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

August 10, 2017

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

RE: **Notice of Exempt Modification for Sprint/ Crown Site BU: 806352**
Sprint Site ID: CT03XC357
130 Ledge Road (a/k/a/ 126 Ledge Road), Darien, Fairfield County, CT
Latitude: 41° 4' 20.75" / Longitude: -73° 28' 41.4"

Dear Ms. Bachman:

Sprint currently maintains three (3) antennas at the 118-foot level of the existing 117-foot monopole tower at 130 Ledge Road (a/k/a/ 126 Ledge Road). The tower is owned by Crown Castle. The property is owned by the Town of Darien. Sprint intends to install (3) antennas and (3) RRUs with (1) hybrid cable.

This facility was approved by the Connecticut Siting Council Petition No. 155 on December 30, 1992.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to the municipality and land owner the Town of Darien, to First Selectman Jayme Stevenson and Jeremy Ginsberg the Planning & Zoning Director. Crown Castle is the tower owner.

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

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

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

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

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

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

Sincerely,

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

Attachments:

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

cc: First Selectman Jayme Stevenson
Darien Town Hall
2 Renshaw Rd, RM 202
Darien, CT, 06820

Jeremy Ginsberg, Planning & Zoning Director
Town of Darien
Darien Town Hall
2 Renshaw Rd, RM 211
Darien, CT, 06820

PARID: 29014

TOWN OF DARIEN PUBLIC WORKS GARAGE 126 LEDGE ROAD

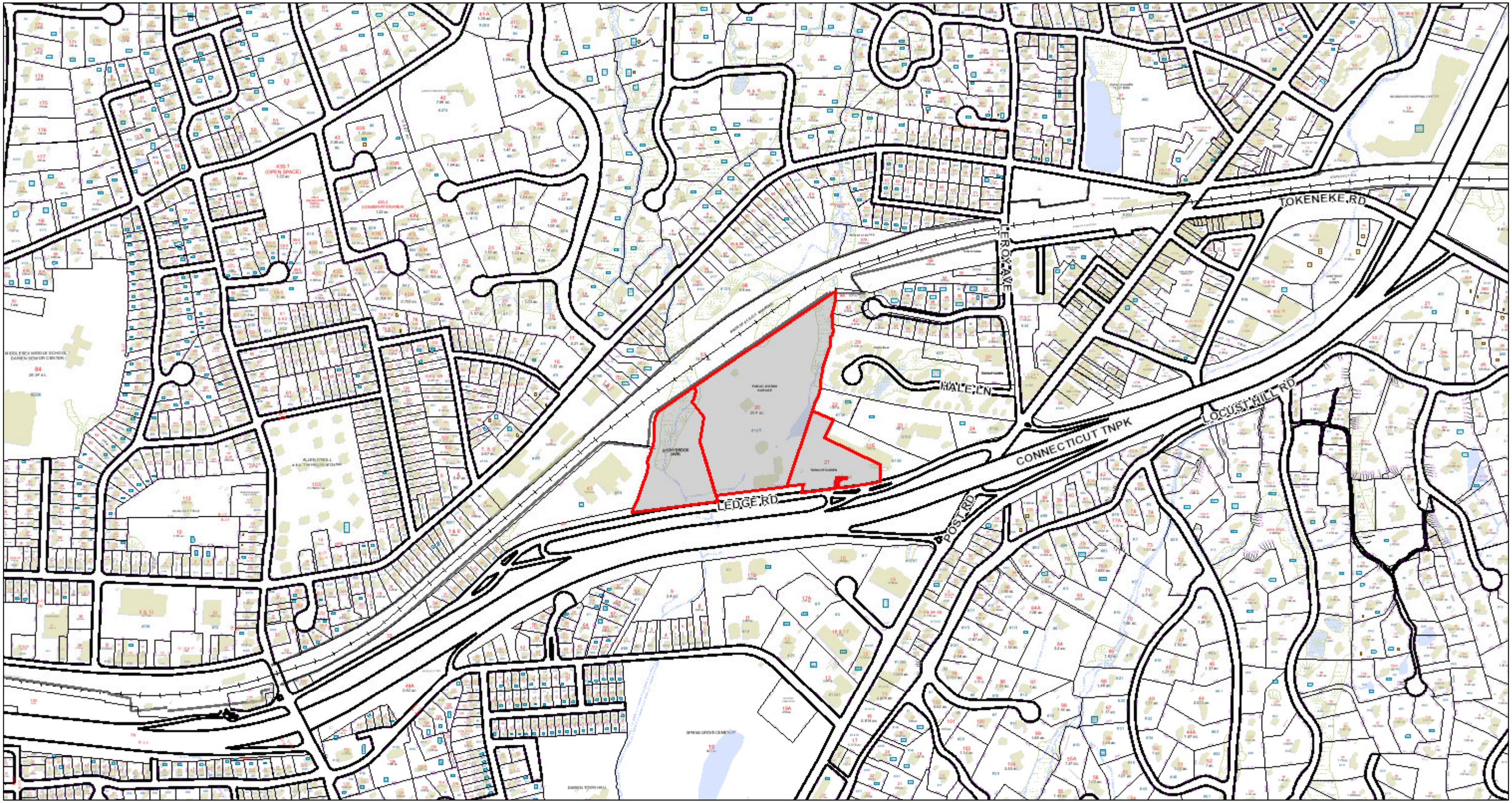
Parcel

Alt ID	39 20&21
Address	126 LEDGE ROAD
Unit	
Neighborhood	1032
Class	300
Land Use Code	903-MUNICIPAL
Living Units	
Acres	20.4
Zoning	R13
Street1/Street2	8-SECONDARY /-
Topo1/Topo2/Topo3	1-LEVEL/-/-
Util1/Util2/Util3	1-ALL PUBLIC/1-/1-
Notes	TOWN GARAGE / FIRE TRAINING=-'13 '15,AH,PRICE TOWER AND CROWN OBLD '0718X40' BLD-VERIZON-'16-ATT 110' TOWER 117'TOWERTMOBILSPRINT-'13CROWN-'15

Owners

Owner		Address	City	State	Zip
TOWN OF DARIEN	PUBLIC WORKS GARAGE	126 LEDGE ROAD	DARIEN	CT	06820

29014 126 LEDGE ROAD



February 14, 2017

1:9,526

0 0.1 0.2 0.4 mi

0 0.175 0.35 0.7 km

Town of Darien Connecticut

DOCKET NO. 155 - An application of Metro Mobile CTS of Fairfield County, Inc., for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a cellular telephone telecommunications tower, antennas, associated equipment, and building on a 17-acre parcel of land used and owned by the Town of Darien as the Town waste transfer station off Ledge Road, with an alternative site on a 1 acre parcel owned by the Noroton Heights Fire Department, Inc., located immediately adjacent to the Noroton Heights Fire Department Building at 209 Noroton Avenue in the Town of Darien, Connecticut.

Connecticut

Siting

Council

December 30, 1992

DECISION AND ORDER

Pursuant to the foregoing Findings of Fact, and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a cellular telecommunications tower and equipment building at the proposed Darien, Connecticut, prime site including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application and therefore directs that a Certificate of Environmental Compatibility and Public Need as provided by section 16-50k of the Connecticut General Statutes (CGS), be issued to Metro Mobile CTS of Fairfield County, Inc. (Metro Mobile), for the construction, operation, and maintenance of a cellular telecommunications tower, associated equipment, and building within property owned by the Town of Darien located on Ledge Road, Darien, Connecticut.

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

1. The self-supporting monopole tower shall be no taller than necessary to provide the proposed communications service and the tower shall not exceed a total height of 113 feet above ground level (AGL), with antennas and appurtenances.

2. The Certificate holder shall prepare a Development and Management (D&M) plan for this site in compliance with sections 16-50j-75 through 16-50j-77 of the Regulations of State Agencies. The D&M plan shall include detailed plans of the tower, tower foundation, equipment building, access road including all upgrades, utility connection, security fence, and detailed plans for drainage, erosion, and sedimentation controls consistent with the Connecticut Guidelines for Soil Erosion and Sedimentation Control. In addition, the D&M plan shall include detailed landscaping plans for the facility site, with options to provide landscaping on the Town property boundary north of the site and on the Middlesex Common Condominium property subject to their approval.

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

4. The Certificate Holder shall provide the Council a recalculated report of electromagnetic radio frequency power density if and when circumstances in operation cause a change in power density above the levels originally calculated and provided in the application.

5. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.

6. If the facility does not initially provide, or permanently ceases to provide cellular or other services following completion of construction, this Decision and Order shall be void, and the Certificate holder shall dismantle the tower and remove all associated equipment or reapplication for any continued or new use shall be made to the Council before any such use is made.

7. Unless otherwise approved by the Council, this Decision and Order shall be void if all construction authorized herein is not completed within three years of the effective date of this Decision and Order or within three years after all appeals to this Decision and Order have been resolved.

Pursuant to CGS section 16-50p, we hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below, and notice of issuance shall be published in the Norwalk Hour, Stamford Advocate, and Darien News-Review.

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

The parties and intervenors to this proceeding are:

APPLICANT	ITS REPRESENTATIVES
Metro Mobile CTS of Fairfield County, Inc.	Metro Mobile CTS of Fairfield County, Inc. 20 Alexander Drive Wallingford, CT 06492 Attn: David S. Malko, P.E. Manager, Engineering and Regulatory Services Robinson & Cole One Commercial Plaza Hartford, CT 06103-3597 Attn: Earl W. Phillips, Jr., Esq. Charles R. Wolfe, Esq. Henry H. Sprague, III, Esq.
INTERVENOR	ITS REPRESENTATIVE
The Springwich Cellular Limited Partnership	Peter J. Tyrrell Senior Attorney SNET Cellular, Inc. 227 Church Street Room 1021 New Haven, CT 06506
PARTY	ITS REPRESENTATIVE
Middlesex Common Condominium Association, Inc.	Rebecca Oldfield Smith 53 Hale Lane Darien, Connecticut 06820
INTERVENOR	
Bruce Fletcher 236 Noroton Avenue Darien, Connecticut 06820	

Sprint

2.5 EQUIPMENT DEPLOYMENT

CROWN ID#: 806352

CROWN SITE NAME: DARIEN

SITE NUMBER:
CT03XC357
SITE NAME:
DARIEN
SITE ADDRESS:
130 LEDGE ROAD
DARIEN, CT 06820

APPROVED
By Jason D'Amico at 1:42 pm, Jun 29, 2017

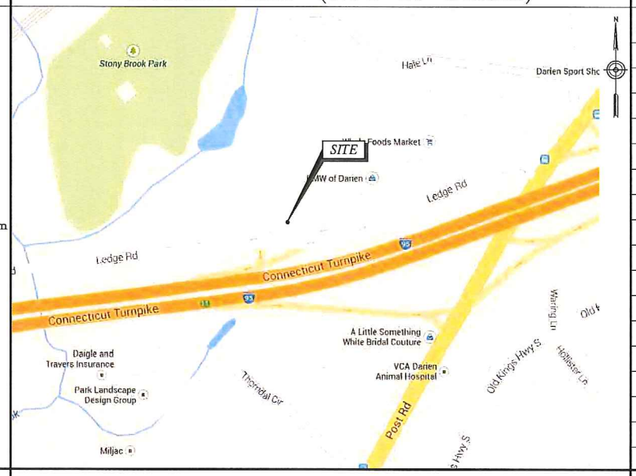
APPROVED
By Ray Perry at 5:17 pm, Sep 24, 2014

SHEET INFORMATION

SITE NUMBER:	CT03XC357
SITE NAME:	DARIEN
SITE ADDRESS:	130 LEDGE ROAD DARIEN, CT 06820
COUNTY:	FAIRFIELD
COORDINATES: (NAD 83)	41° 04' 27.75" N 73° 28' 41.26" W
GROUND ELEV:	50'± AMSL
STRUCTURE TYPE:	MONOPOLE
STRUCTURE HEIGHT:	117'-0"± AGL
STRUCTURE RAD CENTER:	117'-0"± AGL
ZONING CLASSIFICATION:	SB
MAP-BLOCK-LOT:	39/20-1

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:	FIBERTECH

VICINITY MAP (NOT TO SCALE)



SHEET INDEX

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

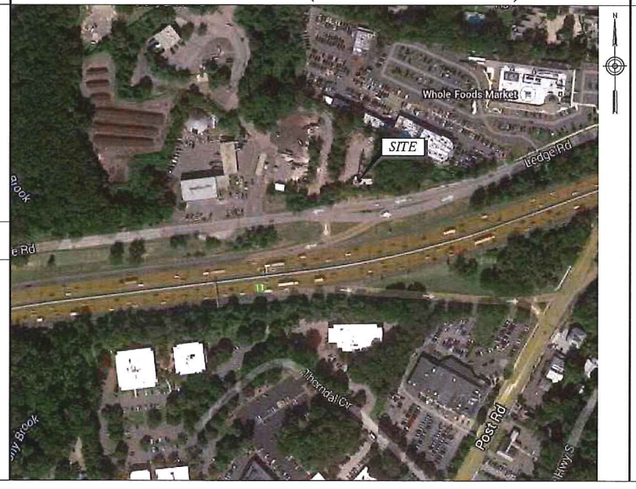
GENERAL NOTES

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

PROJECT DESCRIPTION

1. (1) NEW 2.5 EQUIPMENT RACK INSIDE EXIST MMBTS CABINET.
2. (3) NEW RFS APXVTM14-C-120 ANTENNAS.
3. (3) NEW TD-RRH8x20-25 RRH.
4. (1) NEW 5/8" FIBER CABLE.
5. (1) REPLACEMENT ANTENNA MOUNT
6. (3) NEW FIBER SECTOR JUMPERS

AERIAL VIEW (NOT TO SCALE)



APPROVALS

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

CONSTRUCTION: _____ DATE: _____

LEASING/
SITE ACQUISITION: _____ DATE: _____

LANDLORD/
PROPERTY OWNER: _____ DATE: _____

R.F. ENGINEER: _____ DATE: _____

CALL TOLL FREE FOR CONNECTICUT
1-800-922-4455 OR DIAL 811
CALL TWO FULL WORKING DAYS IN ADVANCE TO LOCATE BURIED UTILITY PIPES AND CABLES

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

CROWN CASTLE

TECTONIC
• PLANNING
• ENGINEERING
• SURVEYING
• CONSTRUCTION MANAGEMENT

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

SUBMITTALS

PROJECT NO: 7225.CT03XC357

NO	DATE	DESCRIPTION	BY
0	08/15/14	FOR COMMENT	JT
1	09/23/14	FOR CONSTRUCTION	MP

DATE	REVIEWED BY
9/23/14	JMQ

SEAL
STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 22038
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC357
SITE NAME:
DARIEN
SITE ADDRESS:
130 LEDGE ROAD
DARIEN, CT 06820

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._157201110421855492.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.

Sprint

2.5 EQUIPMENT DEPLOYMENT
6850 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

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SUBMITTALS

PROJECT NO: 7225.CT03XC357

NO	DATE	DESCRIPTION	BY
0	08/15/14	FOR COMMENT	JT
1	09/23/14	FOR CONSTRUCTION	MP

DATE	REVIEWED BY
9/23/14	JMQ

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

SITE NUMBER:
CT03XC357

SITE NAME:
DARIEN

SITE ADDRESS:
130 LEDGE ROAD
DARIEN, CT 06820

SHEET TITLE:
GENERAL NOTES

SHEET NO:
SP–1

DIVISION 13000–SPECIAL CONSTRUCTION ANTENNA INSTALLATION

PART 1 – GENERAL

1.01 WORK INCLUDED

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

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

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

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

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

G. ANTENNA AND HYBRIFLEX CABLE GROUNDING:

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

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

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

1.03 REQUIREMENTS OF REGULATOR AGENCIES

A. FURNISH U.L. LISTED EQUIPMENT WHERE SUCH LABEL IS AVAILABLE. INSTALL IN CONFORMANCE WITH U.L. STANDARDS WHERE APPLICABLE.

B. INSTALL ANTENNA, ANTENNA CABLES, GROUNDING SYSTEM IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS IN EFFECT AT PROJECT LOCATION AND RECOMMENDATIONS OF STATE AND LOCAL BUILDING CODES HAVING JURISDICTION OVER SPECIFIC PORTIONS OF WORK. THIS WORK INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING:

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

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

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

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

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

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

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

8. LIFE SAFETY CODE NFPA, LATEST EDITION.

DIVISION 13000–EARTHWORK

PART 1 GENERAL

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

1.02 RELATED WORK

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

PART 2 PRODUCTS

2.01 MATERIALS

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

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

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

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

MATERIAL SHALL CONFORM TO THE FOLLOWING GRADATION REQUIREMENTS.

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

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

2.02 EQUIPMENT

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

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

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

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

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

3.03 INSTALLATION

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

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

C. DO NOT CREATE DEPRESSIONS WHERE WATER MAY POND.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3.04 FIELD QUALITY CONTROL

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

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

3.05 PROTECTION

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

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

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

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

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2.5 EQUIPMENT DEPLOYMENT
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SUBMITTALS

PROJECT NO: 7225.CT03XC357

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DATE	REVIEWED BY
9/23/14	JMG

SEAL

STATE OF CONNECTICUT
NANDKUMAR PATIL
No. 22039
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC357

SITE NAME:
DARIEN

SITE ADDRESS:
130 LEDGE ROAD
DARIEN, CT 06820

SHEET TITLE:
GENERAL NOTES

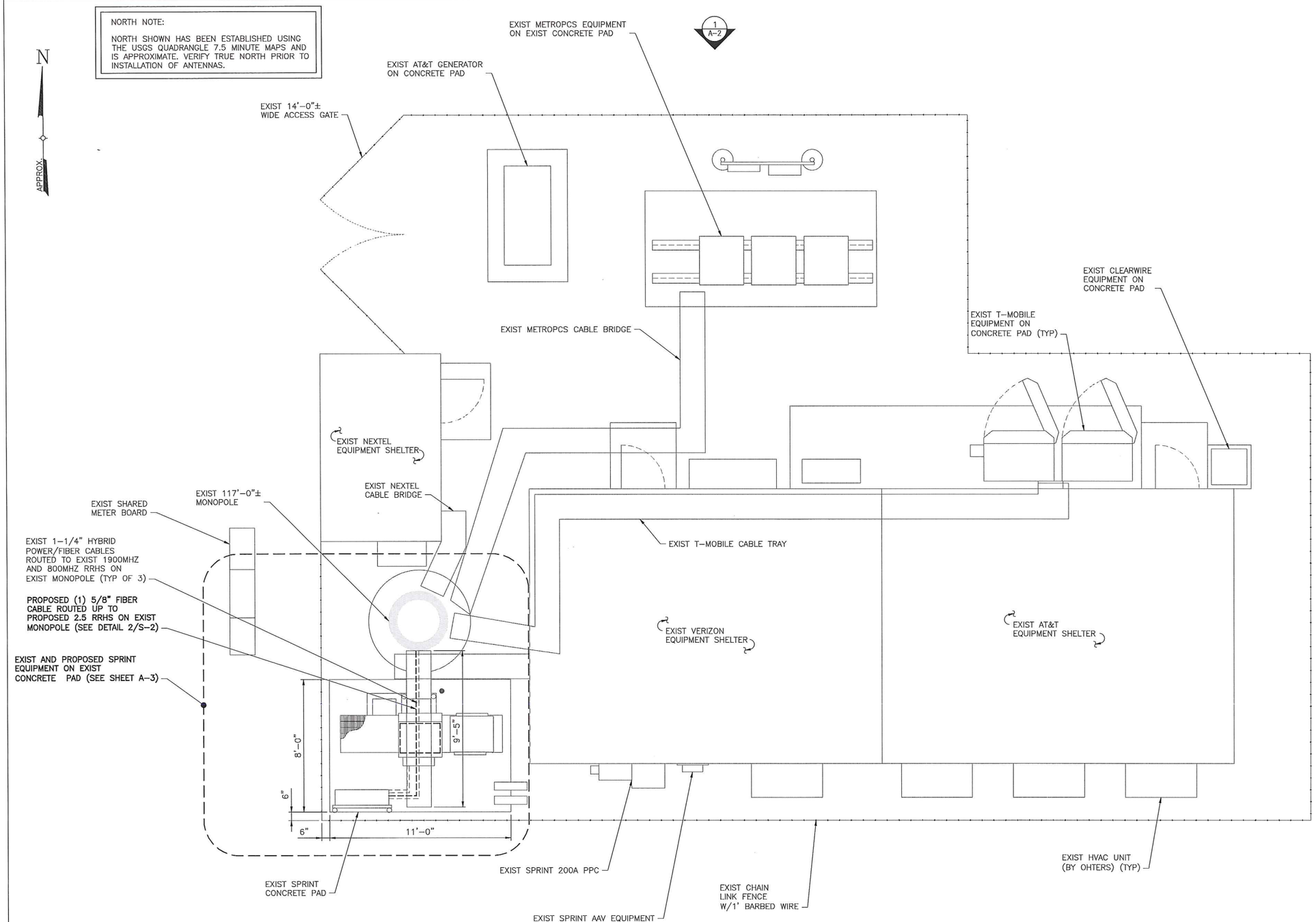
SHEET NO:
SP–2

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: 3/8" = 1'-0"

