



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

July 6, 2016

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: 806366
AT&T Site ID: CT1073
73 North Main Street, Marlborough, CT 06447
Latitude: 41° 37' 47.3"/ Longitude: -72° 27' 59.4"

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 144-foot level of the existing 155.5-foot monopole tower 73 North Main Street in Marlborough, CT. The tower and property is owned by Crown Castle. AT&T now intends add three (3) bias-tees.

This facility was approved by the by the Connecticut Siting Council in Docket No. 169 on October 25, 1995. This approval included the conditions that:

1. The tower shall be constructed as a monopole, no taller than necessary to provide the proposed communications service, sufficient to accommodate the antennas of Springwich Cellular Limited Partnership and the Town of Marlborough, and not to exceed a total height of 160 feet above ground level (AGL).

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 Ms. Amy Traversa, First Selectman, Town of Marlborough, 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.

Melanie A. Bachman

July 6, 2016

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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: Ms. Amy Traversa
Town of Marlborough
26 North Main Street
Marlborough, CT 06447

CURRENT OWNER		TOPO.	UTILITIES	STRT./ROAD	LOCATION	CURRENT ASSESSMENT			
VILLAGE PROPERTIES LLC C/O CROWN ATLANTIC CO PMB 353 4017 WASHINGTON RD MCMURRAY, PA 15317 Additional Owners:		2 Above Street		1 Paved		Description	Code	Appraised Value	Assessed Value
						Comm Land	2-1	121,900	85,330
						Comm Bldg	2-2	80,600	56,420
						Comm OB	2-5	826,600	578,620
SUPPLEMENTAL DATA						6079 MARLBOROUGH, CT VISION			
Other ID: 2014T		EXEMPT CO							
Census Dev. Lot Dev. Map		Lake Area Photo Retake CB Letter							
GIS ID: 6/26/65T		ASSOC PID#							
						Total		1,029,100	720,370

RECORD OF OWNERSHIP		BK-VOL/PAGE	SALE DATE	q/u	v/i	SALE PRICE	V.C.	PREVIOUS ASSESSMENTS (HISTORY)								
VILLAGE PROPERTIES LLC		127/ 9	02/03/1999	U	I		29	Yr.	Code	Assessed Value	Yr.	Code	Assessed Value	Yr.	Code	Assessed Value
								2015	2-1	85,330	2014	2-1	90,300	2014	2-1	90,300
								2015	2-2	56,420	2014	2-2	25,270	2014	2-2	25,270
								2015	2-5	578,620	2014	2-5	463,260	2014	2-5	463,260
								Total:		720,370	Total:		578,830	Total:		578,830

EXEMPTIONS				OTHER ASSESSMENTS				This signature acknowledges a visit by a Data Collector or Assessor				
Year	Type	Description	Amount	Code	Description	Number	Amount	Comm. Int.				
Total:												

ASSESSING NEIGHBORHOOD					
NBHD/ SUB	NBHD Name	Street Index Name	Tracing	Batch	
0001/A					

NOTES						APPRaised VALUE SUMMARY	
CELL TOWER LOCATED BEHIND MARLBORO BARN		CELL TOWER VALUE = \$2083/MONTH-5% VAC-				80,600	
CELLULAR TOWER; GATED		15% EXPENSES = \$20,184 CAPPED AT 10% =				0	
500 FT LF FALL DOWN ZONE = 5.74 AC		\$201,880 PER SITE X 5 SITES = \$1,009,400				826,600	
1.84 COMMERCIAL SITE						121,900	
3.9 COMMERCIAL EXCESS						0	
						Total Appraised Parcel Value	1,029,100
						Valuation Method:	C
						Adjustment:	0
						Net Total Appraised Parcel Value	1,029,100

BUILDING PERMIT RECORD										VISIT/ CHANGE HISTORY					
Permit ID	Issue Date	Type	Description	Amount	Insp. Date	% Comp.	Date Comp.	Comments		Date	Type	IS	ID	Cd.	Purpose/Result
15-101	05/12/2015	CM	Commercial	0	07/27/2015	100		ANTENNA UPGRADE		07/27/2015			LM	99	Vacant Land
1128	12/27/2012	CM	Commercial	0	07/27/2015	100		GROUND MOUNTED C							
500	12/13/2011	CM	Commercial	0	07/27/2015	100		CHANGE SEVEN (7) AN							

LAND LINE VALUATION SECTION																			
B #	Use Code	Use Description	Zone	D	Front	Depth	Units	Unit Price	I. Factor	S.A.	Acre Disc	C. Factor	ST. Idx	Adj.	Notes- Adj	Special Pricing	S Adj Fact	Adj. Unit Price	Land Value
1	200	Commercial	R	A	181		1.84	76,000.00	0.6150	C	1.0000	1.00	D	1.10			1.00		94,600
1	200	Commercial	R				3.90	7,000.00	1.0000	0	1.0000	1.00		0.00			1.00		27,300

CONSTRUCTION DETAIL				CONSTRUCTION DETAIL (CONTINUED)			
Element	Cd.	Ch.	Description	Element	Cd.	Ch.	Description
Style	91		Support Shed				
Model	94		Commercial				
Grade	03		Average				
Stories	1						
Occupancy	1						
Exterior Wall A	24		Reinforc Concr				
Exterior Wall B							
Roof Structure	01		Flat				
Roof Cover	04		T&G/Rubber				
Interior Wall A	01		Minimum				
Interior Wall B							
Interior Floor A	03		Concrete				
Interior Floor B							
Heating Fuel	01		Coal or Wood				
Heating Type	01		None				
AC Type	03		Central				
Bldg Use	200		Commercial				
Heat/AC	02		HEAT/AC SPLIT				
Frame Type	04		Reinforced Cnc				
Baths/Plumbing	00		None				
Ceiling/Walls	00		None				
Rooms/Prtns	01		Light				
Wall Height	8						
% Comn Wall							

BAS	20	42
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OB-OUTBUILDING & YARD ITEMS(L) / XF-BUILDING EXTRA FEATURES(B)												
Code	Description	Sub	Sub Descript	L/B	Units	Unit Price	Yr	Gde	Dp Rt	Cnd	%Cnd	Apr Value
SHD1	Shed	FR	Frame	L	360	20.00	1999			5	60	4,300
FN4	Fence 8'			L	322	20.00	2000			5	60	3,900
PAT1	Patio	CR	Concrete	L	192	3.50	2000				60	400
CELL	Cell Tower			L	5	163,600.00	2011		0		100	818,000

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Gross Area	Eff. Area	Unit Cost	Undeprec. Value
BAS	First Floor	840	840	840		92,669
Ttl. Gross Liv/Lease Area:		840	840	840		92,669



Google Directions

Zoom

Google Maps

Town of Marlborough

Property Record Card

Property

Address 73 NO MAIN ST

ID 6/26/65T

Ownership

Name VILLAGE PROPERTIES LLC

Address PMB 353 MCMURRAY, PA 15317

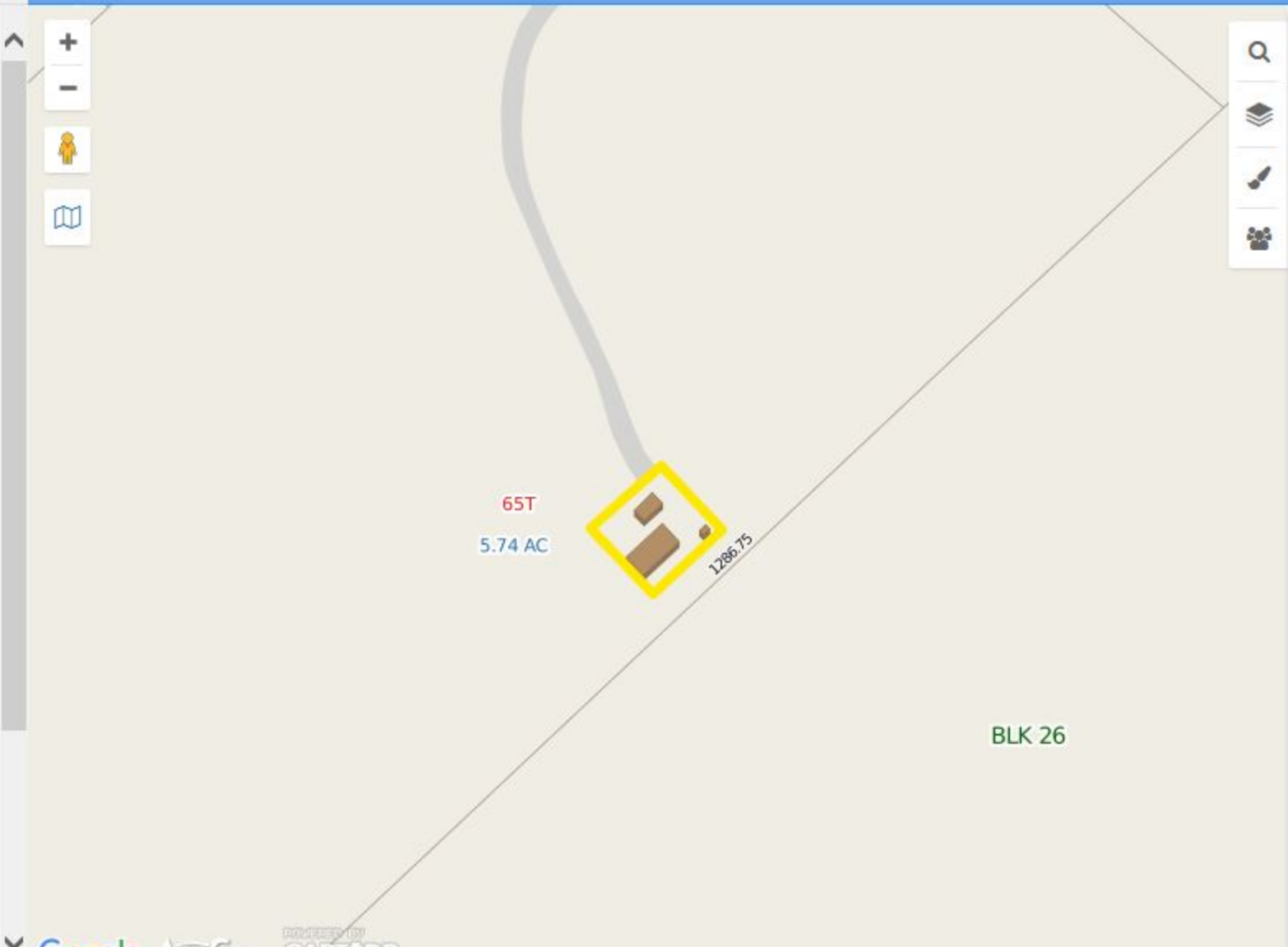
Valuation

Total \$1029100

Assessment

Land \$121900

Last Sale \$0.00 on 1999-02-03





WIRELESS COMMUNICATIONS FACILITY

CT1073 - LTE 2C

CROWN CASTLE SITE NO.: 806366

MARLBOROUGH - COUNTRY BARN

73 NORTH MAIN STREET

MARLBOROUGH, CT 06447

GENERAL NOTES

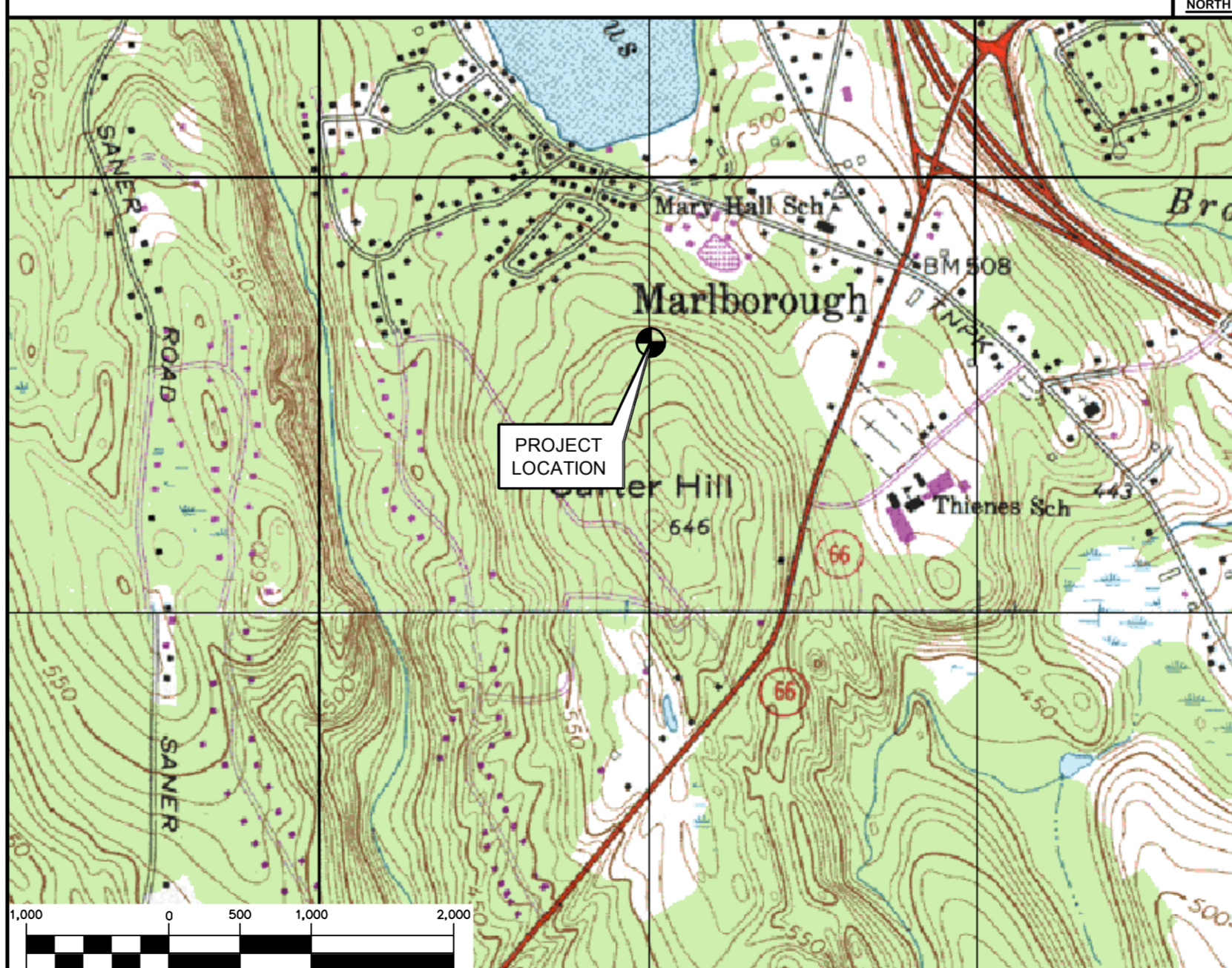
- ALL WORK SHALL BE IN ACCORDANCE WITH THE 2003 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2005 CONNECTICUT SUPPLEMENT AND 2009 AMENDMENTS, INCLUDING THE TA/EIA-222 REVISION "F" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES," 2005 CONNECTICUT FIRE SAFETY CODE AND 2009 AMENDMENTS, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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:	43 NORTH MAIN ST MARLBOROUGH, CT
1.	HEAD NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD	0.31 MI	
2.	TURN LEFT ONTO CAPITAL BLVD	0.27 MI	
3.	TURN LEFT ONTO WEST ST	0.16 MI	
4.	MERGE ONTO I-91N TOWARDS HARTFORD	4.44 MI	
5.	TAKE EXIT 25	2.34 MI	
6.	MERGE ONTO CT-2 E TOWARDS NORWICH	10.95 MI	
7.	TAKE EXIT 13, CT-66	0.26 MI	
8.	MERGE ONTO HEBRON RD/CT-66	0.26 MI	
9.	TAKE FIRST RIGHT ONTO N MAIN ST	0.17 MI	
10.	ARRIVE AT 43 N MAIN ST ON THE LEFT	0.26 MI	

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

- THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
 - INSTALL (3) NEW RRU-11 MOUNTED BY ANTENNA ON EXISTING MONOPOLE.

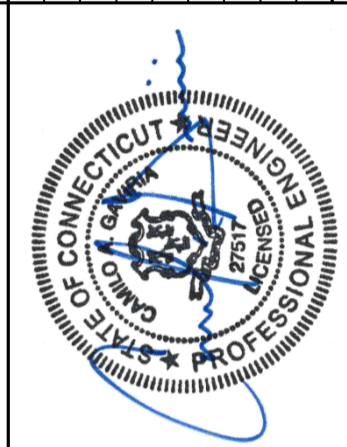
PROJECT INFORMATION

AT&T SITE NUMBER:	CT1073
AT&T SITE NAME:	MARLBOROUGH - COUNTRY BARN
SITE ADDRESS:	CROWN CASTLE SITE NO.: 806366 43 NORTH MAIN STREET MARLBOROUGH, CT 06447
LESSEE/APPLICANT:	NEW CINGULAR WIRELESS PCS, LLC 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
ENGINEER:	CENITEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT. 06405
PROJECT COORDINATES:	LATITUDE: 41°-37'-47.28" N LONGITUDE: 72°-27'-59.40" W GROUND ELEVATION: ±525.0' AMSL GROUND ELEVATION REFERENCED FROM GOOGLE EARTH. COORDINATES REFERENCED FROM RFDS DOCUMENTS.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	1
N-1	NOTES AND SPECIFICATIONS	0
C-1	PLANS, ELEVATION AND DETAILS	1
C-2	LTE 2C EQUIPMENT DETAILS	1
E-1	LTE SCHEMATIC DIAGRAM AND NOTES	0
E-2	LTE WIRING DIAGRAM	0
E-3	TYPICAL ELECTRICAL DETAILS	0

PROFESSIONAL ENGINEER SEAL



CENITEK engineering
 Centek on Solutions
 (203) 498-0390
 (203) 498-3387 Fax
 632 North Branford Road
 Branford, CT 06405
 www.CentekEng.com

AT&T MOBILITY
 WIRELESS COMMUNICATIONS FACILITY
MARLBOROUGH - COUNTRY BARN
CT1073 - LTE2C
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

DATE: 05/12/16
 SCALE: AS NOTED
 JOB NO. 16071.03

TITLE SHEET

T-1
 Sheet No. 1 of 7

REV.	DATE	BY	CHK'D	DESCRIPTION
1	06/15/16	CAG	JTD	CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION
0	05/06/16	CAG	JTD	CONSTRUCTION DOCUMENTS - ISSUED FOR CLIENT REVIEW

NOTES AND SPECIFICATIONS

DESIGN BASIS:

GOVERNING CODE: 2003 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2005 CT STATE BUILDING CODE AND 2009 AMENDMENTS.

- 1. DESIGN CRITERIA:
 - WIND LOAD: PER EIA/TIA 222 F-96 (ANTENNA MOUNTS): 80 MPH (FASTEST MILE), EQUIVALENT TO 100 MPH (3 SECOND GUST)
 - BUILDING CLASSIFICATION: II (BASED ON IBC TABLE 1604.5)
 - BASIC WIND SPEED (OTHER STRUCTURE): 105 MPH (3 SECOND GUST) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-02) PER 2003 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2005 CONNECTICUT SUPPLEMENT AND 2009 AMMENDMENT.
 - SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7-02 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

- 1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
- 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.
- 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.
- DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
- THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
- 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.
- 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.
- 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.
- 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
- 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.
- 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.
- 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.
- NO DRILLING WELDING OR TAPING ON CL&P OWNED EQUIPMENT.
- REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

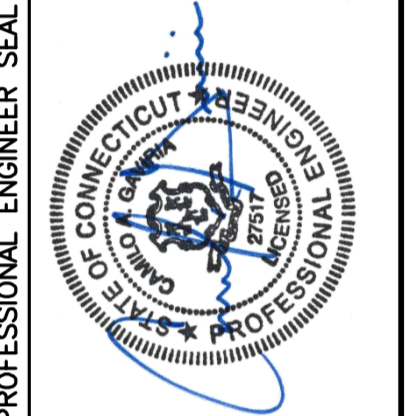
- 1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)
 - A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
 - B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
 - C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
 - D. STRUCTURAL HSS (ROUND SHAPES)---ASTM 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.

REV.	DATE	DRAWN BY	CHECKED BY	ISSUED FOR
0	05/08/16	JTD	CAG	CONSTRUCTION DOCUMENTS
				FOR CONSTRUCTION

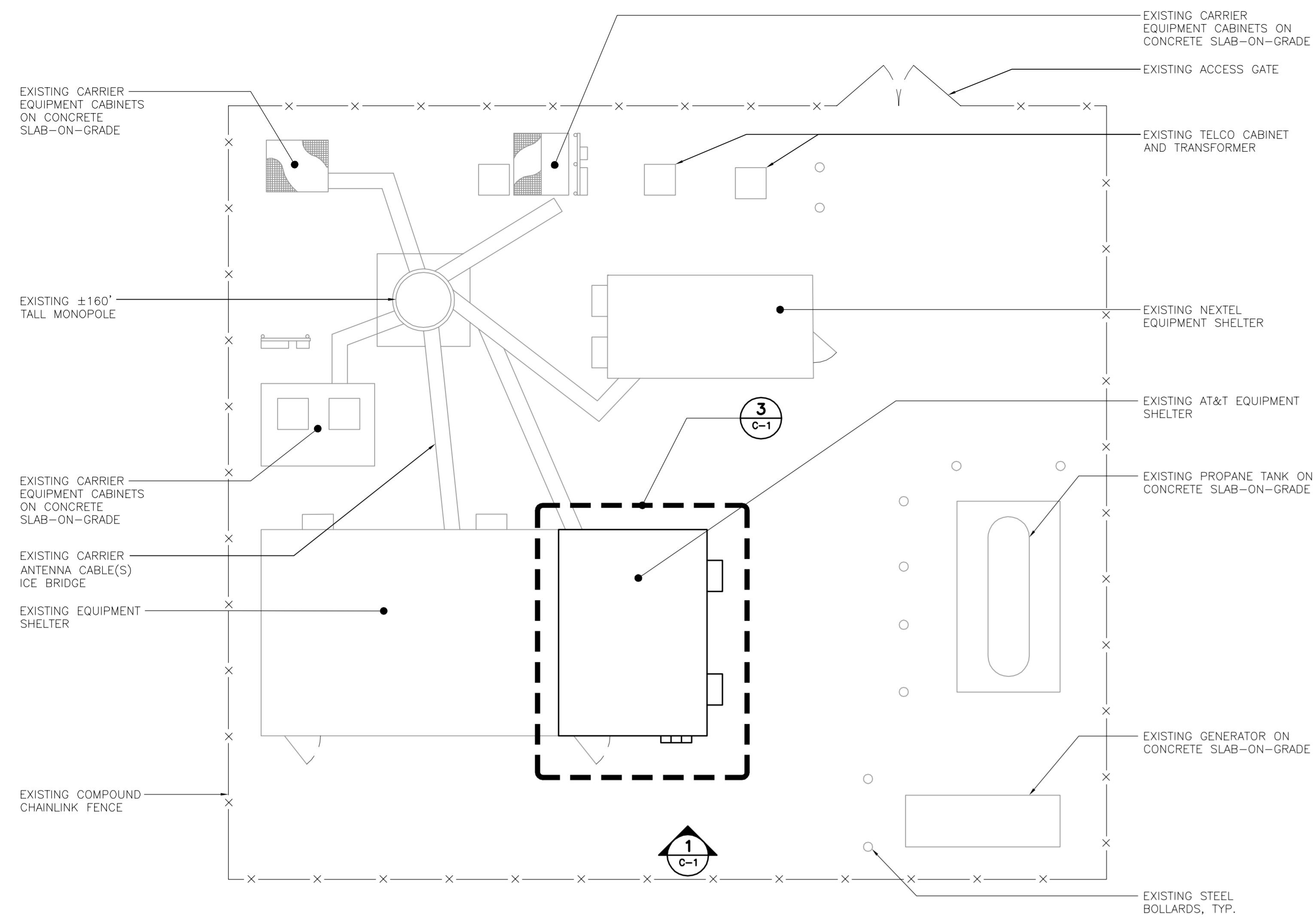


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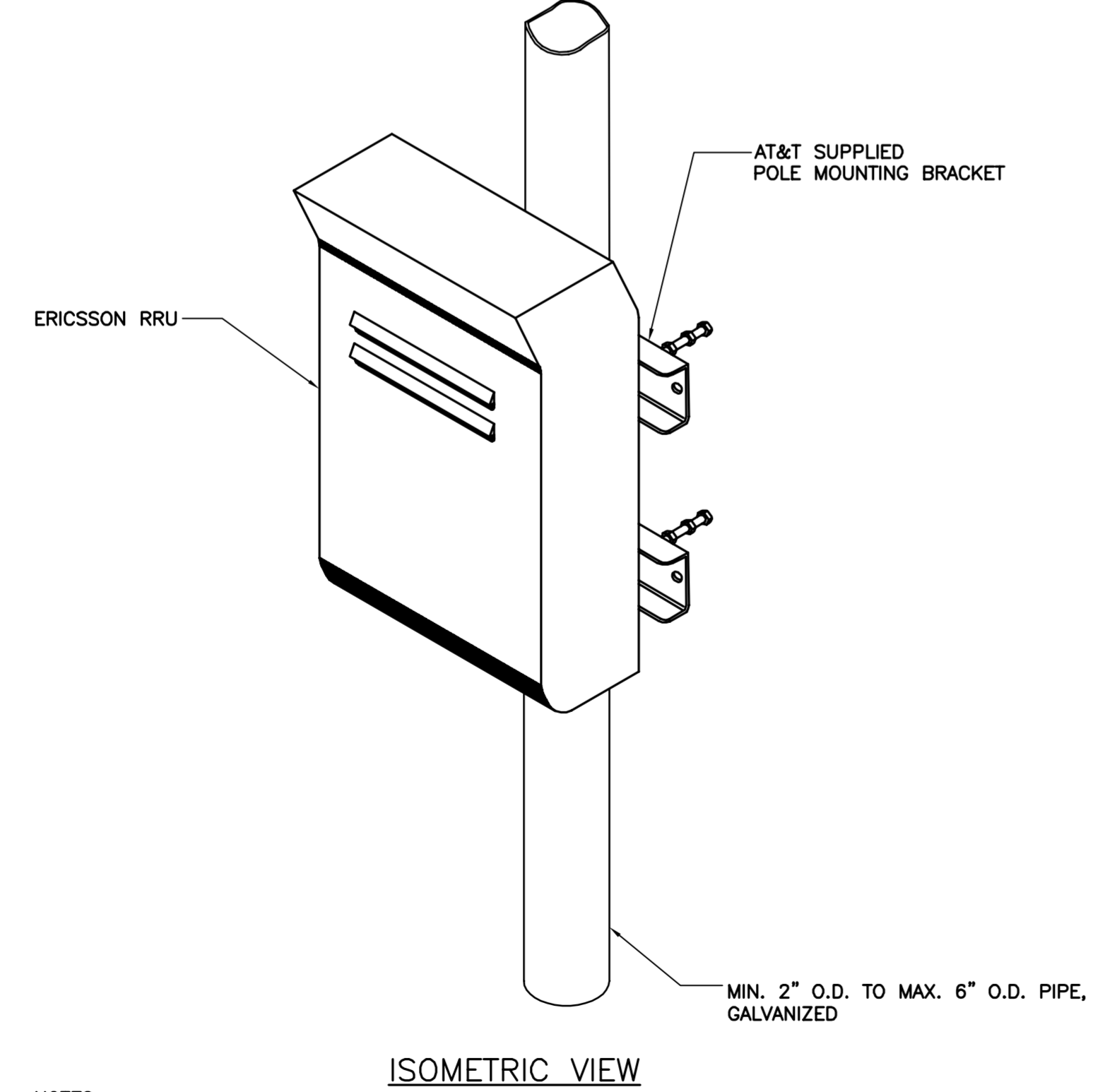
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DATE: 05/12/16
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JOB NO. 16071.03

