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

March 28, 2017

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

RE: **Notice of Exempt Modification for AT&T/ LTE 3C Crown Site BU: 829013**
AT&T Site ID: CT5258
467 South Quaker Lane, West Hartford, CT 06110
Latitude: 41° 44′ 55.59″/ Longitude: -72° 43′ 52.86″

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 110-foot level of the existing 120-foot monopole tower at 467 South Quaker Lane in West Hartford, CT. The tower is owned by Crown Castle. The property is owned by Church of St Mark Evangelist Corp. AT&T intends to replace three (3) RRU11/A2s with three (3) RRUS-32 B2, install six (6) tower mounted switches, six (6) TMAs, and three (3) BiasTs.

This facility was approved by the by the Building Department in the Town of West Hartford on June 5, 2000. This approval included the conditions that:

> "…the building is to be located the proper distance from all street lines, side yard lines, rear yard lines, and required distance from all other zones and is located in a zone in which this building and its use is allowed."

This modification complies with the aforementioned condition(s).

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 Honorable Shari Cantor, Mayor, Town of West Hartford, as well as the property owner, and Crown Castle is the tower owner.

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

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

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

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

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

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

For the foregoing reasons, 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

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:

The Honorable Shari Cantor, Mayor
Town of West Hartford
50 South Main Street
West Hartford, CT 06107

Planning & Zoning
Town of West Hartford
50 South Main Street
West Hartford, CT 06107

Church of St Mark Evangelist Corp
467 South Quaker Lane
West Hartford, CT 06110

APPLICATION FOR BUILDING/ZONING PERMIT

FINAL INSPECTIONS:
Building RPS 9/13/01
Plumbing
HVAC
Electric
Fire Prot
Affidavit
Approved
ParcelID-5096 1 471 0001

COMPLETED

(471,467)
0457 SOUTH QUAKER LANE
ADDRESS

LOT NO
7685
PERMIT #

DATE: 05/01/01

Est Cost	:$ 80000
Permit Fee	:$ 1215
State Fee	:$ 12.80
Occupancy Fee	:$ 0
Additional Fee	:$ 0
Work w/o Perm Fee	:$ 0

Revised Plans Rec'd:
T.C.O. Issue Date :
Approved:
Initials:
Total Fees:$ 1227.80

PROPERTY OWNER
THE EVANGELIST CORP CHURC
455 QUAKER LANE SOUTH
WEST HARTFORD, CT 06110 TEL:
FAX:

BUILDER
MARK GAUGER
VERIZON WIRELESS
20 ALEXANDER DRIVE
WALLINGFORD, CT 06492
LIC #:
EXPIR: / /
TEL:203-494-0023
FAX:203-294-7424

Zone Use Group Construction Type

Purpose of this Permit:
INSTALLING ANTENNAS(12)48"X5"WIDE 8" DEEP ON EXISTING TOUR AND AN EQUIPMENT FACILITY BUILDING TO BE 12X30 PER PLANS ~~AND SITE MAP~~ SUBMITTED

TO THE BUILDING DEPARTMENT, TOWN OF WEST HARTFORD,CT: I, the undersigned hereby agree to conform to all the requirements of the Laws of the State of Connecticut and the Ordinances of the Town of West Hartford and to notify the Building Inspector of any alteration in the plans or specifications of the building for which this permit is asked, and agree that this building is to be located the proper distance from all street lines, side-yard lines, rear yard lines, and required distances from all other zones and is located in a zone in which this building and its use is allowed.

Signed: Mark D. Gauger Property Owner Authorized Agent ✓

By placing my signature below I am hereby certifying my compliance with Public Act 95-277 concerning Workman's Compensation Insurance Coverage.

Signed: Mark D. Gauger

PLANS REVIEWED BY DATE 5-14-01
ZONING REVIEWED BY DATE 5-2-01
APPROVED BY DATE

SEWER SEPTIC
PUBLIC WATER PRIVATE WATER

al/Dshutes

APPLICATION FOR BUILDING/ZONING PERMIT

FINAL INSPECTIONS:
Building 10/26/00 CP
Plumbing
HVAC
Electric 10/26/00 CP
Fire Prot
Affidavit
Approved
Parcel ID-5096 1 471 0001

COMPLETED

DATE: 04/27/00

0471 SOUTH QUAKER LANE
ADDRESS

LOT NO

74575
PERMIT #

Est Cost	:$ 75000
Permit Fee	:$ 1140
State Fee	:$ 12.00
Occupancy Fee	:$ 0
Additional Fee	:$ 0
Work w/o Perm Fee	:$ 0
Total Fees	:$ 1152.00

Revised Plans Rec'd: Approved:
T.C.O. Issue Date : Initials:

PROPERTY OWNER
THE EVANGELIST CORP CHURC
455 QUAKER LANE SOUTH
WEST HARTFORD, CT 06110 TEL:
FAX:

BUILDER
JOSEPH F. RUSSO
294 BATTIS ROAD
HANDEM, CT 06514
LIC #:
EXPIR: / /
TEL:203-248-8231
FAX:same

Zone Use Group Construction Type

Purpose of this Permit:
ERECTING MONOPOLE, ANTENNA, FENCING AND CONCRETE PADS PER SITE PLAN AND SKETCH SUBMITTED

SUP #893

TO THE BUILDING DEPARTMENT, TOWN OF WEST HARTFORD,CT: I, the undersigned hereby agree to conform to all the requirements of the Laws of the State of Connecticut and the Ordinances of the Town of West Hartford and to notify the Building Inspector of any alteration in the plans or specifications of the building for which this permit is asked, and agree that this building is to be located the proper distance from all street lines, side yard lines, rear yard lines, and required distances from all other zones and is located in a zone in which this building and its use is allowed.

Signed: X Joseph F. Russo Agent OLI Property Owner Authorized Agent

By placing my signature below I am hereby certifying my compliance with Public Act 95-277 concerning Workman's Compensation Insurance Coverage.

Signed: X Joseph F. Russo - Agent OLI

PLANS REVIEWED BY CP DATE 6/5/00 Sent to Zoning On:
ZONING REVIEWED BY EVP DATE 6/7
APPROVED BY DATE Returned from Zoning On:

SEWER SEPTIC
PUBLIC WATER PRIVATE WATER

471 SOUTH QUAKER LANE

Location	471 SOUTH QUAKER LANE	**Mblu**	G11/ 5096/ 471/ /
Parcel ID	5096 1 471 0002	**Owner**	CHURCH OF ST MARK THE EVANGELIST CORP
Assessment	$266,000	**Appraisal**	$380,000
Vision Id #	18999	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$0	$380,000	$380,000
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$0	$266,000	$266,000

Owner of Record

Owner	CHURCH OF ST MARK THE EVANGELIST CORP	**Sale Price**	$0
Co-Owner		**Certificate**	1
Address	471 SOUTH QUAKER LANE WEST HARTFORD, CT 06110	**Book & Page**	215/ 42
		Sale Date	
		Instrument	U

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
CHURCH OF ST MARK THE EVANGELIST CORP	$0	1	215/ 42	U	

Building Information

Building 1 : Section 1

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

Building Attributes	
Field	**Description**
Style	Vacant Land

Building Photo

Model	
Stories	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
# of Bedrooms	
Full Bthrms:	
Half Baths:	
Extra Fixtures	
Total Rooms:	
Bath Style:	
Kitchen Style:	
Extra Kitchens	
Fireplaces	
Prefab Fpl(s)	
Bsmt Egress	
Foundation	
Bsmt Garage(s)	
Fin Bsmt/RRm	
Bsmt Rec Rm	
FBLA	
Attic Access	
Dormer LF	

(http://images.vgsi.com/photos/WestHartfordCTPhotos//default.j

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	200
Description	Comm Land

Land Line Valuation

Size (Acres)	0.20
Frontage	

Zone	R-6	**Depth**	
Neighborhood		**Assessed Value**	$266,000
Alt Land Appr	No	**Appraised Value**	$380,000
Category			

Outbuildings

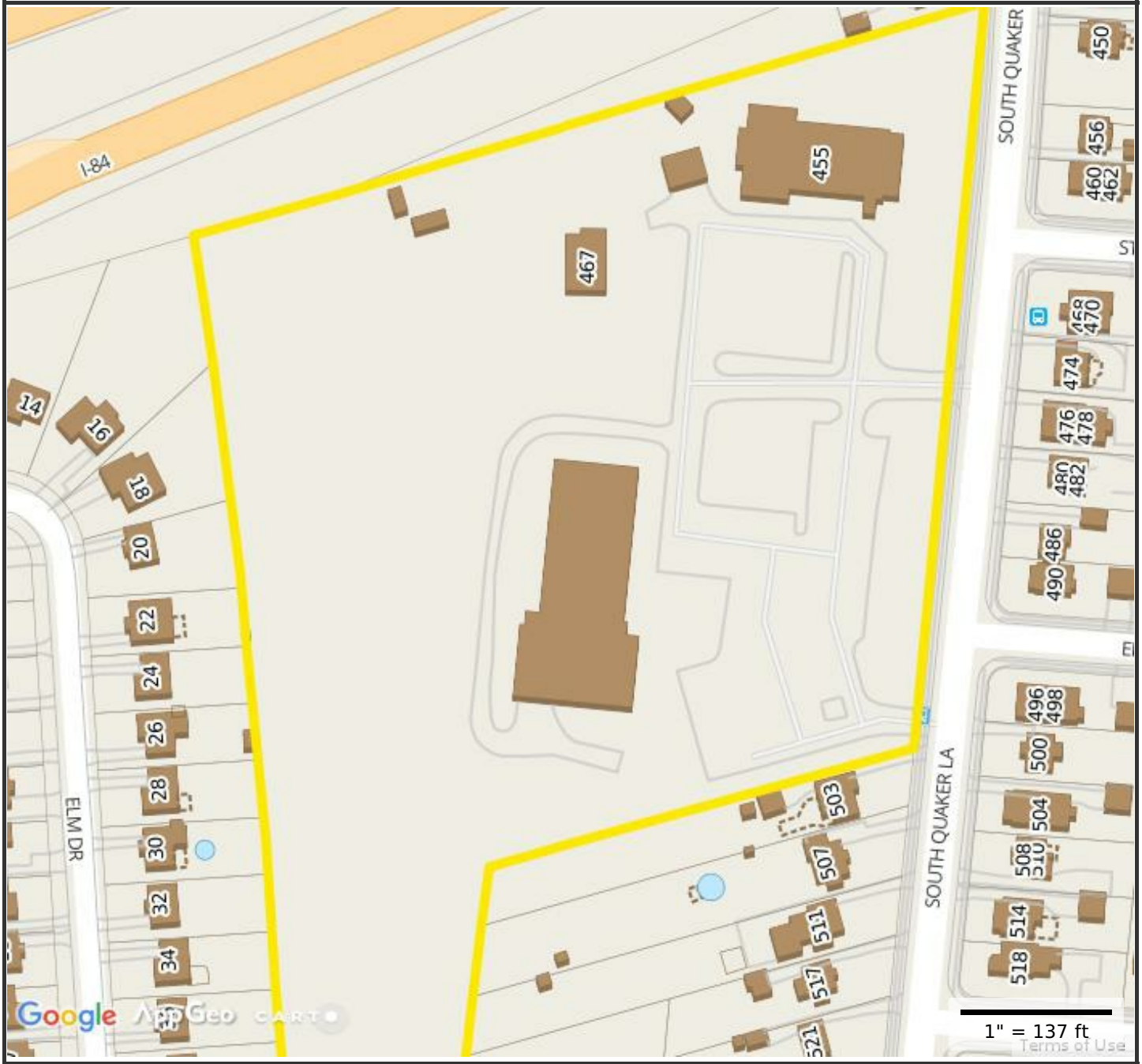
Outbuildings	Legend
No Data for Outbuildings	

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$0	$380,000	$380,000
2015	$0	$151,900	$151,900
2014	$0	$151,900	$151,900

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$0	$266,000	$266,000
2015	$0	$106,330	$106,330
2014	$0	$106,330	$106,330

467 South Quaker



Property Information

Property ID	5096 1 471 0002
Location	471 SOUTH QUAKER LANE
Owner	CHURCH OF ST MARK THE EVANGELIST CORP

TOWN OF WEST HARTFORD

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of West Hartford, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Parcels updated 5/1/2016
Properties updated Daily

WIRELESS COMMUNICATIONS FACILITY
CT5258 - LTE BWE
WEST HARTFORD
CROWN CASTLE SITE NO.: 829013
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE, INCLUDING THE TIA-222 REVISION "G" STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES, 2016 CONNECTICUT FIRE SAFETY CODE AND, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. THE COMPOUND, TOWER, PRIMARY GROUND RING, ELECTRICAL SERVICE TO THE METER BANK AND TELEPHONE SERVICE TO THE DEMARCATION POINT ARE PROVIDED BY SITE OWNER. AS BUILT FIELD CONDITIONS REGARDING THESE ITEMS SHALL BE CONFIRMED BY THE CONTRACTOR. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
3. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
4. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
5. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
6. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
7. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
8. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING BUILDING'S/PROPERTY'S OPERATIONS, COORDINATE WORK WITH BUILDING/PROPERTY OWNER.
10. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
11. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
12. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
13. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE AT&T CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
15. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
16. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
17. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
19. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
20. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED PRIOR TO ANY EXCAVATION WORK. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
21. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

FROM: 500 ENTERPRISE DRIVE, ROCKY HILL, CONNECTICUT

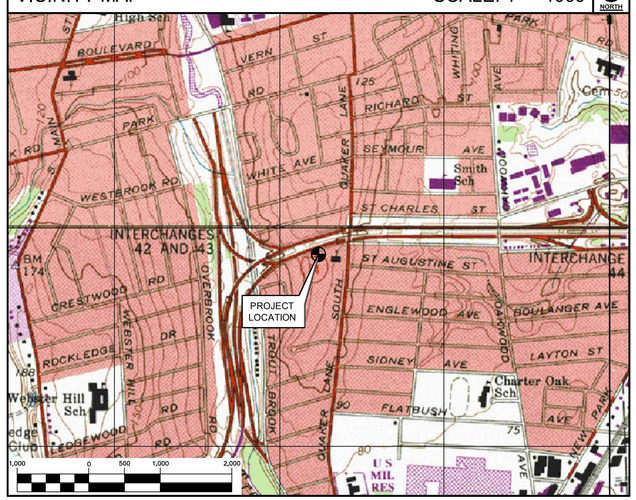
TO: 467 SOUTH QUAKER LANE, WEST HARTFORD, CONNECTICUT

1.	HEAD NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD	0.30 MI
2.	TURN LEFT ONTO CAPITAL BLVD	0.20 MI
3.	TURN LEFT ONTO WEST ST	0.30 MI
4.	TURN LEFT TO MERGE ONTO I-91 S TOWARD NEW HAVEN	1.40 MI
5.	TAKE EXIT 22N TO MERGE ONTO CT-9 N TOWARD NEW BRITAIN	11.10 MI
6.	TAKE EXIT 31 TO MERGE ONTO I-84 E TOWARD HARTFORD	3.60 MI
7.	TAKE EXIT 44 FOR PROSPECT AVE	0.20 MI
8.	TURN SHARP RIGHT ONTO CAYA AVE	0.20 MI
9.	TURN RIGHT ONTO OAKWOOD AVE	112 FT
10.	TURN LEFT ONTO WILFRED ST	0.40 MI
11.	TURN LEFT ONTO QUAKER LN S	0.10 MI

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
   - A. REMOVE AND REPLACE EXISTING LTE PCS RRUS-11, (1) PER SECTOR.
   - B. INSTALL (3) NEW RRUS-32+B2 BEHIND EXISTING POSITION 4 ANTENNAS.
   - C. INSTALL (1) XMU IN EXISTING EQUIPMENT RACK IN EXISTING EQUIPMENT SHELTER.

PROJECT INFORMATION

AT&T SITE NUMBER:	CT5258
AT&T SITE NAME:	WEST HARTFORD
SITE ADDRESS:	CROWN CASTLE SITE NO.: 829013 467 SOUTH QUAKER LANE WEST HARTFORD, CT 06110
LESSEE/APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-44'-55.61" N LONGITUDE: 72°-43'-52.81" W GROUND ELEVATION: ±118' AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	NOTES, SPECIFICATIONS AND DETAILS	0
C-1	PLANS AND ELEVATION	0
C-2	LTE BWE EQUIPMENT PLANS & DETAILS	0
E-1	TYPICAL ELECTRICAL DETAILS & NOTES	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	03/01/17	LGL	CAG	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT · LICENSED PROFESSIONAL ENGINEER

at&t

EMPIRE telecom

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY

WEST HARTFORD
CT5258 - LTE BWE
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

DATE: 02/20/17
SCALE: AS NOTED
JOB NO. 17004.16

TITLE SHEET

T-1

Sheet No. 1 of 5

NOTES AND SPECIFICATIONS

DESIGN BASIS:

GOVERNING CODE: 2012 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2016 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

- WIND LOAD: PER TIA 222 G (ANTENNA MOUNTS): 90–105 MPH (3 SECOND GUST)
- RISK CATEGORY: II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 97 MPH (Vasd) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7–10) PER 2012 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7–10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF–SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON EVERSOURCE OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)–––ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)–––ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)–––ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)–––ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE–––ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS–––ASTM A325–N
   G. U–BOLTS–––ASTM A36
   H. ANCHOR RODS–––ASTM F 1554
   I. WELDING ELECTRODE–––ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON–GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT–DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

PAINT NOTES

PAINTING SCHEDULE:

1. ANTENNA PANELS:

   A. SHERWIN WILLIAMS POLANE–B
   B. COLOR TO BE MATCHED WITH EXISTING TOWER STRUCTURE.

2. COAXIAL CABLES:

   A. ONE COAT OF DTM BONDING PRIMER (2–5 MILS. DRY FINISH)
   B. TWO COATS OF DTM ACRYLIC PRIMER/FINISH (2.5–5 MILS. DRY FINISH)
   C. COLOR TO BE FIELD MATCHED WITH EXISTING STRUCTURE.