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Fax: (845) 567-8703

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SUBMITTALS

PROJECT NO: 7225.CT03XC357

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0	08/15/14	FOR COMMENT	JT
1	09/23/14	FOR CONSTRUCTION	MP

DATE	REVIEWED BY
9/23/14	SMG

SEAL

STATE OF CONNECTICUT
ANANDKUMAR M. PATEL
No. 22033
LICENSED PROFESSIONAL ENGINEER

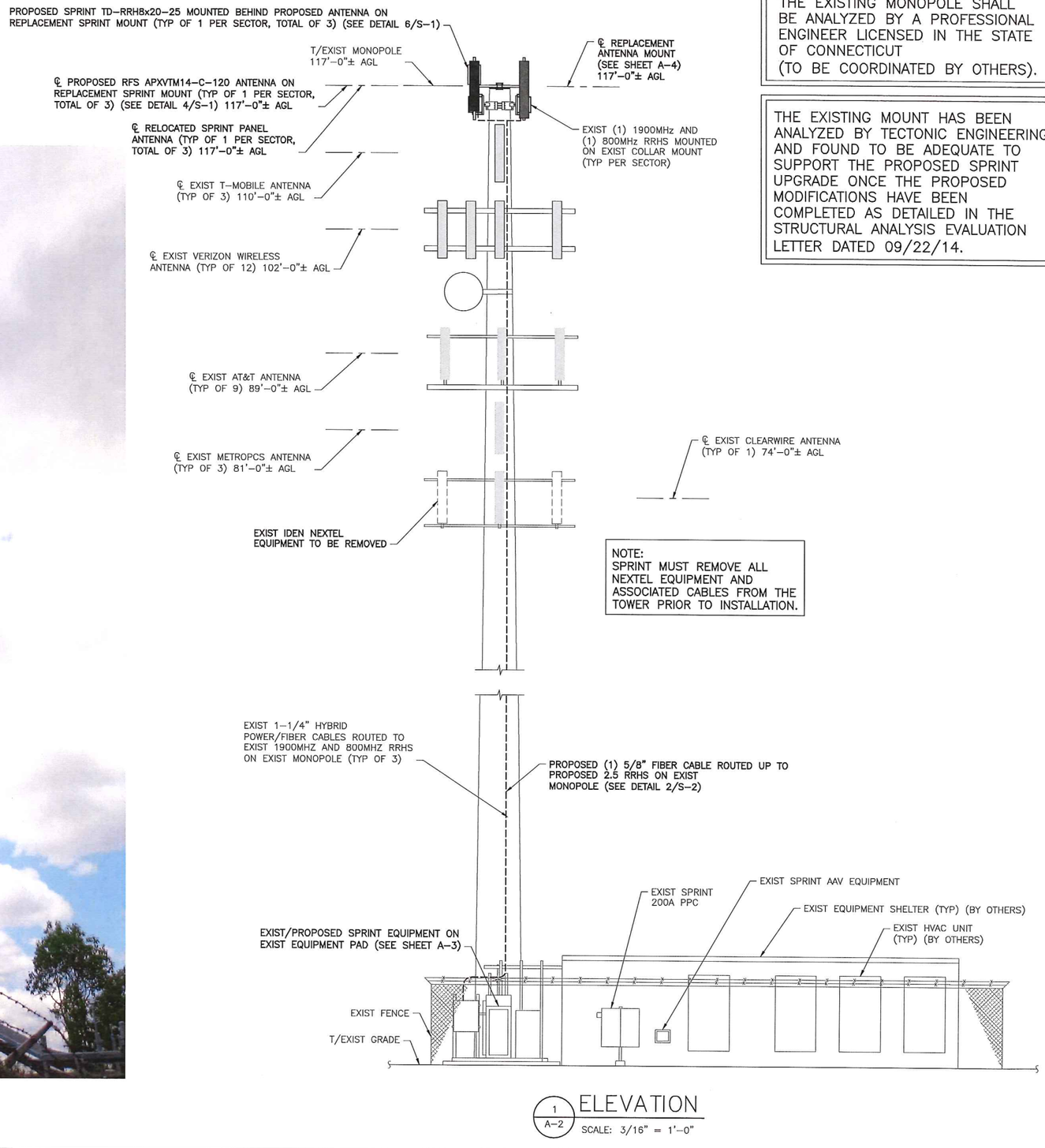
SITE NUMBER:
CT03XC357

SITE NAME:
DARIEN

SITE ADDRESS:
130 LEDGE ROAD
DARIEN, CT 06820

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: 3/16" = 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.

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

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0	08/15/14	FOR COMMENT	JT
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DATE	REVIEWED BY
9/23/14	JMQ

SEAL
STATE OF CONNECTICUT
JAMES M. QUINN
No. 22039
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC357

SITE NAME:
DARIEN

SITE ADDRESS:
130 LEDGE ROAD
DARIEN, CT 06820

SHEET TITLE:
ELEVATION

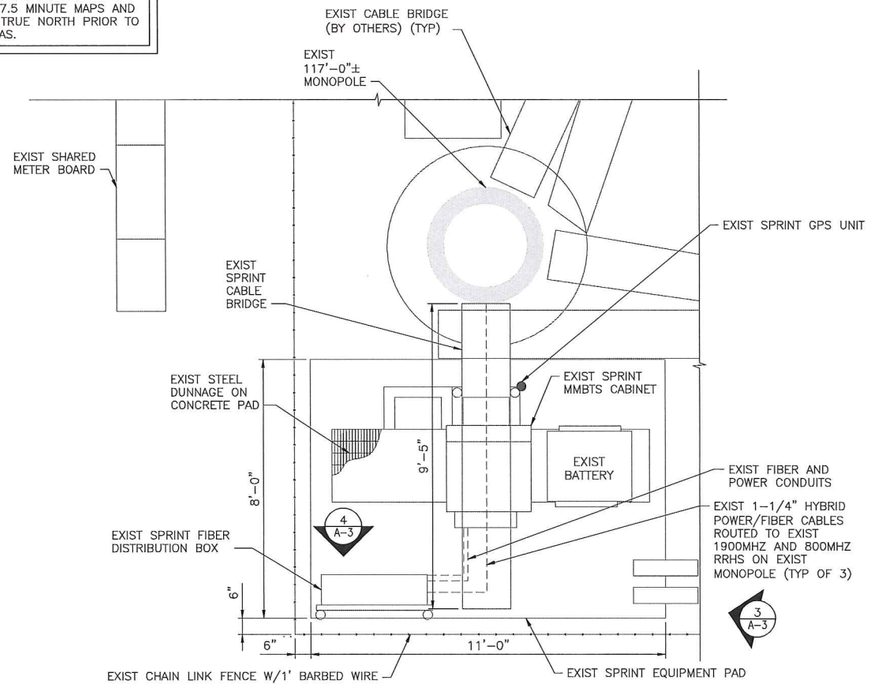
SHEET NO:
A-2

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.

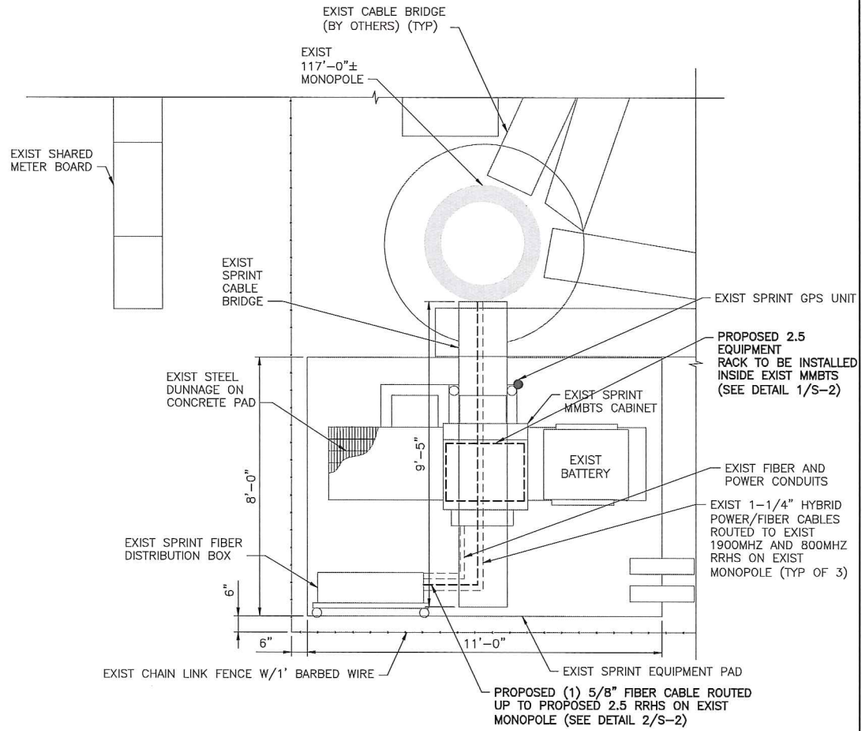
N

APPROX.



1 A-3 ENLARGED EQUIP. LAYOUT PLAN (EXIST)

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



2 A-3 ENLARGED EQUIP. LAYOUT PLAN (FINAL)

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

3 A-3 EXIST EQUIPMENT PAD

SCALE: NTS

4 A-3 EXIST FIBER DISTRIBUTION BOX

SCALE: NTS

Sprint

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OVERLAND PARK, KANSAS 66251

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9/23/14	JMQ

SEAL

STATE OF CONNECTICUT
ANJUKUMAR PATEL
No. 22038
LICENSED PROFESSIONAL ENGINEER

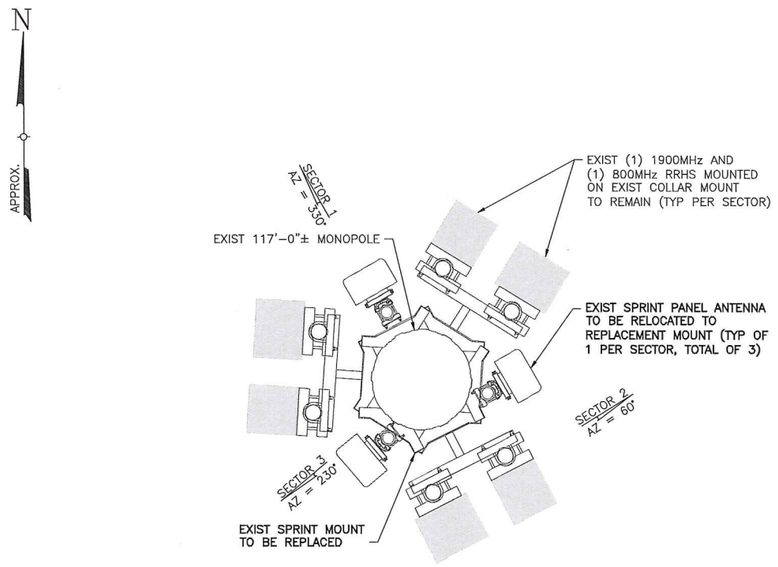
SITE NUMBER:
CT03XC357

SITE NAME:
DARIEN

SITE ADDRESS:
130 LEDGE ROAD
DARIEN, CT 06820

SHEET TITLE:
ENLARGED EQUIPMENT LAYOUT PLANS

SHEET NO:
A-3

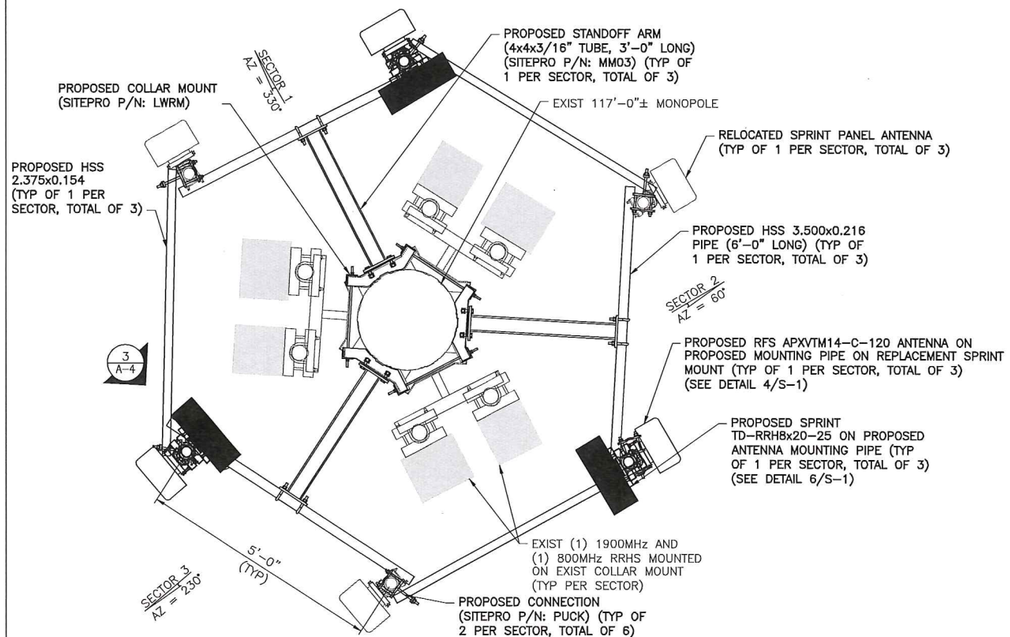


1 / A-4 ANTENNA LAYOUT PLAN (EXIST)

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

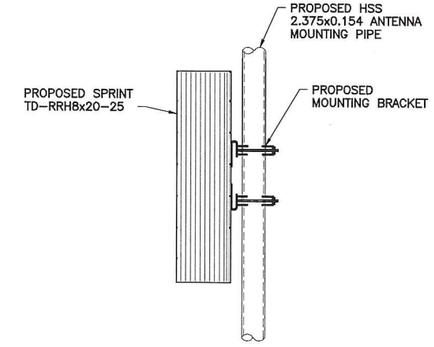
THE EXISTING MONOPOLE SHALL BE ANALYZED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT (TO BE COORDINATED BY OTHERS).

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.



2 / A-4 ANTENNA LAYOUT PLAN (FINAL)

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



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	117'	**117'**
Antenna Azimuth	330/60/230	**330/60/230**
Antenna RRH Model Number	1900MHz/800MHz RRHS	**TD-RRH8x20-25**
Number of RRH	6	**3**

Sprint

2.5 EQUIPMENT DEPLOYMENT
6850 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

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DATE	REVIEWED BY
9/23/14	JMC

SEAL

STATE OF CONNECTICUT · MANOJKUMAR PATEL · No. 22003 · LICENSED PROFESSIONAL ENGINEER

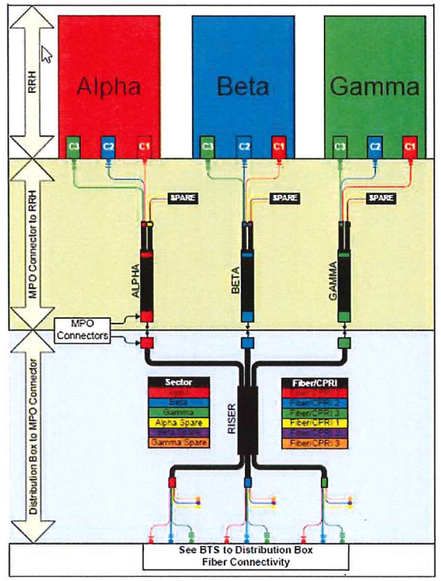
SITE NUMBER:
CT03XC357

SITE NAME:
DARIEN

SITE ADDRESS:
130 LEDGE ROAD
DARIEN, CT 06820

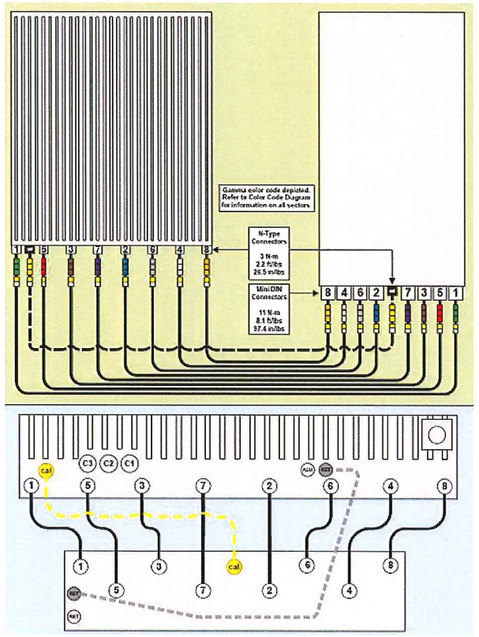
SHEET TITLE:
ANTENNA LAYOUT PLANS

SHEET NO:
A-4



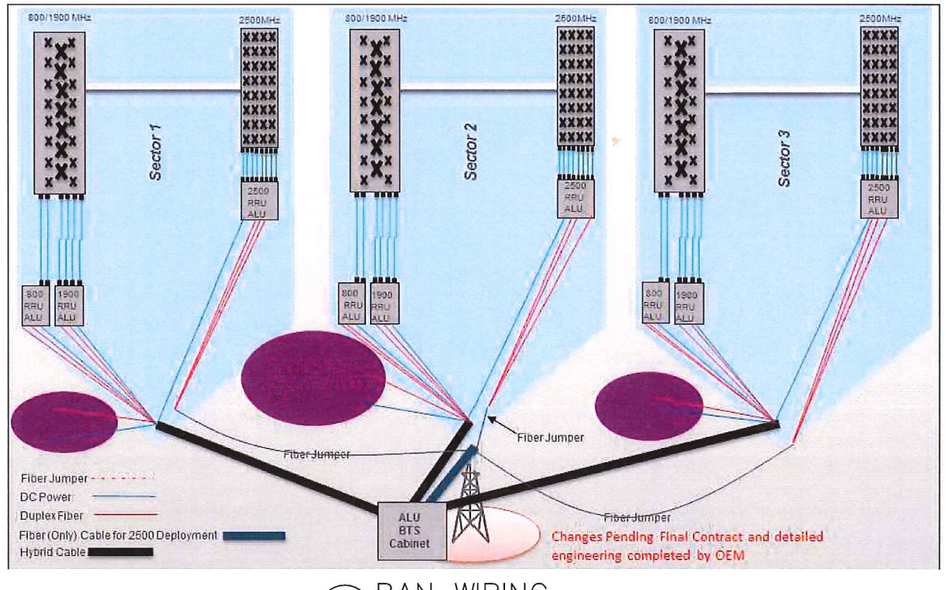
1 A–5 2.5 CABLE COLOR CODING

SCALE: N.T.S.