NOTES AND SPECIFICATIONS



2 COMPOUND PLAN
C-1 SCALE: 1/8" = 1'-0" NORTH



ISOMETRIC VIEW

NOTES:

- 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.
- NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

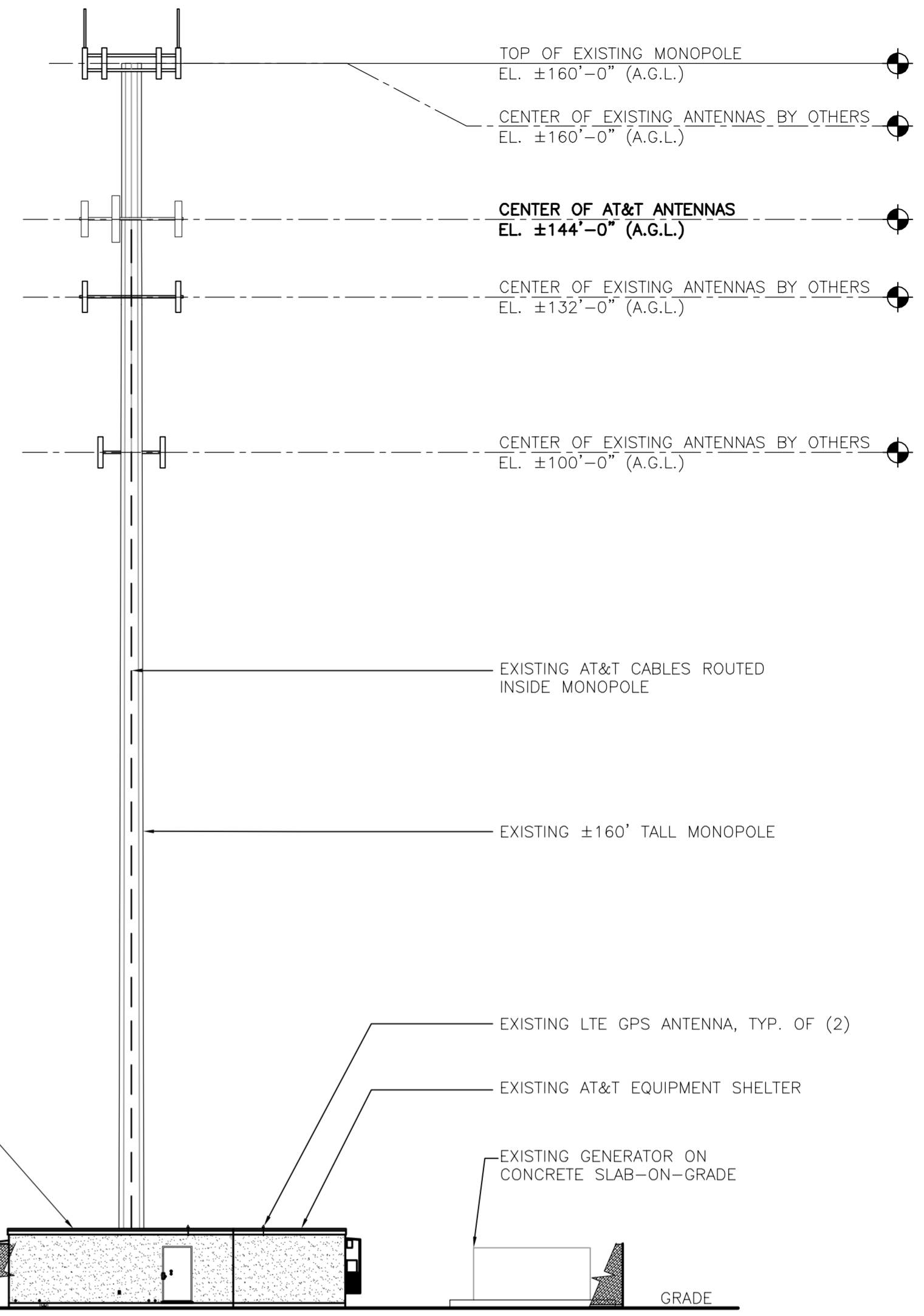
4 TYPICAL RRUS MOUNTING DETAILS
C-1 SCALE: 1 1/2" = 1'-0"

TOWER STRUCTURAL NOTES:

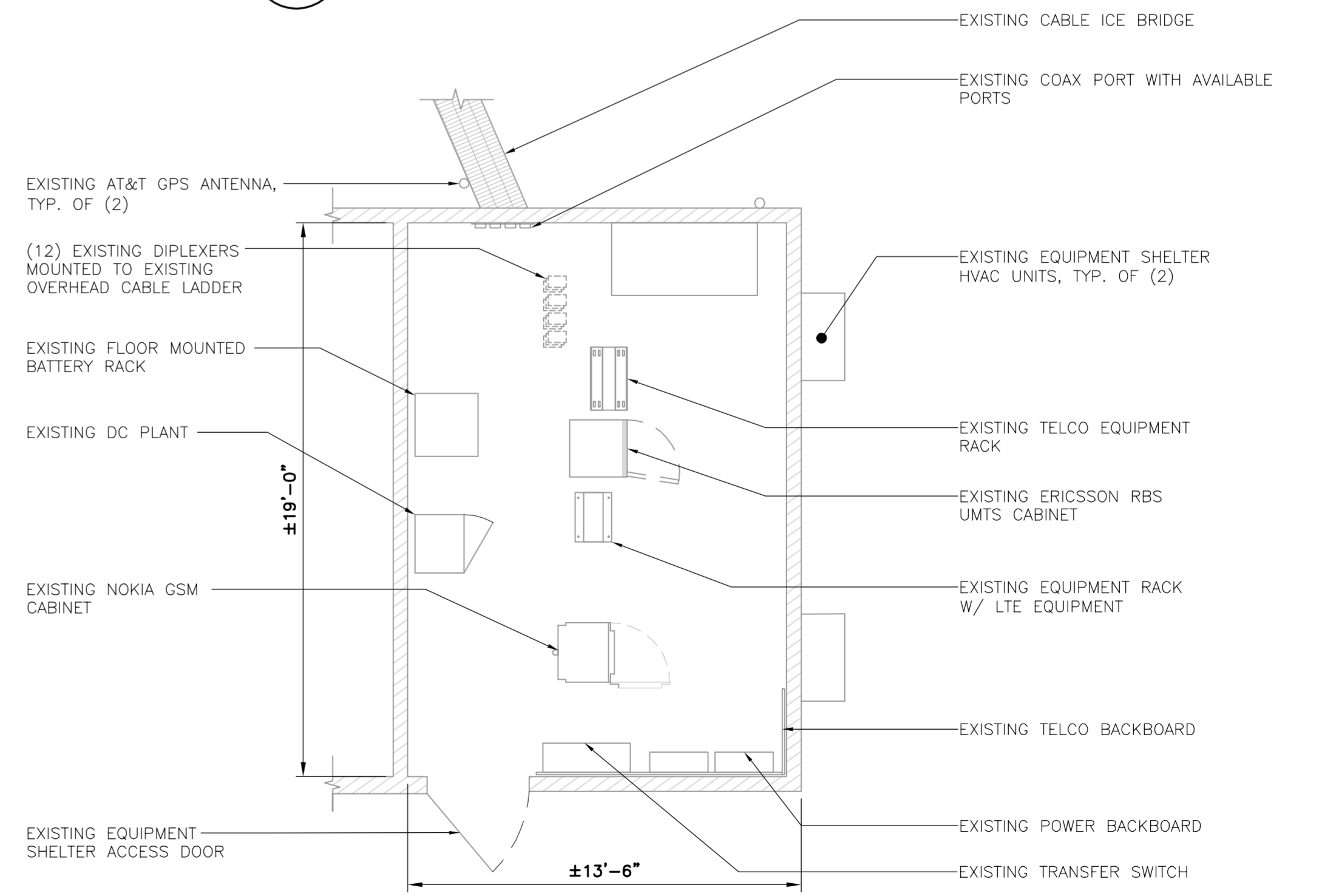
- TOWER STRUCTURAL ANALYSIS SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT TO BE PROVIDED PRIOR TO INSTALLATION OF THE ADDITIONAL TOWER LOADING DEPICTED HEREIN.
- ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE, INC.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

NOTES:

- OTHER CARRIER EQUIPMENT NOT SHOWN FOR CLARITY
- A.G.L. = ABOVE GRADE LEVEL

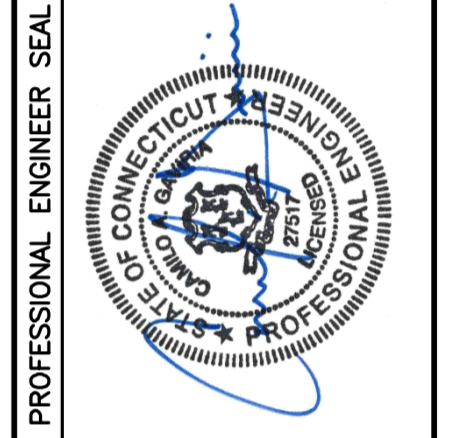


1 NORTHWEST ELEVATION
C-1 SCALE: 1" = 15'



3 EQUIPMENT LAYOUT PLAN
C-1 SCALE: 1/4" = 1'-0" NORTH

REV.	DATE	BY	CHKD	DESCRIPTION
1	6/15/16	CAC	JTD	LVP CAC CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION
0	05/09/16	CAC	JTD	CAC CONSTRUCTION DOCUMENTS - ISSUED FOR CLIENT REVIEW

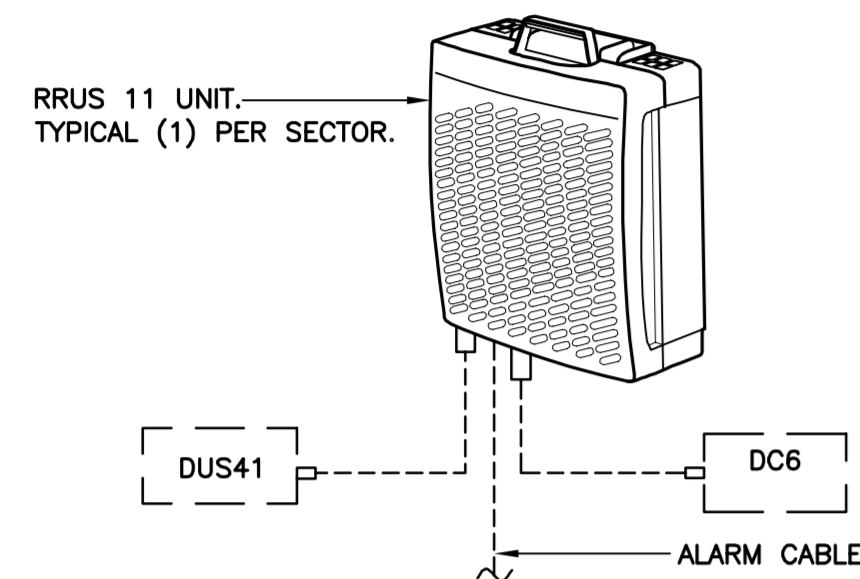


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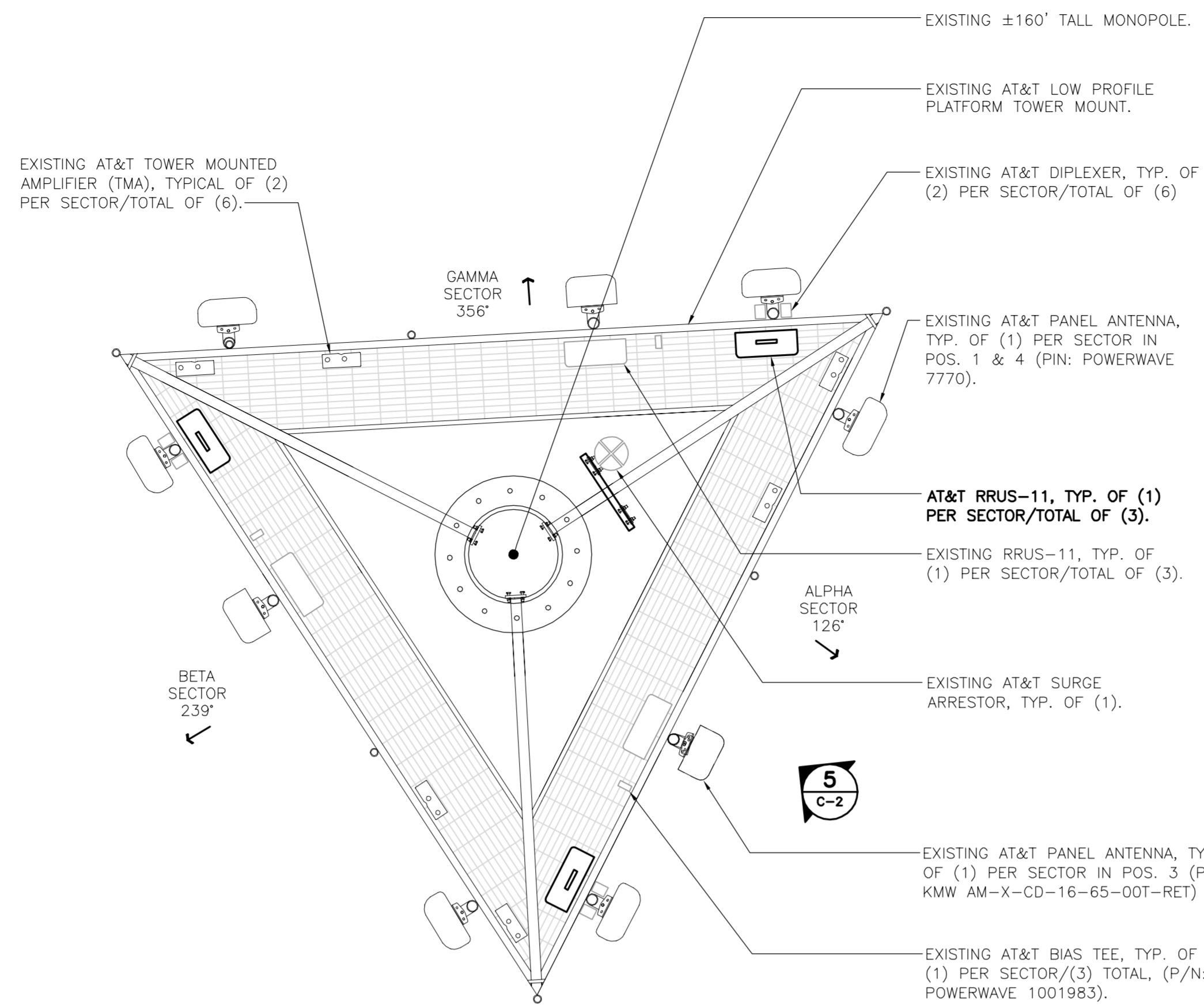
PLANS, ELEVATION AND DETAILS



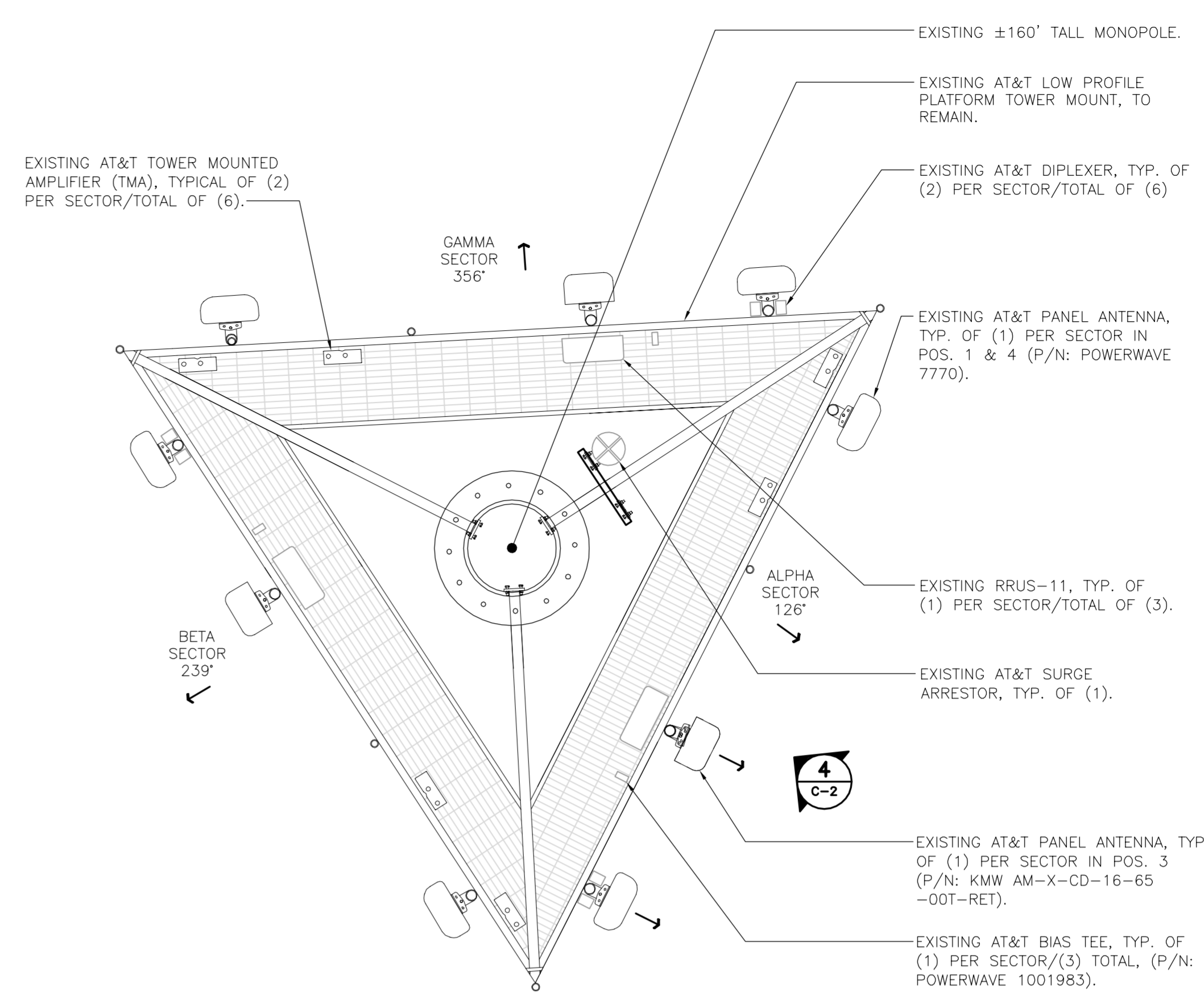
RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS 11	17.8"L x 17.3"W x 7.2"D	50 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

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

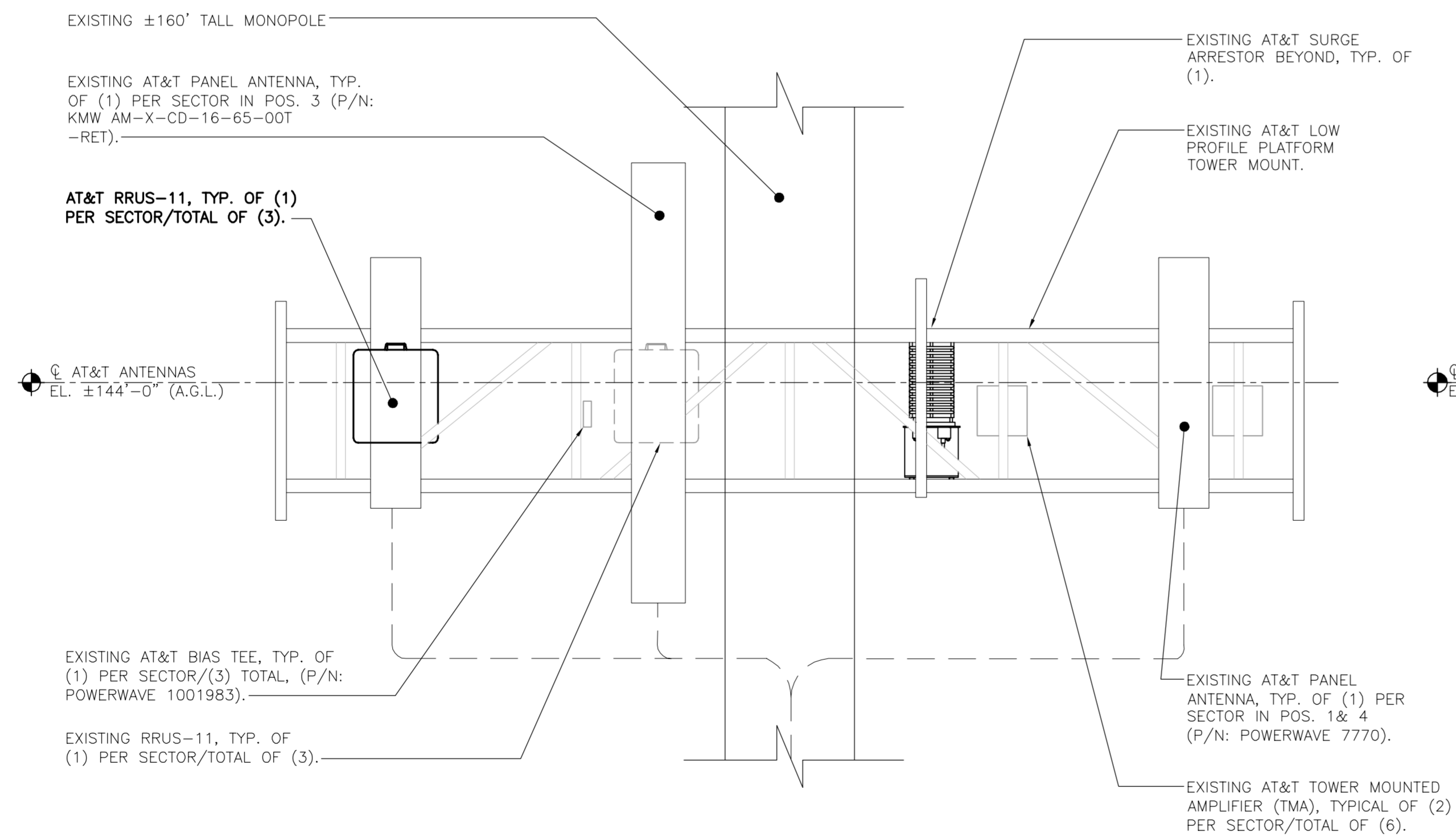
3 ERICSSON RRUS 11 DETAIL
C-2 SCALE: 1" = 1'-0"



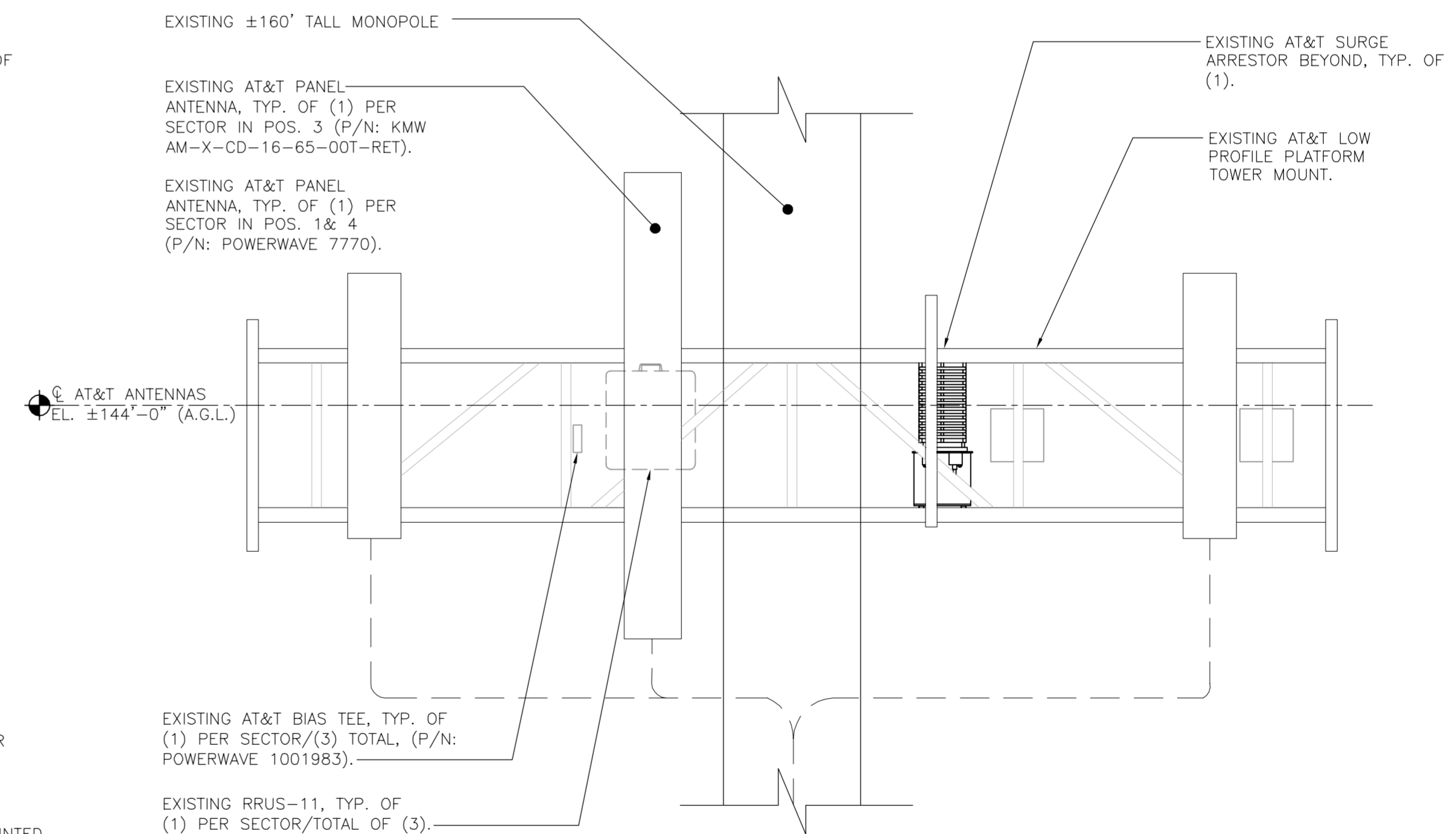
2 PROPOSED ANTENNA PLAN
C-2 SCALE: 3/8" = 1'-0" NORTH



1 EXISTING ANTENNA PLAN
C-2 SCALE: 3/8" = 1'-0" NORTH

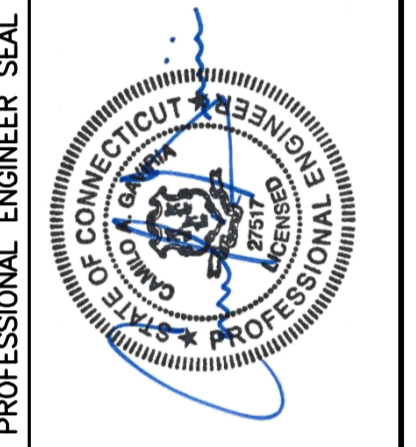


5 PROPOSED ANTENNA PLAN
C-2 SCALE: 1/2" = 1'-0"
NOTE: EXISTING DIPLEXERS BEHIND ANTENNA POSITION 4 NOT SHOWN FOR CLARITY.



