.9 Dead+1.6 Wind 120 deg - No Ice	82.34	39.09	22.54	3612.08	-6260.49	5.85
1.2 Dead+1.6 Wind 150 deg - No Ice	109.79	22.59	39.02	6331.24	-3665.20	6.58
0.9 Dead+1.6 Wind 150 deg - No Ice	82.34	22.59	39.02	6247.46	-3617.85	6.58
1.2 Dead+1.6 Wind 180 deg - No Ice	109.79	0.03	45.03	7305.11	-4.25	5.55
0.9 Dead+1.6 Wind 180 deg - No Ice	82.34	0.03	45.03	7208.81	-5.05	5.55
1.2 Dead+1.6 Wind 210 deg - No Ice	109.79	-22.53	38.98	6323.52	3658.83	3.04
0.9 Dead+1.6 Wind 210 deg - No Ice	82.34	-22.53	38.98	6239.85	3609.84	3.04
1.2 Dead+1.6 Wind 240 deg - No Ice	109.79	-39.06	22.49	3647.30	6342.45	-0.29
0.9 Dead+1.6 Wind 240 deg - No Ice	82.34	-39.06	22.49	3598.82	6258.16	-0.29
1.2 Dead+1.6 Wind 270 deg - No Ice	109.79	-45.11	-0.03	-5.59	7325.91	-3.55
0.9 Dead+1.6 Wind 270 deg - No Ice	82.34	-45.11	-0.03	-6.04	7229.22	-3.55
1.2 Dead+1.6 Wind 300 deg - No Ice	109.79	-39.09	-22.54	-3656.34	6350.19	-5.86
0.9 Dead+1.6 Wind 300 deg - No Ice	82.34	-39.09	-22.54	-3608.81	6265.78	-5.86
1.2 Dead+1.6 Wind 330 deg - No Ice	109.79	-22.59	-39.02	-6326.80	3672.30	-6.59
0.9 Dead+1.6 Wind 330 deg - No Ice	82.34	-22.59	-39.02	-6244.18	3623.11	-6.60
1.2 Dead+1.0 Ice+1.0 Temp	173.47	0.00	-0.00	19.82	32.20	-0.00
1.2 Dead+1.0 Wind 0	173.47	-0.01	-15.04	-2476.51	34.63	-2.27

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
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	173.47	7.52	-13.03	-2141.27	-1216.20	-1.23
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	173.47	13.04	-7.52	-1226.61	-2132.40	0.14
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	173.47	15.06	0.01	22.09	-2468.22	1.47
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	173.47	13.05	7.53	1270.26	-2134.40	2.41
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	173.47	7.54	13.03	2183.46	-1219.66	2.70
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	173.47	0.01	15.04	2516.71	30.64	2.26
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	173.47	-7.52	13.03	2181.47	1281.48	1.23
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	173.47	-13.04	7.52	1266.82	2197.69	-0.14
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	173.47	-15.06	-0.01	18.10	2533.49	-1.47
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	173.47	-13.05	-7.53	-1230.07	2199.68	-2.41
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	173.47	-7.54	-13.03	-2143.26	1284.93	-2.70
Dead+Wind 0 deg - Service	91.49	-0.01	-10.48	-1685.19	4.78	-0.72
Dead+Wind 30 deg - Service	91.49	5.24	-9.07	-1458.27	-841.33	-0.38
Dead+Wind 60 deg - Service	91.49	9.09	-5.23	-840.10	-1461.22	0.07
Dead+Wind 90 deg - Service	91.49	10.50	0.01	3.67	-1688.77	0.50
Dead+Wind 120 deg - Service	91.49	9.10	5.25	846.95	-1463.02	0.79
Dead+Wind 150 deg - Service	91.49	5.26	9.08	1463.80	-844.45	0.87
Dead+Wind 180 deg - Service	91.49	0.01	10.48	1688.92	1.18	0.72
Dead+Wind 210 deg - Service	91.49	-5.24	9.07	1462.00	847.30	0.38
Dead+Wind 240 deg - Service	91.49	-9.09	5.23	843.83	1467.18	-0.07
Dead+Wind 270 deg - Service	91.49	-10.50	-0.01	0.06	1694.74	-0.50
Dead+Wind 300 deg - Service	91.49	-9.10	-5.25	-843.23	1468.98	-0.79
Dead+Wind 330 deg - Service	91.49	-5.26	-9.08	-1460.07	850.42	-0.87

