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

October 27, 2017

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

RE: **Notice of Exempt Modification for Sprint 2.5 Rework Crown Site BU: 806353**
Sprint Site ID: CT03XC369
128 Mather Street, Wilton, CT 06897
Latitude: 41° 14′ 18.34″ / Longitude-73° 25′ 26.44″

Dear Ms. Bachman:

Sprint currently maintains three (3) antennas at the 143-foot level of the existing 180-foot monopole at 128 Mather Street in Wilton, CT. The tower is owned by Crown Castle. The property is owned by the Town of Wilton. Sprint intends to install three (3) antennas, three (3) RRHs, and one (1) hybrid cable.

A request for original zoning documents was sent to Town of Wilton but has not been answered.

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 Lynne Vanderslice, First-Selectman – Town of Wilton, the Planning & Zoning, as well as the property owner.

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

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

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

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

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

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

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

Sincerely,

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

Attachments:

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

cc: Ms. Lynne Vanderslice
Wilton Town Hall
238 Danbury Road
Wilton, CT 06897

Planning & Zoning
Wilton Town Hall
238 Danbury Road
Wilton, CT 06897

Town of Wilton
Finance Department
238 Danbury Road
Wilton, CT 06897

MATHER ST

Location	MATHER ST	**Mblu**	23/ / 23/ /
Acct#	5165,3335	**Owner**	WILTON TOWN OF
Assessment	$6,999,790	**Appraisal**	$9,999,700
PID	1065	**Building Count**	2

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$45,500	$9,954,200	$9,999,700
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$31,850	$6,967,940	$6,999,790

Owner of Record

Owner	WILTON TOWN OF	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	238 DANBURY RD WILTON, CT 06897	**Book & Page**	1151/0195
		Sale Date	02/02/1999
		Instrument	00

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
WILTON TOWN OF	$0		1151/0195	00	02/02/1999
	$0		0112/0179	00	05/01/1965

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	Vacant Land
Model	
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 Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Rooms:	
Bath Style:	
Kitchen Style:	
Elevator	
Fireplaces	
Sauna	
Spa/Jet Tub	
Whirlpool Tub	
Cath. Ceil	

Building Photo

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

Building Layout

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

Building 2 : Section 1

Year Built: 1988
Living Area: 1,200
Replacement Cost: $62,291
Building Percent Good: 73
Replacement Cost Less Depreciation: $45,500

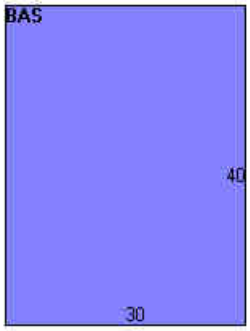
Building Attributes : Bldg 2 of 2	
Field	**Description**
STYLE	Service Shop
MODEL	Commercial
Grade	Below Average
Occupancy	1

Building Photo

(http://images.vgsi.com/photos/WiltonCTPhotos//\00\00\78/11.j

Exterior Wall 1	Pre-finsh Metl
Exterior Wall 2	
Roof Structure	Gable/Hip
Roof Cover	Enam Mtl Shing
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Dirt/None
Interior Floor 2	
Heating Fuel	None
Heating Type	None
AC Type	None
Bldg Use	Ex Com MDL-96
Fireplace	
Elevator	
Cath Ceil	
Sauna	
1st Floor Use:	21I
Heat/AC	None
Frame Type	Steel
Baths/Plumbing	None
Ceiling/Wall	Sus Ceil Min W
Rooms/Prtns	Average
Wall Height	11
% Comn Wall	0

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	1,200	1,200
		1,200	1,200

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	21V
Description	Ex Com MDL-00
Zone	R-2
Neighborhood	4000
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	74.12
Frontage	
Depth	
Assessed Value	$6,967,940
Appraised Value	$9,954,200

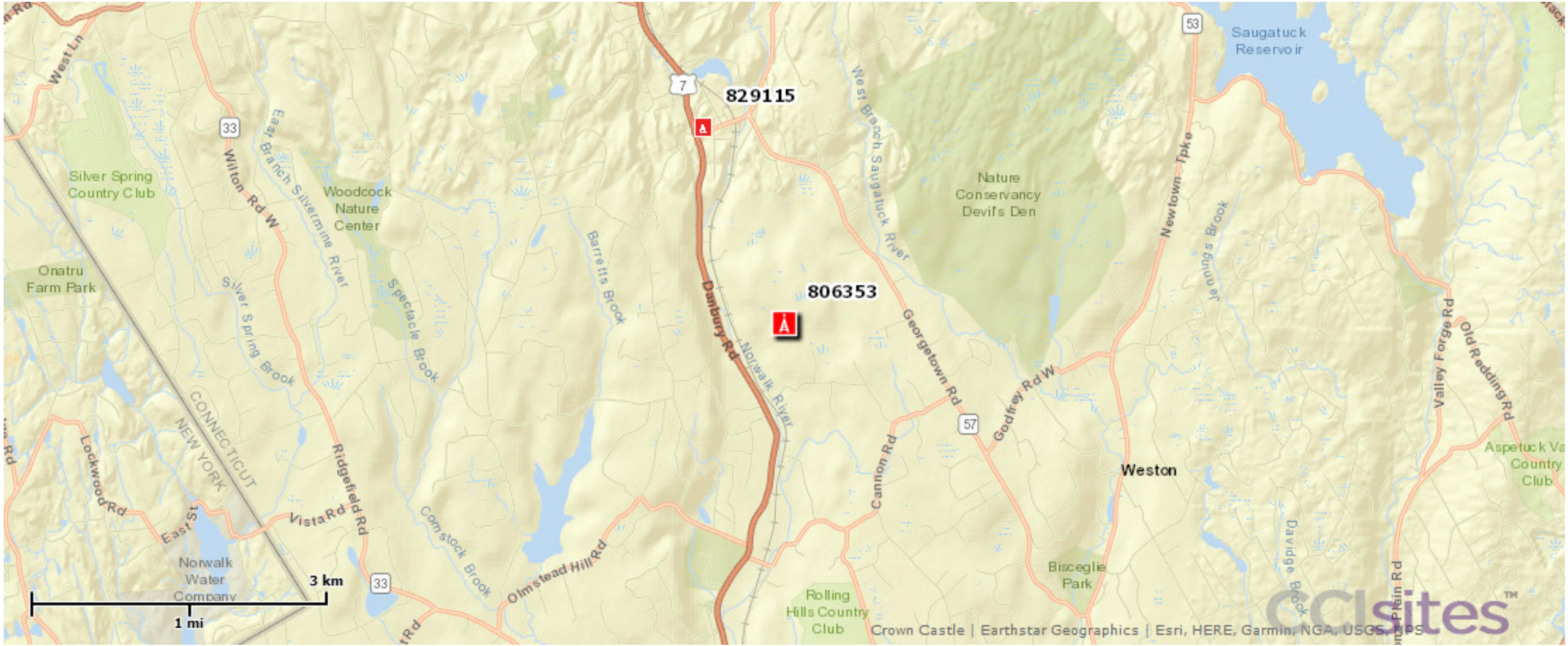
Outbuildings

Outbuildings	Legend
No Data for Outbuildings	

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$45,500	$9,954,200	$9,999,700
2014	$45,500	$9,954,200	$9,999,700
2013	$45,500	$9,954,200	$9,999,700

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$31,850	$6,967,940	$6,999,790
2014	$31,850	$6,967,940	$6,999,790
2013	$31,850	$6,967,940	$6,999,790


829115
806353
Silver Spring Country Club
Onatru Farm Park
Woodcock Nature Center
Nature Conservancy Devil's Den
Saugatuck Reservoir
Norwalk Water Company
Rolling Hills Country Club
Bisceglie Park
Weston
Aspetuck Va Country Club
Wilton Rd W
Danbury Rd
Norwalk River
West Branch Saugatuck River
East Branch Silvermine River
Silver Spring Brook
Spectacle Brook
Barretts Brook
Comstock Brook
Jennings Brook
Davidge Brook
Newtown Tpke
Georgetown Rd
Godfrey Rd W
Cannon Rd
Valley Forge Rd
Old Redding Rd
Ridgefield Rd
Vista Rd
Olmstead Hill Rd
Lockwood Rd
East St
West Ln
CONNECTICUT
NEW YORK
3 km
1 mi
Crown Castle | Earthstar Geographics | Esri, HERE, Garmin, NGA, USGS, GPS
CCIsites™

Sprint

2.5 EQUIPMENT DEPLOYMENT

CROWN ID#: 806353

CROWN SITE NAME: WILTON

SITE NUMBER:
CT03XC369
SITE NAME:
N. WILTON
SITE ADDRESS:
128 MATHER STREET
WILTON, CT 06897

APPROVED
By Jason D'Amico at 12:10 pm, Aug 02, 2017

APPROVED
By Ray Perry at 11:09 am, Sep 23, 2014

SHEET INFORMATION

SITE NUMBER:	CT03XC369
SITE NAME:	N. WILTON
SITE ADDRESS:	128 MATHER STREET WILTON, CT 06897
COUNTY:	FAIRFIELD
COORDINATES: (NAD 83)	41° 14' 18.34" N 73° 25' 26.44" W
GROUND ELEV:	415'± AMSL
STRUCTURE TYPE:	SELF SUPPORT TOWER
STRUCTURE HEIGHT:	180'-0"± AGL
STRUCTURE RAD CENTER:	143'-0"± AGL
ZONING CLASSIFICATION:	R-2
MAP-BLOCK-LOT:	23//23//

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:	GARY WOOD (860) 940-9168 gary.wood@sprint.com
CROWN CM:	JASON D'AMICO (860) 209-0104 jason.d'amico@crowncastle.com
AAV:	AT&T

VICINITY MAP (NOT TO SCALE)

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 5/8" FIBER CABLE.
5. (3) NEW FIBER JUMPERS.

AERIAL VIEW (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

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
6580 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.CT03XC369

NO	DATE	DESCRIPTION	BY
0	06/18/14	FOR COMMENT	JT
1	09/22/14	FOR CONSTRUCTION	MP

DATE	REVIEWED BY
9/22/14	JMQ

SEAL

STATE OF CONNECTICUT
MANOJ KUMAR PATEL
No. 22038
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC369
SITE NAME:
N. WILTON
SITE ADDRESS:
128 MATHER STREET
WILTON, CT 06897

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._1572011104218554 92.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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6580 SPRINT PARKWAY
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SUBMITTALS

PROJECT NO: 7225.CT03XC369

NO	DATE	DESCRIPTION	BY
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1	09/22/14	FOR CONSTRUCTION	MP

DATE	REVIEWED BY
9/22/14	JMQ

SEAL

STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 22033
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC369

SITE NAME:
N. WILTON

SITE ADDRESS:
128 MATHER STREET
WILTON, CT 06897

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—	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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SEAL

STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 22036
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC369

SITE NAME:
N. WILTON

SITE ADDRESS:
128 MATHER STREET
WILTON, CT 06897

SHEET TITLE:
GENERAL NOTES

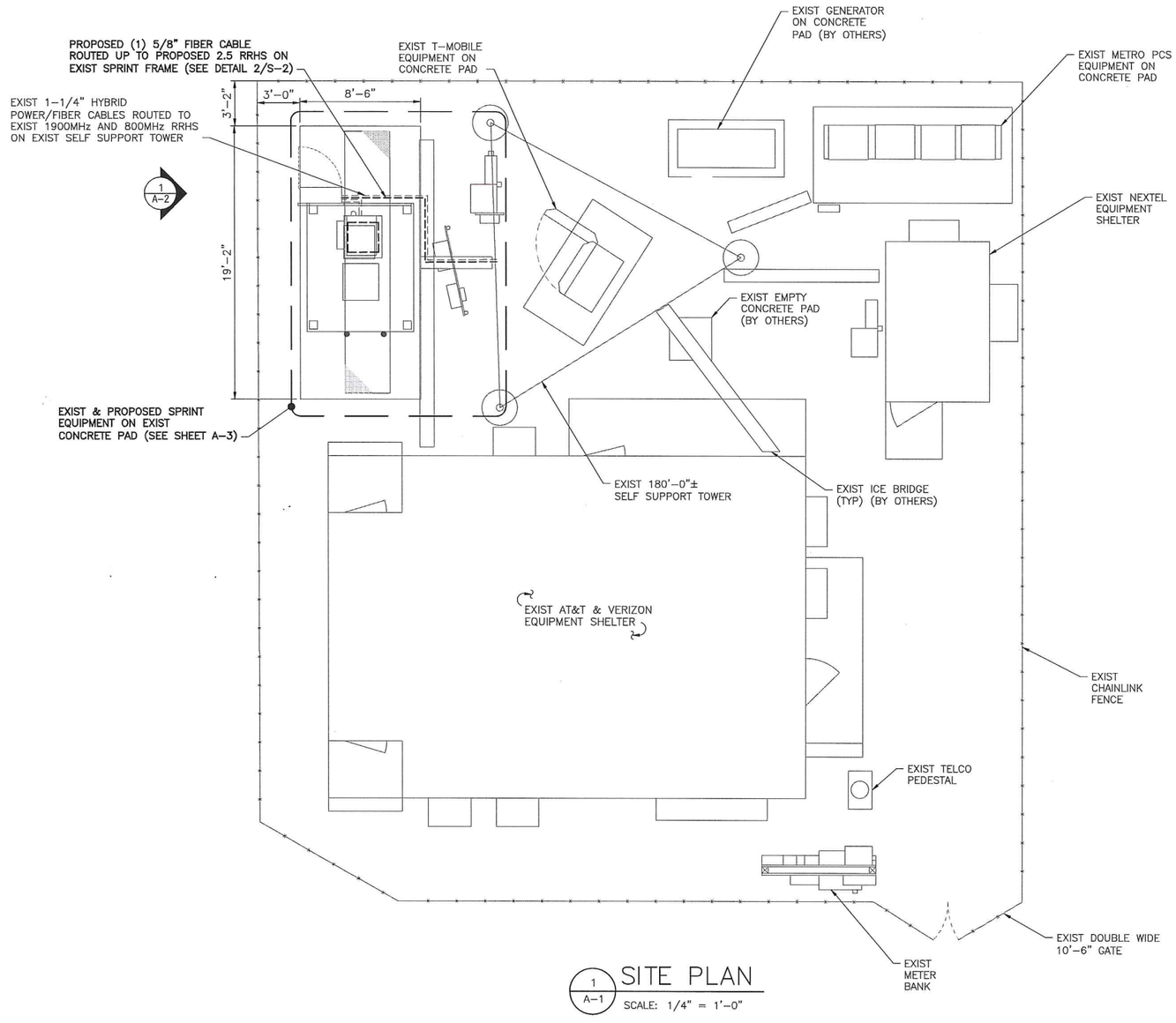
SHEET NO:
SP—2

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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9/22/14	JMC

SEAL

STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 22033
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC369

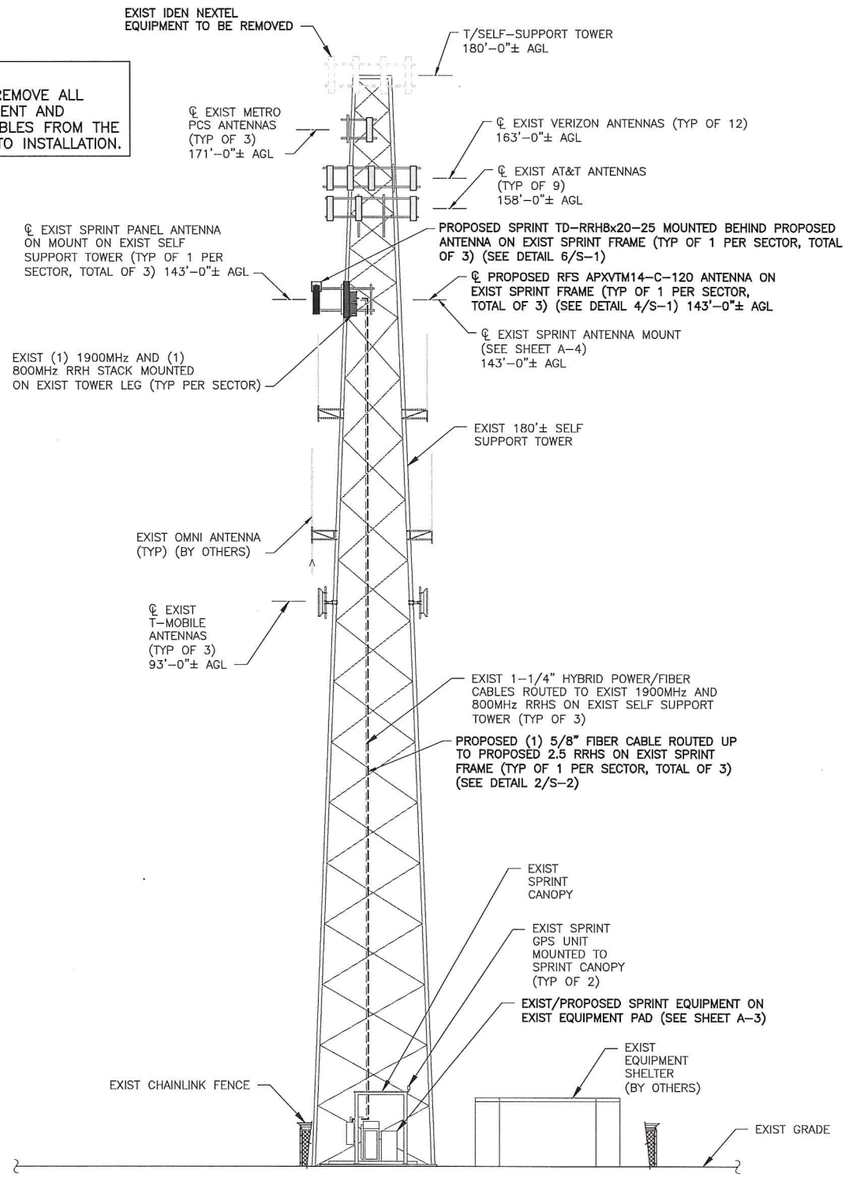
SITE NAME:
N. WILTON

SITE ADDRESS:
128 MATHER STREET
WILTON, CT 06897

SHEET TITLE:
SITE PLAN

SHEET NO:
A-1

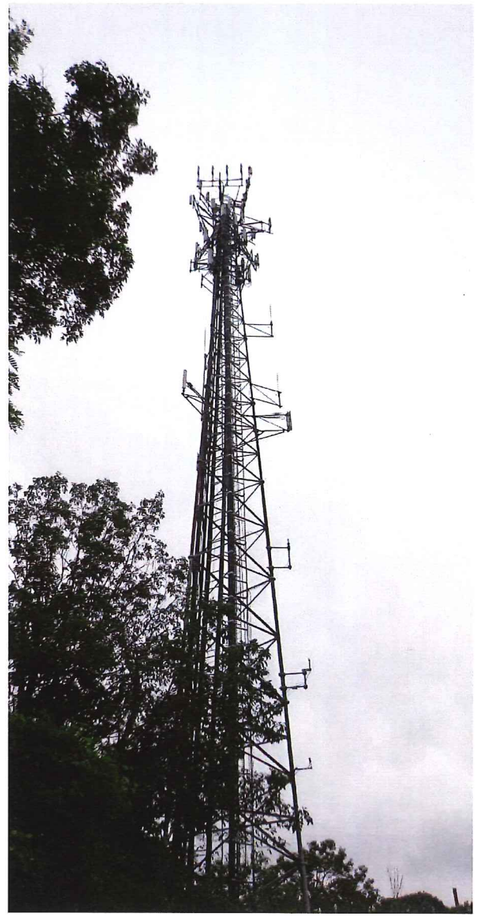
NOTE:
SPRINT MUST REMOVE ALL NEXTEL EQUIPMENT AND ASSOCIATED CABLES FROM THE TOWER PRIOR TO INSTALLATION.