4 EXISTING ANTENNA PLAN
C-2 SCALE: 1/2" = 1'-0"
NOTE: EXISTING DIPLEXERS BEHIND ANTENNA POSITION 4 NOT SHOWN FOR CLARITY.

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1	6/15/16	CAC	JTD	CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION
0	05/09/16	CAC	JTD	CONSTRUCTION DOCUMENTS - ISSUED FOR CLIENT REVIEW



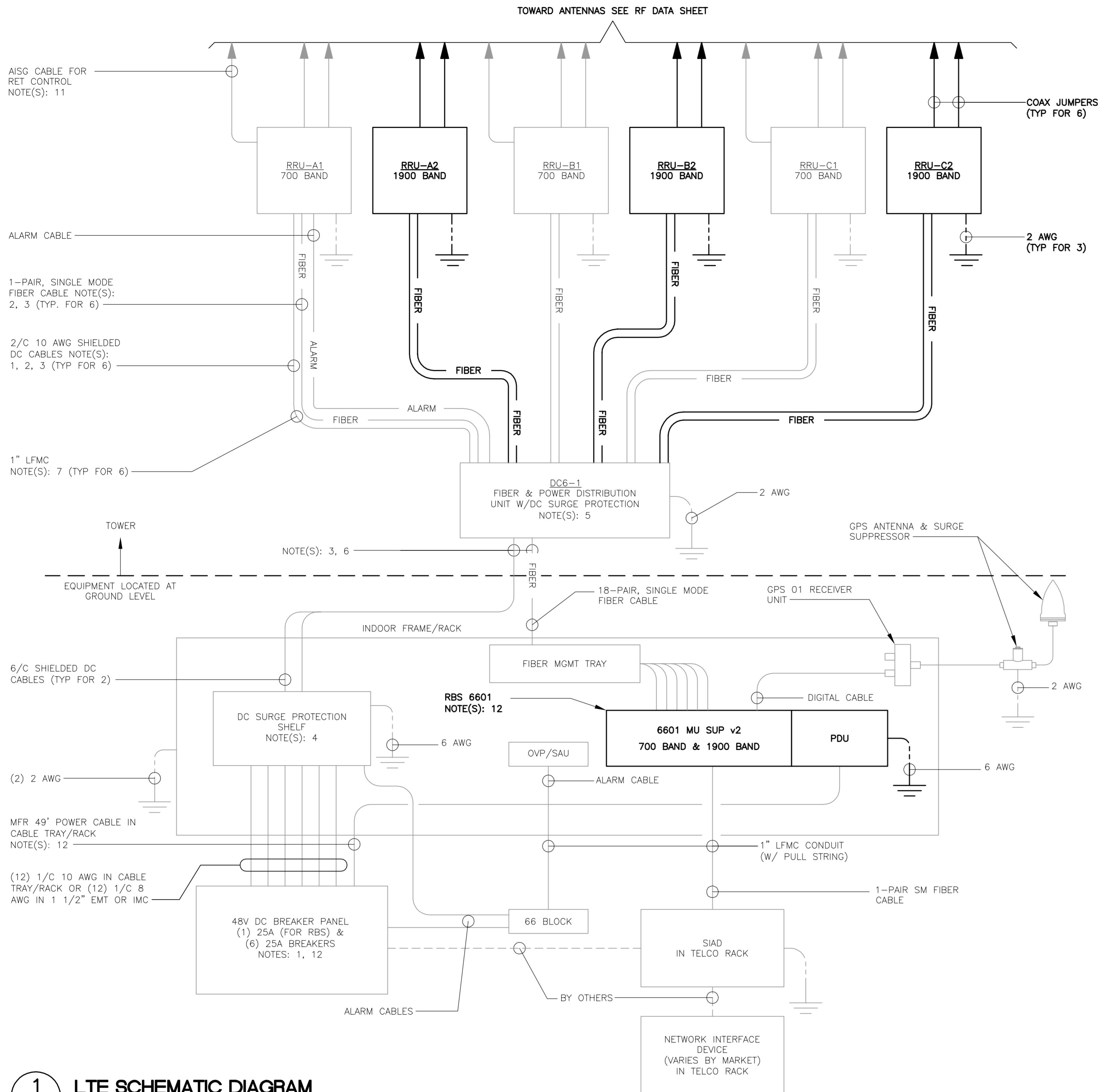
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LTE 2C
EQUIPMENT
DETAILS

C-2
Sheet No. 4 of 7



1
E-1
LTE SCHEMATIC DIAGRAM
NOT TO SCALE

LTE SCHEMATIC DIAGRAM NOTES:

1. BREAKERS TO BE TAGGED AND LOCKED OUT. A 20A (MIN.) OR 30A (MAX.) BREAKER FOR RRUs MAY BE SUBSTITUTED FOR THE RECOMMENDED 25A BREAKER. SIZE 12 CONDUCTORS MAY BE USED ONLY WITH 20A BREAKERS.
2. LEAVE COILED AND PROTECTED UNTIL TERMINATED.
3. DC AND FIBER CABLE SHALL BE ROUTED WITH THE EXISTING COAX CABLE.
4. DC SURGE PROTECTION SHELF SHALL BE RAYCAP DCx-48-60-RM.
5. FIBER & DC DISTRIBUTION BOX W/DC SURGE PROTECTION SHALL BE RAYCAP DC6-48-60-18-BF.
6. SUPPORT FIBER & DC POWER CABLES WITH SNAP-IN HANGERS SPACED NO GREATER THAN 3 FEET APART ON TOWER. SUPPORT FIBER AND DC POWER CABLES INSIDE MONOPOLE WITH CABLE HOISTING GRIPS AT 250 FT MAXIMUM INTERVALS. DRESS CABLES TO PREVENT CONTACT WITH ENTRANCE AND EXIT OPENINGS.
7. CONDUIT TO BE USED ON A TOWER IF THE RRU IS MORE THAN 10' FROM THE DISTRIBUTION UNITS. MAX CABLE LENGTH IS 16 FEET.
8. SINGLE-CONDUCTOR DC POWER CABLES SHALL BE TELCOFLEX® OR KS24194", COPPER, UL LISTED RHH NON-HALOGEN, LOW SMOKE WITH BRAIDED COVER, TYPE TC (1/0 AND LARGER). UNLESS OTHERWISE NOTED, STRANDING SHALL BE CLASS B (TYPE III) FOR CABLES SIZES 14, 12 & 10 AWG AND CLASS 1 (TYPE IV) FOR SIZES 8 AWG AND LARGER. CABLES SHALL BE COLOR CODED RED FOR +24V, BLUE FOR -48V AND GRAY FOR 24V AND 48V RETURN CONDUCTORS. MULTI-CONDUCTOR DC POWER CABLES SHALL BE COPPER, CLASS B STRANDING WITH FLAME RETARDANT PVC JACKET, TYPE TC, UL LISTED FOR 90°C DRY/75°C WET INSTALLATION.
9. GROUNDING WIRES SHALL BE COPPER, GREEN THHN/THWN UL LISTED FOR 90°C DRY/75°C WET INSTALLATION. MINIMUM SIZE IS 6 AWG UNLESS NOTED OTHERWISE.
10. FIBER OPTIC CABLES SHALL BE INSTALLED IN FLEXIBLE CONDUIT AS SCOPED BY MARKET.
11. RET CONTROL FROM THE RRU IS AN OPTIONAL METHOD OF CONNECTION. REFER TO RF DATA SHEET FOR APPLICABILITY.
12. RBS 6601 VARIANT 2 REQUIRES A 25A BREAKER AND 10 AWG (MIN.) CONDUCTORS. REPLACE EXISTING 15A OR 20A BREAKERS AND 12 AWG CONDUCTORS WHEN UPGRADING AN EXISTING RBS 6601 VARIANT 1.

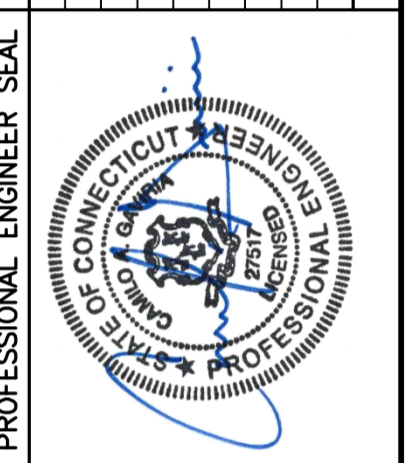
ELECTRICAL NOTES

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.

CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION
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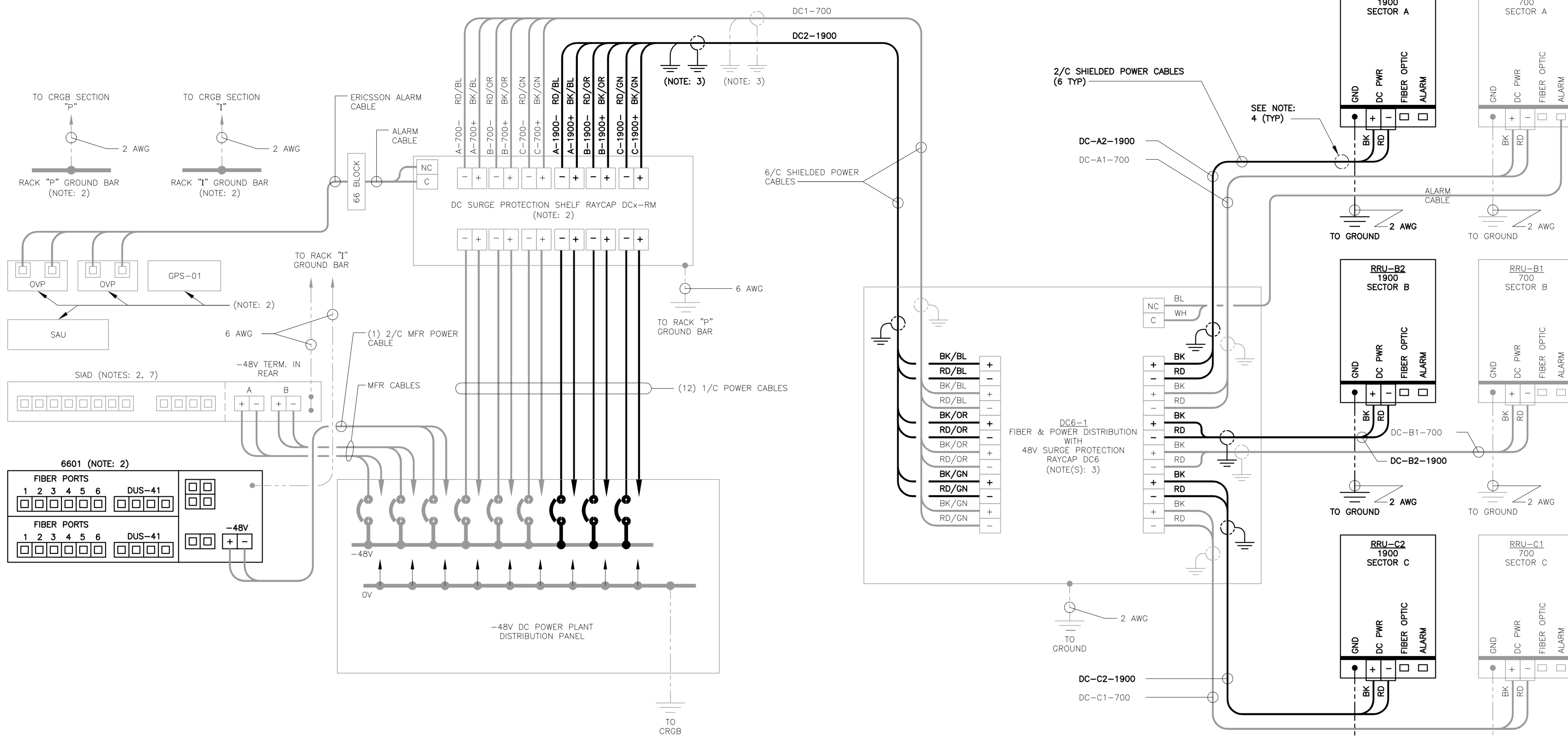
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LTE SCHEMATIC
DIAGRAM
AND NOTES

E-1

Sheet No. 5 of 7

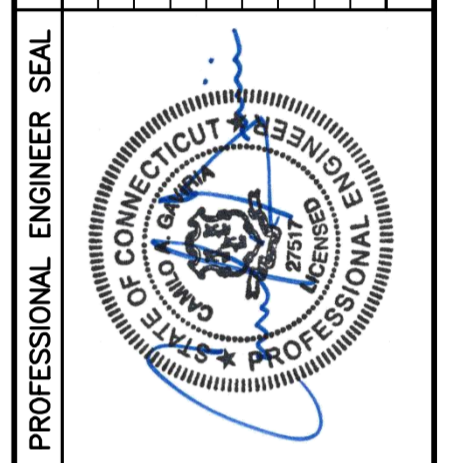


1 LTE WIRING DIAGRAM
E-2 NOT TO SCALE

LTE WIRING DIAGRAM NOTES:

1. LABEL THE DC POWER CABLES AT BOTH ENDS OF EVERY WIRE AND IN ANY PULL BOX IF USED. LABEL SHALL BE DURABLE, SELF ADHESIVE, WRAPPED LONGITUDINALLY ALONG THE CABLE AND STATE THE SECTOR, FREQUENCY BAND AND POLARITY; I.E. "A-1900+". CABLE AND WIRE LABELS SHOWN ARE REPRESENTATIVE AND MAY BE MODIFIED AS DIRECTED BY AT&T.
2. INSTALL ON BASEBAND EQUIPMENT RACK.
3. MAXIMUM CABLE LENGTH IS 49 FEET WITHOUT SURGE PROTECTION AT RRU. INCREASE CONDUCTOR SIZE TO 10 OR 8 AWG WHERE BREAKER RATING IS GREATER THAN 20A.
4. CABLE GROUND WIRE AND SHIELD DRAIN WIRE TO BE LEFT UN-TERMINATED AT RRU AND DC POWER PLANT.
5. SEE LTE SCHEMATIC DIAGRAM DETAIL 1/E-1 FOR BREAKER RATING.

REV	0	DATE	05/06/16	DRAWN BY	JTD	CAG	CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION
REV		DATE		DRAWN BY			BY/CHKD BY/DESCRIPTION

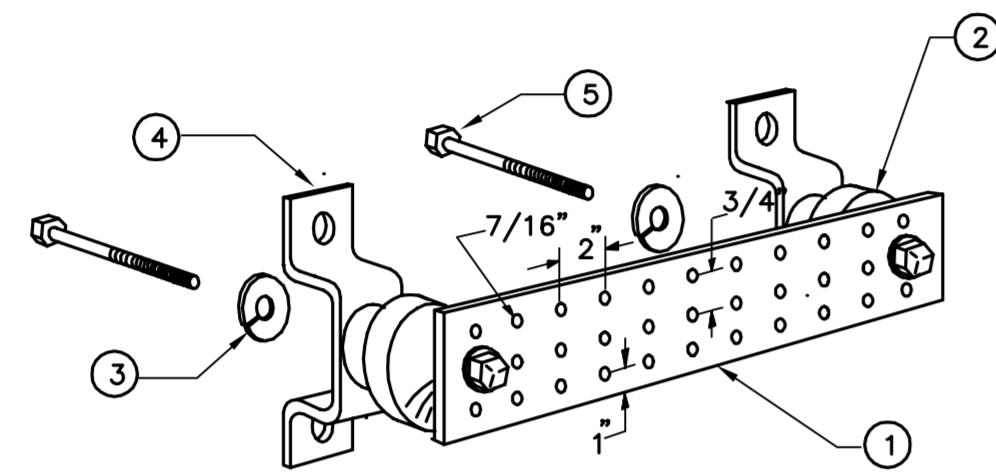


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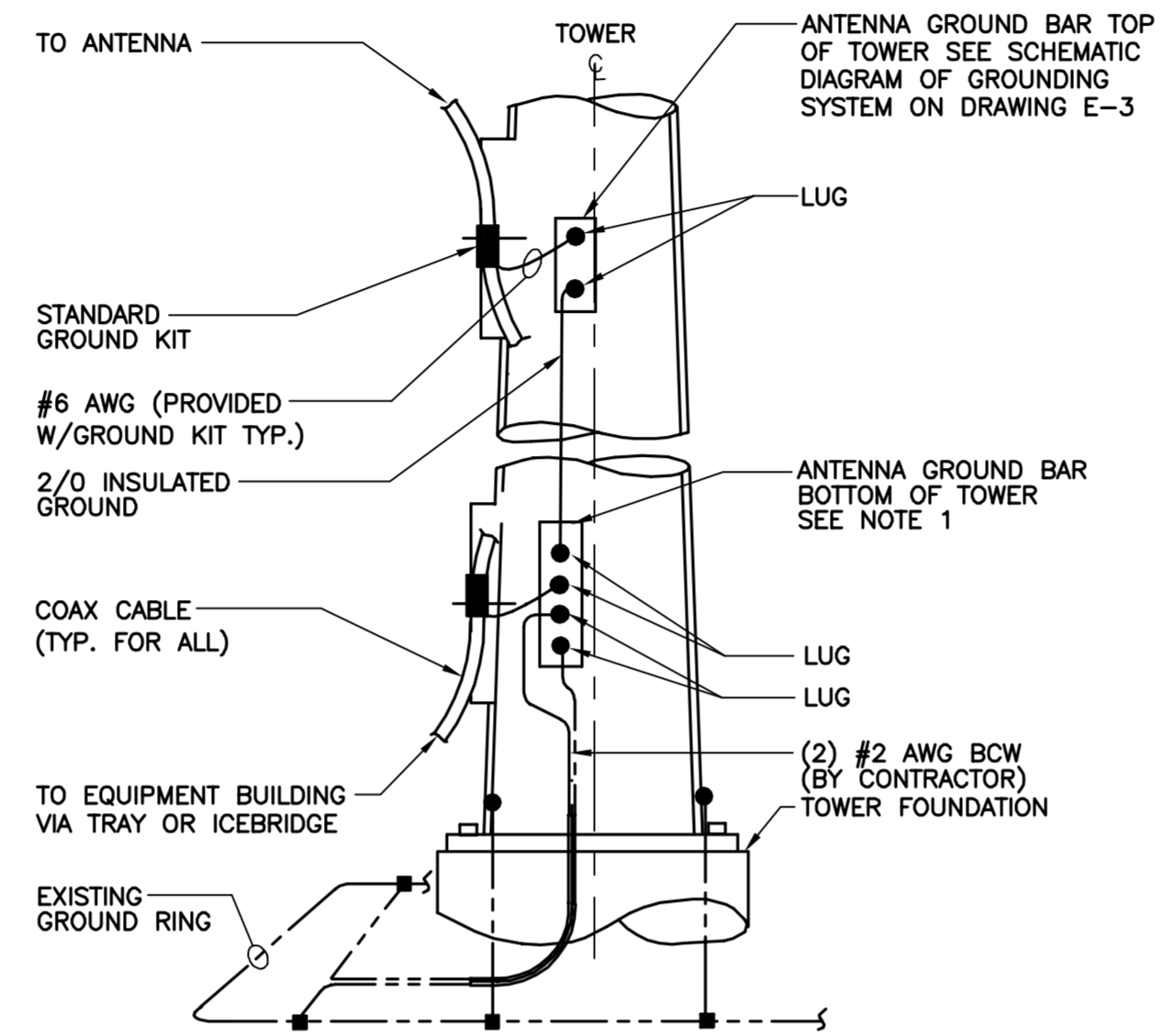
LTE WIRING DIAGRAM



LEGEND

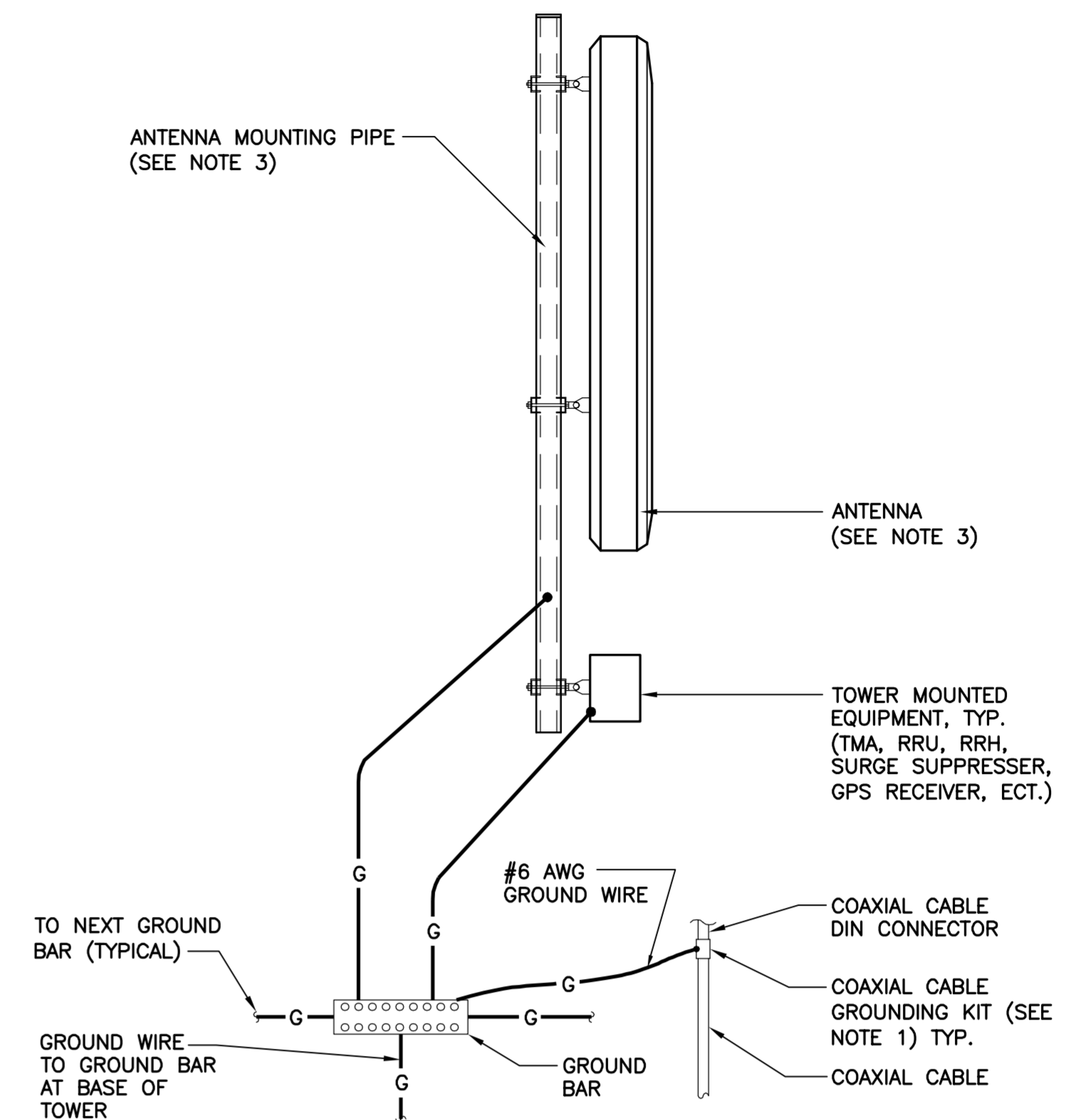
1. TINNED COPPER GROUND BAR, 1/4" x 4" x 20", NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG.
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 2. 3061-4.
3. 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT. NO. A-6056.
5. STAINLESS STEEL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