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-91.49	0.00	0.00	91.49	-0.00	0.000%
2	-0.03	-109.79	-45.03	0.03	109.79	45.03	0.004%
3	-0.03	-82.34	-45.03	0.03	82.34	45.03	0.003%
4	22.53	-109.79	-38.98	-22.53	109.79	38.98	0.000%
5	22.53	-82.34	-38.98	-22.53	82.34	38.98	0.000%
6	39.06	-109.79	-22.49	-39.06	109.79	22.49	0.000%
7	39.06	-82.34	-22.49	-39.06	82.34	22.49	0.000%
8	45.12	-109.79	0.03	-45.11	109.79	-0.03	0.007%
9	45.12	-82.34	0.03	-45.11	82.34	-0.03	0.006%
10	39.09	-109.79	22.54	-39.09	109.79	-22.54	0.000%
11	39.09	-82.34	22.54	-39.09	82.34	-22.54	0.000%
12	22.59	-109.79	39.02	-22.59	109.79	-39.02	0.000%
13	22.59	-82.34	39.02	-22.59	82.34	-39.02	0.000%
14	0.03	-109.79	45.03	-0.03	109.79	-45.03	0.004%
15	0.03	-82.34	45.03	-0.03	82.34	-45.03	0.003%
16	-22.53	-109.79	38.98	22.53	109.79	-38.98	0.000%
17	-22.53	-82.34	38.98	22.53	82.34	-38.98	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
18	-39.06	-109.79	22.49	39.06	109.79	-22.49	0.000%
19	-39.06	-82.34	22.49	39.06	82.34	-22.49	0.000%
20	-45.12	-109.79	-0.03	45.11	109.79	0.03	0.007%
21	-45.12	-82.34	-0.03	45.11	82.34	0.03	0.006%
22	-39.09	-109.79	-22.54	39.09	109.79	22.54	0.000%
23	-39.09	-82.34	-22.54	39.09	82.34	22.54	0.000%
24	-22.59	-109.79	-39.02	22.59	109.79	39.02	0.000%
25	-22.59	-82.34	-39.02	22.59	82.34	39.02	0.000%
26	0.00	-173.47	0.00	-0.00	173.47	0.00	0.000%
27	-0.01	-173.47	-15.05	0.01	173.47	15.04	0.001%
28	7.52	-173.47	-13.03	-7.52	173.47	13.03	0.001%
29	13.04	-173.47	-7.52	-13.04	173.47	7.52	0.001%
30	15.06	-173.47	0.01	-15.06	173.47	-0.01	0.001%
31	13.05	-173.47	7.53	-13.05	173.47	-7.53	0.001%
32	7.54	-173.47	13.03	-7.54	173.47	-13.03	0.001%
33	0.01	-173.47	15.05	-0.01	173.47	-15.04	0.001%
34	-7.52	-173.47	13.03	7.52	173.47	-13.03	0.001%
35	-13.04	-173.47	7.52	13.04	173.47	-7.52	0.001%
36	-15.06	-173.47	-0.01	15.06	173.47	0.01	0.001%
37	-13.05	-173.47	-7.53	13.05	173.47	7.53	0.001%
38	-7.54	-173.47	-13.03	7.54	173.47	13.03	0.001%
39	-0.01	-91.49	-10.48	0.01	91.49	10.48	0.002%
40	5.24	-91.49	-9.07	-5.24	91.49	9.07	0.002%
41	9.09	-91.49	-5.23	-9.09	91.49	5.23	0.002%
42	10.50	-91.49	0.01	-10.50	91.49	-0.01	0.002%
43	9.10	-91.49	5.25	-9.10	91.49	-5.25	0.002%
44	5.26	-91.49	9.08	-5.26	91.49	-9.08	0.002%
45	0.01	-91.49	10.48	-0.01	91.49	-10.48	0.002%
46	-5.24	-91.49	9.07	5.24	91.49	-9.07	0.002%
47	-9.09	-91.49	5.23	9.09	91.49	-5.23	0.002%
48	-10.50	-91.49	-0.01	10.50	91.49	0.01	0.002%
49	-9.10	-91.49	-5.25	9.10	91.49	5.25	0.002%
50	-5.26	-91.49	-9.08	5.26	91.49	9.08	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	17	0.00006031	0.00010602
3	Yes	17	0.00003974	0.00008892
4	Yes	21	0.00000001	0.00010646
5	Yes	21	0.00000001	0.00007978
6	Yes	21	0.00000001	0.00010807
7	Yes	21	0.00000001	0.00008103
8	Yes	16	0.00011778	0.00014834
9	Yes	16	0.00007889	0.00012745
10	Yes	21	0.00000001	0.00011329
11	Yes	21	0.00000001	0.00008503
12	Yes	21	0.00000001	0.00010541
13	Yes	21	0.00000001	0.00007888
14	Yes	17	0.00006030	0.00009711
15	Yes	17	0.00003974	0.00008183
16	Yes	21	0.00000001	0.00011039
17	Yes	21	0.00000001	0.00008277
18	Yes	21	0.00000001	0.00010906
19	Yes	21	0.00000001	0.00008171
20	Yes	16	0.00011777	0.00013329
21	Yes	16	0.00007889	0.00011542
22	Yes	21	0.00000001	0.00010596
23	Yes	21	0.00000001	0.00007928
24	Yes	21	0.00000001	0.00011356
25	Yes	21	0.00000001	0.00008525
26	Yes	13	0.00000001	0.00002012
27	Yes	18	0.00011916	0.00011336
28	Yes	19	0.00006421	0.00008845

