



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 2.5 Rework Crown Site BU: 881535**  
**Sprint Site ID: CT03XC373**  
**425 Indian Ledge Park Rd, Trumbull, CT 06611**  
**Latitude: 41° 16' 23.81"/ Longitude: -73° 12' 47.18"**

Dear Ms. Bachman:

Sprint currently maintains three (3) antennas at the 164-foot level of the existing 195-foot self-support tower at 425 Indian Ledge Park Road in Trumbull, CT. The tower is owned by Crown Castle. The property is owned by the Town of Trumbull. Sprint now intends to install three (3) antennas, three (3) RRHs and one (1) hybrid cable.

Please be advised I have included an email from Gail Andreyka with the zoning department at the Town of Trumbull indicating they no longer have the original zoning approval on file as well as an email from myself indicating the same. Please use both emails to replace the zoning approval requirement.

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 Town of Trumbull, as the property owner, the Town Planner, and Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

The Foundation for a Wireless World.

CrownCastle.com

Melanie A. Bachman

August 10, 2017

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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, AT&T 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](mailto: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:

Town of Trumbull  
5866 Main Street  
Trumbull, CT 06611

Planning and Zoning  
Town of Trumbull  
5866 Main Street – Second Floor  
Trumbull, CT 06611

## Hanlon, Dashanna

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**From:** Myl, Kimberly  
**Sent:** Friday, March 11, 2016 9:34 AM  
**To:** siting.council@ct.gov  
**Subject:** Existing Telecommunications Tower - 425 Indian Ledge Park Road, Trumbull (Crown: 881535 / T-Mobile CT11961A)

Good Morning,

Please be advised per the below email from the Town of Trumbull and on behalf of Crown Castle the Tower Owner, neither party have the original zoning approval on file. Please use this email notification to replace that requirement. Please let me know if you have any questions or need additional information. Thank you in advance.

### KIMBERLY MYL

Real Estate Specialist

T: (201) 236-9069 | M: (201) 993-3697

### CROWN CASTLE

1200 MacArthur Blvd, Suite 200

Mahwah, NJ 07430

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**From:** Gail Andreyka [<mailto:gandreyka@trumbull-ct.gov>]  
**Sent:** Tuesday, March 08, 2016 9:48 AM  
**To:** Myl, Kimberly  
**Cc:** Douglas Wenz  
**Subject:** RE: Zoning Approval - Telecommunications Tower 425 Indian Ledge Park Road

Hi Kim,

We cannot locate the zoning approval. They never came to Planning & Zoning with an application as far as we know. If you have any further questions, please contact Doug Wenz 203-452-5052.

Thank you,

Gail Andreyka

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**From:** Myl, Kimberly [<mailto:Kimberly.Myl@crowncastle.com>]  
**Sent:** Monday, February 29, 2016 12:45 PM  
**To:** Gail Andreyka  
**Subject:** Zoning Approval - Telecommunications Tower 425 Indian Ledge Park Road

Good Afternoon Gail,

I have another existing telecommunications facility that I will need a copy of the original zoning resolution to submit into the CSC. Can you kindly forward this over to me so I can submit on behalf of T-Mobile, one of our tenants. If you do not have this document, kindly reply stating that the township does not have this on record and I can use your email in place of this requirement. Please call or email me if you have any questions or need additional information. Thank you in advance.

### KIMBERLY MYL

Real Estate Specialist

T: (201) 236-9069 | M: (201) 993-3697

**CROWN CASTLE**  
1200 MacArthur Blvd, Suite 200  
Mahwah, NJ 07430

### 425 INDIAN LEDGE PARK ROAD

**Location** 425 INDIAN LEDGE PARK ROAD

**Mblu** F/05 / 00096/ 000/

**Acct#**

**Owner** TRUMBULL TOWN OF

**Assessment** \$1,320,620

**Appraisal** \$1,886,600

**PID** 12730

**Building Count** 1

**Fire District** T

**Current Value**

Appraisal	
Valuation Year	Total
2015	\$1,886,600

Assessment	
Valuation Year	Total
2015	\$1,320,620

**Owner of Record**

**Owner** TRUMBULL TOWN OF  
**Co-Owner**  
**Address** 5866 MAIN STREET  
 TRUMBULL, CT 06611

**Sale Price** \$0  
**Certificate** 1  
**Book & Page** 1/ 466  
**Sale Date** 06/15/1989

**Ownership History**

Ownership History				
Owner	Sale Price	Certificate	Book & Page	Sale Date
TRUMBULL TOWN OF	\$0	1	1/ 466	06/15/1989

**Building Information**

**Building 1 : Section 1**

**Year Built:**

**Living Area:** 0

**Building Photo**

Building Attributes	
Field	Description
Style	Outbuildings
Stories:	
Occupancy	
Exterior Wall 1	

Exterior Wall 2	
Roof Structure:	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Floor Covering	
Alt. Floor Cover	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Xtra Fixtrs:	
Total Rooms:	
Bath Style:	
Kitchen Style:	
Total Kitchens	
Total Elec Meters	



F05-96 05/04/2015

(http://images.vgsi.com/photos2/TrumbullCTPhotos//\00\02\19\51.JPG)

**Building Layout**

Building Layout

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

**Extra Features**

Extra Features	Legend
No Data for Extra Features	

**Land**

**Land Use**

**Use Code** 921  
**Description** Mun Lnd Res  
**Zone** AA  
**Neighborhood** 320  
**Alt Land Appr** No  
**Category**

**Land Line Valuation**

**Size (Acres)** 46.5  
**Frontage**  
**Depth**

**Outbuildings**

Outbuildings					Legend
Code	Description	Sub Code	Sub Description	Size	Bldg #
BHS1	Comm Bth Hse	CB	CindBk/Frame	200 S.F.	1

**Valuation History**

Appraisal	
Valuation Year	Total
2014	\$1,972,000

2013	\$1,972,000
2012	\$1,972,000

<b>Assessment</b>	
<b>Valuation Year</b>	<b>Total</b>
2014	\$1,380,400
2013	\$1,380,400
2012	\$1,380,400

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# 2.5 EQUIPMENT DEPLOYMENT

SITE NUMBER:  
CT03XC373

SITE NAME:  
CANDID COMMUNICATIONS

SITE ADDRESS:  
425 INDIAN LEDGE PARK  
TRUMBULL, CT 06611

**APPROVED**  
By Jason D'Amico at 10:55 am, Jul 06, 2017

**APPROVED**  
By Susan Vale at 2:56 pm, Jan 09, 2015

CROWN ID#: 881535  
CROWN SITE NAME: TRUMBULL TOWER



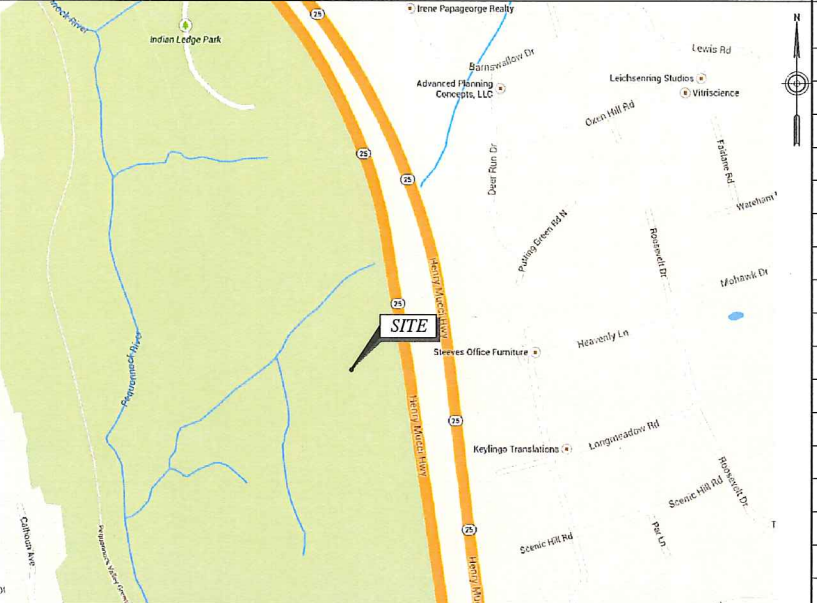
**TECTONIC**  
Engineering & Surveying Consultants P.C.  
1279 Route 300  
Newburgh, NY 12550  
Phone: (845) 567-6656  
Fax: (845) 567-8703  
www.tectonicengineering.com

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## SHEET INFORMATION

SITE NUMBER:	CT03XC373	LANDLORD:	CROWN CASTLE USA 2000 CORPORATE DRIVE CANONSBURG, PA
SITE NAME:	CANDID COMMUNICATIONS	LOCAL POWER COMPANY:	CONNECTICUT LIGHT AND POWER CONTACT CUSTOMER SERVICE (800) 286-2000
SITE ADDRESS:	425 INDIAN LEDGE PARK TRUMBULL, CT 06611	APPLICANT:	SPRINT 6580 SPRINT PARKWAY OVERLAND PARK, KANSAS 66251
COUNTY:	FAIRFIELD	ENGINEER:	JAMES QUICKSELL (845) 567-8656 EXT. 2835 jquicksell@tectonicengineering.com
COORDINATES: (NAD 83)	41° 16' 23.81" N 73° 12' 47.18" W	SPRINT CM:	PETER CULBERT (603) 203-8446 Peter.Culbert@sprint.com
GROUND ELEV:	323'± AMSL	CROWN CM:	JASON D'AMICO (860) 209-0104 jason.d'amico@crowncastle.com
STRUCTURE TYPE:	MONOPOLE	AAV:	AT&T
STRUCTURE HEIGHT:	195'-0"± AGL		
STRUCTURE RAD CENTER:	166'-0"± AGL		
ZONING CLASSIFICATION:	AA		
MAP-BLOCK-LOT:	F/04/00101/000		

## 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

## SUBMITTALS

PROJECT NO: 7225.CT03XC373

NO	DATE	DESCRIPTION	BY
0	06/16/14	FOR COMMENT	JT
1	12/10/14	FOR CONSTRUCTION	MP
2	01/08/15	REVISED ADDRESS	RD

## GENERAL NOTES

- 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.
- 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.
- 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.

## AERIAL VIEW (NOT TO SCALE)



## APPROVALS

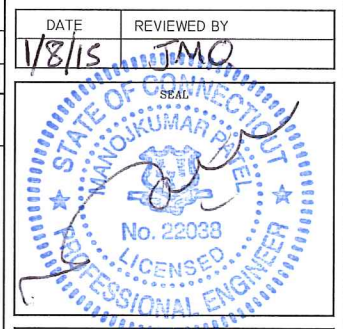
THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR MODIFICATIONS.

CONSTRUCTION: \_\_\_\_\_ DATE: \_\_\_\_\_

LEASING/SITE ACQUISITION: \_\_\_\_\_ DATE: \_\_\_\_\_

LANDLORD/PROPERTY OWNER: \_\_\_\_\_ DATE: \_\_\_\_\_

R.F. ENGINEER: \_\_\_\_\_ DATE: \_\_\_\_\_



## PROJECT DESCRIPTION

- (1) NEW 2.5 EQUIPMENT RACK INSIDE EXIST MMBS CABINET.
- (3) NEW RFS APXVTM14-C-120 ANTENNAS.
- (3) NEW TD-RRH0x20-25 RRH.
- (1) NEW 5/8" FIBER CABLE.
- (3) NEW HANDRAIL SITE PRO1 P/N HRK-12.

SITE NUMBER:  
CT03XC373

SITE NAME:  
CANDID COMMUNICATIONS

SITE ADDRESS:  
425 INDIAN LEDGE PARK  
TRUMBULL, CT 06611

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. AC1-301 - 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 FINIS 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.



2.5 EQUIPMENT DEPLOYMENT  
6580 SPRINT PARKWAY  
OVERLAND PARK, KANSAS 66251




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1279 Route 300  
Newburgh, NY 12550  
Phone: (845) 567-6656  
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SUBMITTALS			
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NO	DATE	DESCRIPTION	BY
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1	12/10/14	FOR CONSTRUCTION	MP
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DATE	REVIEWED BY
1/8/15	JMQ



SITE NUMBER:  
CT03XC373

SITE NAME:  
CANDID COMMUNICATIONS

SITE ADDRESS:  
425 INDIAN LEDGE PARK  
TRUMBULL, CT 06611

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 70/7480-1H, 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 SHEEP'S 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 FROM 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
— — — — — O — — — — — O — — — — —	OVERHEAD WIRE
— — — — — P — — — — — P — — — — —	PROPERTY LINE
— X — — — — X — — — — — X — — — — —	CHAIN LINK FENCE
A-1	ANTENNA MARK
(E)	EXISTING
(P)	PROPOSED DETAIL
	REFERENCE
	SURFACE ELEVATION



**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  
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NO	DATE	DESCRIPTION	BY
0	06/16/14	FOR COMMENT	JT
1	12/10/14	FOR CONSTRUCTION	MP
2	01/08/15	REVISED ADDRESS	RD

DATE	REVIEWED BY
1/8/15	JMQ

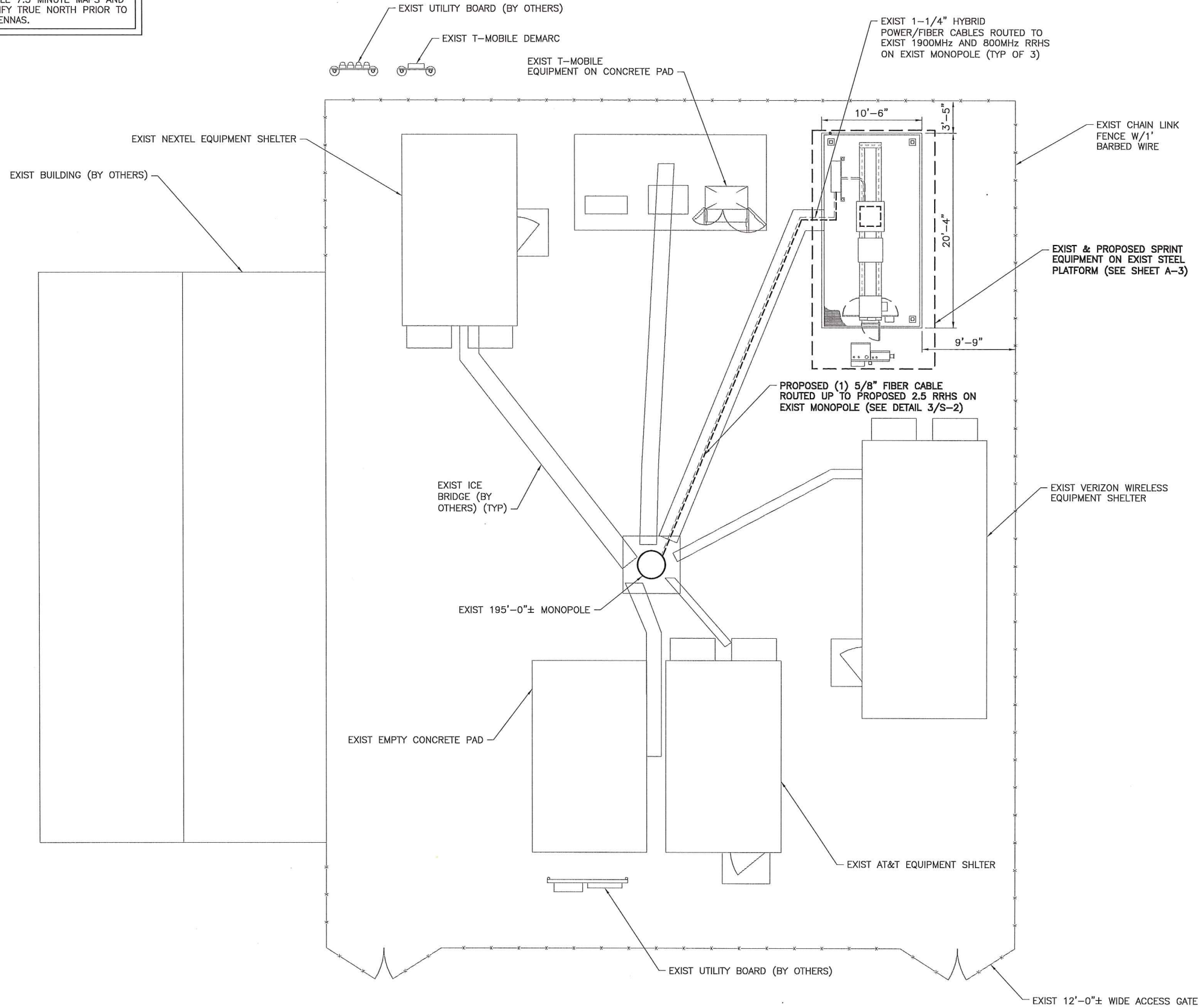


SITE NUMBER:  
**CT03XC373**  
 SITE NAME:  
**CANDID COMMUNICATIONS**  
 SITE ADDRESS:  
**425 INDIAN LEDGE PARK TRUMBULL, CT 06611**

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.