EXAMINATION AND PREPARATION:

1. DO NOT APPLY PAINT IN SNOW, RAIN, FOG OR MIST OR WHEN RELATIVE HUMIDITY EXCEEDS 85%. DO NOT APPLY PAINT TO DAMP OR WET SURFACES.
2. VERIFY THAT SUBSTRATE CONDITIONS ARE READY TO RECEIVE WORK. EXAMINE SURFACE SCHEDULED TO BE FINISHED PRIOR TO COMMENCEMENT OF WORK. REPORT ANY CONDITION THAT MAY POTENTIALLY AFFECT PROPER APPLICATION.
3. TEST SHOP APPLIED PRIMER FOR COMPATIBILITY WITH SUBSEQUENT COVER MATERIALS.
4. PERFORM PREPARATION AND CLEANING PROCEDURE IN STRICT ACCORDANCE WITH COATING MANUFACTURER'S INSTRUCTIONS FOR EACH SUBSTRATE CONDITION.
5. CORRECT DEFECTS AND CLEAN SURFACES WHICH AFFECT WORK OF THIS SECTION. REMOVE EXISTING COATINGS THAT EXHIBIT LOOSE SURFACE DEFECTS.
6. IMPERVIOUS SURFACE: REMOVE MILDEW BY SCRUBBING WITH SOLUTION OF TRI–SODIUM PHOSPHATE AND BLEACH. RINSE WITH CLEAN WATER AND ALLOW SURFACE TO DRY.
7. ALUMINUM SURFACE SCHEDULED FOR PAINT FINISH: REMOVE SURFACE CONTAMINATION BY STEAM OR HIGH–PRESSURE WATER. REMOVE OXIDATION WITH ACID ETCH AND SOLVENT WASHING. APPLY ETCHING PRIMER IMMEDIATELY FOLLOWING CLEANING.
8. FERROUS METALS: CLEAN UNGALVANIZED FERROUS METAL SURFACES THAT HAVE NOT BEEN SHOP COATED; REMOVE OIL, GREASE, DIRT, LOOSE MILL SCALE, AND OTHER FOREIGN SUBSTANCES. USE SOLVENT OR MECHANICAL CLEANING METHODS THAT COMPLY WITH THE STEEL STRUCTURES PAINTING COUNCIL'S (SSPC) RECOMMENDATIONS. TOUCH UP BARE AREAS AND SHOP APPLIED PRIME COATS THAT HAVE BEEN DAMAGED. WIRE BRUSH, CLEAN WITH SOLVENTS RECOMMENDED BY PAINT MANUFACTURER, AND TOUCH UP WITH THE SAME PRIMER AS THE SHOP COAT.
9. GALVANIZED SURFACES: CLEAN GALVANIZED SURFACES WITH NON–PETROLEUM–BASED SOLVENTS SO SURFACE IS FREE OF OIL AND SURFACE CONTAMINANTS. REMOVE PRETREATMENT FROM GALVANIZED SHEET METAL FABRICATED FROM COIL STOCK BY MECHANICAL METHODS.
10. ANTENNA PANELS: REMOVE ALL OIL, DUST, GREASE, DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION. PANELS MUST BE WIPED WITH METHYL ETHYL KETONE (MEK).
11. COAXIAL CABLES: REMOVE ALL OIL, DUST, GREASE. DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION.

CLEANING:

1. COLLECT WASTE MATERIAL, WHICH MAY CONSTITUTE A FIRE HAZARD, PLACE IN CLOSED METAL CONTAINERS AND REMOVE DAILY FROM SITE.

APPLICATION:

1. APPLY PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. DO NOT APPLY FINISHES TO SURFACES THAT ARE NOT DRY.
3. APPLY EACH COAT TO UNIFORM FINISH.
4. APPLY EACH COAT OF PAINT SLIGHTLY DARKER THAN PRECEDING COAT UNLESS OTHERWISE APPROVED.
5. SAND METAL LIGHTLY BETWEEN COATS TO ACHIEVE REQUIRED FINISH.
6. VACUUM CLEAN SURFACES FREE OF LOOSE PARTICLES. USE TACK CLOTH JUST PRIOR TO APPLYING NEXT COAT.
7. ALLOW APPLIED COAT TO DRY BEFORE NEXT COAT IS APPLIED.

COMPLETED WORK:

1. SAMPLES: PREPARE 24" X 24" SAMPLE AREA FOR REVIEW.
2. MATCH APPROVED SAMPLES FOR COLOR, TEXTURE AND COVERAGE. REMOVE REFINISH OR REPAINT WORK NOT IN COMPLIANCE WITH SPECIFIED REQUIREMENTS.

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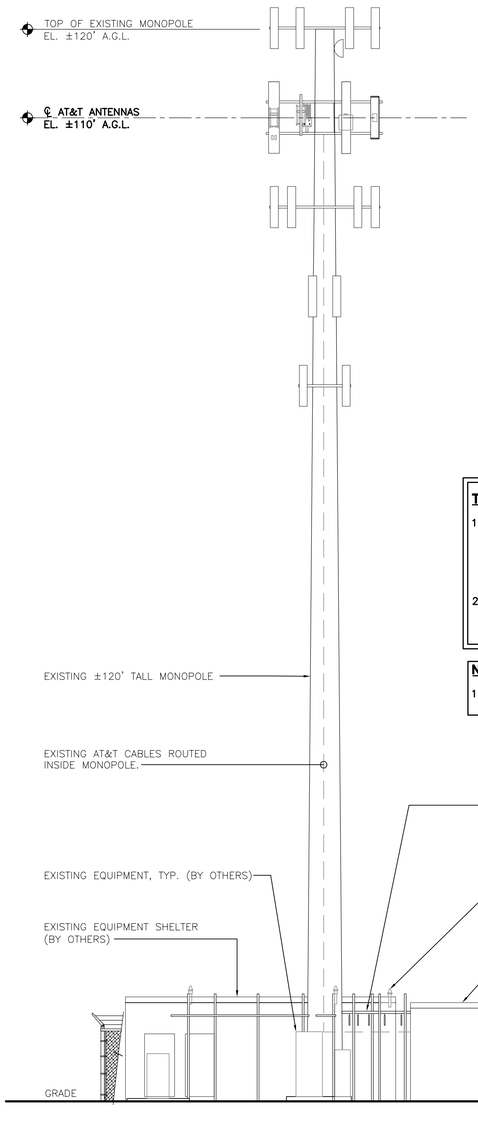
CT5258 - LTE BWE

467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110

DATE:	02/20/17
SCALE:	AS NOTED
JOB NO.	17004.16

NOTES, SPECIFICATIONS AND DETAILS

N–1



TOWER STRUCTURAL NOTES:

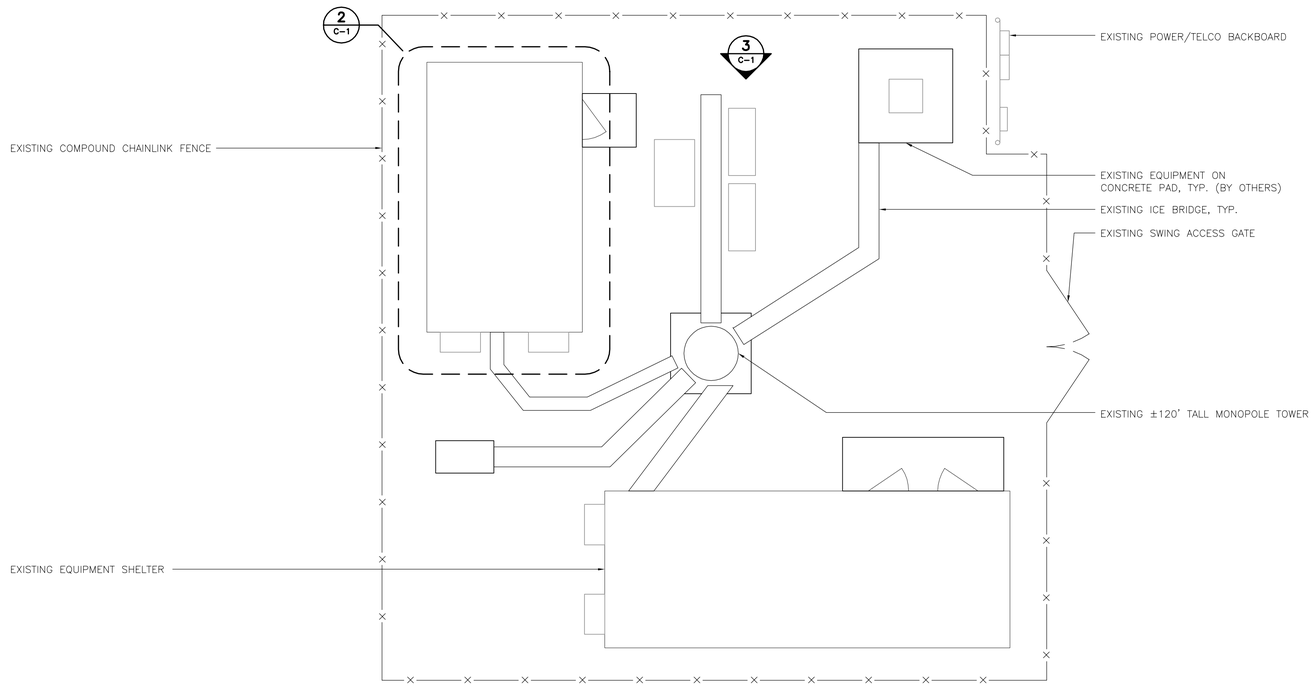
1. TOWER STRUCTURAL ANALYSIS SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT TO BE PROVIDED PRIOR TO INSTALLATION OF THE ADDITIONAL TOWER LOADING DEPICTED HEREIN.
2. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE, INC. AND FINAL AT&T RF DATA SHEET.

NOTES:

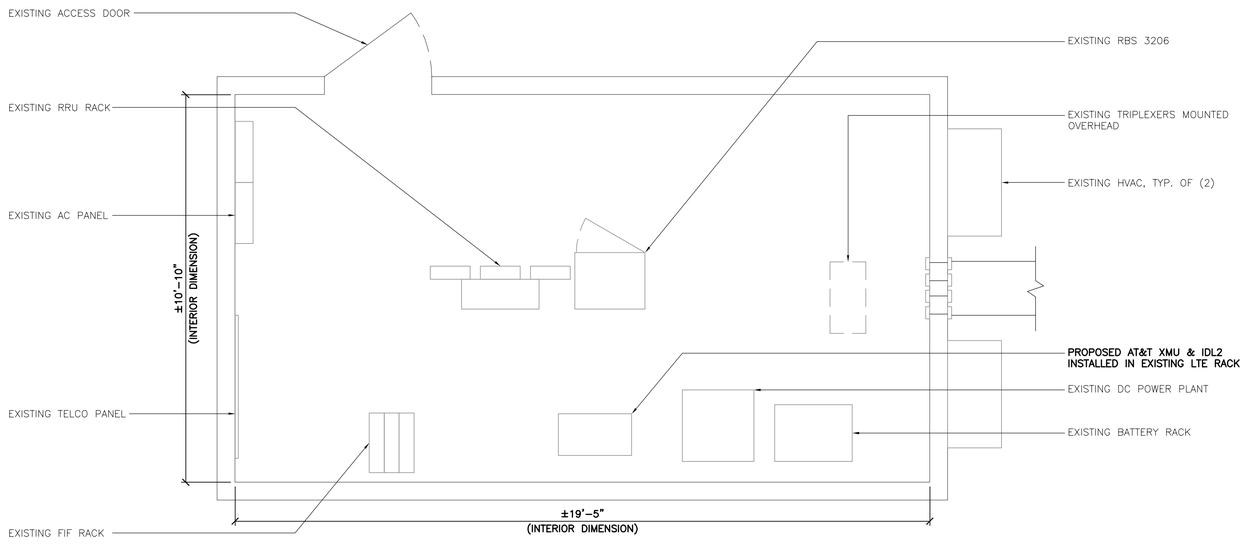
1. A.G.L. = ABOVE GRADE LEVEL

3 / C-1 **SOUTH ELEVATION**
SCALE: 1/8" = 1'-0"

GRAPHIC SCALE
8 0 4 8 16 32
(IN FEET)
1 inch = 8 ft.



1 / C-1 **COMPOUND PLAN**
SCALE: 3/16" = 1'-0"
TRUE NORTH



2 / C-1 **EQUIPMENT LAYOUT PLAN**
SCALE: 1/2" = 1'-0"
TRUE NORTH

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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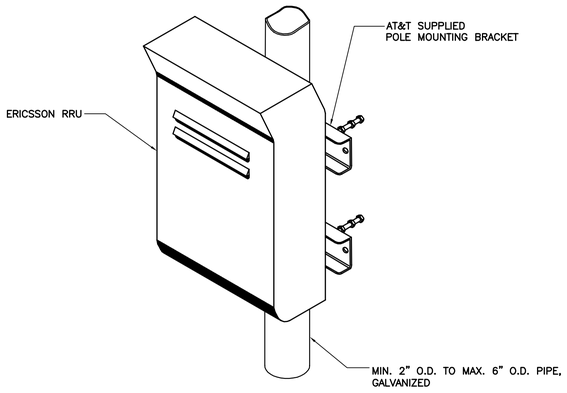
PLANS AND ELEVATION

C-1

Sheet No. 3 of 5



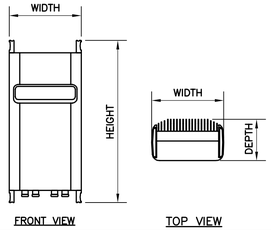
ISOMETRIC VIEW

NOTES:

1. AT&T SHALL SUPPLY RRU, AND RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL INSTALLS RRU AND MAKES CABLE TERMINATIONS.
2. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

5 / C-2 TYPICAL RRUS MOUNTING DETAILS

SCALE: NTS



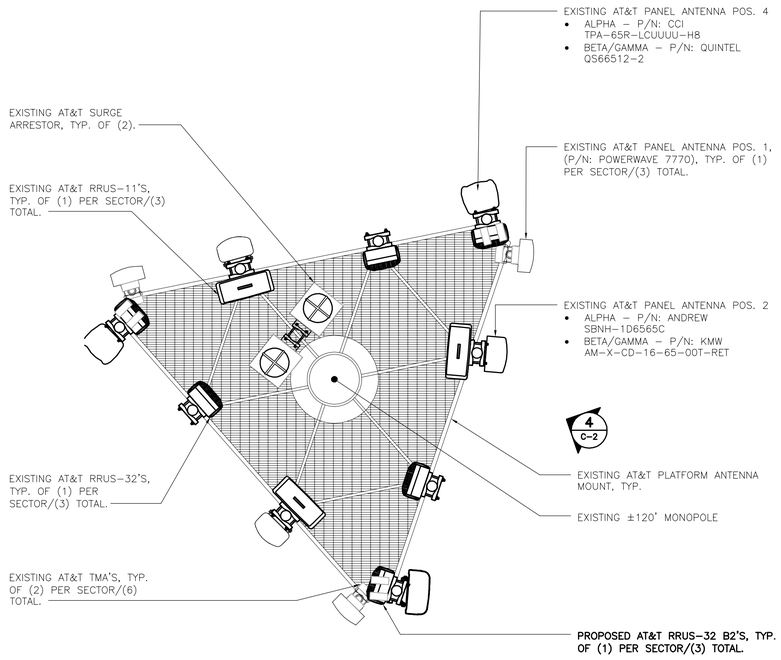
FRONT VIEW TOP VIEW

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS-32 B2	27.17"H x 12.05"W x 7.01"D	52.91 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.