29	Yes	19	0.00006421	0.00008915
30	Yes	18	0.00011919	0.00011264
31	Yes	19	0.00006420	0.00009368
32	Yes	19	0.00006420	0.00008974
33	Yes	18	0.00011915	0.00011522
34	Yes	19	0.00006417	0.00009491
35	Yes	19	0.00006417	0.00009419
36	Yes	18	0.00011913	0.00011538
37	Yes	19	0.00006418	0.00009076
38	Yes	19	0.00006418	0.00009472
39	Yes	16	0.00009649	0.00002243
40	Yes	16	0.00009637	0.00003078
41	Yes	16	0.00009637	0.00003273
42	Yes	16	0.00009649	0.00002170
43	Yes	16	0.00009637	0.00003999
44	Yes	16	0.00009637	0.00002867
45	Yes	16	0.00009649	0.00002240
46	Yes	16	0.00009637	0.00003632
47	Yes	16	0.00009637	0.00003433
48	Yes	16	0.00009649	0.00002171
49	Yes	16	0.00009637	0.00002914
50	Yes	16	0.00009637	0.00004052

Maximum Tower Deflections - Service Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load Comb.*	*Tilt*	*Twist*
	ft	*in*		°	°
L1	226 - 197.96	34.816	48	1.5498	0.0058
L2	202.04 - 162.91	27.340	48	1.3959	0.0039
L3	168.08 - 120.29	18.189	48	1.1461	0.0021
L4	126.71 - 79.21	9.739	48	0.7823	0.0009
L5	86.8 - 39.13	4.385	48	0.4835	0.0005
L6	47.88 - 0	1.332	48	0.2515	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation	*Appurtenance*	*Gov. Load Comb.*	*Deflection*	*Tilt*	*Twist*	*Radius of Curvature*
ft			*in*	°	°	*ft*
226.0000	Beacon	48	34.816	1.5498	0.0058	33705
205.0000	APXV18-206516S-C-A20 w/ Mount Pipe	48	28.230	1.4155	0.0041	8046
193.0000	AM-X-CD-16-65-00T-RET w/ Mount Pipe	48	24.712	1.3344	0.0033	7037
185.0000	APXV18-206517S-C w/ Mount Pipe	48	22.502	1.2774	0.0029	7036
177.0000	800 EXTERNAL NOTCH FILTER	48	20.402	1.2173	0.0025	7033
175.0000	APXVSPP18-C-A20 w/ Mount Pipe	48	19.894	1.2018	0.0024	7032
72.0000	GPS_A	48	2.980	0.3901	0.0003	8841

Maximum Tower Deflections - Design Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load Comb.*	*Tilt*	*Twist*
	ft	*in*		°	°
L1	226 - 197.96	150.507	20	6.7060	0.0277
L2	202.04 - 162.91	118.228	20	6.0409	0.0197
L3	168.08 - 120.29	78.689	20	4.9618	0.0115
L4	126.71 - 79.21	42.142	20	3.3871	0.0058
L5	86.8 - 39.13	18.975	22	2.0931	0.0030

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L6	47.88 - 0	5.761	22	1.0882	0.0014

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
226.0000	Beacon	20	150.507	6.7060	0.0277	8012
205.0000	APXV18-206516S-C-A20 w/ Mount Pipe	20	122.073	6.1254	0.0206	1909
193.0000	AM-X-CD-16-65-00T-RET w/ Mount Pipe	20	106.877	5.7754	0.0171	1663
185.0000	APXV18-206517S-C w/ Mount Pipe	20	97.331	5.5291	0.0151	1658
177.0000	800 EXTERNAL NOTCH FILTER	20	88.255	5.2696	0.0133	1654
175.0000	APXVSPP18-C-A20 w/ Mount Pipe	20	86.059	5.2024	0.0129	1653
72.0000	GPS_A	22	12.891	1.6886	0.0023	2045