3 GROUND BAR DETAIL
E-3 NOT TO SCALE



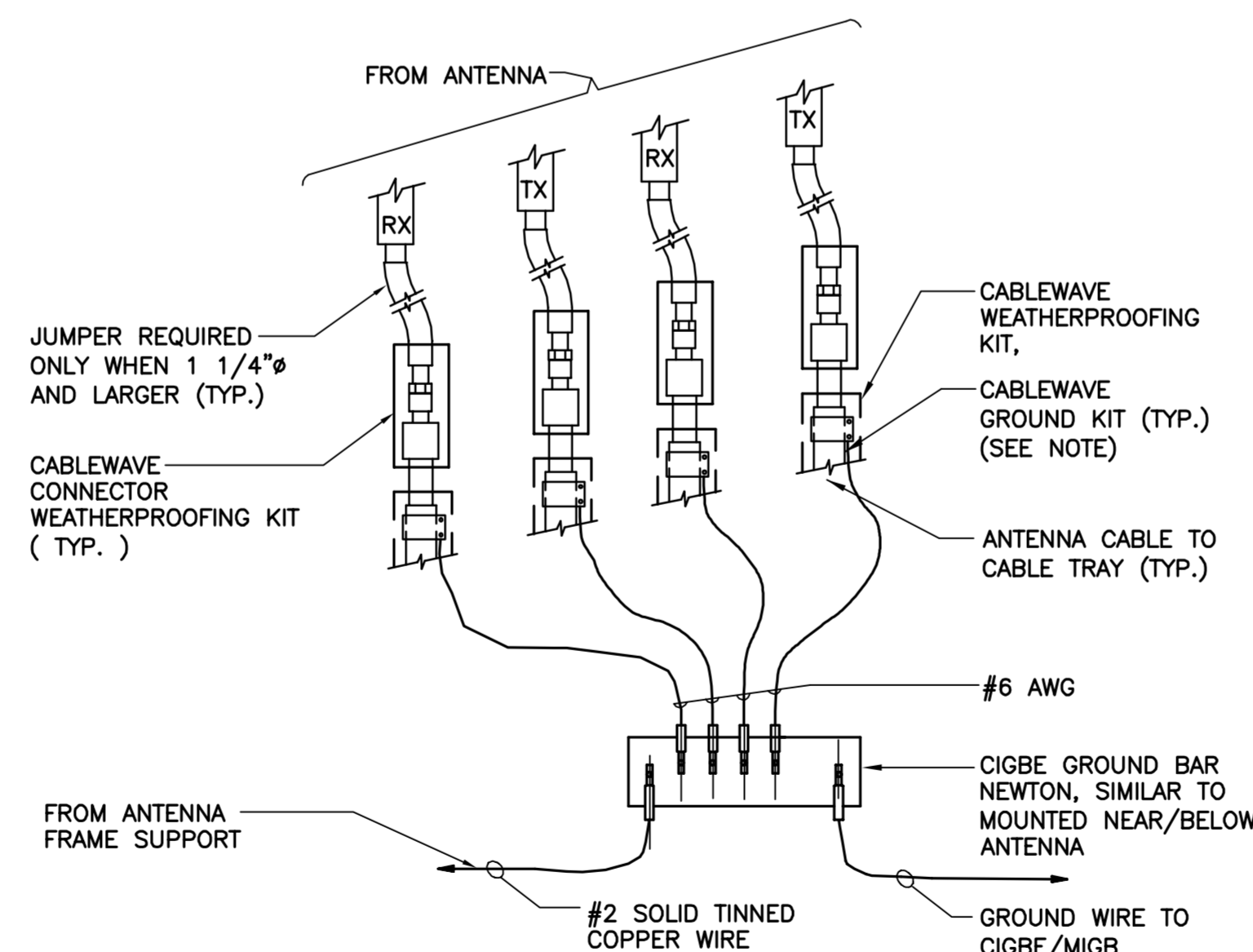
- NOTES:**
1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
 2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED.

2 ANTENNA CABLE GROUNDING - TOWER
E-3 NOT TO SCALE



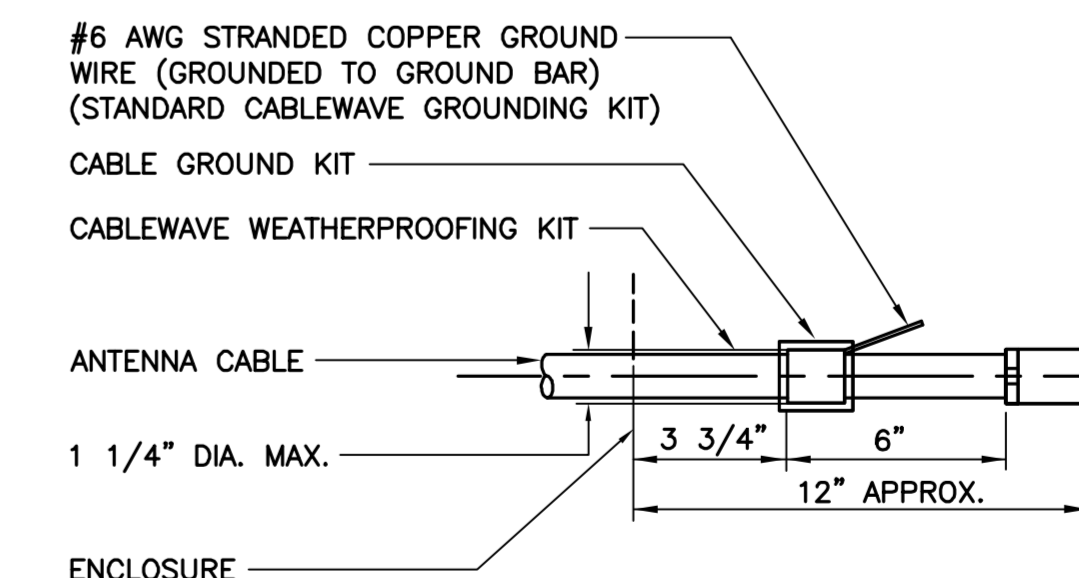
- NOTES:**
1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
 2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
 3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

1 TYPICAL ANTENNA GROUNDING DETAIL
E-3 NOT TO SCALE



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

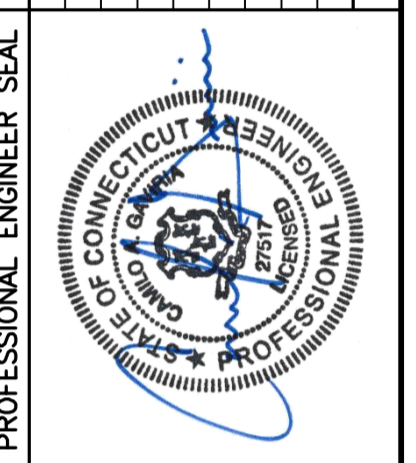
5 CONNECTION OF GROUND WIRES TO GROUND BAR
E-3 NOT TO SCALE



- NOTE:**
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

4 ANTENNA CABLE GROUNDING DETAIL
E-3 NOT TO SCALE

REV.	DATE	DRAWN BY	CHKD BY	DESCRIPTION
0	05/06/16	JTD	CAG	CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION



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CT1073 - LTE2C
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

DATE: 05/12/16
SCALE: AS NOTED
JOB NO. 16071.03

TYPICAL ELECTRICAL DETAILS
E-3
Sheet No. 3 of 7



ENGINEERING INNOVATION

Velocitel, Inc., d.b.a. FDH Velocitel
6521 Meridien Drive, Suite 107
Raleigh, North Carolina 27616
9197551012

Date: **June 08, 2016**

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

Subject: Structural Analysis Report

Carrier Designation: *AT&T Mobility Co-Locate*
Carrier Site Number: CTL01073
Carrier Site Name: MARLBOROUGH-COUNTRY BARN

Crown Castle Designation:
Crown Castle BU Number: 806366
Crown Castle Site Name: HRT 107(C) 943204
Crown Castle JDE Job Number: 381151
Crown Castle Work Order Number: 1248137
Crown Castle Application Number: 343864 Rev. 1

Engineering Firm Designation: **FDH Velocitel Project Number:** 16BJOJ1400

Site Data: **NORTH MAIN STREET, MARLBOROUGH, Hartford County, CT**
Latitude 41° 37' 47.3", Longitude -72° 27' 59.4"
155.5 Foot - Monopole Tower

Dear Charles Trask,

FDH Velocitel 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 910860, in accordance with application 343864, revision 1.

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

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

The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 Connecticut Building Code based upon a wind speed of 80 mph fastest mile.

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

Respectfully submitted by:

Reviewed by:

Mark S. Girgis, EI
Project Engineer II

Dennis D. Abel, PE
Director of Structural Engineering
CT PE License No. 23247



06-08-2016

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1) INTRODUCTION

This tower is a 155.5 ft Monopole tower designed by FWT INC. in December of 1997. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1.25 inch ice thickness and 50 mph under service loads.

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
144.0	144.0	3	powerwave tech	1001940	-	-	-

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			
156.0	159.0	3	alcatel lucent	RRH2x60-700	-	-	2			
		6	andrew	SBNHH-1D65B w/ Mount Pipe						
		3	alcatel lucent	RRH2x60-AWS						
		3	alcatel lucent	RRH2x60-PCS						
		5	commscope	LNx-6514DS-A1M w/ Mount Pipe				14	1-5/8	1
		1	commscope	LNx-8513DS-VTM w/ Mount Pipe						
		2	rfs celwave	DB-T1-6Z-8AB-0Z						
		156.0	3	decibel	DB809K-Y	3	1-5/8	1		
		1	crown mounts	Platform Mount [LP 1001-1]	-	-	1			
144.0	144.0	1	crown mounts	Platform Mount [LP 1002-1]	1 2 12	3/8 3/4 1-1/4	1			
		6	ericsson	RRUS-11						
		3	kmw comm	AM-X-CD-16-65-00T-RET w/ Mount Pipe						
		6	powerwave tech	7770.00 w/ Mount Pipe						
		6	powerwave tech	LGP 17201						
		6	powerwave tech	LGP21903						
		1	raycap	DC6-48-60-18-8F						
135.0	135.0	3	kathrein	742 213 w/ Mount Pipe	6	1-1/4	1			
127.0	127.0	1	crown mounts	T-Arm Mount [TA 602-3]	-	-	1			
126.0	128.0	2	kreco	CO-41A	4	7/8	2			
		1	telewave	ANT450F6						
		1	telewave	ANT450Y7-WR						
		6	decibel	DB980H90E-M w/ Mount Pipe	6	1-1/4	1			
125.0	125.0	1	crown mounts	T-Arm Mount [TA 602-3]	-	-	1			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
100.0	100.0	6	andrew	ETM19V2S12UB	12	1-1/4	1
		3	commscope	ATBT-BOTTOM-24V			
		3	commscope	LNx-6515DS-VTM w/ Mount Pipe			
		1	crown mounts	Side Arm Mount [SO 701-3]			
		3	ems wireless	RV90-17-00DP w/ Mount Pipe			

- Notes:
 1) Existing Equipment
 2) Reserved Equipment
 3) 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)
157.75	157.75	12	Swedcom	ALP-9212-N	-	-
		1	generic	16' Platform w/ Handrail		
144.25	144.25	9	Swedcom	ALP-9212-N	-	-
		1	generic	16' Platform w/ Handrail		
132.00	132.00	2	Celwave	PD1142	-	-
		1	Celwave	PD201		
		2	Celwave	PD220		
		9	Decibel	DB980		
		3	generic	10' T-Arm w/ Double Mounts		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-TOWER MANUFACTURER DRAWINGS	FWT, Inc.	823126	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	FWT, Inc.	823125	CCISITES
4-GEOTECHNICAL REPORTS	FDH Engineering, Inc.	2208816	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	155.5 - 110	Pole	TP64.606x58.6x0.375	1	-21.73	3194.44	17.5	Pass
L2	110 - 72.5	Pole	TP68.805x62.8x0.4375	2	-37.45	4260.83	32.7	Pass
L3	72.5 - 36	Pole	TP72.748x66.8082x0.5	3	-55.58	5424.19	43.1	Pass
L4	36 - 0	Pole	TP76.5x70.56x0.5	4	-79.32	5547.27	64.7	Pass
							Summary	
						Pole (L4)	64.7	Pass
						Rating =	64.7	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	64.2	Pass
1	Base Plate	0	31.8	Pass
1	Base Foundation	0	51.5	Pass
1	Base Foundation Soil Interaction	0	38.5	Pass

Structure Rating (max from all components) =	64.7%
---	--------------

Notes:

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

4.1) Recommendations

The tower, anchor rods, base plate, and foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A
TNXTOWER OUTPUT

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
DB809K-Y	156	(2) RRUS-11	144
DB809K-Y	156	DC6-48-60-18-8F	144
DB809K-Y	156	1001940	144
(2) SBNHH-1D65B w/ Mount Pipe	156	1001940	144
(2) SBNHH-1D65B w/ Mount Pipe	156	1001940	144
(2) SBNHH-1D65B w/ Mount Pipe	156	Pipe Mount	144
LNx-8513DS-VTM w/ Mount Pipe	156	Pipe Mount	144
LNx-6514DS-A1M w/ Mount Pipe	156	Pipe Mount	144
(2) LNx-6514DS-A1M w/ Mount Pipe	156	Platform Mount [LP 1002-1]	144
(2) LNx-6514DS-A1M w/ Mount Pipe	156	742 213 w/ Mount Pipe	135
RRH2x60-700	156	742 213 w/ Mount Pipe	135
RRH2x60-700	156	742 213 w/ Mount Pipe	135
RRH2x60-700	156	T-Arm Mount [TA 602-3]	127
RRH2x60-AWS	156	(2) DB980H90E-M w/ Mount Pipe	126
RRH2x60-AWS	156	(2) DB980H90E-M w/ Mount Pipe	126
RRH2x60-AWS	156	ANT450F6	126
RRH2x60-PCS	156	CO-41A	126
RRH2x60-PCS	156	CO-41A	126
RRH2x60-PCS	156	CO-41A	126
RRH2x60-PCS	156	ANT450Y7-WR	126
(2) DB-T1-6Z-8AB-0Z	156	Pipe Mount	126
Platform Mount [LP 1001-1]	156	Pipe Mount	126
(2) 7770.00 w/ Mount Pipe	144	Pipe Mount	126
(2) 7770.00 w/ Mount Pipe	144	(2) DB980H90E-M w/ Mount Pipe	126
(2) 7770.00 w/ Mount Pipe	144	T-Arm Mount [TA 602-3]	125
AM-X-CD-16-65-00T-RET w/ Mount Pipe	144	LNx-6515DS-VTM w/ Mount Pipe	100
AM-X-CD-16-65-00T-RET w/ Mount Pipe	144	LNx-6515DS-VTM w/ Mount Pipe	100
AM-X-CD-16-65-00T-RET w/ Mount Pipe	144	LNx-6515DS-VTM w/ Mount Pipe	100
AM-X-CD-16-65-00T-RET w/ Mount Pipe	144	RV90-17-00DP w/ Mount Pipe	100
AM-X-CD-16-65-00T-RET w/ Mount Pipe	144	RV90-17-00DP w/ Mount Pipe	100
(2) LGP 17201	144	RV90-17-00DP w/ Mount Pipe	100
(2) LGP 17201	144	ATBT-BOTTOM-24V	100
(2) LGP 17201	144	ATBT-BOTTOM-24V	100
(2) LGP21903	144	ATBT-BOTTOM-24V	100
(2) LGP21903	144	(2) ETM19V2S12UB	100
(2) LGP21903	144	(2) ETM19V2S12UB	100
(2) RRUS-11	144	(2) ETM19V2S12UB	100
(2) RRUS-11	144	Side Arm Mount [SO 701-3]	100

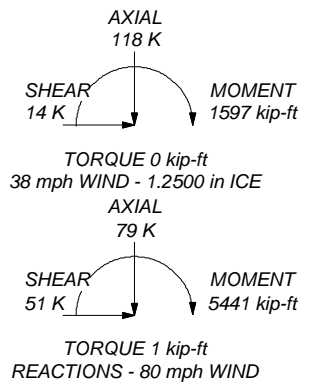
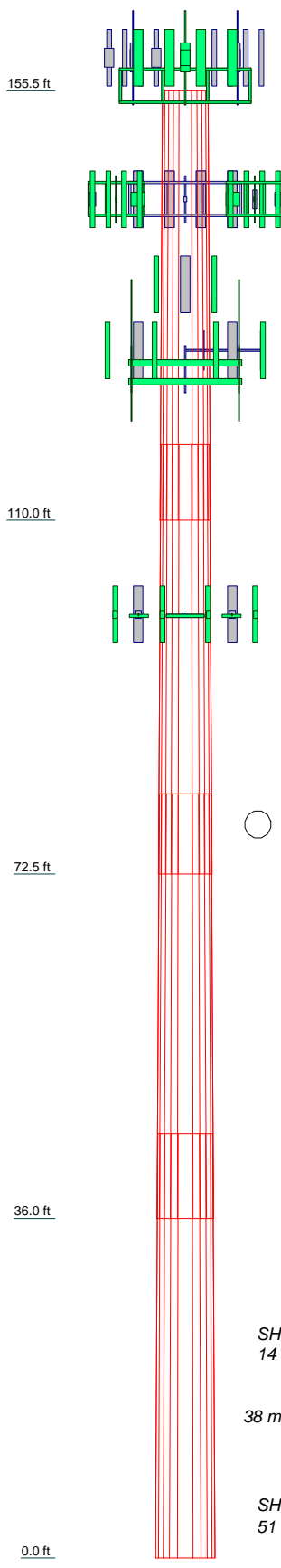
MATERIAL STRENGTH

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 a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.25 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 64.7%

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	45.50	12	0.3750	8.00	58.6000	64.6060	A572-65	11.4
2	45.50	12	0.4375	8.50	62.8000	68.8050	A572-65	14.3
3	45.00	12	0.5000	9.00	66.8082	72.7480	A572-65	17.1
4	45.00	12	0.5000	70.5600	76.5000		A572-65	18.0
								60.8



<p>ENGINEERING INNOVATION</p> <p>Tower Analysis</p>	FDH Velocitel 6521 Meridien Drive, Suite 107 Raleigh, North Carolina 27616 Phone: 9197551012 FAX: 9197551031		Job: HRT 107(C) 943204, BU# 806366	
	Project: 16BJOJ1400		Client: Crown Castle	Drawn by: Mark S. Gorgis, EI
	Code: TIA/EIA-222-F		Date: 06/08/16	App'd:
	Path:		Scale: NTS	Dwg No. E-1

tnxTower FDH Velocitel 6521 Meridien Drive, Suite 107 Raleigh, North Carolina 27616 Phone: 9197551012 FAX: 9197551031	Job HRT 107(C) 943204, BU# 806366	Page 1 of 28
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	Client Crown Castle	Designed by Mark S. Girgis, EI

Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

- Tower is located in Hartford County, Connecticut.
- Basic wind speed of 80 mph.
- Nominal ice thickness of 1.2500 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 38 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 50 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.333.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

- | | | |
|--|--|---|
| <ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys √ Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric | <ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension √ Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. Autocalc Torque Arm Areas Add IBC .6D+W Combination Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder | <ul style="list-style-type: none"> Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-G Bracing Resist. Exemption Use TIA-222-G Tension Splice Exemption <li style="text-align: center;">Poles √ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets |
|--|--|---|

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	155.50-110.00	45.50	8.00	12	58.6000	64.6060	0.3750	1.5000	A572-65 (65 ksi)
L2	110.00-72.50	45.50	8.50	12	62.8000	68.8050	0.4375	1.7500	A572-65 (65 ksi)
L3	72.50-36.00	45.00	9.00	12	66.8082	72.7480	0.5000	2.0000	A572-65 (65 ksi)
L4	36.00-0.00	45.00		12	70.5600	76.5000	0.5000	2.0000	A572-65 (65 ksi)

tnxTower FDH Velocitel 6521 Meridien Drive, Suite 107 Raleigh, North Carolina 27616 Phone: 9197551012 FAX: 9197551031	Job HRT 107(C) 943204, BU# 806366	Page 2 of 28
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	Client Crown Castle	Designed by Mark S. Girgis, EI

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	60.6672	70.3067	30422.9680	20.8446	30.3548	1002.2457	61645.1813	34.6028	14.6998	39.199
	66.8851	77.5589	40842.0131	22.9947	33.4659	1220.4065	82756.9913	38.1721	16.3094	43.492
L2	66.1084	87.8532	43610.4361	22.3258	32.5304	1340.6056	88366.5670	43.2387	15.6579	35.789
	71.2322	96.3127	57460.4440	24.4756	35.6410	1612.2011	116430.4378	47.4022	17.2672	39.468
L3	70.3265	106.7562	59911.9268	23.7383	34.6066	1731.2263	121397.8066	52.5421	16.5646	33.129
	75.3143	116.3193	77497.7893	25.8648	37.6835	2056.5463	157031.5318	57.2488	18.1565	36.313
L4	74.2790	112.7967	70668.0184	25.0815	36.5501	1933.4563	143192.5643	55.5151	17.5701	35.14
	79.1986	122.3600	90209.5680	27.2080	39.6270	2276.4673	182789.0418	60.2219	19.1620	38.324

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 155.50-110.00				1	1	1			
L2 110.00-72.50				1	1	1			
L3 72.50-36.00				1	1	1			
L4 36.00-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
Safety Line 3/8 ***	A	Surface Ar (CaAa)	155.00 - 8.00	1	1	0.000 0.000	0.3750		0.22

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A _A ft ² /ft	Weight plf	
*** 561(1-5/8")	C	No	Inside Pole	155.50 - 8.00	14	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00 0.00	1.35 1.35 1.35 1.35 1.35
LDF7-50A(1-5/8")	A	No	Inside Pole	155.50 - 8.00	3	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.82 0.82 0.82

tnxTower FDH Velocitel 6521 Meridien Drive, Suite 107 Raleigh, North Carolina 27616 Phone: 9197551012 FAX: 9197551031	Job	HRT 107(C) 943204, BU# 806366	Page	3 of 28
	Project	16BJOJ1400	Date	07:56:28 06/08/16
	Client	Crown Castle	Designed by	Mark S. Girgis, EI

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _{AA}		Weight
						ft ² /ft	plf	
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82

UCF114-50JA(1 1/4")	B	No	Inside Pole	144.00 - 8.00	12	No Ice	0.00	0.55
						1/2" Ice	0.00	0.55
						1" Ice	0.00	0.55
						2" Ice	0.00	0.55
						4" Ice	0.00	0.55
FB-L98B-002-75000(3/8")	B	No	Inside Pole	144.00 - 8.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	B	No	Inside Pole	144.00 - 8.00	2	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
						2" Ice	0.00	0.58
						4" Ice	0.00	0.58
2" Conduit	B	No	Inside Pole	144.00 - 8.00	1	No Ice	0.00	2.80
						1/2" Ice	0.00	2.80
						1" Ice	0.00	2.80
						2" Ice	0.00	2.80
						4" Ice	0.00	2.80

AVA6-50(1-1/4")	A	No	Inside Pole	135.00 - 8.00	6	No Ice	0.00	0.45
						1/2" Ice	0.00	0.45
						1" Ice	0.00	0.45
						2" Ice	0.00	0.45
						4" Ice	0.00	0.45

LDF6-50A(1-1/4")	C	No	Inside Pole	126.00 - 8.00	6	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
LDF5-50A(7/8")	C	No	Inside Pole	126.00 - 0.00	4	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33

LDF6-50A(1-1/4")	A	No	Inside Pole	100.00 - 8.00	6	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
AVA6-50(1-1/4")	A	No	Inside Pole	100.00 - 8.00	6	No Ice	0.00	0.45
						1/2" Ice	0.00	0.45
						1" Ice	0.00	0.45
						2" Ice	0.00	0.45
						4" Ice	0.00	0.45

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
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tnxTower FDH Velocitel 6521 Meridien Drive, Suite 107 Raleigh, North Carolina 27616 Phone: 9197551012 FAX: 9197551031	Job	HRT 107(C) 943204, BU# 806366	Page	4 of 28
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Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight K
L1	155.50-110.00	A	0.000	0.000	1.688	0.000	0.19
		B	0.000	0.000	0.000	0.000	0.36
		C	0.000	0.000	0.000	0.000	0.94
L2	110.00-72.50	A	0.000	0.000	1.406	0.000	0.38
		B	0.000	0.000	0.000	0.000	0.40
		C	0.000	0.000	0.000	0.000	0.91
L3	72.50-36.00	A	0.000	0.000	1.369	0.000	0.44
		B	0.000	0.000	0.000	0.000	0.39
		C	0.000	0.000	0.000	0.000	0.88
L4	36.00-0.00	A	0.000	0.000	1.050	0.000	0.34
		B	0.000	0.000	0.000	0.000	0.30
		C	0.000	0.000	0.000	0.000	0.69