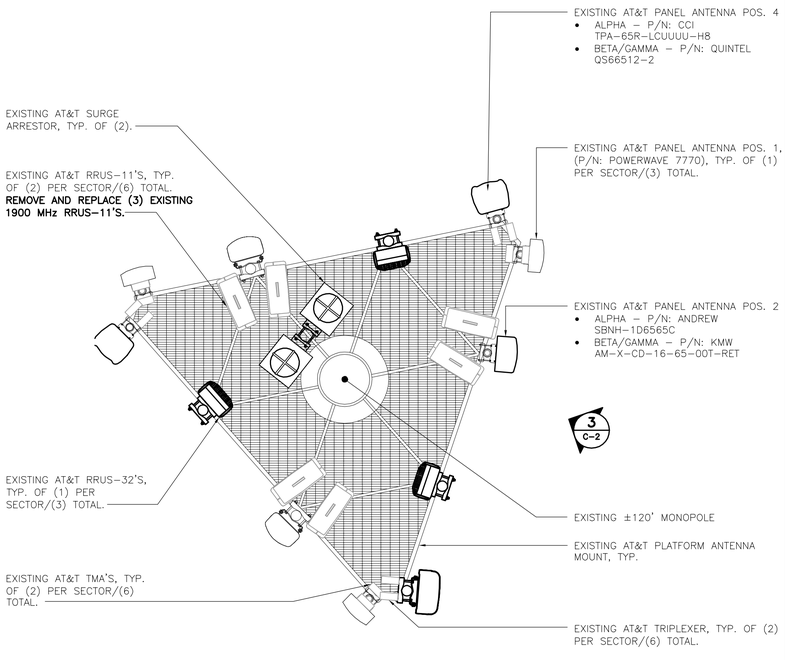
6 / C-2 ERICSSON RRUS 32 B2 DETAIL

SCALE: 1" = 1'-0"



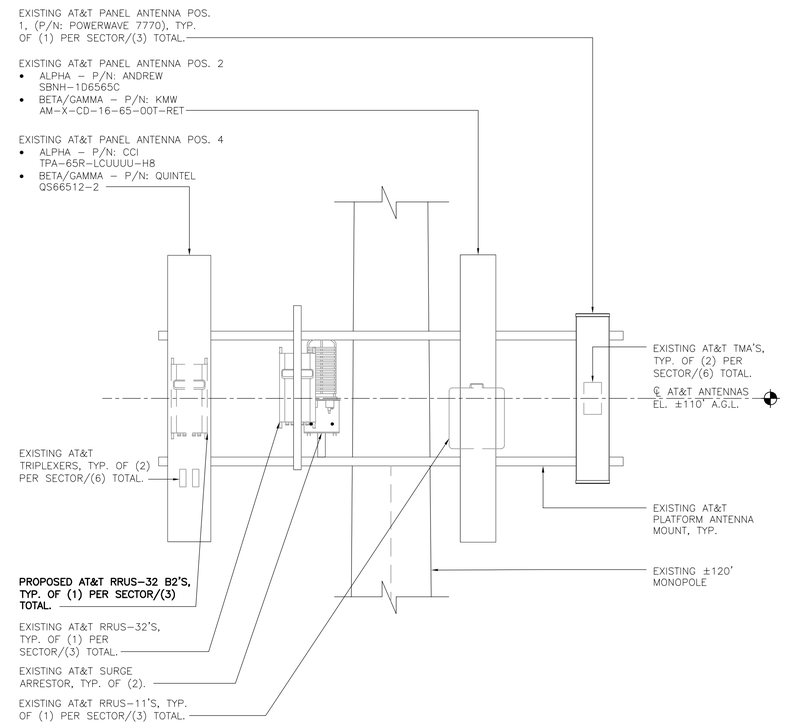
2 / C-2 PROPOSED ANTENNA PLAN

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



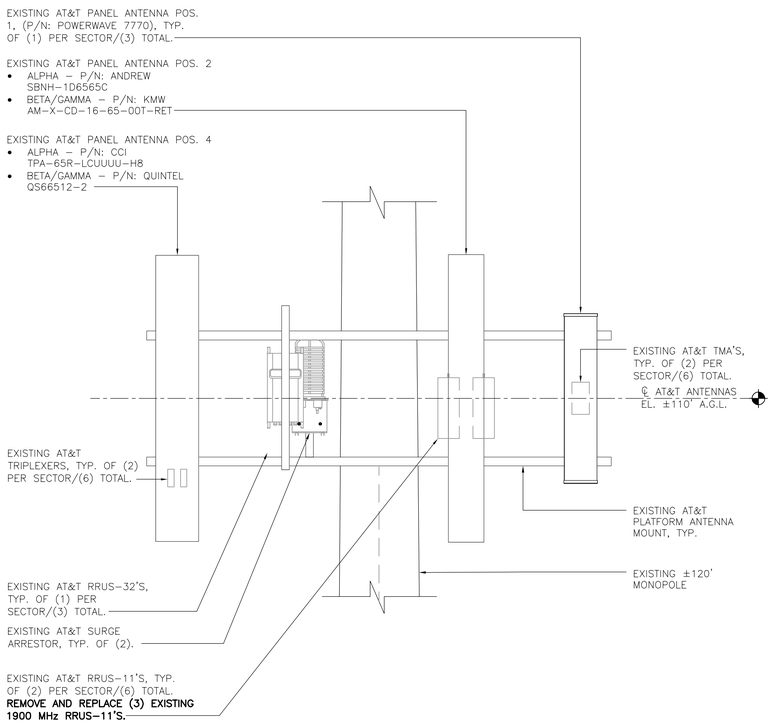
1 / C-2 EXISTING ANTENNA PLAN

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



4 / C-2 PROPOSED ANTENNA ELEVATION

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



3 / C-2 EXISTING ANTENNA ELEVATION

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

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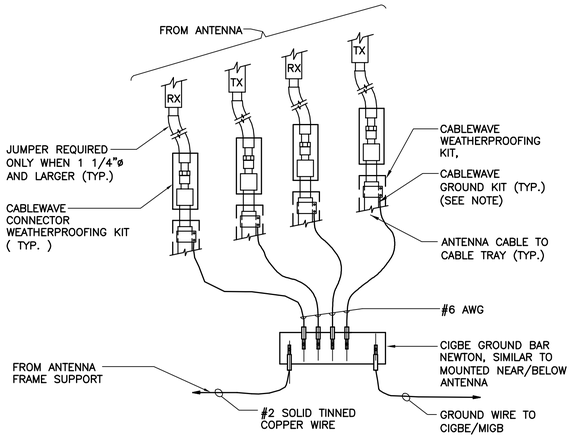
LTE BWE
EQUIPMENT PLANS
& DETAILS

C-2

Sheet No. 4 of 5



NOTE:

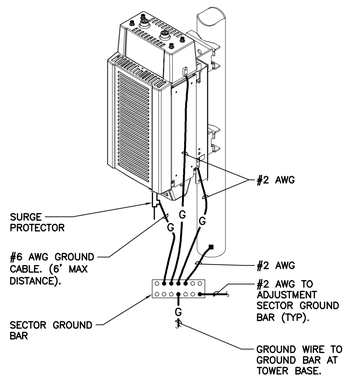
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE

2 E-1 CONNECTION OF GROUND WIRES TO GROUND BAR

NOT TO SCALE

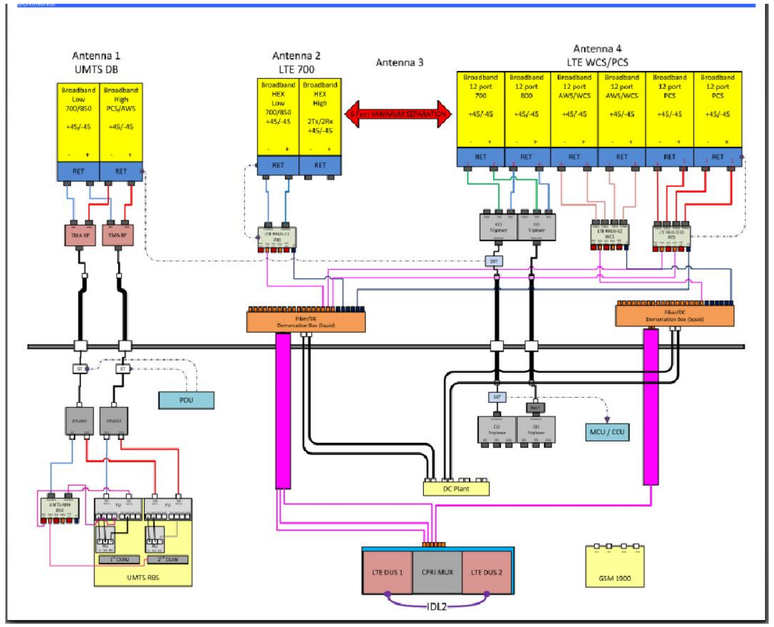
EACH RRH CABINET SHALL BE GROUNDED IN THE FOLLOWING MANNER:

1. AT TOP OF THE CABINET
2. AT RIGHT SIDE OF THE CABINET.



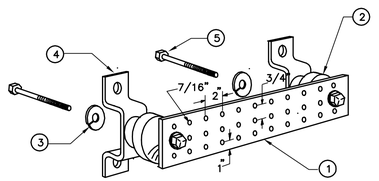
1 E-1 RRU POLE MOUNT GROUNDING

NOT TO SCALE



4 E-1 PLUMBING DIAGRAM

NOT TO SCALE



LEGEND

1. TINNED COPPER GROUND BAR, 1/4"x 4"x 20", NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG .
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 2. 3061-4.
3. 3. 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. 4. CAT NO. A-6056.
5. STAINLESS STEEL SECURITY SCREWS.

3 E-1 GROUND BAR DETAIL

NOT TO SCALE

ELECTRICAL NOTES

1. PRIOR TO START OF CONSTRUCTION CONTRACTOR SHALL COORDINATE WITH OWNER FOR ALL CONSTRUCTION STANDARDS AND SPECIFICATIONS, AND ALL MANUFACTURER DOCUMENTATION FOR ALL EQUIPMENT TO BE INSTALLED.
2. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH LOCAL BUILDING CODE, NATIONAL ELECTRIC CODE, OWNER AND MANUFACTURER'S SPECIFICATIONS.
3. CONNECT ALL NEW EQUIPMENT TO EXISTING TELCO AS REQUIRED BY MANUFACTURER.
4. MAINTAIN ALL CLEARANCES REQUIRED BY NEC AND EQUIPMENT MANUFACTURER.
5. PRIOR TO INSTALLATION CONTRACTOR SHALL MEASURE EXISTING ELECTRICAL LOAD AND VERIFY EXISTING AVAILABLE CAPACITY FOR PROPOSED INSTALLATION. IF INADEQUATE CAPACITY IS AVAILABLE, CONTRACTOR SHALL COORDINATE WITH LOCAL ELECTRIC UTILITY COMPANY TO UPGRADE EXISTING ELECTRIC SERVICE.
6. CONTRACTOR SHALL INSPECT EXISTING GROUNDING AND LIGHTNING PROTECTION SYSTEM AND ENSURE THAT IT IS IN COMPLIANCE WITH NEC, AND SITE OWNER'S SPECIFICATIONS. THE RESULTS OF THIS INSPECTION SHALL BE PRESENTED TO OWNERS REPRESENTATIVE, AND ANY DEFICIENCIES SHALL BE CORRECTED.
7. ALL TRANSMISSION TOWER SITES CONTAIN AN EXTENSIVE BURIED GROUNDING SYSTEM. ALL GROUNDING WORK MUST BE COORDINATED WITH, AND APPROVED BY, THE TOWER OWNER'S SITE REPRESENTATIVE. ALL OF THE TOWER OWNER'S SPECIFICATIONS MUST BE STRICTLY FOLLOWED.
8. PROVIDE AND INSTALL GROUND KITS FOR ALL NEW COAXIAL CABLES AND BOND TO EXISTING OWNERS GROUNDING SYSTEM PER OWNERS SPECIFICATIONS AND NEC.
9. ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION:
10. MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.
11. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.
12. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNER'S REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES AS MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR SCHEDULING OF ALL INSPECTIONS AS MAY BE REQUIRED BY THE LOCAL AUTHORITY.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE SITE AND/OR BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.
15. THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.
16. DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.
17. ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.
18. GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.
19. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122. (MIN. #12 AWG).
20. CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 5 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

A. CONTRACTOR SHALL RETAIN THE SERVICES OF A LOCAL INDEPENDENT ELECTRICAL TESTING FIRM (WITH MINIMUM 5 YEARS COMMERCIAL EXPERIENCE IN THE ELECTRICAL TESTING INDUSTRY) AS SPECIFIED BY OWNER TO PERFORM:

   TEST 1: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM.

   THE TESTING FIRM SHALL INCLUDE THE FOLLOWING INFORMATION WITH THE REPORT:

   1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.
   2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.
   3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

B. TESTING SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNERS CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.

C. THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM REPORT/ANALYSIS TO ENGINEER A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE JOB TURNOVER.

D. CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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TYPICAL ELECTRICAL NOTES & DETAILS

E-1

Sheet No. 7 of 5

Date: **February 22, 2017**

Charles McGuirt
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6607

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351
crown@tepgroup.net

Subject: Structural Analysis Report

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT5258
	Carrier Site Name:	West Hartford
Crown Castle Designation:	**Crown Castle BU Number:**	829013
	Crown Castle Site Name:	West Hartford/I-84/X43
	Crown Castle JDE Job Number:	418721
	Crown Castle Work Order Number:	1362402
	Crown Castle Application Number:	376733 Rev. 0
Engineering Firm Designation:	**TEP Project Number:**	25680.108631
Site Data:	**467 South Quaker Lane (Church of St. Mark)** **West Hartford, Hartford County, CT 06110** **Latitude *41° 44' 55.59"*, Longitude *-72° 43' 52.86"*** **119 Foot - Monopole Tower**	

Dear Charles McGuirt,

Tower Engineering Professionals 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 1001401, in accordance with application 376733, 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 1609.3.1 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C and Risk Category II were used in this analysis.

All modifications and equipment proposed in this report shall be installed in accordance with the appurtenances listed in Tables 1 and 2 and the attached drawing for the determined available structural capacity to be effective.

We at *Tower Engineering Professionals* 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: Travis L. Infante, E.I. / TML

Respectfully submitted by:

Graham M. Andres, P.E.

STATE OF CONNECTICUT GRAHAM M. ANDRES 29538 LICENSED PROFESSIONAL ENGINEER 2/22/17

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1) INTRODUCTION

This tower is a 119-ft monopole tower designed by Pirod, Inc. in May of 2000. The tower was originally designed for a wind speed of 80 mph per EIA/TIA-222-F for the appurtenances listed in Table 3. The tower has been modified multiple times to accommodate additional loading. TEP visited the site in July of 2014 to perform a Rebar Mapping. All information provided to TEP was assumed to be accurate and complete.

2) ANALYSIS CRITERIA

The analysis has been performed in accordance with the ANSI/TIA-222-G-2-2009 Structural Standard for Antenna Supporting Structures and Antennas – Addendum 2 using a nominal 3-second gust wind speed of 97 with no ice, 40 mph with 1.0 inch ice thickness, and 60 mph under service loads with the following design criteria:

Type of Analysis: **Rigorous Structural Analysis**
Classification of Structure: **Class II**
Exposure Category: **Exposure C**
Topographic Category: **Category 1**
Earthquake Category: **Not Considered**
Earthquake effects may be ignored per this standard for site locations where Ss does not exceed 1.0. (Hartford County Ss = 0.181).

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
110.0	110.0	2	Quintel Technology	QS66512-3 w/ Mount Pipe	1 2	3/8 3/4	1
		1	CCI Antennas	TPA-65R-LCUUUU-H8 w/ Mount Pipe			
		6	CCI Antennas	TPX-070821			
		3	Ericsson	RRUS 32			
		1	Raycap	DC6-48-60-18-8F			
		3	Ericsson	RRUS 32 B2			
		3	Powerwave Technologies	1001983			
		6	Powerwave Technologies	7020.00			
		6	Powerwave Technologies	LGP21401			

Notes:
1) See “Appendix B Base Level Drawing” for assumed feed line configuration.