1/A-2 ELEVATION
SCALE: 3/32" = 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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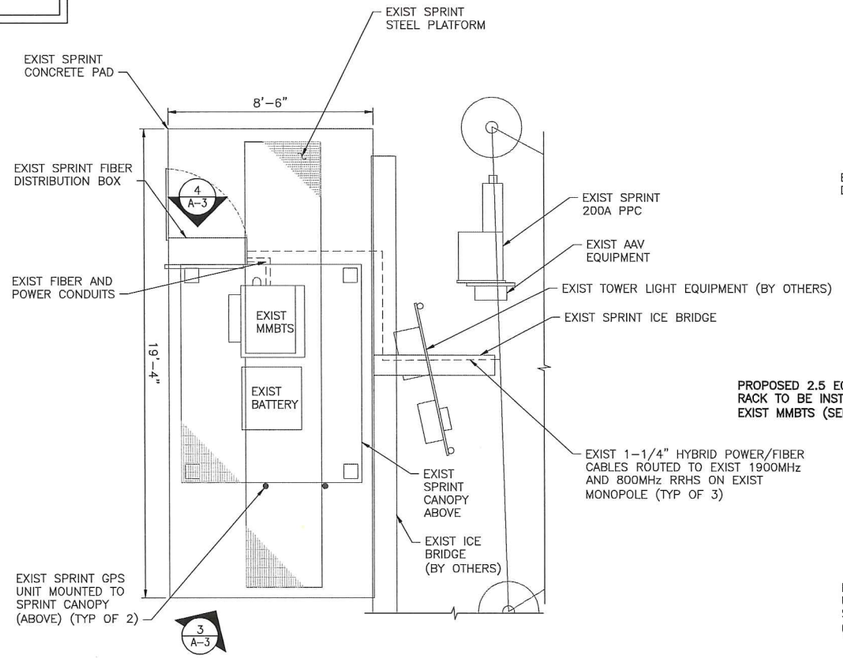
SHEET TITLE:
ELEVATION

SHEET NO:
A-2

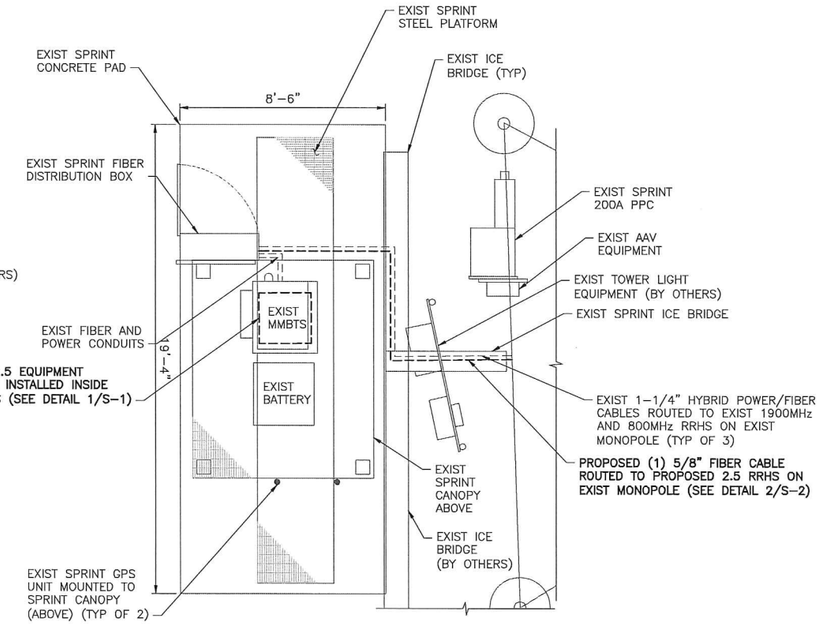
NORTH NOTE:

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



1 A-3 ENLARGED EQUIPMENT LAYOUT PLAN (EXIST)

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



2 A-3 ENLARGED EQUIPMENT LAYOUT PLAN (FINAL)

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

3 A-3 EXIST EQUIPMENT PAD

SCALE: NTS

4 A-3 EXIST FIBER DISTRIBUTION BOX

SCALE: NTS

Sprint

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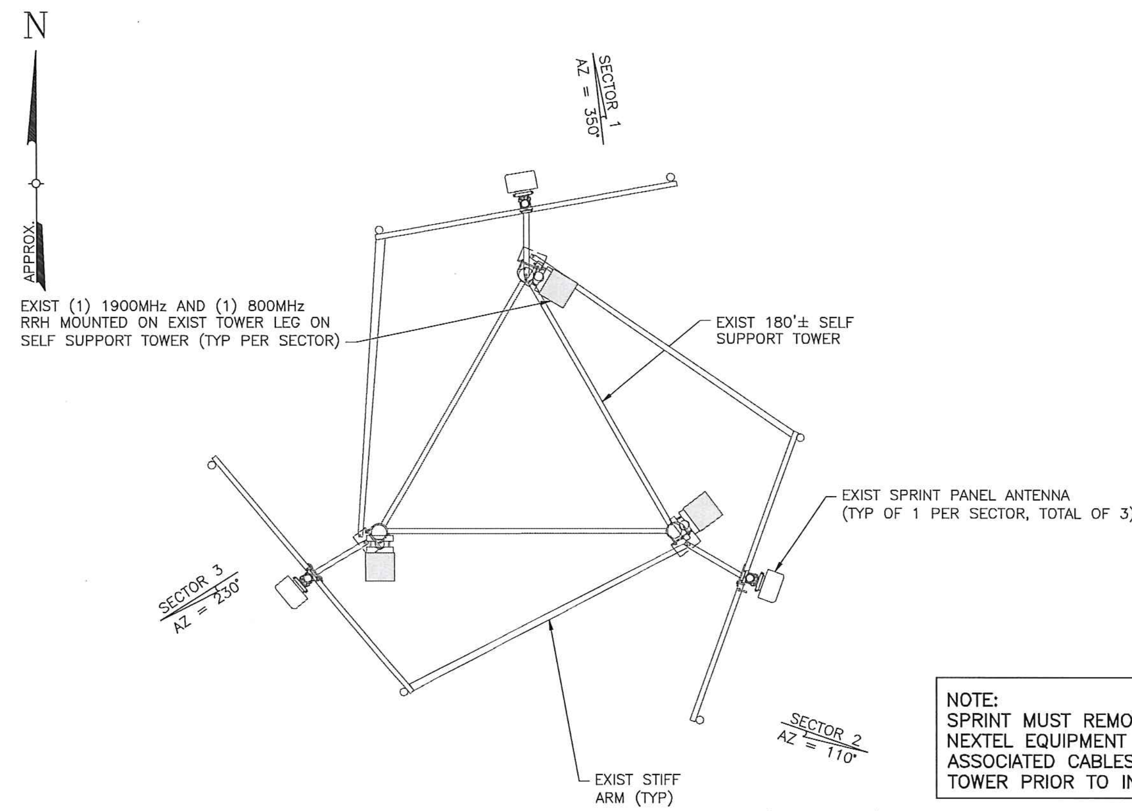
CT03XC369

SITE NAME:
N. WILTON

SITE ADDRESS:
128 MATHER STREET
WILTON, CT 06897

SHEET TITLE:
ENLARGED EQUIPMENT LAYOUT PLANS

SHEET NO:
A-3



NOTE:
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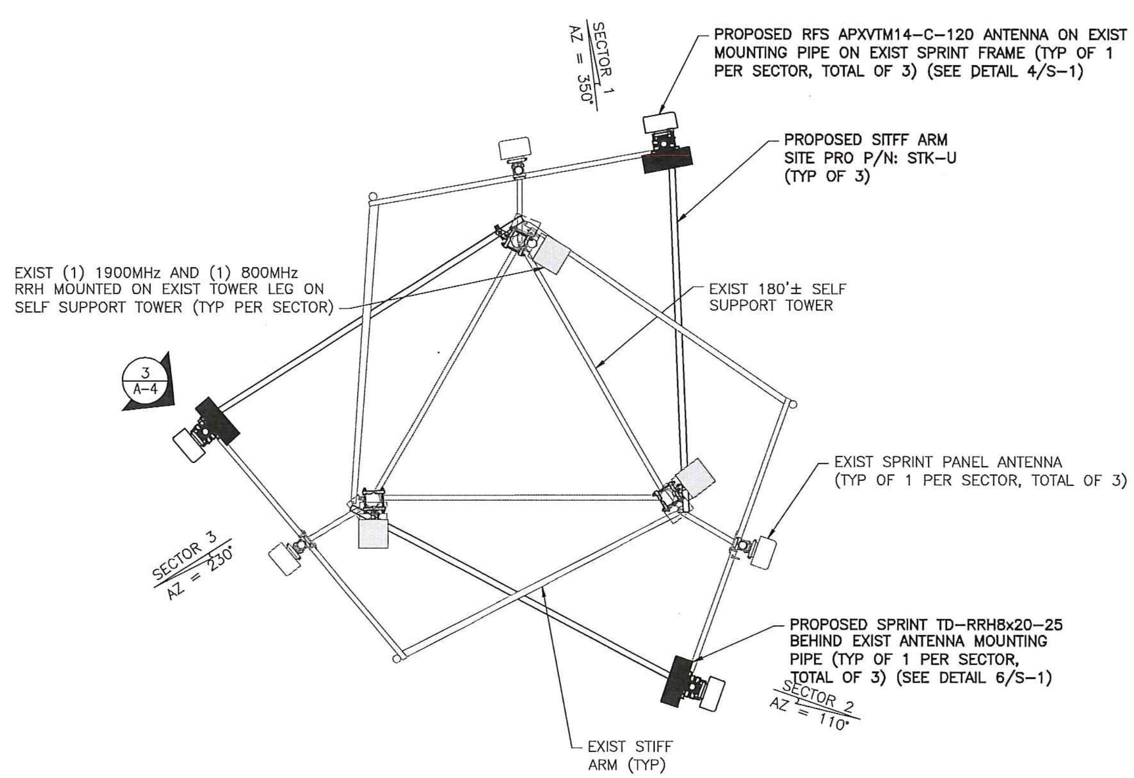
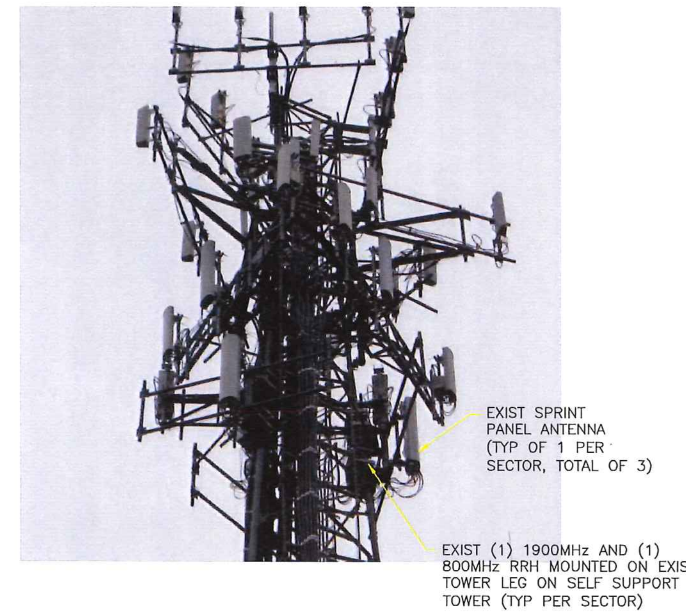
1 / A-4 ANTENNA LAYOUT PLAN (EXIST)
SCALE: 3/8" = 1'-0"



2 / A-4 ANTENNA LAYOUT PLAN (FINAL)
SCALE: 3/8" = 1'-0"



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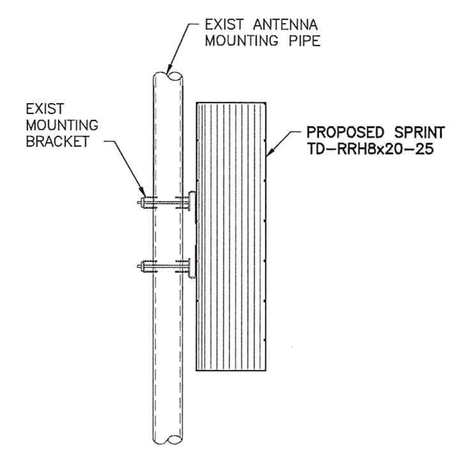

3 / A-4 RRH MOUNTING DETAIL
SCALE: 1 1/2" = 1'-0"

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	143'	143'
Antenna Azimuth	350/110/230	350/110/230
Antenna RRH Model Number	1900MHz/800MHz RRHS	TD-RRH8x20-25
Number of RRH	6	3

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STATE OF CONNECTICUT · MANOJKUMAR PATEL · No. 22030 · LICENSED PROFESSIONAL ENGINEER

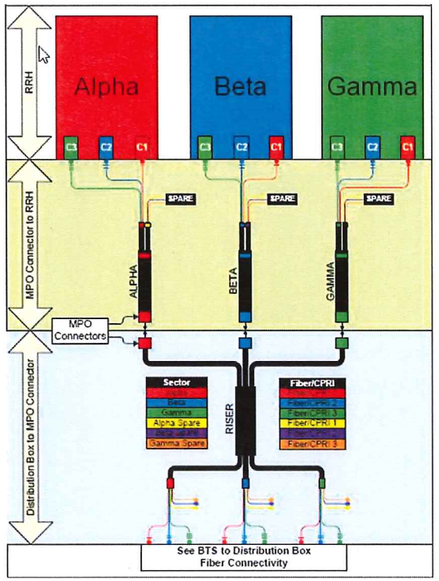
SITE NUMBER:
CT03XC369

SITE NAME:
N. WILTON

SITE ADDRESS:
128 MATHER STREET
WILTON, CT 06897

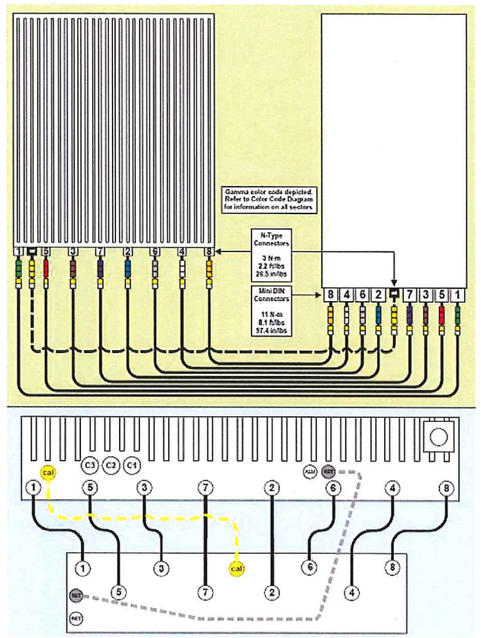
SHEET TITLE:
ANTENNA LAYOUT PLANS

SHEET NO:
A-4



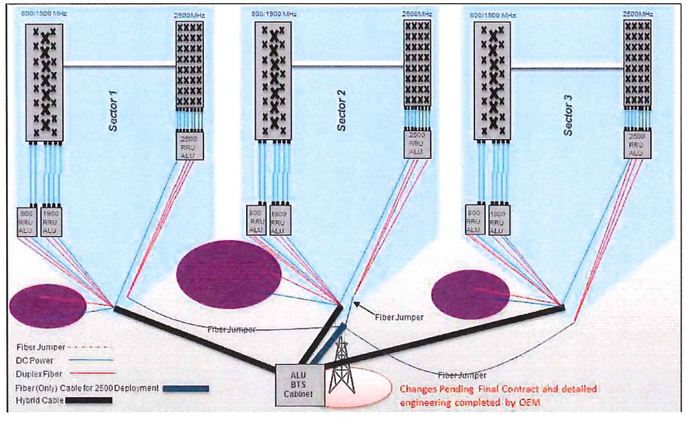
1 / A–5 2.5 CABLE COLOR CODING

SCALE: N.T.S.



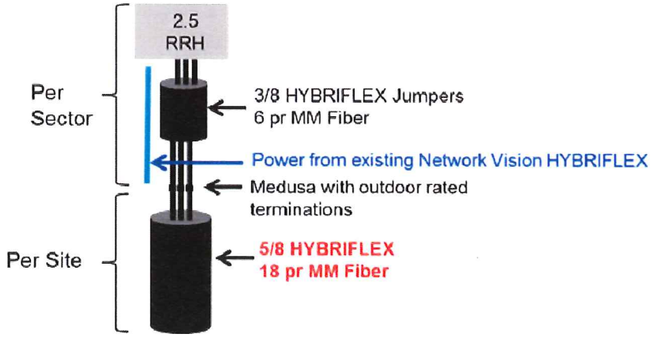
2 / A–5 RRH CONNECTIVITY

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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Fax: (845) 567–8703
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SUBMITTALS

PROJECT NO: 7225.CT03XC369

NO	DATE	DESCRIPTION	BY
0	06/18/14	FOR COMMENT	JT
1	09/22/14	FOR CONSTRUCTION	MP

DATE	REVIEWED BY
9/23/14	JMQ

SEAL
STATE OF CONNECTICUT
ANANDKUMAR KARUPPIAH
No. 22033
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC369

SITE NAME:
N. WILTON

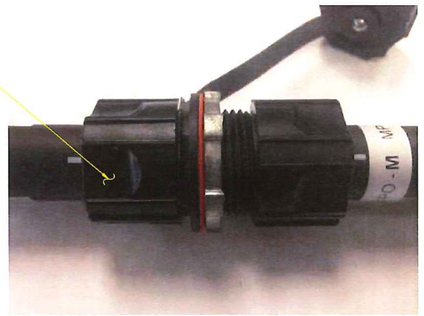
SITE ADDRESS:
128 MATHER STREET
WILTON, CT 06897

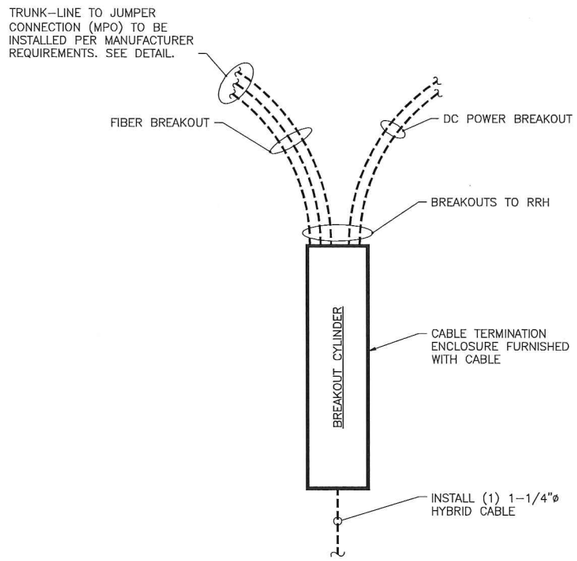
SHEET TITLE:
RAN WIRING DIAGRAM

SHEET NO:
A–5

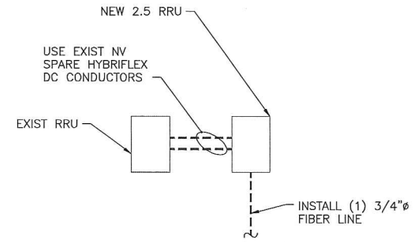
IMPORTANT!! LINE UP WHITE MARKINGS ON JUMPER AND RISER IP-MPO CONNECTOR. PUSH THE WHITE MARK ON THE JUMPER CONNECTOR FLUSH AGAINST THE RED SEAL ON THE RISER CONNECTION

IMPORTANT!! ROTATE THE BAYONET HOUSING CLOCKWISE UNTIL A CLICK SOUND IS HEARD TO ENSURE A GOOD CONNECTION





2.5 HYBRID CABLE W/FIBER & DC FEEDERS



FIBER ONLY TRUNK LINES

1 / A-6 HYBRIFLEX RISER/JUMPER CONNECTION DETAILS

SCALE: N.T.S.

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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SUBMITTALS

PROJECT NO: 7225.CT03XC369

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0	06/18/14	FOR COMMENT	JT
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9/22/14	JMQ

SEAL

STATE OF CONNECTICUT
JOSEPH M. QUINN
No. 22039
LICENSED PROFESSIONAL ENGINEER

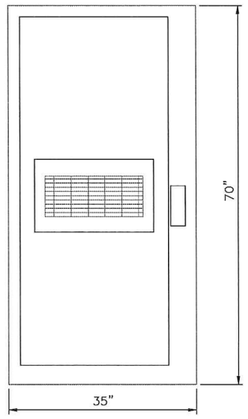
SITE NUMBER:
CT03XC369

SITE NAME:
N. WILTON

SITE ADDRESS:
128 MATHER STREET
WILTON, CT 06897

SHEET TITLE:
CABLE DETAILS

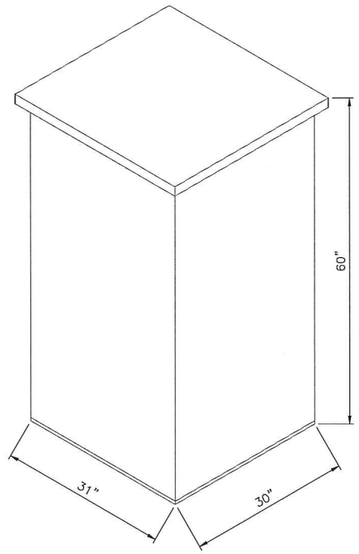
SHEET NO:
A-6



CABINET FRONT 9928 MMBTS MODULAR CELL
SPECIFICATIONS:
HEIGHT: 70" WIDTH: 35" DEPTH: 37.8" WEIGHT: 1090 LBS.

1 S-1 (EXIST) MMBTS CABINET

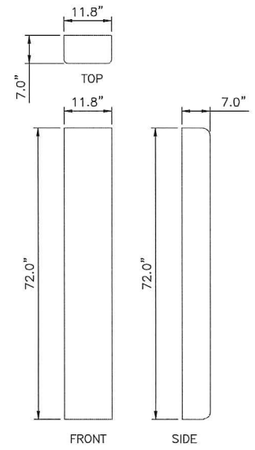
SCALE: 1" = 1'-0"



ANDREW 60ECv2
SPECIFICATIONS:
HEIGHT: 60" WIDTH: 31" DEPTH: 30" WEIGHT: 2430 LBS.

2 S-1 (EXIST) BATTERY CABINET

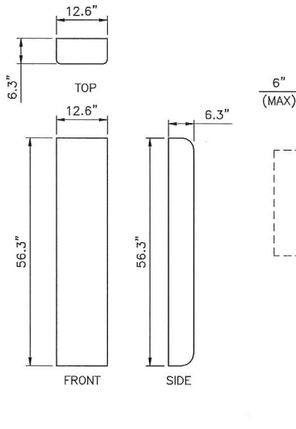
SCALE: 1" = 1'-0"



APXVSPP18-C-A20

3 S-1 (EXIST) ANTENNA DETAILS

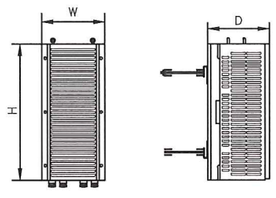
SCALE: 3/4"=1'-0"



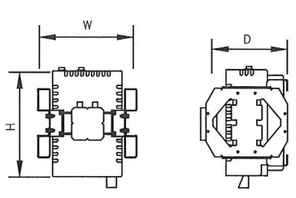
APXVTM14-C-120

4 S-1 (PROPOSED) ANTENNA DETAIL

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



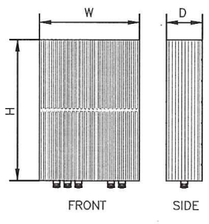
TYPE: 1900 MHz 4x45W MODEL #: RRH 1900 4X45 65MHz HEIGHT: 25.0" WIDTH: 11.1" DEPTH: 11.4" WEIGHT: ±60 LBS.



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 1/2"=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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2.5 EQUIPMENT DEPLOYMENT
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SUBMITTALS

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DATE	REVIEWED BY
9/22/14	TMQ

SEAL

STATE OF CONNECTICUT
MANOJ KUMAR QUINTYNE
No. 22038
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC369

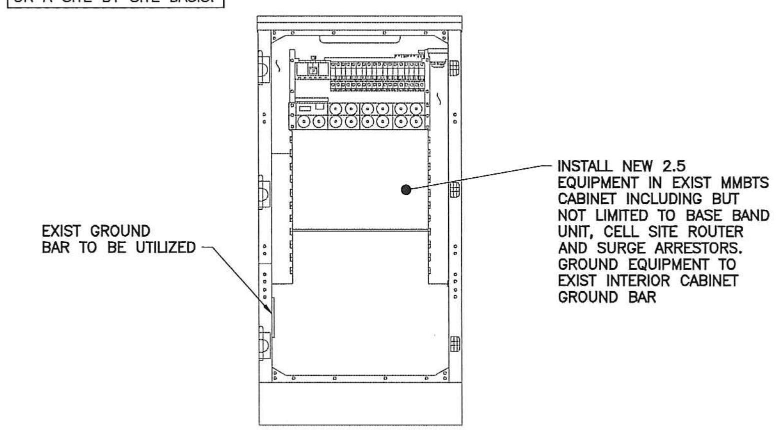
SITE NAME:
N. WILTON

SITE ADDRESS:
128 MATHER STREET
WILTON, CT 06897

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.

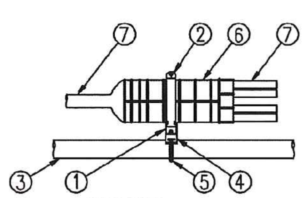


FRONT ELEVATION
(CABINET INTERIOR)

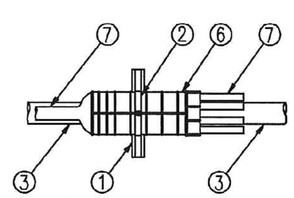
1/S-2 MMBTS INTERIOR DETAIL

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.