**SITE PLAN**  
 SCALE: 1/4" = 1'-0"

**Sprint**  
 2.5 EQUIPMENT DEPLOYMENT  
 6580 SPRINT PARKWAY  
 OVERLAND PARK, KANSAS 66251

**CROWN CASTLE**

**TECTONIC** ENGINEERING & SURVEYING CONSULTANTS P.C.  
 1279 Route 300  
 Newburgh, NY 12550  
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 CT03XC373

SITE NAME:  
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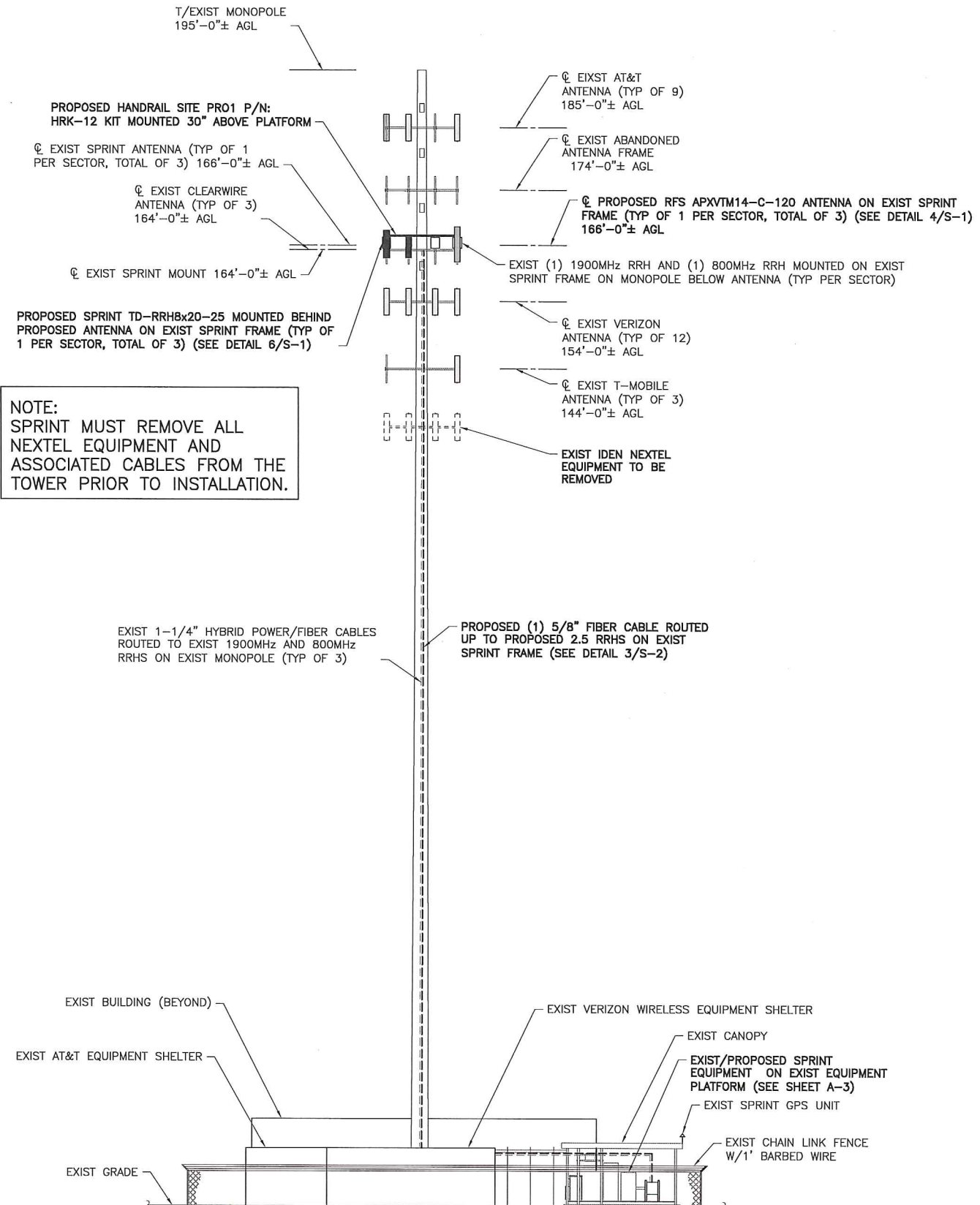
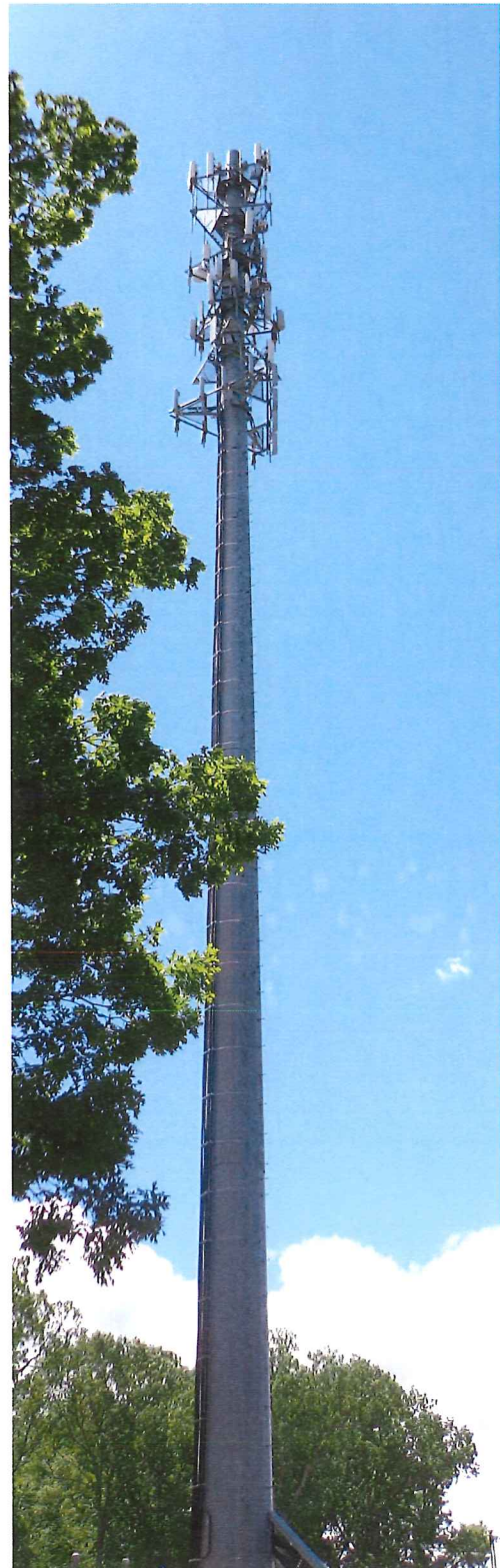
SITE ADDRESS:  
 425 INDIAN LEDGE PARK  
 TRUMBULL, CT 06611

SHEET TITLE:  
 SITE PLAN

SHEET NO:  
 A-1

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 12/10/14.



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

1  
A-2  
**ELEVATION**  
SCALE: 3/32" = 1'-0"

**Sprint**  
2.5 EQUIPMENT DEPLOYMENT  
6580 SPRINT PARKWAY  
OVERLAND PARK, KANSAS 66251

**CROWN CASTLE**

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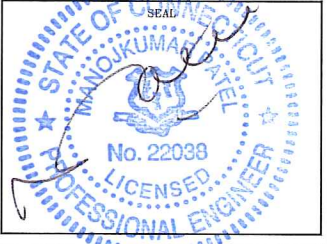
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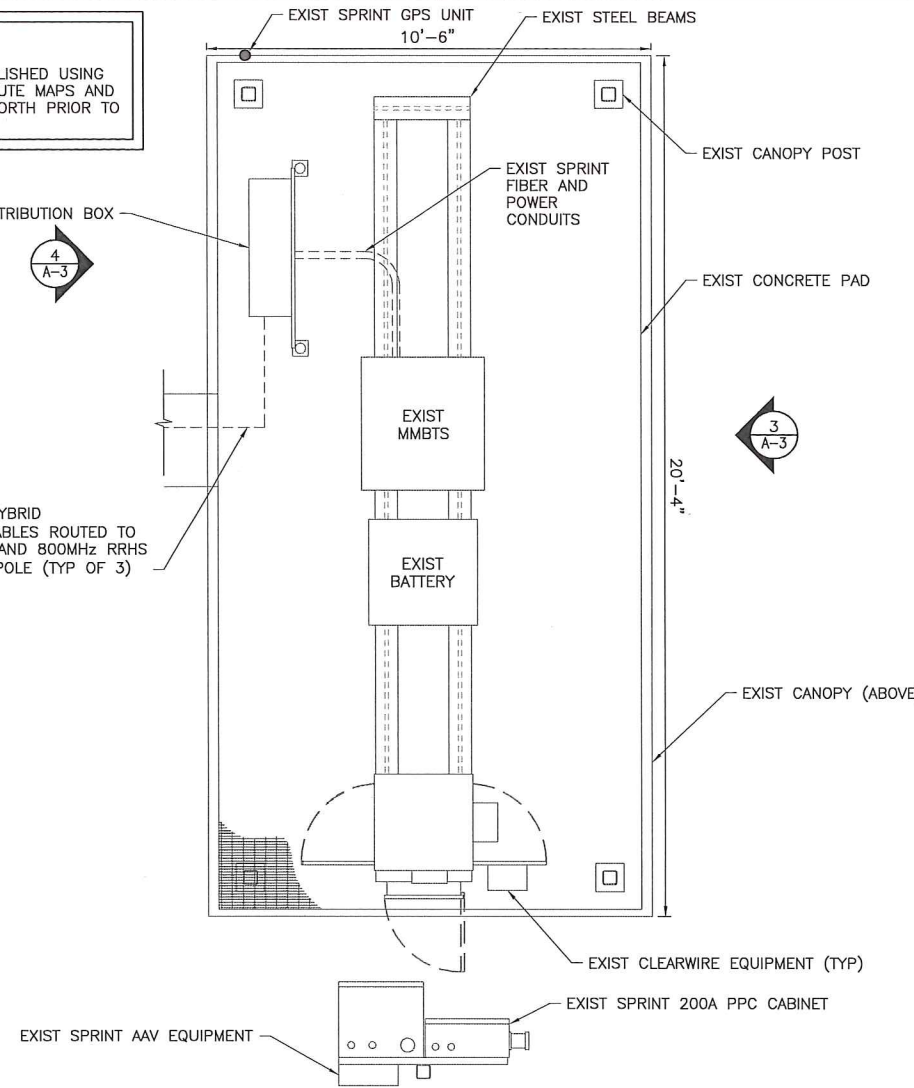
SHEET TITLE:  
ELEVATION

SHEET NO:  
A-2

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



EXIST 1-1/4" HYBRID POWER/FIBER CABLES ROUTED TO EXIST 1900MHz AND 800MHz RRHS ON EXIST MONOPOLE (TYP OF 3)



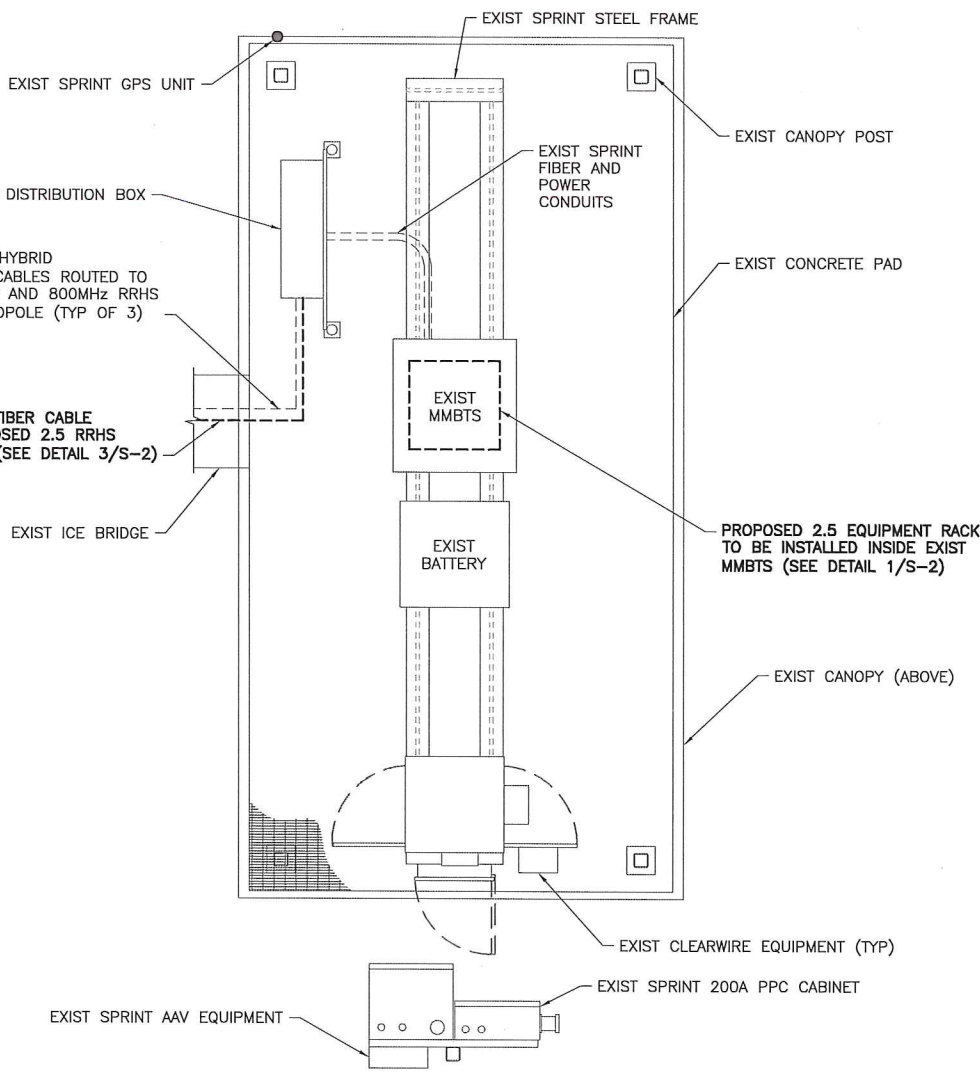
**1 ENLARGED EQUIP. LAYOUT PLAN (EXIST)**  
 SCALE: 3/4" = 1'-0"



**3 EXIST EQUIPMENT PAD**  
 SCALE: NTS

EXIST 1-1/4" HYBRID POWER/FIBER CABLES ROUTED TO EXIST 1900MHz AND 800MHz RRHS ON EXIST MONOPOLE (TYP OF 3)

PROPOSED (1) 5/8" FIBER CABLE ROUTED UP TO PROPOSED 2.5 RRHS ON EXIST MONOPOLE (SEE DETAIL 3/S-2)



**2 ENLARGED EQUIP. LAYOUT PLAN (FINAL)**  
 SCALE: 3/4" = 1'-0"



**4 EXIST FIBER DISTRIBUTION BOX**  
 SCALE: NTS

**Sprint**  
 2.5 EQUIPMENT DEPLOYMENT  
 6580 SPRINT PARKWAY  
 OVERLAND PARK, KANSAS 66251

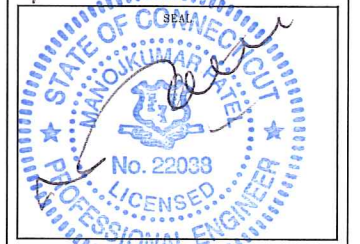
**CROWN CASTLE**

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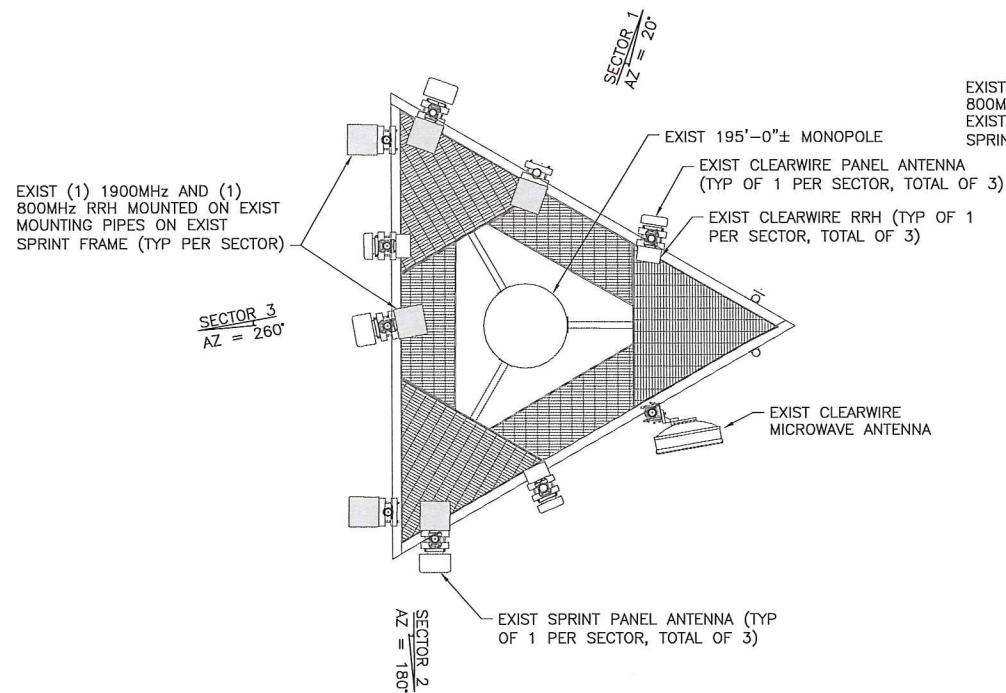
DATE: 1/8/15  
 REVIEWED BY: JMA



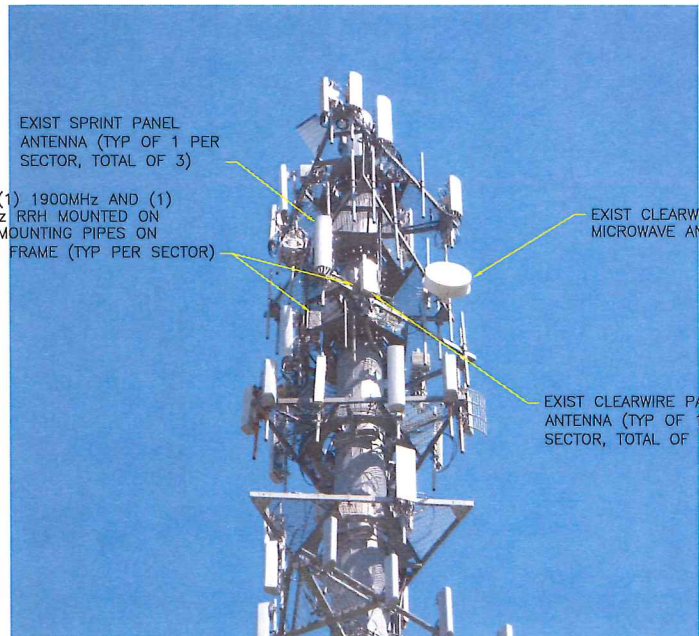
SITE NUMBER: CT03XC373  
 SITE NAME: CANDID COMMUNICATIONS  
 SITE ADDRESS: 425 INDIAN LEDGE PARK TRUMBULL, CT 06611