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	226 - 197.96 (1)	TP28.67x21.5x0.1875	28.0400	0.0000	0.0	16.3298	-6.71	1072.42	0.006
L2	197.96 - 162.91 (2)	TP37.12x27.2517x0.375	39.1300	0.0000	0.0	42.1838	-22.40	3134.05	0.007
L3	162.91 - 120.29 (3)	TP47.14x35.0662x0.4375	47.7900	0.0000	0.0	62.5999	-36.50	4616.12	0.008
L4	120.29 - 79.21 (4)	TP56.63x44.643x0.5	47.5000	0.0000	0.0	86.0386	-54.61	6258.12	0.009
L5	79.21 - 39.13 (5)	TP65.75x53.7146x0.5625	47.6700	0.0000	0.0	112.4400	-77.48	8104.46	0.010
L6	39.13 - 0 (6)	TP74.5x62.4159x0.5625	47.8800	0.0000	0.0	132.0060	-109.77	9035.61	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	226 - 197.96 (1)	TP28.67x21.5x0.1875	240.58	605.72	0.397	0.00	605.72	0.000
L2	197.96 - 162.91 (2)	TP37.12x27.2517x0.375	972.23	2277.90	0.427	0.00	2277.90	0.000
L3	162.91 - 120.29 (3)	TP47.14x35.0662x0.4375	2271.96	4271.34	0.532	0.00	4271.34	0.000
L4	120.29 - 79.21 (4)	TP56.63x44.643x0.5	3697.00	6967.32	0.531	0.00	6967.32	0.000
L5	79.21 - 39.13 (5)	TP65.75x53.7146x0.5625	5244.91	10484.50	0.500	0.00	10484.50	0.000
L6	39.13 - 0 (6)	TP74.5x62.4159x0.5625	7327.60	13741.17	0.533	0.00	13741.17	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	226 - 197.96 (1)	TP28.67x21.5x0.1875	13.35	536.21	0.025	1.67	1212.93	0.001
L2	197.96 - 162.91 (2)	TP37.12x27.2517x0.375	29.25	1567.02	0.019	3.66	4561.38	0.001
L3	162.91 - 120.29 (3)	TP47.14x35.0662x0.4375	33.55	2308.06	0.015	4.22	8553.08	0.000
L4	120.29 - 79.21 (4)	TP56.63x44.643x0.5	37.72	3129.06	0.012	4.75	13951.67	0.000
L5	79.21 - 39.13 (5)	TP65.75x53.7146x0.5625	41.58	4052.23	0.010	5.24	20994.58	0.000
L6	39.13 - 0 (6)	TP74.5x62.4159x0.5625	45.17	4517.80	0.010	5.86	27515.92	0.000

Pole Interaction Design Data

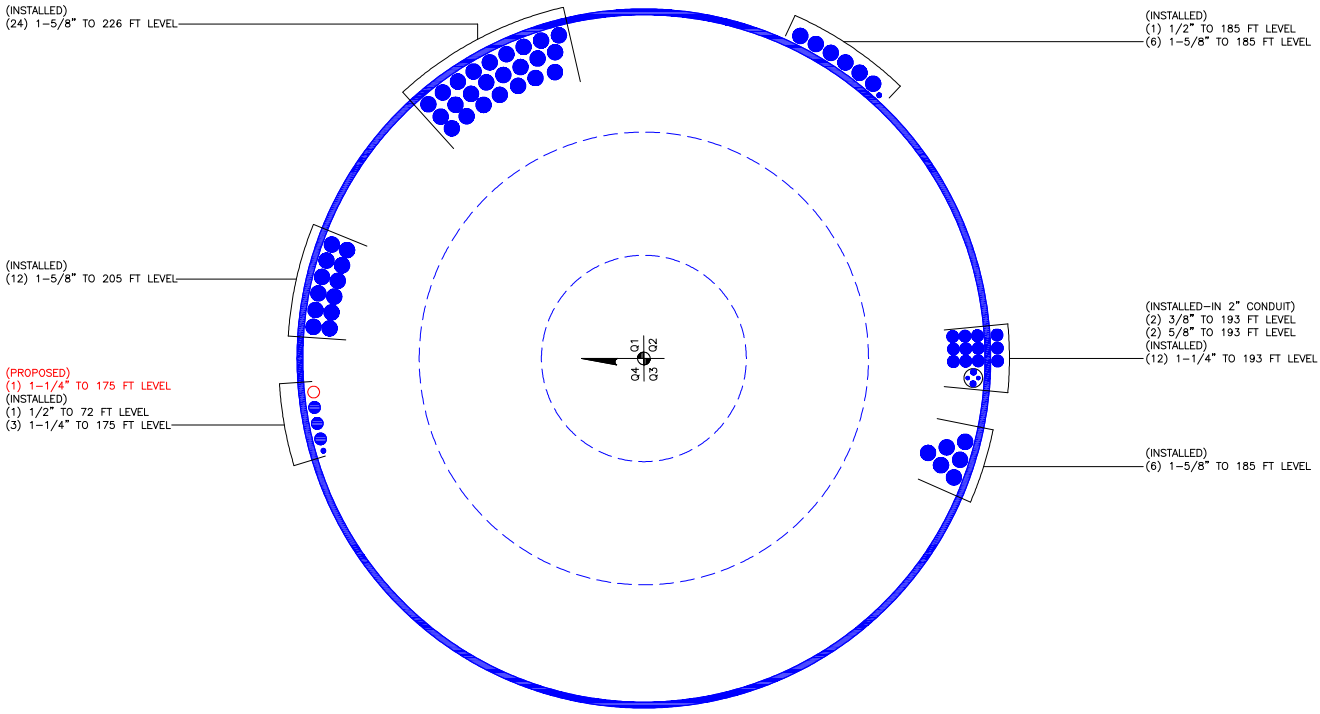
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	226 - 197.96 (1)	0.006	0.397	0.000	0.025	0.001	0.404	1.000	4.8.2
L2	197.96 - 162.91 (2)	0.007	0.427	0.000	0.019	0.001	0.434	1.000	4.8.2
L3	162.91 - 120.29 (3)	0.008	0.532	0.000	0.015	0.000	0.540	1.000	4.8.2
L4	120.29 - 79.21 (4)	0.009	0.531	0.000	0.012	0.000	0.539	1.000	4.8.2
L5	79.21 - 39.13 (5)	0.010	0.500	0.000	0.010	0.000	0.510	1.000	4.8.2
L6	39.13 - 0 (6)	0.012	0.533	0.000	0.010	0.000	0.546	1.000	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	226 - 197.96	Pole	TP28.67x21.5x0.1875	1	-6.71	1072.42	40.4	Pass
L2	197.96 - 162.91	Pole	TP37.12x27.2517x0.375	2	-22.40	3134.05	43.4	Pass
L3	162.91 - 120.29	Pole	TP47.14x35.0662x0.4375	3	-36.50	4616.12	54.0	Pass
L4	120.29 - 79.21	Pole	TP56.63x44.643x0.5	4	-54.61	6258.12	53.9	Pass
L5	79.21 - 39.13	Pole	TP65.75x53.7146x0.5625	5	-77.48	8104.46	51.0	Pass
L6	39.13 - 0	Pole	TP74.5x62.4159x0.5625	6	-109.77	9035.61	54.6	Pass
							Summary	
						Pole (L6)	54.6	Pass
						RATING =	**54.6**	**Pass**