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} In Face ft ²	C_{AA} Out Face ft ²	Weight K
L1	155.50-110.00	A	1.477	0.000	0.000	14.982	0.000	0.34
		B		0.000	0.000	0.000	0.000	0.36
		C		0.000	0.000	0.000	0.000	0.94
L2	110.00-72.50	A	1.412	0.000	0.000	12.485	0.000	0.51
		B		0.000	0.000	0.000	0.000	0.40
		C		0.000	0.000	0.000	0.000	0.91
L3	72.50-36.00	A	1.328	0.000	0.000	11.679	0.000	0.55
		B		0.000	0.000	0.000	0.000	0.39
		C		0.000	0.000	0.000	0.000	0.88
L4	36.00-0.00	A	1.250	0.000	0.000	8.484	0.000	0.41
		B		0.000	0.000	0.000	0.000	0.30
		C		0.000	0.000	0.000	0.000	0.69

Feed Line Center of Pressure

Section	Elevation ft	CP_x in	CP_z in	CP_x Ice in	CP_z Ice in
L1	155.50-110.00	-0.0481	-0.0278	-0.3872	-0.2235
L2	110.00-72.50	-0.0487	-0.0281	-0.3937	-0.2273
L3	72.50-36.00	-0.0487	-0.0281	-0.3817	-0.2204
L4	36.00-0.00	-0.0376	-0.0217	-0.2845	-0.1642

Discrete Tower Loads

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	Client	Crown Castle	Designed by	Mark S. Girgis, EI

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral					
DB809K-Y	A	From Face	4.00	0.0000	156.00	No Ice	2.85	2.85	0.03
			0.00			1/2" Ice	4.03	4.03	0.05
			3.00			1" Ice	5.21	5.21	0.08
						2" Ice	7.17	7.17	0.16
						4" Ice	10.06	10.06	0.42
DB809K-Y	B	From Face	4.00	0.0000	156.00	No Ice	2.85	2.85	0.03
			0.00			1/2" Ice	4.03	4.03	0.05
			3.00			1" Ice	5.21	5.21	0.08
						2" Ice	7.17	7.17	0.16
						4" Ice	10.06	10.06	0.42
DB809K-Y	C	From Face	4.00	0.0000	156.00	No Ice	2.85	2.85	0.03
			0.00			1/2" Ice	4.03	4.03	0.05
			3.00			1" Ice	5.21	5.21	0.08
						2" Ice	7.17	7.17	0.16
						4" Ice	10.06	10.06	0.42
*									
(2) SBNHH-1D65B w/ Mount Pipe	A	From Face	4.00	0.0000	156.00	No Ice	8.86	7.30	0.07
			0.00			1/2" Ice	9.62	8.58	0.14
			3.00			1" Ice	10.34	9.72	0.22
						2" Ice	11.73	11.66	0.41
						4" Ice	14.64	15.92	0.94
(2) SBNHH-1D65B w/ Mount Pipe	B	From Face	4.00	0.0000	156.00	No Ice	8.86	7.30	0.07
			0.00			1/2" Ice	9.62	8.58	0.14
			3.00			1" Ice	10.34	9.72	0.22
						2" Ice	11.73	11.66	0.41
						4" Ice	14.64	15.92	0.94
(2) SBNHH-1D65B w/ Mount Pipe	C	From Face	4.00	0.0000	156.00	No Ice	8.86	7.30	0.07
			0.00			1/2" Ice	9.62	8.58	0.14
			3.00			1" Ice	10.34	9.72	0.22
						2" Ice	11.73	11.66	0.41
						4" Ice	14.64	15.92	0.94
LNX-8513DS-VTM w/ Mount Pipe	A	From Face	4.00	0.0000	156.00	No Ice	8.65	7.08	0.06
			0.00			1/2" Ice	9.31	8.27	0.13
			3.00			1" Ice	9.93	9.18	0.21
						2" Ice	11.20	11.02	0.39
						4" Ice	13.87	15.06	0.90
LNX-6514DS-A1M w/ Mount Pipe	A	From Face	4.00	0.0000	156.00	No Ice	8.65	7.08	0.06
			0.00			1/2" Ice	9.31	8.27	0.13
			3.00			1" Ice	9.93	9.18	0.21
						2" Ice	11.20	11.02	0.39
						4" Ice	13.87	15.06	0.90
(2) LNX-6514DS-A1M w/ Mount Pipe	B	From Face	4.00	0.0000	156.00	No Ice	8.65	7.08	0.06
			0.00			1/2" Ice	9.31	8.27	0.13
			3.00			1" Ice	9.93	9.18	0.21
						2" Ice	11.20	11.02	0.39
						4" Ice	13.87	15.06	0.90
(2) LNX-6514DS-A1M w/ Mount Pipe	C	From Face	4.00	0.0000	156.00	No Ice	8.65	7.08	0.06
			0.00			1/2" Ice	9.31	8.27	0.13
			3.00			1" Ice	9.93	9.18	0.21
						2" Ice	11.20	11.02	0.39
						4" Ice	13.87	15.06	0.90
RRH2x60-700	A	From Face	4.00	0.0000	156.00	No Ice	3.96	1.82	0.06
			0.00			1/2" Ice	4.27	2.08	0.08
			3.00			1" Ice	4.60	2.36	0.11
						2" Ice	5.27	2.96	0.17
						4" Ice	6.72	4.25	0.35
RRH2x60-700	B	From Face	4.00	0.0000	156.00	No Ice	3.96	1.82	0.06

<i>tnxTower</i> <i>FDH Velocitel</i> 6521 Meridien Drive, Suite 107 Raleigh, North Carolina 27616 Phone: 9197551012 FAX: 9197551031	Job	HRT 107(C) 943204, BU# 806366	Page	6 of 28
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	Client	Crown Castle	Designed by	Mark S. Girgis, EI

<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>	<i>C_{AA} Front ft²</i>	<i>C_{AA} Side ft²</i>	<i>Weight K</i>	
			0.00			1/2" Ice 4.27	2.08	0.08	
			3.00			1" Ice 4.60	2.36	0.11	
						2" Ice 5.27	2.96	0.17	
						4" Ice 6.72	4.25	0.35	
RRH2x60-700	C	From Face	4.00	0.0000	156.00	No Ice 3.96	1.82	0.06	
			0.00			1/2" Ice 4.27	2.08	0.08	
			3.00			1" Ice 4.60	2.36	0.11	
						2" Ice 5.27	2.96	0.17	
						4" Ice 6.72	4.25	0.35	
RRH2x60-AWS	A	From Face	4.00	0.0000	156.00	No Ice 2.19	1.43	0.04	
			0.00			1/2" Ice 2.40	1.61	0.06	
			3.00			1" Ice 2.61	1.80	0.08	
						2" Ice 3.07	2.21	0.13	
						4" Ice 4.09	3.13	0.26	
RRH2x60-AWS	B	From Face	4.00	0.0000	156.00	No Ice 2.19	1.43	0.04	
			0.00			1/2" Ice 2.40	1.61	0.06	
			3.00			1" Ice 2.61	1.80	0.08	
						2" Ice 3.07	2.21	0.13	
						4" Ice 4.09	3.13	0.26	
RRH2x60-AWS	C	From Face	4.00	0.0000	156.00	No Ice 2.19	1.43	0.04	
			0.00			1/2" Ice 2.40	1.61	0.06	
			3.00			1" Ice 2.61	1.80	0.08	
						2" Ice 3.07	2.21	0.13	
						4" Ice 4.09	3.13	0.26	
RRH2x60-PCS	A	From Face	4.00	0.0000	156.00	No Ice 2.57	1.93	0.05	
			0.00			1/2" Ice 2.79	2.13	0.07	
			3.00			1" Ice 3.02	2.34	0.09	
						2" Ice 3.52	2.80	0.14	
						4" Ice 4.61	3.81	0.30	
RRH2x60-PCS	B	From Face	4.00	0.0000	156.00	No Ice 2.57	1.93	0.05	
			0.00			1/2" Ice 2.79	2.13	0.07	
			3.00			1" Ice 3.02	2.34	0.09	
						2" Ice 3.52	2.80	0.14	
						4" Ice 4.61	3.81	0.30	
RRH2x60-PCS	C	From Face	4.00	0.0000	156.00	No Ice 2.57	1.93	0.05	
			0.00			1/2" Ice 2.79	2.13	0.07	
			3.00			1" Ice 3.02	2.34	0.09	
						2" Ice 3.52	2.80	0.14	
						4" Ice 4.61	3.81	0.30	
(2) DB-T1-6Z-8AB-0Z	A	From Face	4.00	0.0000	156.00	No Ice 5.60	2.33	0.04	
			0.00			1/2" Ice 5.92	2.56	0.08	
			3.00			1" Ice 6.24	2.79	0.12	
						2" Ice 6.91	3.28	0.21	
						4" Ice 8.37	4.37	0.45	
Platform Mount [LP 1001-1]	C	None		0.0000	156.00	No Ice 47.70	47.70	3.02	
						1/2" Ice 59.50	59.50	3.62	
						1" Ice 71.30	71.30	4.22	
						2" Ice 94.90	94.90	5.43	
						4" Ice 142.10	142.10	7.85	

(2) 7770.00 w/ Mount Pipe	A	From Face	6.00	0.0000	144.00	No Ice 6.12	4.25	0.06	
			0.00			1/2" Ice 6.63	5.01	0.10	
			0.00			1" Ice 7.13	5.71	0.16	
						2" Ice 8.16	7.16	0.29	
						4" Ice 10.36	10.41	0.66	
(2) 7770.00 w/ Mount Pipe	B	From Face	6.00	0.0000	144.00	No Ice 6.12	4.25	0.06	
			0.00			1/2" Ice 6.63	5.01	0.10	

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	Client Crown Castle	Designed by Mark S. Girgis, EI

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral					
				0.00					
						1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) 7770.00 w/ Mount Pipe	C	From Face	6.00	0.0000	144.00	No Ice	6.12	4.25	0.06
			0.00			1/2" Ice	6.63	5.01	0.10
			0.00			1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Face	6.00	0.0000	144.00	No Ice	8.50	6.30	0.07
			0.00			1/2" Ice	9.15	7.48	0.14
			0.00			1" Ice	9.77	8.37	0.21
						2" Ice	11.03	10.18	0.38
						4" Ice	13.68	14.02	0.87
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Face	6.00	0.0000	144.00	No Ice	8.50	6.30	0.07
			0.00			1/2" Ice	9.15	7.48	0.14
			0.00			1" Ice	9.77	8.37	0.21
						2" Ice	11.03	10.18	0.38
						4" Ice	13.68	14.02	0.87
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Face	6.00	0.0000	144.00	No Ice	8.50	6.30	0.07
			0.00			1/2" Ice	9.15	7.48	0.14
			0.00			1" Ice	9.77	8.37	0.21
						2" Ice	11.03	10.18	0.38
						4" Ice	13.68	14.02	0.87
(2) LGP 17201	A	From Face	6.00	0.0000	144.00	No Ice	1.95	0.52	0.03
			0.00			1/2" Ice	2.13	0.64	0.04
			0.00			1" Ice	2.33	0.77	0.06
						2" Ice	2.75	1.06	0.09
						4" Ice	3.69	1.73	0.19
(2) LGP 17201	B	From Face	6.00	0.0000	144.00	No Ice	1.95	0.52	0.03
			0.00			1/2" Ice	2.13	0.64	0.04
			0.00			1" Ice	2.33	0.77	0.06
						2" Ice	2.75	1.06	0.09
						4" Ice	3.69	1.73	0.19
(2) LGP 17201	C	From Face	6.00	0.0000	144.00	No Ice	1.95	0.52	0.03
			0.00			1/2" Ice	2.13	0.64	0.04
			0.00			1" Ice	2.33	0.77	0.06
						2" Ice	2.75	1.06	0.09
						4" Ice	3.69	1.73	0.19
(2) LGP21903	A	From Face	6.00	0.0000	144.00	No Ice	0.27	0.18	0.01
			0.00			1/2" Ice	0.34	0.25	0.01
			0.00			1" Ice	0.43	0.32	0.02
						2" Ice	0.62	0.49	0.03
						4" Ice	1.10	0.94	0.07
(2) LGP21903	B	From Face	6.00	0.0000	144.00	No Ice	0.27	0.18	0.01
			0.00			1/2" Ice	0.34	0.25	0.01
			0.00			1" Ice	0.43	0.32	0.02
						2" Ice	0.62	0.49	0.03
						4" Ice	1.10	0.94	0.07
(2) LGP21903	C	From Face	6.00	0.0000	144.00	No Ice	0.27	0.18	0.01
			0.00			1/2" Ice	0.34	0.25	0.01
			0.00			1" Ice	0.43	0.32	0.02
						2" Ice	0.62	0.49	0.03
						4" Ice	1.10	0.94	0.07
(2) RRUS-11	A	From Face	6.00	0.0000	144.00	No Ice	2.94	1.25	0.06
			0.00			1/2" Ice	3.17	1.41	0.07
			0.00			1" Ice	3.41	1.59	0.10
						2" Ice	3.91	1.96	0.15

tnxTower

FDH Velocitel
 6521 Meridien Drive, Suite 107
 Raleigh, North Carolina 27616
 Phone: 9197551012
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Client	Crown Castle	Designed by	Mark S. Girgis, EI

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA}		Weight
			Horz	Lateral			Front	Side	
			ft	ft	°	ft	ft ²	ft ²	K
(2) RRUS-11	B	From Face	6.00	0.0000	144.00	4" Ice	5.02	2.82	0.30
			0.00	No Ice		2.94	1.25	0.06	
			0.00	1/2" Ice		3.17	1.41	0.07	
				1" Ice		3.41	1.59	0.10	
				2" Ice		3.91	1.96	0.15	
(2) RRUS-11	C	From Face	6.00	0.0000	144.00	4" Ice	5.02	2.82	0.30
			0.00	No Ice		2.94	1.25	0.06	
			0.00	1/2" Ice		3.17	1.41	0.07	
				1" Ice		3.41	1.59	0.10	
				2" Ice		3.91	1.96	0.15	
DC6-48-60-18-8F	B	From Face	6.00	0.0000	144.00	4" Ice	5.02	2.82	0.30
			0.00	No Ice		2.57	4.32	0.03	
			0.00	1/2" Ice		2.80	4.60	0.06	
				1" Ice		3.04	4.88	0.10	
				2" Ice		3.54	5.49	0.18	
1001940	A	From Leg	6.00	0.0000	144.00	4" Ice	4.66	6.80	0.40
			0.00	No Ice		0.21	0.09	0.00	
			0.00	1/2" Ice		0.27	0.15	0.00	
				1" Ice		0.34	0.21	0.01	
				2" Ice		0.52	0.36	0.01	
1001940	B	From Leg	6.00	0.0000	144.00	4" Ice	0.97	0.75	0.05
			0.00	No Ice		0.21	0.09	0.00	
			0.00	1/2" Ice		0.27	0.15	0.00	
				1" Ice		0.34	0.21	0.01	
				2" Ice		0.52	0.36	0.01	
1001940	C	From Leg	6.00	0.0000	144.00	4" Ice	0.97	0.75	0.05
			0.00	No Ice		0.21	0.09	0.00	
			0.00	1/2" Ice		0.27	0.15	0.00	
				1" Ice		0.34	0.21	0.01	
				2" Ice		0.52	0.36	0.01	
Pipe Mount	A	From Leg	6.00	0.0000	144.00	4" Ice	0.97	0.75	0.05
			0.00	No Ice		1.20	1.20	0.02	
			0.00	1/2" Ice		1.50	1.50	0.03	
				1" Ice		1.81	1.81	0.04	
				2" Ice		2.47	2.47	0.08	
Pipe Mount	B	From Leg	6.00	0.0000	144.00	4" Ice	3.93	3.93	0.20
			0.00	No Ice		1.20	1.20	0.02	
			0.00	1/2" Ice		1.50	1.50	0.03	
				1" Ice		1.81	1.81	0.04	
				2" Ice		2.47	2.47	0.08	
Pipe Mount	C	From Leg	6.00	0.0000	144.00	4" Ice	3.93	3.93	0.20
			0.00	No Ice		1.20	1.20	0.02	
			0.00	1/2" Ice		1.50	1.50	0.03	
				1" Ice		1.81	1.81	0.04	
				2" Ice		2.47	2.47	0.08	
Platform Mount [LP 1002-1]	C	None		0.0000	144.00	4" Ice	3.93	3.93	0.20
				No Ice		77.10	77.10	4.05	
				1/2" Ice		93.30	93.30	5.27	
				1" Ice		109.50	109.50	6.48	
				2" Ice		141.90	141.90	8.91	
*** 742 213 w/ Mount Pipe	A	From Leg	1.00	0.0000	135.00	4" Ice	206.70	206.70	13.77
			0.00	No Ice		5.37	4.62	0.05	
			0.00	1/2" Ice		5.95	6.00	0.09	
				1" Ice		6.50	6.98	0.15	
				2" Ice		7.61	8.85	0.28	
	4" Ice	9.93	12.79	0.68					

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	Client	Crown Castle	Designed by Mark S. Girgis, EI

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral					
742 213 w/ Mount Pipe	B	From Leg	1.00	0.0000	135.00	No Ice	5.37	4.62	0.05
			0.00			1/2" Ice	5.95	6.00	0.09
			0.00			1" Ice	6.50	6.98	0.15
						2" Ice	7.61	8.85	0.28
						4" Ice	9.93	12.79	0.68
742 213 w/ Mount Pipe	C	From Leg	1.00	0.0000	135.00	No Ice	5.37	4.62	0.05
			0.00			1/2" Ice	5.95	6.00	0.09
			0.00			1" Ice	6.50	6.98	0.15
						2" Ice	7.61	8.85	0.28
						4" Ice	9.93	12.79	0.68

(2) DB980H90E-M w/ Mount Pipe	A	From Leg	4.00	0.0000	126.00	No Ice	4.04	3.62	0.03
			0.00			1/2" Ice	4.50	4.48	0.07
			2.00			1" Ice	4.95	5.22	0.11
						2" Ice	5.87	6.74	0.22
						4" Ice	8.05	10.00	0.55
(2) DB980H90E-M w/ Mount Pipe	B	From Leg	4.00	0.0000	126.00	No Ice	4.04	3.62	0.03
			0.00			1/2" Ice	4.50	4.48	0.07
			2.00			1" Ice	4.95	5.22	0.11
						2" Ice	5.87	6.74	0.22
						4" Ice	8.05	10.00	0.55
(2) DB980H90E-M w/ Mount Pipe	C	From Leg	4.00	0.0000	126.00	No Ice	4.04	3.62	0.03
			0.00			1/2" Ice	4.50	4.48	0.07
			2.00			1" Ice	4.95	5.22	0.11
						2" Ice	5.87	6.74	0.22
						4" Ice	8.05	10.00	0.55
ANT450F6	A	From Leg	4.00	0.0000	126.00	No Ice	1.90	1.90	0.01
			0.00			1/2" Ice	2.73	2.73	0.02
			2.00			1" Ice	3.40	3.40	0.04
						2" Ice	4.40	4.40	0.10
						4" Ice	6.50	6.50	0.28
CO-41A	B	From Leg	4.00	0.0000	126.00	No Ice	3.94	3.94	0.01
			0.00			1/2" Ice	5.47	5.47	0.04
			2.00			1" Ice	7.01	7.01	0.08
						2" Ice	10.16	10.16	0.19
						4" Ice	14.39	14.39	0.52
CO-41A	C	From Leg	4.00	0.0000	126.00	No Ice	3.94	3.94	0.01
			0.00			1/2" Ice	5.47	5.47	0.04
			2.00			1" Ice	7.01	7.01	0.08
						2" Ice	10.16	10.16	0.19
						4" Ice	14.39	14.39	0.52
ANT450Y7-WR	A	From Leg	4.00	0.0000	126.00	No Ice	0.93	0.93	0.01
			0.00			1/2" Ice	1.22	1.22	0.01
			2.00			1" Ice	1.50	1.50	0.01
						2" Ice	2.06	2.06	0.02
						4" Ice	3.18	3.18	0.03
Pipe Mount	A	From Leg	4.00	0.0000	126.00	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
						2" Ice	2.47	2.47	0.08
						4" Ice	3.93	3.93	0.20
Pipe Mount	B	From Leg	4.00	0.0000	126.00	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
						2" Ice	2.47	2.47	0.08
						4" Ice	3.93	3.93	0.20
Pipe Mount	C	From Leg	4.00	0.0000	126.00	No Ice	1.20	1.20	0.02

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Lateral						Vert
			0.00							
			0.00			1/2" Ice	1.50	1.50	0.03	
						1" Ice	1.81	1.81	0.04	
						2" Ice	2.47	2.47	0.08	
						4" Ice	3.93	3.93	0.20	
T-Arm Mount [TA 602-3]	C	None			0.0000	127.00	No Ice	11.59	11.59	0.77
							1/2" Ice	15.44	15.44	0.99
							1" Ice	19.29	19.29	1.21
							2" Ice	26.99	26.99	1.64
							4" Ice	42.39	42.39	2.50
T-Arm Mount [TA 602-3]	C	None			0.0000	125.00	No Ice	11.59	11.59	0.77
							1/2" Ice	15.44	15.44	0.99
							1" Ice	19.29	19.29	1.21
							2" Ice	26.99	26.99	1.64
							4" Ice	42.39	42.39	2.50

LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	3.00		0.0000	100.00	No Ice	11.68	9.84	0.08
			0.00				1/2" Ice	12.40	11.37	0.17
			0.00				1" Ice	13.14	12.91	0.27
							2" Ice	14.60	15.27	0.51
							4" Ice	17.87	20.14	1.15
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	3.00		0.0000	100.00	No Ice	11.68	9.84	0.08
			0.00				1/2" Ice	12.40	11.37	0.17
			0.00				1" Ice	13.14	12.91	0.27
							2" Ice	14.60	15.27	0.51
							4" Ice	17.87	20.14	1.15
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	3.00		0.0000	100.00	No Ice	11.68	9.84	0.08
			0.00				1/2" Ice	12.40	11.37	0.17
			0.00				1" Ice	13.14	12.91	0.27
							2" Ice	14.60	15.27	0.51
							4" Ice	17.87	20.14	1.15
RV90-17-00DP w/ Mount Pipe	A	From Leg	3.00		0.0000	100.00	No Ice	4.59	3.32	0.04
			0.00				1/2" Ice	5.09	4.09	0.08
			0.00				1" Ice	5.58	4.78	0.12
							2" Ice	6.59	6.23	0.23
							4" Ice	8.73	9.31	0.56
RV90-17-00DP w/ Mount Pipe	B	From Leg	3.00		0.0000	100.00	No Ice	4.59	3.32	0.04
			0.00				1/2" Ice	5.09	4.09	0.08
			0.00				1" Ice	5.58	4.78	0.12
							2" Ice	6.59	6.23	0.23
							4" Ice	8.73	9.31	0.56
RV90-17-00DP w/ Mount Pipe	C	From Leg	3.00		0.0000	100.00	No Ice	4.59	3.32	0.04
			0.00				1/2" Ice	5.09	4.09	0.08
			0.00				1" Ice	5.58	4.78	0.12
							2" Ice	6.59	6.23	0.23
							4" Ice	8.73	9.31	0.56
ATBT-BOTTOM-24V	A	From Leg	3.00		0.0000	100.00	No Ice	0.12	0.08	0.00
			0.00				1/2" Ice	0.17	0.12	0.00
			0.00				1" Ice	0.23	0.17	0.01
							2" Ice	0.38	0.30	0.01
							4" Ice	0.77	0.67	0.04
ATBT-BOTTOM-24V	B	From Leg	3.00		0.0000	100.00	No Ice	0.12	0.08	0.00
			0.00				1/2" Ice	0.17	0.12	0.00
			0.00				1" Ice	0.23	0.17	0.01
							2" Ice	0.38	0.30	0.01
							4" Ice	0.77	0.67	0.04
ATBT-BOTTOM-24V	C	From Leg	3.00		0.0000	100.00	No Ice	0.12	0.08	0.00
			0.00				1/2" Ice	0.17	0.12	0.00

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral					
			Vert		°	ft	ft ²	ft ²	K
			ft	ft					
			ft						
			0.00			1" Ice	0.23	0.17	0.01
						2" Ice	0.38	0.30	0.01
						4" Ice	0.77	0.67	0.04
(2) ETM19V2S12UB	A	From Leg	3.00		0.0000	100.00	No Ice	0.84	0.22
			0.00				1/2" Ice	0.96	0.31
			0.00				1" Ice	1.09	0.40
							2" Ice	1.39	0.61
							4" Ice	2.08	1.14
(2) ETM19V2S12UB	B	From Leg	3.00		0.0000	100.00	No Ice	0.84	0.22
			0.00				1/2" Ice	0.96	0.31
			0.00				1" Ice	1.09	0.40
							2" Ice	1.39	0.61
							4" Ice	2.08	1.14
(2) ETM19V2S12UB	C	From Leg	3.00		0.0000	100.00	No Ice	0.84	0.22
			0.00				1/2" Ice	0.96	0.31
			0.00				1" Ice	1.09	0.40
							2" Ice	1.39	0.61
							4" Ice	2.08	1.14
Side Arm Mount [SO 701-3]	C	None			0.0000	100.00	No Ice	2.83	2.83
							1/2" Ice	3.92	3.92
							1" Ice	5.01	5.01
							2" Ice	7.19	7.19
							4" Ice	11.55	11.55

Tower Pressures - No Ice

$$G_H = 1.690$$

Section Elevation	z	K _Z	q _z	A _G	F _a	A _F	A _R	A _{leg}	Leg %	C _{AA} In Face	C _{AA} Out Face
ft	ft		psf	ft ²	c	ft ²	ft ²	ft ²	%	ft ²	ft ²
L1 155.50-110.00	132.66	1.488	24	233.578	A	0.000	233.578	233.578	100.00	1.688	0.000
					B	0.000	233.578		100.00	0.000	0.000
					C	0.000	233.578		100.00	0.000	0.000
L2 110.00-72.50	91.29	1.337	22	207.283	A	0.000	207.283	207.283	100.00	1.406	0.000
					B	0.000	207.283		100.00	0.000	0.000
					C	0.000	207.283		100.00	0.000	0.000
L3 72.50-36.00	54.48	1.154	19	213.948	A	0.000	213.948	213.948	100.00	1.369	0.000
					B	0.000	213.948		100.00	0.000	0.000
					C	0.000	213.948		100.00	0.000	0.000
L4 36.00-0.00	17.81	1	16	222.372	A	0.000	222.372	222.372	100.00	1.050	0.000
					B	0.000	222.372		100.00	0.000	0.000
					C	0.000	222.372		100.00	0.000	0.000