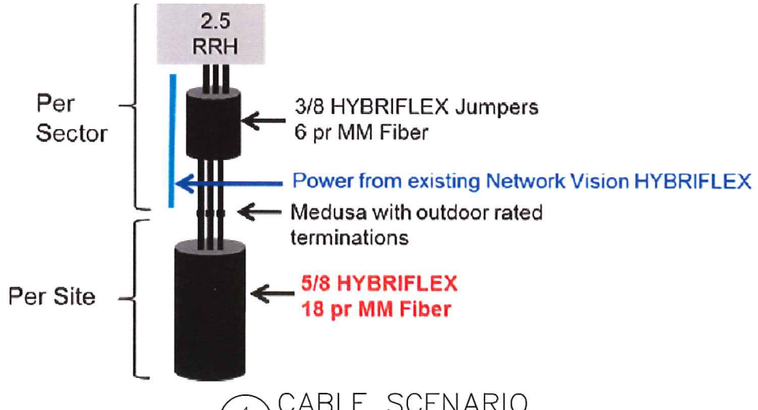
2 A–5 RRH CONNECTIVITY

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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PROJECT NO: 7225.CT03XC357

NO	DATE	DESCRIPTION	BY
0	08/15/14	FOR COMMENT	JT
1	09/23/14	FOR CONSTRUCTION	MP

DATE	REVIEWED BY
9/23/14	JMQ

SEAL

STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 22033
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC357

SITE NAME:
DARIEN

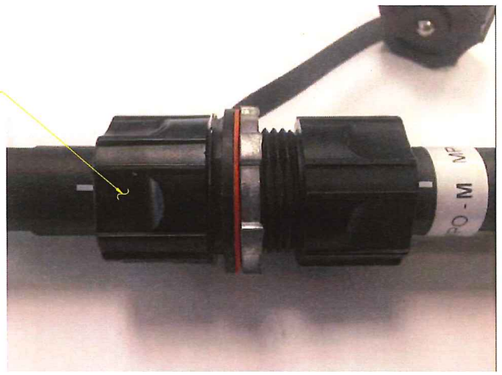
SITE ADDRESS:
130 LEDGE ROAD
DARIEN, CT 06820

SHEET TITLE:
RAN WIRING DIAGRAM

SHEET NO:
A–5

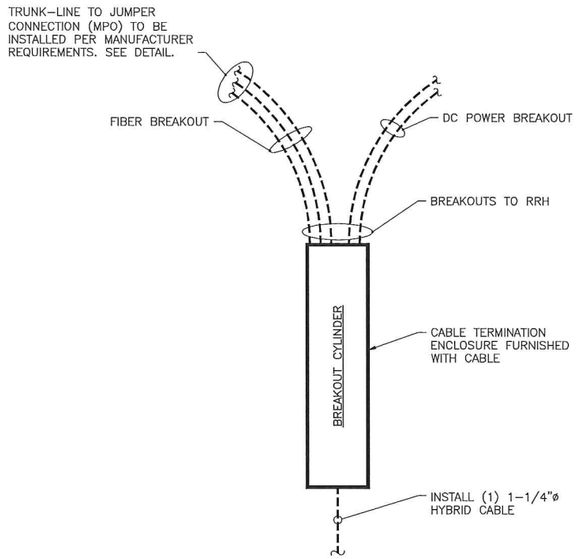
IMPORTANT!! LINE UP WHITE MARKINGS ON JUMPER AND RISER IP-MPO CONNECTOR. PUSH THE WHITE MARK ON THE JUMPER CONNECTOR FLUSH AGAINST THE RED SEAL ON THE RISER CONNECTION

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

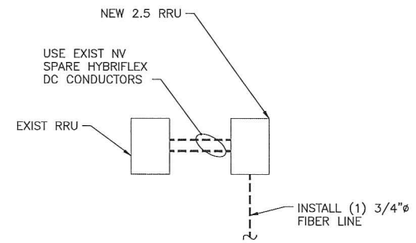


1 A-6 HYBRIFLEX RISER/JUMPER CONNECTION DETAILS

SCALE: N.T.S.



2.5 HYBRID CABLE W/FIBER & DC FEEDERS



FIBER ONLY TRUNK LINES

2 A-6 TRUNK LINE DETAILS (TYPICAL)

SCALE: N.T.S.

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

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

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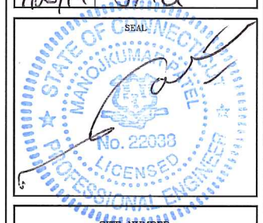


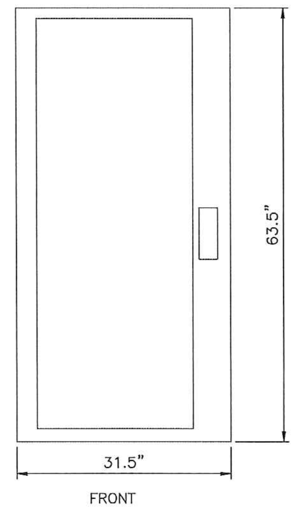
SITE NUMBER:
CT03XC357

SITE NAME:
DARIEN

SITE ADDRESS:
130 LEDGE ROAD
DARIEN, CT 06820

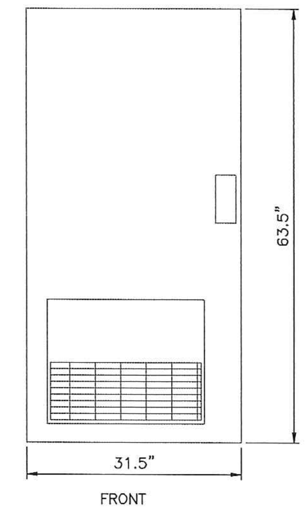
SHEET TITLE:
CABLE DETAILS

SHEET NO:
A-6



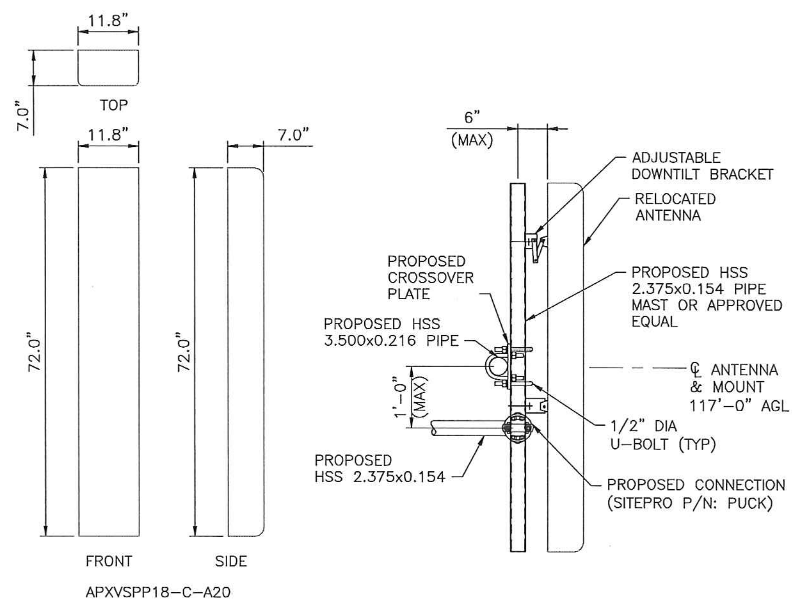
9927 MMBTS MODULAR CELL	
SPECIFICATIONS:	
HEIGHT:	63.5"
WIDTH:	31.5"
DEPTH:	38.0"

(1/S-1) (EXIST) MMBTS CABINET
SCALE: 1" = 1'-0"

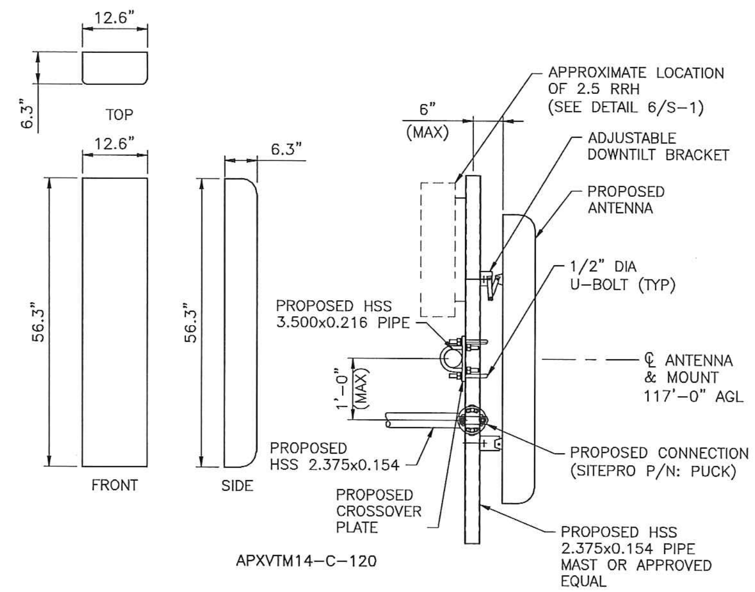


BATTERY	
SPECIFICATIONS:	
HEIGHT:	63.5"
WIDTH:	31.5"
DEPTH:	28.0"

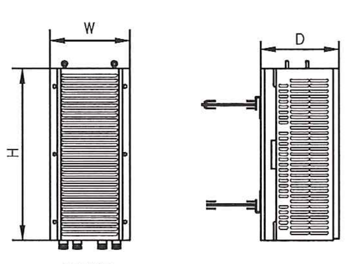
(2/S-1) (EXIST) BATTERY CABINET
SCALE: 1" = 1'-0"



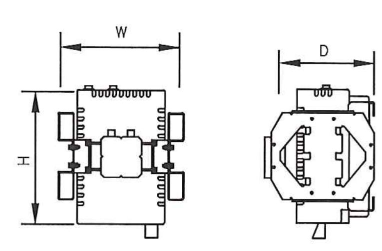
(3/S-1) (EXIST) ANTENNA DETAIL
SCALE: 3/4" = 1'-0"



(4/S-1) (PROPOSED) ANTENNA DETAIL
SCALE: 3/4" = 1'-0"

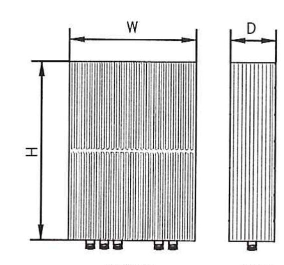


TYPE:	1900 MHz 4x45W
MODEL #:	RRH 1900 4X45 65MHz
HEIGHT:	25.0"
WIDTH:	11.1"
DEPTH:	11.4"
WEIGHT:	±60 LBS.



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

(5/S-1) (EXIST) RRH DETAILS
SCALE: 1" = 1'-0"



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

(6/S-1) (PROPOSED) RRH DETAIL
SCALE: 1" = 1'-0"

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No. 22038
LICENSED PROFESSIONAL ENGINEER

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CT03XC357

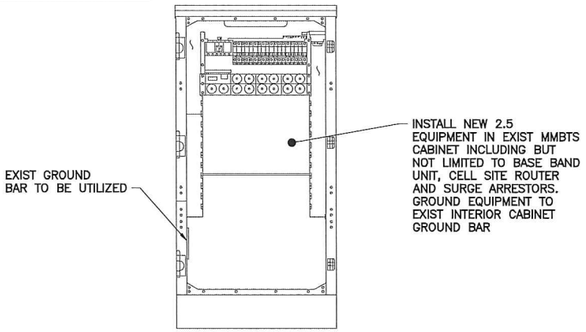
SITE NAME:
DARIEN

SITE ADDRESS:
130 LEDGE ROAD
DARIEN, CT 06820

SHEET TITLE:
EQUIPMENT DETAILS

SHEET NO:
S-1

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

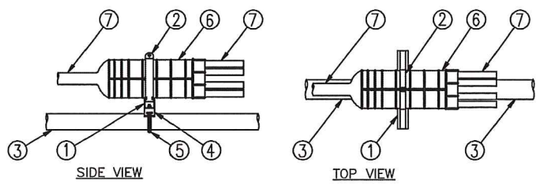


FRONT ELEVATION
(CABINET INTERIOR)

1 / S–2 MMBTS INTERIOR DETAIL

SCALE: N.T.S.

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



3 / S–2 MEDUSA HEAD DETAIL

SCALE: NTS

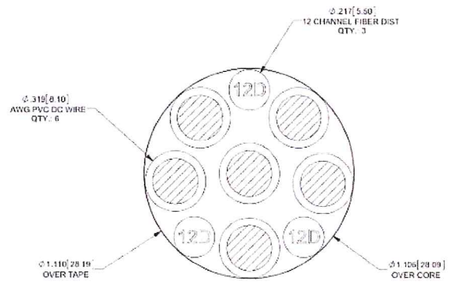
RFS HYBRIFLEX RISER CABLES SCHEDULE

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

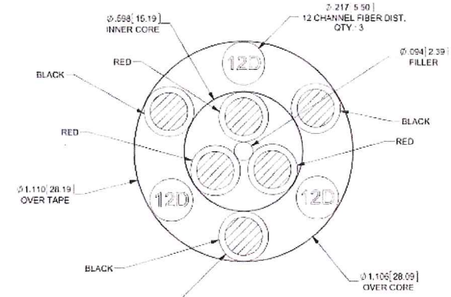
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

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

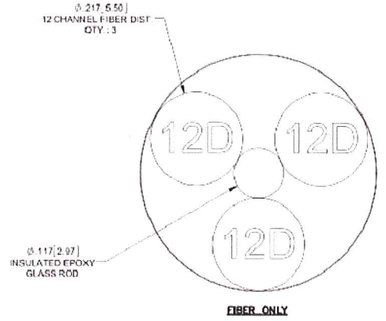
HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE			
MANUF:	RFS		
CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
FIBER ONLY	VARIES	USE NV HYBRIFLEX	7/8"
HYBRIFLEX	<200'	8 AWG	1-1/4"
HYBRIFLEX	225-300'	6 AWG	1-1/4"
HYBRIFLEX	325-375'	4 AWG	1-1/4"



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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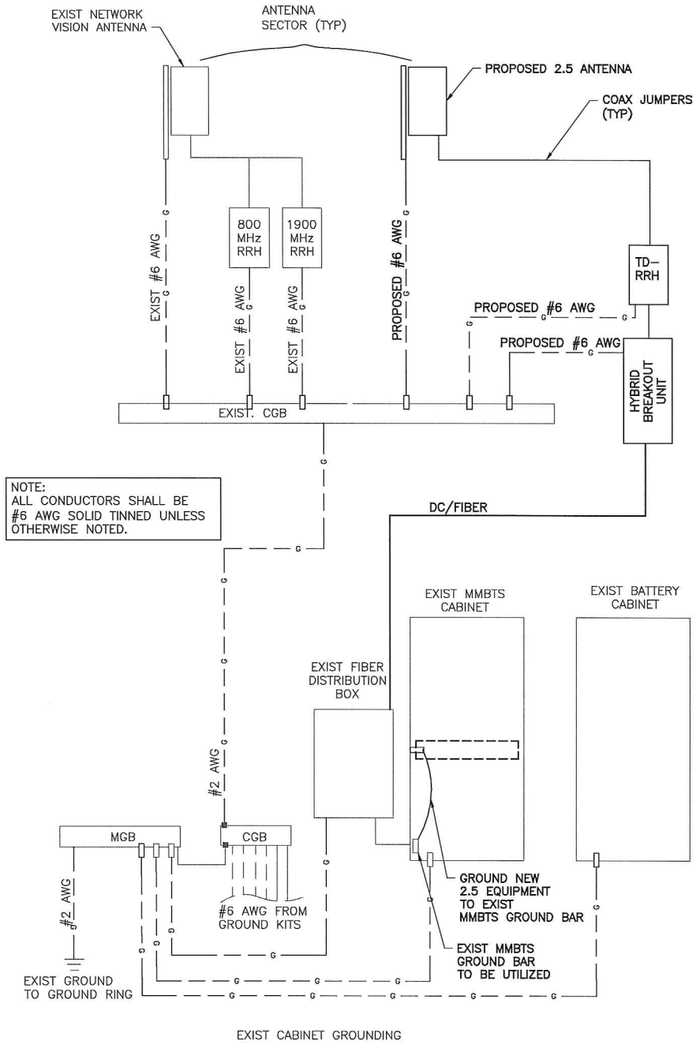
130 LEDGE ROAD
DARIEN, CT 06820

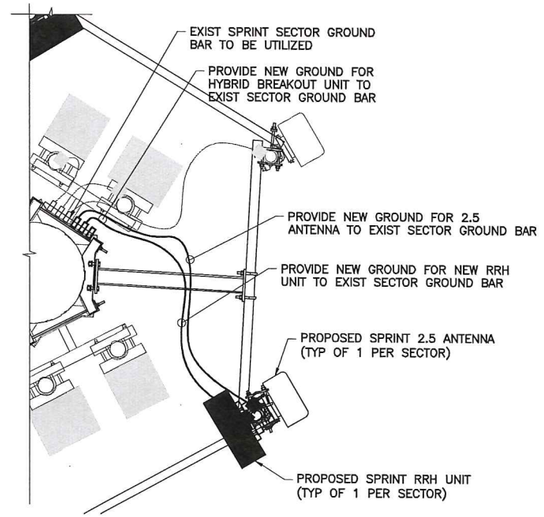
SHEET TITLE:
EQUIPMENT SCHEMATIC DETAILS

SHEET NO:
S–2



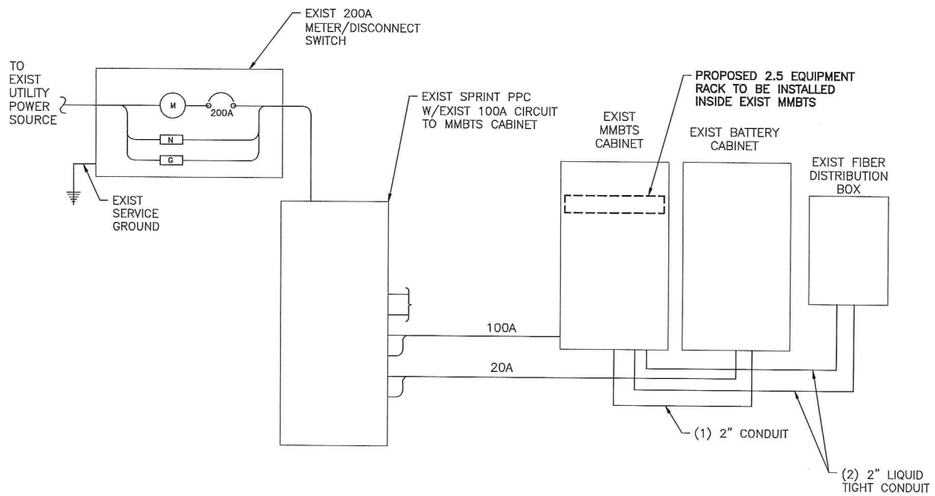
1 / E-1 TYPICAL GROUNDING ONE LINE DIAGRAM

SCALE: NTS



2 / E-1 TYPICAL ANTENNA GROUNDING PLAN

SCALE: NTS



3 / E-1 TYPICAL ELECTRICAL & TELCO PLAN

SCALE: NTS

Sprint

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SEAL

STATE OF CONNECTICUT · MANOKUR AGRAWAL · No. 22038 · LICENSED PROFESSIONAL ENGINEER

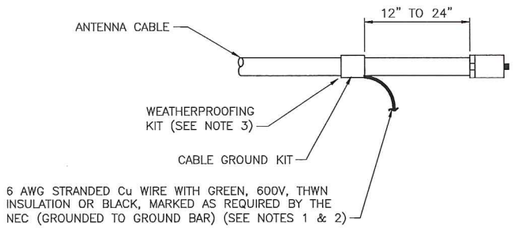
SITE NUMBER:
CT03XC357

SITE NAME:
DARIEN

SITE ADDRESS:
130 LEDGE ROAD
DARIEN, CT 06820

SHEET TITLE:
ELECTRICAL & GROUNDING PLANS

SHEET NO:
E-1



CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

NOTES:

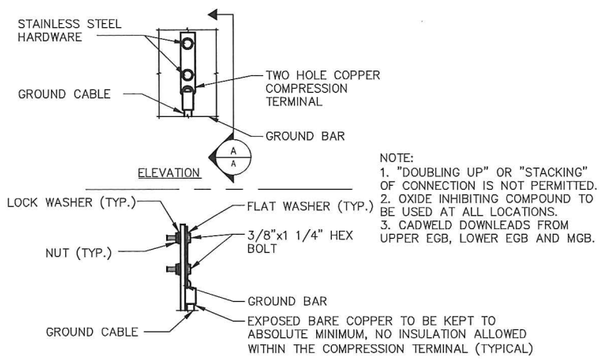
DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

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

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

1 E-2 CABLE GROUNDING KIT DETAIL

SCALE: N.T.S.

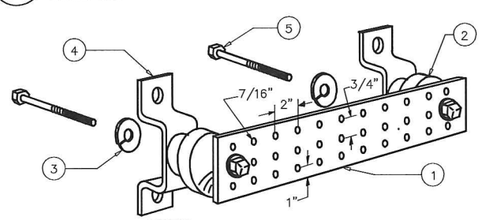


NOTE:
1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB AND MGB.

SECTION "A-A"

2 E-2 GROUNDING BAR CONN. DETAIL

SCALE: NTS



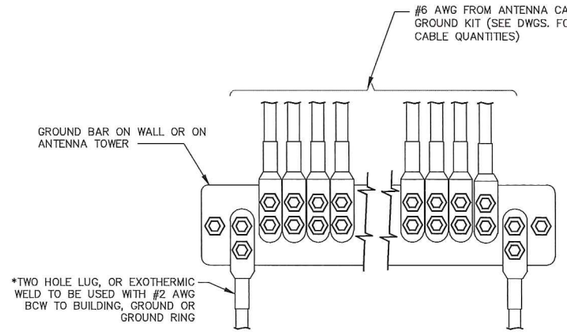
LEGEND

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

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

3 E-2 GROUNDING BAR DETAIL

SCALE: NTS



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

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

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

4 E-2 ANTENNA GROUND BAR DETAIL

SCALE: NTS

GROUNDING NOTES:

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

PROTECTIVE GROUNDING SYSTEM GENERAL NOTES:

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

ELECTRICAL AND GROUNDING NOTES

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

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

CROWN CASTLE

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.CT03XC357

NO	DATE	DESCRIPTION	BY
0	08/15/14	FOR COMMENT	JT
1	09/23/14	FOR CONSTRUCTION	MP

DATE	REVIEWED BY
9/23/14	SMQ

STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 22038
LICENSED PROFESSIONAL ENGINEER
SEAL

SITE NUMBER:
CT03XC357

SITE NAME:
DARIEN

SITE ADDRESS:
130 LEDGE ROAD
DARIEN, CT 06820

SHEET TITLE:
GROUNDING DETAILS & NOTES

SHEET NO:
E-2

PAUL J. FORD & COMPANY

Date: **June 19, 2017**

Charles Trask
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
980.209.8228

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

Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT03XC357
	Carrier Site Name:	CT03XC357
Crown Castle Designation:	**Crown Castle BU Number:**	806352
	Crown Castle Site Name:	BRG 302 943052
	Crown Castle JDE Job Number:	442000
	Crown Castle Work Order Number:	1418729
	Crown Castle Application Number:	393532 Rev. 1
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37517-0349.002.7805
Site Data:	**126 Ledge Road, DARIEN, Fairfield County, CT** **Latitude *41° 4' 20.75"*, Longitude *-73° 28' 41.4"*** **117 Foot - Monopole Tower**	

Dear Charles Trask,

Paul J Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 1047958, in accordance with application 393532, revision 1.