APPENDIX B

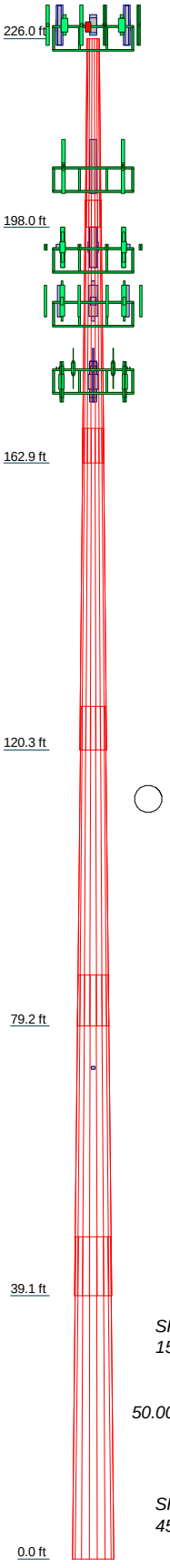
BASE LEVEL DRAWING


(INSTALLED)
(24) 1-5/8" TO 226 FT LEVEL
(INSTALLED)
(1) 1/2" TO 185 FT LEVEL
(6) 1-5/8" TO 185 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 205 FT LEVEL
(INSTALLED-IN 2" CONDUIT)
(2) 3/8" TO 193 FT LEVEL
(2) 5/8" TO 193 FT LEVEL
(INSTALLED)
(12) 1-1/4" TO 193 FT LEVEL
(PROPOSED)
(1) 1-1/4" TO 175 FT LEVEL
(INSTALLED)
(1) 1/2" TO 72 FT LEVEL
(3) 1-1/4" TO 175 FT LEVEL
(INSTALLED)
(6) 1-5/8" TO 185 FT LEVEL
Q1
Q2
Q3
Q4

APPENDIX C

ADDITIONAL CALCULATIONS

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	28.0400	18	0.1875	4.0800	21.5000	28.6700		1.4
2	39.1300	18	0.3750	5.1700	27.2517	37.1200		5.0
3	47.7900	18	0.4375	6.4200	35.0662	47.1400		9.2
4	47.5000	18	0.5000	7.5900	44.6430	56.6300		12.9
5	47.6700	18	0.5625	8.7500	53.7146	65.7500		17.1
6	47.8800	18	0.5625		62.4159	74.5000		19.7
							A572-65	65.4