Tower Pressure - With Ice

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$$G_H = 1.690$$

Section Elevation ft	z ft	K _Z	q _z psf	t _z in	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 155.50-110.00	132.66	1.488	5	1.4771	244.780	A	0.000	244.780	244.780	100.00	14.982	0.000
						B	0.000	244.780		100.00	0.000	0.000
						C	0.000	244.780		100.00	0.000	0.000
L2 110.00-72.50	91.29	1.337	5	1.4123	216.515	A	0.000	216.515	216.515	100.00	12.485	0.000
						B	0.000	216.515		100.00	0.000	0.000
						C	0.000	216.515		100.00	0.000	0.000
L3 72.50-36.00	54.48	1.154	4	1.3275	222.540	A	0.000	222.540	222.540	100.00	11.679	0.000
						B	0.000	222.540		100.00	0.000	0.000
						C	0.000	222.540		100.00	0.000	0.000
L4 36.00-0.00	17.81	1	4	1.2500	230.337	A	0.000	230.337	230.337	100.00	8.484	0.000
						B	0.000	230.337		100.00	0.000	0.000
						C	0.000	230.337		100.00	0.000	0.000

Tower Pressure - Service

$$G_H = 1.690$$

Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 155.50-110.00	132.66	1.488	10	233.578	A	0.000	233.578	233.578	100.00	1.688	0.000
					B	0.000	233.578		100.00	0.000	0.000
					C	0.000	233.578		100.00	0.000	0.000
L2 110.00-72.50	91.29	1.337	9	207.283	A	0.000	207.283	207.283	100.00	1.406	0.000
					B	0.000	207.283		100.00	0.000	0.000
					C	0.000	207.283		100.00	0.000	0.000
L3 72.50-36.00	54.48	1.154	7	213.948	A	0.000	213.948	213.948	100.00	1.369	0.000
					B	0.000	213.948		100.00	0.000	0.000
					C	0.000	213.948		100.00	0.000	0.000
L4 36.00-0.00	17.81	1	6	222.372	A	0.000	222.372	222.372	100.00	1.050	0.000
					B	0.000	222.372		100.00	0.000	0.000
					C	0.000	222.372		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
L1 155.50-110.00	1.50	11.45	A	1	1.03	1	1	1	233.578	9.97	219.10	C
			B	1	1.03	1	1	1	233.578			
			C	1	1.03	1	1	1	233.578			
L2 110.00-72.50	1.69	14.26	A	1	1.03	1	1	1	207.283	7.94	211.81	C
			B	1	1.03	1	1	1	207.283			
			C	1	1.03	1	1	1	207.283			
L3 72.50-36.00	1.71	17.08	A	1	1.03	1	1	1	213.948	7.05	193.10	C
			B	1	1.03	1	1	1	213.948			
			C	1	1.03	1	1	1	213.948			
L4 36.00-0.00	1.32	18.00	A	1	1.03	1	1	1	222.372	6.37	176.97	C

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Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
Sum Weight:	6.22	60.79	B C	1 1	1.03 1.03	1 1	1 1	1 1 OTM	222.372 222.372 2545.09 kip-ft	31.33		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
L1 155.50-110.00	1.50	11.45	A B C	1 1 1	1.03 1.03 1.03	1 1 1	1 1 1	1 1 1	233.578 233.578 233.578	9.97	219.10	C
L2 110.00-72.50	1.69	14.26	A B C	1 1 1	1.03 1.03 1.03	1 1 1	1 1 1	1 1 1	207.283 207.283 207.283	7.94	211.81	C
L3 72.50-36.00	1.71	17.08	A B C	1 1 1	1.03 1.03 1.03	1 1 1	1 1 1	1 1 1	213.948 213.948 213.948	7.05	193.10	C
L4 36.00-0.00	1.32	18.00	A B C	1 1 1	1.03 1.03 1.03	1 1 1	1 1 1	1 1 1	222.372 222.372 222.372	6.37	176.97	C
Sum Weight:	6.22	60.79		1	1.03	1	1	1 OTM	2545.09 kip-ft	31.33		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
L1 155.50-110.00	1.50	11.45	A B C	1 1 1	1.03 1.03 1.03	1 1 1	1 1 1	1 1 1	233.578 233.578 233.578	9.97	219.10	C
L2 110.00-72.50	1.69	14.26	A B C	1 1 1	1.03 1.03 1.03	1 1 1	1 1 1	1 1 1	207.283 207.283 207.283	7.94	211.81	C
L3 72.50-36.00	1.71	17.08	A B C	1 1 1	1.03 1.03 1.03	1 1 1	1 1 1	1 1 1	213.948 213.948 213.948	7.05	193.10	C
L4 36.00-0.00	1.32	18.00	A B C	1 1 1	1.03 1.03 1.03	1 1 1	1 1 1	1 1 1	222.372 222.372 222.372	6.37	176.97	C
Sum Weight:	6.22	60.79		1	1.03	1	1	1 OTM	2545.09 kip-ft	31.33		

Tower Forces - With Ice - Wind Normal To Face

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Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
L1 155.50-110.00	1.65	16.76	A	1	1.03	1	1	1	244.780	2.43	53.36	C
			B	1	1.03	1	1	1	244.780			
			C	1	1.03	1	1	1	244.780			
L2 110.00-72.50	1.82	18.75	A	1	1.03	1	1	1	216.515	1.92	51.27	C
			B	1	1.03	1	1	1	216.515			
			C	1	1.03	1	1	1	216.515			
L3 72.50-36.00	1.82	21.43	A	1	1.03	1	1	1	222.540	1.69	46.34	C
			B	1	1.03	1	1	1	222.540			
			C	1	1.03	1	1	1	222.540			
L4 36.00-0.00	1.40	22.25	A	1	1.03	1	1	1	230.337	1.50	41.75	C
			B	1	1.03	1	1	1	230.337			
			C	1	1.03	1	1	1	230.337			
Sum Weight:	6.68	79.18						OTM	616.53 kip-ft	7.55		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
L1 155.50-110.00	1.65	16.76	A	1	1.03	1	1	1	244.780	2.43	53.36	C
			B	1	1.03	1	1	1	244.780			
			C	1	1.03	1	1	1	244.780			
L2 110.00-72.50	1.82	18.75	A	1	1.03	1	1	1	216.515	1.92	51.27	C
			B	1	1.03	1	1	1	216.515			
			C	1	1.03	1	1	1	216.515			
L3 72.50-36.00	1.82	21.43	A	1	1.03	1	1	1	222.540	1.69	46.34	C
			B	1	1.03	1	1	1	222.540			
			C	1	1.03	1	1	1	222.540			
L4 36.00-0.00	1.40	22.25	A	1	1.03	1	1	1	230.337	1.50	41.75	C
			B	1	1.03	1	1	1	230.337			
			C	1	1.03	1	1	1	230.337			
Sum Weight:	6.68	79.18						OTM	616.53 kip-ft	7.55		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
L1 155.50-110.00	1.65	16.76	A	1	1.03	1	1	1	244.780	2.43	53.36	C
			B	1	1.03	1	1	1	244.780			
			C	1	1.03	1	1	1	244.780			
L2 110.00-72.50	1.82	18.75	A	1	1.03	1	1	1	216.515	1.92	51.27	C
			B	1	1.03	1	1	1	216.515			
			C	1	1.03	1	1	1	216.515			
L3 72.50-36.00	1.82	21.43	A	1	1.03	1	1	1	222.540	1.69	46.34	C
			B	1	1.03	1	1	1	222.540			

tnxTower FDH Velocitel 6521 Meridien Drive, Suite 107 Raleigh, North Carolina 27616 Phone: 9197551012 FAX: 9197551031	Job	HRT 107(C) 943204, BU# 806366	Page	15 of 28
	Project	16BJOJ1400	Date	07:56:28 06/08/16
	Client	Crown Castle	Designed by	Mark S. Girgis, EI

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
L4 36.00-0.00	1.40	22.25	C	1	1.03	1	1	1	222.540	1.50	41.75	C
			A	1	1.03	1	1	1	230.337			
			B	1	1.03	1	1	1	230.337			
			C	1	1.03	1	1	1	230.337			
Sum Weight:	6.68	79.18						OTM	616.53 kip-ft	7.55		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
L1 155.50-110.00	1.50	11.45	A	1	1.03	1	1	1	233.578	3.89	85.59	C
			B	1	1.03	1	1	1	233.578			
			C	1	1.03	1	1	1	233.578			
L2 110.00-72.50	1.69	14.26	A	1	1.03	1	1	1	207.283	3.10	82.74	C
			B	1	1.03	1	1	1	207.283			
			C	1	1.03	1	1	1	207.283			
L3 72.50-36.00	1.71	17.08	A	1	1.03	1	1	1	213.948	2.75	75.43	C
			B	1	1.03	1	1	1	213.948			
			C	1	1.03	1	1	1	213.948			
L4 36.00-0.00	1.32	18.00	A	1	1.03	1	1	1	222.372	2.49	69.13	C
			B	1	1.03	1	1	1	222.372			
			C	1	1.03	1	1	1	222.372			
Sum Weight:	6.22	60.79						OTM	994.18 kip-ft			

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F K	w plf	Ctrl. Face
L1 155.50-110.00	1.50	11.45	A	1	1.03	1	1	1	233.578	3.89	85.59	C
			B	1	1.03	1	1	1	233.578			
			C	1	1.03	1	1	1	233.578			
L2 110.00-72.50	1.69	14.26	A	1	1.03	1	1	1	207.283	3.10	82.74	C
			B	1	1.03	1	1	1	207.283			
			C	1	1.03	1	1	1	207.283			
L3 72.50-36.00	1.71	17.08	A	1	1.03	1	1	1	213.948	2.75	75.43	C
			B	1	1.03	1	1	1	213.948			
			C	1	1.03	1	1	1	213.948			
L4 36.00-0.00	1.32	18.00	A	1	1.03	1	1	1	222.372	2.49	69.13	C
			B	1	1.03	1	1	1	222.372			
			C	1	1.03	1	1	1	222.372			
Sum Weight:	6.22	60.79						OTM	994.18 kip-ft			

tnxTower FDH Velocitel 6521 Meridien Drive, Suite 107 Raleigh, North Carolina 27616 Phone: 9197551012 FAX: 9197551031	Job HRT 107(C) 943204, BU# 806366	Page 16 of 28
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	Client Crown Castle	Designed by Mark S. Girgis, EI

Tower Forces - Service - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
L1 155.50-110.00	1.50	11.45	A B C	1 1 1	1.03 1.03 1.03	1 1 1	1 1 1	1 1 1	233.578 233.578 233.578	3.89	85.59	C
L2 110.00-72.50	1.69	14.26	A B C	1 1 1	1.03 1.03 1.03	1 1 1	1 1 1	1 1 1	207.283 207.283 207.283	3.10	82.74	C
L3 72.50-36.00	1.71	17.08	A B C	1 1 1	1.03 1.03 1.03	1 1 1	1 1 1	1 1 1	213.948 213.948 213.948	2.75	75.43	C
L4 36.00-0.00	1.32	18.00	A B C	1 1 1	1.03 1.03 1.03	1 1 1	1 1 1	1 1 1	222.372 222.372 222.372	2.49	69.13	C
Sum Weight:	6.22	60.79						OTM	994.18 kip-ft	12.24		

Discrete Appurtenance Pressures - No Ice G_H = 1.690

Description	Aiming Azimuth °	Weight K	Offset _x ft	Offset _z ft	z ft	K _z	q _z psf	C _A A _C Front ft ²	C _A A _C Side ft ²
DB809K-Y	300.0000	0.03	-5.58	-3.22	159.00	1.567	26	2.85	2.85
DB809K-Y	60.0000	0.03	5.58	-3.22	159.00	1.567	26	2.85	2.85
DB809K-Y	180.0000	0.03	0.00	6.44	159.00	1.567	26	2.85	2.85
SBNHH-1D65B w/ Mount Pipe	300.0000	0.14	-5.58	-3.22	159.00	1.567	26	17.73	14.59
SBNHH-1D65B w/ Mount Pipe	60.0000	0.14	5.58	-3.22	159.00	1.567	26	17.73	14.59
SBNHH-1D65B w/ Mount Pipe	180.0000	0.14	0.00	6.44	159.00	1.567	26	17.73	14.59
LNx-8513DS-VTM w/ Mount Pipe	300.0000	0.06	-5.58	-3.22	159.00	1.567	26	8.65	7.08
LNx-6514DS-A1M w/ Mount Pipe	300.0000	0.06	-5.58	-3.22	159.00	1.567	26	8.65	7.08
LNx-6514DS-A1M w/ Mount Pipe	60.0000	0.12	5.58	-3.22	159.00	1.567	26	17.30	14.16
LNx-6514DS-A1M w/ Mount Pipe	180.0000	0.12	0.00	6.44	159.00	1.567	26	17.30	14.16
RRH2x60-700	300.0000	0.06	-5.58	-3.22	159.00	1.567	26	3.96	1.82
RRH2x60-700	60.0000	0.06	5.58	-3.22	159.00	1.567	26	3.96	1.82
RRH2x60-700	180.0000	0.06	0.00	6.44	159.00	1.567	26	3.96	1.82
RRH2x60-AWS	300.0000	0.04	-5.58	-3.22	159.00	1.567	26	2.19	1.43
RRH2x60-AWS	60.0000	0.04	5.58	-3.22	159.00	1.567	26	2.19	1.43
RRH2x60-AWS	180.0000	0.04	0.00	6.44	159.00	1.567	26	2.19	1.43
RRH2x60-PCS	300.0000	0.05	-5.58	-3.22	159.00	1.567	26	2.57	1.93
RRH2x60-PCS	60.0000	0.05	5.58	-3.22	159.00	1.567	26	2.57	1.93
RRH2x60-PCS	180.0000	0.05	0.00	6.44	159.00	1.567	26	2.57	1.93
DB-T1-6Z-8AB-0Z Platform Mount [LP 1001-1]	300.0000	0.08	-5.58	-3.22	159.00	1.567	26	11.20	4.67
Platform Mount [LP 1001-1]	0.0000	3.02	0.00	0.00	156.00	1.559	26	47.70	47.70
7770.00 w/ Mount Pipe	300.0000	0.12	-7.37	-4.25	144.00	1.523	25	12.24	8.51
7770.00 w/ Mount Pipe	60.0000	0.12	7.37	-4.25	144.00	1.523	25	12.24	8.51
7770.00 w/ Mount Pipe	180.0000	0.12	0.00	8.50	144.00	1.523	25	12.24	8.51
AM-X-CD-16-65-00T-R	300.0000	0.07	-7.37	-4.25	144.00	1.523	25	8.50	6.30

tnxTower

FDH Velocitel
 6521 Meridien Drive, Suite 107
 Raleigh, North Carolina 27616
 Phone: 9197551012
 FAX: 9197551031

Job	HRT 107(C) 943204, BU# 806366	Page	17 of 28
Project	16BJOJ1400	Date	07:56:28 06/08/16
Client	Crown Castle	Designed by	Mark S. Girgis, EI

Description	Aiming Azimuth °	Weight K	Offset _x ft	Offset _z ft	z ft	K _z	q _z psf	C _{AAC} Front ft ²	C _{AAC} Side ft ²
ET w/ Mount Pipe									
AM-X-CD-16-65-00T-R	60.0000	0.07	7.37	-4.25	144.00	1.523	25	8.50	6.30
ET w/ Mount Pipe									
AM-X-CD-16-65-00T-R	180.0000	0.07	0.00	8.50	144.00	1.523	25	8.50	6.30
ET w/ Mount Pipe									
LGP 17201	300.0000	0.06	-7.37	-4.25	144.00	1.523	25	3.89	1.04
LGP 17201	60.0000	0.06	7.37	-4.25	144.00	1.523	25	3.89	1.04
LGP 17201	180.0000	0.06	0.00	8.50	144.00	1.523	25	3.89	1.04
LGP21903	300.0000	0.02	-7.37	-4.25	144.00	1.523	25	0.54	0.37
LGP21903	60.0000	0.02	7.37	-4.25	144.00	1.523	25	0.54	0.37
LGP21903	180.0000	0.02	0.00	8.50	144.00	1.523	25	0.54	0.37
RRUS-11	300.0000	0.12	-7.37	-4.25	144.00	1.523	25	5.88	2.49
RRUS-11	60.0000	0.12	7.37	-4.25	144.00	1.523	25	5.88	2.49
RRUS-11	180.0000	0.12	0.00	8.50	144.00	1.523	25	5.88	2.49
DC6-48-60-18-8F	60.0000	0.03	7.37	-4.25	144.00	1.523	25	2.57	4.32
1001940	0.0000	0.00	0.00	-8.50	144.00	1.523	25	0.21	0.09
1001940	120.0000	0.00	7.37	4.25	144.00	1.523	25	0.21	0.09
1001940	240.0000	0.00	-7.37	4.25	144.00	1.523	25	0.21	0.09
Pipe Mount	0.0000	0.02	0.00	-8.50	144.00	1.523	25	1.20	1.20
Pipe Mount	120.0000	0.02	7.37	4.25	144.00	1.523	25	1.20	1.20
Pipe Mount	240.0000	0.02	-7.37	4.25	144.00	1.523	25	1.20	1.20
Platform Mount [LP 1002-1]	0.0000	4.05	0.00	0.00	144.00	1.523	25	77.10	77.10
742 213 w/ Mount Pipe	0.0000	0.05	0.00	-3.55	135.00	1.496	25	5.37	4.62
742 213 w/ Mount Pipe	120.0000	0.05	3.08	1.78	135.00	1.496	25	5.37	4.62
742 213 w/ Mount Pipe	240.0000	0.05	-3.08	1.78	135.00	1.496	25	5.37	4.62
DB980H90E-M w/ Mount Pipe	0.0000	0.06	0.00	-6.60	128.00	1.473	24	8.07	7.24
DB980H90E-M w/ Mount Pipe	120.0000	0.06	5.72	3.30	128.00	1.473	24	8.07	7.24
DB980H90E-M w/ Mount Pipe	240.0000	0.06	-5.72	3.30	128.00	1.473	24	8.07	7.24
ANT450F6	0.0000	0.01	0.00	-6.60	128.00	1.473	24	1.90	1.90
CO-41A	120.0000	0.01	5.72	3.30	128.00	1.473	24	3.94	3.94
CO-41A	240.0000	0.01	-5.72	3.30	128.00	1.473	24	3.94	3.94
ANT450Y7-WR	0.0000	0.01	0.00	-6.60	128.00	1.473	24	0.93	0.93
Pipe Mount	0.0000	0.02	0.00	-6.60	126.00	1.466	24	1.20	1.20
Pipe Mount	120.0000	0.02	5.72	3.30	126.00	1.466	24	1.20	1.20
Pipe Mount	240.0000	0.02	-5.72	3.30	126.00	1.466	24	1.20	1.20
T-Arm Mount [TA 602-3]	0.0000	0.77	0.00	0.00	127.00	1.470	24	11.59	11.59
T-Arm Mount [TA 602-3]	0.0000	0.77	0.00	0.00	125.00	1.463	24	11.59	11.59
LNx-6515DS-VTM w/ Mount Pipe	0.0000	0.08	0.00	-5.72	100.00	1.373	22	11.68	9.84
LNx-6515DS-VTM w/ Mount Pipe	120.0000	0.08	4.95	2.86	100.00	1.373	22	11.68	9.84
LNx-6515DS-VTM w/ Mount Pipe	240.0000	0.08	-4.95	2.86	100.00	1.373	22	11.68	9.84
RV90-17-00DP w/ Mount Pipe	0.0000	0.04	0.00	-5.72	100.00	1.373	22	4.59	3.32
RV90-17-00DP w/ Mount Pipe	120.0000	0.04	4.95	2.86	100.00	1.373	22	4.59	3.32
RV90-17-00DP w/ Mount Pipe	240.0000	0.04	-4.95	2.86	100.00	1.373	22	4.59	3.32
ATBT-BOTTOM-24V	0.0000	0.00	0.00	-5.72	100.00	1.373	22	0.12	0.08
ATBT-BOTTOM-24V	120.0000	0.00	4.95	2.86	100.00	1.373	22	0.12	0.08
ATBT-BOTTOM-24V	240.0000	0.00	-4.95	2.86	100.00	1.373	22	0.12	0.08
ETM19V2S12UB	0.0000	0.02	0.00	-5.72	100.00	1.373	22	1.67	0.45
ETM19V2S12UB	120.0000	0.02	4.95	2.86	100.00	1.373	22	1.67	0.45
ETM19V2S12UB	240.0000	0.02	-4.95	2.86	100.00	1.373	22	1.67	0.45

tnxTower FDH Velocitel 6521 Meridien Drive, Suite 107 Raleigh, North Carolina 27616 Phone: 9197551012 FAX: 9197551031	Job HRT 107(C) 943204, BU# 806366	Page 18 of 28
	Project 16BJOJ1400	Date 07:56:28 06/08/16
	Client Crown Castle	Designed by Mark S. Girgis, EI

Description	Aiming Azimuth °	Weight K	Offset _x ft	Offset _z ft	z ft	K _z	q _z psf	C _{AAc} Front ft ²	C _{AAc} Side ft ²
Side Arm Mount [SO 701-3]	0.0000	0.20	0.00	0.00	100.00	1.373	22	2.83	2.83
	Sum Weight:	12.33							

Discrete Appurtenance Pressures - With Ice $G_H = 1.690$

Description	Aiming Azimuth °	Weight K	Offset _x ft	Offset _z ft	z ft	K _z	q _z psf	C _{AAc} Front ft ²	C _{AAc} Side ft ²	t _z in
DB809K-Y	300.0000	0.12	-5.58	-3.22	159.00	1.567	6	6.20	6.20	1.5061
DB809K-Y	60.0000	0.12	5.58	-3.22	159.00	1.567	6	6.20	6.20	1.5061
DB809K-Y	180.0000	0.12	0.00	6.44	159.00	1.567	6	6.20	6.20	1.5061
SBNHH-1D65B w/ Mount Pipe	300.0000	0.63	-5.58	-3.22	159.00	1.567	6	22.09	21.40	1.5061
SBNHH-1D65B w/ Mount Pipe	60.0000	0.63	5.58	-3.22	159.00	1.567	6	22.09	21.40	1.5061
SBNHH-1D65B w/ Mount Pipe	180.0000	0.63	0.00	6.44	159.00	1.567	6	22.09	21.40	1.5061
LNx-8513DS-VTM w/ Mount Pipe	300.0000	0.30	-5.58	-3.22	159.00	1.567	6	10.57	10.12	1.5061
LNx-6514DS-A1M w/ Mount Pipe	300.0000	0.30	-5.58	-3.22	159.00	1.567	6	10.57	10.12	1.5061
LNx-6514DS-A1M w/ Mount Pipe	60.0000	0.61	5.58	-3.22	159.00	1.567	6	21.15	20.23	1.5061
LNx-6514DS-A1M w/ Mount Pipe	180.0000	0.61	0.00	6.44	159.00	1.567	6	21.15	20.23	1.5061
RRH2x60-700	300.0000	0.14	-5.58	-3.22	159.00	1.567	6	4.94	2.66	1.5061
RRH2x60-700	60.0000	0.14	5.58	-3.22	159.00	1.567	6	4.94	2.66	1.5061
RRH2x60-700	180.0000	0.14	0.00	6.44	159.00	1.567	6	4.94	2.66	1.5061
RRH2x60-AWS	300.0000	0.10	-5.58	-3.22	159.00	1.567	6	2.85	2.01	1.5061
RRH2x60-AWS	60.0000	0.10	5.58	-3.22	159.00	1.567	6	2.85	2.01	1.5061
RRH2x60-AWS	180.0000	0.10	0.00	6.44	159.00	1.567	6	2.85	2.01	1.5061
RRH2x60-PCS	300.0000	0.12	-5.58	-3.22	159.00	1.567	6	3.27	2.57	1.5061
RRH2x60-PCS	60.0000	0.12	5.58	-3.22	159.00	1.567	6	3.27	2.57	1.5061
RRH2x60-PCS	180.0000	0.12	0.00	6.44	159.00	1.567	6	3.27	2.57	1.5061
DB-T1-6Z-8AB-0Z	300.0000	0.33	-5.58	-3.22	159.00	1.567	6	13.16	6.08	1.5061
Platform Mount [LP 1001-1]	0.0000	4.84	0.00	0.00	156.00	1.559	6	83.24	83.24	1.5061
7770.00 w/ Mount Pipe	300.0000	0.44	-7.37	-4.25	144.00	1.523	6	15.28	12.84	1.4917
7770.00 w/ Mount Pipe	60.0000	0.44	7.37	-4.25	144.00	1.523	6	15.28	12.84	1.4917
7770.00 w/ Mount Pipe	180.0000	0.44	0.00	8.50	144.00	1.523	6	15.28	12.84	1.4917
AM-X-CD-16-65-00T-R ET w/ Mount Pipe	300.0000	0.30	-7.37	-4.25	144.00	1.523	6	10.39	9.26	1.4917
AM-X-CD-16-65-00T-R ET w/ Mount Pipe	60.0000	0.30	7.37	-4.25	144.00	1.523	6	10.39	9.26	1.4917
AM-X-CD-16-65-00T-R ET w/ Mount Pipe	180.0000	0.30	0.00	8.50	144.00	1.523	6	10.39	9.26	1.4917
LGP 17201	300.0000	0.14	-7.37	-4.25	144.00	1.523	6	5.07	1.82	1.4917
LGP 17201	60.0000	0.14	7.37	-4.25	144.00	1.523	6	5.07	1.82	1.4917
LGP 17201	180.0000	0.14	0.00	8.50	144.00	1.523	6	5.07	1.82	1.4917
LGP21903	300.0000	0.04	-7.37	-4.25	144.00	1.523	6	1.04	0.81	1.4917
LGP21903	60.0000	0.04	7.37	-4.25	144.00	1.523	6	1.04	0.81	1.4917
LGP21903	180.0000	0.04	0.00	8.50	144.00	1.523	6	1.04	0.81	1.4917
RRUS-11	300.0000	0.25	-7.37	-4.25	144.00	1.523	6	7.32	3.54	1.4917
RRUS-11	60.0000	0.25	7.37	-4.25	144.00	1.523	6	7.32	3.54	1.4917
RRUS-11	180.0000	0.25	0.00	8.50	144.00	1.523	6	7.32	3.54	1.4917
DC6-48-60-18-8F	60.0000	0.14	7.37	-4.25	144.00	1.523	6	3.29	5.18	1.4917