SHEET TITLE: ENLARGED EQUIPMENT LAYOUT PLANS

SHEET NO: A-3

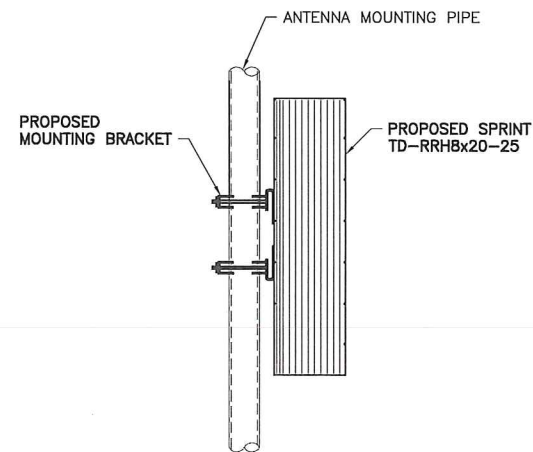


1 ANTENNA LAYOUT PLAN (EXIST)  
A-4 SCALE: 3/8" = 1'-0"

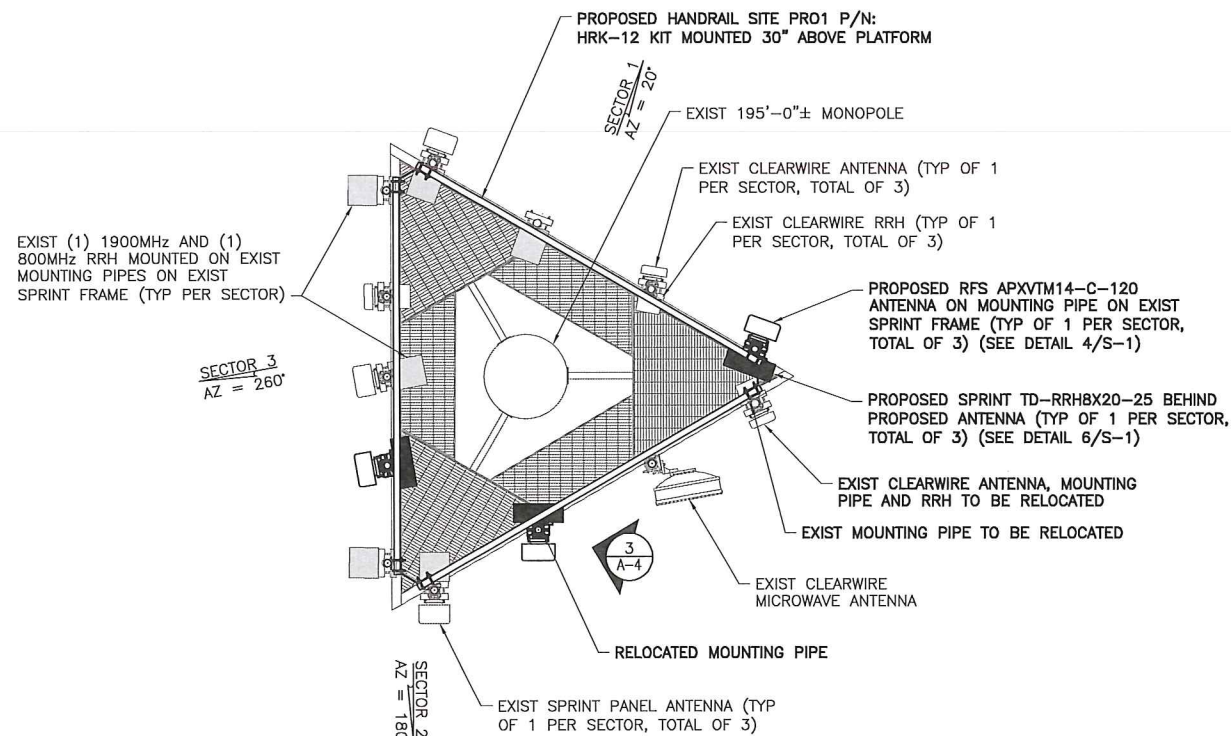


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3 RRH MOUNTING DETAIL  
A-4 SCALE: 1 1/2" = 1'-0"



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

ANTENNA DATA

Status	Exist	Proposed
Antenna Manufacturer	RFS-CEL WAVE	RFS-CEL WAVE
Antenna Model Number	APXVSP18C-A20	APXVTM14-C-120
Number of Antennas	3	3
Antenna RAD Center	166'	166'
Antenna Azimuth	20/180/260	20/180/260
Antenna RRH Model Number	1900MHz/800MHz RRHS	TD-RRHx20-25
Number of RRH	6	3



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SUBMITTALS

PROJECT NO: 7225.CT03XC373

NO	DATE	DESCRIPTION	BY
0	06/16/14	FOR COMMENT	JT
1	12/10/14	FOR CONSTRUCTION	MP
2	01/08/15	REVISED ADDRESS	RD

DATE	REVIEWED BY
1/8/15	JMQ



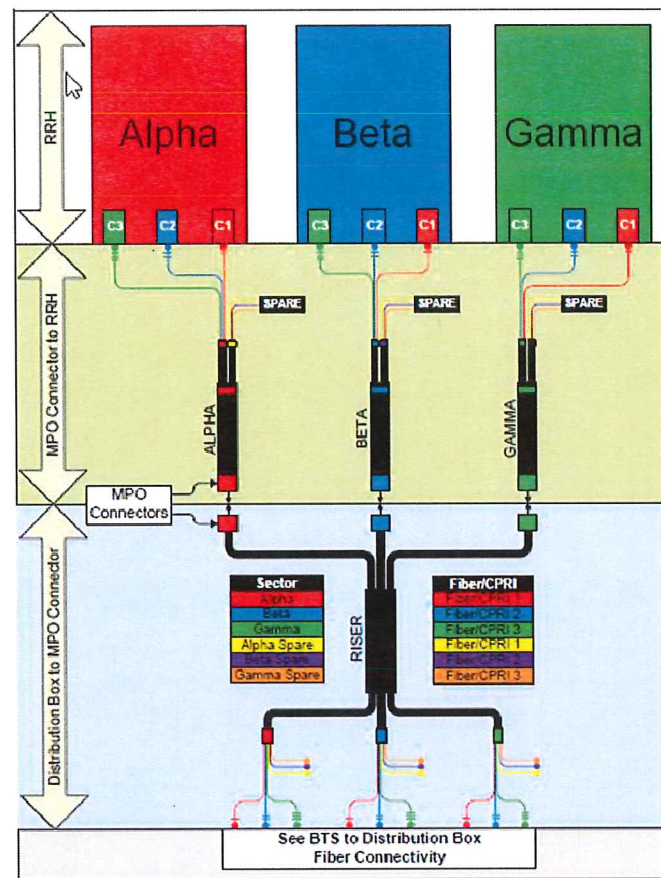
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SITE NAME: CANDID COMMUNICATIONS

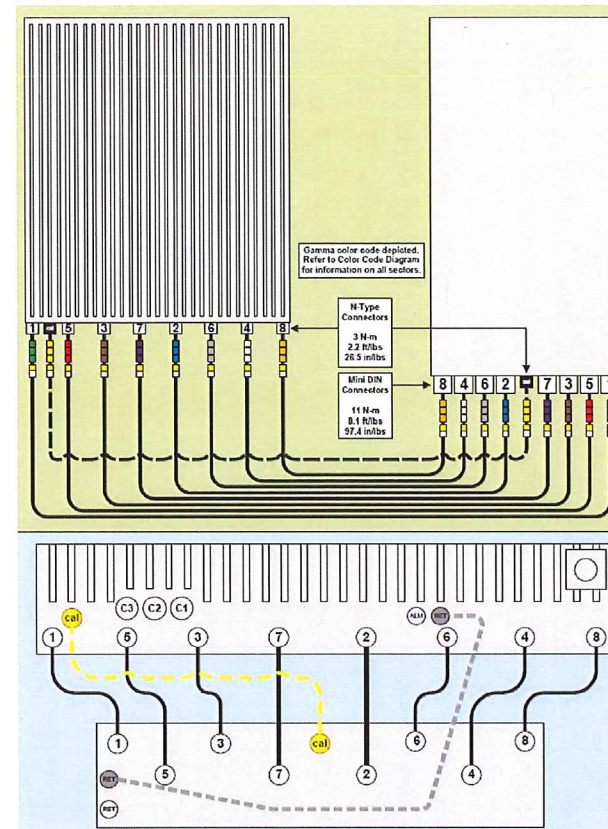
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SHEET TITLE: ANTENNA LAYOUT PLANS

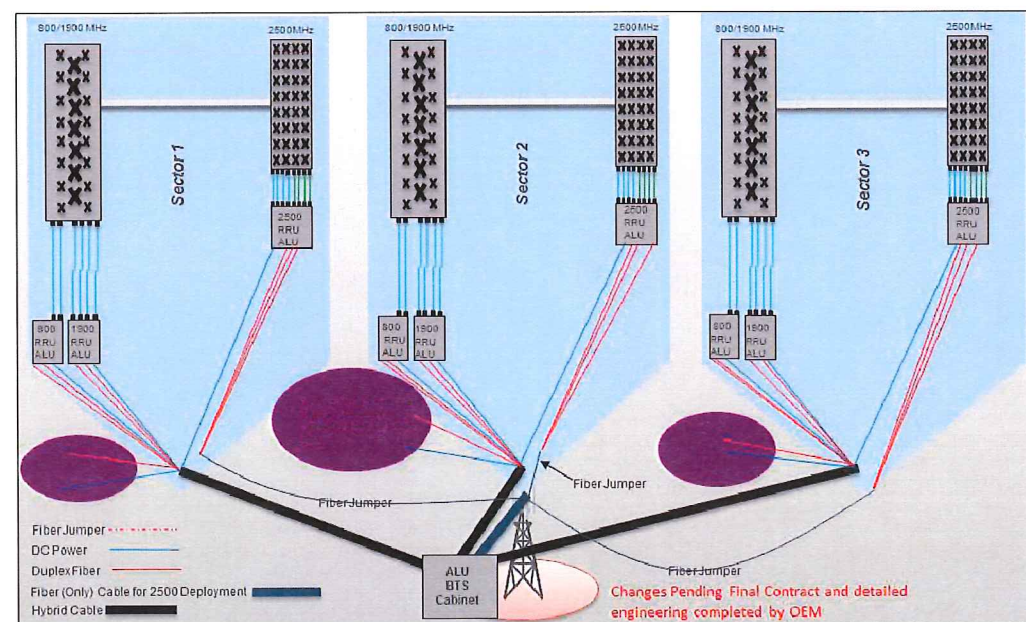
SHEET NO: A-4



1 2.5 CABLE COLOR CODING  
A-5 SCALE: N.T.S.



2 RRH CONNECTIVITY  
A-5 SCALE: N.T.S.



3 RAN WIRING  
A-5 SCALE: N.T.S.



4 CABLE SCENARIO  
A-5 SCALE: N.T.S.

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2.5 EQUIPMENT DEPLOYMENT  
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OVERLAND PARK, KANSAS 66251

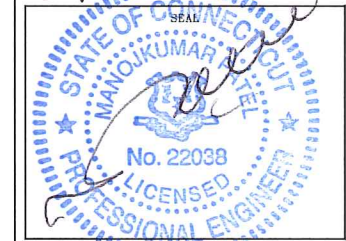
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SITE NAME:  
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SITE ADDRESS:  
425 INDIAN LEDGE PARK  
TRUMBULL, CT 06611

SHEET TITLE:  
RAN WIRING DIAGRAM

SHEET NO:  
A-5

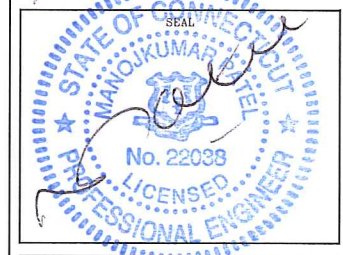
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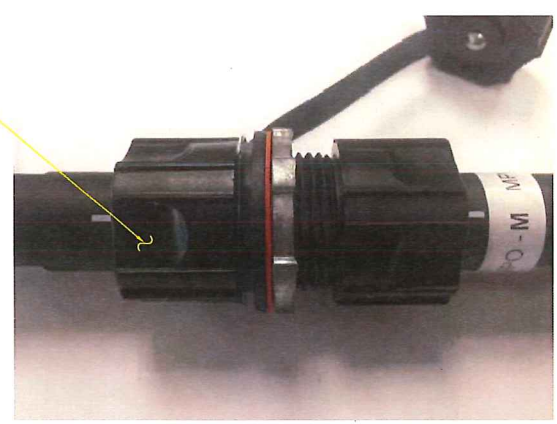
SHEET TITLE:  
CABLE DETAILS

SHEET NO:  
A-6

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

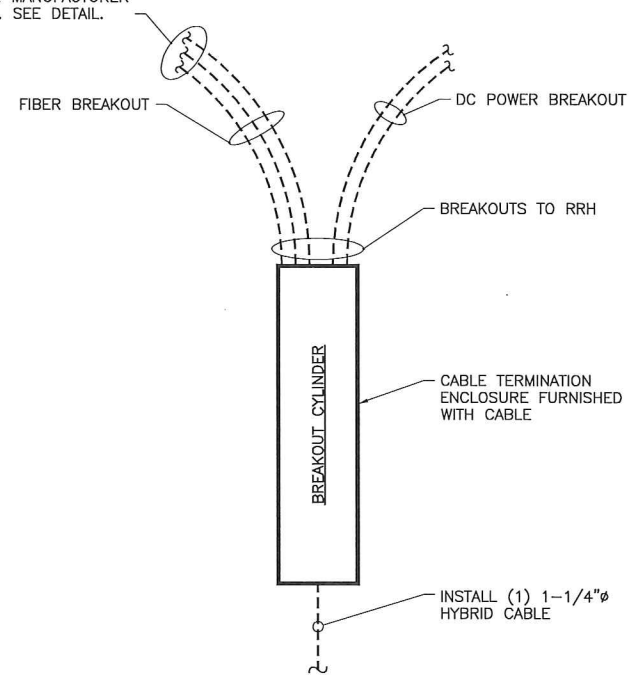


IMPORTANT!! ROTATE THE BAYONET HOUSING CLOCKWISE UNTIL A CLICK SOUND IS HEARD TO ENSURE A GOOD CONNECTION

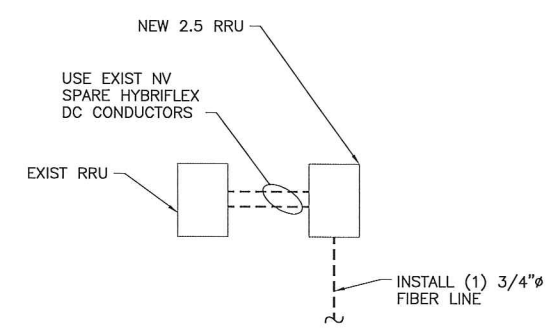


**1** HYBRIFLEX RISER/JUMPER CONNECTION DETAILS  
 A-6 SCALE: N.T.S.

TRUNK-LINE TO JUMPER CONNECTION (MPO) TO BE INSTALLED PER MANUFACTURER REQUIREMENTS. SEE DETAIL.



**2** 2.5 HYBRID CABLE W/FIBER & DC FEEDERS  
 A-6 SCALE: N.T.S.

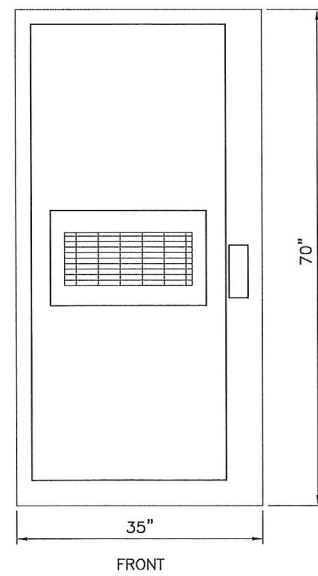


**2** FIBER ONLY TRUNK LINES  
 A-6 SCALE: N.T.S.

**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 CODED 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.



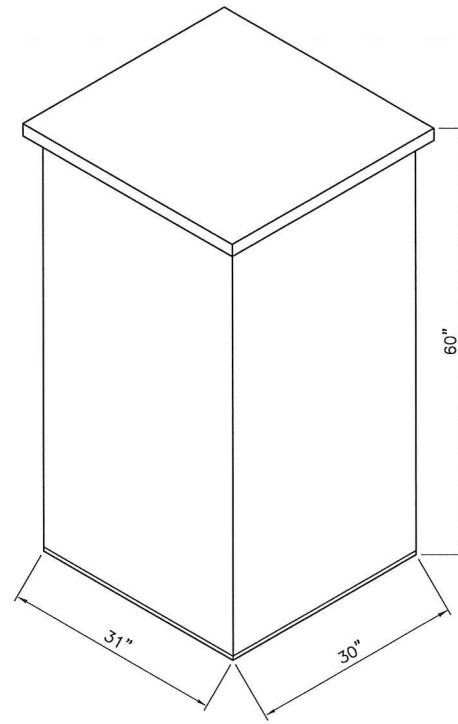


CABINET FRONT  
9928 MMBTS MODULAR CELL

SPECIFICATIONS:

HEIGHT: 70"  
WIDTH: 35"  
DEPTH: 37.8"  
WEIGHT: 1090 LBS.