ALL REACTIONS ARE FACTORED

AXIAL 173 K

SHEAR 15 K

MOMENT 2537 kip-ft

TORQUE 3 kip-ft

50.00 mph WIND - 0.7500 in ICE

AXIAL 110 K

SHEAR 45 K

MOMENT 7328 kip-ft

TORQUE 7 kip-ft

REACTIONS - 93.00 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Beacon	226	RRUS 12-B2	193
(2) LPA-80080/6CF w/ Mount Pipe	226	RRUS 12-B2	193
(2) LPA-80080/6CF w/ Mount Pipe	226	RRUS 12-B2	193
(2) LPA-80080/6CF w/ Mount Pipe	226	(2) 860 10025	193
(2) SBNHH-1D65B w/ Mount Pipe	226	(2) 860 10025	193
(2) SBNHH-1D65B w/ Mount Pipe	226	(2) 860 10025	193
(2) SBNHH-1D65B w/ Mount Pipe	226	RRUS 11	193
RRH4X45-AWS4 B66	226	RRUS 11	193
RRH4X45-AWS4 B66	226	RRUS 11	193
RRH4X45-AWS4 B66	226	DC6-48-60-18-8F	193
(4) FD9R6004/2C-3L	226	8-ft Ladder	193
(6) FD9R6004/2C-3L	226	Platform Mount [LP 601-1]	193
(2) FD9R6004/2C-3L	226	APXV18-206517S-C w/ Mount Pipe	185
(2) RRH2X60-1900	226	APXV18-206517S-C w/ Mount Pipe	185
RRH2X60-1900	226	APXV18-206517S-C w/ Mount Pipe	185
RRH2x60-700	226	978QNB120E-M w/ Mount Pipe	185
RRH2x60-700	226	978QNB120E-M w/ Mount Pipe	185
RRH2x60-700	226	978QNB120E-M w/ Mount Pipe	185
DB-T1-6Z-8AB-0Z	226	(2) FV90-16-02DP w/ Mount Pipe	185
DB-T1-6Z-8AB-0Z	226	(2) FV90-16-02DP w/ Mount Pipe	185
8-ft Ladder	226	(2) FV90-16-02DP w/ Mount Pipe	185
Side Arm Mount [SO 203-3]	226	CS72993.07	185
Platform Mount [LP 602-1]	226	CS72993.07	185
APXV18-206516S-C-A20 w/ Mount Pipe	205	CS72993.07	185
		8-ft Ladder	185
APXV18-206516S-C-A20 w/ Mount Pipe	205	Platform Mount [LP 601-1]	185
APXV18-206516S-C-A20 w/ Mount Pipe	205	800 EXTERNAL NOTCH FILTER	177
		800 EXTERNAL NOTCH FILTER	177
LNX-6515DS-A1M w/ Mount Pipe	205	800 EXTERNAL NOTCH FILTER	177
LNX-6515DS-A1M w/ Mount Pipe	205	1900MHz RRH (65MHz)	177
LNX-6515DS-A1M w/ Mount Pipe	205	1900MHz RRH (65MHz)	177
ATMPP1412D-1CWA	205	1900MHz RRH (65MHz)	177
ATMPP1412D-1CWA	205	800MHZ RRH	177
ATMPP1412D-1CWA	205	800MHZ RRH	177
ATSBT-TOP-MF-4G	205	800MHZ RRH	177
ATSBT-TOP-MF-4G	205	(3) ACU-A20-N	177
ATSBT-TOP-MF-4G	205	(3) ACU-A20-N	177
8-ft Ladder	205	(3) ACU-A20-N	177
Platform Mount [LP 601-1]	205	2.375" OD x 6' Mount Pipe	177
AM-X-CD-16-65-00T-RET w/ Mount Pipe	193	2.375" OD x 6' Mount Pipe	177
		2.375" OD x 6' Mount Pipe	177
AM-X-CD-16-65-00T-RET w/ Mount Pipe	193	Side Arm Mount [SO 102-3]	177
		APXVSPP18-C-A20 w/ Mount Pipe	175
AM-X-CD-16-65-00T-RET w/ Mount Pipe	193	APXVSPP18-C-A20 w/ Mount Pipe	175
		APXVSPP18-C-A20 w/ Mount Pipe	175
OPA-65R-LCUU-H6 w/ Mount Pipe	193	APXVTM14-C-120 w/ Mount Pipe	175
OPA-65R-LCUU-H6 w/ Mount Pipe	193	APXVTM14-C-120 w/ Mount Pipe	175
OPA-65R-LCUU-H6 w/ Mount Pipe	193	APXVTM14-C-120 w/ Mount Pipe	175
800 10121 w/ Mount Pipe	193	TD-RRH8x20-25	175
800 10121 w/ Mount Pipe	193	TD-RRH8x20-25	175
800 10121 w/ Mount Pipe	193	TD-RRH8x20-25	175
(2) DTMABP7819VG12A	193	2.375" OD x 6' Mount Pipe	175
(2) DTMABP7819VG12A	193	2.375" OD x 6' Mount Pipe	175
(2) DTMABP7819VG12A	193	2.375" OD x 6' Mount Pipe	175
RRUS A2 MODULE	193	Platform Mount [LP 1201-1]	175
RRUS A2 MODULE	193	GPS_A	72
RRUS A2 MODULE	193	Side Arm Mount [SO 701-1]	72

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 93.00 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.00 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.00 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.0000 ft
8. TOWER RATING: 54.6%

Paul J. Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: **226 ft Monopole / NHV 109 943107**			
Project: **PJF 37517-0065 / BU 806358**			
Client: Crown Castle	Drawn by: Joey Meinerding	App'd:	
Code: TIA-222-G	Date: 08/02/17	Scale: NTS	
Path: G:\TOWER\375_Crown_Castle\2017\37517-0065_806358_NHV_109 943107\37517-0065.002.7805_SA_1437208\37517-0065.002.7805.eri		Dwg No. E-1	

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *806358*
Site Name: *NHV 109 943107*
App #:

Pole Manufacturer:	*Other*

Anchor Rod Data		
Qty:	28	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	84	in

Plate Data		
Diam:	90	in
Thick:	2.5	in
Grade:	60	ksi
Single-Rod B-eff:	8.44	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Groove	
Groove Depth:	0.5	in **
Groove Angle:	45	degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:	0.5	in
Width:	6	in
Height:	18	in
Thick:	1	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	74.5	in
Thick:	0.5625	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Reactions		
Mu:	7328	ft-kips
Axial, Pu:	110	kips
Shear, Vu:	45	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