SIDE VIEW



TOP VIEW

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

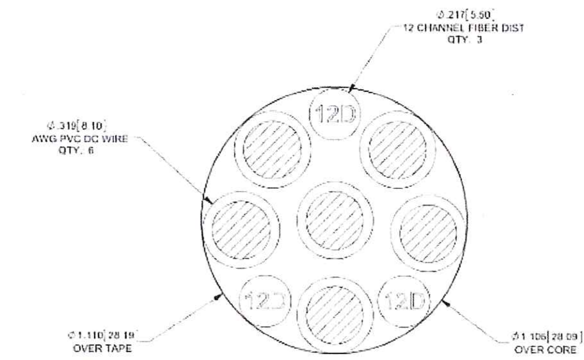
8 AWG Power	**Hybrid Jumper cable** MN: HBF058-08U1M3-5F1 5 ft, 1x 8 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC Connectors, 5/8 cable	5 ft
	MN: HBF058-08U1M3-10F1	10 ft
	MN: HBF058-08U1M3-15F1	15 ft
	MN: HBF058-08U1M3-20F1	20 ft
	MN: HBF058-08U1M3-25F1	25 ft
	MN: HBF058-08U1M3-30F1	30 ft

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

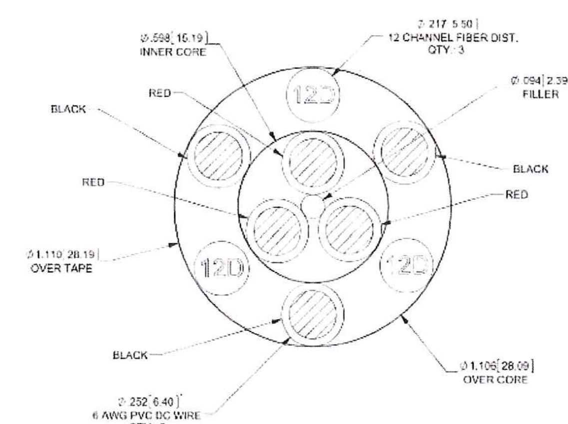
4 AWG Power	**Hybrid Jumper cable** MN: HBF078-21U1M3-5F1 5 ft, 1x 4 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC Connectors, 7/8 cable	5 ft
	MN: HBF078-21U1M3-10F1	10 ft
	MN: HBF078-21U1M3-15F1	15 ft
	MN: HBF078-21U1M3-20F1	20 ft
	MN: HBF078-21U1M3-25F1	25 ft
	MN: HBF078-21U1M3-30F1	30 ft

HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE

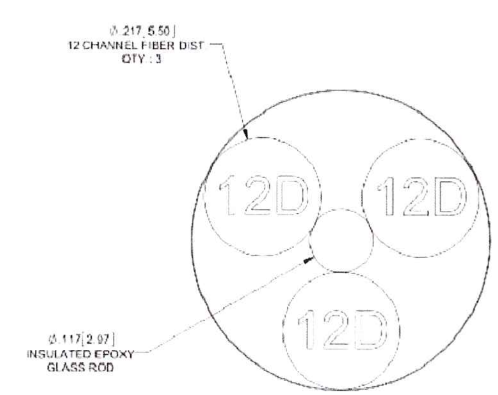
MANUF:	RFS		
CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
FIBER ONLY	VARIES	USE NV HYBRIFLEX	7/8"
HYBRIFLEX	<200'	8 AWG	1-1/4"
HYBRIFLEX	225-300'	6 AWG	1-1/4"
HYBRIFLEX	325-375'	4 AWG	1-1/4"



4 AWG



8 AWG & 6 AWG



FIBER ONLY

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

SCALE: NTS

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9/22/14	JMA

SEAL
STATE OF CONNECTICUT
LICENSED PROFESSIONAL ENGINEER
No. 23030

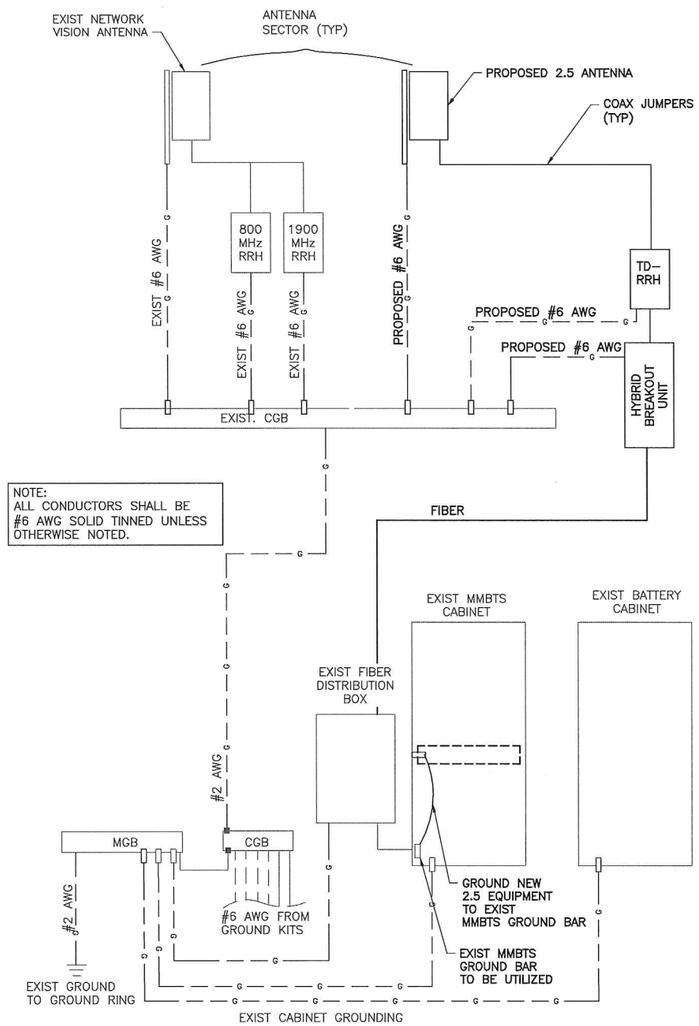
SITE NUMBER:
CT03XC369

SITE NAME:
N. WILTON

SITE ADDRESS:
128 MATHER STREET
WILTON, CT 06897

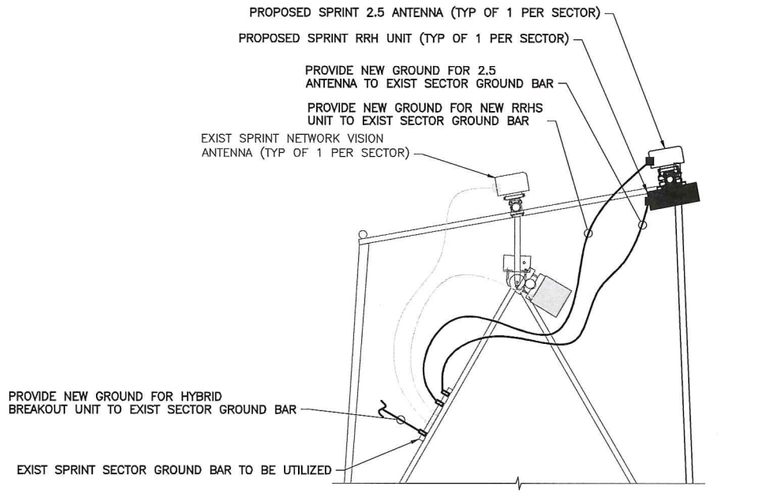
SHEET TITLE:
EQUIPMENT SCHEMATIC DETAILS

SHEET NO:
S–2



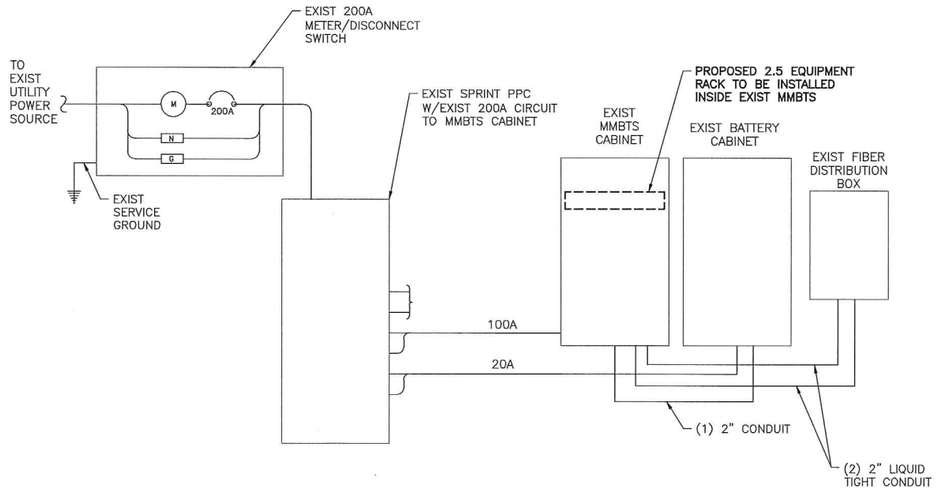
1 / E-1 TYPICAL GROUNDING ONE LINE DIAGRAM

SCALE: NTS



2 / E-1 TYPICAL ANTENNA GROUNDING PLAN

SCALE: NTS



3 / E-1 TYPICAL ELECTRICAL & TELCO PLAN

SCALE: NTS

Sprint

2.5 EQUIPMENT DEPLOYMENT
6580 SPRINT PARKWAY
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9/22/14	JMA

SEAL

STATE OF CONNECTICUT — JOSHUA M. ANDERSON — No. 22038 — LICENSED PROFESSIONAL ENGINEER

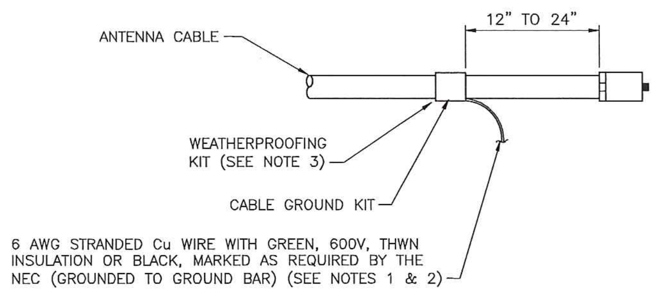
SITE NUMBER:
CT03XC369

SITE NAME:
N. WILTON

SITE ADDRESS:
128 MATHER STREET
WILTON, CT 06897

SHEET TITLE:
ELECTRICAL & GROUNDING PLANS

SHEET NO:
E-1



CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

NOTES:

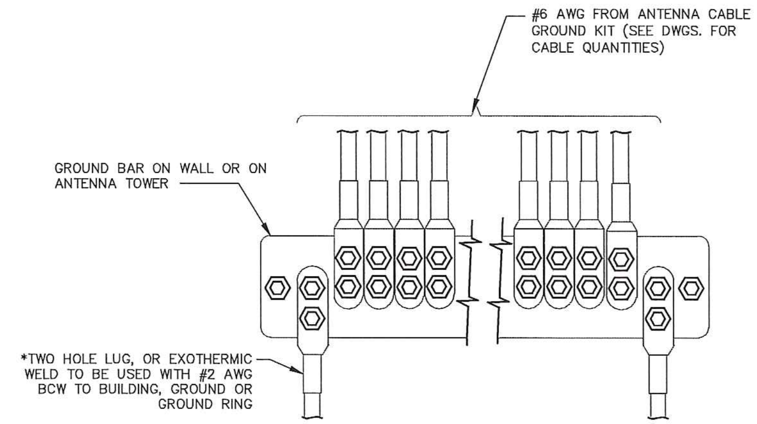
DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

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.



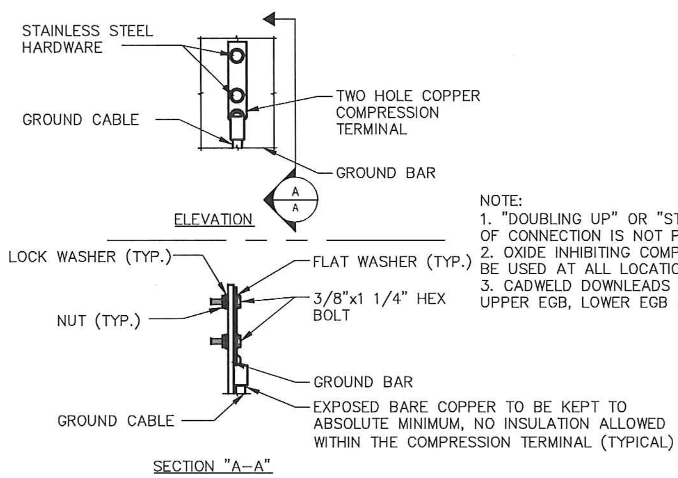
* – GROUND BARS AT THE BOTTOM OF TOWERS/MONOPOLES SHALL ONLY USE EXOTHERMIC WELDS.

– 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

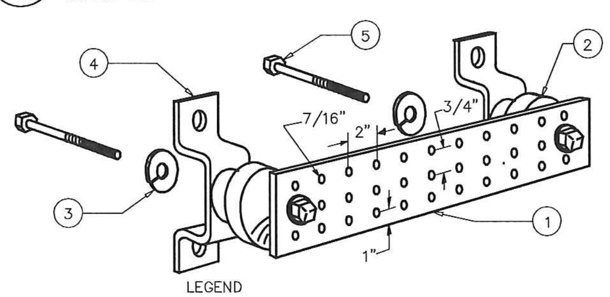
SCALE: NTS



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.

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

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
6580 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.CT03XC369

NO	DATE	DESCRIPTION	BY
0	06/18/14	FOR COMMENT	JT
1	09/22/14	FOR CONSTRUCTION	MP

DATE	REVIEWED BY
9/22/14	JMQ

SEAL

STATE OF CONNECTICUT · No. 22030 · LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC369

SITE NAME:
N. WILTON

SITE ADDRESS:
128 MATHER STREET
WILTON, CT 06897

SHEET TITLE:
GROUNDING DETAILS & NOTES

SHEET NO:
E-2

Date: **July 28, 2017**

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

Destek Engineering, LLC
1281 Kennestone Circle, Suite 100
Marietta, GA 30066
(770) 693-0835

Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT03XC369
	Carrier Site Name:	CT03XC369
Crown Castle Designation:	**Crown Castle BU Number:**	806353
	Crown Castle Site Name:	BRG 124 943066
	Crown Castle JDE Job Number:	450664
	Crown Castle Work Order Number:	1436100
	Crown Castle Application Number:	399311 Rev. 0
Engineering Firm Designation:	**Destek Engineering, LLC Project Number:**	1702063
Site Data:	**128 MATHER STREET, WILTON, Fairfield County, CT**	
	Latitude *41° 14' 18.34"*, Longitude *-73° 25' 26.44"*	
	180 Foot - Self Support Tower	

Dear Marianne Dunst,

Destek Engineering, LLC 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 1063386, in accordance with application 399311, revision 0.

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

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

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 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 TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B and Risk Category II were used in this analysis.

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

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

Structural analysis prepared by: Wade Baxter, EIT

Respectfully submitted by: 07/28/2017

STATE OF CONNECTICUT
AHMET COLAKOGLU
PEN. 27057
LICENSED
PROFESSIONAL ENGINEER

Ahmet Colakoglu, PE
President

tnxTower Report - version 7.0.6.2

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 180 ft Self Support tower designed by FWT INC. in May of 1988. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-E.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 93 mph with no ice, 50 mph with 0.75 inch ice thickness and 60 mph under service loads, exposure category B with topographic category 1 and crest height of 0 feet.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
143.0	143.0	3	Tower Mounts	Tieback Arm	1	1-1/4	-
		3	alcatel lucent	TD-RRH8x20-25			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
178.0	184.0	1	rfs celwave	PD10017	2	7/8	1
170.0	171.0	3	kathrein	800 10504 w/ Mount Pipe	6 1	1-5/8 1/4	1
		3	kathrein	860 10025			
	170.0	1	tower mounts	Side Arm Mount [SO 103-3]			
164.0	164.0	1	tower mounts	Sector Mount [SM 702-3]	6	1-5/8	1
	163.0	3	alcatel lucent	RRH4X45-AWS4 B66	7	1-5/8	2
		3	commscope	LNX-6512DS-VTM w/ Mount Pipe			
		3	kathrein	742 213 w/ Mount Pipe			
		6	rfs celwave	APL868013-42T0 w/ Mount Pipe	-	-	1
		1	rfs celwave	DB-T1-6Z-8AB-0Z			2
		3	rymsa wireless	MG D3-800Tx w/ Mount Pipe			1
	162.0	6	rfs celwave	FD9R6004/2C-3L			
154.0	158.0	6	ericsson	RRUS-11	12 2 1	1-5/8 5/8 3/8	1
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		6	powerwave technologies	LGP21901			
		3	powerwave technologies	P65-16-XLH-RR w/ Mount Pipe			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
	154.0	1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Sector Mount [SM 602-3]			
146.0	146.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER	-	-	1
		3	alcatel lucent	TME-800MHZ 2X50W RRH			
	143.0	3	alcatel lucent	PCS 1900 MHz 4x45W-65MHz			
143.0	143.0	9	rfs celwave	ACU-A20-N	3	1-1/4	1
		3	rfs celwave	APXVSPP18-C-A20			
		1	tower mounts	Sector Mount [SM 701-3]			
124.0	131.0	2	rfs celwave	1142-2C	2	1/2	1
	124.0	2	tower mounts	Side Arm Mount [SO 302-1]			
104.0	111.0	1	rfs celwave	1142-2C	1 1	1/2 7/8	1
	108.0	1	rfs celwave	220-3BN			
	104.0	2	tower mounts	Side Arm Mount [SO 302-1]			
93.0	93.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe	13	1-1/4	1
		3	ericsson	ERICSSON AIR 21 B2A B4P			
		3	ericsson	ERICSSON AIR 21 B4A B2P			
		3	ericsson	KRY 112 144/1			
		3	ericsson	RRUS 11 B12			
		1	tower mounts	Sector Mount [SM 402-3]			
62.0	65.0	1	gps	GPS_A	1	1/2	1
	62.0	1	tower mounts	Side Arm Mount [SO 301-1]			
42.0	44.0	1	gps	GPS_A	1	1/2	1
	42.0	1	tower mounts	Side Arm Mount [SO 301-1]			
31.0	32.0	1	gps	GPS_A	1	1/2	1
	31.0	1	tower mounts	Side Arm Mount [SO 701-1]			

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

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
179	179	2	Generic	PD10017	2	7/8
165	165	3	Generic	PD1132D	3	7/8
160	160	2	Generic	8' Dishes W/O RAD	2	7/8
140	140	2	Generic	PD10017	2	7/8
125	125	3	Generic	PD1132D	3	7/8

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Geotechnical Reports	FDH, Job#: 09-04219E G1, dated 04/29/2009	262283	CCISITES
Tower Foundation Drawings	FWT, Job#: 18888-81, dated 05/31/1988	262285	CCISITES
Foundation Mapping	FDH, Job#: 09-11077E N1, dated 08/07/2012	3290324	CCISITES
Tower Manufacturer Drawings	FWT, Job#: 18888-81, dated 05/06/1988	217757	CCISITES
Tower Reinforcement Drawings	HEB, Job#: 98124A, dated 01/07/2000	3290324	CCISITES
Tower Reinforcement Drawings	APT, Job#: CT105271, dated 12/20/2002	801524	CCISITES
Tower Reinforcement Drawings	Paul J. Ford, Job#: 37509-0801, dated 12/08/2009	2434484	CCISITES
Tower Reinforcement Drawings	Destek, Pro. # 1654003,date 1/13/2016	6061656	CCISITES
Post-Modification Inspection	Paul J. Ford, Job#: 37509-0801, dated 01/11/2010	2575710	CCISITES
Structural Analysis Report	B+T Group, Job#: 102920.001.01, dated 11/17/2015	5978416	CCISITES
Mount Structural Evaluation Letter	Tectonic, Job#: 7225.CT03XC369, dated 09/22/2014	-	CCI

3.1) Analysis Method

tnxTower (version 7.0.6.2), 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.

This analysis may be affected if any assumptions are not valid or have been made in error. Destek Engineering, LLC should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	180 - 168	Leg	P2x.154	2	-2.162	27.981	7.7	Pass
T2	168 - 160	Leg	P2x.154 (GR)	25	-8.375	38.430	21.8	Pass
T3	160 - 140	Leg	P3x.216 (GR)	40	34.936	70.197	49.8	Pass
T4	140 - 120	Leg	P3.5x.318 (GR)	67	-77.580	122.133	63.5	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T5	120 - 100	Leg	P4x.337 (GR)	88	-108.677	157.190	69.1 78.4 (b)	Pass
T6	100 - 80	Leg	P5x.375 (GR)	111	120.288	192.527	62.5 74.1 (b)	Pass
T7	80 - 60	Leg	P6x.432 (GR)	130	145.033	264.756	54.8 58.4 (b)[1]	Pass
T8	60 - 40	Leg	P6x.432 (GR)	145	170.723	264.756	64.5 80.5 (b)	Pass
T9	40 - 20	Leg	P6x.432 (GR)	160	194.728	264.756	73.5 78.5 (b)[1]	Pass
T10	20 - 0	Leg	P8x.5 (GR)	181	218.222	402.026	54.3 63.1 (b)	Pass
T1	180 - 168	Diagonal	L2x1 1/2x3/16	10	-0.572	11.752	4.9 6.9 (b)	Pass
T2	168 - 160	Diagonal	L2x1 1/2x3/16	33	-2.453	11.752	20.9 30.2 (b)	Pass
T3	160 - 140	Diagonal	L2x1 1/2x3/16	44	-4.028	7.635	52.8	Pass
T4	140 - 120	Diagonal	L2x2x3/16	71	-4.744	7.150	66.3	Pass
T5	120 - 100	Diagonal	L2 1/2x2x3/16	92	-5.049	7.120	70.9	Pass
T6	100 - 80	Diagonal	L2 1/2x2 1/2x3/16	113	-6.175	8.211	75.2	Pass
T7	80 - 60	Diagonal	L3x3x3/16	133	-7.399	8.983	82.4	Pass
T8	60 - 40	Diagonal	L3 1/2x3x1/4	148	-7.929	11.905	66.6	Pass
T9	40 - 20	Diagonal	L3 1/2x3x1/4	163	-8.735	9.650	90.5	Pass
T10	20 - 0	Diagonal	L3 1/2x3 1/2x1/4	187	-9.148	11.176	81.9	Pass
T9	40 - 20	Secondary Horizontal	L3 1/2x3 1/2x1/4	169	-3.998	34.656	11.5 50.3 (b)	Pass
T1	180 - 168	Top Girt	L1 1/2x2x3/16	5	-0.113	8.172	1.4 2.2 (b)	Pass
							Summary	
						Leg (T9)	80.5	Pass
						Diagonal (T9)	90.5	Pass
						Secondary Horizontal (T9)	50.3	Pass
						Top Girt (T1)	2.2	Pass
						Bolt Checks	80.5	Pass
						Rating =	90.5	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	68.2	Pass
1	Base Foundation	0	39.5	Pass
1	Base Foundation Soil Interaction	0	50.8	Pass