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

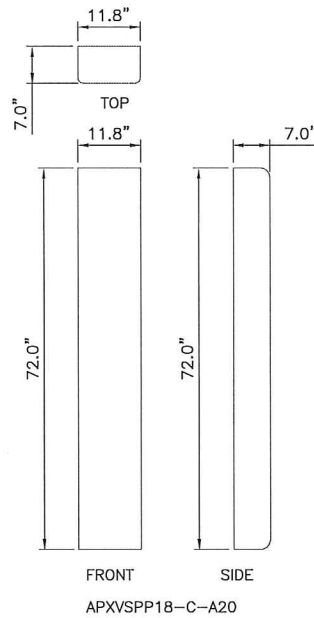


ANDREW 60ECv2

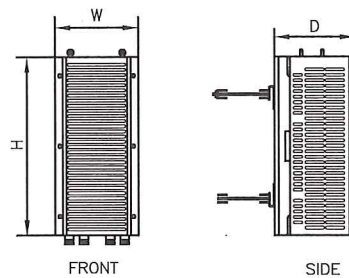
SPECIFICATIONS:

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

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

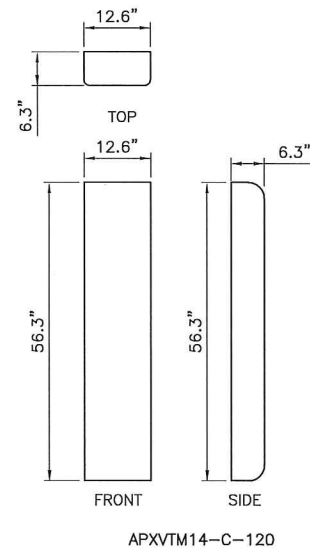


3 (EXIST) ANTENNA DETAILS  
S-1 SCALE: 3/4"=1'-0"

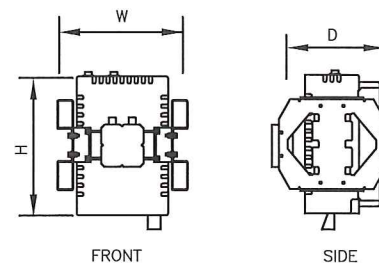


TYPE: 1900 MHz 4x45W  
MODEL #: RRH 1900 4X45 65MHz  
HEIGHT: 25.0"  
WIDTH: 11.1"  
DEPTH: 11.4"  
WEIGHT: ±60 LBS.

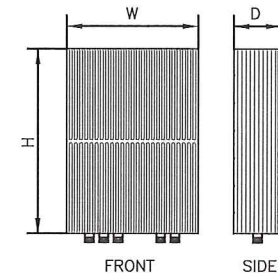
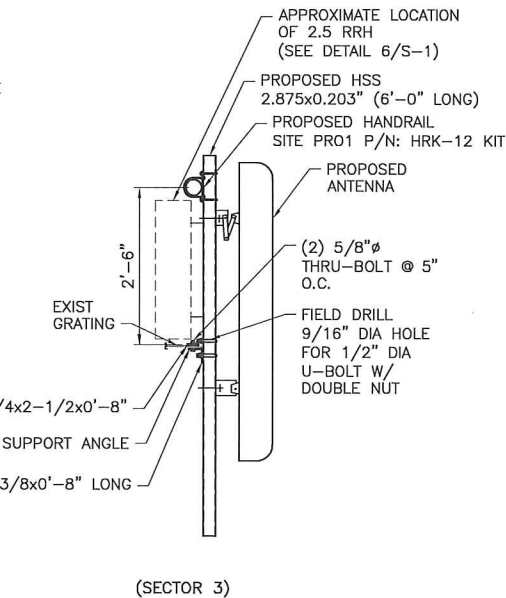
5 (EXIST) RRH DETAILS  
S-1 SCALE: 1 1/2"=1'-0"



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



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



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

6 (PROPOSED) RRH DETAIL  
S-1 SCALE: N.T.S.

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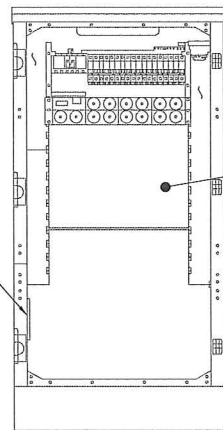
SITE NAME:  
CANDID COMMUNICATIONS

SITE ADDRESS:  
425 INDIAN LEDGE PARK  
TRUMBULL, CT 06611

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.



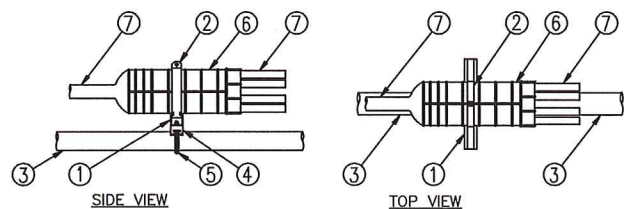
EXIST GROUND  
BAR TO BE UTILIZED

INSTALL NEW 2.5  
EQUIPMENT IN EXIST MMBTS  
CABINET INCLUDING BUT  
NOT LIMITED TO BASE BAND  
UNIT, CELL SITE ROUTER  
AND SURGE ARRESTORS.  
GROUND EQUIPMENT TO  
EXIST INTERIOR CABINET  
GROUND BAR

FRONT ELEVATION  
(CABINET INTERIOR)

1 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.



2 MEDUSA HEAD DETAIL  
SCALE: NTS

RFS HYBRIFLEX RISER CABLES SCHEDULE

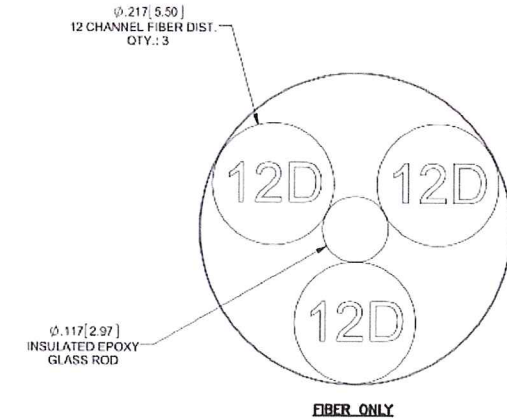
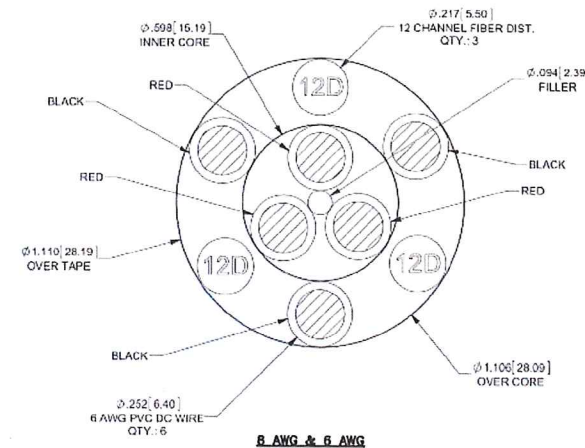
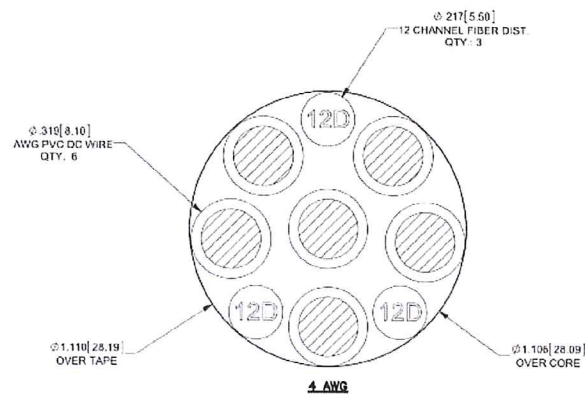
Power	Hybrid cable	Length
Fiber Only (Existing DC Power)	MN: HB058-M12-050F 12x multi-mode fiber pairs, Top: Outdoor protected connectors, Bottom:LC Connectors, 5/8 cable, 50ft	50ft
	MN: HB058-M12-075F	75ft
	MN: HB058-M12-100F	100ft
	MN: HB058-M12-125F	125ft
	MN: HB058-M12-150F	150ft
	MN: HB058-M12-175F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

RFS HYBRIFLEX JUMPER CABLE SCHEDULE

Power	Hybrid Jumper cable	Length
Fiber Only	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
8 AWG Power	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
6 AWG Power	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
4 AWG Power	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

HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE

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



3 2.5 HYBRID CABLE X-SECTION AND DATA  
SCALE: NTS

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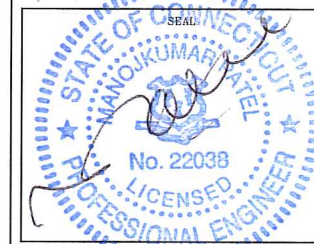
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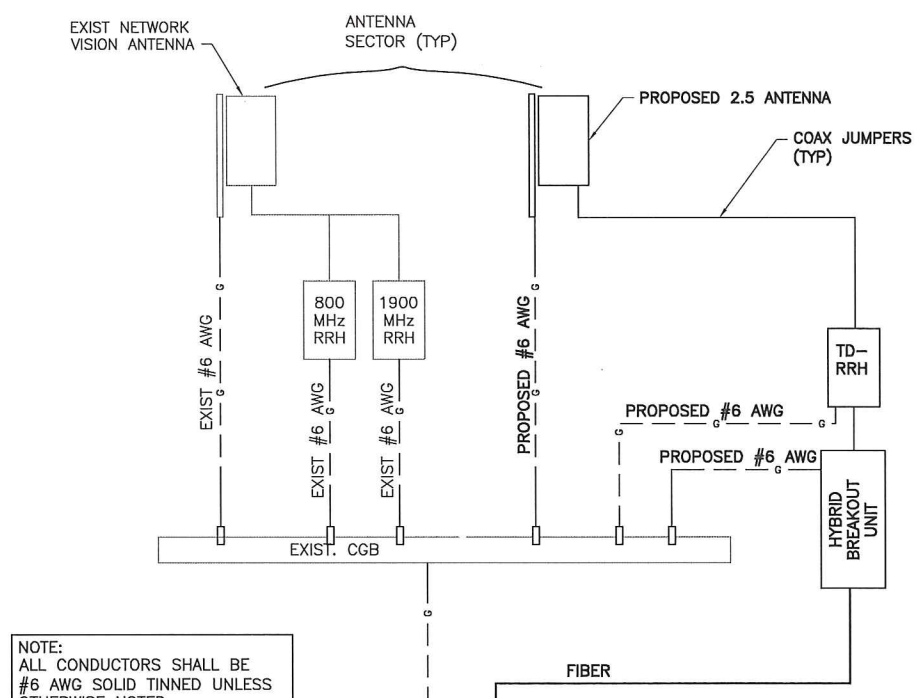
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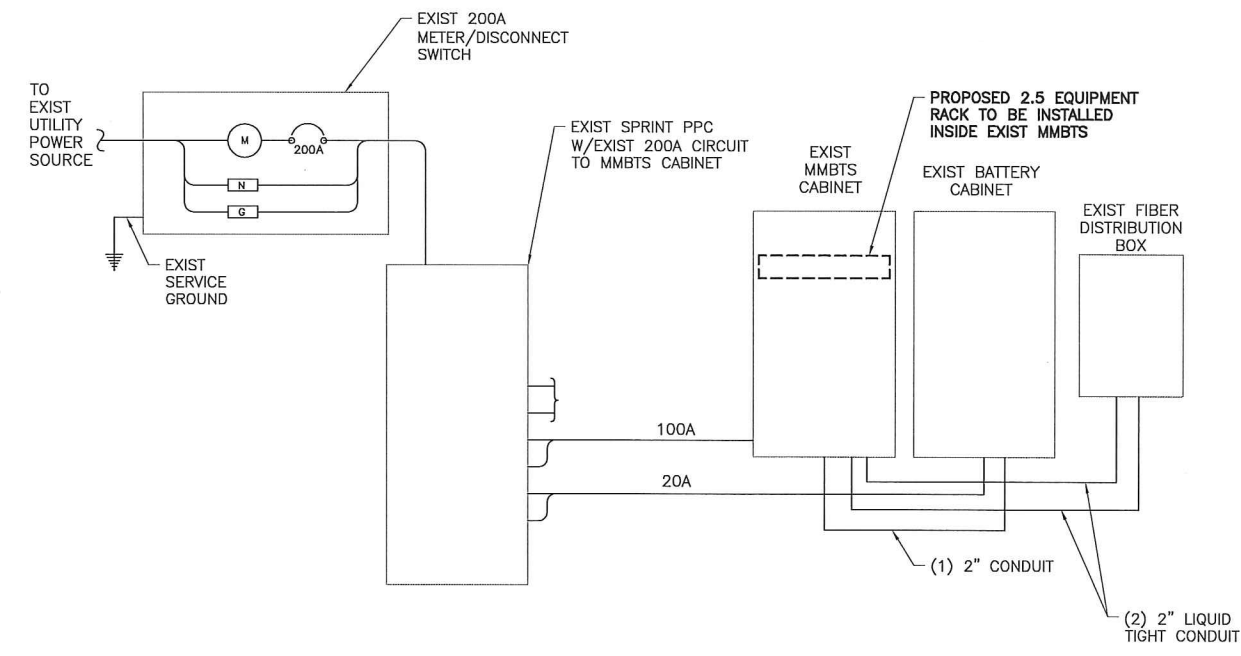
SHEET TITLE:  
EQUIPMENT  
SCHEMATIC DETAILS

SHEET NO:  
S-2



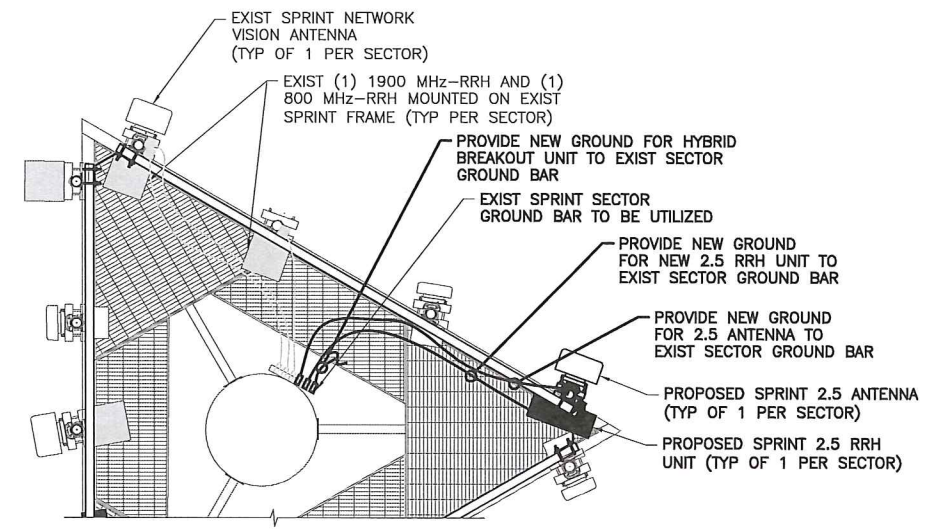
1 TYPICAL GROUNDING ONE LINE DIAGRAM  
E-1 SCALE: NTS

- LEGEND**
- CADWELDED CONNECTION
  - MECHANICAL CONNECTION
  - COMPRESSION CONNECTION



3 TYPICAL ELECTRICAL & TELCO PLAN  
E-1 SCALE: NTS

2 TYPICAL ANTENNA GROUNDING PLAN  
E-1 SCALE: NTS



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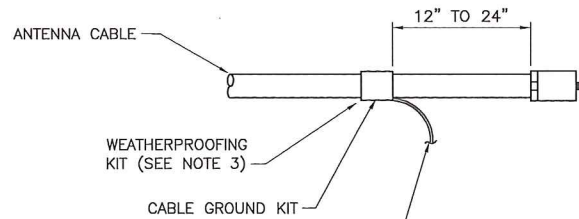
SITE NUMBER: CT03XC373

SITE NAME: CANDID COMMUNICATIONS

SITE ADDRESS: 425 INDIAN LEDGE PARK TRUMBULL, CT 06611

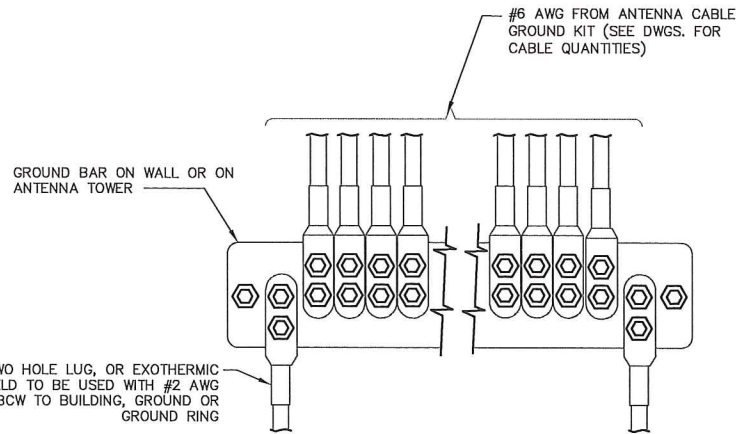
SHEET TITLE: ELECTRICAL & GROUNDING PLANS

SHEET NO: E-1



6 AWG STRANDED Cu WIRE WITH GREEN, 600V, THWN INSULATION OR BLACK, MARKED AS REQUIRED BY THE NEC (GROUNDED TO GROUND BAR) (SEE NOTES 1 & 2)

CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE



\*TWO HOLE LUG, OR EXOTHERMIC WELD TO BE USED WITH #2 AWG BCW TO BUILDING, GROUND OR GROUND RING

\* - 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 ANTENNA GROUND BAR DETAIL SCALE: NTS

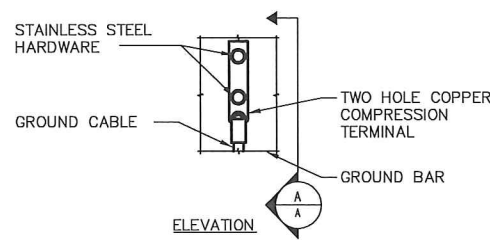
NOTES:

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

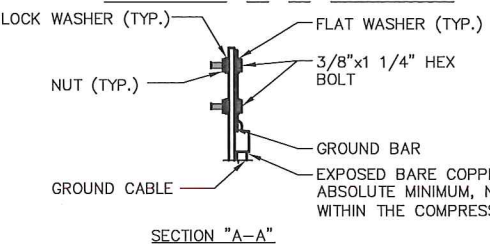
GROUNTING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.