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

Anchor Rod Results

		Stiffened
Max Rod (Cu+ Vu/ή):	156.7 Kips	AISC LRFD
Allowable Axial, Φ*Fu*Anet:	260.0 Kips	φ*Tn
Anchor Rod Stress Ratio:	60.3% **Pass**	

Base Plate Results Flexural Check

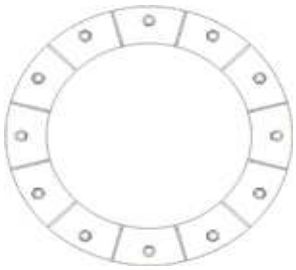
		Stiffened
Base Plate Stress:	20.2 ksi	AISC LRFD
Allowable Plate Stress:	54.0 ksi	φ*Fy
Base Plate Stress Ratio:	37.3% **Pass**	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	40.6% **Pass**
Vertical Weld:	26.7% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	10.0% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2	41.4% **Pass**
Plate Comp. (AISC Bracket):	42.4% **Pass**

Pole Results

Pole Punching Shear Check:	7.1% **Pass**



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

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

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

Job Number: 37517-0065.002.7805
Site Number: 806358
Site Name: NHV 109 943107

By: JWM
Date: 8/2/2017

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

Factored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, Mu =	7328.0		k-ft
Shear, Vu =	45.0		kips
Axial Load, Pu1 =	110.0		kips (from 1.2D + 1.6W)*
Axial Load, Pu2 =	82.5	0.0	kips (from 0.9D + 1.6W)**
OTMu =	7373.0	0.0	k-ft @ Ground

***Axial Load, Pu1 will be used for Soil Compression Analysis.**
****Axial Load, Pu2 will be used for Steel Analysis.**

Safety Factors / Load Factors / Φ Factors

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

Drilled Pier Parameters

Diameter =	9 ft
Height Above Grade =	1 ft
Depth Below Grade =	36 ft
fc' =	4 ksi
εc =	0.003 in/in
L / D Ratio =	4.11
Mat Ftdn. Cap Width =	ft
Mat Ftdn. Cap Length =	ft
Depth Below Grade =	ft

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

Load Combinations Checked per TIA-222-G

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

Steel Parameters

Number of Bars =	40
Rebar Size =	#11
Rebar Fy =	60 ksi
Rebar MOE =	29000 ksi
Tie Size =	#5
Side Clear Cover to Ties =	4 in

Soil Parameters

Water Table Depth =	99.00 ft
Depth to Ignore Soil =	4.50 ft
Depth to Full Cohesion =	0 ft
Full Cohesion Starts at?*	Ground

Above Full Cohesion Lateral Resistance = 4(Cohesion)(Dia)(H)
Below Full Cohesion Lateral Resistance = 8(Cohesion)(Dia)(H)

Direct Embed Pole Shaft Parameters

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

Maximum Capacity Ratios

Maximum Soil Ratio =	110.0%
Maximum Steel Ratio =	105.0%

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

Define Soil Layers

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

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	4	100	0	28	Sand				4
2	5	110	0	35	Sand				9
3	5	120	0	40	Sand				14
4	5	125	0	40	Sand				19
5	20	130	0	40	Sand	10000			39
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	26.54 ft, from Grade	Shear, Vu =	45.00 kips
Bending Moment, Mu =	8567.38 k-ft, from COR	Resisting Shear, ΦVn =	236.49 kips
Resisting Moment, ΦMn =	45023.61 k-ft, from COR		

MOMENT RATIO = 19.0% OK **SHEAR RATIO = 19.0% OK**

Soil Results: Uplift

Uplift, Tu =	0.00 kips
Uplift Capacity, ΦTn =	317.77 kips

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

Compression, Cu =	110.00 kips
Comp. Capacity, ΦCn =	388.19 kips

COMPRESSION RATIO = 28.3% OK

Steel Results (ACI 318-05):

Minimum Steel Area =	30.54 sq in	Axial Load, Pu =	157.65 kips @ 7.75 ft Below Grade
Actual Steel Area =	62.40 sq in	Moment, Mu =	7678.63 k-ft @ 7.75 ft Below Grade
		Moment, ΦMn =	13210.48 k-ft
Axial, ΦPn (min) =	-3369.60 kips, Where ΦMn = 0 k-ft		
Axial, ΦPn (max) =	18033.00 kips, Where ΦMn = 0 k-ft	**MOMENT RATIO =**	**58.1% OK**

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

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

Site Data

BU#: *806358*
Site Name: *NHV 109 943107*
App #:

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

Pier Properties

Concrete:

Pier Diameter =	9.0	ft
Concrete Area =	9160.9	in^2

Reinforcement:

Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	8.11	ft
Vert. Cage Diameter =	97.34	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	40	
As Total=	62.4	in^2
A s/ Aconc, Rho:	0.0068	0.68%

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

(3)*(Sqrt(f'c)/Fy:	0.0032
200 / Fy:	0.0033

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.68%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	18033.00	kips
at Mu=(ϕ=0.65)Mn=	14169.12	ft-kips
Max Tu, (φ=0.9) Tn =	3369.6	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	G	
Max. Factored Shaft Mu:	7678.63	ft-kips **(* Note)**
Max. Factored Shaft Pu:	157.65	kips
Max Axial Force Type:	Comp.	