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

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 C with a maximum topographic factor, Kzt, of 1.0 and Risk Category II were used in this analysis.

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

Respectfully submitted by:

Joshua Johnson, E.I. SJT
Structural Designer

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER
6.20.17

Date: **June 19, 2017**

Charles Trask
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Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT03XC357
	Carrier Site Name:	CT03XC357
Crown Castle Designation:	**Crown Castle BU Number:**	806352
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Respectfully submitted by:

Joshua Johnson, E.I.
Structural Designer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 117 ft Monopole tower designed by VALMONT in May of 1992. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-E. The tower has been modified multiple times in the past to accommodate additional loading.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C with a maximum topographic factor, Kzt, of 1.0 and Risk Category II were used in this analysis.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
117.0	118.0	3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe	1	5/8	-
		3	alcatel lucent	TD-RRH8x20-25			
	117.0	1	tower mounts	Stabilizer Bars			
		1	tower mounts	T-Arm Mount [TA 702-3]			

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
117.0	118.0	3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1-1/4	1
	117.0	9	rfs celwave	ACU-A20-N			
		1	tower mounts	Pipe Mount [PM 601-3]	-	-	3
115.0	115.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER	-	-	1
		3	alcatel lucent	TME-800MHZ RRH			
		3	alcatel lucent	TME-PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Side Arm Mount [SO 102-3]			
110.0	110.0	3	ericsson	Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	13	1-5/8	1
		3	ericsson	RRUS 11 B12			
		1	tower mounts	T-Arm Mount [TA 602-3]			
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
100.0	102.0	3	alcatel lucent	RRH2X40-07-U	2 1 12	1-5/8 1-1/4 7/8	1
		3	alcatel lucent	RRH2X60-AWS			
		3	alcatel lucent	RRH2X60-PCS			
		6	andrew	HBXX-6516DS-A2M w/ Mount Pipe			
		3	kathrein	800 10735V01 w/ Mount Pipe			
		2	rfs celwave	DB-T1-6Z-8AB-0Z			
		6	decibel	DB844G65ZAXY w/ Mount Pipe			
		1	gps	GPS_A			
		6	rfs celwave	FD9R6004/2C-3L			
	100.0	1	tower mounts	Platform Mount [LP 715-1]			
93.0	95.0	1	andrew	VHLP1-23	4	1/2	1
	94.0	1	andrew	VHLP2-11			
		1	andrew	VHLP2.5-11			
	93.0	1	tower mounts	Pipe Mount [PM 601-3]			
	92.0	1	andrew	VHLP1-23			
89.0	89.0	2	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe	2 1 1	5/8 3/8 2” Conduit	2
		1	cci antennas	OPA-65R-LCUU-H8 w/ Mount Pipe			
		1	cci antennas	TPA-65R-LCUUUU-H8 w/ Mount Pipe			
		6	cci antennas	TPX-070821			
		3	ericsson	RRUS 32 B2			
		3	ericsson	RRUS 32 B30			
		2	quintel technology	QS66512-2 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Miscellaneous [NA 509-3]			
		3	ericsson	RRUS 11	1 2 12	3/8 5/8 1-1/4	1
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP2140X			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 715-1]			
81.0	81.0	3	kathrein	800 10504 w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			

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

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 1307951600, 9/26/13	217769	CCISITES
4-POST-MODIFICATION INSPECTION	GPD, 2007278.24, 03/11/08	2218625	CCISITES
4-POST-MODIFICATION INSPECTION	Sabre, 11-1114, 12/7/10	2785508	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 131001.806352, 11/7/13	4069331	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 25562, 5/12/14	5077215	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 25562.32675, 03/01/2016	6122311	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 25562, 04/06/2016	6232380	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	FDH, 1308201500, 6/7/13	3907710	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont, 10844-92, 5/19/92	217772	CCISITES
MONOPOLE PRE-MOD MAPPING	FDH, 146IQW1500, 1/9/2015	-	PJF

3.1) Analysis Method

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

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Monopole was reinforced in conformance with the referenced modification drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	117 - 110	Pole	TP15.94x14.36x0.1875	1	-1.70	701.02	13.1	Pass
L2	110 - 100	Pole	TP18.2x15.94x0.1875	2	-4.43	775.82	37.7	Pass
L3	100 - 81.875	Pole	TP22.2676x18.2x0.25	3	-13.62	1301.71	78.3	Pass
L4	81.875 - 76.0833	Pole	TP23.5674x22.2676x0.3262	4	-14.94	1461.93	86.8	Pass
L5	76.0833 - 71	Pole	TP24.7082x23.5674x0.4537	5	-16.00	1633.76	90.7	Pass
L6	71 - 68.0833	Pole	TP25.3627x24.7082x0.6488	6	-16.77	2076.71	77.8	Pass
L7	68.0833 - 63.5	Pole	TP26.3913x25.3627x0.685	7	-18.09	2399.72	74.5	Pass
L8	63.5 - 47.42	Pole	TP30x26.3913x0.8147	8	-22.06	3134.39	70.1	Pass
L9	47.42 - 38.0833	Pole	TP31.6377x27.3428x0.8045	9	-25.03	3019.88	81.2	Pass
L10	38.0833 - 35	Pole	TP32.339x31.6377x0.7403	10	-29.63	3144.21	87.3	Pass
L11	35 - 12.5	Pole	TP37.4568x32.339x0.7647	11	-38.83	3949.43	84.8	Pass
L12	12.5 - 11	Pole	TP37.798x37.4568x0.7495	12	-39.47	3919.73	86.3	Pass
L13	11 - 2.5	Pole	TP39.7314x37.798x0.9196	13	-43.90	5035.53	71.9	Pass
L14	2.5 - 0	Pole	TP40.3x39.7314x0.9631	14	-45.30	5509.93	66.9	Pass
							Summary	
						Pole (L5)	90.7	Pass
						RATING =	**90.7**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	60.0	Pass
1	Base Plate	0	41.3	Pass
1	Base Foundation Steel	0	75.1	Pass
1	Base Foundation Soil Interaction	0	50.0	Pass
1	Flange Connection	100	34.4	Pass
1	Flange Connection	110	12.8	Pass

Structure Rating (max from all components) =	**90.7%**

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

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

1) Tower is located in Fairfield County, Connecticut.
2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
3) Basic wind speed of 93 mph.
4) Structure Class II.
5) Exposure Category C.
6) Topographic Category 1.
7) Crest Height 0.0000 ft.
8) Nominal ice thickness of 0.7500 in.
9) Ice thickness is considered to increase with height.
10) Ice density of 56.00 pcf.
11) A wind speed of 50 mph is used in combination with ice.
12) Temperature drop of 50 °F.
13) Deflections calculated using a wind speed of 60 mph.
14) A non-linear (P-delta) analysis was used.
15) Pressures are calculated at each section.
16) Stress ratio used in pole design is 1.
17) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation* ft	*Section Length* ft	*Splice Length* ft	*Number of Sides*	*Top Diameter* in	*Bottom Diameter* in	*Wall Thickness* in	*Bend Radius* in	*Pole Grade*
L1	117.0000-110.0000	7.0000	0.00	12	14.3600	15.9400	0.1875	0.7500	A572-65 (65 ksi)
L2	110.0000-100.0000	10.0000	0.00	12	15.9400	18.2000	0.1875	0.7500	A572-65 (65 ksi)
L3	100.0000-81.8750	18.1250	0.00	12	18.2000	22.2676	0.2500	1.0000	A572-65 (65 ksi)
L4	81.8750-76.0833	5.7917	0.00	12	22.2676	23.5674	0.3262	1.3048	Reinf 52.81 ksi (53 ksi)
L5	76.0833-71.0000	5.0833	0.00	12	23.5674	24.7082	0.4537	1.8148	Reinf 40.66 ksi (41 ksi)
L6	71.0000-68.0833	2.9167	0.00	12	24.7082	25.3627	0.6488	2.5952	Reinf 35.47 ksi (35 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L7	68.0833-63.5000	4.5833	0.00	12	25.3627	26.3913	0.6850	2.7401	Reinf 37.32 ksi (37 ksi)
L8	63.5000-47.4200	16.0800	4.58	12	26.3913	30.0000	0.8147	3.2587	Reinf 37.42 ksi (37 ksi)
L9	47.4200-38.0833	13.9167	0.00	12	27.3428	31.6377	0.8045	3.2178	Reinf 36.78 ksi (37 ksi)
L10	38.0833-35.0000	3.0833	0.00	12	31.6377	32.3390	0.7403	2.9612	Reinf 36.81 ksi (37 ksi)
L11	35.0000-12.5000	22.5000	0.00	12	32.3390	37.4568	0.7647	3.0586	Reinf 38.55 ksi (39 ksi)
L12	12.5000-11.0000	1.5000	0.00	12	37.4568	37.7980	0.7495	2.9979	Reinf 38.66 ksi (39 ksi)
L13	11.0000-2.5000	8.5000	0.00	12	37.7980	39.7314	0.9195	3.6782	Reinf 38.64 ksi (39 ksi)
L14	2.5000-0.0000	2.5000		12	39.7314	40.3000	0.9631	3.8524	Reinf 39.83 ksi (40 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	14.8666	8.5566	219.3727	5.0738	7.4385	29.4916	444.5085	4.2113	3.3460	17.845
	16.5023	9.5106	301.2254	5.6394	8.2569	36.4816	610.3643	4.6808	3.7694	20.104
L2	16.5023	9.5106	301.2254	5.6394	8.2569	36.4816	610.3643	4.6808	3.7694	20.104
	18.8420	10.8750	450.3655	6.4485	9.4276	47.7710	912.5625	5.3524	4.3751	23.334
L3	18.8420	14.4498	594.2582	6.4261	9.4276	63.0339	1204.1282	7.1117	4.2076	16.83
	23.0531	17.7242	1096.7114	7.8823	11.5346	95.0800	2222.2346	8.7233	5.2977	21.191
L4	23.0531	23.0465	1416.1830	7.8550	11.5346	122.7767	2869.5707	11.3428	5.0935	15.615
	24.3987	24.4117	1683.0627	8.3203	12.2079	137.8667	3410.3414	12.0147	5.4418	16.683
L5	24.3987	33.7664	2302.5490	8.2747	12.2079	188.6113	4665.5885	16.6188	5.1002	11.242
	25.5798	35.4329	2660.5870	8.6831	12.7988	207.8772	5391.0707	17.4390	5.4059	11.915
L6	25.5798	50.2626	3713.6400	8.6133	12.7988	290.1545	7524.8415	24.7377	4.8830	7.526
	26.2574	51.6300	4025.0609	8.8476	13.1379	306.3702	8155.8647	25.4107	5.0585	7.797
L7	26.2574	54.4340	4231.2237	8.8346	13.1379	322.0624	8573.6063	26.7908	4.9613	7.243
	27.3223	56.7029	4782.6668	9.2029	13.6707	349.8478	9690.9796	27.9074	5.2370	7.645
L8	27.3223	67.0944	5602.2161	9.1564	13.6707	409.7970	11351.6087	33.0218	4.8895	6.002
	31.0583	76.5610	8323.8119	10.4483	15.5400	535.6378	16866.2995	37.6810	5.8567	7.189
L9	29.7707	68.7431	6179.6304	9.5007	14.1636	436.3046	12521.6067	33.8332	5.1719	6.429
	32.7537	79.8682	9691.6361	11.0383	16.3883	591.3750	19637.8823	39.3087	6.3230	7.86
L10	32.7537	73.6521	8974.5709	11.0613	16.3883	547.6203	18184.9137	36.2493	6.4949	8.773
	33.4798	75.3239	9599.6720	11.3123	16.7516	573.0603	19451.5380	37.0721	6.6828	9.027
L11	33.4798	77.7425	9892.6402	11.3036	16.7516	590.5493	20045.1710	38.2625	6.6176	8.654
	38.7781	90.3435	15524.8928	13.1358	19.4026	800.1445	31457.6418	44.4643	7.9891	10.448
L12	38.7781	88.5855	15235.3962	13.1412	19.4026	785.2240	30871.0433	43.5991	8.0298	10.714
	39.1313	89.4089	15664.1907	13.2634	19.5793	800.0364	31739.8972	44.0043	8.1213	10.836
L13	39.1313	109.1952	18955.4496	13.2025	19.5793	968.1348	38408.8799	53.7426	7.6655	8.336
	41.1329	114.9199	22095.7558	13.8946	20.5808	1073.6078	44771.9916	56.5601	8.1836	8.9
L14	41.1329	120.2262	23064.1769	13.8790	20.5808	1120.6623	46734.2753	59.1717	8.0669	8.376
	41.7216	121.9897	24094.0286	14.0826	20.8754	1154.1828	48821.0342	60.0396	8.2193	8.534

Feed Line/Linear Appurtenances - Entered As Area

Description	*Face or Leg*	*Allow Shield*	*Component Type*	*Placement* *ft*	*Total Number*		*C_AA_A* *ft^2/ft*	*Weight* *plf*
LDF6-50A(1-1/4")	C	No	Inside Pole	117.0000 - 0.0000	3	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66
HB058-1-08U1-S2F(5/8")	C	No	Inside Pole	117.0000 - 0.0000	1	No Ice	0.0000	0.40
						1/2" Ice	0.0000	0.40
						1" Ice	0.0000	0.40
***								
LDF7-50A(1-5/8")	C	No	Inside Pole	110.0000 - 0.0000	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	C	No	CaAa (Out Of Face)	110.0000 - 0.0000	1	No Ice	0.1625	1.07
						1/2" Ice	0.2625	2.37
						1" Ice	0.3625	4.28
***								
LDF6-50A(1-1/4")	C	No	Inside Pole	100.0000 - 0.0000	1	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66
LDF5-50A(7/8")	C	No	Inside Pole	100.0000 - 0.0000	12	No Ice	0.0000	0.33
						1/2" Ice	0.0000	0.33
						1" Ice	0.0000	0.33
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	100.0000 - 0.0000	2	No Ice	0.0000	1.30
						1/2" Ice	0.0000	1.30
						1" Ice	0.0000	1.30
***								
7983A(1/2")	C	No	CaAa (Out Of Face)	93.0000 - 0.0000	3	No Ice	0.0000	0.08
						1/2" Ice	0.0000	0.74
						1" Ice	0.0000	2.01
7983A(1/2")	C	No	CaAa (Out Of Face)	81.0000 - 0.0000	1	No Ice	0.0000	0.08
						1/2" Ice	0.0000	0.74
						1" Ice	0.0000	2.01
7983A(1/2")	C	No	CaAa (Out Of Face)	93.0000 - 81.0000	1	No Ice	0.0580	0.08
						1/2" Ice	0.1580	0.74
						1" Ice	0.2580	2.01
***								
LDF6-50A(1-1/4")	C	No	Inside Pole	89.0000 - 0.0000	12	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66
FB-L98-002-XXX(3/8")	C	No	Inside Pole	89.0000 - 0.0000	1	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
WR-VG82ST-BRDA(5/8)	C	No	Inside Pole	89.0000 - 0.0000	2	No Ice	0.0000	0.31
						1/2" Ice	0.0000	0.31
						1" Ice	0.0000	0.31
2" (Nominal) Conduit	C	No	Inside Pole	89.0000 - 0.0000	1	No Ice	0.0000	0.72
						1/2" Ice	0.0000	0.72
						1" Ice	0.0000	0.72
FB-L98-002-XXX(3/8")	C	No	Inside Pole	89.0000 - 0.0000	1	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
WR-VG82ST-BRDA(5/8)	C	No	Inside Pole	89.0000 - 0.0000	2	No Ice	0.0000	0.31
						1/2" Ice	0.0000	0.31
						1" Ice	0.0000	0.31
***								
AVA7-50(1-5/8)	C	No	CaAa (Out Of Face)	81.0000 - 0.0000	2	No Ice	0.2010	0.70
						1/2" Ice	0.3010	2.23
						1" Ice	0.4010	4.38
AVA7-50(1-5/8)	C	No	CaAa (Out Of Face)	81.0000 - 0.0000	4	No Ice	0.0000	0.70
						1/2" Ice	0.0000	2.23
						1" Ice	0.0000	4.38
**								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	72.5000 - 0.0000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00
3/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	77.0800 - 72.5000	1	No Ice	0.1250	0.00
						1/2" Ice	0.2361	0.00
						1" Ice	0.3472	0.00
***								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	117.0000-110.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.02
L2	110.0000-100.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.625	0.13
L3	100.0000-81.8750	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.591	0.45
L4	81.8750-76.0833	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.093	0.20
L5	76.0833-71.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.567	0.18
L6	71.0000-68.0833	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.133	0.10
L7	68.0833-63.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.351	0.16
L8	63.5000-47.4200	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	11.757	0.56
L9	47.4200-38.0833	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.827	0.33
L10	38.0833-35.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.254	0.11
L11	35.0000-12.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	16.451	0.79
L12	12.5000-11.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.097	0.05
L13	11.0000-2.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.215	0.30
L14	2.5000-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.828	0.09

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	117.0000-110.0000	A	1.697	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.02
L2	110.0000-100.0000	A	1.684	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.993	0.20
L3	100.0000-81.8750	A	1.659	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	13.298	0.79
L4	81.8750-76.0833	A	1.637	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.857	0.57
L5	76.0833-71.0000	A	1.625	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.360	0.54
L6	71.0000-68.0833	A	1.616	0.000	0.000	0.000	0.000	0.00

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	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.008	0.31
L7	68.0833-63.5000	A	1.607	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	9.408	0.48
L8	63.5000-47.4200	A	1.579	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	32.639	1.65
L9	47.4200-38.0833	A	1.539	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	18.952	0.96
L10	38.0833-35.0000	A	1.515	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.096	0.30
L11	35.0000-12.5000	A	1.450	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	43.272	2.14
L12	12.5000-11.0000	A	1.353	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.765	0.13
L13	11.0000-2.5000	A	1.279	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	15.155	0.72
L14	2.5000-0.0000	A	1.081	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.050	0.18

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	117.0000-110.0000	0.0000	0.0000	0.0000	0.0000
L2	110.0000-100.0000	-0.1836	0.1060	-0.4096	0.2365
L3	100.0000-81.8750	-0.2248	0.1298	-0.5905	0.3409
L4	81.8750-76.0833	-0.5293	0.3056	-1.0068	0.5813
L5	76.0833-71.0000	-0.6588	0.3804	-1.2128	0.7002
L6	71.0000-68.0833	-0.6854	0.3957	-1.2436	0.7180
L7	68.0833-63.5000	-0.6911	0.3990	-1.2629	0.7291
L8	63.5000-47.4200	-0.7054	0.4073	-1.3111	0.7569
L9	47.4200-38.0833	-0.7164	0.4136	-1.3546	0.7821
L10	38.0833-35.0000	-0.7253	0.4187	-1.3722	0.7922
L11	35.0000-12.5000	-0.7382	0.4262	-1.4038	0.8105
L12	12.5000-11.0000	-0.7488	0.4323	-1.4128	0.8157
L13	11.0000-2.5000	-0.7529	0.4347	-1.4010	0.8089
L14	2.5000-0.0000	-0.7571	0.4371	-1.3361	0.7714

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVSPP18-C-A20 w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	6.9458 8.1266 9.0212	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	6.9458 8.1266 9.0212	0.08 0.15 0.23