Structure Rating (max from all components) =	90.5%

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

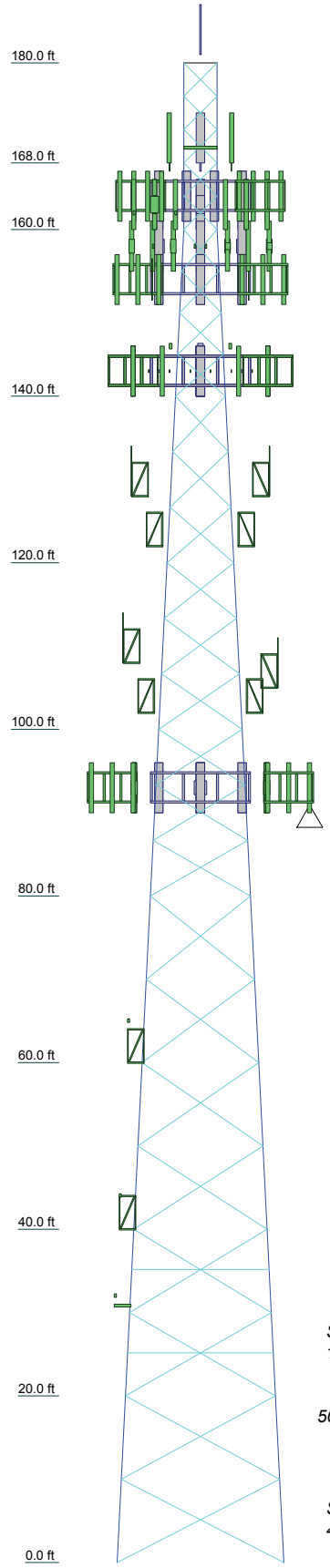
4.1) Recommendations

The modified tower and its foundation will have sufficient capacity to carry the existing and proposed loads. No additional medications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Sec. Horizontals	Face Width (ft)	# Panels @ (ft)	Weight (K)
T1	P2x.154	A53-B-35	L2x1 1/2x3/16	A36	L1 1/2x2x3/16	N.A.	4	5 @ 4	0.4
T2	A								0.3
T3	P3x.216 (GR)							4 @ 5	1.3
T4	P3.5x.318 (GR)		L2x2x3/16				6		1.8
T5	P4x.337 (GR)		L2 1/2x2x3/16			N.A.	8	9 @ 6.66667	2.3
T6	P5x.375 (GR)		L2 1/2x2 1/2x3/16		N.A.		10		3.3
T7	P6x.432 (GR)		L3x3x3/16				12		4.3
T8			L3 1/2x3x1/4				14	8 @ 10	4.7
T9						L3 1/2x3 1/2x1/4	16		5.5
T10	P8x.5 (GR)		L3 1/2x3 1/2x1/4			N.A.	18		7.3
							20		31.2



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
PD10017	178	PCS 1900 MHz 4x45W-65MHz	146
800 10504 w/ Mount Pipe	170	800 EXTERNAL NOTCH FILTER	146
800 10504 w/ Mount Pipe	170	800 EXTERNAL NOTCH FILTER	146
800 10504 w/ Mount Pipe	170	800 EXTERNAL NOTCH FILTER	146
860 10025	170	APXVSPP18-C-A20	143
860 10025	170	APXVSPP18-C-A20	143
860 10025	170	APXVSPP18-C-A20	143
6' x 2" Mount Pipe	170	(3) ACU-A20-N	143
6' x 2" Mount Pipe	170	(3) ACU-A20-N	143
6' x 2" Mount Pipe	170	(3) ACU-A20-N	143
Side Arm Mount [SO 103-3]	170	Pipe Mount [PM 601-3]	143
(2) APL868013-42T0 w/ Mount Pipe	164	Sector Mount [SM 701-3]	143
(2) APL868013-42T0 w/ Mount Pipe	164	APXVTM14-C-120 w/ Mount Pipe	143
(2) APL868013-42T0 w/ Mount Pipe	164	APXVTM14-C-120 w/ Mount Pipe	143
MG D3-800Tx w/ Mount Pipe	164	APXVTM14-C-120 w/ Mount Pipe	143
MG D3-800Tx w/ Mount Pipe	164	TD-RRH8x20-25	143
MG D3-800Tx w/ Mount Pipe	164	TD-RRH8x20-25	143
(2) FD9R6004/2C-3L	164	TD-RRH8x20-25	143
(2) FD9R6004/2C-3L	164	12' horizontal x 2" Pipe Mount	143
(2) FD9R6004/2C-3L	164	12' horizontal x 2" Pipe Mount	143
LNX-6512DS-VTM w/ Mount Pipe	164	12' horizontal x 2" Pipe Mount	143
LNX-6512DS-VTM w/ Mount Pipe	164	1142-2C	124
LNX-6512DS-VTM w/ Mount Pipe	164	1142-2C	124
742 213 w/ Mount Pipe	164	Side Arm Mount [SO 302-1]	124
742 213 w/ Mount Pipe	164	Side Arm Mount [SO 302-1]	124
742 213 w/ Mount Pipe	164	220-3BN	104
RRH4X45-AWS4 B66	164	1142-2C	104
RRH4X45-AWS4 B66	164	Side Arm Mount [SO 302-1]	104
RRH4X45-AWS4 B66	164	Side Arm Mount [SO 302-1]	104
DB-T1-6Z-8AB-0Z	164	ERICSSON AIR 21 B2A B4P	93
Sector Mount [SM 702-3]	164	ERICSSON AIR 21 B2A B4P	93
(2) 7770.00 w/ Mount Pipe	154	ERICSSON AIR 21 B2A B4P	93
(2) 7770.00 w/ Mount Pipe	154	ERICSSON AIR 21 B4A B2P	93
(2) 7770.00 w/ Mount Pipe	154	ERICSSON AIR 21 B4A B2P	93
P65-16-XLH-RR w/ Mount Pipe	154	ERICSSON AIR 21 B4A B2P	93
P65-16-XLH-RR w/ Mount Pipe	154	LNX-6515DS-VTM w/ Mount Pipe	93
P65-16-XLH-RR w/ Mount Pipe	154	LNX-6515DS-VTM w/ Mount Pipe	93
(2) LGP21401	154	LNX-6515DS-VTM w/ Mount Pipe	93
(2) LGP21401	154	KRY 112 144/1	93
(2) LGP21401	154	KRY 112 144/1	93
(2) LGP21901	154	KRY 112 144/1	93
(2) LGP21901	154	RRUS 11 B12	93
(2) LGP21901	154	RRUS 11 B12	93
(2) RRUS-11	154	RRUS 11 B12	93
(2) RRUS-11	154	Sector Mount [SM 402-3]	93
(2) RRUS-11	154	GPS_A	62
DC6-48-60-18-8F	154	Side Arm Mount [SO 301-1]	62
(2) 5' x 2" Pipe Mount	154	(2) 3'x8" Knife Plate	60
(2) 5' x 2" Pipe Mount	154	(2) 3'x8" Knife Plate	60
(2) 5' x 2" Pipe Mount	154	(2) 3'x8" Knife Plate	60
Pipe Mount [PM 601-3]	154	GPS_A	42
Sector Mount [SM 602-3]	154	Side Arm Mount [SO 301-1]	42
TME-800MHZ 2X50W RRH	146	Side Arm Mount [SO 701-1]	31
TME-800MHZ 2X50W RRH	146	GPS_A	31
TME-800MHZ 2X50W RRH	146	(2) 3'x8" Knife Plate	20
PCS 1900 MHz 4x45W-65MHz	146	(2) 3'x8" Knife Plate	20
PCS 1900 MHz 4x45W-65MHz	146	(2) 3'x8" Knife Plate	20

ALL F
ARE

MAX.
DC
SH

UF
SH

SHEAR
14 K

TORC
50 mph WI

SHEAR
45 K

TORQ
REACTION

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	P2x.154 (GR)		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	63 ksi	A36	36 ksi	58 ksi

MOMENT

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. Grouted pipe f'c is 7.000 ksi
9. TOWER RATING: 90.5%

DESTEK ENGINEERING
Destek Engineering, LLC
1281 Kennestone Circle, Suite 100
Marietta, GA 30066
Phone: (770) 693-0835
FAX:

Job: *806353 - BRG 124 943066*			
Project: *1702063*			
Client: Crown Castle	Drawn by: Ahmet Colakoglu	App'd:	
Code: TIA-222-G	Date: 07/28/17	Scale: NTS	
Path: Z:\Projects\2017\02 - Crown Castle\1702063 - 806353 BRG 124 943066 (3) WO\WO 1436100\TNXTower\806353.eri		Dwg No. E-1	

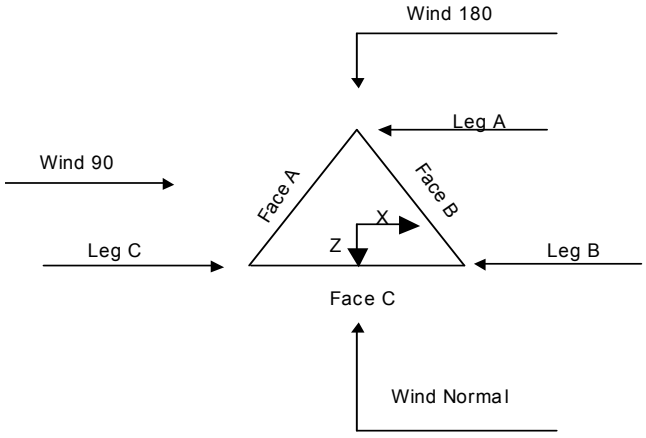
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.000 ft above the ground line.
The base of the tower is set at an elevation of 0.000 ft above the ground line.
The face width of the tower is 4.000 ft at the top and 20.000 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

1) Tower is located in Fairfield County, Connecticut.
2) Basic wind speed of 93 mph.
3) Structure Class II.
4) Exposure Category B.
5) Topographic Category 1.
6) Crest Height 0.000 ft.
7) Nominal ice thickness of 0.750 in.
8) Ice thickness is considered to increase with height.
9) Ice density of 56.000 pcf.
10) A wind speed of 50 mph is used in combination with ice.
11) Temperature drop of 50.000 °F.
12) Deflections calculated using a wind speed of 60 mph.
13) Grouted pipe f'_c is 7.000 ksi.
14) Pressures are calculated at each section.
15) Stress ratio used in tower member design is 1.
16) 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				



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	180.000-168.000			4.000	1	12.000
T2	168.000-160.000			4.000	1	8.000
T3	160.000-140.000			4.000	1	20.000
T4	140.000-120.000			6.000	1	20.000
T5	120.000-100.000			8.000	1	20.000
T6	100.000-80.000			10.000	1	20.000
T7	80.000-60.000			12.000	1	20.000
T8	60.000-40.000			14.000	1	20.000
T9	40.000-20.000			16.000	1	20.000
T10	20.000-0.000			18.000	1	20.000

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	180.000-168.000	4.000	X Brace	No	No	0.000	0.000
T2	168.000-160.000	4.000	X Brace	No	No	0.000	0.000
T3	160.000-140.000	5.000	X Brace	No	No	0.000	0.000
T4	140.000-120.000	6.667	X Brace	No	No	0.000	0.000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T5	120.000-100.000	6.667	X Brace	No	No	0.000	0.000
T6	100.000-80.000	6.667	X Brace	No	No	0.000	0.000
T7	80.000-60.000	10.000	X Brace	No	No	0.000	0.000
T8	60.000-40.000	10.000	X Brace	No	No	0.000	0.000
T9	40.000-20.000	10.000	X Brace	No	Yes	0.000	0.000
T10	20.000-0.000	10.000	X Brace	No	No	0.000	0.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180.000-168.000	Pipe	P2x.154	A53-B-35 (35 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T2 168.000-160.000	Grouted Pipe	P2x.154	A53-B-35 (35 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T3 160.000-140.000	Grouted Pipe	P3x.216	A53-B-35 (35 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T4 140.000-120.000	Grouted Pipe	P3.5x.318	A53-B-35 (35 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T5 120.000-100.000	Grouted Pipe	P4x.337	A53-B-35 (35 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T6 100.000-80.000	Grouted Pipe	P5x.375	A53-B-35 (35 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T7 80.000-60.000	Grouted Pipe	P6x.432	A53-B-35 (35 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T8 60.000-40.000	Grouted Pipe	P6x.432	A53-B-35 (35 ksi)	Single Angle	L3 1/2x3x1/4	A36 (36 ksi)
T9 40.000-20.000	Grouted Pipe	P6x.432	A53-B-35 (35 ksi)	Single Angle	L3 1/2x3x1/4	A36 (36 ksi)
T10 20.000-0.000	Grouted Pipe	P8x.5	A53-B-35 (35 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 180.000-168.000	Single Angle	L1 1/2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T9 40.000-20.000	Single Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 180.000-168.000	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	0.000	0.000	36.000
T2 168.000-160.000	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	0.000	0.000	36.000
T3 160.000-140.000	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	0.000	0.000	36.000
T4 140.000-120.000	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	0.000	0.000	36.000
T5 120.000-100.000	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	0.000	0.000	36.000
T6 100.000-80.000	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	0.000	0.000	36.000
T7 80.000-60.000	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	0.000	0.000	36.000
T8 60.000-40.000	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	0.000	0.000	36.000
T9 40.000-20.000	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	0.000	0.000	36.000
T10 20.000-0.000	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	0.000	0.000	36.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 180.000-168.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 168.000-160.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 160.000-140.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 140.000-120.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 120.000-100.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 100.000-80.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 80.000-60.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 60.000-40.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 40.000-20.000	No	No	1	1 1	1 1	1 1	1 1	1 1	0.5 0.5	1 1
T10 20.000-0.000	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 180.000-168.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 168.000-160.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 160.000-140.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 140.000-120.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 120.000-100.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 100.000-80.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 80.000-60.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 60.000-40.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9 40.000-20.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T10 20.000-0.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 180.000-168.000	Flange	0.000 A325N	0	0.625 A325N	1	0.625 A325N	1	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.000 A325N	0
T2 168.000-160.000	Flange	0.625 A325N	4	0.625 A325N	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.000 A325N	0
T3 160.000-140.000	Flange	0.625 A325N	4	0.625 A325N	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.000 A325N	0
T4 140.000-120.000	Flange	0.750 A325N	4	0.625 A325N	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.000 A325N	0
T5 120.000-100.000	Flange	0.750 A325N	4	0.625 A325N	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.000 A325N	0
T6 100.000-80.000	Flange	0.875 A325N	4	0.625 A325N	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.000 A325N	0
T7 80.000-60.000	Flange	0.875 A325N	4	0.625 A325N	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.000 A325N	0
T8 60.000-40.000	Flange	1.000 A325N	4	0.625 A325N	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.000 A325N	0
T9 40.000-20.000	Flange	1.000 A325N	4	0.625 A325N	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.500 A325N	1
T10 20.000-0.000	Flange	1.500 A36	6	0.625 A325N	1	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.000 A325N	0

Grouted Pipe Properties

Size	F_y ksi	A_s in^2	A_c in^2	Wt plf	E_c ksi	E_m ksi	F_{ym} ksi
P2x.154 (GR)	35.000	1.075	3.356	10.647	4768.962	40914.218	53.581
P3x.216 (GR)	35.000	2.228	7.393	22.984	4768.962	41656.327	54.738
P3.5x.318 (GR)	35.000	3.678	8.888	31.033	4768.962	38218.387	49.377
P4x.337 (GR)	35.000	4.407	11.497	38.949	4768.962	38951.934	50.521

Size	F_y ksi	A_s in^2	A_c in^2	Wt plf	E_c ksi	E_m ksi	F_{ym} ksi
P5x.375 (GR)	35.000	6.112	18.194	58.701	4768.962	40356.758	52.712
P6x.432 (GR)	35.000	8.405	26.067	82.906	4768.962	40832.181	53.453
P8x.5 (GR)	35.000	12.763	45.664	138.561	4768.962	42650.237	56.288

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
***												
CR 50 1873PE(1-5/8)	C	No	Ar (CaAa)	170.000 - 0.000	0.000	-0.35	6	4	1.980	1.980		0.001
LDF1-50A(1/4")	C	No	Ar (CaAa)	170.000 - 0.000	0.000	-0.325	1	1	0.345	0.345		0.000
LDF4-50A(1/2")	C	No	Ar (CaAa)	31.000 - 0.000	0.000	-0.32	1	1	0.630	0.630		0.000
Feedline Ladder (Af)	C	No	Af (CaAa)	170.000 - 0.000	0.000	-0.36	1	1	3.000	3.000		0.008
***												
Safety Line 3/8	C	No	Ar (CaAa)	180.000 - 0.000	0.000	0	1	1	0.375	0.375		0.000
Climbing Ladder (Flat)	C	No	Af (CaAa)	180.000 - 0.000	0.000	0	1	1	3.840	3.840		0.005
***												
LDF6-50A(1-1/4)	B	No	Ar (CaAa)	93.000 - 0.000	0.000	0.1	13	13	1.550	1.550		0.001
Feedline Ladder (Af)	B	No	Af (CaAa)	93.000 - 0.000	0.000	0.1	1	1	3.000	3.000		0.008
***												
LDF4-50A(1/2")	B	No	Ar (CaAa)	104.000 - 0.000	1.000	0.3	1	1	0.630	0.630		0.000
LDF5-50A(7/8)	B	No	Ar (CaAa)	104.000 - 0.000	0.000	0.3	1	1	1.030	1.030		0.000
LCF158-50JA-A0(1 5/8")	B	No	Ar (CaAa)	154.000 - 0.000	0.000	0.25	12	6	1.980	1.980		0.000
FB-L98B-002-75000(3/8)	B	No	Ar (CaAa)	154.000 - 0.000	0.000	0.35	1	1	0.394	0.000		0.000
WR-VG82ST-BRDA(5/8")	B	No	Ar (CaAa)	154.000 - 0.000	0.000	0.35	2	2	0.500	0.000		0.000
2" Rigid Conduit	B	No	Ar (CaAa)	154.000 - 0.000	0.000	0.35	1	1	2.000	2.000		0.003
***												
HB114-1-0813U4-M5J(1 1/4")	A	No	Ar (CaAa)	143.000 - 0.000	0.000	-0.09	4	4	1.540	1.540		0.001
FSJ4-50B(1/2)	A	No	Ar (CaAa)	42.000 - 0.000	0.000	-0.12	4	2	0.530	0.530		0.000
FSJ4-50B(1/2)	A	No	Ar (CaAa)	62.000 - 42.000	0.000	-0.12	3	3	0.530	0.530		0.000
FSJ4-50B(1/2)	A	No	Ar (CaAa)	124.000 - 62.000	0.000	-0.12	2	2	0.530	0.530		0.000
***												
561(1-5/8")	A	No	Ar (CaAa)	164.000 - 0.000	0.000	0.075	15	8	1.625	1.625		0.001
Feedline Ladder (Af)	A	No	Af (CaAa)	164.000 - 0.000	0.000	0.05	1	1	3.000	3.000		0.008
LDF5-50A(7/8)	A	No	Ar (CaAa)	178.000 - 164.000	4.000	0	2	2	1.030	1.030		0.000
***												

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C_AA_A ft^2/ft	Weight klf
***							

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
T1	180.000-168.000	A	0.000	0.000	2.060	0.000	0.007
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	11.575	0.000	0.087
T2	168.000-160.000	A	0.000	0.000	12.574	0.000	0.117
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	19.200	0.000	0.148
T3	160.000-140.000	A	0.000	0.000	60.598	0.000	0.587
		B	0.000	0.000	36.064	0.000	0.062
		C	0.000	0.000	48.000	0.000	0.369
T4	140.000-120.000	A	0.000	0.000	71.494	0.000	0.670
		B	0.000	0.000	51.520	0.000	0.089
		C	0.000	0.000	48.000	0.000	0.369
T5	120.000-100.000	A	0.000	0.000	73.190	0.000	0.675
		B	0.000	0.000	52.184	0.000	0.091
		C	0.000	0.000	48.000	0.000	0.369
T6	100.000-80.000	A	0.000	0.000	73.190	0.000	0.675
		B	0.000	0.000	87.535	0.000	0.309
		C	0.000	0.000	48.000	0.000	0.369
T7	80.000-60.000	A	0.000	0.000	73.296	0.000	0.675
		B	0.000	0.000	105.140	0.000	0.422
		C	0.000	0.000	48.000	0.000	0.369
T8	60.000-40.000	A	0.000	0.000	74.356	0.000	0.678
		B	0.000	0.000	105.140	0.000	0.422
		C	0.000	0.000	48.000	0.000	0.369
T9	40.000-20.000	A	0.000	0.000	75.310	0.000	0.680
		B	0.000	0.000	105.140	0.000	0.422
		C	0.000	0.000	48.693	0.000	0.371
T10	20.000-0.000	A	0.000	0.000	75.310	0.000	0.680
		B	0.000	0.000	105.140	0.000	0.422
		C	0.000	0.000	49.260	0.000	0.372

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
T1	180.000-168.000	A	1.771	0.000	0.000	10.070	0.000	0.101
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	24.073	0.000	0.444
T2	168.000-160.000	A	1.761	0.000	0.000	21.989	0.000	0.494
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	40.756	0.000	0.775
T3	160.000-140.000	A	1.745	0.000	0.000	95.390	0.000	2.343
		B		0.000	0.000	69.053	0.000	1.349
		C		0.000	0.000	101.533	0.000	1.922
T4	140.000-120.000	A	1.720	0.000	0.000	130.337	0.000	2.816
		B		0.000	0.000	98.115	0.000	1.907
		C		0.000	0.000	100.968	0.000	1.898
T5	120.000-100.000	A	1.692	0.000	0.000	142.482	0.000	2.890
		B		0.000	0.000	100.873	0.000	1.927
		C		0.000	0.000	100.319	0.000	1.871
T6	100.000-80.000	A	1.658	0.000	0.000	141.689	0.000	2.853

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
		B		0.000	0.000	192.993	0.000	3.317
		C		0.000	0.000	99.553	0.000	1.838
T7	80.000-60.000	A	1.617	0.000	0.000	140.935	0.000	2.812
		B		0.000	0.000	234.263	0.000	3.912
		C		0.000	0.000	98.616	0.000	1.799
T8	60.000-40.000	A	1.564	0.000	0.000	141.588	0.000	2.784
		B		0.000	0.000	232.176	0.000	3.813
		C		0.000	0.000	97.398	0.000	1.749
T9	40.000-20.000	A	1.486	0.000	0.000	139.377	0.000	2.710
		B		0.000	0.000	229.141	0.000	3.670
		C		0.000	0.000	99.587	0.000	1.721
T10	20.000-0.000	A	1.331	0.000	0.000	135.740	0.000	2.548
		B		0.000	0.000	223.124	0.000	3.393
		C		0.000	0.000	98.693	0.000	1.607

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	180.000-168.000	0.235	1.520	0.279	1.815
T2	168.000-160.000	0.469	1.074	0.732	1.591
T3	160.000-140.000	1.132	0.397	1.091	0.952
T4	140.000-120.000	1.609	0.484	1.374	1.064
T5	120.000-100.000	1.942	0.606	1.723	1.299
T6	100.000-80.000	3.464	0.392	3.663	1.020
T7	80.000-60.000	4.467	0.290	4.846	0.922
T8	60.000-40.000	4.969	0.327	5.429	1.020
T9	40.000-20.000	5.300	0.384	5.987	1.177
T10	20.000-0.000	5.973	0.467	6.875	1.340