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

1 CABLE GROUNDING KIT DETAIL SCALE: N.T.S.

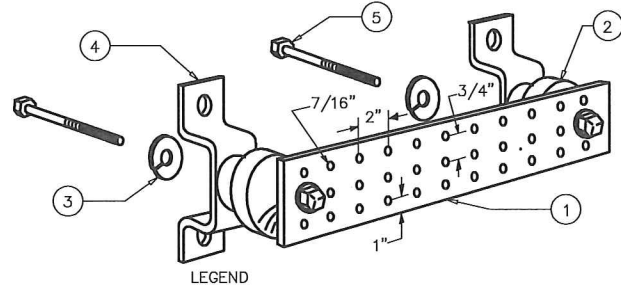


NOTE:  
1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.  
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.  
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB AND MGB.



SECTION "A-A"

2 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 GROUNDING BAR DETAIL SCALE: NTS

GROUNDING NOTES:

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

PROTECTIVE GROUNDING SYSTEM GENERAL NOTES:

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

ELECTRICAL AND GROUNDING NOTES

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

**Sprint**  
2.5 EQUIPMENT DEPLOYMENT  
6580 SPRINT PARKWAY  
OVERLAND PARK, KANSAS 66251

**CROWN CASTLE**

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

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SUBMITTALS

PROJECT NO: 7225.CT03XC373

NO	DATE	DESCRIPTION	BY
0	06/16/14	FOR COMMENT	JT
1	12/10/14	FOR CONSTRUCTION	MP
2	01/08/15	REVISED ADDRESS	RD

DATE	REVIEWED BY
1/8/15	JMA

STATE OF CONNECTICUT  
MANUQUIN J. PATEL  
No. 22038  
PROFESSIONAL ENGINEER

SITE NUMBER  
CT03XC373  
SITE NAME  
CANDID COMMUNICATIONS  
SITE ADDRESS  
425 INDIAN LEDGE PARK  
TRUMBULL, CT 06611

SHEET TITLE:  
GROUNDING DETAILS & NOTES

SHEET NO:  
E-2

Date: **June 16, 2017**

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

**JACOBS**  
Jacobs Engineering Group, Inc.  
5449 Bells Ferry Road  
Acworth, GA 30102  
770-701-2500

**Subject:** Structural Analysis Report

**Carrier Designation:** Sprint PCS Co-Locate  
**Carrier Site Number:** CT03XC373

**Crown Castle Designation:** Crown Castle BU Number: 881535  
Crown Castle Site Name: TRUMBULL TOWER  
Crown Castle JDE Job Number: 442066  
Crown Castle Work Order Number: 1417498  
Crown Castle Application Number: 393553 Rev. 0

**Engineering Firm Designation:** Jacobs Engineering Group, Inc. Project Number: 1417498

**Site Data:** 425 Indian Ledge Park Rd, Trumbull, Fairfield County, CT  
Latitude 41° 16' 23.81", Longitude -73° 12' 47.18"  
195 Foot - Monopole Tower

Dear Marianne Dunst,

Jacobs Engineering Group, Inc. 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 1046742, in accordance with application 393553, revision 0.

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

LC7: Existing + Reserved + Proposed Equipment

**Sufficient Capacity**

Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B with a maximum topographic factor, Kzt, of 1 and Risk Category II were used in this analysis.

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

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

Structural analysis prepared by:

Reviewed By:

Allan Scott, EI  
Tower Structural Engineer



Matthew E. Watkins, P.E.  
Engineering Project Manager

06/16/17

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## 1) INTRODUCTION

This tower is a 195 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in July of 2001. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

## 2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 97 mph with no ice, 50 mph with 0.75-inch ice thickness and 60 mph under service loads, exposure category B with topographic category 1 and crest height of 0 feet.

**Table 1 - Proposed Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
164.0	166.0	3	Alcatel Lucent	TD-RRH8x20-25	1	1-1/4	-
		3	RFS Celwave	APXVTM14-ALU-I20 w/ Mount Pipe			
	1	Site Pro1	HRK-12 Handrail Kit				

**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	
193.0	195.0	1	Lcom	HG2409U-PRO	1	1-5/8	2	
	193.0	1	Commscope	S-300				
185.0	187.0	3	CCI Antennas	HPA-65R-BUU-H6 w/ Mount Pipe	-	-	2	
		3	Ericsson	RRUS12/RRUS A2				
		6	Powerwave Technologies	7770.00 w/ Mount Pipe				
	185.0	185.0	6	Ericsson	RRUS-11	12 2 1	1-1/4 5/8 3/8	1
			12	Powerwave Technologies	LGP21401			
			1	Raycap	DC6-48-60-18-8F			
1	185.0	1	Tower Mounts	Platform Mount [LP 601-1]				
175.0	175.0	1	Tower Mounts	Platform Mount [LP 601-1]	-	-	4	

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
164.0	166.0	1	Dragonwave	A-ANT-23G-2-C	2 6 3	7983A 5/16 1-1/4	1
		3	Argus Technologies	LLPX310R w/ Mount Pipe			
		3	RFS Celwave	APXVSP18-C-A20 w/ Mount Pipe			
	164.0	3	Alcatel Lucent	1900MHz RRH (65MHz)			
		3	Alcatel Lucent	800 EXTERNAL NOTCH FILTER			
		3	Alcatel Lucent	800MHZ RRH			
		9	RFS Celwave	ACU-A20-N			
		3	Samsung Telecommunications	FDD_R6_RRH			
1	Tower Mounts	Platform Mount [LP 601-1]					
154.0	155.0	3	Alcatel Lucent	RRH2X60-PCS	1	1-5/8	2
		3	Alcatel Lucent	RRH2x60-700			
		3	Alcatel Lucent	RRH4X45-AWS4 B66			
		9	Andrew	SBNHH-1D65B w/ Mount Pipe			
		2	RFS Celwave	DB-B1-6C-8AB-0Z			
		2	Antel	LPA-4016 w/ Mount Pipe			
	4	Decibel	DB844G65ZAXY w/ Mount Pipe	19			
154.0	1	Tower Mounts	Platform Mount [LP 601-1]				
144.0	145.0	3	Commscope	SBNH-1D65C-SR w/ Mount Pipe	12 1	1-5/8 1-1/4	1
		3	Ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	Ericsson	KRY 112 144/1			
		3	Ericsson	RRUS 11 B12			
		3	Ericsson	RRUS 11 B2			
	144.0	1	Tower Mounts	Platform Mount [LP 601-1]			
134.0	135.0	12	Decibel	DB844H90E-XY w/ Mount Pipe	9	1-1/4	3
	134.0	1	Tower Mounts	Platform Mount [LP 303-1]	6	1-5/8	

Notes:

- 1) Existing Equipment
- 2) Reserved Equipment
- 3) Abandoned equipment to be removed; not considered in this analysis
- 4) Empty mount; considered in this analysis.



**Table 3 - Design Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
195.0	195.0	2	Generic	Omni Whip Antenna	-	-
185.0	185.0	12	Allgon	7120.16	-	-
175.0	175.0	12	Allgon	7120.16	-	-
165.0	165.0	12	Allgon	7120.16	-	-
155.0	155.0	12	Allgon	7120.16	-	-
145.0	145.0	12	Allgon	7120.16	-	-
135.0	135.0	12	Allgon	7120.16	-	-
125.0	125.0	12	Allgon	7120.16	-	-

### 3) ANALYSIS PROCEDURE

**Table 4 - Documents Provided**

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clarence Welti Assoc., Inc.	1406210	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Engineered Endeavors Inc.	1405798	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Engineered Endeavors Inc.	1405789	CCISITES

#### 3.1) Analysis Method

tnxTower (version 7.0.7.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

#### 3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 4) The existing base plate grout was not considered in this analysis.

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

#### 4) ANALYSIS RESULTS

**Table 5 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	195 - 157.648	Pole	TP33.875x25x0.25	1	-10.48	1772.14	18.3	Pass
L2	157.648 - 117.083	Pole	TP42.9063x32.2501x0.3125	2	-24.01	2794.77	51.6	Pass
L3	117.083 - 81.0937	Pole	TP50.75x40.9017x0.375	3	-35.32	3988.09	58.9	Pass
L4	81.0937 - 40.0391	Pole	TP59.6563x48.3897x0.5	4	-53.72	6508.62	49.6	Pass
L5	40.0391 - 0	Pole	TP68x56.7861x0.5	5	-79.87	7261.40	56.9	Pass
							Summary	
						Pole (L3)	58.9	Pass
						Rating =	58.9	Pass

**Table 6 - Tower Component Stresses vs. Capacity – LC7**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	59.2	Pass
1	Base Plate	0	52.2	Pass
1	Base Foundation Structural	0	62.8	Pass
1	Base Foundation Soil Interaction	0	54.3	Pass

<b>Structure Rating (max from all components) =</b>	<b>62.8%</b>
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Notes:

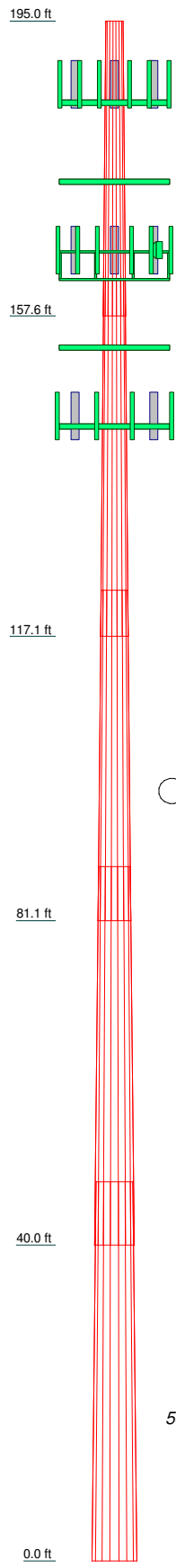
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

#### 4.1) Recommendations

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

**APPENDIX A**  
**TNXTOWER OUTPUT**

Section	1	2	3	4	5
Length (ft)	37.35	45.30	41.85	47.90	47.99
Number of Sides	18	18	18	18	18
Thickness (in)	0.2500	0.3125	0.3750	0.5000	0.5000
Socket Length (ft)	4.73	5.86	6.84	7.95	56.7861
Top Dia (in)	25.0000	32.2501	40.9017	48.3897	68.0000
Bot Dia (in)	33.8750	42.9063	50.7500	59.6563	68.0000
Grade			A572-65		
Weight (K)	2.9	5.7	7.7	13.8	16.0



**DESIGNED APPURTENANCE LOADING**

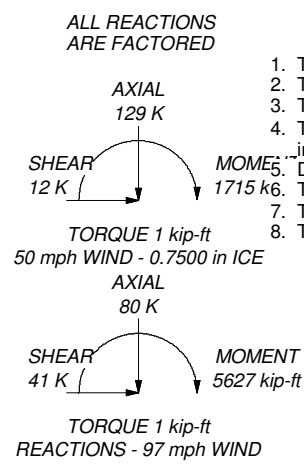
TYPE	ELEVATION	TYPE	ELEVATION
HG2409U-PRO	193	APXVTM14-ALU-I20 w/ Mount Pipe	164
Commscope S-300	193	(2) TD-RRH8x20-25	164
(2) 7770.00 w/ Mount Pipe	185	TD-RRH8x20-25	164
(2) 7770.00 w/ Mount Pipe	185	Miscellaneous [NA 507-1]	164
(2) 7770.00 w/ Mount Pipe	185	Platform Mount [LP 601-1]	164
(4) LGP21401	185	8' x 2" Mount Pipe	164
(4) LGP21401	185	(2) 8' x 2" Mount Pipe	164
(4) LGP21401	185	8' x 2" Mount Pipe	164
(2) RRUS-11	185	A-ANT-23G-2-C	164
(2) RRUS-11	185	6' Climbing Ladder (Flat)	162
(2) RRUS-11	185	(2) LPA-4016 w/ Mount Pipe	154
DC6-48-60-18-8F	185	(2) DB844G65ZAXY w/ Mount Pipe	154
HPA-65R-BUU-H6 w/ Mount Pipe	185	(3) SBNHH-1D65B w/ Mount Pipe	154
HPA-65R-BUU-H6 w/ Mount Pipe	185	(3) SBNHH-1D65B w/ Mount Pipe	154
HPA-65R-BUU-H6 w/ Mount Pipe	185	(3) SBNHH-1D65B w/ Mount Pipe	154
RRUS12/RRUS A2	185	RRH4X45-AWS4 B66	154
RRUS12/RRUS A2	185	RRH4X45-AWS4 B66	154
RRUS12/RRUS A2	185	RRH4X45-AWS4 B66	154
Platform Mount [LP 601-1]	185	RRH2X60-PCS	154
6' Climbing Ladder (Flat)	183	RRH2X60-PCS	154
Platform Mount [LP 601-1]	175	RRH2X60-PCS	154
(4) 8' x 2" Mount Pipe	175	RRH2x60-700	154
(4) 8' x 2" Mount Pipe	175	RRH2x60-700	154
(4) 8' x 2" Mount Pipe	175	RRH2x60-700	154
6' Climbing Ladder (Flat)	172	(2) DB-B1-6C-8AB-0Z	154
APXVSP18-C-A20 w/ Mount Pipe	164	Platform Mount [LP 601-1]	154
APXVSP18-C-A20 w/ Mount Pipe	164	(2) DB844G65ZAXY w/ Mount Pipe	154
APXVSP18-C-A20 w/ Mount Pipe	164	6' Climbing Ladder (Flat)	152
LLPX310R w/ Mount Pipe	164	SBNH-1D65C-SR w/ Mount Pipe	144
LLPX310R w/ Mount Pipe	164	SBNH-1D65C-SR w/ Mount Pipe	144
LLPX310R w/ Mount Pipe	164	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	144
(3) ACU-A20-N	164	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	144
(3) ACU-A20-N	164	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	144
(3) ACU-A20-N	164	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	144
800MHZ RRH	164	RRUS 11 B2	144
800MHZ RRH	164	RRUS 11 B2	144
800MHZ RRH	164	RRUS 11 B2	144
800 EXTERNAL NOTCH FILTER	164	RRUS 11 B12	144
800 EXTERNAL NOTCH FILTER	164	RRUS 11 B12	144
800 EXTERNAL NOTCH FILTER	164	RRUS 11 B12	144
1900MHz RRH (65MHz)	164	RRUS 11 B12	144
1900MHz RRH (65MHz)	164	KRY 112 144/1	144
1900MHz RRH (65MHz)	164	KRY 112 144/1	144
FDD_R6_RRH	164	KRY 112 144/1	144
FDD_R6_RRH	164	Platform Mount [LP 601-1]	144
FDD_R6_RRH	164	SBNH-1D65C-SR w/ Mount Pipe	144
APXVTM14-ALU-I20 w/ Mount Pipe	164	6' Climbing Ladder (Flat)	142
APXVTM14-ALU-I20 w/ Mount Pipe	164		

**MATERIAL STRENGTH**

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

**TOWER DESIGN NOTES**

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 58.9%



**JACOBS**  
**Jacobs Engineering Group, Inc.**  
 5449 Bells Ferry Road  
 Acworth, GA 30102  
 Phone: 770-701-2500  
 FAX: 770-701-2501

**Job: TRUMBULL TOWER**  
**Project: BU881535\_WO1417498**  
 Client: Crown Castle      Drawn by: scotta      App'd:  
 Code: TIA-222-G      Date: 06/15/17      Scale: NTS  
 Path: T:\881535.TRUMBULL TOWER\1417498\Analysis\Model\BU881535\_WO1417498.er      Dwg No. E-1

<b>tnxTower</b>  <b>Jacobs Engineering Group, Inc.</b> 5449 Bells Ferry Road Acworth, GA 30102 Phone: 770-701-2500 FAX: 770-701-2501	<b>Job</b>	TRUMBULL TOWER	<b>Page</b>	1 of 15
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## Tower Input Data

There is a pole section.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

Tower is located in Fairfield County, Connecticut.

Basic wind speed of 97 mph.

Structure Class II.

Exposure Category B.

Topographic Category 1.

Crest Height 0.00 ft.