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* ft ft ft	*Azimuth Adjustment* °	*Placement* ft		C_AA_A *Front* ft^2	C_AA_A *Side* ft^2	*Weight* K
APXVSPP18-C-A20 w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	6.9458 8.1266 9.0212	0.08 0.15 0.23
800 EXTERNAL NOTCH FILTER	A	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	0.6601 0.7627 0.8727	0.3211 0.3983 0.4830	0.01 0.02 0.02
800 EXTERNAL NOTCH FILTER	B	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	0.6601 0.7627 0.8727	0.3211 0.3983 0.4830	0.01 0.02 0.02
800 EXTERNAL NOTCH FILTER	C	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	0.6601 0.7627 0.8727	0.3211 0.3983 0.4830	0.01 0.02 0.02
(3) ACU-A20-N	A	From Face	4.0000 0.00 0.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	0.0667 0.1037 0.1481	0.1167 0.1620 0.2148	0.00 0.00 0.00
(3) ACU-A20-N	B	From Face	4.0000 0.00 0.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	0.0667 0.1037 0.1481	0.1167 0.1620 0.2148	0.00 0.00 0.00
(3) ACU-A20-N	C	From Face	4.0000 0.00 0.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	0.0667 0.1037 0.1481	0.1167 0.1620 0.2148	0.00 0.00 0.00
T-Arm Mount [TA 702-3]	C	None		0.00	117.0000	No Ice 1/2" Ice 1" Ice	5.6400 6.5500 7.4600	5.6400 6.5500 7.4600	0.34 0.43 0.52
Stabalizer Bars	C	None		0.00	117.0000	No Ice 1/2" Ice 1" Ice	2.6100 3.7000 4.7900	2.6100 3.7000 4.7900	0.04 0.05 0.06
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	6.5799 7.0306 7.4733	4.9591 5.7544 6.4723	0.08 0.13 0.19
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	6.5799 7.0306 7.4733	4.9591 5.7544 6.4723	0.08 0.13 0.19
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	6.5799 7.0306 7.4733	4.9591 5.7544 6.4723	0.08 0.13 0.19
TD-RRH8x20-25	A	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13
TD-RRH8x20-25	B	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13
TD-RRH8x20-25	C	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13
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800 EXTERNAL NOTCH FILTER	A	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	0.6601 0.7627 0.8727	0.3211 0.3983 0.4830	0.01 0.02 0.02

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* ft ft ft	*Azimuth Adjustment* °	*Placement* ft		C_AA_A *Front* ft^2	C_AA_A *Side* ft^2	*Weight* K
800 EXTERNAL NOTCH FILTER	B	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	0.6601 0.7627 0.8727	0.3211 0.3983 0.4830	0.01 0.02 0.02
800 EXTERNAL NOTCH FILTER	C	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	0.6601 0.7627 0.8727	0.3211 0.3983 0.4830	0.01 0.02 0.02
TME-PCS 1900MHz 4x45W-65MHz	A	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2381 2.4407 2.6507	0.06 0.08 0.11
TME-PCS 1900MHz 4x45W-65MHz	B	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2381 2.4407 2.6507	0.06 0.08 0.11
TME-PCS 1900MHz 4x45W-65MHz	C	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2381 2.4407 2.6507	0.06 0.08 0.11
TME-800MHZ RRH	A	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	2.1342 2.3195 2.5123	1.7730 1.9461 2.1267	0.05 0.07 0.10
TME-800MHZ RRH	B	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	2.1342 2.3195 2.5123	1.7730 1.9461 2.1267	0.05 0.07 0.10
TME-800MHZ RRH	C	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	2.1342 2.3195 2.5123	1.7730 1.9461 2.1267	0.05 0.07 0.10
Side Arm Mount [SO 102-3]	C	None		0.00	115.0000	No Ice 1/2" Ice 1" Ice	3.0000 3.4800 3.9600	3.0000 3.4800 3.9600	0.08 0.11 0.14
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ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Face	1.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	6.3292 6.7751 7.2137	5.6424 6.4259 7.1313	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Face	1.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	6.3292 6.7751 7.2137	5.6424 6.4259 7.1313	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Face	1.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	6.3292 6.7751 7.2137	5.6424 6.4259 7.1313	0.11 0.17 0.23
KRY 112 144/1	A	From Face	1.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	0.3500 0.4259 0.5093	0.1750 0.2343 0.3009	0.01 0.01 0.02
KRY 112 144/1	B	From Face	1.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	0.3500 0.4259 0.5093	0.1750 0.2343 0.3009	0.01 0.01 0.02
KRY 112 144/1	B	From Face	1.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	0.3500 0.4259 0.5093	0.1750 0.2343 0.3009	0.01 0.01 0.02
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	7.8625 8.3076 8.7610	6.8796 7.5944 8.3255	0.16 0.23 0.31

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
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	7.8625 8.3076 8.7610	6.8796 7.5944 8.3255	0.16 0.23 0.31
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	7.8625 8.3076 8.7610	6.8796 7.5944 8.3255	0.16 0.23 0.31
RRUS 11 B12	A	From Face	4.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	2.8333 3.0426 3.2593	1.1821 1.3299 1.4848	0.05 0.07 0.10
RRUS 11 B12	B	From Face	4.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	2.8333 3.0426 3.2593	1.1821 1.3299 1.4848	0.05 0.07 0.10
RRUS 11 B12	C	From Face	4.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	2.8333 3.0426 3.2593	1.1821 1.3299 1.4848	0.05 0.07 0.10
Pipe Mount [PM 601-3]	C	None		0.00	110.0000	No Ice 1/2" Ice 1" Ice	4.3900 5.4800 6.5700	4.3900 5.4800 6.5700	0.20 0.24 0.28
T-Arm Mount [TA 602-3]	C	None		0.00	110.0000	No Ice 1/2" Ice 1" Ice	11.5900 15.4400 19.2900	11.5900 15.4400 19.2900	0.77 0.99 1.21
(2) 2.375" OD x 4' Mount Pipe	A	From Face	4.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	0.8657 1.1106 1.3648	0.8657 1.1106 1.3648	0.02 0.03 0.04
(2) 2.375" OD x 4' Mount Pipe	B	From Face	4.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	0.8657 1.1106 1.3648	0.8657 1.1106 1.3648	0.02 0.03 0.04
(2) 2.375" OD x 4' Mount Pipe	C	From Face	4.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice	0.8657 1.1106 1.3648	0.8657 1.1106 1.3648	0.02 0.03 0.04
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(2) HBXX-6516DS-A2M w/ Mount Pipe	A	From Face	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	6.6672 7.5501 8.4493	5.5365 6.8440 8.1652	0.07 0.13 0.19
(2) HBXX-6516DS-A2M w/ Mount Pipe	B	From Face	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	6.6672 7.5501 8.4493	5.5365 6.8440 8.1652	0.07 0.13 0.19
(2) HBXX-6516DS-A2M w/ Mount Pipe	C	From Face	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	6.6672 7.5501 8.4493	5.5365 6.8440 8.1652	0.07 0.13 0.19
RRH2X60-AWS	A	From Face	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	1.8775 2.0551 2.2401	1.2359 1.3858 1.5441	0.04 0.06 0.08
RRH2X60-AWS	B	From Face	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	1.8775 2.0551 2.2401	1.2359 1.3858 1.5441	0.04 0.06 0.08
RRH2X60-AWS	C	From Face	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	1.8775 2.0551 2.2401	1.2359 1.3858 1.5441	0.04 0.06 0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RRH2X60-PCS	A	From Face	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	2.2000 2.3926 2.5926	1.7233 1.9015 2.0870	0.06 0.08 0.10
RRH2X60-PCS	B	From Face	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	2.2000 2.3926 2.5926	1.7233 1.9015 2.0870	0.06 0.08 0.10
RRH2X60-PCS	C	From Face	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	2.2000 2.3926 2.5926	1.7233 1.9015 2.0870	0.06 0.08 0.10
800 10735V01 w/ Mount Pipe	A	From Face	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	8.8727 9.4550 10.0100	5.4888 6.7103 7.6880	0.06 0.12 0.19
800 10735V01 w/ Mount Pipe	B	From Face	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	8.8727 9.4550 10.0100	5.4888 6.7103 7.6880	0.06 0.12 0.19
800 10735V01 w/ Mount Pipe	C	From Face	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	8.8727 9.4550 10.0100	5.4888 6.7103 7.6880	0.06 0.12 0.19
RRH2X40-07-U	A	From Face	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	1.9250 2.0976 2.2776	1.0523 1.1871 1.3294	0.05 0.07 0.09
RRH2X40-07-U	B	From Face	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	1.9250 2.0976 2.2776	1.0523 1.1871 1.3294	0.05 0.07 0.09
RRH2X40-07-U	C	From Face	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	1.9250 2.0976 2.2776	1.0523 1.1871 1.3294	0.05 0.07 0.09
DB-T1-6Z-8AB-0Z	A	From Face	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	4.8000 5.0704 5.3481	2.0000 2.1926 2.3926	0.04 0.08 0.12
(2) DB844G65ZAXY w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	4.5782 4.9555 5.3404	4.8023 5.4160 6.0401	0.03 0.08 0.13
(2) DB844G65ZAXY w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	4.5782 4.9555 5.3404	4.8023 5.4160 6.0401	0.03 0.08 0.13
(2) DB844G65ZAXY w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	4.5782 4.9555 5.3404	4.8023 5.4160 6.0401	0.03 0.08 0.13
GPS_A	C	From Face	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	0.2550 0.3205 0.3934	0.2550 0.3205 0.3934	0.00 0.00 0.01
(2) FD9R6004/2C-3L	A	From Face	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	0.3142 0.3862 0.4656	0.0762 0.1189 0.1685	0.00 0.01 0.01
(2) FD9R6004/2C-3L	B	From Face	4.0000 0.00 2.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice	0.3142 0.3862 0.4656	0.0762 0.1189 0.1685	0.00 0.01 0.01
(2) FD9R6004/2C-3L	C	From Face	4.0000	0.00	100.0000	No Ice	0.3142	0.0762	0.00

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* ft ft ft	*Azimuth Adjustment* °	*Placement* ft		C_AA_A *Front* ft^2	C_AA_A *Side* ft^2	*Weight* K
			0.00			1/2"	0.3862	0.1189	0.01
			2.00			Ice	0.4656	0.1685	0.01
						1" Ice			
DB-T1-6Z-8AB-0Z	A	From Face	4.0000	0.00	100.0000	No Ice	4.8000	2.0000	0.04
			0.00			1/2"	5.0704	2.1926	0.08
			2.00			Ice	5.3481	2.3926	0.12
						1" Ice			
Platform Mount [LP 715-1]	C	None		0.00	100.0000	No Ice	44.2100	44.2100	1.77
						1/2"	53.9700	53.9700	2.32
						Ice	63.7300	63.7300	2.87
						1" Ice			
***									
Pipe Mount [PM 601-3]	C	None		0.00	93.0000	No Ice	4.3900	4.3900	0.20
						1/2"	5.4800	5.4800	0.24
						Ice	6.5700	6.5700	0.28
						1" Ice			
***									
7770.00 w/ Mount Pipe	A	From Face	4.0000	0.00	89.0000	No Ice	5.8284	4.7144	0.09
			0.00			1/2"	6.2677	5.5082	0.14
			0.00			Ice	6.6966	6.2127	0.21
						1" Ice			
7770.00 w/ Mount Pipe	B	From Face	4.0000	0.00	89.0000	No Ice	5.8284	4.7144	0.09
			0.00			1/2"	6.2677	5.5082	0.14
			0.00			Ice	6.6966	6.2127	0.21
						1" Ice			
7770.00 w/ Mount Pipe	C	From Face	4.0000	0.00	89.0000	No Ice	5.8284	4.7144	0.09
			0.00			1/2"	6.2677	5.5082	0.14
			0.00			Ice	6.6966	6.2127	0.21
						1" Ice			
RRUS 11	A	From Face	4.0000	0.00	89.0000	No Ice	2.7908	1.1923	0.05
			0.00			1/2"	2.9984	1.3395	0.07
			0.00			Ice	3.2134	1.4957	0.10
						1" Ice			
RRUS 11	B	From Face	4.0000	0.00	89.0000	No Ice	2.7908	1.1923	0.05
			0.00			1/2"	2.9984	1.3395	0.07
			0.00			Ice	3.2134	1.4957	0.10
						1" Ice			
RRUS 11	C	From Face	4.0000	0.00	89.0000	No Ice	2.7908	1.1923	0.05
			0.00			1/2"	2.9984	1.3395	0.07
			0.00			Ice	3.2134	1.4957	0.10
						1" Ice			
DC6-48-60-18-8F	A	From Face	4.0000	0.00	89.0000	No Ice	0.9167	0.9167	0.02
			0.00			1/2"	1.4583	1.4583	0.04
			0.00			Ice	1.6431	1.6431	0.06
						1" Ice			
QS66512-2 w/ Mount Pipe	A	From Face	4.0000	0.00	89.0000	No Ice	8.3708	8.4625	0.14
			0.00			1/2"	8.9314	9.6573	0.21
			0.00			Ice	9.4571	10.5478	0.30
						1" Ice			
QS66512-2 w/ Mount Pipe	B	From Face	4.0000	0.00	89.0000	No Ice	8.3708	8.4625	0.14
			0.00			1/2"	8.9314	9.6573	0.21
			0.00			Ice	9.4571	10.5478	0.30
						1" Ice			
TPA-65R-LCUUUU-H8 w/ Mount Pipe	C	From Face	4.0000	0.00	89.0000	No Ice	13.5353	10.9597	0.11
			0.00			1/2"	14.2380	12.4861	0.22
			0.00			Ice	14.9495	14.0367	0.33
						1" Ice			
OPA-65R-LCUU-H8 w/ Mount Pipe	A	From Face	4.0000	0.00	89.0000	No Ice	12.9838	9.3187	0.12
			0.00			1/2"	13.6685	10.7901	0.21
			0.00			Ice	14.3572	12.2416	0.32
						1" Ice			
OPA-65R-LCUU-H6 w/ Mount Pipe	B	From Face	4.0000	0.00	89.0000	No Ice	9.8953	7.1792	0.10
			0.00			1/2"	10.4700	8.3621	0.18
			0.00			Ice	11.0098	9.2588	0.26
						1" Ice			

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
OPA-65R-LCUU-H6 w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice	9.8953 10.4700 11.0098	7.1792 8.3621 9.2588	0.10 0.18 0.26
RRUS 32 B2	A	From Face	4.0000 0.00 0.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice	2.7313 2.9531 3.1823	1.6681 1.8552 2.0493	0.05 0.07 0.10
RRUS 32 B2	B	From Face	4.0000 0.00 0.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice	2.7313 2.9531 3.1823	1.6681 1.8552 2.0493	0.05 0.07 0.10
RRUS 32 B2	C	From Face	4.0000 0.00 0.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice	2.7313 2.9531 3.1823	1.6681 1.8552 2.0493	0.05 0.07 0.10
RRUS 32 B30	A	From Face	4.0000 0.00 0.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice	2.7427 2.9647 3.1941	1.6681 1.8552 2.0493	0.05 0.07 0.10
RRUS 32 B30	B	From Face	4.0000 0.00 0.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice	2.7427 2.9647 3.1941	1.6681 1.8552 2.0493	0.05 0.07 0.10
RRUS 32 B30	C	From Face	4.0000 0.00 0.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice	2.7427 2.9647 3.1941	1.6681 1.8552 2.0493	0.05 0.07 0.10
(2) TPX-070821	A	From Face	4.0000 0.00 0.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice	0.4688 0.5585 0.6556	0.1009 0.1471 0.2020	0.01 0.01 0.02
(2) TPX-070821	B	From Face	4.0000 0.00 0.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice	0.4688 0.5585 0.6556	0.1009 0.1471 0.2020	0.01 0.01 0.02
(2) TPX-070821	C	From Face	4.0000 0.00 0.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice	0.4688 0.5585 0.6556	0.1009 0.1471 0.2020	0.01 0.01 0.02
DC6-48-60-18-8F	B	From Face	4.0000 0.00 0.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice	0.9167 1.4583 1.6431	0.9167 1.4583 1.6431	0.02 0.04 0.06
Platform Mount [LP 715-1]	C	None		0.00	89.0000	No Ice 1/2" Ice 1" Ice	44.2100 53.9700 63.7300	44.2100 53.9700 63.7300	1.77 2.32 2.87
Miscellaneous [NA 509-3]	C	None		0.00	89.0000	No Ice 1/2" Ice 1" Ice	11.8400 16.9600 22.0800	11.8400 16.9600 22.0800	0.28 0.30 0.32
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800 10504 w/ Mount Pipe	A	From Face	1.0000 0.00 0.00	0.00	81.0000	No Ice 1/2" Ice 1" Ice	3.5887 4.0069 4.4217	3.1779 3.9053 4.5808	0.04 0.07 0.11
800 10504 w/ Mount Pipe	B	From Face	1.0000 0.00 0.00	0.00	81.0000	No Ice 1/2" Ice 1" Ice	3.5887 4.0069 4.4217	3.1779 3.9053 4.5808	0.04 0.07 0.11
800 10504 w/ Mount Pipe	C	From Face	1.0000 0.00 0.00	0.00	81.0000	No Ice 1/2" Ice 1" Ice	3.5887 4.0069 4.4217	3.1779 3.9053 4.5808	0.04 0.07 0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pipe Mount [PM 601-3]	C	None		0.00	81.0000	No Ice 1/2" Ice 1" Ice	4.3900 5.4800 6.5700	4.3900 5.4800 6.5700	0.20 0.24 0.28
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Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2-11	A	Paraboloid w/o Radome	From Leg	2.0000 0.00 1.00	48.00		93.0000	2.1750	No Ice 1/2" Ice 1" Ice	3.7200 4.0100 4.3000	0.03 0.05 0.07
VHLP1-23	A	Paraboloid w/o Radome	From Leg	2.0000 0.00 2.00	68.00		93.0000	1.2750	No Ice 1/2" Ice 1" Ice	1.2800 1.4500 1.6200	0.01 0.02 0.03
VHLP2.5-11	C	Paraboloid w/Shroud (HP)	From Leg	2.0000 0.00 1.00	-2.00		93.0000	2.9167	No Ice 1/2" Ice 1" Ice	6.6800 7.0700 7.4600	0.05 0.08 0.12
VHLP1-23	A	Paraboloid w/o Radome	From Leg	2.0000 0.00 -1.00	68.00		93.0000	1.2750	No Ice 1/2" Ice 1" Ice	1.2800 1.4500 1.6200	0.01 0.02 0.03
**											

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 117.0000-110.0000	113.4392	1.3	27.338	9.149	A	0.000	9.149	9.149	100.00	0.000	0.000
					B	0.000	9.149		100.00	0.000	0.000
					C	0.000	9.149		100.00	0.000	0.000
L2 110.0000-100.0000	104.8897	1.278	26.890	14.727	A	0.000	14.727	14.727	100.00	0.000	0.000
					B	0.000	14.727		100.00	0.000	0.000
					C	0.000	14.727		100.00	0.000	1.625
L3 100.0000-81.8750	90.6339	1.24	26.076	31.640	A	0.000	31.640	31.640	100.00	0.000	0.000
					B	0.000	31.640		100.00	0.000	0.000
					C	0.000	31.640		100.00	0.000	3.591
L4 81.8750-76.0833	78.9518	1.204	25.329	11.451	A	0.000	11.451	11.451	100.00	0.000	0.000
					B	0.000	11.451		100.00	0.000	0.000
					C	0.000	11.451		100.00	0.000	3.093
L5 76.0833-71.0000	73.5216	1.186	24.952	10.586	A	0.000	10.586	10.586	100.00	0.000	0.000
					B	0.000	10.586		100.00	0.000	0.000
					C	0.000	10.586		100.00	0.000	3.567
L6 71.0000-68.0833	69.5353	1.172	24.661	6.300	A	0.000	6.300	6.300	100.00	0.000	0.000
					B	0.000	6.300		100.00	0.000	0.000
					C	0.000	6.300		100.00	0.000	2.133
L7 68.0833-63.5000	65.7765	1.159	24.374	10.232	A	0.000	10.232	10.232	100.00	0.000	0.000
					B	0.000	10.232		100.00	0.000	0.000
					C	0.000	10.232		100.00	0.000	3.351
L8 63.5000-47.4200	55.2885	1.117	23.499	39.115	A	0.000	39.115	39.115	100.00	0.000	0.000
					B	0.000	39.115		100.00	0.000	0.000
					C	0.000	39.115		100.00	0.000	11.757
L9 47.4200-38.0833	42.6774	1.058	22.253	24.324	A	0.000	24.324	24.324	100.00	0.000	0.000
					B	0.000	24.324		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	24.324		100.00	0.000	6.827
L10 38.0833-35.0000	36.5360	1.024	21.536	8.509	A	0.000	8.509	8.509	100.00	0.000	0.000
					B	0.000	8.509		100.00	0.000	0.000
					C	0.000	8.509		100.00	0.000	2.254
L11 35.0000-12.5000	23.4750	0.933	19.621	67.742	A	0.000	67.742	67.742	100.00	0.000	0.000
					B	0.000	67.742		100.00	0.000	0.000
					C	0.000	67.742		100.00	0.000	16.451
L12 12.5000-11.0000	11.7489	0.85	17.879	4.869	A	0.000	4.869	4.869	100.00	0.000	0.000
					B	0.000	4.869		100.00	0.000	0.000
					C	0.000	4.869		100.00	0.000	1.097
L13 11.0000-2.5000	6.7147	0.85	17.879	28.427	A	0.000	28.427	28.427	100.00	0.000	0.000
					B	0.000	28.427		100.00	0.000	0.000
					C	0.000	28.427		100.00	0.000	6.215
L14 2.5000-0.0000	1.2470	0.85	17.879	8.631	A	0.000	8.631	8.631	100.00	0.000	0.000
					B	0.000	8.631		100.00	0.000	0.000
					C	0.000	8.631		100.00	0.000	1.828