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	2	CR 50 1873PE(1-5/8)	168.00 - 170.00	0.6000	0.4712
T1	3	LDF1-50A(1/4")	168.00 - 170.00	0.6000	0.4712
T1	5	Feedline Ladder (Af)	168.00 - 170.00	0.6000	0.4712
T1	7	Safety Line 3/8	168.00 - 180.00	0.6000	0.4712
T1	8	Climbing Ladder (Flat)	168.00 - 180.00	0.6000	0.4712
T1	28	LDF5-50A(7/8)	168.00 - 178.00	0.6000	0.4712
T2	2	CR 50 1873PE(1-5/8)	160.00 - 168.00	0.6000	0.5028
T2	3	LDF1-50A(1/4")	160.00 - 168.00	0.6000	0.5028
T2	5	Feedline Ladder (Af)	160.00 - 168.00	0.6000	0.5028
T2	7	Safety Line 3/8	160.00 - 168.00	0.6000	0.5028
T2	8	Climbing Ladder (Flat)	160.00 - 168.00	0.6000	0.5028

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T2	25	561(1-5/8")	160.00 - 164.00	0.6000	0.5028
T2	27	Feedline Ladder (Af)	160.00 - 164.00	0.6000	0.5028
T2	28	LDF5-50A(7/8)	164.00 - 168.00	0.6000	0.5028
T3	2	CR 50 1873PE(1-5/8)	140.00 - 160.00	0.6000	0.5694
T3	3	LDF1-50A(1/4")	140.00 - 160.00	0.6000	0.5694
T3	5	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.5694
T3	7	Safety Line 3/8	140.00 - 160.00	0.6000	0.5694
T3	8	Climbing Ladder (Flat)	140.00 - 160.00	0.6000	0.5694
T3	15	LCF158-50JA-A0(1 5/8")	140.00 - 154.00	0.6000	0.5694
T3	16	FB-L98B-002-75000(3/8)	140.00 - 154.00	0.6000	0.5694
T3	17	WR-VG82ST-BRDA(5/8")	140.00 - 154.00	0.6000	0.5694
T3	18	2" Rigid Conduit	140.00 - 154.00	0.6000	0.5694
T3	20	HB114-1-0813U4-M5J(1 1/4")	140.00 - 143.00	0.6000	0.5694
T3	25	561(1-5/8")	140.00 - 160.00	0.6000	0.5694
T3	27	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.5694
T4	2	CR 50 1873PE(1-5/8)	120.00 - 140.00	0.6000	0.6000
T4	3	LDF1-50A(1/4")	120.00 - 140.00	0.6000	0.6000
T4	5	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T4	7	Safety Line 3/8	120.00 - 140.00	0.6000	0.6000
T4	8	Climbing Ladder (Flat)	120.00 - 140.00	0.6000	0.6000
T4	15	LCF158-50JA-A0(1 5/8")	120.00 - 140.00	0.6000	0.6000
T4	16	FB-L98B-002-75000(3/8)	120.00 - 140.00	0.6000	0.6000
T4	17	WR-VG82ST-BRDA(5/8")	120.00 - 140.00	0.6000	0.6000
T4	18	2" Rigid Conduit	120.00 - 140.00	0.6000	0.6000
T4	20	HB114-1-0813U4-M5J(1 1/4")	120.00 - 140.00	0.6000	0.6000
T4	23	FSJ4-50B(1/2)	120.00 - 124.00	0.6000	0.6000
T4	25	561(1-5/8")	120.00 - 140.00	0.6000	0.6000
T4	27	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	2	CR 50 1873PE(1-5/8)	100.00 - 120.00	0.6000	0.6000
T5	3	LDF1-50A(1/4")	100.00 - 120.00	0.6000	0.6000
T5	5	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T5	7	Safety Line 3/8	100.00 - 120.00	0.6000	0.6000
T5	8	Climbing Ladder (Flat)	100.00 - 120.00	0.6000	0.6000
T5	13	LDF4-50A(1/2")	100.00 - 104.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T5	14	LDF5-50A(7/8)	100.00 - 104.00	0.6000	0.6000
T5	15	LCF158-50JA-A0(1 5/8")	100.00 - 120.00	0.6000	0.6000
T5	16	FB-L98B-002-75000(3/8)	100.00 - 120.00	0.6000	0.6000
T5	17	WR-VG82ST-BRDA(5/8")	100.00 - 120.00	0.6000	0.6000
T5	18	2" Rigid Conduit	100.00 - 120.00	0.6000	0.6000
T5	20	HB114-1-0813U4-M5J(1 1/4")	100.00 - 120.00	0.6000	0.6000
T5	23	FSJ4-50B(1/2)	100.00 - 120.00	0.6000	0.6000
T5	25	561(1-5/8")	100.00 - 120.00	0.6000	0.6000
T5	27	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	2	CR 50 1873PE(1-5/8)	80.00 - 100.00	0.6000	0.6000
T6	3	LDF1-50A(1/4")	80.00 - 100.00	0.6000	0.6000
T6	5	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T6	7	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T6	8	Climbing Ladder (Flat)	80.00 - 100.00	0.6000	0.6000
T6	10	LDF6-50A(1-1/4)	80.00 - 93.00	0.6000	0.6000
T6	11	Feedline Ladder (Af)	80.00 - 93.00	0.6000	0.6000
T6	13	LDF4-50A(1/2")	80.00 - 100.00	0.6000	0.6000
T6	14	LDF5-50A(7/8)	80.00 - 100.00	0.6000	0.6000
T6	15	LCF158-50JA-A0(1 5/8")	80.00 - 100.00	0.6000	0.6000
T6	16	FB-L98B-002-75000(3/8)	80.00 - 100.00	0.6000	0.6000
T6	17	WR-VG82ST-BRDA(5/8")	80.00 - 100.00	0.6000	0.6000
T6	18	2" Rigid Conduit	80.00 - 100.00	0.6000	0.6000
T6	20	HB114-1-0813U4-M5J(1 1/4")	80.00 - 100.00	0.6000	0.6000
T6	23	FSJ4-50B(1/2)	80.00 - 100.00	0.6000	0.6000
T6	25	561(1-5/8")	80.00 - 100.00	0.6000	0.6000
T6	27	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	2	CR 50 1873PE(1-5/8)	60.00 - 80.00	0.6000	0.6000
T7	3	LDF1-50A(1/4")	60.00 - 80.00	0.6000	0.6000
T7	5	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T7	7	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T7	8	Climbing Ladder (Flat)	60.00 - 80.00	0.6000	0.6000
T7	10	LDF6-50A(1-1/4)	60.00 - 80.00	0.6000	0.6000
T7	11	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T7	13	LDF4-50A(1/2")	60.00 - 80.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T7	14	LDF5-50A(7/8)	60.00 - 80.00	0.6000	0.6000
T7	15	LCF158-50JA-A0(1 5/8")	60.00 - 80.00	0.6000	0.6000
T7	16	FB-L98B-002-75000(3/8)	60.00 - 80.00	0.6000	0.6000
T7	17	WR-VG82ST-BRDA(5/8")	60.00 - 80.00	0.6000	0.6000
T7	18	2" Rigid Conduit	60.00 - 80.00	0.6000	0.6000
T7	20	HB114-1-0813U4-M5J(1 1/4")	60.00 - 80.00	0.6000	0.6000
T7	22	FSJ4-50B(1/2)	60.00 - 62.00	0.6000	0.6000
T7	23	FSJ4-50B(1/2)	62.00 - 80.00	0.6000	0.6000
T7	25	561(1-5/8")	60.00 - 80.00	0.6000	0.6000
T7	27	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T8	2	CR 50 1873PE(1-5/8)	40.00 - 60.00	0.6000	0.6000
T8	3	LDF1-50A(1/4")	40.00 - 60.00	0.6000	0.6000
T8	5	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T8	7	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T8	8	Climbing Ladder (Flat)	40.00 - 60.00	0.6000	0.6000
T8	10	LDF6-50A(1-1/4)	40.00 - 60.00	0.6000	0.6000
T8	11	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T8	13	LDF4-50A(1/2")	40.00 - 60.00	0.6000	0.6000
T8	14	LDF5-50A(7/8)	40.00 - 60.00	0.6000	0.6000
T8	15	LCF158-50JA-A0(1 5/8")	40.00 - 60.00	0.6000	0.6000
T8	16	FB-L98B-002-75000(3/8)	40.00 - 60.00	0.6000	0.6000
T8	17	WR-VG82ST-BRDA(5/8")	40.00 - 60.00	0.6000	0.6000
T8	18	2" Rigid Conduit	40.00 - 60.00	0.6000	0.6000
T8	20	HB114-1-0813U4-M5J(1 1/4")	40.00 - 60.00	0.6000	0.6000
T8	21	FSJ4-50B(1/2)	40.00 - 42.00	0.6000	0.6000
T8	22	FSJ4-50B(1/2)	42.00 - 60.00	0.6000	0.6000
T8	25	561(1-5/8")	40.00 - 60.00	0.6000	0.6000
T8	27	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T9	2	CR 50 1873PE(1-5/8)	20.00 - 40.00	0.6000	0.6000
T9	3	LDF1-50A(1/4")	20.00 - 40.00	0.6000	0.6000
T9	4	LDF4-50A(1/2")	20.00 - 31.00	0.6000	0.6000
T9	5	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T9	7	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T9	8	Climbing Ladder (Flat)	20.00 - 40.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T9	10	LDF6-50A(1-1/4)	20.00 - 40.00	0.6000	0.6000
T9	11	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T9	13	LDF4-50A(1/2")	20.00 - 40.00	0.6000	0.6000
T9	14	LDF5-50A(7/8)	20.00 - 40.00	0.6000	0.6000
T9	15	LCF158-50JA-A0(1 5/8")	20.00 - 40.00	0.6000	0.6000
T9	16	FB-L98B-002-75000(3/8)	20.00 - 40.00	0.6000	0.6000
T9	17	WR-VG82ST-BRDA(5/8")	20.00 - 40.00	0.6000	0.6000
T9	18	2" Rigid Conduit	20.00 - 40.00	0.6000	0.6000
T9	20	HB114-1-0813U4-M5J(1 1/4")	20.00 - 40.00	0.6000	0.6000
T9	21	FSJ4-50B(1/2)	20.00 - 40.00	0.6000	0.6000
T9	25	561(1-5/8")	20.00 - 40.00	0.6000	0.6000
T9	27	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T10	2	CR 50 1873PE(1-5/8)	0.00 - 20.00	0.6000	0.6000
T10	3	LDF1-50A(1/4")	0.00 - 20.00	0.6000	0.6000
T10	4	LDF4-50A(1/2")	0.00 - 20.00	0.6000	0.6000
T10	5	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T10	7	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000
T10	8	Climbing Ladder (Flat)	0.00 - 20.00	0.6000	0.6000
T10	10	LDF6-50A(1-1/4)	0.00 - 20.00	0.6000	0.6000
T10	11	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T10	13	LDF4-50A(1/2")	0.00 - 20.00	0.6000	0.6000
T10	14	LDF5-50A(7/8)	0.00 - 20.00	0.6000	0.6000
T10	15	LCF158-50JA-A0(1 5/8")	0.00 - 20.00	0.6000	0.6000
T10	16	FB-L98B-002-75000(3/8)	0.00 - 20.00	0.6000	0.6000
T10	17	WR-VG82ST-BRDA(5/8")	0.00 - 20.00	0.6000	0.6000
T10	18	2" Rigid Conduit	0.00 - 20.00	0.6000	0.6000
T10	20	HB114-1-0813U4-M5J(1 1/4")	0.00 - 20.00	0.6000	0.6000
T10	21	FSJ4-50B(1/2)	0.00 - 20.00	0.6000	0.6000
T10	25	561(1-5/8")	0.00 - 20.00	0.6000	0.6000
T10	27	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000

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
***									
PD10017	A	From Leg	0.500 0.000 6.000	0.000	178.000	No Ice 1/2" Ice 1" Ice	4.114 5.641 7.185	4.114 5.641 7.185	0.025 0.055 0.095
170' Metro PCS									
800 10504 w/ Mount Pipe	A	From Leg	2.000 0.000 1.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	3.589 4.007 4.422	3.178 3.905 4.581	0.038 0.070 0.109

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 10504 w/ Mount Pipe	B	From Leg	2.000 0.000 1.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	3.589 4.007 4.422	3.178 3.905 4.581	0.038 0.070 0.109
800 10504 w/ Mount Pipe	C	From Leg	2.000 0.000 1.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	3.589 4.007 4.422	3.178 3.905 4.581	0.038 0.070 0.109
860 10025	A	From Leg	2.000 0.000 1.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	0.137 0.190 0.252	0.116 0.167 0.225	0.001 0.003 0.005
860 10025	B	From Leg	2.000 0.000 1.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	0.137 0.190 0.252	0.116 0.167 0.225	0.001 0.003 0.005
860 10025	C	From Leg	2.000 0.000 1.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	0.137 0.190 0.252	0.116 0.167 0.225	0.001 0.003 0.005
6' x 2" Mount Pipe	A	From Leg	2.000 0.000 0.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.022 0.033 0.048
6' x 2" Mount Pipe	B	From Leg	2.000 0.000 0.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.022 0.033 0.048
6' x 2" Mount Pipe	C	From Leg	2.000 0.000 0.000	0.000	170.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.022 0.033 0.048
Side Arm Mount [SO 103-3]	C	None		0.000	170.000	No Ice 1/2" Ice 1" Ice	9.500 11.800 14.100	9.500 11.800 14.100	0.224 0.317 0.410
163' Verizon									
(2) APL868013-42T0 w/ Mount Pipe	A	From Leg	4.000 0.000 -1.000	0.000	164.000	No Ice 1/2" Ice 1" Ice	3.104 3.476 3.848	4.802 5.416 6.040	0.025 0.063 0.108
(2) APL868013-42T0 w/ Mount Pipe	B	From Leg	4.000 0.000 -1.000	0.000	164.000	No Ice 1/2" Ice 1" Ice	3.104 3.476 3.848	4.802 5.416 6.040	0.025 0.063 0.108
(2) APL868013-42T0 w/ Mount Pipe	C	From Leg	4.000 0.000 -1.000	0.000	164.000	No Ice 1/2" Ice 1" Ice	3.104 3.476 3.848	4.802 5.416 6.040	0.025 0.063 0.108
MG D3-800Tx w/ Mount Pipe	A	From Leg	4.000 0.000 -1.000	0.000	164.000	No Ice 1/2" Ice 1" Ice	3.570 3.979 4.387	3.418 4.119 4.784	0.035 0.068 0.108
MG D3-800Tx w/ Mount Pipe	B	From Leg	4.000 0.000 -1.000	0.000	164.000	No Ice 1/2" Ice 1" Ice	3.570 3.979 4.387	3.418 4.119 4.784	0.035 0.068 0.108
MG D3-800Tx w/ Mount Pipe	C	From Leg	4.000 0.000 -1.000	0.000	164.000	No Ice 1/2" Ice 1" Ice	3.570 3.979 4.387	3.418 4.119 4.784	0.035 0.068 0.108
(2) FD9R6004/2C-3L	A	From Leg	4.000 0.000 -2.000	0.000	164.000	No Ice 1/2" Ice 1" Ice	0.314 0.386 0.466	0.076 0.119 0.169	0.003 0.005 0.009

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) FD9R6004/2C-3L	B	From Leg	4.000 0.000 -2.000	0.000	164.000	No Ice 1/2" Ice 1" Ice	0.314 0.386 0.466	0.076 0.119 0.169	0.003 0.005 0.009
(2) FD9R6004/2C-3L	C	From Leg	4.000 0.000 -2.000	0.000	164.000	No Ice 1/2" Ice 1" Ice	0.314 0.386 0.466	0.076 0.119 0.169	0.003 0.005 0.009
LNX-6512DS-VTM w/ Mount Pipe	A	From Leg	4.000 0.000 -1.000	0.000	164.000	No Ice 1/2" Ice 1" Ice	5.328 5.718 6.115	4.527 5.146 5.771	0.047 0.095 0.150
LNX-6512DS-VTM w/ Mount Pipe	B	From Leg	4.000 0.000 -1.000	0.000	164.000	No Ice 1/2" Ice 1" Ice	5.328 5.718 6.115	4.527 5.146 5.771	0.047 0.095 0.150
LNX-6512DS-VTM w/ Mount Pipe	C	From Leg	4.000 0.000 -1.000	0.000	164.000	No Ice 1/2" Ice 1" Ice	5.328 5.718 6.115	4.527 5.146 5.771	0.047 0.095 0.150
742 213 w/ Mount Pipe	A	From Leg	4.000 0.000 -1.000	0.000	164.000	No Ice 1/2" Ice 1" Ice	5.373 5.950 6.501	4.620 6.000 6.982	0.049 0.094 0.146
742 213 w/ Mount Pipe	B	From Leg	4.000 0.000 -1.000	0.000	164.000	No Ice 1/2" Ice 1" Ice	5.373 5.950 6.501	4.620 6.000 6.982	0.049 0.094 0.146
742 213 w/ Mount Pipe	C	From Leg	4.000 0.000 -1.000	0.000	164.000	No Ice 1/2" Ice 1" Ice	5.373 5.950 6.501	4.620 6.000 6.982	0.049 0.094 0.146
RRH4X45-AWS4 B66	A	From Leg	4.000 0.000 -1.000	0.000	164.000	No Ice 1/2" Ice 1" Ice	2.660 2.878 3.104	1.586 1.769 1.959	0.064 0.084 0.108
RRH4X45-AWS4 B66	B	From Leg	4.000 0.000 -1.000	0.000	164.000	No Ice 1/2" Ice 1" Ice	2.660 2.878 3.104	1.586 1.769 1.959	0.064 0.084 0.108
RRH4X45-AWS4 B66	C	From Leg	4.000 0.000 -1.000	0.000	164.000	No Ice 1/2" Ice 1" Ice	2.660 2.878 3.104	1.586 1.769 1.959	0.064 0.084 0.108
DB-T1-6Z-8AB-0Z	C	From Leg	4.000 0.000 -1.000	0.000	164.000	No Ice 1/2" Ice 1" Ice	4.800 5.070 5.348	2.000 2.193 2.393	0.044 0.080 0.120
Sector Mount [SM 702-3]	C	None		0.000	164.000	No Ice 1/2" Ice 1" Ice	37.400 54.200 71.000	37.400 54.200 71.000	1.551 2.352 3.153
154' AT&T									
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.000 0.000 4.000	0.000	154.000	No Ice 1/2" Ice 1" Ice	5.746 6.179 6.607	4.254 5.014 5.711	0.055 0.103 0.157
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.000 0.000 4.000	0.000	154.000	No Ice 1/2" Ice 1" Ice	5.746 6.179 6.607	4.254 5.014 5.711	0.055 0.103 0.157
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.000 0.000 4.000	0.000	154.000	No Ice 1/2" Ice 1" Ice	5.746 6.179 6.607	4.254 5.014 5.711	0.055 0.103 0.157

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
P65-16-XLH-RR w/ Mount Pipe	A	From Leg	4.000 0.000 4.000	0.000	154.000	No Ice 1/2" Ice 1" Ice	8.371 8.931 9.457	6.362 7.538 8.427	0.079 0.144 0.218
P65-16-XLH-RR w/ Mount Pipe	B	From Leg	4.000 0.000 4.000	0.000	154.000	No Ice 1/2" Ice 1" Ice	8.371 8.931 9.457	6.362 7.538 8.427	0.079 0.144 0.218
P65-16-XLH-RR w/ Mount Pipe	C	From Leg	4.000 0.000 4.000	0.000	154.000	No Ice 1/2" Ice 1" Ice	8.371 8.931 9.457	6.362 7.538 8.427	0.079 0.144 0.218
(2) LGP21401	A	From Leg	4.000 0.000 4.000	0.000	154.000	No Ice 1/2" Ice 1" Ice	1.104 1.239 1.381	0.207 0.274 0.348	0.014 0.021 0.030
(2) LGP21401	B	From Leg	4.000 0.000 4.000	0.000	154.000	No Ice 1/2" Ice 1" Ice	1.104 1.239 1.381	0.207 0.274 0.348	0.014 0.021 0.030
(2) LGP21401	C	From Leg	4.000 0.000 4.000	0.000	154.000	No Ice 1/2" Ice 1" Ice	1.104 1.239 1.381	0.207 0.274 0.348	0.014 0.021 0.030
(2) LGP21901	A	From Leg	1.000 0.000 4.000	0.000	154.000	No Ice 1/2" Ice 1" Ice	0.231 0.294 0.365	0.158 0.213 0.276	0.006 0.008 0.011
(2) LGP21901	B	From Leg	1.000 0.000 4.000	0.000	154.000	No Ice 1/2" Ice 1" Ice	0.231 0.294 0.365	0.158 0.213 0.276	0.006 0.008 0.011
(2) LGP21901	C	From Leg	1.000 0.000 4.000	0.000	154.000	No Ice 1/2" Ice 1" Ice	0.231 0.294 0.365	0.158 0.213 0.276	0.006 0.008 0.011
(2) RRUS-11	A	From Leg	4.000 0.000 4.000	0.000	154.000	No Ice 1/2" Ice 1" Ice	2.784 2.992 3.207	1.187 1.334 1.490	0.048 0.068 0.092
(2) RRUS-11	B	From Leg	4.000 0.000 4.000	0.000	154.000	No Ice 1/2" Ice 1" Ice	2.784 2.992 3.207	1.187 1.334 1.490	0.048 0.068 0.092
(2) RRUS-11	C	From Leg	4.000 0.000 4.000	0.000	154.000	No Ice 1/2" Ice 1" Ice	2.784 2.992 3.207	1.187 1.334 1.490	0.048 0.068 0.092
DC6-48-60-18-8F	B	From Leg	4.000 0.000 0.000	0.000	154.000	No Ice 1/2" Ice 1" Ice	1.266 1.456 1.658	1.266 1.456 1.658	0.019 0.034 0.051
(2) 5' x 2" Pipe Mount	A	From Leg	4.000 0.000 0.000	0.000	154.000	No Ice 1/2" Ice 1" Ice	1.000 1.393 1.703	1.000 1.393 1.703	0.029 0.037 0.048
(2) 5' x 2" Pipe Mount	B	From Leg	4.000 0.000 0.000	0.000	154.000	No Ice 1/2" Ice 1" Ice	1.000 1.393 1.703	1.000 1.393 1.703	0.029 0.037 0.048
(2) 5' x 2" Pipe Mount	C	From Leg	4.000 0.000 0.000	0.000	154.000	No Ice 1/2" Ice 1" Ice	1.000 1.393 1.703	1.000 1.393 1.703	0.029 0.037 0.048
Pipe Mount [PM 601-3]	C	None		0.000	154.000	No Ice	4.390	4.390	0.195