Nominal ice thickness of 0.7500 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

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	Retention 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	195.00-157.65	37.35	4.73	18	25.0000	33.8750	0.2500	1.0000	A572-65 (65 ksi)
L2	157.65-117.08	45.30	5.86	18	32.2501	42.9063	0.3125	1.2500	A572-65 (65 ksi)

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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
L3	117.08-81.09	41.85	6.84	18	40.9017	50.7500	0.3750	1.5000	A572-65 (65 ksi)
L4	81.09-40.04	47.90	7.95	18	48.3897	59.6563	0.5000	2.0000	A572-65 (65 ksi)
L5	40.04-0.00	47.99		18	56.7861	68.0000	0.5000	2.0000	A572-65 (65 ksi)

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	It/Q in <sup>2</sup>	w in	w/t
L1	25.3857	19.6391	1519.8824	8.7863	12.7000	119.6758	3041.7647	9.8214	3.9600	15.84
	34.3976	26.6814	3811.2835	11.9369	17.2085	221.4768	7627.5821	13.3433	5.5220	22.088
L2	33.8785	31.6781	4082.2569	11.3378	16.3830	249.1758	8169.8853	15.8421	5.1260	16.403
	43.5681	42.2477	9683.4926	15.1208	21.7964	444.2708	19379.7271	21.1279	7.0015	22.405
L3	42.9339	48.2369	10009.1822	14.3870	20.7781	481.7190	20031.5347	24.1230	6.5387	17.437
	51.5329	59.9588	19222.9846	17.8831	25.7810	745.6260	38471.2633	29.9851	8.2720	22.059
L4	50.7708	76.0009	22021.1305	17.0008	24.5819	895.8253	44071.2370	38.0077	7.6366	15.273
	60.5765	93.8810	41506.5163	21.0005	30.3054	1369.6091	83067.6479	46.9494	9.6195	19.239
L5	59.5486	89.3261	35753.5214	19.9816	28.8474	1239.4036	71554.0883	44.6715	9.1144	18.229
	69.0490	107.1225	61663.1484	23.9625	34.5440	1785.0610	123407.434	53.5714	11.0880	22.176

8

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 195.00-157.65				1	1	1			
L2 157.65-117.08				1	1	1			
L3 117.08-81.09				1	1	1			
L4 81.09-40.04				1	1	1			
L5 40.04-0.00				1	1	1			

### Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
HJ7-50A(1-5/8")	B	Surface Ar (CaAa)	154.00 - 0.00	2	2	-0.130 -0.100	1.9800		1.04
HJ7-50A(1-5/8")	B	Surface Ar (CaAa)	154.00 - 0.00	5	5	-0.200 -0.140	0.0000		1.04
HB158-1-08U8-S8J18(1-5/8)	B	Surface Ar (CaAa)	154.00 - 0.00	1	1	-0.090 -0.080	1.9800		1.30
*** Safety Line 3/8	A	Surface Ar (CaAa)	195.00 - 0.00	1	1	0.000 0.000	0.3750		0.22

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### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>A</sub> A <sub>A</sub>		Weight
						ft <sup>2</sup> /ft	plf	
LDF6-50A(1-1/4")	C	No	Inside Pole	185.00 - 0.00	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
FB-L98B-002-75000(3/8")	C	No	Inside Pole	185.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
WR-VG82ST-BRDA(5/8)	C	No	Inside Pole	185.00 - 0.00	2	No Ice	0.00	0.31
						1/2" Ice	0.00	0.31
						1" Ice	0.00	0.31
2" Rigid Conduit	C	No	Inside Pole	185.00 - 0.00	1	No Ice	0.00	2.80
						1/2" Ice	0.00	2.80
						1" Ice	0.00	2.80
***								
HB114-1-0813U4-M5J(1-1/4")	B	No	Inside Pole	164.00 - 0.00	3	No Ice	0.00	1.20
						1/2" Ice	0.00	1.20
						1" Ice	0.00	1.20
HB114-21U3M12-XXX F(1-1/4)	B	No	Inside Pole	164.00 - 0.00	1	No Ice	0.00	1.22
						1/2" Ice	0.00	1.22
						1" Ice	0.00	1.22
9207(5/16")	B	No	Inside Pole	164.00 - 0.00	6	No Ice	0.00	0.60
						1/2" Ice	0.00	0.60
						1" Ice	0.00	0.60
2" Rigid Conduit	B	No	Inside Pole	164.00 - 0.00	1	No Ice	0.00	2.80
						1/2" Ice	0.00	2.80
						1" Ice	0.00	2.80
FSJ4-50B(1/2")	B	No	Inside Pole	164.00 - 0.00	2	No Ice	0.00	0.14
						1/2" Ice	0.00	0.14
						1" Ice	0.00	0.14
7983A(ELLIPTICAL)	B	No	Inside Pole	164.00 - 0.00	2	No Ice	0.00	0.08
						1/2" Ice	0.00	0.08
						1" Ice	0.00	0.08
AL7-50(1-5/8")	B	No	Inside Pole	154.00 - 0.00	3	No Ice	0.00	0.52
						1/2" Ice	0.00	0.52
						1" Ice	0.00	0.52
HB158-1-08U8-S8J18(1-5/8")	B	No	Inside Pole	154.00 - 0.00	1	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
HJ7-50A(1-5/8")	B	No	Inside Pole	154.00 - 0.00	8	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
***								
LDF7-50A(1-5/8")	A	No	Inside Pole	144.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
MLE Hybrid 3Power/6Fiber RL 2(1-1/4")	A	No	Inside Pole	144.00 - 0.00	1	No Ice	0.00	0.68
						1/2" Ice	0.00	0.68
						1" Ice	0.00	0.68
***								
AVA7-50(1-5/8)	C	No	Inside Pole	193.00 - 0.00	1	No Ice	0.00	0.70
						1/2" Ice	0.00	0.70
						1" Ice	0.00	0.70

### Feed Line/Linear Appurtenances Section Areas

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Tower Section	Tower Elevation ft	Face	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight K
L1	195.00-157.65	A	0.000	0.000	1.401	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.07
		C	0.000	0.000	0.000	0.000	0.34
L2	157.65-117.08	A	0.000	0.000	1.521	0.000	0.29
		B	0.000	0.000	21.929	0.000	1.20
		C	0.000	0.000	0.000	0.000	0.49
L3	117.08-81.09	A	0.000	0.000	1.350	0.000	0.39
		B	0.000	0.000	21.378	0.000	1.13
		C	0.000	0.000	0.000	0.000	0.44
L4	81.09-40.04	A	0.000	0.000	1.540	0.000	0.44
		B	0.000	0.000	24.386	0.000	1.29
		C	0.000	0.000	0.000	0.000	0.50
L5	40.04-0.00	A	0.000	0.000	1.501	0.000	0.43
		B	0.000	0.000	23.783	0.000	1.26
		C	0.000	0.000	0.000	0.000	0.48

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight K
L1	195.00-157.65	A	1.773	0.000	0.000	14.644	0.000	0.18
		B		0.000	0.000	0.000	0.000	0.07
		C		0.000	0.000	0.000	0.000	0.34
L2	157.65-117.08	A	1.729	0.000	0.000	15.904	0.000	0.48
		B		0.000	0.000	71.397	0.000	2.06
		C		0.000	0.000	0.000	0.000	0.49
L3	117.08-81.09	A	1.674	0.000	0.000	13.796	0.000	0.55
		B		0.000	0.000	68.502	0.000	1.93
		C		0.000	0.000	0.000	0.000	0.44
L4	81.09-40.04	A	1.594	0.000	0.000	15.283	0.000	0.61
		B		0.000	0.000	76.553	0.000	2.16
		C		0.000	0.000	0.000	0.000	0.50
L5	40.04-0.00	A	1.423	0.000	0.000	14.263	0.000	0.58
		B		0.000	0.000	72.413	0.000	2.05
		C		0.000	0.000	0.000	0.000	0.48

### Feed Line Center of Pressure

Section	Elevation ft	$CP_x$ in	$CP_z$ in	$CP_x$ Ice in	$CP_z$ Ice in
L1	195.00-157.65	-0.0479	-0.0276	-0.3981	-0.2298
L2	157.65-117.08	0.4887	-0.5109	0.6970	-1.0560
L3	117.08-81.09	0.5384	-0.5574	0.8174	-1.1909
L4	81.09-40.04	0.5463	-0.5660	0.8707	-1.2653
L5	40.04-0.00	0.5524	-0.5726	0.9101	-1.3153



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### Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
L1	26	Safety Line 3/8	157.65 - 195.00	1.0000	1.0000
L1	15	HJ7-50A(1-5/8")	157.65 - 154.00	1.0000	1.0000
L1	16	HJ7-50A(1-5/8")	157.65 - 154.00	1.0000	1.0000
L1	17	HB158-1-08U8-S8J18(1-5/8)	157.65 - 154.00	1.0000	1.0000
L2	15	HJ7-50A(1-5/8")	117.08 - 154.00	1.0000	1.0000
L2	16	HJ7-50A(1-5/8")	117.08 - 154.00	1.0000	1.0000
L2	17	HB158-1-08U8-S8J18(1-5/8)	117.08 - 154.00	1.0000	1.0000
L2	26	Safety Line 3/8	117.08 - 157.65	1.0000	1.0000
L3	15	HJ7-50A(1-5/8")	81.09 - 117.08	1.0000	1.0000
L3	16	HJ7-50A(1-5/8")	81.09 - 117.08	1.0000	1.0000
L3	17	HB158-1-08U8-S8J18(1-5/8)	81.09 - 117.08	1.0000	1.0000
L3	26	Safety Line 3/8	81.09 - 117.08	1.0000	1.0000
L4	15	HJ7-50A(1-5/8")	40.04 - 81.09	1.0000	1.0000
L4	16	HJ7-50A(1-5/8")	40.04 - 81.09	1.0000	1.0000
L4	17	HB158-1-08U8-S8J18(1-5/8)	40.04 - 81.09	1.0000	1.0000
L4	26	Safety Line 3/8	40.04 - 81.09	1.0000	1.0000

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
HG2409U-PRO	B	From Leg	3.00 0.00 2.00	0.0000	193.00	No Ice 0.38 1/2" Ice 0.54 1" Ice 0.72	0.38 0.54 0.72	0.00 0.01 0.01
Commscope S-300	B	From Leg	1.50 0.00 0.00	0.0000	193.00	No Ice 0.94 1/2" Ice 1.48 1" Ice 2.02	1.41 2.17 2.93	0.03 0.04 0.06
***								
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	185.00	No Ice 5.75 1/2" Ice 6.18 1" Ice 6.61	4.25 5.01 5.71	0.06 0.10 0.16
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	185.00	No Ice 5.75 1/2" Ice 6.18 1" Ice 6.61	4.25 5.01 5.71	0.06 0.10 0.16
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	185.00	No Ice 5.75 1/2" Ice 6.18 1" Ice 6.61	4.25 5.01 5.71	0.06 0.10 0.16
(4) LGP21401	A	From Leg	4.00 0.00	0.0000	185.00	No Ice 1.10 1/2" Ice 1.24	0.21 0.27	0.01 0.02

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
(4) LGP21401	B	From Leg	0.00		0.0000	185.00	1" Ice	1.38	0.35	0.03
			4.00				No Ice	1.10	0.21	0.01
			0.00				1/2" Ice	1.24	0.27	0.02
(4) LGP21401	C	From Leg	0.00		0.0000	185.00	1" Ice	1.38	0.35	0.03
			4.00				No Ice	1.10	0.21	0.01
			0.00				1/2" Ice	1.24	0.27	0.02
(2) RRUS-11	A	From Leg	0.00		0.0000	185.00	1" Ice	1.38	0.35	0.03
			4.00				No Ice	2.52	1.07	0.06
			0.00				1/2" Ice	2.72	1.21	0.07
(2) RRUS-11	B	From Leg	0.00		0.0000	185.00	1" Ice	2.92	1.36	0.10
			4.00				No Ice	2.52	1.07	0.06
			0.00				1/2" Ice	2.72	1.21	0.07
(2) RRUS-11	C	From Leg	0.00		0.0000	185.00	1" Ice	2.92	1.36	0.10
			4.00				No Ice	2.52	1.07	0.06
			0.00				1/2" Ice	2.72	1.21	0.07
DC6-48-60-18-8F	A	From Leg	0.00		0.0000	185.00	1" Ice	2.92	1.36	0.10
			4.00				No Ice	0.92	0.92	0.03
			0.00				1/2" Ice	1.46	1.46	0.05
HPA-65R-BUU-H6 w/ Mount Pipe	A	From Leg	0.00		0.0000	185.00	1" Ice	1.64	1.64	0.07
			4.00				No Ice	9.90	8.11	0.08
			0.00				1/2" Ice	10.47	9.30	0.16
HPA-65R-BUU-H6 w/ Mount Pipe	B	From Leg	2.00		0.0000	185.00	1" Ice	11.01	10.21	0.25
			4.00				No Ice	9.90	8.11	0.08
			0.00				1/2" Ice	10.47	9.30	0.16
HPA-65R-BUU-H6 w/ Mount Pipe	C	From Leg	2.00		0.0000	185.00	1" Ice	11.01	10.21	0.25
			4.00				No Ice	9.90	8.11	0.08
			0.00				1/2" Ice	10.47	9.30	0.16
RRUS12/RRUS A2	A	From Leg	2.00		0.0000	185.00	1" Ice	11.01	10.21	0.25
			4.00				No Ice	3.14	1.84	0.07
			0.00				1/2" Ice	3.36	2.01	0.10
RRUS12/RRUS A2	B	From Leg	2.00		0.0000	185.00	1" Ice	3.59	2.20	0.13
			4.00				No Ice	3.14	1.84	0.07
			0.00				1/2" Ice	3.36	2.01	0.10
RRUS12/RRUS A2	C	From Leg	2.00		0.0000	185.00	1" Ice	3.59	2.20	0.13
			4.00				No Ice	3.14	1.84	0.07
			0.00				1/2" Ice	3.36	2.01	0.10
Platform Mount [LP 601-1]	C	None	2.00		0.0000	185.00	1" Ice	3.59	2.20	0.13
							No Ice	28.47	28.47	1.12
							1/2" Ice	33.59	33.59	1.51
*** 6' Climbing Ladder (Flat)	C	From Leg			0.0000	183.00	1" Ice	38.71	38.71	1.91
			2.00				No Ice	5.84	5.84	0.05
			0.00				1/2" Ice	10.30	10.30	0.07
*** Platform Mount [LP 601-1]	C	None	0.00		0.0000	175.00	1" Ice	14.76	14.76	0.09
							No Ice	28.47	28.47	1.12
							1/2" Ice	33.59	33.59	1.51
(4) 8' x 2" Mount Pipe	A	From Leg			0.0000	175.00	1" Ice	38.71	38.71	1.91
			4.00				No Ice	1.90	1.90	0.03
			0.00				1/2" Ice	2.73	2.73	0.04
(4) 8' x 2" Mount Pipe	B	From Leg	0.00		0.0000	175.00	1" Ice	3.40	3.40	0.06
			4.00				No Ice	1.90	1.90	0.03
			0.00				1/2" Ice	2.73	2.73	0.04
(4) 8' x 2" Mount Pipe	C	From Leg	0.00		0.0000	175.00	1" Ice	3.40	3.40	0.06
			4.00				No Ice	1.90	1.90	0.03
			0.00				1/2" Ice	2.73	2.73	0.04
(4) 8' x 2" Mount Pipe	C	From Leg	0.00		0.0000	175.00	1" Ice	3.40	3.40	0.06
			4.00				No Ice	1.90	1.90	0.03
			0.00				1/2" Ice	2.73	2.73	0.04

<b>tnxTower</b>  <b>Jacobs Engineering Group, Inc.</b> 5449 Bells Ferry Road Acworth, GA 30102 Phone: 770-701-2500 FAX: 770-701-2501	<b>Job</b>	TRUMBULL TOWER	<b>Page</b>	7 of 15
	<b>Project</b>	BU881535_WO1417498	<b>Date</b>	10:19:48 06/15/17
	<b>Client</b>	Crown Castle	<b>Designed by</b>	scotta

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz Lateral	Vert					
***									
6' Climbing Ladder (Flat)	C	From Leg	2.00	0.0000	172.00	No Ice	5.84	5.84	0.05
			0.00			1/2" Ice	10.30	10.30	0.07
			0.00			1" Ice	14.76	14.76	0.09
***									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00	0.0000	164.00	No Ice	8.26	6.95	0.08
			0.00			1/2" Ice	8.82	8.13	0.15
			2.00			1" Ice	9.35	9.02	0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00	0.0000	164.00	No Ice	8.26	6.95	0.08
			0.00			1/2" Ice	8.82	8.13	0.15
			2.00			1" Ice	9.35	9.02	0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00	0.0000	164.00	No Ice	8.26	6.95	0.08
			0.00			1/2" Ice	8.82	8.13	0.15
			2.00			1" Ice	9.35	9.02	0.23
LLPX310R w/ Mount Pipe	A	From Leg	4.00	0.0000	164.00	No Ice	4.54	2.98	0.05
			0.00			1/2" Ice	4.89	3.53	0.08
			2.00			1" Ice	5.25	4.09	0.13
LLPX310R w/ Mount Pipe	B	From Leg	4.00	0.0000	164.00	No Ice	4.54	2.98	0.05
			0.00			1/2" Ice	4.89	3.53	0.08
			2.00			1" Ice	5.25	4.09	0.13
LLPX310R w/ Mount Pipe	C	From Leg	4.00	0.0000	164.00	No Ice	4.54	2.98	0.05
			0.00			1/2" Ice	4.89	3.53	0.08
			2.00			1" Ice	5.25	4.09	0.13
(3) ACU-A20-N	A	From Leg	4.00	0.0000	164.00	No Ice	0.07	0.12	0.00
			0.00			1/2" Ice	0.10	0.16	0.00
			0.00			1" Ice	0.15	0.21	0.00
(3) ACU-A20-N	B	From Leg	4.00	0.0000	164.00	No Ice	0.07	0.12	0.00
			0.00			1/2" Ice	0.10	0.16	0.00
			0.00			1" Ice	0.15	0.21	0.00
(3) ACU-A20-N	C	From Leg	4.00	0.0000	164.00	No Ice	0.07	0.12	0.00
			0.00			1/2" Ice	0.10	0.16	0.00
			0.00			1" Ice	0.15	0.21	0.00
800MHZ RRH	A	From Leg	4.00	0.0000	164.00	No Ice	2.13	1.77	0.05
			0.00			1/2" Ice	2.32	1.95	0.07
			0.00			1" Ice	2.51	2.13	0.10
800MHZ RRH	B	From Leg	4.00	0.0000	164.00	No Ice	2.13	1.77	0.05
			0.00			1/2" Ice	2.32	1.95	0.07
			0.00			1" Ice	2.51	2.13	0.10
800MHZ RRH	C	From Leg	4.00	0.0000	164.00	No Ice	2.13	1.77	0.05
			0.00			1/2" Ice	2.32	1.95	0.07
			0.00			1" Ice	2.51	2.13	0.10
800 EXTERNAL NOTCH FILTER	A	From Leg	4.00	0.0000	164.00	No Ice	0.66	0.32	0.01
			0.00			1/2" Ice	0.76	0.40	0.02
			0.00			1" Ice	0.87	0.48	0.02
800 EXTERNAL NOTCH FILTER	B	From Leg	4.00	0.0000	164.00	No Ice	0.66	0.32	0.01
			0.00			1/2" Ice	0.76	0.40	0.02
			0.00			1" Ice	0.87	0.48	0.02
800 EXTERNAL NOTCH FILTER	C	From Leg	4.00	0.0000	164.00	No Ice	0.66	0.32	0.01
			0.00			1/2" Ice	0.76	0.40	0.02
			0.00			1" Ice	0.87	0.48	0.02
1900MHz RRH (65MHz)	A	From Leg	4.00	0.0000	164.00	No Ice	2.31	2.38	0.06
			0.00			1/2" Ice	2.52	2.58	0.08
			0.00			1" Ice	2.73	2.79	0.11
1900MHz RRH (65MHz)	B	From Leg	4.00	0.0000	164.00	No Ice	2.31	2.38	0.06
			0.00			1/2" Ice	2.52	2.58	0.08
			0.00			1" Ice	2.73	2.79	0.11
1900MHz RRH (65MHz)	C	From Leg	4.00	0.0000	164.00	No Ice	2.31	2.38	0.06