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 117.0000-110.0000	113.4392	1.3	7.902	1.6971	11.129	A	0.000	11.129	11.129	100.00	0.000	0.000
						B	0.000	11.129		100.00	0.000	0.000
						C	0.000	11.129		100.00	0.000	0.000
L2 110.0000-100.0000	104.8897	1.278	7.773	1.6839	17.533	A	0.000	17.533	17.533	100.00	0.000	0.000
						B	0.000	17.533		100.00	0.000	0.000
						C	0.000	17.533		100.00	0.000	4.993
L3 100.0000-81.8750	90.6339	1.24	7.537	1.6595	36.653	A	0.000	36.653	36.653	100.00	0.000	0.000
						B	0.000	36.653		100.00	0.000	0.000
						C	0.000	36.653		100.00	0.000	13.298
L4 81.8750-76.0833	78.9518	1.204	7.321	1.6367	13.031	A	0.000	13.031	13.031	100.00	0.000	0.000
						B	0.000	13.031		100.00	0.000	0.000
						C	0.000	13.031		100.00	0.000	8.857
L5 76.0833-71.0000	73.5216	1.186	7.212	1.6251	11.962	A	0.000	11.962	11.962	100.00	0.000	0.000
						B	0.000	11.962		100.00	0.000	0.000
						C	0.000	11.962		100.00	0.000	10.360
L6 71.0000-68.0833	69.5353	1.172	7.128	1.6161	7.085	A	0.000	7.085	7.085	100.00	0.000	0.000
						B	0.000	7.085		100.00	0.000	0.000
						C	0.000	7.085		100.00	0.000	6.008
L7 68.0833-63.5000	65.7765	1.159	7.045	1.6071	11.460	A	0.000	11.460	11.460	100.00	0.000	0.000
						B	0.000	11.460		100.00	0.000	0.000
						C	0.000	11.460		100.00	0.000	9.408
L8 63.5000-47.4200	55.2885	1.117	6.792	1.5794	43.348	A	0.000	43.348	43.348	100.00	0.000	0.000
						B	0.000	43.348		100.00	0.000	0.000
						C	0.000	43.348		100.00	0.000	32.639
L9 47.4200-38.0833	42.6774	1.058	6.432	1.5391	26.782	A	0.000	26.782	26.782	100.00	0.000	0.000
						B	0.000	26.782		100.00	0.000	0.000
						C	0.000	26.782		100.00	0.000	18.952
L10 38.0833-35.0000	36.5360	1.024	6.225	1.5153	9.288	A	0.000	9.288	9.288	100.00	0.000	0.000
						B	0.000	9.288		100.00	0.000	0.000
						C	0.000	9.288		100.00	0.000	6.096
L11 35.0000-12.5000	23.4750	0.933	5.672	1.4498	73.178	A	0.000	73.178	73.178	100.00	0.000	0.000
						B	0.000	73.178		100.00	0.000	0.000
						C	0.000	73.178		100.00	0.000	43.272
L12 12.5000-11.0000	11.7489	0.85	5.168	1.3528	5.208	A	0.000	5.208	5.208	100.00	0.000	0.000
						B	0.000	5.208		100.00	0.000	0.000
						C	0.000	5.208		100.00	0.000	2.765
L13 11.0000-2.5000	6.7147	0.85	5.168	1.2792	30.239	A	0.000	30.239	30.239	100.00	0.000	0.000
						B	0.000	30.239		100.00	0.000	0.000
						C	0.000	30.239		100.00	0.000	15.155
L14 2.5000-0.0000	1.2470	0.85	5.168	1.0810	9.081	A	0.000	9.081	9.081	100.00	0.000	0.000
						B	0.000	9.081		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						C	0.000	9.081		100.00	0.000	4.050

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 117.0000-110.0000	113.4392	1.3	10.181	9.149	A	0.000	9.149	9.149	100.00	0.000	0.000
					B	0.000	9.149		100.00	0.000	0.000
					C	0.000	9.149		100.00	0.000	0.000
L2 110.0000-100.0000	104.8897	1.278	10.014	14.727	A	0.000	14.727	14.727	100.00	0.000	0.000
					B	0.000	14.727		100.00	0.000	0.000
					C	0.000	14.727		100.00	0.000	1.625
L3 100.0000-81.8750	90.6339	1.24	9.711	31.640	A	0.000	31.640	31.640	100.00	0.000	0.000
					B	0.000	31.640		100.00	0.000	0.000
					C	0.000	31.640		100.00	0.000	3.591
L4 81.8750-76.0833	78.9518	1.204	9.433	11.451	A	0.000	11.451	11.451	100.00	0.000	0.000
					B	0.000	11.451		100.00	0.000	0.000
					C	0.000	11.451		100.00	0.000	3.093
L5 76.0833-71.0000	73.5216	1.186	9.293	10.586	A	0.000	10.586	10.586	100.00	0.000	0.000
					B	0.000	10.586		100.00	0.000	0.000
					C	0.000	10.586		100.00	0.000	3.567
L6 71.0000-68.0833	69.5353	1.172	9.184	6.300	A	0.000	6.300	6.300	100.00	0.000	0.000
					B	0.000	6.300		100.00	0.000	0.000
					C	0.000	6.300		100.00	0.000	2.133
L7 68.0833-63.5000	65.7765	1.159	9.077	10.232	A	0.000	10.232	10.232	100.00	0.000	0.000
					B	0.000	10.232		100.00	0.000	0.000
					C	0.000	10.232		100.00	0.000	3.351
L8 63.5000-47.4200	55.2885	1.117	8.751	39.115	A	0.000	39.115	39.115	100.00	0.000	0.000
					B	0.000	39.115		100.00	0.000	0.000
					C	0.000	39.115		100.00	0.000	11.757
L9 47.4200-38.0833	42.6774	1.058	8.287	24.324	A	0.000	24.324	24.324	100.00	0.000	0.000
					B	0.000	24.324		100.00	0.000	0.000
					C	0.000	24.324		100.00	0.000	6.827
L10 38.0833-35.0000	36.5360	1.024	8.021	8.509	A	0.000	8.509	8.509	100.00	0.000	0.000
					B	0.000	8.509		100.00	0.000	0.000
					C	0.000	8.509		100.00	0.000	2.254
L11 35.0000-12.5000	23.4750	0.933	7.307	67.742	A	0.000	67.742	67.742	100.00	0.000	0.000
					B	0.000	67.742		100.00	0.000	0.000
					C	0.000	67.742		100.00	0.000	16.451
L12 12.5000-11.0000	11.7489	0.85	6.659	4.869	A	0.000	4.869	4.869	100.00	0.000	0.000
					B	0.000	4.869		100.00	0.000	0.000
					C	0.000	4.869		100.00	0.000	1.097
L13 11.0000-2.5000	6.7147	0.85	6.659	28.427	A	0.000	28.427	28.427	100.00	0.000	0.000
					B	0.000	28.427		100.00	0.000	0.000
					C	0.000	28.427		100.00	0.000	6.215
L14 2.5000-0.0000	1.2470	0.85	6.659	8.631	A	0.000	8.631	8.631	100.00	0.000	0.000
					B	0.000	8.631		100.00	0.000	0.000
					C	0.000	8.631		100.00	0.000	1.828

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

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	117 - 110	Pole	Max Tension	48	0.00	-0.00	-0.00
			Max. Compression	26	-5.42	0.02	0.01
			Max. Mx	20	-1.70	28.68	-0.00
			Max. My	14	-1.70	0.03	-28.67
			Max. Vy	20	-4.20	28.68	-0.00
			Max. Vx	14	4.20	0.03	-28.67
			Max. Torque	22			-0.00
L2	110 - 100	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-11.85	0.09	0.07
			Max. Mx	20	-4.43	105.21	-0.02
			Max. My	2	-4.43	-0.02	105.10
			Max. Vy	20	-8.06	105.21	-0.02
			Max. Vx	14	8.05	0.13	-105.06
			Max. Torque	3			0.04
L3	100 - 81.875	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.04	2.95	1.34
			Max. Mx	20	-13.62	448.99	-2.03
			Max. My	2	-13.66	-0.44	444.38
			Max. Vy	20	-23.39	448.99	-2.03

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	14	23.23	4.57	-444.30
			Max. Torque	14			-2.57
L4	81.875 - 76.0833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-37.42	3.35	1.14
			Max. Mx	20	-14.94	589.18	-3.58
			Max. My	14	-14.96	6.80	-583.55
			Max. Vy	20	-24.64	589.18	-3.58
			Max. Vx	14	24.48	6.80	-583.55
			Max. Torque	14			-2.69
L5	76.0833 - 71	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-38.97	3.73	0.95
			Max. Mx	20	-16.00	716.05	-4.95
			Max. My	14	-16.02	8.75	-709.60
			Max. Vy	20	-25.30	716.05	-4.95
			Max. Vx	14	25.14	8.75	-709.60
			Max. Torque	14			-2.82
L6	71 - 68.0833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-40.06	3.95	0.83
			Max. Mx	20	-16.77	790.43	-5.74
			Max. My	14	-16.79	9.86	-783.50
			Max. Vy	20	-25.71	790.43	-5.74
			Max. Vx	14	25.55	9.86	-783.50
			Max. Torque	14			-2.90
L7	68.0833 - 63.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.87	4.31	0.64
			Max. Mx	20	-18.09	909.75	-6.97
			Max. My	14	-18.10	11.62	-902.09
			Max. Vy	20	-26.37	909.75	-6.97
			Max. Vx	14	26.21	11.62	-902.09
			Max. Torque	14			-3.04
L8	63.5 - 47.42	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-47.12	5.26	0.12
			Max. Mx	20	-22.06	1222.53	-10.08
			Max. My	14	-22.07	16.03	-1213.01
			Max. Vy	20	-28.05	1222.53	-10.08
			Max. Vx	14	27.89	16.03	-1213.01
			Max. Torque	14			-3.38
L9	47.42 - 38.0833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.39	6.44	-0.53
			Max. Mx	20	-28.49	1628.01	-13.85
			Max. My	14	-28.50	21.36	-1616.25
			Max. Vy	20	-30.14	1628.01	-13.85
			Max. Vx	14	29.98	21.36	-1616.25
			Max. Torque	14			-3.82
L10	38.0833 - 35	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-56.85	6.70	-0.68
			Max. Mx	20	-29.63	1721.58	-14.68
			Max. My	14	-29.64	22.54	-1709.33
			Max. Vy	20	-30.57	1721.58	-14.68
			Max. Vx	14	30.41	22.54	-1709.33
			Max. Torque	14			-3.91
L11	35 - 12.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-68.36	8.56	-1.77
			Max. Mx	20	-38.83	2441.22	-20.73
			Max. My	14	-38.83	31.06	-2425.39
			Max. Vy	20	-33.46	2441.22	-20.73
			Max. Vx	14	33.31	31.06	-2425.39
			Max. Torque	14			-4.63
L12	12.5 - 11	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-69.14	8.69	-1.84
			Max. Mx	20	-39.47	2491.53	-21.13
			Max. My	14	-39.47	31.63	-2475.46
			Max. Vy	20	-33.64	2491.53	-21.13
			Max. Vx	14	33.49	31.63	-2475.46
			Max. Torque	14			-4.67
L13	11 - 2.5	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-74.36	9.35	-2.23
			Max. Mx	20	-43.90	2781.86	-23.39
			Max. My	14	-43.90	34.81	-2764.45
			Max. Vy	20	-34.69	2781.86	-23.39
			Max. Vx	14	34.54	34.81	-2764.45
			Max. Torque	14			-4.95
L14	2.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-75.93	9.51	-2.32
			Max. Mx	20	-45.30	2868.98	-24.05
			Max. My	14	-45.30	35.74	-2851.18
			Max. Vy	20	-35.01	2868.98	-24.05
			Max. Vx	14	34.86	35.74	-2851.18
			Max. Torque	14			-5.03

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	75.93	-0.00	-0.00
	Max. H_x	21	33.98	35.00	-0.26
	Max. H_z	3	33.98	-0.13	34.74
	Max. M_x	2	2841.96	-0.13	34.74
	Max. M_z	8	2859.37	-34.92	0.04
	Max. Torsion	24	4.10	17.45	30.03
	Min. Vert	21	33.98	35.00	-0.26
	Min. H_x	9	33.98	-34.93	0.04
	Min. H_z	14	45.31	0.36	-34.85
	Min. M_x	14	-2851.18	0.36	-34.85
	Min. M_z	20	-2868.98	35.00	-0.26
	Min. Torsion	14	-5.03	0.36	-34.85

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	37.76	0.00	0.00	-0.26	1.06	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	45.31	0.13	-34.74	-2841.96	-11.04	-4.00
0.9 Dead+1.6 Wind 0 deg - No Ice	33.98	0.13	-34.74	-2820.33	-11.29	-3.98
1.2 Dead+1.6 Wind 30 deg - No Ice	45.31	17.50	-30.13	-2464.82	-1431.72	-3.01
0.9 Dead+1.6 Wind 30 deg - No Ice	33.98	17.50	-30.13	-2446.03	-1421.18	-2.99
1.2 Dead+1.6 Wind 60 deg - No Ice	45.31	30.26	-17.41	-1423.97	-2477.60	-1.43
0.9 Dead+1.6 Wind 60 deg - No Ice	33.98	30.26	-17.41	-1413.07	-2459.12	-1.41
1.2 Dead+1.6 Wind 90 deg - No Ice	45.31	34.92	-0.04	-3.44	-2859.37	0.68
0.9 Dead+1.6 Wind 90 deg - No Ice	33.98	34.93	-0.04	-3.33	-2838.07	0.69
1.2 Dead+1.6 Wind 120 deg - No Ice	45.31	30.27	17.23	1407.42	-2478.56	2.63
0.9 Dead+1.6 Wind 120 deg - No Ice	33.98	30.27	17.23	1396.83	-2460.07	2.63
1.2 Dead+1.6 Wind 150 deg - No Ice	45.31	17.31	30.13	2465.03	-1414.56	4.35
0.9 Dead+1.6 Wind 150 deg - No Ice	33.98	17.31	30.13	2446.42	-1404.14	4.35
1.2 Dead+1.6 Wind 180 deg - No Ice	45.31	-0.36	34.85	2851.18	35.74	5.03

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
0.9 Dead+1.6 Wind 180 deg - No Ice	33.98	-0.36	34.85	2829.61	35.15	5.02
1.2 Dead+1.6 Wind 210 deg - No Ice	45.31	-17.68	30.10	2461.77	1452.40	3.80
0.9 Dead+1.6 Wind 210 deg - No Ice	33.98	-17.68	30.10	2443.18	1441.05	3.78
1.2 Dead+1.6 Wind 240 deg - No Ice	45.31	-30.32	17.47	1429.69	2485.68	1.76
0.9 Dead+1.6 Wind 240 deg - No Ice	33.98	-30.32	17.47	1418.94	2466.48	1.74
1.2 Dead+1.6 Wind 270 deg - No Ice	45.31	-35.00	0.26	24.05	2868.98	-0.38
0.9 Dead+1.6 Wind 270 deg - No Ice	33.98	-35.00	0.26	23.97	2846.94	-0.39
1.2 Dead+1.6 Wind 300 deg - No Ice	45.31	-30.44	-17.11	-1396.00	2498.18	-2.23
0.9 Dead+1.6 Wind 300 deg - No Ice	33.98	-30.44	-17.11	-1385.31	2478.88	-2.23
1.2 Dead+1.6 Wind 330 deg - No Ice	45.31	-17.45	-30.03	-2456.13	1430.62	-4.10
0.9 Dead+1.6 Wind 330 deg - No Ice	33.98	-17.45	-30.03	-2437.39	1419.42	-4.09
1.2 Dead+1.0 Ice+1.0 Temp	75.93	0.00	0.00	2.32	9.51	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	75.93	0.03	-9.33	-805.12	6.37	-1.68
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	75.93	4.70	-8.09	-698.06	-397.40	-1.18
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	75.93	8.13	-4.68	-402.52	-694.38	-0.41
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	75.93	9.38	-0.01	1.19	-802.64	0.51
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	75.93	8.12	4.63	402.68	-693.99	1.29
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	75.93	4.65	8.09	702.30	-392.66	1.84
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	75.93	-0.09	9.36	812.28	18.71	1.94
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	75.93	-4.75	8.09	702.22	421.59	1.37
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	75.93	-8.14	4.69	408.78	715.41	0.49
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	75.93	-9.40	0.07	8.77	824.01	-0.44
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	75.93	-8.17	-4.60	-394.79	717.88	-1.19
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	75.93	-4.68	-8.06	-695.36	415.31	-1.77
Dead+Wind 0 deg - Service	37.76	0.03	-8.09	-658.95	-1.76	-0.32
Dead+Wind 30 deg - Service	37.76	4.07	-7.01	-571.52	-331.06	-0.35
Dead+Wind 60 deg - Service	37.76	7.04	-4.05	-330.27	-573.48	-0.34
Dead+Wind 90 deg - Service	37.76	8.13	-0.01	-1.00	-662.03	-0.20
Dead+Wind 120 deg - Service	37.76	7.04	4.01	326.02	-573.70	-0.00
Dead+Wind 150 deg - Service	37.76	4.03	7.01	571.15	-327.08	0.31
Dead+Wind 180 deg - Service	37.76	-0.08	8.11	660.66	9.08	0.57
Dead+Wind 210 deg - Service	37.76	-4.12	7.01	570.40	337.44	0.54
Dead+Wind 240 deg - Service	37.76	-7.06	4.07	331.18	576.95	0.41
Dead+Wind 270 deg - Service	37.76	-8.15	0.06	5.37	665.85	0.26
Dead+Wind 300 deg - Service	37.76	-7.09	-3.98	-323.78	579.84	0.09
Dead+Wind 330 deg - Service	37.76	-4.06	-6.99	-569.50	332.39	-0.25

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-37.76	0.00	-0.00	37.76	-0.00	0.000%
2	0.13	-45.31	-34.74	-0.13	45.31	34.74	0.002%
3	0.13	-33.98	-34.74	-0.13	33.98	34.74	0.001%
4	17.50	-45.31	-30.13	-17.50	45.31	30.13	0.000%
5	17.50	-33.98	-30.13	-17.50	33.98	30.13	0.000%
6	30.26	-45.31	-17.41	-30.26	45.31	17.41	0.000%
7	30.26	-33.98	-17.41	-30.26	33.98	17.41	0.000%
8	34.93	-45.31	-0.04	-34.92	45.31	0.04	0.004%
9	34.93	-33.98	-0.04	-34.93	33.98	0.04	0.004%
10	30.27	-45.31	17.23	-30.27	45.31	-17.23	0.000%
11	30.27	-33.98	17.23	-30.27	33.98	-17.23	0.000%
12	17.31	-45.31	30.13	-17.31	45.31	-30.13	0.000%
13	17.31	-33.98	30.13	-17.31	33.98	-30.13	0.000%
14	-0.36	-45.31	34.85	0.36	45.31	-34.85	0.001%
15	-0.36	-33.98	34.85	0.36	33.98	-34.85	0.001%
16	-17.68	-45.31	30.10	17.68	45.31	-30.10	0.000%
17	-17.68	-33.98	30.10	17.68	33.98	-30.10	0.000%
18	-30.32	-45.31	17.47	30.32	45.31	-17.47	0.000%
19	-30.32	-33.98	17.47	30.32	33.98	-17.47	0.000%
20	-35.00	-45.31	0.26	35.00	45.31	-0.26	0.004%
21	-35.00	-33.98	0.26	35.00	33.98	-0.26	0.004%
22	-30.44	-45.31	-17.11	30.44	45.31	17.11	0.000%
23	-30.44	-33.98	-17.11	30.44	33.98	17.11	0.000%
24	-17.45	-45.31	-30.03	17.45	45.31	30.03	0.000%
25	-17.45	-33.98	-30.03	17.45	33.98	30.03	0.000%
26	0.00	-75.93	0.00	-0.00	75.93	-0.00	0.001%
27	0.03	-75.93	-9.33	-0.03	75.93	9.33	0.000%
28	4.70	-75.93	-8.09	-4.70	75.93	8.09	0.000%
29	8.13	-75.93	-4.68	-8.13	75.93	4.68	0.000%
30	9.38	-75.93	-0.01	-9.38	75.93	0.01	0.000%
31	8.12	-75.93	4.63	-8.12	75.93	-4.63	0.000%
32	4.65	-75.93	8.09	-4.65	75.93	-8.09	0.000%
33	-0.09	-75.93	9.36	0.09	75.93	-9.36	0.000%
34	-4.75	-75.93	8.09	4.75	75.93	-8.09	0.000%
35	-8.14	-75.93	4.69	8.14	75.93	-4.69	0.000%
36	-9.40	-75.93	0.07	9.40	75.93	-0.07	0.000%
37	-8.17	-75.93	-4.60	8.17	75.93	4.60	0.000%
38	-4.68	-75.93	-8.06	4.68	75.93	8.06	0.000%
39	0.03	-37.76	-8.09	-0.03	37.76	8.09	0.003%
40	4.07	-37.76	-7.01	-4.07	37.76	7.01	0.003%
41	7.04	-37.76	-4.05	-7.04	37.76	4.05	0.003%
42	8.13	-37.76	-0.01	-8.13	37.76	0.01	0.003%
43	7.05	-37.76	4.01	-7.04	37.76	-4.01	0.003%
44	4.03	-37.76	7.01	-4.03	37.76	-7.01	0.003%
45	-0.08	-37.76	8.11	0.08	37.76	-8.11	0.003%
46	-4.12	-37.76	7.01	4.12	37.76	-7.01	0.003%
47	-7.06	-37.76	4.07	7.06	37.76	-4.07	0.003%
48	-8.15	-37.76	0.06	8.15	37.76	-0.06	0.003%
49	-7.09	-37.76	-3.98	7.09	37.76	3.98	0.003%
50	-4.06	-37.76	-6.99	4.06	37.76	6.99	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	14	0.00000001	0.00009363
3	Yes	14	0.00000001	0.00007366
4	Yes	16	0.00000001	0.00014168
5	Yes	16	0.00000001	0.00010417
6	Yes	17	0.00000001	0.00005560
7	Yes	16	0.00000001	0.00011256
8	Yes	13	0.00005939	0.00009311
9	Yes	13	0.00004050	0.00007728