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1/2" Ice	5.480	5.480	0.237
						1" Ice	6.570	6.570	0.280
Sector Mount [SM 602-3]	C	None		0.000	154.000	No Ice	33.110	33.110	1.541
						1/2" Ice	44.900	44.900	2.159
						1" Ice	56.690	56.690	2.777
146' Sprint									
TME-800MHZ 2X50W RRH	A	From Leg	1.000 0.000 0.000	0.000	146.000	No Ice	2.490	2.068	0.053
						1/2" Ice	2.706	2.271	0.074
						1" Ice	2.931	2.481	0.098
TME-800MHZ 2X50W RRH	B	From Leg	1.000 0.000 0.000	0.000	146.000	No Ice	2.490	2.068	0.053
						1/2" Ice	2.706	2.271	0.074
						1" Ice	2.931	2.481	0.098
TME-800MHZ 2X50W RRH	C	From Leg	1.000 0.000 0.000	0.000	146.000	No Ice	2.490	2.068	0.053
						1/2" Ice	2.706	2.271	0.074
						1" Ice	2.931	2.481	0.098
PCS 1900 MHz 4x45W-65MHz	A	From Leg	1.000 0.000 -3.000	0.000	146.000	No Ice	2.709	2.611	0.060
						1/2" Ice	2.948	2.847	0.083
						1" Ice	3.195	3.092	0.110
PCS 1900 MHz 4x45W-65MHz	B	From Leg	1.000 0.000 -3.000	0.000	146.000	No Ice	2.709	2.611	0.060
						1/2" Ice	2.948	2.847	0.083
						1" Ice	3.195	3.092	0.110
PCS 1900 MHz 4x45W-65MHz	C	From Leg	1.000 0.000 -3.000	0.000	146.000	No Ice	2.709	2.611	0.060
						1/2" Ice	2.948	2.847	0.083
						1" Ice	3.195	3.092	0.110
800 EXTERNAL NOTCH FILTER	A	From Leg	1.000 0.000 0.000	0.000	146.000	No Ice	0.660	0.321	0.011
						1/2" Ice	0.763	0.398	0.017
						1" Ice	0.873	0.483	0.024
800 EXTERNAL NOTCH FILTER	B	From Leg	1.000 0.000 0.000	0.000	146.000	No Ice	0.660	0.321	0.011
						1/2" Ice	0.763	0.398	0.017
						1" Ice	0.873	0.483	0.024
800 EXTERNAL NOTCH FILTER	C	From Leg	1.000 0.000 0.000	0.000	146.000	No Ice	0.660	0.321	0.011
						1/2" Ice	0.763	0.398	0.017
						1" Ice	0.873	0.483	0.024
143' Sprint									
APXVSPP18-C-A20	A	From Leg	2.000 0.000 0.000	0.000	143.000	No Ice	8.024	5.283	0.057
						1/2" Ice	8.480	5.736	0.107
						1" Ice	8.943	6.196	0.162
APXVSPP18-C-A20	B	From Leg	2.000 0.000 0.000	0.000	143.000	No Ice	8.024	5.283	0.057
						1/2" Ice	8.480	5.736	0.107
						1" Ice	8.943	6.196	0.162
APXVSPP18-C-A20	C	From Leg	2.000 0.000 0.000	0.000	143.000	No Ice	8.024	5.283	0.057
						1/2" Ice	8.480	5.736	0.107
						1" Ice	8.943	6.196	0.162
(3) ACU-A20-N	A	From Leg	1.000 0.000 0.000	0.000	143.000	No Ice	0.067	0.117	0.001
						1/2" Ice	0.104	0.162	0.002
						1" Ice	0.148	0.215	0.004
(3) ACU-A20-N	B	From Leg	1.000 0.000 0.000	0.000	143.000	No Ice	0.067	0.117	0.001
						1/2" Ice	0.104	0.162	0.002
						1" Ice	0.148	0.215	0.004

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
(3) ACU-A20-N	C	From Leg	1.000 0.000 0.000	0.000	143.000	No Ice 1/2" Ice 1" Ice	0.067 0.104 0.148	0.117 0.162 0.215	0.001 0.002 0.004
Pipe Mount [PM 601-3]	C	None		0.000	143.000	No Ice 1/2" Ice 1" Ice	4.390 5.480 6.570	4.390 5.480 6.570	0.195 0.237 0.280
Sector Mount [SM 701-3]	C	None		0.000	143.000	No Ice 1/2" Ice 1" Ice	19.730 27.410 35.090	19.730 27.410 35.090	0.825 1.166 1.507
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	143.000	No Ice 1/2" Ice 1" Ice	6.580 7.031 7.473	4.959 5.754 6.472	0.077 0.132 0.193
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	143.000	No Ice 1/2" Ice 1" Ice	6.580 7.031 7.473	4.959 5.754 6.472	0.077 0.132 0.193
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	143.000	No Ice 1/2" Ice 1" Ice	6.580 7.031 7.473	4.959 5.754 6.472	0.077 0.132 0.193
TD-RRH8x20-25	A	From Leg	4.000 0.000 0.000	0.000	143.000	No Ice 1/2" Ice 1" Ice	4.045 4.298 4.557	1.535 1.714 1.901	0.070 0.097 0.128
TD-RRH8x20-25	B	From Leg	4.000 0.000 0.000	0.000	143.000	No Ice 1/2" Ice 1" Ice	4.045 4.298 4.557	1.535 1.714 1.901	0.070 0.097 0.128
TD-RRH8x20-25	C	From Leg	4.000 0.000 0.000	0.000	143.000	No Ice 1/2" Ice 1" Ice	4.045 4.298 4.557	1.535 1.714 1.901	0.070 0.097 0.128
12' horizontal x 2" Pipe Mount	A	From Leg	4.000 0.000 0.000	0.000	143.000	No Ice 1/2" Ice 1" Ice	1.000 2.115 2.839	1.000 2.115 2.839	0.100 0.650 1.215
12' horizontal x 2" Pipe Mount	B	From Leg	4.000 0.000 0.000	0.000	143.000	No Ice 1/2" Ice 1" Ice	1.000 2.115 2.839	1.000 2.115 2.839	0.100 0.650 1.215
12' horizontal x 2" Pipe Mount	C	From Leg	4.000 0.000 0.000	0.000	143.000	No Ice 1/2" Ice 1" Ice	1.000 2.115 2.839	1.000 2.115 2.839	0.100 0.650 1.215
124' Wilton 1142-2C	B	From Leg	4.000 0.000 7.000	0.000	124.000	No Ice 1/2" Ice 1" Ice	2.092 3.374 4.673	2.092 3.374 4.673	0.024 0.041 0.066
1142-2C	C	From Leg	4.000 0.000 7.000	0.000	124.000	No Ice 1/2" Ice 1" Ice	2.092 3.374 4.673	2.092 3.374 4.673	0.024 0.041 0.066
Side Arm Mount [SO 302-1]	B	From Leg	2.000 0.000 0.000	0.000	124.000	No Ice 1/2" Ice 1" Ice	1.670 2.510 3.350	3.270 4.990 6.710	0.055 0.088 0.121
Side Arm Mount [SO 302-1]	C	From Leg	2.000 0.000 0.000	0.000	124.000	No Ice 1/2" Ice 1" Ice	1.670 2.510 3.350	3.270 4.990 6.710	0.055 0.088 0.121

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
104' Wilton									
220-3BN	B	From Leg	4.000 0.000 4.000	0.000	104.000	No Ice 1/2" Ice 1" Ice	5.720 7.831 9.959	5.720 7.831 9.959	0.024 0.066 0.120
1142-2C	C	From Leg	4.000 0.000 7.000	0.000	104.000	No Ice 1/2" Ice 1" Ice	2.092 3.374 4.673	2.092 3.374 4.673	0.024 0.041 0.066
Side Arm Mount [SO 302-1]	B	From Leg	2.000 0.000 0.000	0.000	104.000	No Ice 1/2" Ice 1" Ice	1.670 2.510 3.350	3.270 4.990 6.710	0.055 0.088 0.121
Side Arm Mount [SO 302-1]	C	From Leg	2.000 0.000 0.000	0.000	104.000	No Ice 1/2" Ice 1" Ice	1.670 2.510 3.350	3.270 4.990 6.710	0.055 0.088 0.121
93' T-Mobile									
ERICSSON AIR 21 B2A B4P	A	From Leg	3.000 0.000 0.000	0.000	93.000	No Ice 1/2" Ice 1" Ice	6.092 6.462 6.838	4.297 4.649 5.005	0.092 0.133 0.180
ERICSSON AIR 21 B2A B4P	B	From Leg	3.000 0.000 0.000	0.000	93.000	No Ice 1/2" Ice 1" Ice	6.092 6.462 6.838	4.297 4.649 5.005	0.092 0.133 0.180
ERICSSON AIR 21 B2A B4P	C	From Leg	3.000 0.000 0.000	0.000	93.000	No Ice 1/2" Ice 1" Ice	6.092 6.462 6.838	4.297 4.649 5.005	0.092 0.133 0.180
ERICSSON AIR 21 B4A B2P	A	From Leg	3.000 0.000 0.000	0.000	93.000	No Ice 1/2" Ice 1" Ice	6.079 6.448 6.825	4.288 4.639 4.994	0.092 0.133 0.180
ERICSSON AIR 21 B4A B2P	B	From Leg	3.000 0.000 0.000	0.000	93.000	No Ice 1/2" Ice 1" Ice	6.079 6.448 6.825	4.288 4.639 4.994	0.092 0.133 0.180
ERICSSON AIR 21 B4A B2P	C	From Leg	3.000 0.000 0.000	0.000	93.000	No Ice 1/2" Ice 1" Ice	6.079 6.448 6.825	4.288 4.639 4.994	0.092 0.133 0.180
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	3.000 0.000 0.000	0.000	93.000	No Ice 1/2" Ice 1" Ice	11.683 12.404 13.135	9.842 11.366 12.914	0.083 0.173 0.273
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	3.000 0.000 0.000	0.000	93.000	No Ice 1/2" Ice 1" Ice	11.683 12.404 13.135	9.842 11.366 12.914	0.083 0.173 0.273
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	3.000 0.000 0.000	0.000	93.000	No Ice 1/2" Ice 1" Ice	11.683 12.404 13.135	9.842 11.366 12.914	0.083 0.173 0.273
KRY 112 144/1	A	From Leg	3.000 0.000 0.000	0.000	93.000	No Ice 1/2" Ice 1" Ice	0.350 0.426 0.509	0.175 0.234 0.301	0.011 0.014 0.019
KRY 112 144/1	B	From Leg	3.000 0.000 0.000	0.000	93.000	No Ice 1/2" Ice 1" Ice	0.350 0.426 0.509	0.175 0.234 0.301	0.011 0.014 0.019
KRY 112 144/1	C	From Leg	3.000 0.000 0.000	0.000	93.000	No Ice 1/2" Ice	0.350 0.426 0.509	0.175 0.234 0.301	0.011 0.014 0.019

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
RRUS 11 B12	A	From Leg	3.000 0.000 0.000	0.000	93.000	No Ice 1/2" Ice 1" Ice	2.833 3.043 3.259	1.182 1.330 1.485	0.051 0.072 0.095
RRUS 11 B12	B	From Leg	3.000 0.000 0.000	0.000	93.000	No Ice 1/2" Ice 1" Ice	2.833 3.043 3.259	1.182 1.330 1.485	0.051 0.072 0.095
RRUS 11 B12	C	From Leg	3.000 0.000 0.000	0.000	93.000	No Ice 1/2" Ice 1" Ice	2.833 3.043 3.259	1.182 1.330 1.485	0.051 0.072 0.095
Sector Mount [SM 402-3]	C	None		0.000	93.000	No Ice 1/2" Ice 1" Ice	18.910 26.780 34.650	18.910 26.780 34.650	0.851 1.233 1.616
62' Verizon GPS_A	C	From Leg	2.000 0.000 3.000	0.000	62.000	No Ice 1/2" Ice 1" Ice	0.255 0.320 0.393	0.255 0.320 0.393	0.001 0.005 0.010
Side Arm Mount [SO 301-1]	C	From Leg	1.000 0.000 0.000	0.000	62.000	No Ice 1/2" Ice 1" Ice	1.000 1.390 1.780	0.900 1.420 1.940	0.023 0.033 0.042
42' Verizon GPS_A	C	From Leg	2.000 0.000 2.000	0.000	42.000	No Ice 1/2" Ice 1" Ice	0.255 0.320 0.393	0.255 0.320 0.393	0.001 0.005 0.010
Side Arm Mount [SO 301-1]	C	From Leg	1.000 0.000 0.000	0.000	42.000	No Ice 1/2" Ice 1" Ice	1.000 1.390 1.780	0.900 1.420 1.940	0.023 0.033 0.042
31' Verizon GPS_A	C	From Leg	2.000 0.000 1.000	0.000	31.000	No Ice 1/2" Ice 1" Ice	0.255 0.320 0.393	0.255 0.320 0.393	0.001 0.005 0.010
Side Arm Mount [SO 701-1]	C	From Leg	1.000 0.000 0.000	0.000	31.000	No Ice 1/2" Ice 1" Ice	0.850 1.140 1.430	1.670 2.340 3.010	0.065 0.079 0.093
C *** Knife Plates *** (2) 3'x8'' Knife Plate	A	From Leg	0.000 0.000 0.000	0.000	20.000	No Ice 1/2" Ice 1" Ice	2.333 2.625 2.917	0.250 0.500 0.750	0.048 0.054 0.060
(2) 3'x8'' Knife Plate	B	From Leg	0.000 0.000 0.000	0.000	20.000	No Ice 1/2" Ice 1" Ice	2.333 2.625 2.917	0.250 0.500 0.750	0.048 0.054 0.060
(2) 3'x8'' Knife Plate	C	From Leg	0.000 0.000 0.000	0.000	20.000	No Ice 1/2" Ice 1" Ice	2.333 2.625 2.917	0.250 0.500 0.750	0.048 0.054 0.060
(2) 3'x8'' Knife Plate	A	From Leg	0.000 0.000 0.000	0.000	60.000	No Ice 1/2" Ice 1" Ice	2.333 2.625 2.917	0.250 0.500 0.750	0.048 0.054 0.060
(2) 3'x8'' Knife Plate	B	From Leg	0.000 0.000 0.000	0.000	60.000	No Ice 1/2" Ice	2.333 2.625 2.917	0.250 0.500 0.750	0.048 0.054 0.060

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) 3'x8" Knife Plate	C	From Leg	0.000 0.000 0.000	0.000	60.000	1" Ice No Ice 1/2" Ice 1" Ice	2.333 2.625 2.917	0.250 0.500 0.750	0.048 0.054 0.060

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
T1	180 - 168	Leg	Max Tension	7	1.573	-0.075	0.037
			Max. Compression	10	-2.162	-0.066	-0.037
			Max. Mx	8	1.223	0.146	-0.034
			Max. My	14	1.534	-0.000	0.150
			Max. Vy	8	0.145	-0.142	0.004
			Max. Vx	3	-0.140	-0.034	0.123
		Diagonal	Max Tension	11	0.547	0.000	0.000
			Max. Compression	22	-0.572	0.000	0.000
			Max. Mx	30	0.001	0.014	0.000
			Max. My	4	-0.562	-0.000	0.002
			Max. Vy	30	-0.017	0.014	0.000
			Max. Vx	4	-0.001	0.006	0.002
		Top Girt	Max Tension	18	0.129	0.000	0.000
			Max. Compression	7	-0.113	0.000	0.000
			Max. Mx	26	0.027	-0.024	0.000
			Max. Vy	26	0.024	0.000	0.000
T2	168 - 160	Leg	Max Tension	7	6.648	-0.021	0.011
			Max. Compression	18	-8.375	-0.012	0.013
			Max. Mx	8	-0.437	-0.142	0.004
			Max. My	14	-1.982	0.027	-0.126
			Max. Vy	8	-0.973	0.002	0.048
			Max. Vx	14	-0.966	-0.002	-0.025
		Diagonal	Max Tension	5	2.378	0.000	0.000
			Max. Compression	16	-2.453	0.000	0.000
			Max. Mx	37	0.623	0.021	0.001
			Max. My	4	-2.441	-0.007	0.004
			Max. Vy	37	-0.019	0.021	0.001
			Max. Vx	4	-0.001	0.012	0.004
T3	160 - 140	Leg	Max Tension	7	34.936	-0.391	-0.001
			Max. Compression	18	-43.293	0.338	0.005
			Max. Mx	22	10.723	-0.425	-0.001
			Max. My	4	-3.154	-0.020	0.572
			Max. Vy	22	-0.814	-0.425	-0.001
			Max. Vx	16	0.760	-0.021	0.184
		Diagonal	Max Tension	9	3.966	0.000	0.000
			Max. Compression	8	-4.028	0.000	0.000
			Max. Mx	31	0.968	0.025	0.002
			Max. My	8	-3.401	-0.009	-0.003
			Max. Vy	31	-0.023	0.024	0.002
			Max. Vx	30	0.001	0.000	0.000
T4	140 - 120	Leg	Max Tension	7	65.739	-0.261	-0.034
			Max. Compression	18	-77.580	0.298	0.040
			Max. Mx	6	43.486	-0.392	-0.005
			Max. My	16	-4.541	-0.030	0.457
			Max. Vy	14	-0.084	-0.265	0.004
			Max. Vx	19	0.117	-0.136	0.280
		Diagonal	Max Tension	8	4.854	0.000	0.000
			Max. Compression	8	-4.876	0.000	0.000
			Max. Mx	31	1.145	0.038	-0.005
			Max. My	29	1.185	0.035	-0.005
			Max. Vy	33	0.032	0.035	-0.005
			Max. Vx	29	0.002	0.000	0.000
T5	120 - 100	Leg	Max Tension	7	93.469	-0.334	-0.052
			Max. Compression	18	-108.677	0.409	0.062
			Max. Mx	3	-106.284	0.419	-0.034
			Max. My	16	-6.990	-0.006	0.551
			Max. Vy	14	0.101	-0.413	0.033
			Max. Vx	4	-0.148	-0.021	-0.418
		Diagonal	Max Tension	8	5.008	0.000	0.000
			Max. Compression	8	-5.049	0.000	0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	31	1.193	0.060	-0.007
			Max. My	29	1.170	0.055	-0.007
			Max. Vy	33	0.043	0.055	-0.007
			Max. Vx	29	0.002	0.000	0.000
T6	100 - 80	Leg	Max Tension	15	120.288	-0.417	0.005
			Max. Compression	18	-140.686	0.780	0.018
			Max. Mx	18	-140.686	0.780	0.018
			Max. My	16	-9.647	0.002	0.625
			Max. Vy	22	-0.703	-0.550	-0.009
			Max. Vx	16	0.610	-0.007	0.311
		Diagonal	Max Tension	8	6.184	0.000	0.000
			Max. Compression	8	-6.175	0.000	0.000
			Max. Mx	31	1.679	0.075	-0.009
			Max. My	29	-1.493	0.064	-0.010
			Max. Vy	29	0.054	0.075	-0.010
			Max. Vx	29	0.003	0.000	0.000
T7	80 - 60	Leg	Max Tension	7	145.033	-0.665	-0.008
			Max. Compression	18	-169.770	1.068	0.030
			Max. Mx	18	-169.770	1.068	0.030
			Max. My	16	-11.174	-0.086	0.967
			Max. Vy	22	0.131	-0.982	-0.004
			Max. Vx	16	-0.124	-0.086	0.967
		Diagonal	Max Tension	20	7.328	0.000	0.000
			Max. Compression	20	-7.399	0.000	0.000
			Max. Mx	29	1.942	0.125	0.016
			Max. My	35	1.801	0.122	0.017
			Max. Vy	29	0.071	0.125	0.016
			Max. Vx	35	-0.004	0.000	0.000
T8	60 - 40	Leg	Max Tension	7	170.723	-0.894	-0.008
			Max. Compression	18	-200.886	-0.104	0.011
			Max. Mx	18	-184.625	1.068	0.030
			Max. My	4	-14.667	-0.068	-0.949
			Max. Vy	22	-0.181	-0.914	-0.009
			Max. Vx	4	-0.117	0.019	-0.782
		Diagonal	Max Tension	20	7.854	0.000	0.000
			Max. Compression	20	-7.929	0.000	0.000
			Max. Mx	31	2.288	0.177	-0.023
			Max. My	34	2.406	0.171	0.023
			Max. Vy	29	0.092	0.173	0.022
			Max. Vx	34	-0.005	0.000	0.000
T9	40 - 20	Leg	Max Tension	7	194.728	1.395	-0.007
			Max. Compression	18	-230.560	-0.378	0.013
			Max. Mx	31	-122.191	-3.542	-0.004
			Max. My	4	-16.562	-0.364	-1.793
			Max. Vy	31	1.163	-3.542	-0.004
			Max. Vx	4	0.433	-0.364	-1.793
		Diagonal	Max Tension	21	8.305	0.092	-0.002
			Max. Compression	20	-8.735	0.000	0.000
			Max. Mx	31	1.427	0.206	0.015
			Max. My	28	-1.844	0.167	-0.019
			Max. Vy	29	0.098	0.190	0.015
			Max. Vx	28	-0.004	0.000	0.000
		Secondary Horizontal	Max Tension	18	3.998	0.000	0.000
			Max. Compression	18	-3.998	0.065	0.007
			Max. Mx	36	-0.350	0.178	0.037
			Max. My	30	-0.052	0.156	0.040
			Max. Vy	35	-0.101	0.160	0.038
			Max. Vx	30	-0.007	0.000	0.000
T10	20 - 0	Leg	Max Tension	7	218.222	-1.681	-0.006
			Max. Compression	2	-261.508	0.000	0.000
			Max. Mx	31	-129.265	4.779	-0.013
			Max. My	4	-19.844	-0.164	-2.350
			Max. Vy	31	-0.863	-3.542	-0.004
			Max. Vx	4	-0.324	-0.164	-2.350
		Diagonal	Max Tension	24	8.890	0.000	0.000
			Max. Compression	24	-9.148	0.000	0.000
			Max. Mx	29	0.374	0.261	-0.028
			Max. My	28	4.238	0.192	-0.032

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	29	0.107	0.261	-0.028
			Max. Vx	28	0.006	0.000	0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	268.621	24.297	-13.744
	Max. H_x	18	268.621	24.297	-13.744
	Max. H_z	5	-200.944	-18.333	12.107
	Min. Vert	7	-223.623	-21.024	11.872
	Min. H_x	7	-223.623	-21.024	11.872
	Min. H_z	18	268.621	24.297	-13.744
Leg B	Max. Vert	10	268.600	-24.138	-13.978
	Max. H_x	23	-222.852	20.867	12.078
	Max. H_z	25	-200.104	18.089	12.455
	Min. Vert	23	-222.852	20.867	12.078
	Min. H_x	10	268.600	-24.138	-13.978
	Min. H_z	10	268.600	-24.138	-13.978
Leg A	Max. Vert	2	268.753	0.259	27.927
	Max. H_x	20	20.867	3.062	1.527
	Max. H_z	2	268.753	0.259	27.927
	Min. Vert	15	-223.464	-0.235	-24.152
	Min. H_x	9	16.104	-3.054	1.173
	Min. H_z	15	-223.464	-0.235	-24.152