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
120.0	120.0	3	Ericsson	AIR -32 B2A/B66AA w/ Mount Pipe	1	7/8	1
		3	Ericsson	AIR 21 B2A B4P w/ Mount Pipe	13	1-5/8	2
		3	Commscope	LNX-6515DS-VTM w/ Mount Pipe			
		3	Ericsson	KRY 112 144/1			
		3	Ericsson	RRUS 11 B12			
		1	Tower Mounts	Platform Mount [LP 403-1]			
115.0	115.0	1	Andrew	VHLP2-18	-	-	2
		1	Tower Mounts	Side Arm Mount [SO 102-3]			
110.0	110.0	3	Powerwave Technologies	7770.00 w/ Mount Pipe	-	-	3
		3	Ericsson	RRUS 11			
		6	Powerwave Technologies	LGP21901			
		3	Powerwave Technologies	7770.00 w/ Mount Pipe	1 2 12	3/8 7/16 1-5/8	2
		1	Andrew	SBNH-1D6565C w/ Mount Pipe			
		2	KMW Communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	Ericsson	RRUS 11			
		1	Raycap	DC6-48-60-18-8F			
		1	Tower Mounts	Miscellaneous [NA 507-1]			
		1	Tower Mounts	Platform Mount [LP 712-1]			
100.0	100.0	6	Commscope	SBNHH-1D65B w/ Mount Pipe	2	1-5/8	1
		3	Alcatel Lucent	RRH2x60-700			
		3	Alcatel Lucent	RRH2x60-AWS			
		3	Alcatel Lucent	RRH2X60-PCS			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			
		2	Andrew	LNX-6514DS-T4M w/ Mount Pipe	12	1-5/8	2
		1	Antel	BXA-70063-6CF-EDIN-0 w/ Mount Pipe			
		3	Amphenol	BXA-80063-4BF-EDIN-X w/ Mount Pipe			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			
		1	Tower Mounts	Platform Mount [LP 403-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
90.0	90.0	3	Kathrein	742 213 w/ Mount Pipe	6	1-5/8	2
80.0	83.0	1	Andrew	VHLP2-23	3 1 3 4	1/4 5/16 5/8 1/2	2
		1	Clearwire	CW Junction Box			
	81.0	3	Argus Technologies	LLPX310R w/ Mount Pipe			
		3	Samsung Telecommunications	WIMAX DAP Head			
	80.0	1	Tower Mounts	Side Arm Mount [SO 101-3]			

Notes:
1) Reserved equipment
2) Existing equipment
3) Existing equipment to be removed; not 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)
120.0	120.0	12	Generic	1'x4' Panels	12	1-5/8
110.0	110.0	12	Generic	1'x4' Panels	12	1-5/8
100.0	100.0	12	Generic	1'x4' Panels	12	1-5/8

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Supplemental Geotechnical Report	Tower Engineering Professionals / Dr. Clarence Welti, P.E., P.C.	3636697	CCISites
Tower Foundation Drawings	Pirod, Inc.	3636698	CCISites
Rebar Mapping	Tower Engineering Professionals	3636698	CCISites
Tower Manufacturer Drawings	Pirod, Inc.	3525378	CCISites
Tower Reinforcement Drawings	Natcomm Consulting Engineers, Inc.	3525386	CCISites
Post Modification Inspection	Natcomm Consulting Engineers, Inc.	3974228	CCISites
Tower Reinforcement Drawings	Tower Engineering Professionals	5650111	CCISites
Post Modification Inspection	Sinnott Gering and Schmitt Towers, Inc.	5852136	CCISites

3.1) Analysis Method

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

3.2) Assumptions

1) The tower and foundation were built in accordance with the manufacturer's specifications.
2) The tower and foundation 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 "Appendix B – Base Level Drawing".
4) All tower components are in sufficient condition to carry their full design capacity.
5) Serviceability with respect to antenna twist, tilt, roll, or lateral translation, is not checked and is left to the carrier or tower owner to ensure conformance.
6) All antenna mounts and mounting hardware are structurally sufficient to carry the full design capacity requirements of appurtenance wind area and weight as provided by the original manufacturer specifications. It is the carrier's responsibility to ensure compliance to the structural limitations of the existing and/or proposed antenna mounts. TEP did not analyze antennas supporting mounts as part of this structural analysis report.

This analysis may be affected if any assumptions are not valid or have been made in error. Tower Engineering Professionals 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)	ΦP_{allow} (K)	% Capacity	Pass / Fail
L1	119.083 - 101.083	Pole	TP26x21.61x0.25	1	-8	1476	19.0	Pass
L2	101.083 - 66.5	Pole	TP34.063x24.789x0.313	2	-18	2388	52.3	Pass
L3	66.5 - 32.8333	Pole	TP41.75x32.49x0.375	3	-26	3493	58.1	Pass
L4	32.8333 - 0	Pole	TP49.063x39.848x0.375	4	-38	3984	68.6	Pass
							Summary	
						Pole (L4)	68.6	Pass
						RATING =	**68.6**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	-	78.0	Pass
1	Base Plate	-	63.3	Pass
1	Base Foundation Soil Interaction	-	71.6	Pass
1	Base Foundation Structural	-	65.6	Pass
1	Rock Anchors	-	93.2	Pass

Structure Rating (max from all components) =	**93.2%**

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

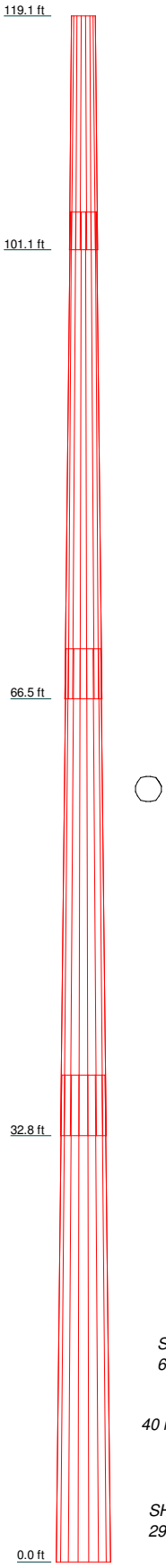
4.1) Recommendations

1) If the load differs from that described in Tables 1 and 2 of this report, "Appendix B – Base Level Drawing" or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
2) The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

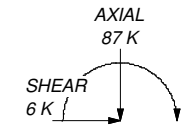
APPENDIX A

TNXTOWER OUTPUT

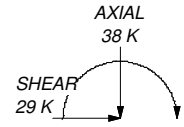
Section	1	2	3	4				
Length (ft)	18.000	37.500	37.500	37.500				
Number of Sides	18	18	18	18				
Thickness (in)	0.250	0.313	0.375	0.375				
Socket Length (ft)	2.917	3.833	4.667					
Top Dia (in)	21.610	24.789	32.490	39.848				
Bot Dia (in)	26.000	34.063	41.750	49.063				
Grade	A572-65							
Weight (K)	1.1	3.7	5.6	6.7	17.1			



ALL REACTIONS ARE FACTORED



TORQUE 1 kip-ft
40 mph WIND - 1.000 in ICE



TORQUE 6 kip-ft
REACTIONS - 97 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION
2.4-in x 6-ft Mount Pipe	123
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	120
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	120
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	120
LNX-6515DS-VTM w/ Mount Pipe	120
LNX-6515DS-VTM w/ Mount Pipe	120
LNX-6515DS-VTM w/ Mount Pipe	120
AIR -32 B2A/B66AA w/ Mount Pipe	120
AIR -32 B2A/B66AA w/ Mount Pipe	120
AIR -32 B2A/B66AA w/ Mount Pipe	120
KRY 112 144/1	120
KRY 112 144/1	120
KRY 112 144/1	120
RRUS 11 B12	120
RRUS 11 B12	120
RRUS 11 B12	120
2.4" Dia x 4-ft Mount Pipe	120
2.4" Dia x 4-ft Mount Pipe	120
2.4" Dia x 4-ft Mount Pipe	120
Platform Mount [LP 403-1]	120
Side Arm Mount [SO 102-3]	115
2.4" Dia. x 6-ft	115
VHLP2-18	115
7770.00 w/ Mount Pipe	110
7770.00 w/ Mount Pipe	110
SBNH-1D6565C w/ Mount Pipe	110
AM-X-CD-16-65-00T-RET w/ Mount Pipe	110
AM-X-CD-16-65-00T-RET w/ Mount Pipe	110
QS66512-3 w/ Mount Pipe	110
TPA-65R-LCUUUU-H8 w/ Mount Pipe	110
QS66512-3 w/ Mount Pipe	110
(2) TPX-070821	110
(2) TPX-070821	110
(2) TPX-070821	110
RRUS 32	110
RRUS 32	110
RRUS 32	110
DC6-48-60-18-8F	110
RRUS 11	110
RRUS 11	110
RRUS 11	110
RRUS 32 B2	110
RRUS 32 B2	110
RRUS 32 B2	110
1001983	110
1001983	110
1001983	110
(2) 7020.00	110
(2) 7020.00	110

TYPE	ELEVATION
(2) 7020.00	110
(2) LGP21401	110
(2) LGP21401	110
(2) LGP21401	110
DC6-48-60-18-8F	110
2.4" Dia. x 6-ft	110
2.4" Dia. x 6-ft	110
2.4" Dia. x 6-ft	110
2.4" x 8' Pipe	110
2.4" x 8' Pipe	110
2.4" x 8' Pipe	110
Miscellaneous [NA 507-1]	110
Platform Mount [LP 712-1]	110
7770.00 w/ Mount Pipe	110
LNX-6514DS-T4M w/ Mount Pipe	100
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	100
BXA-80063-4BF-EDIN-X w/ Mount Pipe	100
BXA-80063-4BF-EDIN-X w/ Mount Pipe	100
BXA-80063-4BF-EDIN-X w/ Mount Pipe	100
(2) SBNHH-1D65B w/ Mount Pipe	100
(2) SBNHH-1D65B w/ Mount Pipe	100
(2) SBNHH-1D65B w/ Mount Pipe	100
RRH2x60-700	100
RRH2x60-700	100
RRH2x60-700	100
RRH2x60-AWS	100
RRH2x60-AWS	100
RRH2x60-AWS	100
RRH2X60-PCS	100
RRH2X60-PCS	100
RRH2X60-PCS	100
DB-T1-6Z-8AB-0Z	100
DB-T1-6Z-8AB-0Z	100
Platform Mount [LP 403-1]	100
LNX-6514DS-T4M w/ Mount Pipe	100
2'x3' Ice Shield	97
2'x3' Ice Shield	95
742 213 w/ Mount Pipe	90
742 213 w/ Mount Pipe	90
742 213 w/ Mount Pipe	90
LLPX310R w/ Mount Pipe	80
LLPX310R w/ Mount Pipe	80
WIMAX DAP HEAD	80
WIMAX DAP HEAD	80
WIMAX DAP HEAD	80
CW JUNCTION BOX	80
2.4" Dia. x 6-ft	80
2.4" Dia. x 6-ft	80
2.4" Dia. x 6-ft	80
Side Arm Mount [SO 101-3]	80
LLPX310R w/ Mount Pipe	80
VHLP2-23	80

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C 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 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 68.6%

Tower Engineering Professionals

Tower Engineering Professionals, Inc.
326 Tryon Rd.
Raleigh, NC 27603
Phone: (919) 661-6351
FAX: (919) 661-6350

Job: ***West Hartford/I-84/X43 (BU 829013)***			
Project: ***TEP No. 25680.108631***			
Client: Crown Castle	Drawn by: tmlester	App'd:	
Code: TIA-222-G	Date: 02/22/17	Scale: NTS	
Path: C:\Users\tmlester\Desktop\West Hartford I-84x43\829013_LC7.eri		Dwg No. E-1	

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 Hartford County, Connecticut.
Basic wind speed of 97 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.000 ft.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 40 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	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	√ Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric		

Tapered Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Splice Length* *ft*	*Number of Sides*	*Top Diameter* *in*	*Bottom Diameter* *in*	*Wall Thickness* *in*	*Bend Radius* *in*	*Pole Grade*
L1	119.083-101.083	18.000	2.917	18	21.610	26.000	0.250	1.000	A572-65 (65 ksi)
L2	101.083-66.500	37.500	3.833	18	24.789	34.063	0.313	1.250	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L3	66.500-32.833	37.500	4.667	18	32.490	41.750	0.375	1.500	A572-65 (65 ksi)
L4	32.833-0.000	37.500		18	39.848	49.063	0.375	1.500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	21.943	16.949	976.986	7.583	10.978	88.996	1955.257	8.476	3.363	13.453
	26.401	20.433	1711.654	9.141	13.208	129.592	3425.561	10.218	4.136	16.544
L2	25.903	24.277	1837.486	8.689	12.593	145.917	3677.390	12.141	3.813	12.201
	34.588	33.476	4817.433	11.981	17.304	278.404	9641.206	16.741	5.445	17.424
L3	33.952	38.224	4980.574	11.401	16.505	301.768	9967.702	19.116	5.058	13.488
	42.394	49.247	10650.982	14.688	21.209	502.192	21315.979	24.628	6.688	17.835
L4	41.627	46.982	9248.308	14.013	20.243	456.874	18508.785	23.496	6.353	16.942
	49.819	57.950	17355.138	17.284	24.924	696.329	34733.112	28.981	7.975	21.267

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 119.083-101.083				1	1	1			
L2 101.083-66.500				1	1	1			
L3 66.500-32.833				1	1	1			
L4 32.833-0.000				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
Safety Line 3/8	B	Surface Ar (CaAa)	119.000 - 0.000	1	1	0.250 0.250	0.375		0.220
PiRod Ladder	B	Surface Ar (CaAa)	119.000 - 0.000	1	1	0.250 0.250	0.540		2.000
LDF7-50A(1-5/8")	A	Surface Ar (CaAa)	119.083 - 0.000	3	3	0.500 0.500	1.980		0.820
LDF7-50A(1-5/8") **90**	B	Surface Ar (CaAa)	100.000 - 80.000	3	3	0.250 0.250	1.980		0.820
LDF7-50A(1-5/8")	C	Surface Ar (CaAa)	90.000 - 0.000	6	6	0.000 0.000	1.980		0.820
2" Flexible Conduit	B	Surface Ar (CaAa)	80.000 - 0.000	2	2	0.250 0.250	2.000		0.340

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
***									

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
120								
LDF7-50A(1-5/8")	A	No	Inside Pole	119.083 - 0.000	10	No Ice	0.000	0.820
						1/2" Ice	0.000	0.820
						1" Ice	0.000	0.820
MLC Hybrid 6/6(7/8")	A	No	CaAa (Out Of Face)	119.083 - 0.000	1	No Ice	0.000	1.820
						1/2" Ice	0.000	2.785
						1" Ice	0.000	4.361
110								
LDF7-50A(1-5/8")	C	No	Inside Pole	110.000 - 0.000	12	No Ice	0.000	0.820
						1/2" Ice	0.000	0.820
						1" Ice	0.000	0.820
WR-VG102ST-BRDA(7/16")	C	No	Inside Pole	110.000 - 0.000	2	No Ice	0.000	0.201
						1/2" Ice	0.000	0.201
						1" Ice	0.000	0.201
WR-VG122ST-BRDA(3/8) ((1)E+(1)P)	C	No	Inside Pole	110.000 - 0.000	2	No Ice	0.000	0.200
						1/2" Ice	0.000	0.200
						1" Ice	0.000	0.200
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	110.000 - 0.000	2	No Ice	0.000	0.584
						1/2" Ice	0.000	0.584
						1" Ice	0.000	0.584
3" Flexible Conduit	C	No	Inside Pole	110.000 - 0.000	1	No Ice	0.000	1.040
						1/2" Ice	0.000	1.040
						1" Ice	0.000	1.040
100								
LDF7-50A(1-5/8")	B	No	Inside Pole	100.000 - 0.000	11	No Ice	0.000	0.820
						1/2" Ice	0.000	0.820
						1" Ice	0.000	0.820
LDF7-50A(1-5/8")	B	No	CaAa (Out Of Face)	80.000 - 0.000	3	No Ice	0.000	0.820
						1/2" Ice	0.000	2.335
						1" Ice	0.000	4.461
80								
FSJ1-50A(1/4")	B	No	Inside Pole	80.000 - 0.000	3	No Ice	0.000	0.045
						1/2" Ice	0.000	0.045
						1" Ice	0.000	0.045
HJ4.5-50(5/8")	B	No	Inside Pole	80.000 - 0.000	3	No Ice	0.000	0.400
						1/2" Ice	0.000	0.400
						1" Ice	0.000	0.400
9207(5/16")	B	No	Inside Pole	80.000 - 0.000	1	No Ice	0.000	0.600
						1/2" Ice	0.000	0.600
						1" Ice	0.000	0.600
FSJ4-50B(1/2")	B	No	CaAa (Out Of Face)	80.000 - 0.000	1	No Ice	0.000	0.140
						1/2" Ice	0.000	0.763
						1" Ice	0.000	1.997
***								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	119.083-101.083	A	0.000	0.000	10.692	0.000	0
		B	0.000	0.000	1.639	0.000	0
		C	0.000	0.000	0.000	0.000	0
L2	101.083-66.500	A	0.000	0.000	20.542	0.000	0
		B	0.000	0.000	20.444	0.000	0
		C	0.000	0.000	27.918	0.000	1
L3	66.500-32.833	A	0.000	0.000	19.998	0.000	0
		B	0.000	0.000	16.547	0.000	1
		C	0.000	0.000	39.996	0.000	1
L4	32.833-0.000	A	0.000	0.000	19.503	0.000	0
		B	0.000	0.000	16.138	0.000	1
		C	0.000	0.000	39.006	0.000	1

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	119.083-101.083	A	2.255	0.000	0.000	23.515	0.000	1
		B		0.000	0.000	17.804	0.000	0
		C		0.000	0.000	0.000	0.000	0
L2	101.083-66.500	A	2.194	0.000	0.000	45.179	0.000	1
		B		0.000	0.000	74.855	0.000	2
		C		0.000	0.000	48.149	0.000	1
L3	66.500-32.833	A	2.082	0.000	0.000	43.461	0.000	1
		B		0.000	0.000	67.918	0.000	3
		C		0.000	0.000	68.458	0.000	2
L4	32.833-0.000	A	1.864	0.000	0.000	41.470	0.000	1
		B		0.000	0.000	63.857	0.000	3
		C		0.000	0.000	65.848	0.000	2