10	Yes	16	0.00000001	0.00014935
11	Yes	16	0.00000001	0.00011010
12	Yes	16	0.00000001	0.00013901
13	Yes	16	0.00000001	0.00010227
14	Yes	15	0.00000001	0.00006744
15	Yes	14	0.00000001	0.00013394
16	Yes	17	0.00000001	0.00005797
17	Yes	16	0.00000001	0.00011745
18	Yes	16	0.00000001	0.00014367
19	Yes	16	0.00000001	0.00010553
20	Yes	13	0.00005937	0.00008633
21	Yes	13	0.00004049	0.00007257
22	Yes	16	0.00000001	0.00014536
23	Yes	16	0.00000001	0.00010679
24	Yes	17	0.00000001	0.00005633
25	Yes	16	0.00000001	0.00011413
26	Yes	9	0.00000001	0.00004476
27	Yes	15	0.00000001	0.00008736
28	Yes	15	0.00000001	0.00010188
29	Yes	15	0.00000001	0.00010334
30	Yes	15	0.00000001	0.00008566
31	Yes	15	0.00000001	0.00010277
32	Yes	15	0.00000001	0.00010106
33	Yes	15	0.00000001	0.00008798
34	Yes	15	0.00000001	0.00010779
35	Yes	15	0.00000001	0.00010555
36	Yes	15	0.00000001	0.00008863
37	Yes	15	0.00000001	0.00010517
38	Yes	15	0.00000001	0.00010697
39	Yes	12	0.00000001	0.00006899
40	Yes	12	0.00000001	0.00006466
41	Yes	12	0.00000001	0.00009354
42	Yes	12	0.00000001	0.00006724
43	Yes	12	0.00000001	0.00007573
44	Yes	12	0.00000001	0.00006452
45	Yes	12	0.00000001	0.00007808
46	Yes	12	0.00000001	0.00010425
47	Yes	12	0.00000001	0.00006423
48	Yes	12	0.00000001	0.00006833
49	Yes	12	0.00000001	0.00008237
50	Yes	12	0.00000001	0.00008840

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	117 - 110	16.75	48	1.47	0.01
L2	110 - 100	14.61	48	1.44	0.01
L3	100 - 81.875	11.69	48	1.33	0.01
L4	81.875 - 76.0833	7.26	48	0.96	0.00
L5	76.0833 - 71	6.17	48	0.83	0.00
L6	71 - 68.0833	5.33	48	0.75	0.00
L7	68.0833 - 63.5	4.88	48	0.71	0.00
L8	63.5 - 47.42	4.23	48	0.65	0.00
L9	52 - 38.0833	2.81	48	0.53	0.00
L10	38.0833 - 35	1.45	48	0.39	0.00
L11	35 - 12.5	1.21	48	0.35	0.00
L12	12.5 - 11	0.14	48	0.11	0.00
L13	11 - 2.5	0.10	48	0.09	0.00
L14	2.5 - 0	0.01	48	0.02	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
117.0000	APXVSPP18-C-A20 w/ Mount Pipe	48	16.75	1.47	0.01	11132

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
115.0000	800 EXTERNAL NOTCH FILTER	48	16.14	1.47	0.01	11132
110.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	48	14.61	1.44	0.01	8157
100.0000	(2) HBXX-6516DS-A2M w/ Mount Pipe	48	11.69	1.33	0.01	3911
95.0000	VHLP1-23	48	10.33	1.24	0.01	3220
94.0000	VHLP2-11	48	10.07	1.22	0.01	3114
93.0000	Pipe Mount [PM 601-3]	48	9.82	1.20	0.00	3015
92.0000	VHLP1-23	48	9.56	1.18	0.00	2922
89.0000	7770.00 w/ Mount Pipe	48	8.83	1.12	0.00	2675
81.0000	800 10504 w/ Mount Pipe	48	7.08	0.94	0.00	2385

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	117 - 110	72.11	20	6.33	0.03
L2	110 - 100	62.90	20	6.22	0.03
L3	100 - 81.875	50.34	20	5.73	0.03
L4	81.875 - 76.0833	31.28	20	4.14	0.02
L5	76.0833 - 71	26.58	20	3.59	0.01
L6	71 - 68.0833	22.96	20	3.21	0.01
L7	68.0833 - 63.5	21.05	20	3.05	0.01
L8	63.5 - 47.42	18.24	20	2.80	0.01
L9	52 - 38.0833	12.13	20	2.27	0.01
L10	38.0833 - 35	6.26	20	1.68	0.00
L11	35 - 12.5	5.23	20	1.53	0.00
L12	12.5 - 11	0.58	20	0.46	0.00
L13	11 - 2.5	0.45	20	0.40	0.00
L14	2.5 - 0	0.02	20	0.09	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
117.0000	APXVSPP18-C-A20 w/ Mount Pipe	20	72.11	6.33	0.03	2648
115.0000	800 EXTERNAL NOTCH FILTER	20	69.47	6.31	0.03	2648
110.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	20	62.90	6.22	0.03	1937
100.0000	(2) HBXX-6516DS-A2M w/ Mount Pipe	20	50.34	5.73	0.03	928
95.0000	VHLP1-23	20	44.51	5.36	0.03	762
94.0000	VHLP2-11	20	43.39	5.27	0.03	737
93.0000	Pipe Mount [PM 601-3]	20	42.29	5.19	0.03	713
92.0000	VHLP1-23	20	41.20	5.10	0.03	691
89.0000	7770.00 w/ Mount Pipe	20	38.05	4.83	0.02	631
81.0000	800 10504 w/ Mount Pipe	20	30.52	4.06	0.02	560

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	117 - 110 (1)	TP15.94x14.36x0.1875	7.0000	0.0000	0.0	9.5106	-1.70	701.02	0.002
L2	110 - 100 (2)	TP18.2x15.94x0.1875	10.000 0	0.0000	0.0	10.875 0	-4.43	775.82	0.006
L3	100 - 81.875	TP22.2676x18.2x0.25	18.125	0.0000	0.0	17.724	-13.62	1301.71	0.010

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
	(3)		0			2			
L4	81.875 - 76.0833 (4)	TP23.5674x22.2676x0.3262	5.7917	0.0000	0.0	24.4117	-14.94	1461.93	0.010
L5	76.0833 - 71 (5)	TP24.7082x23.5674x0.4537	5.0833	0.0000	0.0	35.4329	-16.00	1633.76	0.010
L6	71 - 68.0833 (6)	TP25.3627x24.7082x0.6488	2.9167	0.0000	0.0	51.6300	-16.77	2076.71	0.008
L7	68.0833 - 63.5 (7)	TP26.3913x25.3627x0.685	4.5833	0.0000	0.0	56.7029	-18.09	2399.72	0.008
L8	63.5 - 47.42 (8)	TP30x26.3913x0.8147	16.0800	0.0000	0.0	73.8647	-22.06	3134.39	0.007
L9	47.42 - 38.0833 (9)	TP31.6377x27.3428x0.8045	13.9167	0.0000	0.0	72.4043	-25.03	3019.88	0.008
L10	38.0833 - 35 (10)	TP32.339x31.6377x0.7403	3.0833	0.0000	0.0	75.3239	-29.63	3144.21	0.009
L11	35 - 12.5 (11)	TP37.4568x32.339x0.7647	22.5000	0.0000	0.0	90.3435	-38.83	3949.43	0.010
L12	12.5 - 11 (12)	TP37.798x37.4568x0.7495	1.5000	0.0000	0.0	89.4089	-39.47	3919.73	0.010
L13	11 - 2.5 (13)	TP39.7314x37.798x0.9196	8.5000	0.0000	0.0	114.9200	-43.90	5035.53	0.009
L14	2.5 - 0 (14)	TP40.3x39.7314x0.9631	2.5000	0.0000	0.0	121.9900	-45.30	5509.93	0.008

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	117 - 110 (1)	TP15.94x14.36x0.1875	28.68	224.09	0.128	0.00	224.09	0.000
L2	110 - 100 (2)	TP18.2x15.94x0.1875	105.23	284.00	0.371	0.00	284.00	0.000
L3	100 - 81.875 (3)	TP22.2676x18.2x0.25	449.00	581.91	0.772	0.00	581.91	0.000
L4	81.875 - 76.0833 (4)	TP23.5674x22.2676x0.3262	589.19	688.03	0.856	0.00	688.03	0.000
L5	76.0833 - 71 (5)	TP24.7082x23.5674x0.4537	716.07	798.74	0.896	0.00	798.74	0.000
L6	71 - 68.0833 (6)	TP25.3627x24.7082x0.6488	790.45	1026.93	0.770	0.00	1026.93	0.000
L7	68.0833 - 63.5 (7)	TP26.3913x25.3627x0.685	909.77	1233.83	0.737	0.00	1233.83	0.000
L8	63.5 - 47.42 (8)	TP30x26.3913x0.8147	1222.57	1761.31	0.694	0.00	1761.31	0.000
L9	47.42 - 38.0833 (9)	TP31.6377x27.3428x0.8045	1352.83	1684.81	0.803	0.00	1684.81	0.000
L10	38.0833 - 35 (10)	TP32.339x31.6377x0.7403	1721.64	1993.42	0.864	0.00	1993.42	0.000
L11	35 - 12.5 (11)	TP37.4568x32.339x0.7647	2441.31	2914.91	0.838	0.00	2914.91	0.000
L12	12.5 - 11 (12)	TP37.798x37.4568x0.7495	2491.62	2922.82	0.852	0.00	2922.82	0.000
L13	11 - 2.5 (13)	TP39.7314x37.798x0.9196	2781.96	3920.26	0.710	0.00	3920.26	0.000
L14	2.5 - 0 (14)	TP40.3x39.7314x0.9631	2869.07	4344.27	0.660	0.00	4344.27	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	117 - 110 (1)	TP15.94x14.36x0.1875	4.20	350.51	0.012	0.00	454.38	0.000
L2	110 - 100 (2)	TP18.2x15.94x0.1875	8.06	387.91	0.021	0.01	575.85	0.000
L3	100 - 81.875	TP22.2676x18.2x0.25	23.39	650.86	0.036	1.05	1179.93	0.001

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L4	81.875 - 76.0833 (4)	TP23.5674x22.2676x0.3262	24.64	730.97	0.034	0.99	1395.11	0.001
L5	76.0833 - 71 (5)	TP24.7082x23.5674x0.4537	25.30	816.88	0.031	0.92	1619.60	0.001
L6	71 - 68.0833 (6)	TP25.3627x24.7082x0.6488	25.71	1038.36	0.025	0.88	2082.28	0.000
L7	68.0833 - 63.5 (7)	TP26.3913x25.3627x0.685	26.37	1199.86	0.022	0.80	2501.81	0.000
L8	63.5 - 47.42 (8)	TP30x26.3913x0.8147	28.05	1567.20	0.018	0.59	3571.38	0.000
L9	47.42 - 38.0833 (9)	TP31.6377x27.3428x0.8045	28.98	1527.23	0.019	0.49	3416.28	0.000
L10	38.0833 - 35 (10)	TP32.339x31.6377x0.7403	30.57	1572.10	0.019	0.28	4042.03	0.000
L11	35 - 12.5 (11)	TP37.4568x32.339x0.7647	33.46	1974.72	0.017	0.15	5910.52	0.000
L12	12.5 - 11 (12)	TP37.798x37.4568x0.7495	33.64	1959.86	0.017	0.18	5926.58	0.000
L13	11 - 2.5 (13)	TP39.7314x37.798x0.9196	34.70	2517.77	0.014	0.33	7949.06	0.000
L14	2.5 - 0 (14)	TP40.3x39.7314x0.9631	35.02	2754.97	0.013	0.38	8808.83	0.000

Pole Interaction Design Data

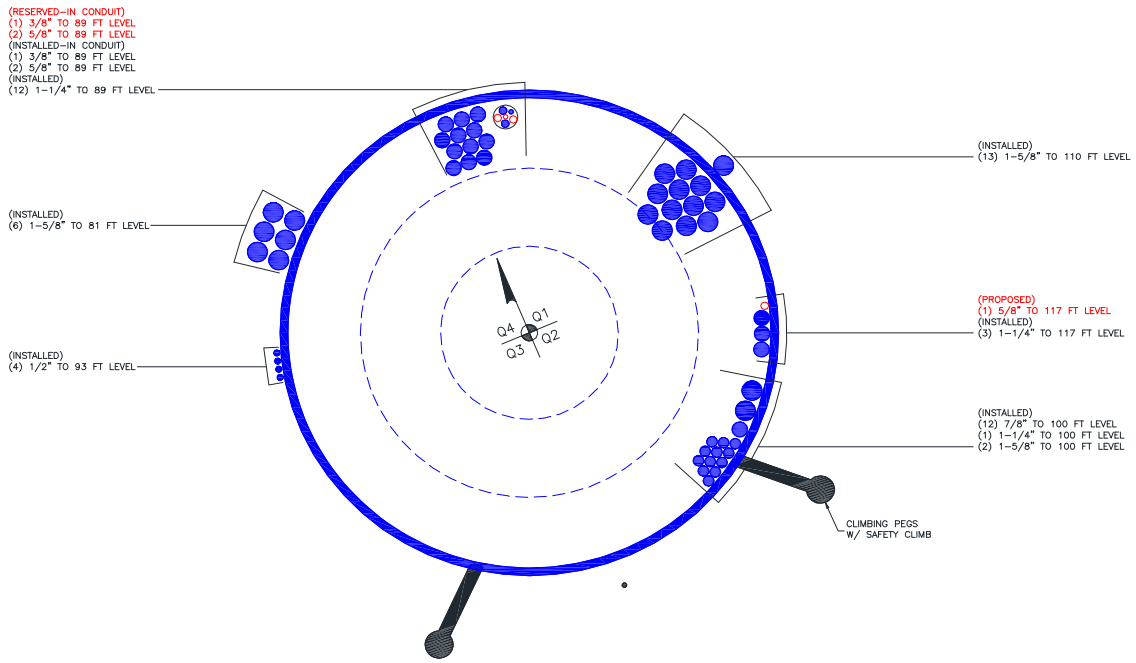
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	117 - 110 (1)	0.002	0.128	0.000	0.012	0.000	0.131 ✔	1.000	4.8.2 ✔
L2	110 - 100 (2)	0.006	0.371	0.000	0.021	0.000	0.377 ✔	1.000	4.8.2 ✔
L3	100 - 81.875 (3)	0.010	0.772	0.000	0.036	0.001	0.783 ✔	1.000	4.8.2 ✔
L4	81.875 - 76.0833 (4)	0.010	0.856	0.000	0.034	0.001	0.868 ✔	1.000	4.8.2 ✔
L5	76.0833 - 71 (5)	0.010	0.896	0.000	0.031	0.001	0.907 ✔	1.000	4.8.2 ✔
L6	71 - 68.0833 (6)	0.008	0.770	0.000	0.025	0.000	0.778 ✔	1.000	4.8.2 ✔
L7	68.0833 - 63.5 (7)	0.008	0.737	0.000	0.022	0.000	0.745 ✔	1.000	4.8.2 ✔
L8	63.5 - 47.42 (8)	0.007	0.694	0.000	0.018	0.000	0.701 ✔	1.000	4.8.2 ✔
L9	47.42 - 38.0833 (9)	0.008	0.803	0.000	0.019	0.000	0.812 ✔	1.000	4.8.2 ✔
L10	38.0833 - 35 (10)	0.009	0.864	0.000	0.019	0.000	0.873 ✔	1.000	4.8.2 ✔
L11	35 - 12.5 (11)	0.010	0.838	0.000	0.017	0.000	0.848 ✔	1.000	4.8.2 ✔
L12	12.5 - 11 (12)	0.010	0.852	0.000	0.017	0.000	0.863 ✔	1.000	4.8.2 ✔
L13	11 - 2.5 (13)	0.009	0.710	0.000	0.014	0.000	0.719 ✔	1.000	4.8.2 ✔
L14	2.5 - 0 (14)	0.008	0.660	0.000	0.013	0.000	0.669 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	117 - 110	Pole	TP15.94x14.36x0.1875	1	-1.70	701.02	13.1	Pass
L2	110 - 100	Pole	TP18.2x15.94x0.1875	2	-4.43	775.82	37.7	Pass
L3	100 - 81.875	Pole	TP22.2676x18.2x0.25	3	-13.62	1301.71	78.3	Pass
L4	81.875 - 76.0833	Pole	TP23.5674x22.2676x0.3262	4	-14.94	1461.93	86.8	Pass
L5	76.0833 - 71	Pole	TP24.7082x23.5674x0.4537	5	-16.00	1633.76	90.7	Pass
L6	71 - 68.0833	Pole	TP25.3627x24.7082x0.6488	6	-16.77	2076.71	77.8	Pass
L7	68.0833 - 63.5	Pole	TP26.3913x25.3627x0.685	7	-18.09	2399.72	74.5	Pass
L8	63.5 - 47.42	Pole	TP30x26.3913x0.8147	8	-22.06	3134.39	70.1	Pass
L9	47.42 - 38.0833	Pole	TP31.6377x27.3428x0.8045	9	-25.03	3019.88	81.2	Pass
L10	38.0833 - 35	Pole	TP32.339x31.6377x0.7403	10	-29.63	3144.21	87.3	Pass
L11	35 - 12.5	Pole	TP37.4568x32.339x0.7647	11	-38.83	3949.43	84.8	Pass
L12	12.5 - 11	Pole	TP37.798x37.4568x0.7495	12	-39.47	3919.73	86.3	Pass
L13	11 - 2.5	Pole	TP39.7314x37.798x0.9196	13	-43.90	5035.53	71.9	Pass
L14	2.5 - 0	Pole	TP40.3x39.7314x0.9631	14	-45.30	5509.93	66.9	Pass
							Summary	
						Pole (L5)	90.7	Pass
						RATING =	**90.7**	**Pass**

APPENDIX B

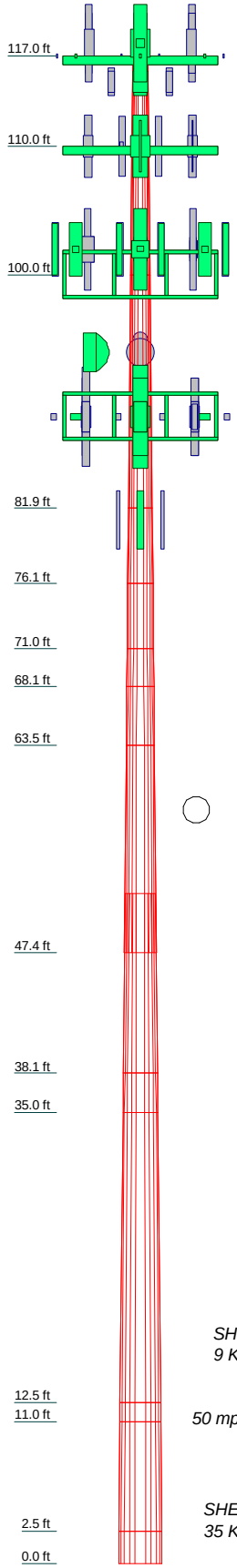
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