<b>tnxTower</b>  <b>Jacobs Engineering Group, Inc.</b> 5449 Bells Ferry Road Acworth, GA 30102 Phone: 770-701-2500 FAX: 770-701-2501	<b>Job</b>	TRUMBULL TOWER	<b>Page</b>	8 of 15
	<b>Project</b>	BU881535_WO1417498	<b>Date</b>	10:19:48 06/15/17
	<b>Client</b>	Crown Castle	<b>Designed by</b>	scotta

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Lateral					
			ft	ft					
			0.00			1/2" Ice	2.52	2.58	0.08
			0.00			1" Ice	2.73	2.79	0.11
FDD_R6_RRH	A	From Leg	4.00	0.0000	164.00	No Ice	1.53	0.68	0.03
			0.00			1/2" Ice	1.69	0.80	0.04
			0.00			1" Ice	1.85	0.92	0.06
FDD_R6_RRH	B	From Leg	4.00	0.0000	164.00	No Ice	1.53	0.68	0.03
			0.00			1/2" Ice	1.69	0.80	0.04
			0.00			1" Ice	1.85	0.92	0.06
FDD_R6_RRH	C	From Leg	4.00	0.0000	164.00	No Ice	1.53	0.68	0.03
			0.00			1/2" Ice	1.69	0.80	0.04
			0.00			1" Ice	1.85	0.92	0.06
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.00	0.0000	164.00	No Ice	6.58	4.96	0.08
			0.00			1/2" Ice	7.03	5.75	0.13
			2.00			1" Ice	7.47	6.47	0.19
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	4.00	0.0000	164.00	No Ice	6.58	4.96	0.08
			0.00			1/2" Ice	7.03	5.75	0.13
			2.00			1" Ice	7.47	6.47	0.19
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.00	0.0000	164.00	No Ice	6.58	4.96	0.08
			0.00			1/2" Ice	7.03	5.75	0.13
			2.00			1" Ice	7.47	6.47	0.19
(2) TD-RRH8x20-25	B	From Leg	4.00	0.0000	164.00	No Ice	4.05	1.53	0.07
			0.00			1/2" Ice	4.30	1.71	0.10
			2.00			1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	C	From Leg	4.00	0.0000	164.00	No Ice	4.05	1.53	0.07
			0.00			1/2" Ice	4.30	1.71	0.10
			2.00			1" Ice	4.56	1.90	0.13
Miscellaneous [NA 507-1]	C	None		0.0000	164.00	No Ice	4.80	4.80	0.25
						1/2" Ice	6.70	6.70	0.29
						1" Ice	8.60	8.60	0.34
Platform Mount [LP 601-1]	C	None		0.0000	164.00	No Ice	28.47	28.47	1.12
						1/2" Ice	33.59	33.59	1.51
						1" Ice	38.71	38.71	1.91
8' x 2" Mount Pipe	A	From Leg	4.00	0.0000	164.00	No Ice	1.90	1.90	0.03
			0.00			1/2" Ice	2.73	2.73	0.04
			0.00			1" Ice	3.40	3.40	0.06
(2) 8' x 2" Mount Pipe	B	From Leg	4.00	0.0000	164.00	No Ice	1.90	1.90	0.03
			0.00			1/2" Ice	2.73	2.73	0.04
			0.00			1" Ice	3.40	3.40	0.06
8' x 2" Mount Pipe	C	From Leg	4.00	0.0000	164.00	No Ice	1.90	1.90	0.03
			0.00			1/2" Ice	2.73	2.73	0.04
			0.00			1" Ice	3.40	3.40	0.06
***									
6' Climbing Ladder (Flat)	C	From Leg	2.00	0.0000	162.00	No Ice	5.84	5.84	0.05
			0.00			1/2" Ice	10.30	10.30	0.07
			0.00			1" Ice	14.76	14.76	0.09
***									
(2) DB844G65ZAXY w/ Mount Pipe	A	From Leg	4.00	0.0000	154.00	No Ice	4.58	4.80	0.03
			0.00			1/2" Ice	4.96	5.42	0.08
			1.00			1" Ice	5.34	6.04	0.13
(2) LPA-4016 w/ Mount Pipe	B	From Leg	4.00	0.0000	154.00	No Ice	8.62	6.75	0.04
			0.00			1/2" Ice	9.06	7.38	0.12
			1.00			1" Ice	9.51	8.02	0.21
(2) DB844G65ZAXY w/ Mount Pipe	C	From Leg	4.00	0.0000	154.00	No Ice	4.58	4.80	0.03
			0.00			1/2" Ice	4.96	5.42	0.08
			1.00			1" Ice	5.34	6.04	0.13
(3) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00	0.0000	154.00	No Ice	8.62	7.30	0.07
			0.00			1/2" Ice	9.28	8.58	0.14

<b>tnxTower</b>  <b>Jacobs Engineering Group, Inc.</b> 5449 Bells Ferry Road Acworth, GA 30102 Phone: 770-701-2500 FAX: 770-701-2501	<b>Job</b>						<b>Page</b>	
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	<b>Project</b>						<b>Date</b>	
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<b>Client</b>						<b>Designed by</b>		
Crown Castle						scotta		

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Lateral						°
(3) SBNHH-1D65B w/ Mount Pipe	B	From Leg	1.00		0.0000	154.00	1" Ice	9.91	9.72	0.22
			4.00				No Ice	8.62	7.30	0.07
			0.00				1/2" Ice	9.28	8.58	0.14
(3) SBNHH-1D65B w/ Mount Pipe	C	From Leg	1.00		0.0000	154.00	1" Ice	9.91	9.72	0.22
			4.00				No Ice	8.62	7.30	0.07
			0.00				1/2" Ice	9.28	8.58	0.14
RRH4X45-AWS4 B66	A	From Leg	1.00		0.0000	154.00	1" Ice	9.91	9.72	0.22
			4.00				No Ice	2.66	1.59	0.06
			0.00				1/2" Ice	2.88	1.77	0.08
RRH4X45-AWS4 B66	B	From Leg	1.00		0.0000	154.00	1" Ice	3.10	1.96	0.11
			4.00				No Ice	2.66	1.59	0.06
			0.00				1/2" Ice	2.88	1.77	0.08
RRH4X45-AWS4 B66	C	From Leg	1.00		0.0000	154.00	1" Ice	3.10	1.96	0.11
			4.00				No Ice	2.66	1.59	0.06
			0.00				1/2" Ice	2.88	1.77	0.08
RRH2X60-PCS	A	From Leg	1.00		0.0000	154.00	1" Ice	3.10	1.96	0.11
			4.00				No Ice	2.20	1.72	0.06
			0.00				1/2" Ice	2.39	1.90	0.08
RRH2X60-PCS	B	From Leg	1.00		0.0000	154.00	1" Ice	2.59	2.09	0.10
			4.00				No Ice	2.20	1.72	0.06
			0.00				1/2" Ice	2.39	1.90	0.08
RRH2X60-PCS	C	From Leg	1.00		0.0000	154.00	1" Ice	2.59	2.09	0.10
			4.00				No Ice	2.20	1.72	0.06
			0.00				1/2" Ice	2.39	1.90	0.08
RRH2x60-700	A	From Leg	1.00		0.0000	154.00	1" Ice	2.59	2.09	0.10
			4.00				No Ice	3.50	1.82	0.06
			0.00				1/2" Ice	3.76	2.05	0.08
RRH2x60-700	B	From Leg	1.00		0.0000	154.00	1" Ice	4.03	2.29	0.11
			4.00				No Ice	3.50	1.82	0.06
			0.00				1/2" Ice	3.76	2.05	0.08
RRH2x60-700	C	From Leg	1.00		0.0000	154.00	1" Ice	4.03	2.29	0.11
			4.00				No Ice	3.50	1.82	0.06
			0.00				1/2" Ice	3.76	2.05	0.08
(2) DB-B1-6C-8AB-0Z	C	From Leg	1.00		0.0000	154.00	1" Ice	4.03	2.29	0.11
			4.00				No Ice	4.80	2.00	0.04
			0.00				1/2" Ice	5.07	2.19	0.08
Platform Mount [LP 601-1]	C	None	1.00		0.0000	154.00	1" Ice	5.35	2.39	0.12
							No Ice	28.47	28.47	1.12
							1/2" Ice	33.59	33.59	1.51
*** 6' Climbing Ladder (Flat)	A	From Leg	2.00		0.0000	152.00	1" Ice	38.71	38.71	1.91
			0.00				No Ice	5.84	5.84	0.05
			0.00				1/2" Ice	10.30	10.30	0.07
*** SBNH-1D65C-SR w/ Mount Pipe	A	From Leg	2.00		0.0000	144.00	1" Ice	14.76	14.76	0.09
			0.00				No Ice	11.68	9.84	0.08
			0.00				1/2" Ice	12.40	11.37	0.17
SBNH-1D65C-SR w/ Mount Pipe	B	From Leg	1.00		0.0000	144.00	1" Ice	13.14	12.91	0.27
			4.00				No Ice	11.68	9.84	0.08
			0.00				1/2" Ice	12.40	11.37	0.17
SBNH-1D65C-SR w/ Mount Pipe	C	From Leg	1.00		0.0000	144.00	1" Ice	13.14	12.91	0.27
			4.00				No Ice	11.68	9.84	0.08
			0.00				1/2" Ice	12.40	11.37	0.17
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	1.00		0.0000	144.00	1" Ice	13.14	12.91	0.27
			4.00				No Ice	6.33	5.64	0.11
			0.00				1/2" Ice	6.78	6.43	0.17
			1.00				1" Ice	7.21	7.13	0.23

<b>tnxTower</b>  <b>Jacobs Engineering Group, Inc.</b> 5449 Bells Ferry Road Acworth, GA 30102 Phone: 770-701-2500 FAX: 770-701-2501	<b>Job</b>	TRUMBULL TOWER	<b>Page</b>	10 of 15
	<b>Project</b>	BU881535_WO1417498	<b>Date</b>	10:19:48 06/15/17
	<b>Client</b>	Crown Castle	<b>Designed by</b>	scotta

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz Lateral	Vert					
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00	0.0000	144.00	No Ice	6.33	5.64	0.11
			0.00			1/2" Ice	6.78	6.43	0.17
			1.00			1" Ice	7.21	7.13	0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00	0.0000	144.00	No Ice	6.33	5.64	0.11
			0.00			1/2" Ice	6.78	6.43	0.17
			1.00			1" Ice	7.21	7.13	0.23
RRUS 11 B2	A	From Leg	4.00	0.0000	144.00	No Ice	2.83	1.18	0.05
			0.00			1/2" Ice	3.04	1.33	0.07
			1.00			1" Ice	3.26	1.48	0.10
RRUS 11 B2	B	From Leg	4.00	0.0000	144.00	No Ice	2.83	1.18	0.05
			0.00			1/2" Ice	3.04	1.33	0.07
			1.00			1" Ice	3.26	1.48	0.10
RRUS 11 B2	C	From Leg	4.00	0.0000	144.00	No Ice	2.83	1.18	0.05
			0.00			1/2" Ice	3.04	1.33	0.07
			1.00			1" Ice	3.26	1.48	0.10
RRUS 11 B12	A	From Leg	4.00	0.0000	144.00	No Ice	2.83	1.18	0.05
			0.00			1/2" Ice	3.04	1.33	0.07
			1.00			1" Ice	3.26	1.48	0.10
RRUS 11 B12	B	From Leg	4.00	0.0000	144.00	No Ice	2.83	1.18	0.05
			0.00			1/2" Ice	3.04	1.33	0.07
			1.00			1" Ice	3.26	1.48	0.10
RRUS 11 B12	C	From Leg	4.00	0.0000	144.00	No Ice	2.83	1.18	0.05
			0.00			1/2" Ice	3.04	1.33	0.07
			1.00			1" Ice	3.26	1.48	0.10
KRY 112 144/1	A	From Leg	4.00	0.0000	144.00	No Ice	0.35	0.16	0.01
			0.00			1/2" Ice	0.43	0.22	0.01
			1.00			1" Ice	0.51	0.28	0.02
KRY 112 144/1	B	From Leg	4.00	0.0000	144.00	No Ice	0.35	0.16	0.01
			0.00			1/2" Ice	0.43	0.22	0.01
			1.00			1" Ice	0.51	0.28	0.02
KRY 112 144/1	C	From Leg	4.00	0.0000	144.00	No Ice	0.35	0.16	0.01
			0.00			1/2" Ice	0.43	0.22	0.01
			1.00			1" Ice	0.51	0.28	0.02
Platform Mount [LP 601-1]	C	None		0.0000	144.00	No Ice	28.47	28.47	1.12
						1/2" Ice	33.59	33.59	1.51
						1" Ice	38.71	38.71	1.91
***									
6' Climbing Ladder (Flat)	A	From Leg	2.00	0.0000	142.00	No Ice	5.84	5.84	0.05
			0.00			1/2" Ice	10.30	10.30	0.07
			0.00			1" Ice	14.76	14.76	0.09
***									
***									

## Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets:		Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight	
				Horz Lateral	Vert							°
A-ANT-23G-2-C	B	Paraboloid	From	4.00	40.0000			164.00	2.17	No Ice	3.72	0.01

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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 <sup>2</sup>	Weight K
		w/Shroud (HP)	Leg	0.00				1/2" Ice	4.01	0.03
				2.00				1" Ice	4.30	0.05
***										

## Load Combinations

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

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Comb. No.	Description
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	195 - 157.648	Pole	Max Tension	8	0.00	0.00	0.00
			Max. Compression	26	-26.72	-1.16	-2.04
			Max. Mx	8	-10.48	-208.50	-0.82
			Max. My	14	-10.49	-0.35	-208.92
			Max. Vy	8	15.53	-208.50	-0.82
			Max. Vx	2	-15.49	-0.33	207.40
			Max. Torque	8			-1.60
L2	157.648 - 117.083	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.94	-1.10	-1.70
			Max. Mx	8	-24.01	-1200.77	-3.31
			Max. My	2	-24.04	2.13	1192.93
			Max. Vy	8	30.13	-1200.77	-3.31
			Max. Vx	2	-29.91	2.13	1192.93
			Max. Torque	8			-2.83
L3	117.083 - 81.0937	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-71.69	-2.38	-0.00
			Max. Mx	8	-35.32	-2317.57	-5.16
			Max. My	2	-35.34	3.63	2302.12
			Max. Vy	8	33.56	-2317.57	-5.16
			Max. Vx	2	-33.34	3.63	2302.12
			Max. Torque	12			-1.25
L4	81.0937 - 40.0391	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-95.69	-4.08	2.23
			Max. Mx	8	-53.72	-3738.83	-7.12
			Max. My	2	-53.73	5.22	3714.74
			Max. Vy	8	37.41	-3738.83	-7.12
			Max. Vx	2	-37.19	5.22	3714.74
			Max. Torque	12			-1.25
L5	40.0391 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-128.55	-6.35	5.18
			Max. Mx	8	-79.87	-5626.50	-9.28
			Max. My	2	-79.87	6.96	5592.25
			Max. Vy	8	41.04	-5626.50	-9.28
			Max. Vx	2	-40.83	6.96	5592.25
			Max. Torque	12			-1.25

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	195 - 157.648	23.248	42	1.0143	0.0018
L2	162.383 - 117.083	16.396	42	0.9704	0.0012
L3	122.948 - 81.0937	9.151	42	0.7416	0.0005



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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L4	87.9375 - 40.0391	4.563	42	0.4886	0.0002
L5	47.9896 - 0	1.378	42	0.2592	0.0001

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
193.00	HG2409U-PRO	42	22.820	1.0136	0.0017	119824
185.00	(2) 7770.00 w/ Mount Pipe	42	21.115	1.0096	0.0016	59912
183.00	6' Climbing Ladder (Flat)	42	20.690	1.0082	0.0016	49926
175.00	Platform Mount [LP 601-1]	42	19.002	0.9995	0.0015	29956
172.00	6' Climbing Ladder (Flat)	42	18.375	0.9946	0.0014	26048
166.00	A-ANT-23G-2-C	42	17.134	0.9811	0.0013	20656
164.00	APXVSPP18-C-A20 w/ Mount Pipe	42	16.725	0.9755	0.0013	19286
162.00	6' Climbing Ladder (Flat)	42	16.318	0.9691	0.0012	18015
154.00	(2) DB844G65ZAXY w/ Mount Pipe	42	14.719	0.9369	0.0011	13914
152.00	6' Climbing Ladder (Flat)	42	14.327	0.9273	0.0010	13149
144.00	SBNH-1D65C-SR w/ Mount Pipe	42	12.799	0.8838	0.0008	10763
142.00	6' Climbing Ladder (Flat)	42	12.427	0.8718	0.0008	10295

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	195 - 157.648	109.237	8	4.7709	0.0081
L2	162.383 - 117.083	77.043	8	4.5637	0.0057
L3	122.948 - 81.0937	43.003	8	3.4870	0.0021
L4	87.9375 - 40.0391	21.441	8	2.2968	0.0010
L5	47.9896 - 0	6.474	8	1.2180	0.0004