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	119.083-101.083	0.102	-0.709	0.546	-0.766
L2	101.083-66.500	0.513	0.218	0.847	0.058
L3	66.500-32.833	0.443	0.539	0.869	0.326
L4	32.833-0.000	0.472	0.574	0.964	0.374

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	1	Safety Line 3/8	101.08 - 119.00	1.0000	1.0000
L1	2	PiRod Ladder	101.08 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	5	LDF7-50A(1-5/8")	119.00 101.08 - 119.08	1.0000	1.0000
L1	16	LDF7-50A(1-5/8")	101.08 - 100.00	1.0000	1.0000
L1	18	LDF7-50A(1-5/8")	101.08 - 90.00	1.0000	1.0000
L1	23	2" Flexible Conduit	101.08 - 80.00	1.0000	1.0000
L2	1	Safety Line 3/8	66.50 - 101.08	1.0000	1.0000
L2	2	PiRod Ladder	66.50 - 101.08	1.0000	1.0000
L2	5	LDF7-50A(1-5/8")	66.50 - 101.08	1.0000	1.0000
L2	18	LDF7-50A(1-5/8")	66.50 - 90.00	1.0000	1.0000
L2	23	2" Flexible Conduit	66.50 - 80.00	1.0000	1.0000
L3	1	Safety Line 3/8	32.83 - 66.50	1.0000	1.0000
L3	2	PiRod Ladder	32.83 - 66.50	1.0000	1.0000
L3	5	LDF7-50A(1-5/8")	32.83 - 66.50	1.0000	1.0000
L3	18	LDF7-50A(1-5/8")	32.83 - 66.50	1.0000	1.0000
L3	23	2" Flexible Conduit	32.83 - 66.50	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral (ft)	Offsets: Vert (ft)	Azimuth Adjustment (°)	Placement (ft)		C_AA_A Front (ft^2)	C_AA_A Side (ft^2)	Weight (K)
2.4-in x 6-ft Mount Pipe	C	None			0.000	123.000	No Ice	1.440	1.440	0
							1/2" Ice	1.933	1.933	0
							1" Ice	2.302	2.302	0
120										
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Centroid-Face	4.000 -7.000	0.000	30.000	120.000	No Ice 1/2" Ice	6.329 6.775	5.642 6.426	0 0
							1" Ice	7.214	7.131	0
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Centroid-Face	4.000 -7.000	0.000	30.000	120.000	No Ice 1/2" Ice	6.329 6.775	5.642 6.426	0 0
							1" Ice	7.214	7.131	0
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Centroid-Face	4.000 -7.000	0.000	30.000	120.000	No Ice 1/2" Ice	6.329 6.775	5.642 6.426	0 0
							1" Ice	7.214	7.131	0
LNX-6515DS-VTM w/ Mount Pipe	A	From Centroid-Face	4.000 7.000	0.000	30.000	120.000	No Ice 1/2" Ice	11.683 12.404	9.842 11.366	0 0
							1" Ice	13.135	12.914	0
LNX-6515DS-VTM w/ Mount Pipe	B	From Centroid-Face	4.000 -3.750	0.000	30.000	120.000	No Ice 1/2" Ice	11.683 12.404	9.842 11.366	0 0
							1" Ice	13.135	12.914	0
LNX-6515DS-VTM w/ Mount Pipe	C	From Centroid-Face	4.000 -3.750	0.000	30.000	120.000	No Ice 1/2" Ice	11.683 12.404	9.842 11.366	0 0
							1" Ice	13.135	12.914	0
AIR -32 B2A/B66AA w/ Mount Pipe	A	From Centroid-Face	4.000 3.500	0.000	30.000	120.000	No Ice 1/2" Ice	6.747 7.202	6.070 6.867	0 0
							1" Ice	7.648	7.583	0
AIR -32 B2A/B66AA w/ Mount Pipe	B	From Centroid-Face	4.000 3.500	0.000	30.000	120.000	No Ice 1/2" Ice	6.747 7.202	6.070 6.867	0 0
							1" Ice	7.648	7.583	0

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
AIR -32 B2A/B66AA w/ Mount Pipe	C	From Centroid-Face	4.000 7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice	6.747 7.202 7.648	6.070 6.867 7.583	0 0 0
KRY 112 144/1	A	From Centroid-Face	4.000 -7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice	0.352 0.428 0.512	0.162 0.219 0.285	0 0 0
KRY 112 144/1	B	From Centroid-Face	4.000 -7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice	0.352 0.428 0.512	0.162 0.219 0.285	0 0 0
KRY 112 144/1	C	From Centroid-Face	4.000 -7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice	0.352 0.428 0.512	0.162 0.219 0.285	0 0 0
RRUS 11 B12	A	From Centroid-Face	4.000 7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice	2.833 3.043 3.259	1.182 1.330 1.485	0 0 0
RRUS 11 B12	B	From Centroid-Face	4.000 -3.750 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice	2.833 3.043 3.259	1.182 1.330 1.485	0 0 0
RRUS 11 B12	C	From Centroid-Face	4.000 -3.750 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice	2.833 3.043 3.259	1.182 1.330 1.485	0 0 0
2.4" Dia x 4-ft Mount Pipe	A	From Centroid-Face	4.000 -3.750 0.000	0.000	120.000	No Ice 1/2" Ice 1" Ice	0.871 1.116 1.370	0.871 1.116 1.370	0 0 0
2.4" Dia x 4-ft Mount Pipe	B	From Centroid-Face	4.000 7.000 0.000	0.000	120.000	No Ice 1/2" Ice 1" Ice	0.871 1.116 1.370	0.871 1.116 1.370	0 0 0
2.4" Dia x 4-ft Mount Pipe	C	From Centroid-Face	4.000 3.500 0.000	0.000	120.000	No Ice 1/2" Ice 1" Ice	0.871 1.116 1.370	0.871 1.116 1.370	0 0 0
Platform Mount [LP 403-1]	C	None		0.000	120.000	No Ice 1/2" Ice 1" Ice	18.850 24.300 29.750	18.850 24.300 29.750	2 2 2
115									
Side Arm Mount [SO 102-3]	C	None		0.000	115.000	No Ice 1/2" Ice 1" Ice	3.000 3.480 3.960	3.000 3.480 3.960	0 0 0
2.4" Dia. x 6-ft	C	From Leg	0.500 0.000 0.000	0.000	115.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0 0 0
110									
7770.00 w/ Mount Pipe	A	From Centroid-Face	4.000 -6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice	5.746 6.179 6.607	4.254 5.014 5.711	0 0 0
7770.00 w/ Mount Pipe	B	From Centroid-Face	4.000 -6.000 0.000	20.000	110.000	No Ice 1/2" Ice 1" Ice	5.746 6.179 6.607	4.254 5.014 5.711	0 0 0
7770.00 w/ Mount Pipe	C	From Centroid-Face	4.000 -6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice	5.746 6.179 6.607	4.254 5.014 5.711	0 0 0
SBNH-1D6565C w/ Mount Pipe	B	From Centroid-Face	4.000 -2.000 0.000	20.000	110.000	No Ice 1/2" Ice 1" Ice	11.695 12.421 13.157	9.854 11.383 12.936	0 0 0
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Centroid-Face	4.000 -2.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice	8.262 8.822 9.346	6.304 7.479 8.368	0 0 0
AM-X-CD-16-65-00T-RET	C	From	4.000	30.000	110.000	No Ice	8.262	6.304	0

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
w/ Mount Pipe		Centroid-Face	-2.000 0.000			1/2" Ice 1" Ice	8.822 9.346	7.479 8.368	0 0
QS66512-3 w/ Mount Pipe	A	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice	8.371 8.931 9.457	8.463 9.657 10.548	0 0 0
TPA-65R-LCUUUU-H8 w/ Mount Pipe	B	From Centroid-Face	4.000 6.000 0.000	20.000	110.000	No Ice 1/2" Ice 1" Ice	13.535 14.238 14.949	10.960 12.486 14.037	0 0 0
QS66512-3 w/ Mount Pipe	C	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice	8.371 8.931 9.457	8.463 9.657 10.548	0 0 0
(2) TPX-070821	A	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice	0.469 0.559 0.656	0.101 0.147 0.202	0 0 0
(2) TPX-070821	B	From Centroid-Face	4.000 6.000 0.000	20.000	110.000	No Ice 1/2" Ice 1" Ice	0.469 0.559 0.656	0.101 0.147 0.202	0 0 0
(2) TPX-070821	C	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice	0.469 0.559 0.656	0.101 0.147 0.202	0 0 0
RRUS 32	A	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice	2.857 3.083 3.316	1.777 1.968 2.166	0 0 0
RRUS 32	B	From Centroid-Face	4.000 6.000 0.000	20.000	110.000	No Ice 1/2" Ice 1" Ice	2.857 3.083 3.316	1.777 1.968 2.166	0 0 0
RRUS 32	C	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice	2.857 3.083 3.316	1.777 1.968 2.166	0 0 0
DC6-48-60-18-8F	B	From Centroid-Face	4.000 6.000 0.000	20.000	110.000	No Ice 1/2" Ice 1" Ice	0.917 1.458 1.643	0.917 1.458 1.643	0 0 0
RRUS 11	A	From Centroid-Face	4.000 -2.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice	2.791 2.998 3.213	1.192 1.340 1.496	0 0 0
RRUS 11	B	From Centroid-Face	4.000 -2.000 0.000	20.000	110.000	No Ice 1/2" Ice 1" Ice	2.791 2.998 3.213	1.192 1.340 1.496	0 0 0
RRUS 11	C	From Centroid-Face	4.000 -2.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice	2.791 2.998 3.213	1.192 1.340 1.496	0 0 0
RRUS 32 B2	A	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice	2.731 2.953 3.182	1.668 1.855 2.049	0 0 0
RRUS 32 B2	B	From Centroid-Face	4.000 6.000 0.000	20.000	110.000	No Ice 1/2" Ice 1" Ice	2.731 2.953 3.182	1.668 1.855 2.049	0 0 0
RRUS 32 B2	C	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice	2.731 2.953 3.182	1.668 1.855 2.049	0 0 0
1001983	A	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice	0.176 0.232 0.295	0.083 0.126 0.178	0 0 0
1001983	B	From Centroid-Face	4.000 6.000 0.000	20.000	110.000	No Ice 1/2" Ice 1" Ice	0.176 0.232 0.295	0.083 0.126 0.178	0 0 0
1001983	C	From	4.000	30.000	110.000	No Ice	0.176	0.083	0

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		Centroid-Face	6.000			1/2" Ice	0.232	0.126	0
			0.000			1" Ice	0.295	0.178	0
(2) 7020.00	A	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice	0.102 0.147 0.199	0.175 0.239 0.311	0 0 0
(2) 7020.00	B	From Centroid-Face	4.000 6.000 0.000	20.000	110.000	No Ice 1/2" Ice 1" Ice	0.102 0.147 0.199	0.175 0.239 0.311	0 0 0
(2) 7020.00	C	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice	0.102 0.147 0.199	0.175 0.239 0.311	0 0 0
(2) LGP21401	A	From Centroid-Face	4.000 -6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice	1.104 1.239 1.381	0.207 0.274 0.348	0 0 0
(2) LGP21401	B	From Centroid-Face	4.000 -6.000 0.000	20.000	110.000	No Ice 1/2" Ice 1" Ice	1.104 1.239 1.381	0.207 0.274 0.348	0 0 0
(2) LGP21401	C	From Centroid-Face	4.000 -6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice	1.104 1.239 1.381	0.207 0.274 0.348	0 0 0
DC6-48-60-18-8F	B	From Centroid-Face	4.000 -6.000 0.000	20.000	110.000	No Ice 1/2" Ice 1" Ice	0.917 1.458 1.643	0.917 1.458 1.643	0 0 0
2.4" Dia. x 6-ft	A	From Centroid-Face	4.000 2.000 0.000	0.000	110.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0 0 0
2.4" Dia. x 6-ft	B	From Centroid-Face	4.000 2.000 0.000	0.000	110.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0 0 0
2.4" Dia. x 6-ft	C	From Centroid-Face	4.000 2.000 0.000	0.000	110.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0 0 0
2.4" x 8' Pipe	A	From Centroid-Face	4.000 -6.000 0.000	0.000	110.000	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	1.900 2.732 3.416	0 0 0
2.4" x 8' Pipe	B	From Centroid-Face	4.000 -6.000 0.000	0.000	110.000	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	1.900 2.732 3.416	0 0 0
2.4" x 8' Pipe	C	From Centroid-Face	4.000 -6.000 0.000	0.000	110.000	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	1.900 2.732 3.416	0 0 0
Miscellaneous [NA 507-1]	C	None		0.000	110.000	No Ice 1/2" Ice 1" Ice	4.800 6.700 8.600	4.800 6.700 8.600	0 0 0
Platform Mount [LP 712-1]	C	None		0.000	110.000	No Ice 1/2" Ice 1" Ice	24.530 29.940 35.350	24.530 29.940 35.350	1 2 2
100									
LNX-6514DS-T4M w/ Mount Pipe	B	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	8.444 8.981 9.506	7.418 8.452 9.345	0 0 0
LNX-6514DS-T4M w/ Mount Pipe	C	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	8.444 8.981 9.506	7.418 8.452 9.345	0 0 0
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	A	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	7.806 8.357 8.872	5.801 6.953 7.819	0 0 0

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
BXA-80063-4BF-EDIN-X w/ Mount Pipe	A	From Centroid-Face	4.000 7.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	4.624 4.987 5.360	3.472 4.045 4.632	0 0 0
BXA-80063-4BF-EDIN-X w/ Mount Pipe	B	From Centroid-Face	4.000 7.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	4.624 4.987 5.360	3.472 4.045 4.632	0 0 0
BXA-80063-4BF-EDIN-X w/ Mount Pipe	C	From Centroid-Face	4.000 7.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	4.624 4.987 5.360	3.472 4.045 4.632	0 0 0
(2) SBNHH-1D65B w/ Mount Pipe	A	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	8.289 8.849 9.374	7.004 8.185 9.081	0 0 0
(2) SBNHH-1D65B w/ Mount Pipe	B	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	8.289 8.849 9.374	7.004 8.185 9.081	0 0 0
(2) SBNHH-1D65B w/ Mount Pipe	C	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	8.289 8.849 9.374	7.004 8.185 9.081	0 0 0
RRH2x60-700	A	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	3.500 3.761 4.029	1.816 2.052 2.289	0 0 0
RRH2x60-700	B	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	3.500 3.761 4.029	1.816 2.052 2.289	0 0 0
RRH2x60-700	C	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	3.500 3.761 4.029	1.816 2.052 2.289	0 0 0
RRH2x60-AWS	A	From Centroid-Face	4.000 3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	3.500 3.761 4.029	1.816 2.052 2.289	0 0 0
RRH2x60-AWS	B	From Centroid-Face	4.000 3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	3.500 3.761 4.029	1.816 2.052 2.289	0 0 0
RRH2x60-AWS	C	From Centroid-Face	4.000 3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	3.500 3.761 4.029	1.816 2.052 2.289	0 0 0
RRH2X60-PCS	A	From Centroid-Face	4.000 -7.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	2.200 2.393 2.593	1.723 1.901 2.087	0 0 0
RRH2X60-PCS	B	From Centroid-Face	4.000 -7.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	2.200 2.393 2.593	1.723 1.901 2.087	0 0 0
RRH2X60-PCS	C	From Centroid-Face	4.000 -7.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	2.200 2.393 2.593	1.723 1.901 2.087	0 0 0
DB-T1-6Z-8AB-0Z	A	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	4.800 5.070 5.348	2.000 2.193 2.393	0 0 0
DB-T1-6Z-8AB-0Z	C	From Centroid-Face	4.000 3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	4.800 5.070 5.348	2.000 2.193 2.393	0 0 0
Platform Mount [LP 403-1]	C	None		0.000	100.000	No Ice 1/2" Ice 1" Ice	18.850 24.300 29.750	18.850 24.300 29.750	2 2 2
90 742 213 w/ Mount Pipe	A	From Leg	0.500 0.000	30.000	90.000	No Ice 1/2" Ice	5.373 5.950	4.620 6.000	0 0