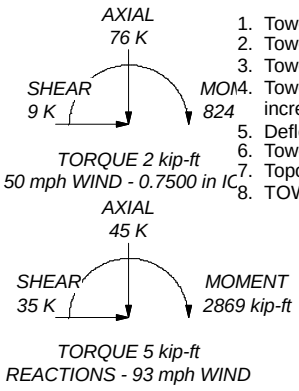
Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Length (ft)	7.0000	10.0000	18.1250	5.7917	5.0833	2.9167	4.5833	16.0800	13.9167	3.0833	22.5000	1.5000	8.5000	2.5000
Number of Sides	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Thickness (in)	0.1875	0.1875	0.2500	0.3262	0.4537	0.6488	0.6850	0.8147	0.8045	0.7403	0.7647	0.7495	0.9195	0.9631
Socket Length (ft)								4.5800						
Top Dia (in)	14.3600	15.9400	18.2000	22.2676	23.5674	24.7082	25.3627	26.3913	27.3428	31.6377	32.3390	37.4568	37.7980	39.7314
Bot Dia (in)	15.9400	18.2000	22.2676	23.5674	24.7082	25.3627	26.3913	30.0000	31.6377	32.3390	37.4568	37.7980	39.7314	40.3000
Grade	A572-65													
Weight (K)	0.2	0.3	1.0	0.5	0.6	0.5	0.9	3.9	3.5	0.8	6.4	0.5	3.2	1.0



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVSPP18-C-A20 w/ Mount Pipe	117	RRH2X60-AWS	100
APXVSPP18-C-A20 w/ Mount Pipe	117	RRH2X60-PCS	100
APXVSPP18-C-A20 w/ Mount Pipe	117	RRH2X60-PCS	100
800 EXTERNAL NOTCH FILTER	117	RRH2X60-PCS	100
800 EXTERNAL NOTCH FILTER	117	800 10735V01 w/ Mount Pipe	100
800 EXTERNAL NOTCH FILTER	117	800 10735V01 w/ Mount Pipe	100
(3) ACU-A20-N	117	800 10735V01 w/ Mount Pipe	100
(3) ACU-A20-N	117	RRH2X40-07-U	100
(3) ACU-A20-N	117	RRH2X40-07-U	100
T-Arm Mount [TA 702-3]	117	RRH2X40-07-U	100
Stabalizer Bars	117	DB-T1-6Z-8AB-0Z	100
APXVTM14-ALU-I20 w/ Mount Pipe	117	(2) DB844G65ZAXY w/ Mount Pipe	100
APXVTM14-ALU-I20 w/ Mount Pipe	117	(2) DB844G65ZAXY w/ Mount Pipe	100
APXVTM14-ALU-I20 w/ Mount Pipe	117	(2) DB844G65ZAXY w/ Mount Pipe	100
TD-RRH8x20-25	117	GPS_A	100
TD-RRH8x20-25	117	(2) FD9R6004/2C-3L	100
TD-RRH8x20-25	117	(2) FD9R6004/2C-3L	100
800 EXTERNAL NOTCH FILTER	115	(2) FD9R6004/2C-3L	100
800 EXTERNAL NOTCH FILTER	115	DB-T1-6Z-8AB-0Z	100
800 EXTERNAL NOTCH FILTER	115	Platform Mount [LP 715-1]	100
TME-PCS 1900MHz 4x45W-65MHz	115	Pipe Mount [PM 601-3]	93
TME-PCS 1900MHz 4x45W-65MHz	115	VHLP2-11	93
TME-PCS 1900MHz 4x45W-65MHz	115	VHLP1-23	93
TME-800MHZ RRH	115	VHLP2.5-11	93
TME-800MHZ RRH	115	VHLP1-23	93
TME-800MHZ RRH	115	RRUS 11	89
Side Arm Mount [SO 102-3]	115	RRUS 11	89
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	110	DC6-48-60-18-8F	89
		QS66512-2 w/ Mount Pipe	89
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	110	QS66512-2 w/ Mount Pipe	89
		TPA-65R-LCUUUU-H8 w/ Mount Pipe	89
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	110	OPA-65R-LCUU-H8 w/ Mount Pipe	89
KRY 112 144/1	110	OPA-65R-LCUU-H6 w/ Mount Pipe	89
KRY 112 144/1	110	OPA-65R-LCUU-H6 w/ Mount Pipe	89
KRY 112 144/1	110	RRUS 32 B2	89
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	110	RRUS 32 B2	89
		RRUS 32 B2	89
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	110	RRUS 32 B30	89
		RRUS 32 B30	89
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	110	RRUS 32 B30	89
		(2) TPX-070821	89
RRUS 11 B12	110	(2) TPX-070821	89
RRUS 11 B12	110	(2) TPX-070821	89
RRUS 11 B12	110	DC6-48-60-18-8F	89
Pipe Mount [PM 601-3]	110	Platform Mount [LP 715-1]	89
T-Arm Mount [TA 602-3]	110	Miscellaneous [NA 509-3]	89
(2) 2.375" OD x 4' Mount Pipe	110	7770.00 w/ Mount Pipe	89
(2) 2.375" OD x 4' Mount Pipe	110	7770.00 w/ Mount Pipe	89
(2) 2.375" OD x 4' Mount Pipe	110	7770.00 w/ Mount Pipe	89
(2) HBXX-6516DS-A2M w/ Mount Pipe	100	RRUS 11	89
(2) HBXX-6516DS-A2M w/ Mount Pipe	100	800 10504 w/ Mount Pipe	81
(2) HBXX-6516DS-A2M w/ Mount Pipe	100	800 10504 w/ Mount Pipe	81
RRH2X60-AWS	100	800 10504 w/ Mount Pipe	81
RRH2X60-AWS	100	Pipe Mount [PM 601-3]	81

ALL REACTIONS ARE FACTORED



TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C 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 0.0000 ft
8. TOWER RATING: 90.7%

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

Job:	**117' Monopole / Darien, CT**		
Project:	**PJF 37517-0349 / BU 806352**		
Client: Crown Castle	Drawn by: jjohnson		App'd:
Code: TIA-222-G	Date: 06/20/17		Scale: NTS
Path:			Dwg No. E-1

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#:	
Site Name:	
App #:	

Reactions		
Mu	28.68	ft-kips
Axial, Pu:	1.7	kips
Shear, Vu:	4.2	kips
Elevation:	110	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Other

If No stiffeners, Criteria:	TIA G

<-Only Applcable to Unstiffened Cases

Bolt Data

Qty:	10		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle (in.):	19.2		

Plate Data

Diam:	22	in
Thick, t:	1.5	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	5.13	in

Stiffener Data (Welding at Both Sides)

Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data

Diam:	15.94	in
Thick:	0.1875	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	Rigid
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.54	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	7.00	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	0.971	in	
Min PL "treq" for actual **T w/ Pry**:	0.260	in	
Min PL "t1" for actual **T w/o Pry**:	0.348	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	7.00	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	12.8%	**Pass**	

Exterior Flange Plate Results Flexural Check

Compression Side Plate Stress:	2.7	ksi	Rigid
Allowable Plate Stress:	32.4	ksi	TIA G
Compression Plate Stress Ratio:	8.3%	**Pass**	φ*Fy
No Prying			Comp. Y.L. Length:
Tension Side Stress Ratio, (treq/t)^2:	3.0%	**Pass**	10.70

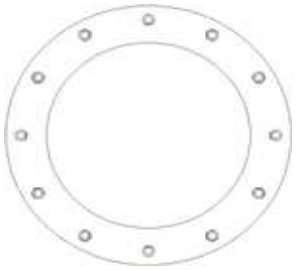
n/a

Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a



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

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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#:	
Site Name:	
App #:	

Reactions		
Mu	105.23	ft-kips
Axial, Pu:	4.43	kips
Shear, Vu:	8.06	kips
Elevation:	100	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Other

If No stiffeners, Criteria:	TIA G	<-Only Applcable to Unstiffened Cases

Bolt Data

Qty:	12		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle (in.):	22		

Plate Data

Diam:	24	in
Thick, t:	1.5	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.88	in

Stiffener Data (Welding at Both Sides)

Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data

Diam:	18.2	in
Thick:	0.1875	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	Rigid
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	18.76	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.108	in	
Min PL "treq" for actual **T w/ Pry**:	0.487	in	
Min PL "t1" for actual **T w/o Pry**:	0.650	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	18.76	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	34.4%	**Pass**	

Exterior Flange Plate Results Flexural Check

Compression Side Plate Stress:	8.3	ksi	Rigid
Allowable Plate Stress:	32.4	ksi	TIA G
Compression Plate Stress Ratio:	25.5%	**Pass**	φ*Fy
No Prying			Comp. Y.L. Length:
Tension Side Stress Ratio, (treq/t)^2:	10.6%	**Pass**	12.36

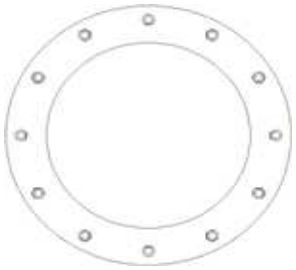
n/a

Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a



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

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

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v4.4 - Effective 7-12-13

Date: 6/20/2017
PJF Project: 37517-0349.002.7805
Client Ref. # 806352
Site Name: BRG 302 943052
Description: 117ft Monopole
Owner: CCI
Engineer: JRJ

Asymmetric Anchor Rod Analysis

Moment =	2869	k-ft	TIA Ref.	G	Location =	Base Plate		
Axial =	45.0	kips	ASIF =	1.0000	η =	0.50	for BP, Rev. G Sect. 4.9.9	
Shear =	35.0	kips	Max Ratio =	105.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	18							

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

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	0.0	48.22	0.00	3.98	151.94	146.59	156.11	0.00	260.00	60.0%
2	2.250	#18J A615 Gr 75	75	100	30.0	48.22	0.00	3.98	151.94	146.59	156.11	0.00	260.00	60.0%
3	2.250	#18J A615 Gr 75	75	100	60.0	48.22	0.00	3.98	151.94	146.59	156.11	0.00	260.00	60.0%
4	2.250	#18J A615 Gr 75	75	100	90.0	48.22	0.00	3.98	151.94	146.59	156.11	0.00	260.00	60.0%
5	2.250	#18J A615 Gr 75	75	100	120.0	48.22	0.00	3.98	151.94	146.59	156.11	0.00	260.00	60.0%
6	2.250	#18J A615 Gr 75	75	100	150.0	48.22	0.00	3.98	151.94	146.59	156.11	0.00	260.00	60.0%
7	2.250	#18J A615 Gr 75	75	100	180.0	48.22	0.00	3.98	151.94	146.59	156.11	0.00	260.00	60.0%
8	2.250	#18J A615 Gr 75	75	100	210.0	48.22	0.00	3.98	151.94	146.59	156.11	0.00	260.00	60.0%
9	2.250	#18J A615 Gr 75	75	100	240.0	48.22	0.00	3.98	151.94	146.59	156.11	0.00	260.00	60.0%
10	2.250	#18J A615 Gr 75	75	100	270.0	48.22	0.00	3.98	151.94	146.59	156.11	0.00	260.00	60.0%
11	2.250	#18J A615 Gr 75	75	100	300.0	48.22	0.00	3.98	151.94	146.59	156.11	0.00	260.00	60.0%
12	2.250	#18J A615 Gr 75	75	100	330.0	48.22	0.00	3.98	151.94	146.59	156.11	0.00	260.00	60.0%
13	1.750	A193 Gr B7	105	125	105.0	58.72	0.00	2.41	111.47	108.23	113.99	0.00	190.00	60.0%
14	1.750	A193 Gr B7	105	125	225.0	58.72	0.00	2.41	111.47	108.23	113.99	0.00	190.00	60.0%
15	1.750	A193 Gr B7	105	125	345.0	58.72	0.00	2.41	111.47	108.23	113.99	0.00	190.00	60.0%
16	2.250	A193 Gr B7	105	125	15.0	58.72	0.00	3.98	184.26	178.92	188.42	0.00	325.00	58.0%
17	2.250	A193 Gr B7	105	125	135.0	58.72	0.00	3.98	184.26	178.92	188.42	0.00	325.00	58.0%
18	2.250	A193 Gr B7	105	125	255.0	58.72	0.00	3.98	184.26	178.92	188.42	0.00	325.00	58.0%
								66.90						

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

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

Site Data	
BU#:	
Site Name:	
App #:	
Pole Manufacturer:	*Other*

Reactions		
Mu:	1799.4	ft-kips
Axial, Pu:	32.1	kips
Shear, Vu:	25	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

Reactions adjusted to account for additional anchor rods.

Anchor Rod Data		
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	48.22	in

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

Anchor Rod Results

Max Rod (Cu+ Vu/ή):	156.1	Kips
Allowable Axial, Φ*Fu*Anet:	260.0	Kips
Anchor Rod Stress Ratio:	60.0%	**Pass**

Rigid
AISC LRFD
φ*Tn

Plate Data		
Diam:	54.22	in
Thick:	2.5	in
Grade:	60	ksi
Single-Rod B-eff:	10.80	in

Base Plate Results Flexural Check

Base Plate Stress:	22.3	ksi
Allowable Plate Stress:	54.0	ksi
Base Plate Stress Ratio:	41.3%	**Pass**

Rigid
AISC LRFD
φ*Fy
Y.L. Length: 26.48

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

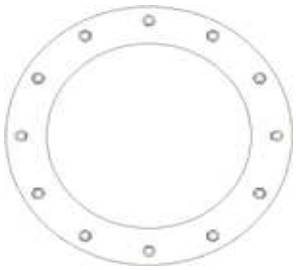
Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Diam:	40.3	in
Thick:	0.34375	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None



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

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

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Job Number:	37517-0349.002.7805	**Page:**	1
Site Number:	806352	**By:**	JRJ
Site Name:	BRG 302 943052	**Date:**	6/20/2017

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

Factored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, Mu =	2869.0		k-ft
Shear, Vu =	35.0		kips
Axial Load, Pu1 =	45.0		kips (from 1.2D + 1.6W)*
Axial Load, Pu2 =	33.8	0.0	kips (from 0.9D + 1.6W)**
OTMu =	2876.0	0.0	k-ft @ Ground

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

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

Safety Factors / Load Factors / Φ Factors

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

Drilled Pier Parameters

Diameter =	6.5	ft
Height Above Grade =	0.2	ft
Depth Below Grade =	16.4	ft
fc' =	3	ksi
εc =	0.003	in/in
L / D Ratio =	2.55	
Mat Ftdn. Cap Width =		ft
Mat Ftdn. Cap Length =		ft
Depth Below Grade =		ft

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

Load Combinations Checked per TIA-222-G

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

Steel Parameters

Number of Bars =	22	
Rebar Size =	#10	
Rebar Fy =	60	ksi
Rebar MOE =	29000	ksi
Tie Size =	#6	
Side Clear Cover to Ties =	5	in

Soil Parameters

Water Table Depth =	99.00	ft
Depth to Ignore Soil =	4.00	ft
Depth to Full Cohesion =	0	ft
Full Cohesion Starts at?*	Ground	

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

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

Direct Embed Pole Shaft Parameters

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

Maximum Capacity Ratios

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

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

Define Soil Layers

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

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	4	115		30	Sand				4
2	2	120		39	Sand	23000	420		6
3	5	135		45	Sand	30900	2150		11
4	5.4	155	14000		Clay	36900	4740		16.4
5									
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	13.29	ft, from Grade	Shear, Vu =	35.00	kips
Bending Moment, Mu =	3341.18	k-ft, from COR	Resisting Shear, ΦVn =	70.01	kips
Resisting Moment, ΦMn =	6683.43	k-ft, from COR			

MOMENT RATIO = 50.0% OK **SHEAR RATIO = 50.0% OK**

Soil Results: Uplift

Uplift, Tu =	0.00	kips
Uplift Capacity, ΦTn =	74.36	kips

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

Compression, Cu =	45.00	kips
Comp. Capacity, ΦCn =	1476.79	kips

COMPRESSION RATIO = 3.0% OK

Steel Results (ACI 318-05):

Minimum Steel Area =	15.93	sq in	Axial Load, Pu =	58.27	kips @ 5.75 ft Below Grade
Actual Steel Area =	27.94	sq in	Moment, Mu =	3051.17	k-ft @ 5.75 ft Below Grade
			Moment, ΦMn =	4061.51	k-ft
Axial, ΦPn (min) =	-1508.76	kips, Where ΦMn = 0 k-ft			
Axial, ΦPn (max) =	7170.79	kips, Where ΦMn = 0 k-ft	**MOMENT RATIO =**	**75.1%**	**OK**

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

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

Site Data

BU#: *806352*
Site Name: *BRG 302 943052*
App #:

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

Pier Properties

Concrete:

Pier Diameter =	6.5	ft
Concrete Area =	4778.4	in^2

Reinforcement:

Clear Cover to **Tie**=	5.00	in
Horiz. **Tie** Bar Size=	6	
Vert. Cage Diameter =	5.44	ft
Vert. Cage Diameter =	65.23	in
Vertical Bar Size =	10	
Bar Diameter =	1.27	in
Bar Area =	1.27	in^2
Number of Bars =	22	
As Total=	27.94	in^2
A s/ Aconc, Rho:	0.0058	0.58%

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

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

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.58%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	7170.79	kips
at Mu=(ϕ=0.65)Mn=	3988.84	ft-kips
Max Tu, (φ=0.9) Tn =	1508.76	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	G	
Max. Factored Shaft Mu:	3051.17	ft-kips **(* Note)**
Max. Factored Shaft Pu:	58.27	kips
Max Axial Force Type:	Comp.	

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

Load Factor	Shaft Factored Loads		
1.00	Mu:	3051.17	ft-kips
1.00	Pu:	58.27	kips

Material Properties

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

ACI 318 Code

Select Analysis ACI Code=	2005	

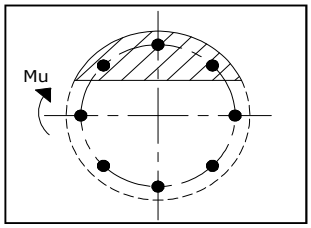
Seismic Properties

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

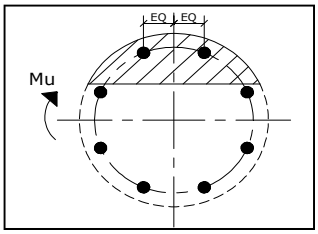
Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **1**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**13.42**	in
Extreme Steel Strain, ϵt:	**0.0130**	
	ϵt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	58.27	kips
Drilled Shaft Moment Capacity, φMn:	**4061.51**	ft-kips
Drilled Shaft Superimposed Mu:	**3051.17**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**75.1%**

EBI Consulting
environmental | engineering | due diligence

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

SPRINT Existing Facility

Site ID: CT03XC357

Darien
130 Ledge Road
Darien, CT 06820

July 24, 2017

EBI Project Number: 6217003221

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	23.25 %

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

EBI Consulting
environmental | engineering | due diligence

July 24, 2017

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

Emissions Analysis for Site: **CT03XC357 – Darien**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **130 Ledge Road, Darien, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed SPRINT Wireless antenna facility located at **130 Ledge Road, Darien, 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 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 **117 feet** above ground level (AGL) for **Sector A**, **117 feet** above ground level (AGL) for **Sector B** and **117 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):	**117 feet**	Height (AGL):	**117 feet**	Height (AGL):	**117 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%	**2.49 %**	Antenna B1 MPE%	**2.49 %**	Antenna C1 MPE%	**2.49 %**
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):	**117 feet**	Height (AGL):	**117 feet**	Height (AGL):	**117 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%	**1.82 %**	Antenna B2 MPE%	**1.82 %**	Antenna C2 MPE%	**1.82 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**4.31 %**
AT&T	7.03 %
Verizon Wireless	3.98 %
Clearwire	0.39 %
MetroPCS	3.95 %
T-Mobile	3.59 %
Site Total MPE %:	**23.25 %**

SPRINT Sector A Total:	4.31 %
SPRINT Sector B Total:	4.31 %
SPRINT Sector C Total:	4.31 %
Site Total:	23.25 %

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	117	1.28	850 MHz	567	0.23%
Sprint 850 MHz LTE	2	437.55	117	2.55	850 MHz	567	0.45%
Sprint 1900 MHz (PCS) CDMA	5	622.47	117	9.08	1900 MHz (PCS)	1000	0.91%
Sprint 1900 MHz (PCS) LTE	2	1,556.18	117	9.08	1900 MHz (PCS)	1000	0.91%
Sprint 2500 MHz (BRS) LTE	8	778.09	117	18.16	2500 MHz (BRS)	1000	1.82%
						Total:	**4.31%**

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:	4.31 %
Sector B:	4.31 %
Sector C:	4.31 %
SPRINT Maximum Total (per sector):	4.31 %
Site Total:	23.25 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **23.25 %** 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.