<p style="text-align: center;">tnxTower</p> <p style="text-align: center;">FDH Velocitel 6521 Meridien Drive, Suite 107 Raleigh, North Carolina 27616 Phone: 9197551012 FAX: 9197551031</p>	<p>Job</p> <p style="text-align: center;">HRT 107(C) 943204, BU# 806366</p>	<p>Page</p> <p style="text-align: center;">19 of 28</p>
	<p>Project</p> <p style="text-align: center;">16BJOJ1400</p>	<p>Date</p> <p style="text-align: center;">07:56:28 06/08/16</p>
	<p>Client</p> <p style="text-align: center;">Crown Castle</p>	<p>Designed by</p> <p style="text-align: center;">Mark S. Girgis, EI</p>

Description	Aiming Azimuth °	Weight K	Offset _x ft	Offset _z ft	z ft	K _z	q _z psf	C _{AAC} Front ft ²	C _{AAC} Side ft ²	t _z in
1001940	0.0000	0.01	0.00	-8.50	144.00	1.523	6	0.43	0.28	1.4917
1001940	120.0000	0.01	7.37	4.25	144.00	1.523	6	0.43	0.28	1.4917
1001940	240.0000	0.01	-7.37	4.25	144.00	1.523	6	0.43	0.28	1.4917
Pipe Mount	0.0000	0.06	0.00	-8.50	144.00	1.523	6	2.13	2.13	1.4917
Pipe Mount	120.0000	0.06	7.37	4.25	144.00	1.523	6	2.13	2.13	1.4917
Pipe Mount	240.0000	0.06	-7.37	4.25	144.00	1.523	6	2.13	2.13	1.4917
Platform Mount [LP 1002-1]	0.0000	7.68	0.00	0.00	144.00	1.523	6	125.43	125.43	1.4917
742 213 w/ Mount Pipe	0.0000	0.21	0.00	-3.55	135.00	1.496	5	7.03	7.88	1.4802
742 213 w/ Mount Pipe	120.0000	0.21	3.08	1.78	135.00	1.496	5	7.03	7.88	1.4802
742 213 w/ Mount Pipe	240.0000	0.21	-3.08	1.78	135.00	1.496	5	7.03	7.88	1.4802
DB980H90E-M w/ Mount Pipe	0.0000	0.32	0.00	-6.60	128.00	1.473	5	10.76	11.87	1.4680
DB980H90E-M w/ Mount Pipe	120.0000	0.32	5.72	3.30	128.00	1.473	5	10.76	11.87	1.4680
DB980H90E-M w/ Mount Pipe	240.0000	0.32	-5.72	3.30	128.00	1.473	5	10.76	11.87	1.4680
ANT450F6	0.0000	0.07	0.00	-6.60	128.00	1.473	5	3.87	3.87	1.4680
CO-41A	120.0000	0.13	5.72	3.30	128.00	1.473	5	8.49	8.49	1.4680
CO-41A	240.0000	0.13	-5.72	3.30	128.00	1.473	5	8.49	8.49	1.4680
ANT450Y7-WR	0.0000	0.02	0.00	-6.60	128.00	1.473	5	1.76	1.76	1.4680
Pipe Mount	0.0000	0.06	0.00	-6.60	126.00	1.466	5	2.12	2.12	1.4680
Pipe Mount	120.0000	0.06	5.72	3.30	126.00	1.466	5	2.12	2.12	1.4680
Pipe Mount	240.0000	0.06	-5.72	3.30	126.00	1.466	5	2.12	2.12	1.4680
T-Arm Mount [TA 602-3]	0.0000	1.41	0.00	0.00	127.00	1.470	5	22.90	22.90	1.4694
T-Arm Mount [TA 602-3]	0.0000	1.41	0.00	0.00	125.00	1.463	5	22.88	22.88	1.4666
LNx-6515DS-VTM w/ Mount Pipe	0.0000	0.37	0.00	-5.72	100.00	1.373	5	13.76	13.92	1.4279
LNx-6515DS-VTM w/ Mount Pipe	120.0000	0.37	4.95	2.86	100.00	1.373	5	13.76	13.92	1.4279
LNx-6515DS-VTM w/ Mount Pipe	240.0000	0.37	-4.95	2.86	100.00	1.373	5	13.76	13.92	1.4279
RV90-17-00DP w/ Mount Pipe	0.0000	0.17	0.00	-5.72	100.00	1.373	5	6.01	5.40	1.4279
RV90-17-00DP w/ Mount Pipe	120.0000	0.17	4.95	2.86	100.00	1.373	5	6.01	5.40	1.4279
RV90-17-00DP w/ Mount Pipe	240.0000	0.17	-4.95	2.86	100.00	1.373	5	6.01	5.40	1.4279
ATBT-BOTTOM-24V	0.0000	0.01	0.00	-5.72	100.00	1.373	5	0.29	0.23	1.4279
ATBT-BOTTOM-24V	120.0000	0.01	4.95	2.86	100.00	1.373	5	0.29	0.23	1.4279
ATBT-BOTTOM-24V	240.0000	0.01	-4.95	2.86	100.00	1.373	5	0.29	0.23	1.4279
ETM19V2S12UB	0.0000	0.06	0.00	-5.72	100.00	1.373	5	2.44	0.98	1.4279
ETM19V2S12UB	120.0000	0.06	4.95	2.86	100.00	1.373	5	2.44	0.98	1.4279
ETM19V2S12UB	240.0000	0.06	-4.95	2.86	100.00	1.373	5	2.44	0.98	1.4279
Side Arm Mount [SO 701-3]	0.0000	0.31	0.00	0.00	100.00	1.373	5	5.94	5.94	1.4279
Sum Weight:		28.93								

Discrete Appurtenance Pressures - Service $G_H = 1.690$

Description	Aiming Azimuth °	Weight K	Offset _x ft	Offset _z ft	z ft	K _z	q _z psf	C _{AAC} Front ft ²	C _{AAC} Side ft ²
DB809K-Y	300.0000	0.03	-5.58	-3.22	159.00	1.567	10	2.85	2.85
DB809K-Y	60.0000	0.03	5.58	-3.22	159.00	1.567	10	2.85	2.85

tnxTower

FDH Velocitel
 6521 Meridien Drive, Suite 107
 Raleigh, North Carolina 27616
 Phone: 9197551012
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Job	HRT 107(C) 943204, BU# 806366	Page	20 of 28
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Client	Crown Castle	Designed by	Mark S. Girgis, EI

Description	Aiming Azimuth °	Weight K	Offset _x ft	Offset _z ft	z ft	K _z	q _z psf	C _{AAC} Front ft ²	C _{AAC} Side ft ²
DB809K-Y	180.0000	0.03	0.00	6.44	159.00	1.567	10	2.85	2.85
SBNHH-1D65B w/ Mount Pipe	300.0000	0.14	-5.58	-3.22	159.00	1.567	10	17.73	14.59
SBNHH-1D65B w/ Mount Pipe	60.0000	0.14	5.58	-3.22	159.00	1.567	10	17.73	14.59
SBNHH-1D65B w/ Mount Pipe	180.0000	0.14	0.00	6.44	159.00	1.567	10	17.73	14.59
LNx-8513DS-VTM w/ Mount Pipe	300.0000	0.06	-5.58	-3.22	159.00	1.567	10	8.65	7.08
LNx-6514DS-A1M w/ Mount Pipe	300.0000	0.06	-5.58	-3.22	159.00	1.567	10	8.65	7.08
LNx-6514DS-A1M w/ Mount Pipe	60.0000	0.12	5.58	-3.22	159.00	1.567	10	17.30	14.16
LNx-6514DS-A1M w/ Mount Pipe	180.0000	0.12	0.00	6.44	159.00	1.567	10	17.30	14.16
RRH2x60-700	300.0000	0.06	-5.58	-3.22	159.00	1.567	10	3.96	1.82
RRH2x60-700	60.0000	0.06	5.58	-3.22	159.00	1.567	10	3.96	1.82
RRH2x60-700	180.0000	0.06	0.00	6.44	159.00	1.567	10	3.96	1.82
RRH2x60-AWS	300.0000	0.04	-5.58	-3.22	159.00	1.567	10	2.19	1.43
RRH2x60-AWS	60.0000	0.04	5.58	-3.22	159.00	1.567	10	2.19	1.43
RRH2x60-AWS	180.0000	0.04	0.00	6.44	159.00	1.567	10	2.19	1.43
RRH2x60-PCS	300.0000	0.05	-5.58	-3.22	159.00	1.567	10	2.57	1.93
RRH2x60-PCS	60.0000	0.05	5.58	-3.22	159.00	1.567	10	2.57	1.93
RRH2x60-PCS	180.0000	0.05	0.00	6.44	159.00	1.567	10	2.57	1.93
DB-T1-6Z-8AB-OZ	300.0000	0.08	-5.58	-3.22	159.00	1.567	10	11.20	4.67
Platform Mount [LP 1001-1]	0.0000	3.02	0.00	0.00	156.00	1.559	10	47.70	47.70
7770.00 w/ Mount Pipe	300.0000	0.12	-7.37	-4.25	144.00	1.523	10	12.24	8.51
7770.00 w/ Mount Pipe	60.0000	0.12	7.37	-4.25	144.00	1.523	10	12.24	8.51
7770.00 w/ Mount Pipe	180.0000	0.12	0.00	8.50	144.00	1.523	10	12.24	8.51
AM-X-CD-16-65-00T-R ET w/ Mount Pipe	300.0000	0.07	-7.37	-4.25	144.00	1.523	10	8.50	6.30
AM-X-CD-16-65-00T-R ET w/ Mount Pipe	60.0000	0.07	7.37	-4.25	144.00	1.523	10	8.50	6.30
AM-X-CD-16-65-00T-R ET w/ Mount Pipe	180.0000	0.07	0.00	8.50	144.00	1.523	10	8.50	6.30
LGP 17201	300.0000	0.06	-7.37	-4.25	144.00	1.523	10	3.89	1.04
LGP 17201	60.0000	0.06	7.37	-4.25	144.00	1.523	10	3.89	1.04
LGP 17201	180.0000	0.06	0.00	8.50	144.00	1.523	10	3.89	1.04
LGP21903	300.0000	0.02	-7.37	-4.25	144.00	1.523	10	0.54	0.37
LGP21903	60.0000	0.02	7.37	-4.25	144.00	1.523	10	0.54	0.37
LGP21903	180.0000	0.02	0.00	8.50	144.00	1.523	10	0.54	0.37
RRUS-11	300.0000	0.12	-7.37	-4.25	144.00	1.523	10	5.88	2.49
RRUS-11	60.0000	0.12	7.37	-4.25	144.00	1.523	10	5.88	2.49
RRUS-11	180.0000	0.12	0.00	8.50	144.00	1.523	10	5.88	2.49
DC6-48-60-18-8F	60.0000	0.03	7.37	-4.25	144.00	1.523	10	2.57	4.32
1001940	0.0000	0.00	0.00	-8.50	144.00	1.523	10	0.21	0.09
1001940	120.0000	0.00	7.37	4.25	144.00	1.523	10	0.21	0.09
1001940	240.0000	0.00	-7.37	4.25	144.00	1.523	10	0.21	0.09
Pipe Mount	0.0000	0.02	0.00	-8.50	144.00	1.523	10	1.20	1.20
Pipe Mount	120.0000	0.02	7.37	4.25	144.00	1.523	10	1.20	1.20
Pipe Mount	240.0000	0.02	-7.37	4.25	144.00	1.523	10	1.20	1.20
Platform Mount [LP 1002-1]	0.0000	4.05	0.00	0.00	144.00	1.523	10	77.10	77.10
742 213 w/ Mount Pipe	0.0000	0.05	0.00	-3.55	135.00	1.496	10	5.37	4.62
742 213 w/ Mount Pipe	120.0000	0.05	3.08	1.78	135.00	1.496	10	5.37	4.62
742 213 w/ Mount Pipe	240.0000	0.05	-3.08	1.78	135.00	1.496	10	5.37	4.62
DB980H90E-M w/ Mount Pipe	0.0000	0.06	0.00	-6.60	128.00	1.473	9	8.07	7.24
DB980H90E-M w/ Mount Pipe	120.0000	0.06	5.72	3.30	128.00	1.473	9	8.07	7.24

Job	HRT 107(C) 943204, BU# 806366	Page	21 of 28
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Client	Crown Castle	Designed by	Mark S. Girgis, EI

Description	Aiming Azimuth °	Weight K	Offset _x ft	Offset _z ft	z ft	K _z	q _z psf	C _{AAc} Front ft ²	C _{AAc} Side ft ²
DB980H90E-M w/ Mount Pipe	240.0000	0.06	-5.72	3.30	128.00	1.473	9	8.07	7.24
ANT450F6	0.0000	0.01	0.00	-6.60	128.00	1.473	9	1.90	1.90
CO-41A	120.0000	0.01	5.72	3.30	128.00	1.473	9	3.94	3.94
CO-41A	240.0000	0.01	-5.72	3.30	128.00	1.473	9	3.94	3.94
ANT450Y7-WR	0.0000	0.01	0.00	-6.60	128.00	1.473	9	0.93	0.93
Pipe Mount	0.0000	0.02	0.00	-6.60	126.00	1.466	9	1.20	1.20
Pipe Mount	120.0000	0.02	5.72	3.30	126.00	1.466	9	1.20	1.20
Pipe Mount	240.0000	0.02	-5.72	3.30	126.00	1.466	9	1.20	1.20
T-Arm Mount [TA 602-3]	0.0000	0.77	0.00	0.00	127.00	1.470	9	11.59	11.59
T-Arm Mount [TA 602-3]	0.0000	0.77	0.00	0.00	125.00	1.463	9	11.59	11.59
LNx-6515DS-VTM w/ Mount Pipe	0.0000	0.08	0.00	-5.72	100.00	1.373	9	11.68	9.84
LNx-6515DS-VTM w/ Mount Pipe	120.0000	0.08	4.95	2.86	100.00	1.373	9	11.68	9.84
LNx-6515DS-VTM w/ Mount Pipe	240.0000	0.08	-4.95	2.86	100.00	1.373	9	11.68	9.84
RV90-17-00DP w/ Mount Pipe	0.0000	0.04	0.00	-5.72	100.00	1.373	9	4.59	3.32
RV90-17-00DP w/ Mount Pipe	120.0000	0.04	4.95	2.86	100.00	1.373	9	4.59	3.32
RV90-17-00DP w/ Mount Pipe	240.0000	0.04	-4.95	2.86	100.00	1.373	9	4.59	3.32
ATBT-BOTTOM-24V	0.0000	0.00	0.00	-5.72	100.00	1.373	9	0.12	0.08
ATBT-BOTTOM-24V	120.0000	0.00	4.95	2.86	100.00	1.373	9	0.12	0.08
ATBT-BOTTOM-24V	240.0000	0.00	-4.95	2.86	100.00	1.373	9	0.12	0.08
ETM19V2S12UB	0.0000	0.02	0.00	-5.72	100.00	1.373	9	1.67	0.45
ETM19V2S12UB	120.0000	0.02	4.95	2.86	100.00	1.373	9	1.67	0.45
ETM19V2S12UB	240.0000	0.02	-4.95	2.86	100.00	1.373	9	1.67	0.45
Side Arm Mount [SO 701-3]	0.0000	0.20	0.00	0.00	100.00	1.373	9	2.83	2.83
Sum Weight:		12.33							

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M _x kip-ft	Sum of Overturning Moments, M _z kip-ft	Sum of Torques kip-ft
Leg Weight	60.79					
Bracing Weight	0.00					
Total Member Self-Weight	60.79					
Total Weight	79.34					
Wind 0 deg - No Ice		-0.15	-50.82	-5331.23	24.43	0.09
Wind 30 deg - No Ice		25.33	-43.94	-4604.98	-2652.79	-0.52
Wind 60 deg - No Ice		44.03	-25.28	-2644.96	-4619.12	-0.99
Wind 90 deg - No Ice		50.93	0.15	23.64	-5347.67	-1.20
Wind 120 deg - No Ice		44.18	25.55	2685.79	-4643.24	-1.08
Wind 150 deg - No Ice		25.60	44.09	4628.15	-2694.57	-0.68
Wind 180 deg - No Ice		0.15	50.82	5330.27	-23.82	-0.09
Wind 210 deg - No Ice		-25.33	43.94	4604.03	2653.40	0.52
Wind 240 deg - No Ice		-44.03	25.28	2644.01	4619.72	0.99
Wind 270 deg - No Ice		-50.93	-0.15	-24.60	5348.28	1.20
Wind 300 deg - No Ice		-44.18	-25.55	-2686.74	4643.85	1.08
Wind 330 deg - No Ice		-25.60	-44.09	-4629.10	2695.18	0.68

<p>tnxTower</p> <p>FDH Velocitel 6521 Meridien Drive, Suite 107 Raleigh, North Carolina 27616 Phone: 9197551012 FAX: 9197551031</p>	<p>Job</p> <p>HRT 107(C) 943204, BU# 806366</p>	<p>Page</p> <p>22 of 28</p>
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	<p>Client</p> <p>Crown Castle</p>	<p>Designed by</p> <p>Mark S. Girgis, EI</p>

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Member Ice	18.40					
Total Weight Ice	114.80			-2.06	2.05	
Wind 0 deg - Ice		-0.04	-14.07	-1549.76	7.83	-0.20
Wind 30 deg - Ice		7.02	-12.17	-1339.52	-768.86	-0.35
Wind 60 deg - Ice		12.19	-7.00	-770.91	-1338.98	-0.41
Wind 90 deg - Ice		14.10	0.04	3.71	-1549.77	-0.36
Wind 120 deg - Ice		12.23	7.07	776.79	-1344.75	-0.21
Wind 150 deg - Ice		7.08	12.21	1341.17	-778.86	-0.00
Wind 180 deg - Ice		0.04	14.07	1545.64	-3.72	0.20
Wind 210 deg - Ice		-7.02	12.17	1335.40	772.96	0.35
Wind 240 deg - Ice		-12.19	7.00	766.79	1343.08	0.41
Wind 270 deg - Ice		-14.10	-0.04	-7.84	1553.88	0.36
Wind 300 deg - Ice		-12.23	-7.07	-780.91	1348.86	0.21
Wind 330 deg - Ice		-7.08	-12.21	-1345.30	782.96	0.00
Total Weight	79.34			-0.48	0.30	
Wind 0 deg - Service		-0.06	-19.85	-2082.76	9.65	0.04
Wind 30 deg - Service		9.89	-17.16	-1799.07	-1036.14	-0.20
Wind 60 deg - Service		17.20	-9.87	-1033.43	-1804.24	-0.39
Wind 90 deg - Service		19.89	0.06	8.99	-2088.83	-0.47
Wind 120 deg - Service		17.26	9.98	1048.89	-1813.66	-0.42
Wind 150 deg - Service		10.00	17.22	1807.63	-1052.46	-0.26
Wind 180 deg - Service		0.06	19.85	2081.89	-9.20	-0.04
Wind 210 deg - Service		-9.89	17.16	1798.20	1036.59	0.20
Wind 240 deg - Service		-17.20	9.87	1032.57	1804.69	0.39
Wind 270 deg - Service		-19.89	-0.06	-9.85	2089.28	0.47
Wind 300 deg - Service		-17.26	-9.98	-1049.75	1814.11	0.42
Wind 330 deg - Service		-10.00	-17.22	-1808.49	1052.91	0.26

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp

tnxTower FDH Velocitel 6521 Meridien Drive, Suite 107 Raleigh, North Carolina 27616 Phone: 9197551012 FAX: 9197551031	Job	HRT 107(C) 943204, BU# 806366	Page	23 of 28
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Comb. No.	Description
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	155.5 - 110	Pole	Max Tension	14	0.00	0.00	0.00
			Max. Compression	14	-41.88	1.14	1.53
			Max. Mx	11	-21.74	689.64	6.36
			Max. My	2	-21.74	6.18	684.94
			Max. Vy	11	-26.35	689.64	6.36
			Max. Vx	2	-26.24	6.18	684.94
			Max. Torque	11			-1.45
L2	110 - 72.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-64.66	1.45	1.71
			Max. Mx	11	-37.46	1853.37	12.22
			Max. My	2	-37.46	12.04	1844.70
			Max. Vy	11	-36.37	1853.37	12.22
			Max. Vx	2	-36.26	12.04	1844.70
			Max. Torque	11			-1.18
L3	72.5 - 36	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-88.06	1.75	1.89
			Max. Mx	11	-55.58	3295.05	17.94
			Max. My	2	-55.58	17.75	3282.52
			Max. Vy	11	-43.49	3295.05	17.94
			Max. Vx	2	-43.38	17.75	3282.52
			Max. Torque	11			-1.20
L4	36 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-117.83	2.05	2.06
			Max. Mx	11	-79.32	5424.20	25.00
			Max. My	2	-79.32	24.82	5406.87
			Max. Vy	11	-50.95	5424.20	25.00
			Max. Vx	2	-50.85	24.82	5406.87
			Max. Torque	11			-1.21

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	117.83	0.00	0.00

<p style="text-align: center;">tnxTower</p> <p style="text-align: center;">FDH Velocitel 6521 Meridien Drive, Suite 107 Raleigh, North Carolina 27616 Phone: 9197551012 FAX: 9197551031</p>	Job	HRT 107(C) 943204, BU# 806366	Page	24 of 28
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Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. H _x	11	79.34	50.93	0.15
	Max. H _z	2	79.34	0.15	50.82
	Max. M _x	2	5406.87	0.15	50.82
	Max. M _z	5	5423.57	-50.93	-0.15
	Max. Torsion	5	1.20	-50.93	-0.15
	Min. Vert	1	79.34	0.00	0.00
	Min. H _x	5	79.34	-50.93	-0.15
	Min. H _z	8	79.34	-0.15	-50.82
	Min. M _x	8	-5405.89	-0.15	-50.82
	Min. M _z	11	-5424.20	50.93	0.15
	Min. Torsion	11	-1.21	50.93	0.15

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	79.34	0.00	0.00	-0.48	0.30	0.00
Dead+Wind 0 deg - No Ice	79.34	-0.15	-50.82	-5406.87	24.82	0.07
Dead+Wind 30 deg - No Ice	79.34	25.33	-43.94	-4670.30	-2690.41	-0.53
Dead+Wind 60 deg - No Ice	79.34	44.03	-25.28	-2682.45	-4684.66	-1.00
Dead+Wind 90 deg - No Ice	79.34	50.93	0.15	24.02	-5423.57	-1.20
Dead+Wind 120 deg - No Ice	79.34	44.18	25.55	2723.93	-4709.16	-1.08
Dead+Wind 150 deg - No Ice	79.34	25.60	44.09	4693.83	-2732.86	-0.68
Dead+Wind 180 deg - No Ice	79.34	0.15	50.82	5405.89	-24.20	-0.09
Dead+Wind 210 deg - No Ice	79.34	-25.33	43.94	4669.32	2691.03	0.53
Dead+Wind 240 deg - No Ice	79.34	-44.03	25.28	2681.48	4685.28	1.01
Dead+Wind 270 deg - No Ice	79.34	-50.93	-0.15	-25.00	5424.20	1.21
Dead+Wind 300 deg - No Ice	79.34	-44.18	-25.55	-2724.90	4709.78	1.08
Dead+Wind 330 deg - No Ice	79.34	-25.60	-44.09	-4694.80	2733.48	0.67
Dead+Ice+Temp	117.83	0.00	0.00	-2.06	2.05	0.00
Dead+Wind 0 deg+Ice+Temp	117.83	-0.04	-14.07	-1588.33	8.06	-0.21
Dead+Wind 30 deg+Ice+Temp	117.83	7.02	-12.17	-1372.85	-787.95	-0.36
Dead+Wind 60 deg+Ice+Temp	117.83	12.19	-7.00	-790.09	-1372.27	-0.42
Dead+Wind 90 deg+Ice+Temp	117.83	14.10	0.04	3.80	-1588.31	-0.36
Dead+Wind 120 deg+Ice+Temp	117.83	12.23	7.07	796.10	-1378.20	-0.21
Dead+Wind 150 deg+Ice+Temp	117.83	7.08	12.21	1374.51	-798.23	0.00
Dead+Wind 180 deg+Ice+Temp	117.83	0.04	14.07	1584.05	-3.81	0.21
Dead+Wind 210 deg+Ice+Temp	117.83	-7.02	12.17	1368.57	792.20	0.36
Dead+Wind 240 deg+Ice+Temp	117.83	-12.19	7.00	785.82	1376.51	0.42
Dead+Wind 270 deg+Ice+Temp	117.83	-14.10	-0.04	-8.07	1592.56	0.36
Dead+Wind 300 deg+Ice+Temp	117.83	-12.23	-7.07	-800.37	1382.45	0.21
Dead+Wind 330 deg+Ice+Temp	117.83	-7.08	-12.21	-1378.79	802.48	-0.00
Dead+Wind 0 deg - Service	79.34	-0.06	-19.85	-2112.55	9.89	0.03
Dead+Wind 30 deg - Service	79.34	9.89	-17.16	-1824.80	-1050.85	-0.21
Dead+Wind 60 deg - Service	79.34	17.20	-9.87	-1048.23	-1829.92	-0.39
Dead+Wind 90 deg - Service	79.34	19.89	0.06	9.09	-2118.59	-0.47
Dead+Wind 120 deg - Service	79.34	17.26	9.98	1063.84	-1839.50	-0.42
Dead+Wind 150 deg - Service	79.34	10.00	17.22	1833.40	-1067.43	-0.26
Dead+Wind 180 deg - Service	79.34	0.06	19.85	2111.57	-9.26	-0.03
Dead+Wind 210 deg - Service	79.34	-9.89	17.16	1823.82	1051.47	0.21
Dead+Wind 240 deg - Service	79.34	-17.20	9.87	1047.25	1830.54	0.39
Dead+Wind 270 deg - Service	79.34	-19.89	-0.06	-10.06	2119.21	0.47
Dead+Wind 300 deg - Service	79.34	-17.26	-9.98	-1064.81	1840.12	0.42
Dead+Wind 330 deg - Service	79.34	-10.00	-17.22	-1834.37	1068.05	0.26