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	6.501	6.982	0
742 213 w/ Mount Pipe	B	From Leg	0.500	0.000	90.000	No Ice	5.373	4.620	0
			0.000			1/2" Ice	5.950	6.000	0
			0.000			1" Ice	6.501	6.982	0
742 213 w/ Mount Pipe	C	From Leg	0.500	-10.000	90.000	No Ice	5.373	4.620	0
			0.000			1/2" Ice	5.950	6.000	0
			0.000			1" Ice	6.501	6.982	0
2'x3' Ice Shield	C	From Leg	0.500	-10.000	95.000	No Ice	0.720	1.180	0
			0.000			1/2" Ice	0.990	1.610	0
			0.000			1" Ice	1.260	2.040	0
2'x3' Ice Shield	C	From Leg	0.500	-10.000	97.000	No Ice	0.720	1.180	0
			0.000			1/2" Ice	0.990	1.610	0
			0.000			1" Ice	1.260	2.040	0
80									
LLPX310R w/ Mount Pipe	A	From Leg	1.000	30.000	80.000	No Ice	4.455	2.874	0
			-2.000			1/2" Ice	4.787	3.398	0
			1.000			1" Ice	5.129	3.937	0
LLPX310R w/ Mount Pipe	B	From Leg	1.000	30.000	80.000	No Ice	4.455	2.874	0
			-2.000			1/2" Ice	4.787	3.398	0
			1.000			1" Ice	5.129	3.937	0
LLPX310R w/ Mount Pipe	C	From Leg	1.000	30.000	80.000	No Ice	4.455	2.874	0
			-2.000			1/2" Ice	4.787	3.398	0
			1.000			1" Ice	5.129	3.937	0
WIMAX DAP HEAD	A	From Leg	1.000	30.000	80.000	No Ice	1.547	0.684	0
			2.000			1/2" Ice	1.704	0.800	0
			1.000			1" Ice	1.868	0.923	0
WIMAX DAP HEAD	B	From Leg	1.000	30.000	80.000	No Ice	1.547	0.684	0
			-2.000			1/2" Ice	1.704	0.800	0
			1.000			1" Ice	1.868	0.923	0
WIMAX DAP HEAD	C	From Leg	1.000	30.000	80.000	No Ice	1.547	0.684	0
			-2.000			1/2" Ice	1.704	0.800	0
			1.000			1" Ice	1.868	0.923	0
CW JUNCTION BOX	A	From Leg	1.000	30.000	80.000	No Ice	1.200	0.600	0
			2.000			1/2" Ice	1.337	0.704	0
			3.000			1" Ice	1.481	0.815	0
2.4" Dia. x 6-ft	A	From Leg	1.000	0.000	80.000	No Ice	1.425	1.425	0
			2.000			1/2" Ice	1.925	1.925	0
			0.000			1" Ice	2.294	2.294	0
2.4" Dia. x 6-ft	B	From Leg	1.000	0.000	80.000	No Ice	1.425	1.425	0
			2.000			1/2" Ice	1.925	1.925	0
			0.000			1" Ice	2.294	2.294	0
2.4" Dia. x 6-ft	C	From Leg	1.000	0.000	80.000	No Ice	1.425	1.425	0
			2.000			1/2" Ice	1.925	1.925	0
			0.000			1" Ice	2.294	2.294	0
Side Arm Mount [SO 101-3]	C	None		0.000	80.000	No Ice	7.500	7.500	0
						1/2" Ice	8.900	8.900	0
						1" Ice	10.300	10.300	0
***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight K
115											
VHLP2-18	C	Paraboloid w/Shroud (HP)	From Leg	1.000 0.000 0.000	0.000		115.000	2.000	No Ice 1/2" Ice 1" Ice	3.140 3.410 3.680	0 0 0
80											
VHLP2-23	A	Paraboloid w/Shroud (HP)	From Leg	1.000 2.000 3.000	-30.000		80.000	2.180	No Ice 1/2" Ice 1" Ice	3.730 4.020 4.310	0 0 0
***											

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

Comb. No.	Description
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	119.083 - 101.083	Pole	Max Tension	26	0	0	0
			Max. Compression	26	-24	-4	8
			Max. Mx	8	-8	-139	3
			Max. My	2	-8	-2	139
			Max. Vy	8	13	-139	3
			Max. Vx	2	-13	-2	139
			Max. Torque	10			7
L2	101.083 - 66.5	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-51	-6	7
			Max. Mx	8	-18	-828	4
			Max. My	2	-18	-6	824
			Max. Vy	8	24	-828	4
			Max. Vx	14	24	3	-821
			Max. Torque	10			7
L3	66.5 - 32.8333	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-67	-10	6
			Max. Mx	8	-26	-1654	3
			Max. My	2	-26	-8	1643
			Max. Vy	8	26	-1654	3
			Max. Vx	14	26	3	-1642
			Max. Torque	10			7
L4	32.8333 - 0	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-87	-14	5
			Max. Mx	8	-38	-2698	2
			Max. My	14	-38	3	-2681
			Max. Vy	8	29	-2698	2
			Max. Vx	14	29	3	-2681
			Max. Torque	10			6

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	87	0	6
	Max. H_x	20	38	29	0
	Max. H_z	2	38	0	29
	Max. M_x	2	2680	0	29
	Max. M_z	8	2698	-29	0
	Max. Torsion	10	6	-25	-14

Location	*Condition*	*Gov. Load Comb.*	*Vertical K*	*Horizontal, X K*	*Horizontal, Z K*
	Min. Vert	25	29	14	25
	Min. H_x	8	38	-29	0
	Min. H_z	14	38	0	-29
	Min. M_x	14	-2681	0	-29
	Min. M_z	20	-2690	29	0
	Min. Torsion	22	-6	25	14

Tower Mast Reaction Summary

Load Combination	*Vertical K*	*Shear$_x$ K*	*Shear$_z$ K*	*Overturning Moment, M_x kip-ft*	*Overturning Moment, M_z kip-ft*	*Torque kip-ft*
Dead Only	32	0	0	-1	-1	0
1.2 Dead+1.6 Wind 0 deg - No Ice	38	0	-29	-2680	-11	4
0.9 Dead+1.6 Wind 0 deg - No Ice	29	0	-29	-2656	-11	4
1.2 Dead+1.6 Wind 30 deg - No Ice	38	14	-25	-2326	-1349	1
0.9 Dead+1.6 Wind 30 deg - No Ice	29	14	-25	-2305	-1336	1
1.2 Dead+1.6 Wind 60 deg - No Ice	38	25	-14	-1347	-2329	-2
0.9 Dead+1.6 Wind 60 deg - No Ice	29	25	-14	-1335	-2308	-2
1.2 Dead+1.6 Wind 90 deg - No Ice	38	29	0	-2	-2698	-5
0.9 Dead+1.6 Wind 90 deg - No Ice	29	29	0	-2	-2674	-5
1.2 Dead+1.6 Wind 120 deg - No Ice	38	25	14	1332	-2329	-6
0.9 Dead+1.6 Wind 120 deg - No Ice	29	25	14	1321	-2309	-6
1.2 Dead+1.6 Wind 150 deg - No Ice	38	14	25	2320	-1339	-6
0.9 Dead+1.6 Wind 150 deg - No Ice	29	14	25	2300	-1327	-6
1.2 Dead+1.6 Wind 180 deg - No Ice	38	0	29	2681	3	-4
0.9 Dead+1.6 Wind 180 deg - No Ice	29	0	29	2657	4	-4
1.2 Dead+1.6 Wind 210 deg - No Ice	38	-14	25	2323	1340	-1
0.9 Dead+1.6 Wind 210 deg - No Ice	29	-14	25	2303	1328	-1
1.2 Dead+1.6 Wind 240 deg - No Ice	38	-25	14	1339	2324	3
0.9 Dead+1.6 Wind 240 deg - No Ice	29	-25	14	1328	2304	3
1.2 Dead+1.6 Wind 270 deg - No Ice	38	-29	0	2	2690	5
0.9 Dead+1.6 Wind 270 deg - No Ice	29	-29	0	2	2667	5
1.2 Dead+1.6 Wind 300 deg - No Ice	38	-25	-14	-1335	2321	6
0.9 Dead+1.6 Wind 300 deg - No Ice	29	-25	-14	-1323	2301	6

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
1.2 Dead+1.6 Wind 330 deg - No Ice	38	-14	-25	-2317	1339	6
0.9 Dead+1.6 Wind 330 deg - No Ice	29	-14	-25	-2297	1327	6
1.2 Dead+1.0 Ice+1.0 Temp	87	0	0	-5	-14	0
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	87	0	-6	-567	-15	1
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	87	3	-5	-467	-280	0
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	87	5	-3	-271	-476	0
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	87	6	0	-3	-562	-1
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	87	5	3	262	-477	-1
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	87	3	5	458	-282	-1
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	87	0	6	558	-15	-1
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	87	-3	5	457	251	0
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	87	-5	3	261	446	0
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	87	-6	0	-6	532	1
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	87	-5	-3	-272	447	1
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	87	-3	-5	-467	253	1
Dead+Wind 0 deg - Service	32	0	-6	-571	-3	1
Dead+Wind 30 deg - Service	32	3	-5	-496	-288	0
Dead+Wind 60 deg - Service	32	5	-3	-288	-497	-1
Dead+Wind 90 deg - Service	32	6	0	-1	-575	-1
Dead+Wind 120 deg - Service	32	5	3	283	-497	-1
Dead+Wind 150 deg - Service	32	3	5	493	-286	-1
Dead+Wind 180 deg - Service	32	0	6	570	0	-1
Dead+Wind 210 deg - Service	32	-3	5	494	285	0
Dead+Wind 240 deg - Service	32	-5	3	284	494	1
Dead+Wind 270 deg - Service	32	-6	0	0	572	1
Dead+Wind 300 deg - Service	32	-5	-3	-285	494	1
Dead+Wind 330 deg - Service	32	-3	-5	-494	284	1

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0	-32	0	0	32	0	0.000%
2	0	-38	-29	0	38	29	0.000%
3	0	-29	-29	0	29	29	0.000%
4	14	-38	-25	-14	38	25	0.000%
5	14	-29	-25	-14	29	25	0.000%
6	25	-38	-14	-25	38	14	0.000%
7	25	-29	-14	-25	29	14	0.000%
8	29	-38	0	-29	38	0	0.000%
9	29	-29	0	-29	29	0	0.000%
10	25	-38	14	-25	38	-14	0.000%
11	25	-29	14	-25	29	-14	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
12	14	-38	25	-14	38	-25	0.000%
13	14	-29	25	-14	29	-25	0.000%
14	0	-38	29	0	38	-29	0.000%
15	0	-29	29	0	29	-29	0.000%
16	-14	-38	25	14	38	-25	0.000%
17	-14	-29	25	14	29	-25	0.000%
18	-25	-38	14	25	38	-14	0.000%
19	-25	-29	14	25	29	-14	0.000%
20	-29	-38	0	29	38	0	0.000%
21	-29	-29	0	29	29	0	0.000%
22	-25	-38	-14	25	38	14	0.000%
23	-25	-29	-14	25	29	14	0.000%
24	-14	-38	-25	14	38	25	0.000%
25	-14	-29	-25	14	29	25	0.000%
26	0	-87	0	0	87	0	0.000%
27	0	-87	-6	0	87	6	0.000%
28	3	-87	-5	-3	87	5	0.000%
29	5	-87	-3	-5	87	3	0.000%
30	6	-87	0	-6	87	0	0.000%
31	5	-87	3	-5	87	-3	0.000%
32	3	-87	5	-3	87	-5	0.000%
33	0	-87	6	0	87	-6	0.000%
34	-3	-87	5	3	87	-5	0.000%
35	-5	-87	3	5	87	-3	0.000%
36	-6	-87	0	6	87	0	0.000%
37	-5	-87	-3	5	87	3	0.000%
38	-3	-87	-5	3	87	5	0.000%
39	0	-32	-6	0	32	6	0.000%
40	3	-32	-5	-3	32	5	0.000%
41	5	-32	-3	-5	32	3	0.000%
42	6	-32	0	-6	32	0	0.000%
43	5	-32	3	-5	32	-3	0.000%
44	3	-32	5	-3	32	-5	0.000%
45	0	-32	6	0	32	-6	0.000%
46	-3	-32	5	3	32	-5	0.000%
47	-5	-32	3	5	32	-3	0.000%
48	-6	-32	0	6	32	0	0.000%
49	-5	-32	-3	5	32	3	0.000%
50	-3	-32	-5	3	32	5	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00016077
3	Yes	5	0.00000001	0.00007328
4	Yes	5	0.00000001	0.00076207
5	Yes	5	0.00000001	0.00032960
6	Yes	5	0.00000001	0.00080572
7	Yes	5	0.00000001	0.00035003
8	Yes	5	0.00000001	0.00021341
9	Yes	5	0.00000001	0.00009666
10	Yes	5	0.00000001	0.00063644
11	Yes	5	0.00000001	0.00027277
12	Yes	5	0.00000001	0.00088310

13	Yes	5	0.00000001	0.00038890
14	Yes	5	0.00000001	0.00014838
15	Yes	5	0.00000001	0.00006779
16	Yes	5	0.00000001	0.00071750
17	Yes	5	0.00000001	0.00030950
18	Yes	5	0.00000001	0.00068714
19	Yes	5	0.00000001	0.00029542
20	Yes	5	0.00000001	0.00020514
21	Yes	5	0.00000001	0.00009303
22	Yes	5	0.00000001	0.00090189
23	Yes	5	0.00000001	0.00039725
24	Yes	5	0.00000001	0.00064705
25	Yes	5	0.00000001	0.00027709
26	Yes	4	0.00000001	0.00011874
27	Yes	5	0.00000001	0.00035445
28	Yes	5	0.00000001	0.00040492
29	Yes	5	0.00000001	0.00041064
30	Yes	5	0.00000001	0.00035628
31	Yes	5	0.00000001	0.00038483
32	Yes	5	0.00000001	0.00039598
33	Yes	5	0.00000001	0.00033652
34	Yes	5	0.00000001	0.00035908
35	Yes	5	0.00000001	0.00035777
36	Yes	5	0.00000001	0.00033467
37	Yes	5	0.00000001	0.00039678
38	Yes	5	0.00000001	0.00038183
39	Yes	4	0.00000001	0.00021813
40	Yes	4	0.00000001	0.00028551
41	Yes	4	0.00000001	0.00035069
42	Yes	4	0.00000001	0.00029808
43	Yes	4	0.00000001	0.00032624
44	Yes	4	0.00000001	0.00049068
45	Yes	4	0.00000001	0.00021401
46	Yes	4	0.00000001	0.00023582
47	Yes	4	0.00000001	0.00022724
48	Yes	4	0.00000001	0.00029199
49	Yes	4	0.00000001	0.00052021
50	Yes	4	0.00000001	0.00030574

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	119.083 - 101.083 (1)	TP26x21.61x0.25	18.000	0.000	0.0	19.868	-8	1476	0.005
L2	101.083 - 66.5 (2)	TP34.063x24.789x0.313	37.500	0.000	0.0	32.535	-18	2388	0.007
L3	66.5 - 32.8333 (3)	TP41.75x32.49x0.375	37.500	0.000	0.0	47.875	-26	3493	0.008
L4	32.8333 - 0 (4)	TP49.063x39.848x0.375	37.500	0.000	0.0	57.950	-38	3984	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	119.083 - 101.083 (1)	TP26x21.61x0.25	140	758	0.185	0	758	0.000
L2	101.083 - 66.5 (2)	TP34.063x24.789x0.313	829	1608	0.516	0	1608	0.000
L3	66.5 - 32.8333 (3)	TP41.75x32.49x0.375	1654	2885	0.573	0	2885	0.000
L4	32.8333 - 0 (4)	TP49.063x39.848x0.375	2698	3989	0.676	0	3989	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	119.083 - 101.083 (1)	TP26x21.61x0.25	13	738	0.018	1	1518	0.001
L2	101.083 - 66.5 (2)	TP34.063x24.789x0.313	24	1194	0.020	2	3219	0.001
L3	66.5 - 32.8333 (3)	TP41.75x32.49x0.375	26	1746	0.015	5	5776	0.001
L4	32.8333 - 0 (4)	TP49.063x39.848x0.375	29	1992	0.015	5	7988	0.001

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	119.083 - 101.083 (1)	0.005	0.185	0.000	0.018	0.001	0.190	1.000	4.8.2
L2	101.083 - 66.5 (2)	0.007	0.516	0.000	0.020	0.001	0.523	1.000	4.8.2
L3	66.5 - 32.8333 (3)	0.008	0.573	0.000	0.015	0.001	0.581	1.000	4.8.2
L4	32.8333 - 0 (4)	0.010	0.676	0.000	0.015	0.001	0.686	1.000	4.8.2