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	52.896	0.000	0.000	0.463	-3.565	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	63.475	0.024	-44.297	-4288.470	-8.773	8.798
0.9 Dead+1.6 Wind 0 deg - No Ice	47.606	0.024	-44.297	-4288.609	-7.703	8.798
1.2 Dead+1.6 Wind 30 deg - No Ice	63.475	22.371	-38.774	-3751.834	-2171.114	9.582
0.9 Dead+1.6 Wind 30 deg - No Ice	47.606	22.371	-38.774	-3751.973	-2170.045	9.582
1.2 Dead+1.6 Wind 60 deg - No Ice	63.475	36.709	-21.236	-2075.812	-3592.345	8.124
0.9 Dead+1.6 Wind 60 deg - No Ice	47.606	36.709	-21.236	-2075.951	-3591.276	8.124
1.2 Dead+1.6 Wind 90 deg - No Ice	63.475	44.702	-0.024	-3.939	-4330.166	4.227
0.9 Dead+1.6 Wind 90 deg - No Ice	47.606	44.702	-0.024	-4.078	-4329.097	4.227
1.2 Dead+1.6 Wind 120 deg - No Ice	63.475	38.301	22.128	2141.176	-3712.623	-1.112
0.9 Dead+1.6 Wind 120 deg - No Ice	47.606	38.301	22.128	2141.037	-3711.553	-1.112
1.2 Dead+1.6 Wind 150 deg - No Ice	63.475	22.330	38.750	3748.451	-2163.330	-5.200
0.9 Dead+1.6 Wind 150 deg - No Ice	47.606	22.330	38.750	3748.312	-2162.261	-5.200
1.2 Dead+1.6 Wind 180 deg - No Ice	63.475	-0.024	42.431	4145.507	0.216	-8.221
0.9 Dead+1.6 Wind 180 deg - No Ice	47.606	-0.024	42.431	4145.368	1.285	-8.221

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.6 Wind 210 deg - No Ice	63.475	-22.371	38.774	3752.945	2162.557	-9.582
0.9 Dead+1.6 Wind 210 deg - No Ice	47.606	-22.371	38.774	3752.806	2163.627	-9.582
1.2 Dead+1.6 Wind 240 deg - No Ice	63.475	-38.325	22.169	2148.960	3708.560	-8.478
0.9 Dead+1.6 Wind 240 deg - No Ice	47.606	-38.325	22.169	2148.821	3709.630	-8.478
1.2 Dead+1.6 Wind 270 deg - No Ice	63.475	-44.702	0.024	5.049	4321.609	-4.227
0.9 Dead+1.6 Wind 270 deg - No Ice	47.606	-44.702	0.024	4.911	4322.679	-4.227
1.2 Dead+1.6 Wind 300 deg - No Ice	63.475	-36.685	-21.195	-2068.028	3579.294	0.889
0.9 Dead+1.6 Wind 300 deg - No Ice	47.606	-36.685	-21.195	-2068.167	3580.364	0.889
1.2 Dead+1.6 Wind 330 deg - No Ice	63.475	-22.330	-38.750	-3747.340	2154.773	5.200
0.9 Dead+1.6 Wind 330 deg - No Ice	47.606	-22.330	-38.750	-3747.479	2155.843	5.200
1.2 Dead+1.0 Ice+1.0 Temp	168.850	0.000	0.000	19.506	-91.536	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	168.850	0.002	-14.129	-1366.133	-92.309	2.770
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	168.850	6.929	-12.035	-1165.621	-774.176	3.649
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	168.850	11.952	-6.922	-663.317	-1269.914	3.565
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	168.850	13.855	-0.002	18.733	-1455.477	2.360
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	168.850	12.199	7.063	711.655	-1287.614	0.528
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	168.850	6.926	12.034	1203.860	-772.837	-1.216
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	168.850	-0.002	13.842	1383.813	-90.762	-2.670
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	168.850	-6.929	12.035	1204.633	591.105	-3.649
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	168.850	-12.201	7.066	712.994	1105.316	-3.638
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	168.850	-13.855	0.002	20.279	1272.406	-2.360
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	168.850	-11.950	-6.919	-661.978	1086.070	-0.554
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	168.850	-6.926	-12.034	-1164.848	589.766	1.216
Dead+Wind 0 deg - Service	52.896	0.006	-11.524	-1115.309	-4.735	2.289
Dead+Wind 30 deg - Service	52.896	5.820	-10.087	-975.705	-567.258	2.493
Dead+Wind 60 deg - Service	52.896	9.550	-5.524	-539.695	-936.986	2.113
Dead+Wind 90 deg - Service	52.896	11.629	-0.006	-0.706	-1128.926	1.100
Dead+Wind 120 deg - Service	52.896	9.964	5.756	557.336	-968.275	-0.289
Dead+Wind 150 deg - Service	52.896	5.809	10.081	975.462	-565.233	-1.353
Dead+Wind 180 deg - Service	52.896	-0.006	11.038	1078.754	-2.396	-2.139
Dead+Wind 210 deg - Service	52.896	-5.820	10.087	976.631	560.128	-2.493
Dead+Wind 240 deg - Service	52.896	-9.970	5.767	559.361	962.313	-2.205
Dead+Wind 270 deg - Service	52.896	-11.629	0.006	1.632	1121.796	-1.100
Dead+Wind 300 deg - Service	52.896	-9.543	-5.514	-537.670	928.686	0.231
Dead+Wind 330 deg - Service	52.896	-5.809	-10.081	-974.536	558.103	1.353

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.000	-52.896	0.000	0.000	52.896	0.000	0.000%
2	0.024	-63.475	-44.297	-0.024	63.475	44.297	0.000%
3	0.024	-47.606	-44.297	-0.024	47.606	44.297	0.000%
4	22.371	-63.475	-38.774	-22.371	63.475	38.774	0.000%
5	22.371	-47.606	-38.774	-22.371	47.606	38.774	0.000%
6	36.709	-63.475	-21.236	-36.709	63.475	21.236	0.000%
7	36.709	-47.606	-21.236	-36.709	47.606	21.236	0.000%
8	44.702	-63.475	-0.024	-44.702	63.475	0.024	0.000%
9	44.702	-47.606	-0.024	-44.702	47.606	0.024	0.000%
10	38.301	-63.475	22.128	-38.301	63.475	-22.128	0.000%
11	38.301	-47.606	22.128	-38.301	47.606	-22.128	0.000%
12	22.330	-63.475	38.750	-22.330	63.475	-38.750	0.000%
13	22.330	-47.606	38.750	-22.330	47.606	-38.750	0.000%
14	-0.024	-63.475	42.431	0.024	63.475	-42.431	0.000%
15	-0.024	-47.606	42.431	0.024	47.606	-42.431	0.000%
16	-22.371	-63.475	38.774	22.371	63.475	-38.774	0.000%
17	-22.371	-47.606	38.774	22.371	47.606	-38.774	0.000%
18	-38.325	-63.475	22.169	38.325	63.475	-22.169	0.000%
19	-38.325	-47.606	22.169	38.325	47.606	-22.169	0.000%
20	-44.702	-63.475	0.024	44.702	63.475	-0.024	0.000%
21	-44.702	-47.606	0.024	44.702	47.606	-0.024	0.000%
22	-36.685	-63.475	-21.195	36.685	63.475	21.195	0.000%
23	-36.685	-47.606	-21.195	36.685	47.606	21.195	0.000%
24	-22.330	-63.475	-38.750	22.330	63.475	38.750	0.000%
25	-22.330	-47.606	-38.750	22.330	47.606	38.750	0.000%
26	0.000	-168.850	0.000	-0.000	168.850	-0.000	0.000%
27	0.002	-168.850	-14.129	-0.002	168.850	14.129	0.000%
28	6.929	-168.850	-12.035	-6.929	168.850	12.035	0.000%
29	11.952	-168.850	-6.922	-11.952	168.850	6.922	0.000%
30	13.855	-168.850	-0.002	-13.855	168.850	0.002	0.000%
31	12.199	-168.850	7.063	-12.199	168.850	-7.063	0.000%
32	6.926	-168.850	12.034	-6.926	168.850	-12.034	0.000%
33	-0.002	-168.850	13.842	0.002	168.850	-13.842	0.000%
34	-6.929	-168.850	12.035	6.929	168.850	-12.035	0.000%
35	-12.201	-168.850	7.066	12.201	168.850	-7.066	0.000%
36	-13.855	-168.850	0.002	13.855	168.850	-0.002	0.000%
37	-11.950	-168.850	-6.919	11.950	168.850	6.919	0.000%
38	-6.926	-168.850	-12.034	6.926	168.850	12.034	0.000%
39	0.006	-52.896	-11.524	-0.006	52.896	11.524	0.000%
40	5.820	-52.896	-10.087	-5.820	52.896	10.087	0.000%
41	9.550	-52.896	-5.524	-9.550	52.896	5.524	0.000%
42	11.629	-52.896	-0.006	-11.629	52.896	0.006	0.000%
43	9.964	-52.896	5.756	-9.964	52.896	-5.756	0.000%
44	5.809	-52.896	10.081	-5.809	52.896	-10.081	0.000%
45	-0.006	-52.896	11.038	0.006	52.896	-11.038	0.000%
46	-5.820	-52.896	10.087	5.820	52.896	-10.087	0.000%
47	-9.970	-52.896	5.767	9.970	52.896	-5.767	0.000%
48	-11.629	-52.896	0.006	11.629	52.896	-0.006	0.000%
49	-9.543	-52.896	-5.514	9.543	52.896	5.514	0.000%
50	-5.809	-52.896	-10.081	5.809	52.896	10.081	0.000%

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Diagonal	A325N	0.625	1	0.547	7.875	0.069	1	Member Block Shear
		Top Girt	A325N	0.625	1	0.129	5.836	0.022	1	Member Block Shear
T2	168	Leg	A325N	0.625	4	1.368	20.709	0.066	1	Bolt Tension

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
		Diagonal	A325N	0.625	1	2.378	7.875	0.302	1	Member Block Shear
T3	160	Leg	A325N	0.625	4	8.734	20.709	0.422	1	Bolt Tension
		Diagonal	A325N	0.625	1	3.966	7.875	0.504	1	Member Block Shear
T4	140	Leg	A325N	0.750	4	16.435	29.821	0.551	1	Bolt Tension
		Diagonal	A325N	0.625	1	4.854	7.875	0.616	1	Member Block Shear
T5	120	Leg	A325N	0.750	4	23.367	29.821	0.784	1	Bolt Tension
		Diagonal	A325N	0.625	1	5.008	9.914	0.505	1	Member Block Shear
T6	100	Leg	A325N	0.875	4	30.072	40.589	0.741	1	Bolt Tension
		Diagonal	A325N	0.625	1	6.184	9.914	0.624	1	Member Block Shear
T7	80	Leg	A325N	0.875	4	36.258	40.589	0.893	1	Bolt Tension
		Diagonal	A325N	0.625	1	7.328	10.934	0.670	1	Member Block Shear
T8	60	Leg	A325N	1.000	4	42.681	53.014	0.805	1	Bolt Tension
		Diagonal	A325N	0.625	1	7.929	12.425	0.638	1	Bolt Shear
T9	40	Leg	A325N	1.000	4	48.595	53.014	0.917	1	Bolt Tension
		Diagonal	A325N	0.625	1	8.735	12.425	0.703	1	Bolt Shear
		Secondary Horizontal	A325N	0.500	1	3.998	7.952	0.503	1	Bolt Shear
T10	20	Leg	A36	1.500	6	36.370	57.653	0.631	1	Bolt Tension
		Diagonal	A325N	0.625	1	9.148	12.425	0.736	1	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 168	P2x.154	12.000	4.000	61.0 K=1.00	1.075	-2.162	27.981	0.077 [1]
T2	168 - 160	P2x.154 (GR)	8.000	4.000	61.0 K=1.00	1.075	-8.375	38.430	0.218 [1]
T3	160 - 140	P3x.216 (GR)	20.033	5.008	51.7 K=1.00	2.228	-43.293	87.013	0.498 [1]
T4	140 - 120	P3.5x.318 (GR)	20.033	6.678	61.3 K=1.00	3.678	-77.580	122.133	0.635 [1]
T5	120 - 100	P4x.337 (GR)	20.033	6.678	54.3 K=1.00	4.407	-108.677	157.190	0.691 [1]
T6	100 - 80	P5x.375 (GR)	20.033	6.678	43.6 K=1.00	6.112	-140.686	242.300	0.581 [1]
T7	80 - 60	P6x.432 (GR)	20.033	10.017	54.8 K=1.00	8.405	-169.770	314.315	0.540 [1]
T8	60 - 40	P6x.432 (GR)	20.033	10.017	54.8 K=1.00	8.405	-200.886	314.315	0.639 [1]
T9	40 - 20	P6x.432 (GR)	20.033	5.151	28.2 K=1.00	8.405	-230.560	362.711	0.636 [1]
T10	20 - 0	P8x.5 (GR)	20.033	10.017	41.8 K=1.00	12.763	-261.508	543.634	0.481 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 168	L2x1 1/2x3/16	5.657	2.543	101.1 K=1.07	0.621	-0.572	11.752	0.049 [1]
T2	168 - 160	L2x1 1/2x3/16	5.657	2.543	101.1 K=1.07	0.621	-2.453	11.752	0.209 [1]
T3	160 - 140	L2x1 1/2x3/16	7.621	3.637	135.6 K=1.00	0.621	-4.028	7.635	0.528 [1]
T4	140 - 120	L2x2x3/16	10.162	4.935	150.3 K=1.00	0.715	-4.744	7.150	0.663 [1]
T5	120 - 100	L2 1/2x2x3/16	11.744	5.701	160.2 K=1.00	0.809	-5.049	7.120	0.709 [1]
T6	100 - 80	L2 1/2x2 1/2x3/16	13.438	6.498	157.5 K=1.00	0.902	-6.175	8.211	0.752 [1]
T7	80 - 60	L3x3x3/16	16.803	8.223	165.6 K=1.00	1.090	-7.399	8.983	0.824 [1]
T8	60 - 40	L3 1/2x3x1/4	18.448	9.047	172.1 K=1.00	1.560	-7.929	11.905	0.666 [1]
T9	40 - 20	L3 1/2x3x1/4	20.158	10.049	191.1 K=1.00	1.560	-8.735	9.650	0.905 [1]
T10	20 - 0	L3 1/2x3 1/2x1/4	21.916	10.690	184.8 K=1.00	1.690	-9.148	11.176	0.819 [1]

[1] P_u / ϕP_n controls

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T9	40 - 20	L3 1/2x3 1/2x1/4	17.486	16.934	93.2 K=0.50	1.690	-3.998	34.656	0.115 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 168	L1 1/2x2x3/16	4.000	3.510	130.8 K=1.00	0.621	-0.113	8.172	0.014 [1]

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	180 - 168	P2x.154	12.000	4.000	61.0	1.075	1.573	33.848	0.046 [1]
T2	168 - 160	P2x.154 (GR)	8.000	4.000	61.0	1.075	5.470	33.848	0.162 [1]
T3	160 - 140	P3x.216 (GR)	20.033	5.008	51.7	2.228	34.936	70.197	0.498 [1]
T4	140 - 120	P3.5x.318 (GR)	20.033	6.678	61.3	3.678	65.739	115.870	0.567 [1]
T5	120 - 100	P4x.337 (GR)	20.033	6.678	54.3	4.407	93.469	138.834	0.673 [1]
T6	100 - 80	P5x.375 (GR)	20.033	6.678	43.6	6.112	120.288	192.527	0.625 [1]
T7	80 - 60	P6x.432 (GR)	20.033	10.017	54.8	8.405	145.033	264.756	0.548 [1]
T8	60 - 40	P6x.432 (GR)	20.033	10.017	54.8	8.405	170.723	264.756	0.645 [1]
T9	40 - 20	P6x.432 (GR)	20.033	4.865	26.6	8.405	194.728	264.756	0.735 [1]
T10	20 - 0	P8x.5 (GR)	20.033	10.017	41.8	12.763	218.222	402.026	0.543 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	180 - 168	L2x1 1/2x3/16	5.657	2.543	73.4	0.360	0.547	15.675	0.035 [1]
T2	168 - 160	L2x1 1/2x3/16	5.657	2.543	73.4	0.360	2.378	15.675	0.152 [1]
T3	160 - 140	L2x1 1/2x3/16	7.621	3.637	103.3	0.360	3.966	15.675	0.253 [1]
T4	140 - 120	L2x2x3/16	9.197	4.474	89.9	0.431	4.854	18.739	0.259 [1]
T5	120 - 100	L2 1/2x2x3/16	11.744	5.701	117.0	0.501	5.008	21.806	0.230 [1]
T6	100 - 80	L2 1/2x2 1/2x3/16	13.438	6.498	102.5	0.571	6.184	24.840	0.249 [1]
T7	80 - 60	L3x3x3/16	16.803	8.223	107.0	0.712	7.328	30.973	0.237 [1]
T8	60 - 40	L3 1/2x3x1/4	18.448	9.047	120.8	1.029	7.854	44.778	0.175 [1]
T9	40 - 20	L3 1/2x3x1/4	20.158	10.049	132.1	1.029	8.305	44.778	0.185 [1]
T10	20 - 0	L3 1/2x3 1/2x1/4	21.916	10.690	119.3	1.127	8.890	49.019	0.181 [1]

[1] P_u / ϕP_n controls

Secondary Horizontal Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T9	40 - 20	L3 1/2x3 1/2x1/4	17.486	16.934	186.4	1.150	3.998	50.039	0.080 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	180 - 168	L1 1/2x2x3/16	4.000	3.510	103.8	0.360	0.129	15.675	0.008 [1]

[1] P_u / ϕP_n controls

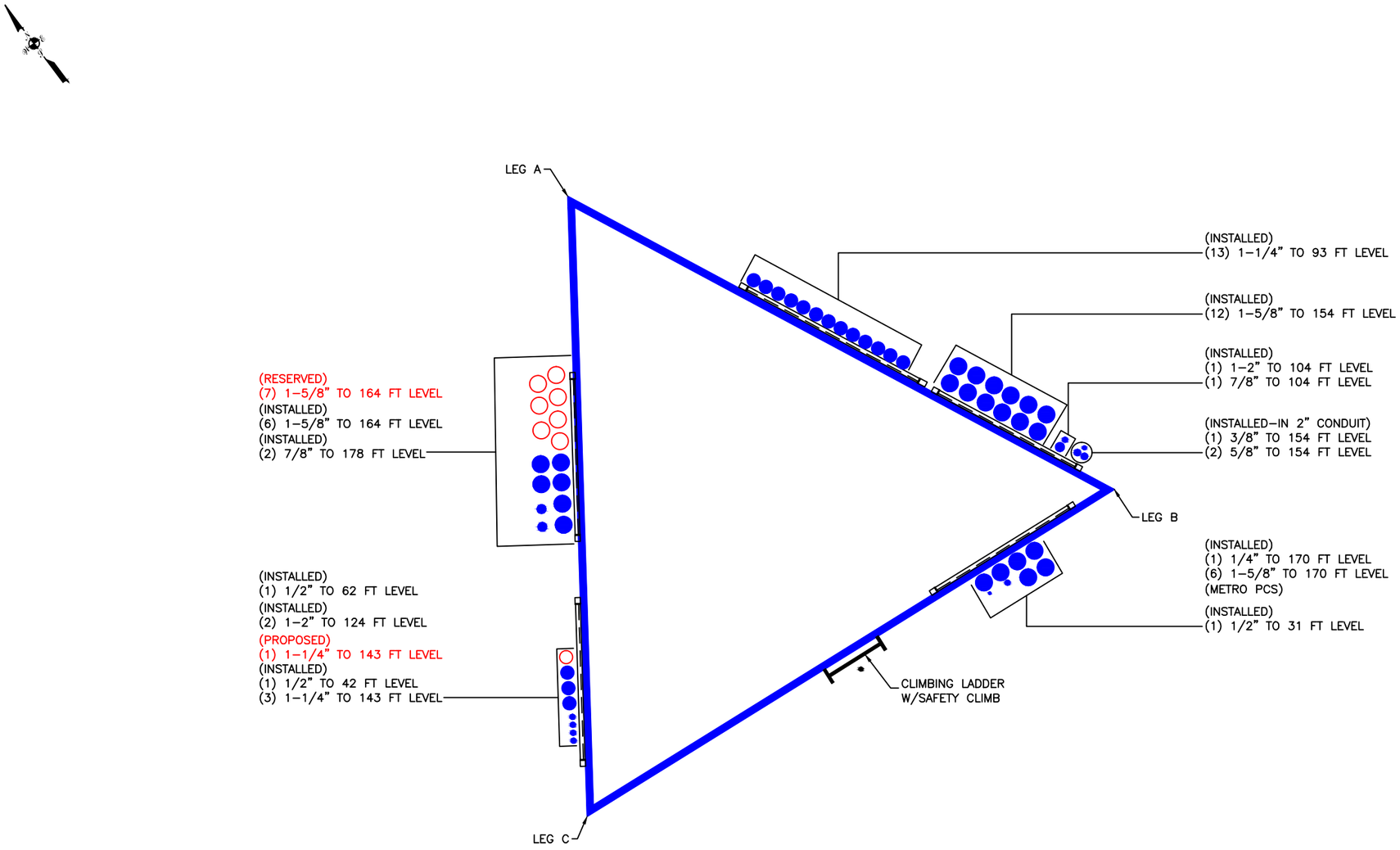
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	180 - 168	Leg	P2x.154	2	-2.162	27.981	7.7	Pass
T2	168 - 160	Leg	P2x.154 (GR)	25	-8.375	38.430	21.8	Pass
T3	160 - 140	Leg	P3x.216 (GR)	40	34.936	70.197	49.8	Pass
T4	140 - 120	Leg	P3.5x.318 (GR)	67	-77.580	122.133	63.5	Pass
T5	120 - 100	Leg	P4x.337 (GR)	88	-108.677	157.190	69.1	Pass
							78.4 (b)	
T6	100 - 80	Leg	P5x.375 (GR)	111	120.288	192.527	62.5	Pass
							74.1 (b)	
T7	80 - 60	Leg	P6x.432 (GR)	130	145.033	264.756	54.8	Pass
							89.3 (b)	
T8	60 - 40	Leg	P6x.432 (GR)	145	170.723	264.756	64.5	Pass
							80.5 (b)	
T9	40 - 20	Leg	P6x.432 (GR)	160	194.728	264.756	73.5	Pass
							91.7 (b)	
T10	20 - 0	Leg	P8x.5 (GR)	181	218.222	402.026	54.3	Pass
							63.1 (b)	
T1	180 - 168	Diagonal	L2x1 1/2x3/16	10	-0.572	11.752	4.9	Pass
							6.9 (b)	
T2	168 - 160	Diagonal	L2x1 1/2x3/16	33	-2.453	11.752	20.9	Pass
							30.2 (b)	
T3	160 - 140	Diagonal	L2x1 1/2x3/16	44	-4.028	7.635	52.8	Pass
T4	140 - 120	Diagonal	L2x2x3/16	71	-4.744	7.150	66.3	Pass
T5	120 - 100	Diagonal	L2 1/2x2x3/16	92	-5.049	7.120	70.9	Pass
T6	100 - 80	Diagonal	L2 1/2x2 1/2x3/16	113	-6.175	8.211	75.2	Pass
T7	80 - 60	Diagonal	L3x3x3/16	133	-7.399	8.983	82.4	Pass
T8	60 - 40	Diagonal	L3 1/2x3x1/4	148	-7.929	11.905	66.6	Pass
T9	40 - 20	Diagonal	L3 1/2x3x1/4	163	-8.735	9.650	90.5	Pass
T10	20 - 0	Diagonal	L3 1/2x3 1/2x1/4	187	-9.148	11.176	81.9	Pass
T9	40 - 20	Secondary Horizontal	L3 1/2x3 1/2x1/4	169	-3.998	34.656	11.5	Pass
							50.3 (b)	
T1	180 - 168	Top Girt	L1 1/2x2x3/16	5	-0.113	8.172	1.4	Pass
							2.2 (b)	
							Summary	
						Leg (T9)	91.7	Pass
						Diagonal (T9)	90.5	Pass
						Secondary Horizontal (T9)	50.3	Pass
						Top Girt (T1)	2.2	Pass
						Bolt Checks	91.7	Pass
						RATING =	**91.7***	**Pass**

*Due to limitations of the TNXTOWER software when analyzing leg connection with additional knife plates, the above output has not been used to determine the governing tower usage. Please see additional calculation results in Appendix C which are based on the Section forces generated in this output.