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

Load Factor	Shaft Factored Loads		
1.00	Mu:	7678.63	ft-kips
1.00	Pu:	157.65	kips

Material Properties

Concrete Comp. strength, f'c =	4000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	

ACI 318 Code

Select Analysis ACI Code=	2005

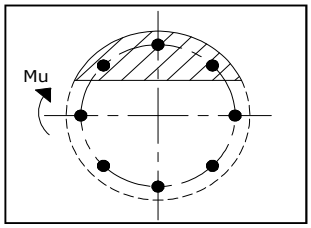
Seismic Properties

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

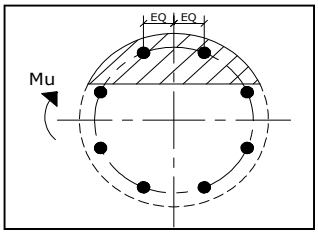
Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **1**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**16.58**	in
Extreme Steel Strain, ϵt:	**0.0156**	
	ϵt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	157.65	kips
Drilled Shaft Moment Capacity, φMn:	**13210.49**	ft-kips
Drilled Shaft Superimposed Mu:	**7678.63**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**58.1%**

EBI Consulting
environmental | engineering | due diligence

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

SPRINT Existing Facility

Site ID: CT54XC718

Middlebury-Crown
1432 Old Waterbury Road
Southbury, CT 06488

September 17, 2017

EBI Project Number: 6217004105

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	3.99 %

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

EBI Consulting
environmental | engineering | due diligence

September 17, 2017

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

Emissions Analysis for Site: **CT54XC718 – Middlebury-Crown**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **1432 Old Waterbury Road, Southbury, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed SPRINT Wireless antenna facility located at **1432 Old Waterbury Road, Southbury, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since SPRINT is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

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

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

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

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

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

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

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

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

9) The antenna mounting height centerlines of the proposed antennas are **175 feet** above ground level (AGL) for **Sector A**, **175 feet** above ground level (AGL) for **Sector B** and **175 feet** above ground level (AGL) for Sector C.

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

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

SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS APXVSPP18-C-A20	Make / Model:	RFS APXVSPP18-C-A20	Make / Model:	RFS APXVSPP18-C-A20
Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd
Height (AGL):	**175 feet**	Height (AGL):	**175 feet**	Height (AGL):	**175 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	10	Channel Count	10	Channel Count	10
Total TX Power(W):	220 Watts	Total TX Power(W):	220 Watts	Total TX Power(W):	220 Watts
ERP (W):	7,537.38	ERP (W):	7,537.38	ERP (W):	7,537.38
Antenna A1 MPE%	**1.08 %**	Antenna B1 MPE%	**1.08 %**	Antenna C1 MPE%	**1.08 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVTM14-C-120	Make / Model:	RFS APXVTM14-C-120	Make / Model:	RFS APXVTM14-C-120
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	**175 feet**	Height (AGL):	**175 feet**	Height (AGL):	**175 feet**
Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts
ERP (W):	6,224.72	ERP (W):	6,224.72	ERP (W):	6,224.72
Antenna A2 MPE%	**0.78 %**	Antenna B2 MPE%	**0.78 %**	Antenna C2 MPE%	**0.78 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**1.86 %**
AT&T	0.44 %
MetroPCS	0.27 %
T-Mobile	0.50 %
Verizon Wireless	0.92 %
Site Total MPE %:	**3.99 %**

SPRINT Sector A Total:	1.86 %
SPRINT Sector B Total:	1.86 %
SPRINT Sector C Total:	1.86 %
Site Total:	3.99 %

SPRINT _ Max Values per Frequency Band / Technology Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Sprint 850 MHz CDMA	1	437.55	175	0.55	850 MHz	567	0.11%
Sprint 850 MHz LTE	2	437.55	175	1.10	850 MHz	567	0.19%
Sprint 1900 MHz (PCS) CDMA	5	622.47	175	3.92	1900 MHz (PCS)	1000	0.39%
Sprint 1900 MHz (PCS) LTE	2	1,556.18	175	3.92	1900 MHz (PCS)	1000	0.39%
Sprint 2500 MHz (BRS) LTE	8	778.09	175	7.84	2500 MHz (BRS)	1000	0.78%
						Total:	**1.86%**

Summary

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

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

SPRINT Sector	Power Density Value (%)
Sector A:	1.86 %
Sector B:	1.86 %
Sector C:	1.86 %
SPRINT Maximum Total (per sector):	1.86 %
Site Total:	3.99 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **3.99 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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