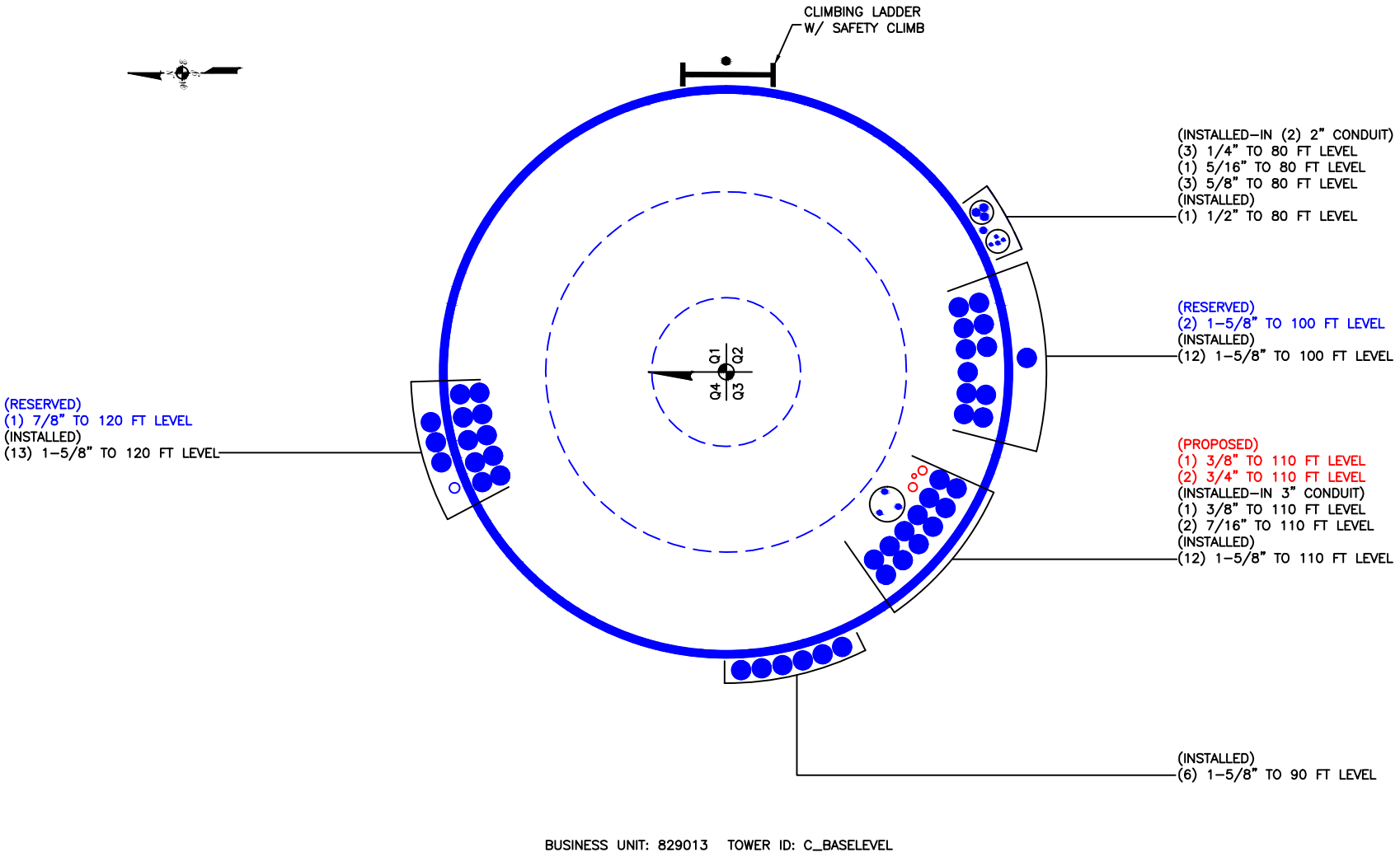
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	119.083 - 101.083	Pole	TP26x21.61x0.25	1	-8	1476	19.0	Pass
L2	101.083 - 66.5	Pole	TP34.063x24.789x0.313	2	-18	2388	52.3	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L3	66.5 - 32.8333	Pole	TP41.75x32.49x0.375	3	-26	3493	58.1	Pass
L4	32.8333 - 0	Pole	TP49.063x39.848x0.375	4	-38	3984	68.6	Pass
							Summary	
						Pole (L4)	68.6	Pass
						RATING =	**68.6**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 829013 TOWER ID: C_BASELEVEL

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#: *829013*
Site Name: *West Hartford/I-84/X43*
App #: *376733 Rev. 0*

Pole Manufacturer:	*Other*

Reactions		
Mu:	2698	ft-kips
Axial, Pu:	38	kips
Shear, Vu:	29	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

Anchor Rod Data		
Qty:	33	
Diam:	1.25	in
Rod Material:	Other	
Strength (Fu):	125	ksi
Yield (Fy):	105	ksi
Bolt Circle:	54	in

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

Plate Data		
Diam:	58	in
Thick:	1.5	in
Grade:	50	ksi
Single-Rod B-eff:	4.74	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.5	in
Fillet V. Weld:	0.25	in
Width:	4	in
Height:	12	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	49.0625	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	15	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Anchor Rod Results

		Stiffened
Max Rod (Cu+ Vu/ή):	75.6 Kips	AISC LRFD
Allowable Axial, Φ*Fu*Anet:	96.9 Kips	φ*Tn
Anchor Rod Stress Ratio:	78.0% **Pass**	

Base Plate Results Flexural Check

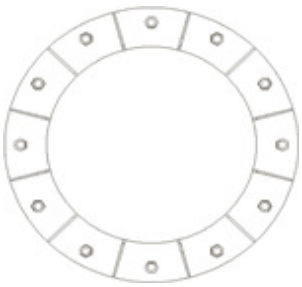
		Stiffened
Base Plate Stress:	25.2 ksi	AISC LRFD
Allowable Plate Stress:	45.0 ksi	φ*Fy
Base Plate Stress Ratio:	56.0% **Pass**	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	63.3% **Pass**
Vertical Weld:	42.1% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	17.2% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2	62.7% **Pass**
Plate Comp. (AISC Bracket):	62.0% **Pass**

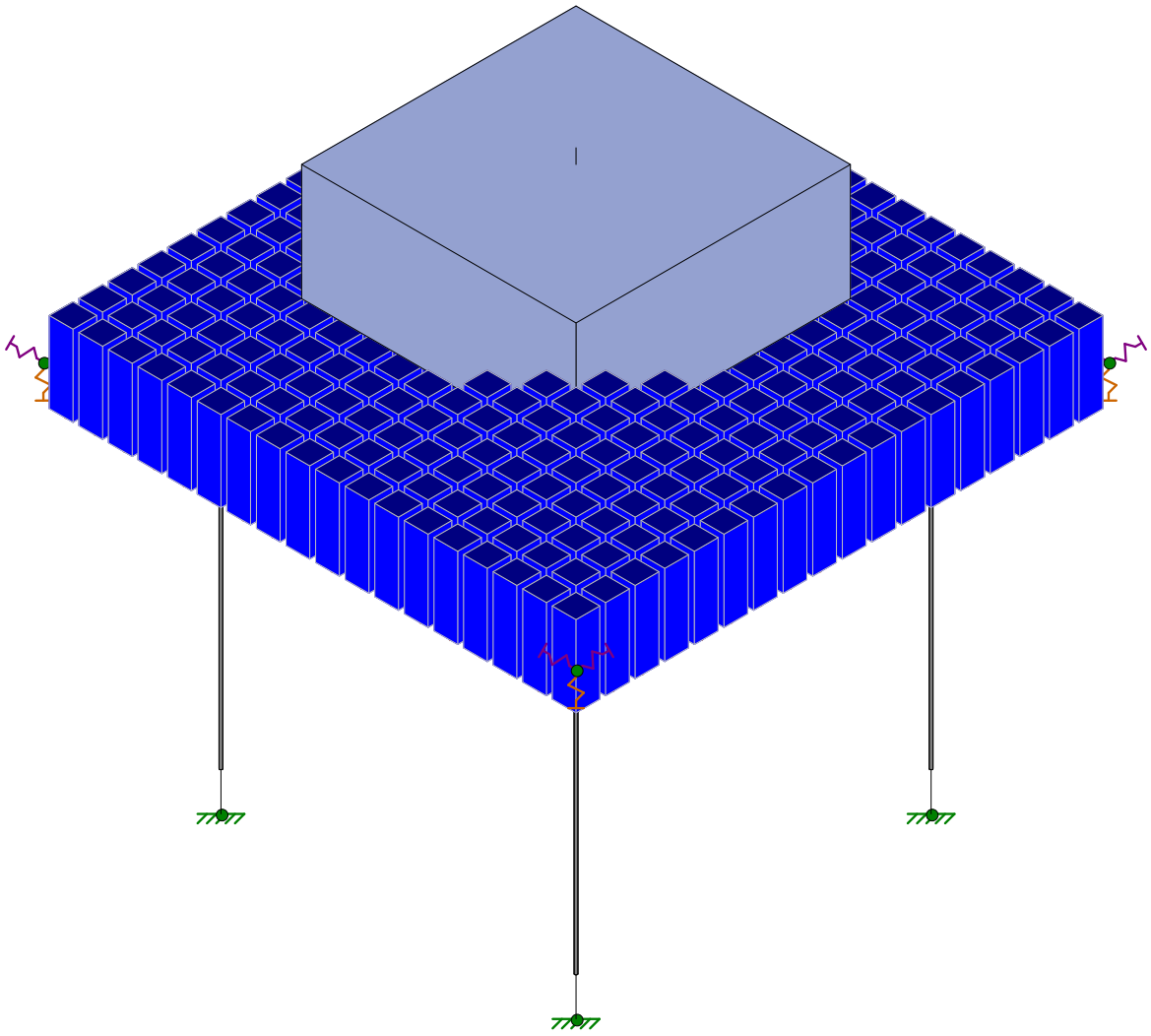
Pole Results

Pole Punching Shear Check:	8.5% **Pass**

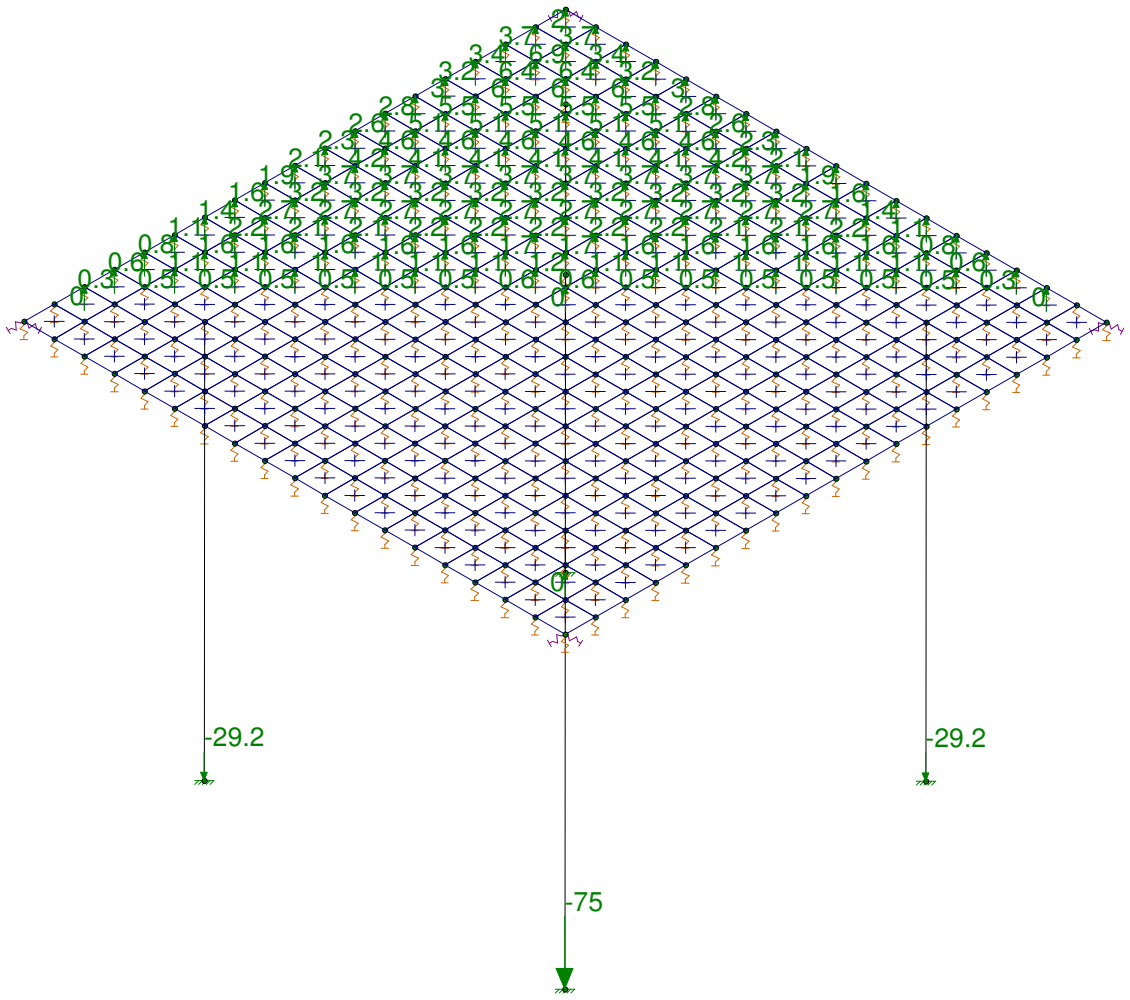


* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

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



Crown Castle	West Hartford/I-84/X43 (BU 829013)	SK - 1
TLI		Feb 14, 2017 at 2:49 PM
TEP No. 25680.108631		829013.02S_Foundation.r3d



Results for LC 6, 0.9D+1.6Wind 45
Y-direction Reaction Units are k and k-ft

Crown Castle	West Hartford/I-84/X43 (BU 829013)	SK - 1
TLI		Feb 22, 2017 at 3:13 PM
TEP No. 25680.108631		829013.02S_Foundation.r3d

Concrete Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[lb/f...	f'c[ksi]	Lambda	Flex Steel[...	Shear Stee...
1	Conc3000NW	3156	1372	.15	.6	145	3	1	60	60
2	Conc3500NW	3409	1482	.15	.6	145	3.5	1	60	60
3	Conc4000NW	3644	1584	.15	.6	145	4	1	60	60
4	Conc3000LW	2085	907	.15	.6	109.999	3	.75	60	60
5	Conc3500LW	2252	979	.15	.6	109.999	3.5	.75	60	60
6	Conc4000LW	2408	1047	.15	.6	109.999	4	.75	60	60

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(de...	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N8	N12			1" WF Rock	Column	None	A722	Typical
2	M2	N7	N11			1" WF Rock	Column	None	A722	Typical
3	M3	N6	N10			1" WF Rock	Column	None	A722	Typical
4	M4	N5	N9			1" WF Rock	Column	None	A722	Typical
5	M5	TL1	N367			CRECT102X...	Column	Rectangular	Conc300...	Typical
6	M6	N367	TOWER			6' rigid offset	Column	None	RIGID	Typical

Joint Loads and Enforced Displacements (BLC 1 : Dead)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft...
1	TL1	L	Y	-32.5

Joint Loads and Enforced Displacements (BLC 2 : Wind 0)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft...
1	TL1	L	X	18.8
2	TL1	L	Mz	-1729.4

Joint Loads and Enforced Displacements (BLC 3 : Wind 90)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft...
1	TL1	L	Z	18.8
2	TL1	L	Mx	1729.4

Joint Loads and Enforced Displacements (BLC 4 : Wind 45)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft...
1	TL1	L	X	13.3
2	TL1	L	Mz	-1222.9
3	TL1	L	Z	13.3
4	TL1	L	Mx	1222.9

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(...
1	Dead	DL		-1		1				260
2	Wind 0	WL				2				
3	Wind 90	WL				2				
4	Wind 45	WL				4				
5	Prestress	None						4		

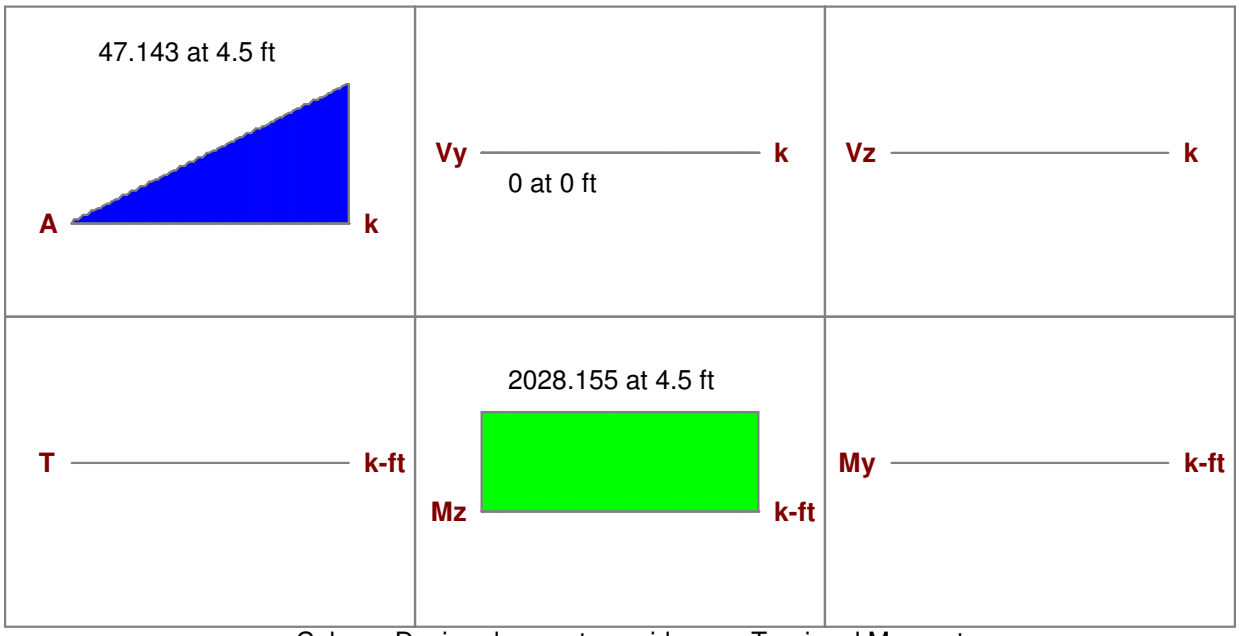
Load Combinations

	Description	So...	PDelta	SRSS	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	1.2D+1.6...	Yes	Y		1	1.2	2	1.6	5	1																
2	1.2D+1.6...	Yes	Y		1	1.2	3	1.6	5	1																
3	1.2D+1.6...	Yes	Y		1	1.2	4	1.6	5	1																
4	0.9D+1.6...	Yes	Y		1	.9	2	1.6	5	1																
5	0.9D+1.6...	Yes	Y		1	.9	3	1.6	5	1																
6	0.9D+1.6...	Yes	Y		1	.9	4	1.6	5	1																
7	Prestress	Yes	Y		5	1																				