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 806353 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

CALCULATION SHEET

Leg Splice Connection Check - 60'

Input Properties:

$E := 60ft$	Elevation of leg splice connection
$F_y := 35ksi$	Yield stress of leg
$F_u := 60ksi$	Tensile stress of leg
$b := 3 \cdot in$	Knife Plate Width
$t := 1.0 \cdot in$	Knife Plate thickness
$F_{ukp} := 65ksi$	Ultimate strength of Knife plate steel
$F_{ykp} := 50ksi$	Yield Strength of Knife plate Steel
$n_{pl} := 2$	Number of Knife Plates
$\phi_{bo} := 0.875 \cdot in$	Diameter of flange bolts
$n_b := 4$	Number of flange bolts

Input Loads:

$Code := "TIA-G"$	Version of the TIA
$T_u := 145.03kip$	Maximum leg tension load
$P_u := 169.77kip$	Maximum leg compression load
$U := 1.00$	Shear lag coefficient
$\phi_t := 0.90$	Tension Yielding
$\phi_{tr} := 0.75$	Tension Rupture
$\phi_b := 0.75$	Bolt Shear

Leg Capacity:

leg above splice

$A_{gt} := 7.88in^2$ Gross area of top leg (P6x0.432)

$GrossAllowableTension_{tm} := \phi_t \cdot F_y \cdot A_{gt} = 248.22 \cdot kip$

$A_{gtnm} := 7.88 \cdot in^2$ Gross area of top leg (P6x0.432)

$GrossAllowableTension_{tnm} := \phi_t \cdot F_y \cdot A_{gtnm} = 248.22 \cdot kip$

Leg below splice

$A_{gb} := 7.88in^2$ Gross area of top leg (P6x0.432)

$GrossAllowableTension_{bm} := \phi_t \cdot F_y \cdot A_{gb} = 248.22 \cdot kip$

$A_{gbnm} := 7.88in^2$ Gross area of top leg (P6x0.432)

$GrossAllowableTension_{bnm} := \phi_t \cdot F_y \cdot A_{gbnm} = 248.22 \cdot kip$

Knife Plate Capacity:

COMPRESSION CHECK

$A_{kp} := b \cdot t = 3 \cdot in^2$ Area of the knife plate

$K := 1$

$L_{kp} := 2ft$ Unbraced length of the knife plate

$I_{kp} := \frac{\left(b \cdot t^3\right)}{12} = 0.25 \cdot in^4$

$r_{kp} := \sqrt{\frac{I_{kp}}{A_{kp}}} = 0.2887 \cdot in$

$E := 29000ksi$

$\frac{K \cdot L_{kp}}{r_{kp}} = 83.1384$

$F_e := \frac{\left(\pi^2 \cdot E\right)}{\left(\frac{K \cdot L_{kp}}{r_{kp}}\right)^2} = 41.4089 \cdot ksi$

$$F_{cr} := \begin{cases} 0.658^{\frac{F_{ykp}}{F_e}} \cdot F_{ykp} & \text{if } \frac{K \cdot L_{kp}}{r_{kp}} \le 4.71 \cdot \sqrt{\frac{E}{F_{ykp}}} \\ 0.877 \cdot F_e & \text{otherwise} \end{cases} = 30.1636 \cdot ksi$$

$\phi_c := 0.9$

$KPUltimateComp := \phi_c \cdot F_{cr} \cdot n_{pl} \cdot A_{kp} = 162.8835 \cdot kip$

TENSILE CHECK

$\phi := 0.9$

$R_{tkp} := F_{ykp} \cdot n_{pl} \cdot A_{kp} = 300 \cdot kip$ Nominal Tensile strength of Knife Plates

$KPUltimateTen := \phi_c \cdot R_{tkp} = 270 \cdot kip$

$R_{kpc} := \frac{n_{pl} A_{kp}}{\left(A_{gtnm} + n_{pl} A_{kp}\right)} = 43.2277 \cdot \%$ Percent of compressive load in knife plates

$R_{lc} := 1 - R_{kpc} = 56.7723 \cdot \%$ Percent of compressive load in tower legs

$R_{kpt} := \frac{n_{pl} A_{kp}}{\left(A_{gtnm} + n_{pl} A_{kp}\right)} = 43.2277 \cdot \%$ Percent of tensile load in knife plates

$R_{lt} := 1 - R_{kpt} = 56.7723 \cdot \%$ Percent of tensile load in tower legs

CALCULATION SHEET

Flange Bolt Capacity:

$F_u := 120 \cdot ksi$

Specified Minimum Tensile strength of A325 bolts between 0.5" & 1" Diameter.

$A_{gb} := \frac{\phi_{bo}^{2} \cdot \pi}{4} = 0.6013 \cdot in^2$

Nominal area of one flange bolt.

$A_{nb} := 0.75 \cdot A_{gb}$

Net are of one flange bolt.

$BoltUltimateTen := \phi_b \cdot A_{nb} \cdot F_u \cdot n_b = 162.3565 \cdot kip$

Ultimate resistance of flange bolt grouping.

CALCULATION SHEET

Summary:

$LegAboveTension := T_u = 145.03 \cdot kip$

$$Test := \begin{cases} \text{"Pass"} & \text{if } LegAboveTension < GrossAllowableTension_{tm} \\ \text{"Fail "} & \text{otherwise} \end{cases}$$

$Test = \text{"Pass"}$

$$StressRatio := \frac{LegAboveTension}{GrossAllowableTension_{tm}} = 58.43 \cdot \%$$

$$Test := \begin{cases} \text{"Pass"} & \text{if } LegAboveTension \cdot R_{lt} < GrossAllowableTension_{tnm} \\ \text{"Fail "} & \text{otherwise} \end{cases}$$

$Test = \text{"Pass"}$

$$StressRatio := \frac{LegAboveTension \cdot R_{lt}}{GrossAllowableTension_{tnm}} = 33.17 \cdot \%$$

$$Test := \begin{cases} \text{"Pass"} & \text{if } LegAboveTension \cdot R_{kpt} < KPUltimateTen \\ \text{"Fail "} & \text{otherwise} \end{cases}$$

$Test = \text{"Pass"}$

$$StressRatio := \frac{LegAboveTension \cdot R_{kpt}}{KPUltimateTen} = 23.22 \cdot \%$$

$$Test := \begin{cases} \text{"Pass"} & \text{if } LegAboveTension \cdot R_{lt} < BoltUltimateTen \\ \text{"Fail "} & \text{otherwise} \end{cases}$$

$Test = \text{"Pass"}$

$$StressRatio := \frac{LegAboveTension \cdot R_{lt}}{BoltUltimateTen} = 50.71 \cdot \%$$

$$Test := \begin{cases} \text{"Pass"} & \text{if } LegAboveTension \cdot R_{lt} < GrossAllowableTension_{bnm} \\ \text{"Fail "} & \text{otherwise} \end{cases}$$

$Test = \text{"Pass"}$

$$StressRatio := \frac{LegAboveTension \cdot R_{lt}}{GrossAllowableTension_{bnm}} = 33.17 \cdot \%$$

$$Test := \begin{cases} \text{"Pass"} & \text{if } LegAboveTension < GrossAllowableTension_{bm} \\ \text{"Fail "} & \text{otherwise} \end{cases}$$

$Test = \text{"Pass"}$

$$StressRatio := \frac{LegAboveTension}{GrossAllowableTension_{bm}} = 58.43 \cdot \%$$

CALCULATION SHEET

$LegAboveCompression := P_u = 169.77 \cdot kip$

$$Test := \begin{cases} \text{"Pass"} & \text{if } LegAboveCompression \cdot R_{kpc} < KPUltimateComp \\ \text{"Fail "} & \text{otherwise} \end{cases}$$

$Test = \text{"Pass"}$

$$StressRatio := \frac{LegAboveCompression \cdot R_{kpc}}{KPUltimateComp} = 45.06 \cdot \%$$

CALCULATION SHEET

Leg Splice Connection Check - 20'

Input Properties:

$E := 20ft$	Elevation of leg splice connection
$F_y := 35ksi$	Yield stress of leg
$F_u := 60ksi$	Tensile stress of leg
$b := 3 \cdot in$	Knife Plate Width
$t := 1 \cdot in$	Knife Plate thickness
$F_{ukp} := 65ksi$	Ultimate strength of Knife plate steel
$F_{ykp} := 50ksi$	Yield Strength of Knife plate Steel
$n_{pl} := 2$	Number of Knife Plates
$\phi_{bo} := 1.0 \cdot in$	Diameter of flange bolts
$n_b := 4$	Number of flange bolts

Input Loads:

$Code := "TIA-G"$	Version of the TIA
$T_u := 194.73kip$	Maximum leg tension load
$P_u := 230.56kip$	Maximum leg compression load
$U := 1.00$	Shear lag coefficient
$\phi_t := 0.90$	Tension Yielding
$\phi_{tr} := 0.75$	Tension Rupture
$\phi_b := 0.75$	Bolt Shear

Leg Capacity:

leg above splice

$A_{gt} := 7.88in^2$ Gross area of top leg (P6x0.432)

$GrossAllowableTension_{tm} := \phi_t \cdot F_y \cdot A_{gt} = 248.22 \cdot kip$

$A_{gtnm} := 7.88 \cdot in^2$ Gross area of top leg (P6x0.432)

$GrossAllowableTension_{tnm} := \phi_t \cdot F_y \cdot A_{gtnm} = 248.22 \cdot kip$

Leg below splice

$A_{gb} := 11.9in^2$ Gross area of bottom leg (P8x0.5)

$GrossAllowableTension_{bm} := \phi_t \cdot F_y \cdot A_{gb} = 374.85 \cdot kip$

$A_{gbnm} := 11.9in^2$ Gross area of bottom leg (P8x0.5)

$GrossAllowableTension_{bnm} := \phi_t \cdot F_y \cdot A_{gbnm} = 374.85 \cdot kip$

Knife Plate Capacity:

COMPRESSION CHECK

$A_{kp} := b \cdot t = 3 \cdot in^2$ Area of the knife plate

$K := 1$

$L_{kp} := 2ft$ Unbraced length of the knife plate

$I_{kp} := \frac{(b \cdot t^3)}{12} = 0.25 \cdot in^4$

$r_{kp} := \sqrt{\frac{I_{kp}}{A_{kp}}} = 0.2887 \cdot in$

$E := 29000ksi$

$\frac{K \cdot L_{kp}}{r_{kp}} = 83.1384$

$F_e := \frac{(\pi^2 \cdot E)}{\left(\frac{K \cdot L_{kp}}{r_{kp}}\right)^2} = 41.4089 \cdot ksi$

$$F_{cr} := \begin{cases} 0.658^{\frac{F_{ykp}}{F_e}} \cdot F_{ykp} & \text{if } \frac{K \cdot L_{kp}}{r_{kp}} \le 4.71 \cdot \sqrt{\frac{E}{F_{ykp}}} \\ 0.877 \cdot F_e & \text{otherwise} \end{cases} = 30.1636 \cdot ksi$$

$\phi_c := 0.9$

$KPUltimateComp := \phi_c \cdot F_{cr} \cdot n_{pl} \cdot A_{kp} = 162.8835 \cdot kip$

TENSILE CHECK

$\phi := 0.9$

$R_{tkp} := F_{ykp} \cdot n_{pl} \cdot A_{kp} = 300 \cdot kip$ Nominal Tensile strength of Knife Plates

$KPUltimateTen := \phi_c \cdot R_{tkp} = 270 \cdot kip$

$R_{kpc} := \frac{n_{pl} A_{kp}}{(A_{gtnm} + n_{pl} A_{kp})} = 43.2277 \cdot \%$ Percent of compressive load in knife plates

$R_{lc} := 1 - R_{kpc} = 56.7723 \cdot \%$ Percent of compressive load in tower legs

$R_{kpt} := \frac{n_{pl} A_{kp}}{(A_{gtnm} + n_{pl} A_{kp})} = 43.2277 \cdot \%$ Percent of tensile load in knife plates

$R_{lt} := 1 - R_{kpt} = 56.7723 \cdot \%$ Percent of tensile load in tower legs

CALCULATION SHEET

Flange Bolt Capacity:

$F_u := 120 \cdot ksi$ — Specified Minimum Tensile strength of A325 bolts between 0.5" & 1" Diameter.

$A_{gb} := \frac{\phi_{bo}^{2} \cdot \pi}{4} = 0.7854 \cdot in^2$ — Nominal area of one flange bolt.

$A_{nb} := 0.75 \cdot A_{gb}$ — Net are of one flange bolt.

$BoltUltimateTen := \phi_b \cdot A_{nb} \cdot F_u \cdot n_b = 212.0575 \cdot kip$ — Ultimate resistance of flange bolt grouping.

CALCULATION SHEET

Summary:

$LegAboveTension := T_u = 194.73 \cdot kip$

$$Test := \begin{cases} "Pass" & \text{if } LegAboveTension < GrossAllowableTension_{tm} \\ "Fail\ " & \text{otherwise} \end{cases}$$

$Test = "Pass"$

$$StressRatio := \frac{LegAboveTension}{GrossAllowableTension_{tm}} = 78.45 \cdot \%$$

$$Test := \begin{cases} "Pass" & \text{if } LegAboveTension \cdot R_{lt} < GrossAllowableTension_{tnm} \\ "Fail\ " & \text{otherwise} \end{cases}$$

$Test = "Pass"$

$$StressRatio := \frac{LegAboveTension \cdot R_{lt}}{GrossAllowableTension_{tnm}} = 44.54 \cdot \%$$

$$Test := \begin{cases} "Pass" & \text{if } LegAboveTension \cdot R_{kpt} < KPUltimateTen \\ "Fail\ " & \text{otherwise} \end{cases}$$

$Test = "Pass"$

$$StressRatio := \frac{LegAboveTension \cdot R_{kpt}}{KPUltimateTen} = 31.18 \cdot \%$$

$$Test := \begin{cases} "Pass" & \text{if } LegAboveTension \cdot R_{lt} < BoltUltimateTen \\ "Fail\ " & \text{otherwise} \end{cases}$$

$Test = "Pass"$

$$StressRatio := \frac{LegAboveTension \cdot R_{lt}}{BoltUltimateTen} = 52.13 \cdot \%$$

$$Test := \begin{cases} "Pass" & \text{if } LegAboveTension \cdot R_{lt} < GrossAllowableTension_{bnm} \\ "Fail\ " & \text{otherwise} \end{cases}$$

$Test = "Pass"$

$$StressRatio := \frac{LegAboveTension \cdot R_{lt}}{GrossAllowableTension_{bnm}} = 29.49 \cdot \%$$

$$Test := \begin{cases} "Pass" & \text{if } LegAboveTension < GrossAllowableTension_{bm} \\ "Fail\ " & \text{otherwise} \end{cases}$$

$Test = "Pass"$

$$StressRatio := \frac{LegAboveTension}{GrossAllowableTension_{bm}} = 51.95 \cdot \%$$

CALCULATION SHEET

$LegAboveCompression := P_u = 230.56 \cdot kip$

$$Test := \begin{cases} \text{"Pass"} & \text{if } LegAboveCompression \cdot R_{kpc} < KPUltimateComp \\ \text{"Fail "} & \text{otherwise} \end{cases}$$

$Test = \text{"Pass"}$

$$StressRatio := \frac{LegAboveCompression \cdot R_{kpc}}{KPUltimateComp} = 61.19 \cdot \%$$

Anchor Rod Check for Self Supporting Towers

TIA-222-G, Section 4.9.9 Rev. 6.1

Site Data	
BU#:	**806353**
Site Name:	**BRG 124 943066**
App #:	**320434 rev 9**

Anchor Rod Data		
Qty:	**6**	
Diam:	**1.5**	in
Rod Material:	**A36**	
Strength (Fu):	58	ksi
Yield (Fy):	36	ksi

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

Mu= Pu x e:		ft-kips

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

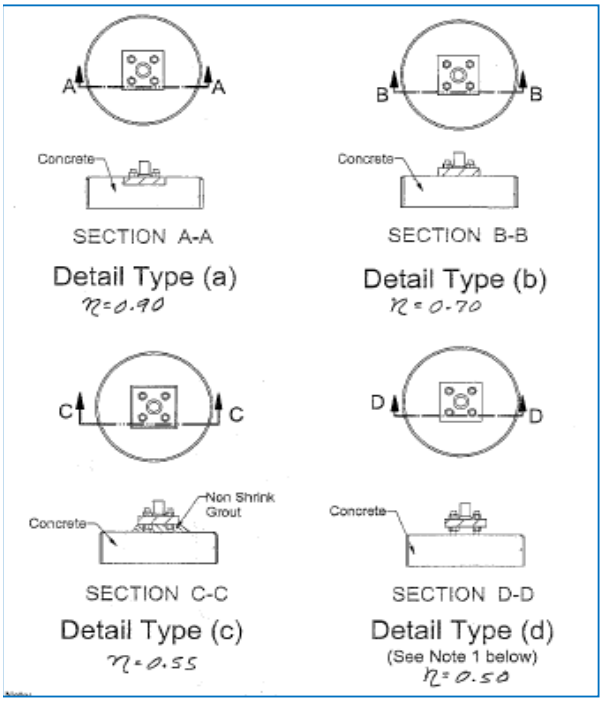


Figure 4-4 of TIA-222-G

Reactions		
Eta Factor, η	**0.55**	Detail Type
Uplift, Pu:	**224**	kips
Shear, Vu:	**24**	kips

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

Anchor Rod Results:

Max Rod (Cu+ Vu/ή):	44.6	Kips
Design Axial, Φ*Fu*Anet:	65.4	Kips
Anchor Rod Stress Ratio:	68.2%	

If Applicable;

Anchor Rod Results with Bending Considered:

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

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

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

Maximum Acceptable Ratio:	**105**	%
Governing Stress Ratio:	**68.2%**	**Pass**

Drilled Pier Foundation

BU # :	806353
Site Name:	BRG 124 943066
App. Number:	399311 Rev.0

TIA-222 Revison:	G
Tower Type:	Self Support

Applied Loads	**Comp.**	**Uplift**
Moment (kip-ft)	0	0
Axial Force (kips)	269	224
Shear Force (kips)	28	24

Material Properties		
Concrete Strength, f'c:	3	ksi
Rebar Strength, Fy:	60	ksi

Pier Design Data		
Depth	13.2	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 13.2' below grade		
Pier Diameter	2.5	ft
Rebar Quantity	14	
Rebar Size	8	
Clear Cover to Ties	3	in
Tie Size	4	

Analysis Results		
Soil Lateral Capacity	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	7.81	7.81
Soil Safety Factor	8.00	9.33
Max Moment (kip-ft)	173.49	148.71
Rating	*16.6%*	*14.2%*
Soil Vertical Capacity	*Compression*	*Uplift*
Skin Friction (kips)	191.24	191.24
End Bearing (kips)	206.28	-
Weight of Concrete (kips)	12.10	9.08
Total Capacity (kips)	637.52	440.32
Axial (kips)	281.10	224.00
Rating	*44.1%*	*50.8%*
Reinforced Concrete Capacity	*Compression*	*Uplift*
Critical Depth (ft from TOC)	7.82	7.43
Critical Moment (kip-ft)	173.49	147.49
Critical Moment Capacity	559.41	373.76
Rating	*31.0%*	*39.5%*

Soil Interaction Rating	**50.8%**
Structural Foundation Rating	**39.5%**

Uplift and bearing capacities have been adjusted to account for the existing foundation modification.

Soil Profile

Groundwater Depth	n/a	ft	
# of Layers	3		

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ultimate Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	5	5	110	150	0	0	0.000	0.000					Cohesionless
2	5	6	1	110	150	0	30	0.000	0.000	0.77	0.77			Cohesionless
3	6	13.2	7.2	140	150	8	0	3.600	3.600	4.40	4.40	56.03		Cohesive

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

SPRINT Existing Facility

Site ID: CT03XC369

N. Wilton
128 Mather Street
Wilton, CT 06897

October 17, 2017

EBI Project Number: 6217004509

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	15.50 %

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

EBI Consulting
environmental | engineering | due diligence

October 17, 2017

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

Emissions Analysis for Site: **CT03XC369 – N. Wilton**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **128 Mather Street, Wilton, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed SPRINT Wireless antenna facility located at **128 Mather Street, Wilton, 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-I20** for transmission in the 850 MHz, 1900 MHz (PCS) and 2500 MHz (BRS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, 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 **143 feet** above ground level (AGL) for **Sector A**, **143 feet** above ground level (AGL) for **Sector B** and **143 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):	**143 feet**	Height (AGL):	**143 feet**	Height (AGL):	**143 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%	**1.64 %**	Antenna B1 MPE%	**1.64 %**	Antenna C1 MPE%	**1.64 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVTM14-C-I20	Make / Model:	RFS APXVTM14-C-I20	Make / Model:	RFS APXVTM14-C-I20
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	**143 feet**	Height (AGL):	**143 feet**	Height (AGL):	**143 feet**
Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts
ERP (W):	6,224.72	ERP (W):	6,224.72	ERP (W):	6,224.72
Antenna A2 MPE%	**1.19 %**	Antenna B2 MPE%	**1.19 %**	Antenna C2 MPE%	**1.19 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**2.83 %**
Verizon Wireless	1.46 %
AT&T	0.90 %
MetroPCS	0.18 %
T-Mobile	5.32 %
Nextel	0.19 %
Town	4.62 %
Site Total MPE %:	**15.50 %**

SPRINT Sector A Total:	2.83 %
SPRINT Sector B Total:	2.83 %
SPRINT Sector C Total:	2.83 %
Site Total:	15.50 %

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	143	0.84	850 MHz	567	0.15%
Sprint 850 MHz LTE	2	437.55	143	1.68	850 MHz	567	0.30%
Sprint 1900 MHz (PCS) CDMA	5	622.47	143	5.96	1900 MHz (PCS)	1000	0.60%
Sprint 1900 MHz (PCS) LTE	2	1,556.18	143	5.96	1900 MHz (PCS)	1000	0.60%
Sprint 2500 MHz (BRS) LTE	8	778.09	143	11.92	2500 MHz (BRS)	1000	1.19%
						Total:	**2.83%**

Summary

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

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

SPRINT Sector	Power Density Value (%)
Sector A:	2.83 %
Sector B:	2.83 %
Sector C:	2.83 %
SPRINT Maximum Total (per sector):	2.83 %
Site Total:	15.50 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **15.50 %** 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.