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
193.00	HG2409U-PRO	8	107.230	4.7673	0.0079	25968
185.00	(2) 7770.00 w/ Mount Pipe	8	99.217	4.7487	0.0074	12983
183.00	6' Climbing Ladder (Flat)	8	97.221	4.7420	0.0073	10819
175.00	Platform Mount [LP 601-1]	8	89.290	4.7008	0.0067	6490
172.00	6' Climbing Ladder (Flat)	8	86.344	4.6776	0.0065	5643
166.00	A-ANT-23G-2-C	8	80.513	4.6144	0.0060	4473
164.00	APXVSPP18-C-A20 w/ Mount Pipe	8	78.590	4.5877	0.0058	4176
162.00	6' Climbing Ladder (Flat)	8	76.678	4.5577	0.0056	3899
154.00	(2) DB844G65ZAXY w/ Mount Pipe	8	69.164	4.4063	0.0048	2998
152.00	6' Climbing Ladder (Flat)	8	67.324	4.3612	0.0046	2831

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Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
144.00	SBNH-1D65C-SR w/ Mount Pipe	8	60.142	4.1563	0.0038	2312
142.00	6' Climbing Ladder (Flat)	8	58.397	4.0996	0.0036	2211

## Compression Checks

## Pole Design Data

Section No.	Elevation	Size	L	L <sub>u</sub>	Kl/r	A	P <sub>u</sub>	φP <sub>n</sub>	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in <sup>2</sup>	K	K	
L1	195 - 157.648 (1)	TP33.875x25x0.25	37.35	0.00	0.0	25.7888	-10.48	1772.14	0.006
L2	157.648 - 117.083 (2)	TP42.9063x32.2501x0.3125	45.30	0.00	0.0	40.8793	-24.01	2794.77	0.009
L3	117.083 - 81.0937 (3)	TP50.75x40.9017x0.375	41.85	0.00	0.0	58.0421	-35.32	3988.09	0.009
L4	81.0937 - 40.0391 (4)	TP59.6563x48.3897x0.5	47.90	0.00	0.0	90.9131	-53.72	6508.62	0.008
L5	40.0391 - 0 (5)	TP68x56.7861x0.5	47.99	0.00	0.0	107.122 0	-79.87	7261.40	0.011

## Pole Bending Design Data

Section No.	Elevation	Size	M <sub>ux</sub>	φM <sub>ux</sub>	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M <sub>uy</sub>	φM <sub>uy</sub>	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
	ft		kip-ft	kip-ft		kip-ft	kip-ft	
L1	195 - 157.648 (1)	TP33.875x25x0.25	208.95	1184.53	0.176	0.00	1184.53	0.000
L2	157.648 - 117.083 (2)	TP42.9063x32.2501x0.3125	1200.78	2369.21	0.507	0.00	2369.21	0.000
L3	117.083 - 81.0937 (3)	TP50.75x40.9017x0.375	2317.57	3999.78	0.579	0.00	3999.78	0.000
L4	81.0937 - 40.0391 (4)	TP59.6563x48.3897x0.5	3738.83	7660.50	0.488	0.00	7660.50	0.000
L5	40.0391 - 0 (5)	TP68x56.7861x0.5	5626.51	10083.50	0.558	0.00	10083.50	0.000

## Pole Shear Design Data

Section No.	Elevation	Size	Actual V <sub>u</sub>	φV <sub>n</sub>	Ratio $\frac{V_u}{\phi V_n}$	Actual T <sub>u</sub>	φT <sub>n</sub>	Ratio $\frac{T_u}{\phi T_n}$
	ft		K	K		kip-ft	kip-ft	
L1	195 - 157.648 (1)	TP33.875x25x0.25	15.51	886.07	0.018	1.05	2371.97	0.000
L2	157.648 - 117.083 (2)	TP42.9063x32.2501x0.3125	30.13	1397.38	0.022	1.01	4744.22	0.000
L3	117.083 -	TP50.75x40.9017x0.375	33.56	1994.04	0.017	1.01	8009.33	0.000

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Section No.	Elevation ft	Size	Actual $V_u$ K	$\phi V_n$ K	Ratio $\frac{V_u}{\phi V_n}$	Actual $T_u$ kip-ft	$\phi T_n$ kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L4	81.0937 (3) 81.0937 - 40.0391 (4)	TP59.6563x48.3897x0.5	37.41	3254.31	0.011	1.00	15339.75	0.000
L5	40.0391 - 0 (5)	TP68x56.7861x0.5	41.04	3630.70	0.011	1.00	20191.67	0.000

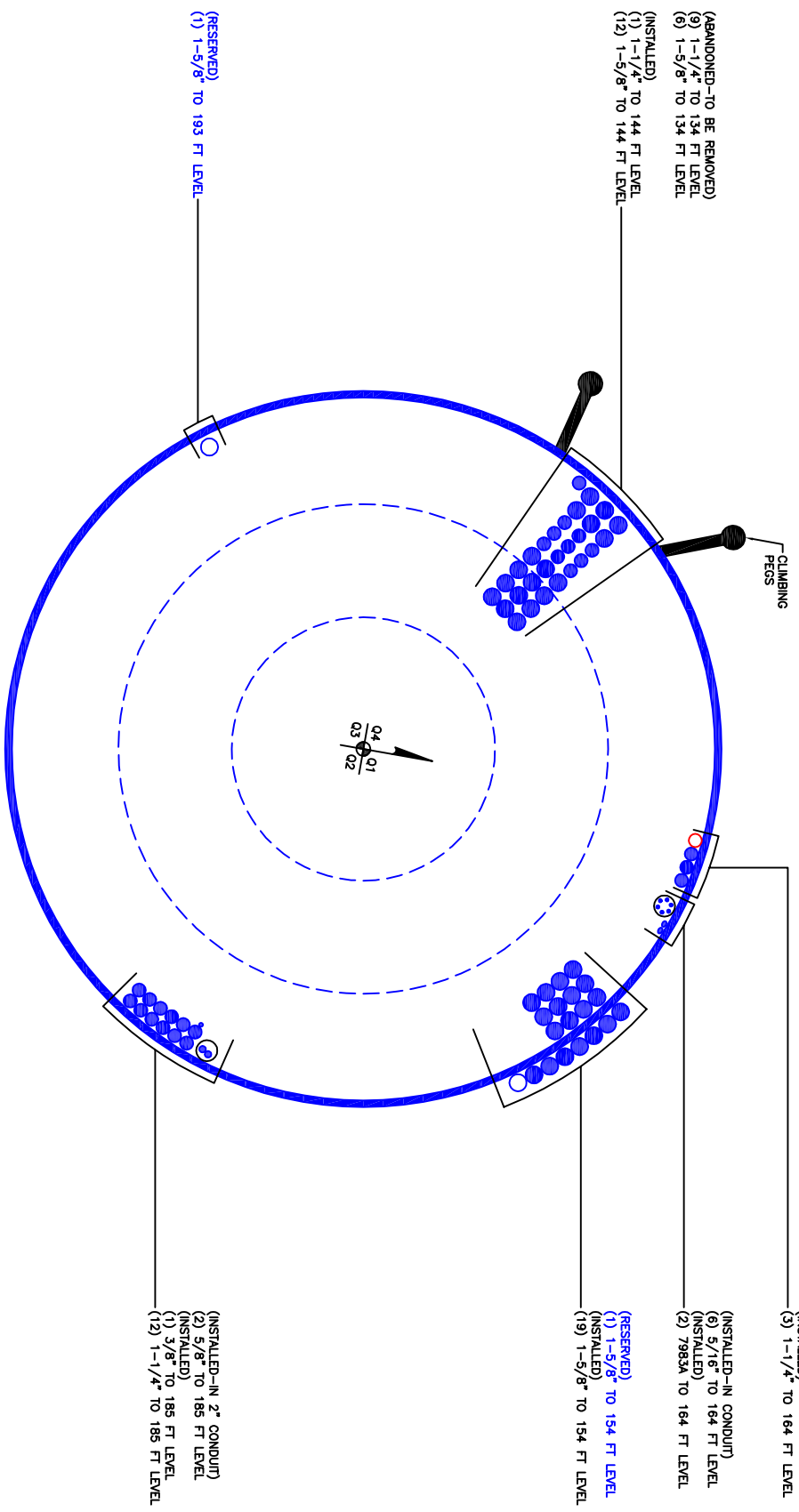
### Pole Interaction Design Data

Section No.	Elevation ft	Ratio $P_u$ $\phi P_n$	Ratio $M_{ux}$ $\phi M_{nx}$	Ratio $M_{uy}$ $\phi M_{ny}$	Ratio $V_u$ $\phi V_n$	Ratio $T_u$ $\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	195 - 157.648 (1)	0.006	0.176	0.000	0.018	0.000	0.183	1.000	4.8.2 ✓
L2	157.648 - 117.083 (2)	0.009	0.507	0.000	0.022	0.000	0.516	1.000	4.8.2 ✓
L3	117.083 - 81.0937 (3)	0.009	0.579	0.000	0.017	0.000	0.589	1.000	4.8.2 ✓
L4	81.0937 - 40.0391 (4)	0.008	0.488	0.000	0.011	0.000	0.496	1.000	4.8.2 ✓
L5	40.0391 - 0 (5)	0.011	0.558	0.000	0.011	0.000	0.569	1.000	4.8.2 ✓

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail	
L1	195 - 157.648	Pole	TP33.875x25x0.25	1	-10.48	1772.14	18.3	Pass	
L2	157.648 - 117.083	Pole	TP42.9063x32.2501x0.3125	2	-24.01	2794.77	51.6	Pass	
L3	117.083 - 81.0937	Pole	TP50.75x40.9017x0.375	3	-35.32	3988.09	58.9	Pass	
L4	81.0937 - 40.0391	Pole	TP59.6563x48.3897x0.5	4	-53.72	6508.62	49.6	Pass	
L5	40.0391 - 0	Pole	TP68x56.7861x0.5	5	-79.87	7261.40	56.9	Pass	
							Summary		
							Pole (L3)	58.9	Pass
							<b>RATING =</b>	<b>58.9</b>	<b>Pass</b>

**APPENDIX B**  
**BASE LEVEL DRAWING**



BUSINESS UNIT: 881535 TOWER ID: C\_BASLEVEL

**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

# 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#:	881535
Site Name:	TRUMBULL TOWER
App #:	393553 Rev.0
Pole Manufacturer:	Other

Reactions		
Mu:	5627	ft-kips
Axial, Pu:	80	kips
Shear, Vu:	41	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

Anchor Rod Data	
Qty:	24
Diam:	2.25 in
Rod Material:	A615-J
Strength (Fu):	100 ksi
Yield (Fy):	75 ksi
Bolt Circle:	76.5 in

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

**Anchor Rod Results**  
 Max Rod (Cu+ Vu/r): 153.9 Kips  
 Allowable Axial, Φ\*Fu\*Anet: 260.0 Kips  
 Anchor Rod Stress Ratio: 59.2% **Pass**

Rigid
AISC LRFD
φ*Tn

Plate Data	
Diam:	82.5 in
Thick:	2.5 in
Grade:	60 ksi
Single-Rod B-eff:	8.99 in

**Base Plate Results**  
 Base Plate Stress: 28.2 ksi  
 Allowable Plate Stress: 54.0 ksi  
 Base Plate Stress Ratio: 52.2% **Pass**

Flexural Check

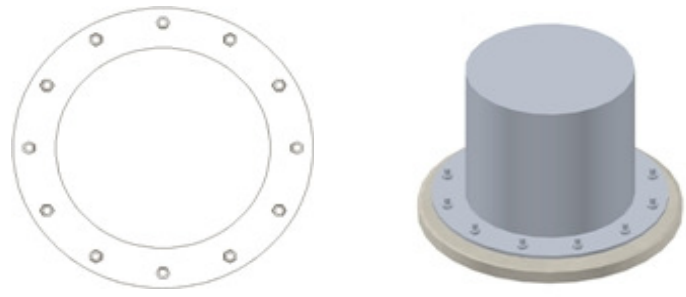
Rigid
AISC LRFD
φ*Fy
Y.L. Length: 35.05

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:	68 in
Thick:	0.5 in
Grade:	65 ksi
# of Sides:	18 "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

# Pier and Pad Foundation



BU #: 881535  
 Site Name: TRUMBULL TOWER  
 App. Number: 393553 Rev.0

TIA-222 Revision: G  
 Tower Type: Monopole

Block Foundation?:

Superstructure Analysis Reactions		
Compression, $P_{comp}$ :	80	kips
Base Shear, $V_{u\_comp}$ :	41	kips
Moment, $M_u$ :	5627	ft-kips
Tower Height, $H$ :	195	ft
BP Dist. Above Fdn, $bp_{dist}$ :	4	in

Foundation Analysis Checks				
	Capacity	Demand	Rating	Check
<i>Lateral (Sliding) (kips)</i>	413.99	41.00	9.9%	Pass
<i>Bearing Pressure (ksf)</i>	9.00	2.38	26.5%	Pass
<i>Overtuning (kip*ft)</i>	10988.70	5968.67	54.3%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	9289.60	5832.00	62.8%	Pass
<i>Pier Compression (kip)</i>	51554.88	152.90	0.3%	Pass
<i>Pad Flexure (kip*ft)</i>	5943.63	1917.70	32.3%	Pass
<i>Pad Shear - 1-way (kips)</i>	1039.95	273.45	26.3%	Pass
<i>Pad Shear - 2-way (kips)</i>	3335.00	152.90	4.6%	Pass

Pier Properties		
Pier Shape:	Square	
Pier Diameter, $dpier$ :	9.0	ft
Ext. Above Grade, $E$ :	1	ft
Pier Rebar Size, $Sc$ :	8	
Pier Rebar Quantity, $mc$ :	54	
Pier Tie/Spiral Size, $St$ :	4	
Pier Tie/Spiral Quantity, $mt$ :	10	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, $cc_{pier}$ :	3	in

Soil Rating: 54.3%  
 Structural Rating: 62.8%

Pad Properties		
Depth, $D$ :	7.0	ft
Pad Width, $W$ :	29.0	ft
Pad Thickness, $T$ :	3.0	ft
Pad Rebar Size, $Sp$ :	8	
Pad Rebar Quantity, $mp$ :	55	
Pad Clear Cover, $cc_{pad}$ :	3	in

Material Properties		
Rebar Grade, $Fy$ :	60000	psi
Concrete Compressive Strength, $F'c$ :	4000	psi
Dry Concrete Density, $\delta c$ :	150	pcf

Soil Properties		
Total Soil Unit Weight, $\gamma$ :	125	pcf
Ultimate Gross Bearing, $Q_{ult}$ :	12.000	ksf
Cohesion, $C_u$ :	0.000	ksf
Friction Angle, $\phi$ :	34	degrees
SPT Blow Count, $N_{blows}$ :	60	
Base Friction, $\mu$ :		
Neglected Depth, $N$ :	3.5	ft
Groundwater Depth, $gw$ :	15	ft

<--Toggle between Gross and Net





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

SPRINT Existing Facility

Site ID: CT03XC373

Candid Communications  
425 Indian Ledge Park  
Trumbull, CT 06611

**July 24, 2017**

**EBI Project Number: 6217003219**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general population allowable limit:	<b>12.80 %</b>



July 24, 2017

SPRINT

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

## Emissions Analysis for Site: **CT03XC373 – Candid Communications**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **425 Indian Ledge Park, Trumbull, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  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 ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limits for the 850 MHz Band is approximately  $567 \mu\text{W}/\text{cm}^2$ . The general population exposure limit for the 1900 MHz (PCS) and 2500 MHz (BRS) bands is  $1000 \mu\text{W}/\text{cm}^2$ . 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 **425 Indian Ledge Park, Trumbull, 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 APXVSP18-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 **166 feet** above ground level (AGL) for **Sector A**, **166 feet** above ground level (AGL) for **Sector B** and **166 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 #:	<b>1</b>	Antenna #:	<b>1</b>	Antenna #:	<b>1</b>
Make / Model:	RFS APXVSP18-C-A20	Make / Model:	RFS APXVSP18-C-A20	Make / Model:	RFS APXVSP18-C-A20
Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd
Height (AGL):	<b>166 feet</b>	Height (AGL):	<b>166 feet</b>	Height (AGL):	<b>166 feet</b>
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%	<b>1.20 %</b>	Antenna B1 MPE%	<b>1.20 %</b>	Antenna C1 MPE%	<b>1.20 %</b>
Antenna #:	<b>2</b>	Antenna #:	<b>2</b>	Antenna #:	<b>2</b>
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):	<b>166 feet</b>	Height (AGL):	<b>166 feet</b>	Height (AGL):	<b>166 feet</b>
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%	<b>0.87 %</b>	Antenna B2 MPE%	<b>0.87 %</b>	Antenna C2 MPE%	<b>0.87 %</b>

Site Composite MPE%	
Carrier	MPE%
SPRINT – Max per sector	<b>2.07 %</b>
Town	4.80 %
AT&T	1.30 %
Clearwire	0.07 %
Verizon Wireless	2.66 %
T-Mobile	1.90 %
<b>Site Total MPE %:</b>	<b>12.80 %</b>

SPRINT Sector A Total:	2.07 %
SPRINT Sector B Total:	2.07 %
SPRINT Sector C Total:	2.07 %
<b>Site Total:</b>	<b>12.80 %</b>

SPRINT _ Max Values per Frequency Band / Technology	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
Sprint 850 MHz CDMA	1	437.55	166	0.61	850 MHz	567	0.11%
Sprint 850 MHz LTE	2	437.55	166	1.23	850 MHz	567	0.22%
Sprint 1900 MHz (PCS) CDMA	5	622.47	166	4.37	1900 MHz (PCS)	1000	0.44%
Sprint 1900 MHz (PCS) LTE	2	1,556.18	166	4.37	1900 MHz (PCS)	1000	0.44%
Sprint 2500 MHz (BRS) LTE	8	778.09	166	8.74	2500 MHz (BRS)	1000	0.87%
<b>Total:</b>						<b>2.07%</b>	



## Summary

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

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

SPRINT Sector	Power Density Value (%)
Sector A:	2.07 %
Sector B:	2.07 %
Sector C:	2.07 %
SPRINT Maximum Total (per sector):	2.07 %
Site Total:	12.80 %
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **12.80 %** 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.