Column: ***M5***

Shape:	**CRECT102X102**	Concrete Stress Block:	**Rectangular**
Material:	**Conc3000NW**	Cracked Sections Used:	**Yes**
Length:	**4.5 ft**	Cracked 'I' Factor:	**.70**
I Joint:	**TL1**	Effective 'I':	**6.31419e+6 in^4**
J Joint:	**N367**	Biaxial Bending Solution:	**Exact Integration**

Code Check: **0.522 (bending)**
Report Based On 97 Sections



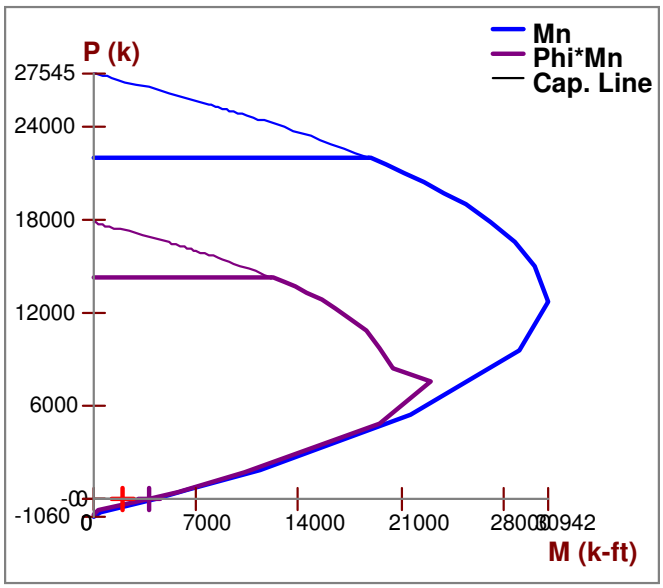
Column Design does not consider any Torsional Moments

Custom rebar layout does not meet min steel (As,min) per Global Parameters

ACI 318-11 Code Check

		Bending Check	**0.522**	Shear Check	**0.000 (y)**
Gov LC	**1**	Location	**4.5 ft**	Location	**0 ft**
Gov Pu	**0 k**	Gov Muy	**0 k-ft**	Gov Vuy	**0 k**
phi*Pn	**0 k**	Gov Muz	**2028.155 k-ft**	Gov Vuz	**0 k**
Phi eff.	**.9**	phi*Mny		phi*Vny	**1111.305 k**
		phi*Mnz	**3887.631 k-ft**	phi*Vnz	**1111.305 k**
Tension Bar Fy	**60 ksi**	Concrete Weight	**145 lb/ft^3**		
Shear Bar Fy	**60 ksi**	λ	**1**	Sway yy	**No**
F'c	**3 ksi**	E_Concrete	**3156 ksi**	Sway zz	**No**
Flex. Rebar Set	**ASTM A615**	Shear Rebar Set	**ASTM A615**	Thres. Torsion	**917.543k-ft(LC:1)**
Flex. Bars	**9 #6 , 9 #6 , 11 #6 , 11 #6**				
Shear Bars	**#4 @6in**				

Column Interaction Diagram



Span Information

Span	Span Length (ft)	I-Face Dist. (in)	J-Face Dist. (in)
1	0 - 4.5	0	0

Column Steel

Span	Main Bars	UC Max	Gov LC	Loc (ft)	Pu (k)	Muy (k-ft)	Muz (k-ft)
1	40 #6	0.522	1	4.5 ft	0	0	2028.155

Axial Span Results

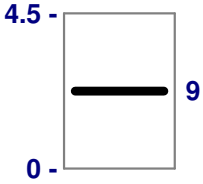
Span	Phi_eff	Pn (k)	Po (k)	Rho Gross	As Prvd (in^2)
1	.9		27545.425	.0017	17.671

Bending Span Results

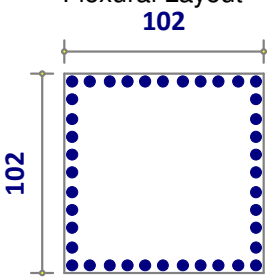
Span	ecc. y (ft)	ecc. z (ft)	NA y-y (ft)	NA z-z (ft)	Mny (k-ft)	Mnz (k-ft)	Mnoy (k-ft)	Mnoz (k-ft)
1	0	0	-3.949			4319.59		

Rebar Detailing

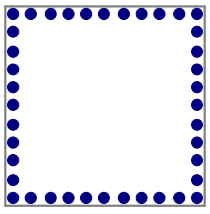
Region(ft)	Shear Steel
Span 1	4.5 - 0 - : 9 #4 @6in



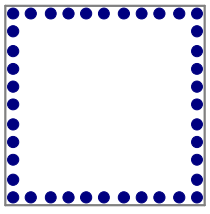
Flexural Layout



Total No. of Bars - Top : 4.5 ft
11#6 Top
9#6 Left
9#6 Right
11#6 Bottom



Total No. of Bars - Middle : 2.25 ft
11#6 Top
9#6 Left
9#6 Right
11#6 Bottom



Total No. of Bars - Bottom : 0 ft
11#6 Top
9#6 Left
9#6 Right
11#6 Bottom

Monopole on Mat Foundation with Rock Anchors - TIA-222-G

Site Data	
Site Name:	West Hartford/I-84/X43
CCI Number:	BU 829013
TEP Job Number:	25680.108631

Factored Reactions from TNX		
Axial	38	k
Shear	29	k
Moment	2698	k-ft

Mat and Pier Properties		
Mat Width	16.5	ft
Mat Length	16.5	ft
Mat Thickness	2.5	ft
Pier Type	Square	
Pier Width/Diam.	8.5	ft
Pier Height	4.5	ft

Soil Properties		
q_{allow}	10.8	ksf
FS	2.0	
Subgrade Mod.	390	kcf
Rock Weight	160	pcf
Rock Cone Angle	30	deg

Rock Anchor Properties		
Type of Bar	WilliamsForm150	
Bar Size	1.00	in
Net Area	0.85	in^2
Ultimate Stress, Fu	150.0	ksi
Yield Stress, Fy	120.0	ksi
Bar Diameter	1.000	in
Steel/Grout Bond[1]	190	psi
Grout/Rock Allow Bond	50	psi
FS	2	
Drilled Shaft Diam.	3.75	in

[1] Ultimate Bond Values

Mat Foundation Results

Bearing Stress	11.6	ksf
Bearing Capacity, ϕq_{allow}	16.3	ksf
% Capacity	71.6%	**Pass**

Mat and Pier Structural Results

Bending Moment	755.7	kft
Flexural Capacity, ϕMn	1151.3	kft
% Capacity	65.6%	**Pass**

Rock Anchor Steel Results

Max Tension Force	75.04	k
Anchor Capacity, ϕPn	91.8	k
% Capacity	81.7%	**Pass**

Rock Anchor Pullout Results

Req. Bond Length, ld	14.0	ft
Req. Cone Height, h	12.2	ft
Total Req. Embedment	20.8	ft
Pullout Capacity, phiTn	80.5	k
% Capacity	93.2%	**Pass**

		PASS	PASS	West Hartford/I-84/X43 (BU 829013)
	Results Summary:	LC1	LC2	TEP #: 25680.108631
	Soil Interaction:	N/A	N/A	Analysis: TLI 2/22/2017
Drilled Caisson Tool - Pier	Foundation Structural:	30.3%	6.0%	Check: TML 2/22/2017

Code Revisions: TIA-222-G ACI 318-11

Tower Type: Monopole

	LC1	LC2	
Moment:	768.85	158.77	kip-ft
Axial (download):	38.00	86.00	kip
Shear:	22.00	4.00	kip
Axial (uplift):			kip

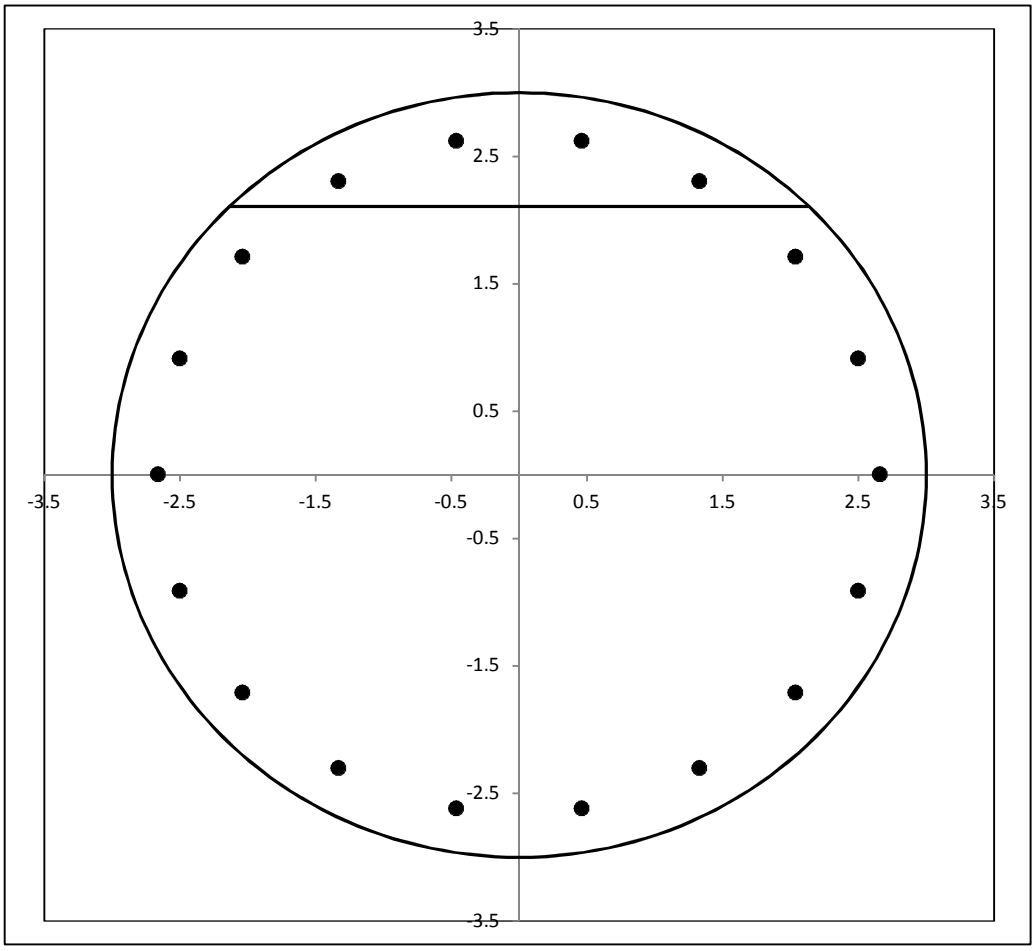
Shaft Information

Diameter:	6.00	ft
Projection:	0.50	ft
Caisson Length:	4.50	ft
f'c:	3.000	ksi
Max εc:	0.003	in/in

Cage 1 Reinforcement

Tie Bar Size:	4	*(fy = 60.0 ksi)*
Clear Cover to Tie:	3.00	*in (Cage Ø = 63.87in)*
Tie Bar Spacing:	6.00	in
Vertical Bar Size:	9	
Vertical Bar Quantity:	18	*(ρ =0.442%)*
fy:	60.0	ksi
E:	29,000	ksi

Reinforcement Capacity



		LC1	LC2	
	Vu =	22.0	4.0	kip
	Vc =	448.1	450.7	kip
fy,tie = 60.0	Vs =	269.8	269.8	kip
	ϕVn =	538.4	540.4	kip
	Capacity =	4.1%	0.7%	
		PASS	PASS	

	LC1	LC2	
Mu =	768.8	158.8	kip-ft
ϕMn =	2538.5	2643.5	kip-ft
Capacity =	30.3%	6.0%	
	PASS	PASS	

Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT5258

West Hartford
491 South Quaker Lane
West Hartford, CT 6110

March 9, 2017

Centerline Communications Project Number: 950006-044

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**16.91 %**

March 9, 2017

AT&T Mobility – New England
Attn: John Benedetto, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: **CT5258 – West Hartford**

Centerline Communications, LLC ("Centerline") was directed to analyze the proposed AT&T facility located at **491 South Quaker Lane, West Hartford, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

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

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

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

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 700 and 850 MHz Bands are approximately 467 $\mu W/cm^2$ and 567 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were performed for the proposed AT&T Wireless antenna facility located at **491 South Quaker Lane, West Hartford, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T 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.

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. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
UMTS	850 MHz	2	30
UMTS	1900 MHz (PCS)	2	30
LTE	700 MHz	2	60
LTE	2300 MHz (WCS)	2	60
LTE	1900 MHz (PCS)	2	60

Table 1: Channel Data Table

The following antennas listed in *Table 2* were used in the modeling for transmission in the 700 MHz, 850 MHz, 1900 MHz (PCS) and 2300 MHz (WCS) 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.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Powerwave 7770	110
A	2	Commscope SBNH-1D6565C	110
A	3	CCI TPA-65R-LCUUUU-H8	110
B	1	Powerwave 7770	110
B	2	KMW AM-X-CD-16-65-00T-RET	110
B	3	Quintel QS66512-2	110
C	1	Powerwave 7770	110
C	2	KMW AM-X-CD-16-65-00T-RET	110
C	3	Quintel QS66512-2	110

Table 2: Antenna Data

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

RESULTS

Per the calculations completed for the proposed AT&T configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.92
Antenna A2	Commscope SBNH-1D6565C	700 MHz	13.65	2	120	2,780.87	1.98
Antenna A3	CCI TPA-65R-LCUUUU-H8	2300 MHz (WCS) / 1900 MHz (PCS)	14.45 / 13.75	4	240	6,188.99	2.06
						Sector A Composite MPE%	**4.96**
Antenna B1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.92
Antenna B2	KMW AM-X-CD-16-65-00T-RET	700 MHz	13.65	2	120	2,595.26	1.85
Antenna B3	Quintel QS66512-2	2300 MHz (WCS) / 1900 MHz (PCS)	14.85 / 13.85	4	240	6,577.84	2.19
						Sector B Composite MPE%	**4.96**
Antenna C1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.92
Antenna C2	KMW AM-X-CD-16-65-00T-RET	700 MHz	13.65	2	120	2,595.26	1.85
Antenna C3	Quintel QS66512-2	2300 MHz (WCS) / 1900 MHz (PCS)	14.85 / 13.85	4	240	6,577.84	2.19
						Sector C Composite MPE%	**4.96**

Table 3: AT&T Emissions Levels

The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum AT&T MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three sectors have similar overall configurations yielding the same results on all three sectors. *Table 5* below shows a summary for each AT&T Sector as well as the composite MPE value for the site.

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max Sector Value	**4.96 %**
Clearwire	0.34 %
T-Mobile	5.86 %
Verizon Wireless	5.75 %
Site Total MPE %:	**16.91 %**

Table 4: All Carrier MPE Contributions

AT&T Sector A Total:	4.96 %
AT&T Sector B Total:	4.96 %
AT&T Sector C Total:	4.96 %
Site Total:	16.91 %

Table 5: Site MPE Summary

FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated AT&T sector(s). For this site, all three sectors have similar overall configurations yielding the same results on all three sectors.

AT&T _ Frequency Band / Technology (All Sectors)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 850 MHz UMTS	2	414.12	110	2.75	850 MHz	567	0.49%
AT&T 1900 MHz (PCS) UMTS	2	656.33	110	4.36	1900 MHz (PCS)	1000	0.44%
AT&T 700 MHz LTE	2	1,390.44	110	9.24	700 MHz	467	1.98%
AT&T 2300 MHz (WCS) LTE	2	1,671.67	110	11.11	2300 MHz (WCS)	1000	1.11%
AT&T 1900 MHz (PCS) LTE	2	1,422.82	110	9.46	1900 MHz (PCS)	1000	0.95%
						Total:	4.96%

Table 6: AT&T Maximum Sector MPE Power Values

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 AT&T 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:

AT&T Sector	Power Density Value (%)
Sector A:	4.96 %
Sector B:	4.96 %
Sector C:	4.96 %
AT&T Maximum Total (per sector):	4.96 %
Site Total:	16.91 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **16.91 %** 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.

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