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Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-79.34	0.00	0.00	79.34	0.00	0.000%
2	-0.15	-79.34	-50.82	0.15	79.34	50.82	0.000%
3	25.33	-79.34	-43.94	-25.33	79.34	43.94	0.000%
4	44.03	-79.34	-25.28	-44.03	79.34	25.28	0.000%
5	50.93	-79.34	0.15	-50.93	79.34	-0.15	0.000%
6	44.18	-79.34	25.55	-44.18	79.34	-25.55	0.000%
7	25.60	-79.34	44.09	-25.60	79.34	-44.09	0.000%
8	0.15	-79.34	50.82	-0.15	79.34	-50.82	0.000%
9	-25.33	-79.34	43.94	25.33	79.34	-43.94	0.000%
10	-44.03	-79.34	25.28	44.03	79.34	-25.28	0.000%
11	-50.93	-79.34	-0.15	50.93	79.34	0.15	0.000%
12	-44.18	-79.34	-25.55	44.18	79.34	25.55	0.000%
13	-25.60	-79.34	-44.09	25.60	79.34	44.09	0.000%
14	0.00	-117.83	0.00	0.00	117.83	0.00	0.000%
15	-0.04	-117.83	-14.07	0.04	117.83	14.07	0.000%
16	7.02	-117.83	-12.17	-7.02	117.83	12.17	0.000%
17	12.19	-117.83	-7.00	-12.19	117.83	7.00	0.000%
18	14.10	-117.83	0.04	-14.10	117.83	-0.04	0.000%
19	12.23	-117.83	7.07	-12.23	117.83	-7.07	0.000%
20	7.08	-117.83	12.21	-7.08	117.83	-12.21	0.000%
21	0.04	-117.83	14.07	-0.04	117.83	-14.07	0.000%
22	-7.02	-117.83	12.17	7.02	117.83	-12.17	0.000%
23	-12.19	-117.83	7.00	12.19	117.83	-7.00	0.000%
24	-14.10	-117.83	-0.04	14.10	117.83	0.04	0.000%
25	-12.23	-117.83	-7.07	12.23	117.83	7.07	0.000%
26	-7.08	-117.83	-12.21	7.08	117.83	12.21	0.000%
27	-0.06	-79.34	-19.85	0.06	79.34	19.85	0.000%
28	9.89	-79.34	-17.16	-9.89	79.34	17.16	0.000%
29	17.20	-79.34	-9.87	-17.20	79.34	9.87	0.000%
30	19.89	-79.34	0.06	-19.89	79.34	-0.06	0.000%
31	17.26	-79.34	9.98	-17.26	79.34	-9.98	0.000%
32	10.00	-79.34	17.22	-10.00	79.34	-17.22	0.000%
33	0.06	-79.34	19.85	-0.06	79.34	-19.85	0.000%
34	-9.89	-79.34	17.16	9.89	79.34	-17.16	0.000%
35	-17.20	-79.34	9.87	17.20	79.34	-9.87	0.000%
36	-19.89	-79.34	-0.06	19.89	79.34	0.06	0.000%
37	-17.26	-79.34	-9.98	17.26	79.34	9.98	0.000%
38	-10.00	-79.34	-17.22	10.00	79.34	17.22	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	4	0.00000001	0.00003963
3	Yes	4	0.00000001	0.00044073
4	Yes	4	0.00000001	0.00045819
5	Yes	4	0.00000001	0.00004598
6	Yes	4	0.00000001	0.00044816
7	Yes	4	0.00000001	0.00046688
8	Yes	4	0.00000001	0.00004025
9	Yes	4	0.00000001	0.00045172

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10	Yes	4	0.00000001	0.00043611
11	Yes	4	0.00000001	0.00005187
12	Yes	4	0.00000001	0.00047282
13	Yes	4	0.00000001	0.00045220
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00074968
16	Yes	4	0.00000001	0.00076770
17	Yes	4	0.00000001	0.00076808
18	Yes	4	0.00000001	0.00074898
19	Yes	4	0.00000001	0.00077216
20	Yes	4	0.00000001	0.00077105
21	Yes	4	0.00000001	0.00074649
22	Yes	4	0.00000001	0.00076668
23	Yes	4	0.00000001	0.00076858
24	Yes	4	0.00000001	0.00075186
25	Yes	4	0.00000001	0.00077679
26	Yes	4	0.00000001	0.00077563
27	Yes	4	0.00000001	0.00001914
28	Yes	4	0.00000001	0.00004549
29	Yes	4	0.00000001	0.00004786
30	Yes	4	0.00000001	0.00001982
31	Yes	4	0.00000001	0.00004597
32	Yes	4	0.00000001	0.00004840
33	Yes	4	0.00000001	0.00001914
34	Yes	4	0.00000001	0.00004694
35	Yes	4	0.00000001	0.00004493
36	Yes	4	0.00000001	0.00002003
37	Yes	4	0.00000001	0.00004929
38	Yes	4	0.00000001	0.00004648

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	155.5 - 110	11.101	37	0.5128	0.0004
L2	118 - 72.5	7.159	37	0.4788	0.0003
L3	81 - 36	3.748	37	0.3833	0.0002
L4	45 - 0	1.301	37	0.2452	0.0001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
156.00	DB809K-Y	37	11.101	0.5128	0.0005	238379
144.00	(2) 7770.00 w/ Mount Pipe	37	9.868	0.5064	0.0004	103643
135.00	742 213 w/ Mount Pipe	37	8.912	0.4998	0.0004	58141
127.00	T-Arm Mount [TA 602-3]	37	8.077	0.4916	0.0003	41821
126.00	(2) DB980H90E-M w/ Mount Pipe	37	7.973	0.4904	0.0003	40403
125.00	T-Arm Mount [TA 602-3]	37	7.870	0.4892	0.0003	39078
100.00	LNx-6515DS-VTM w/ Mount Pipe	37	5.418	0.4396	0.0002	25322

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Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	155.5 - 110	28.405	12	1.3119	0.0011
L2	118 - 72.5	18.319	12	1.2253	0.0007
L3	81 - 36	9.591	12	0.9809	0.0004
L4	45 - 0	3.331	12	0.6274	0.0002

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
156.00	DB809K-Y	12	28.405	1.3119	0.0012	93347
144.00	(2) 7770.00 w/ Mount Pipe	12	25.249	1.2957	0.0010	40585
135.00	742 213 w/ Mount Pipe	12	22.805	1.2788	0.0009	22767
127.00	T-Arm Mount [TA 602-3]	12	20.667	1.2580	0.0008	16376
126.00	(2) DB980H90E-M w/ Mount Pipe	12	20.403	1.2549	0.0008	15821
125.00	T-Arm Mount [TA 602-3]	12	20.140	1.2517	0.0008	15302
100.00	LNx-6515DS-VTM w/ Mount Pipe	12	13.865	1.1249	0.0006	9908

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _a ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
L1	155.5 - 110 (1)	TP64.606x58.6x0.375	45.50	0.00	0.0	31.415	76.2838	-21.73	2396.43	0.009
L2	110 - 72.5 (2)	TP68.805x62.8x0.4375	45.50	0.00	0.0	33.742	94.7324	-37.45	3196.42	0.012
L3	72.5 - 36 (3)	TP72.748x66.8082x0.5	45.00	0.00	0.0	35.568	114.4070	-55.58	4069.16	0.014
L4	36 - 0 (4)	TP76.5x70.56x0.5	45.00	0.00	0.0	34.010	122.3600	-79.32	4161.49	0.019

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M _x kip-ft	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M _y kip-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	155.5 - 110 (1)	TP64.606x58.6x0.375	693.74	7.052	31.415	0.224	0.00	0.000	31.415	0.000
L2	110 - 72.5 (2)	TP68.805x62.8x0.4375	1861.53	14.323	33.742	0.425	0.00	0.000	33.742	0.000
L3	72.5 - 36 (3)	TP72.748x66.8082x0.5	3307.19	19.951	35.568	0.561	0.00	0.000	35.568	0.000
L4	36 - 0 (4)	TP76.5x70.56x0.5	5441.25	28.683	34.010	0.843	0.00	0.000	34.010	0.000

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Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	155.5 - 110 (1)	TP64.606x58.6x0.375	26.46	0.347	26.000	0.027	1.08	0.005	26.000	0.000
L2	110 - 72.5 (2)	TP68.805x62.8x0.4375	36.48	0.385	26.000	0.030	1.08	0.004	26.000	0.000
L3	72.5 - 36 (3)	TP72.748x66.8082x0.5	43.60	0.381	26.000	0.030	1.08	0.003	26.000	0.000
L4	36 - 0 (4)	TP76.5x70.56x0.5	51.06	0.417	26.000	0.033	1.08	0.003	26.000	0.000

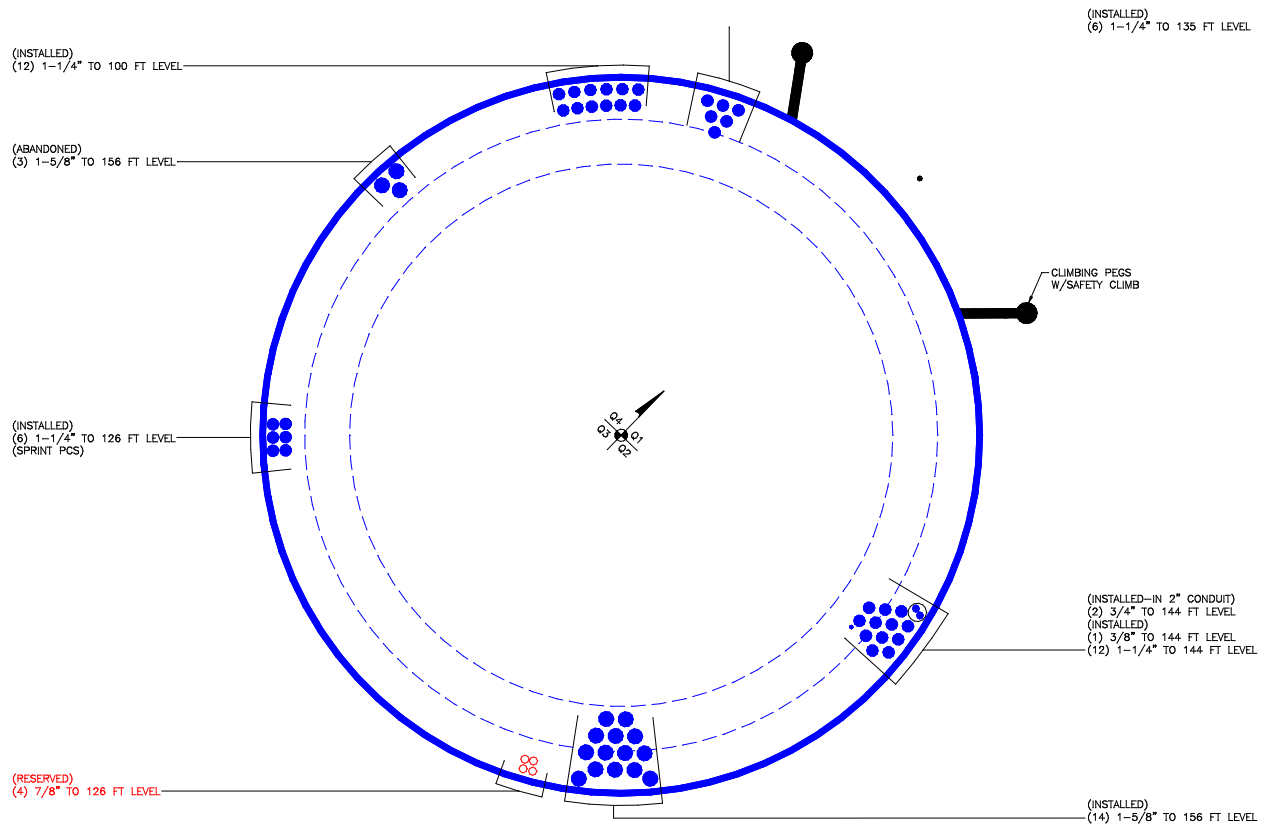
Pole Interaction Design Data

Section No.	Elevation ft	Ratio P P_a	Ratio f_{bx} F_{bx}	Ratio f_{by} F_{by}	Ratio f_v F_v	Ratio f_{vt} F_{vt}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	155.5 - 110 (1)	0.009	0.224	0.000	0.027	0.000	0.234	1.333	H1-3+VT
L2	110 - 72.5 (2)	0.012	0.425	0.000	0.030	0.000	0.436	1.333	H1-3+VT
L3	72.5 - 36 (3)	0.014	0.561	0.000	0.030	0.000	0.575	1.333	H1-3+VT
L4	36 - 0 (4)	0.019	0.843	0.000	0.033	0.000	0.863	1.333	H1-3+VT

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF* P_{allow} K	% Capacity	Pass Fail
L1	155.5 - 110	Pole	TP64.606x58.6x0.375	1	-21.73	3194.44	17.5	Pass
L2	110 - 72.5	Pole	TP68.805x62.8x0.4375	2	-37.45	4260.83	32.7	Pass
L3	72.5 - 36	Pole	TP72.748x66.8082x0.5	3	-55.58	5424.19	43.1	Pass
L4	36 - 0	Pole	TP76.5x70.56x0.5	4	-79.32	5547.27	64.7	Pass
Summary								
Pole (L4)							64.7	Pass
RATING =							64.7	Pass

APPENDIX B
BASE LEVEL DRAWING



APPENDIX C
ADDITIONAL CALCULATIONS

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

TIA Rev F

Site Data

BU#: 806366	
Site Name: HRT 107(C) 943204	
App #: 343864, Rev. 1	
Pole Manufacturer:	Other

Anchor Rod Data

Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	84.75	in

Plate Data

Diam:	91	in
Thick:	3.25	in
Grade:	60	ksi
Single-Rod B-eff:	10.25	in

Stiffener Data (Welding at both sides)

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

Pole Data

Diam:	76.5	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor

ASIF:	1.333	
-------	-------	--

Reactions

Moment:	5441	ft-kips
Axial:	79	kips
Shear:	51	kips

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

Anchor Rod Results

Maximum Rod Tension: 125.1 Kips
 Allowable Tension: 195.0 Kips
 Anchor Rod Stress Ratio: 64.2% **Pass**

Rigid
Service ASD
Fty*ASIF

Base Plate Results

Base Plate Stress: 19.1 ksi
 Allowable Plate Stress: 60.0 ksi
 Base Plate Stress Ratio: 31.8% **Pass**

Flexural Check

Rigid
Service ASD
0.75*Fy*ASIF
Y.L. Length:
36.47

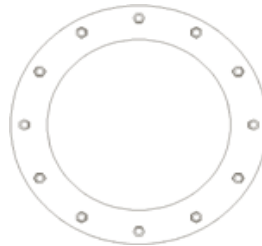
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a



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

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

(Bearing and Stability Checks) Tool for TIA Rev F or G - Application (MP, SST with unitbase)

Site Data

Site BU#: 806366
Site Name: HRT 107(C) 943204
App.:

Enter Load Factors Below:		
For P (DL)	1.2	<---- Enter Factor
For P,V, and M (WL)	1.35	<---- Enter Factor

Pad & Pier Data		
Base PL Dist. Above Pier:	3	in
Pier Dist. Above Grade:	6	in
Pad Bearing Depth, D:	7.5	ft
Pad Thickness, T:	4.5	ft
Pad Width=Length, L:	33.25	ft
Pier Cross Section Shape:	Square	<--Pull Down
Enter Pier Side Width:	9	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	81.00	ft^2
Pier Height:	3.50	ft
Soil (above pad) Height:	3.00	ft

Soil Parameters		
Unit Weight, γ :	130.0	pcf
Ultimate Bearing Capacity, q_n :	21.98	ksf
Strength Reduct. factor, ϕ :	2	
Angle of Friction, ϕ :	40.0	degrees
Undrained Shear Strength, C_u :	0.00	ksf
Allowable Bearing: $\phi \cdot q_n$:	43.96	ksf
Passive Pres. Coeff., K_p :	4.60	

Forces/Moments due to Wind and Lateral Soil		
Minimum of ($\phi \cdot$ Ultimate Pad Passive Force, V_u):	68.9	kips
Pad Force Location Above D:	1.93	ft
ϕ (Passive Pressure Moment):	132.78	ft-kips
Factored O.T. M(WL), "1.6W":	7913.4	ft-kips
Factored OT (MW-Msoil), M1	7780.58	ft-kips

Resistance due to Foundation Gravity		
Soil Wedge Projection grade, a:	2.52	ft
Sum of Soil Wedges Wt:	30.38	kips
Soil Wedges ecc, K1:	14.54	ft
Ftg+Soil above Pad wt:	1188.4	kips
Unfactored (Total ftg-soil Wt):	1218.74	kips
1.2D. No Soil Wedges.	1520.83	kips
0.9D. With Soil Wedges	1167.97	kips

Resistance due to Cohesion (Vertical)		
$\phi \cdot (1/2 \cdot C_u)$ (Total Vert. Planes)	0.00	kips
Cohesion Force Eccentricity, K2	0.00	ft

Monopole Base Reaction Forces		
TIA Revision:	F	<--Pull Down
Unfactored DL Axial, PD:	79	kips
Unfactored WL Shear, V:	51	kips
Unfactored WL Moment, M:	5441	ft-kips

Load Factor	Shaft Factored Loads	
1.20	1.2D+1.6W, Pu:	94.8 kips
0.90	0.9D+1.6W, Pu:	71.1 kips
1.35	Vu:	68.85 kips
	Mu:	7345.35 ft-kips

1.2D+1.6W Load Combination. Bearing Results:

(No Soil Wedges) [Reaction+Conc+Soil]	1520.83	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	7780.58	ft-kips

Orthogonal Direction:

$$ecc1 = M1/P1 = 5.12 \text{ ft}$$

$$Orthogonal qu = 2.22 \text{ ksf}$$

$$qu/\phi \cdot q_n \text{ Ratio} = 5.06\% \text{ Pass}$$

Diagonal Direction:

$$ecc2 = (0.707M1)/P1 = 3.62 \text{ ft}$$

$$Diagonal qu = 2.25 \text{ ksf}$$

$$qu/\phi \cdot q_n \text{ Ratio} = 5.11\% \text{ Pass}$$

<-- Press Upon Completing All Input

Overturning Stability Check

0.9D+1.6W Load Combination. Bearing Results:

(w/ Soil Wedges) [Reaction+Conc+Soil]	1167.97	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	7382.90	ft-kips

$$Orthogonal ecc3 = M2/P2 = 6.32 \text{ ft}$$

$$Ortho Non Bearing Length, NBL = 12.64 \text{ ft}$$

$$Orthogonal qu = 1.86 \text{ ksf}$$

$$Diagonal qu = 1.98 \text{ ksf}$$

Max Reaction Moment (ft-kips) so that $qu = \phi \cdot q_n = 100\%$ Capacity Rating			
Actual M:	5441.00		
M Orthogonal:	14138.14	38.48%	Pass
M Diagonal:	14138.14	38.48%	Pass

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

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

Site Data

BU#:	
Site Name:	
App #:	

Enter Load Factors Below:		
For M (WL)	1.3	<---- Enter Factor
For P (DL)	1.3	<---- Enter Factor

Pier Properties	
Concrete:	
Pier Diameter =	9.0 ft
Concrete Area =	9160.9 in ²
Reinforcement:	
Clear Cover to Tie =	3.00 in
Horiz. Tie Bar Size =	5
Vert. Cage Diameter =	8.25 ft
Vert. Cage Diameter =	99.06 in
Vertical Bar Size =	14
Bar Diameter =	1.69 in
Bar Area =	2.25 in ²
Number of Bars =	40.90667
As Total =	92.04 in ²
A s/ Aconc, Rho:	0.0100 1.00%

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

$$(3) * (\text{Sqrt}(f'c) / Fy) = 0.0032$$

$$200 / Fy = 0.0033$$

99.34

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	1.00%	OK

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = ($\phi=0.65$) Pn.		
Pn per ACI 318 (10-2)	18905.36	kips
at Mu=($\phi=0.65$)Mn=	14394.80	ft-kips
Max Tu, ($\phi=0.9$) Tn =	4970.16	kips
at Mu= $\phi=(0.90)$ Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	7305.35	ft-kips (* Note)
Max. Service Shaft P:	79	kips
Max Axial Force Type:	Comp.	

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

Load Factor	Shaft Factored Loads	
1.30	Mu:	9496.955 ft-kips
1.30	Pu:	102.7 kips

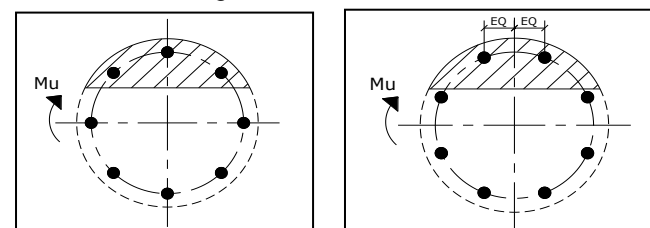
Material Properties	
Concrete Comp. strength, f'c =	4000 psi
Reinforcement yield strength, Fy =	60 ksi
Reinforcing Modulus of Elasticity, E =	29000 ksi
Reinforcement yield strain =	0.00207
Limiting compressive strain =	0.003
ACI 318 Code	
Select Analysis ACI Code=	2002
Seismic Properties	
Seismic Design Category =	D
Seismic Risk =	High

Solve (Run)

<-- Press Upon Completing All Input

Results:

Governing Orientation Case: 1



Case 1

Case 2

Dist. From Edge to Neutral Axis: 19.73 in

Extreme Steel Strain, ϵ_t : 0.0127

$\epsilon_t > 0.0050$, Tension Controlled

Reduction Factor, ϕ : 0.900

Output Note: Negative Pu=Tension
For Axial Compression, ϕ Pn = Pu: 102.70 kips
Drilled Shaft Moment Capacity, ϕ Mn: **18435.18** ft-kips
Drilled Shaft Superimposed Mu: **9496.96** ft-kips

(Mu/ ϕ Mn, Drilled Shaft Flexure CSR):	51.5%
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MONOPOLE PAD AND PIER STEEL CHECKS

Project & Site Details

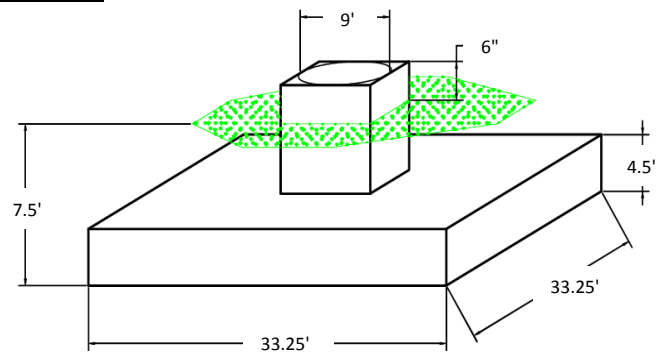
Project No.	16BJOJ1400	Rev.	0
Project Name	HRT 107(C) 943204		
Site ID	806366		
Date	Wednesday, June 08, 2016		
Code	TIA/EIA-222-F		
Overstress Capacity	100%		

tnx Reactions

Moment, M	5,441	kip-ft
Shear, V	51	k
Axial, P	79	k

Foundation Details

Pier Above Grade, E	0.5	ft	
Pad Depth Below Grade, D	7.5	ft	
Pad Width, W	33.3	ft	
Pad Thickness, T	4.5	ft	
Pier Shape	Square	-	
Pier Diameter, D_p	9.0	ft	
Density of Soil, γ_s	0.130	kcf	
Density of Concrete, γ_c	0.150	kcf	

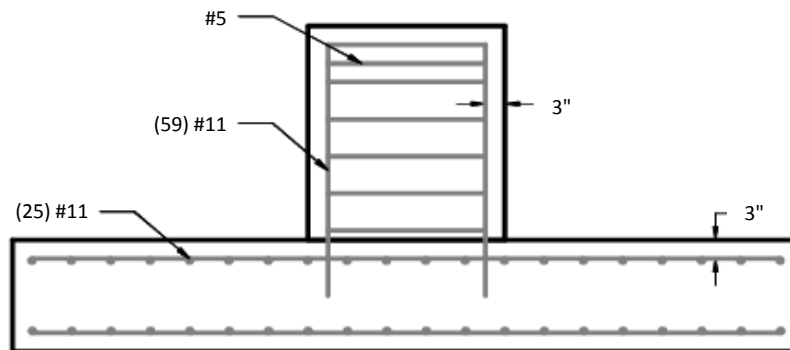


Pad Steel Details

Horiz. Bar Size	#11	-	
Pad Bar Diameter, d_b	1.41	in	
Number of pad bars, n	25	-	
Strength of Concrete, f_c'	4,000	psi	
Clear Cover, cc	3.0	in	
Yield Strength of Steel, F_y	60	ksi	

Pier Steel Details

Vertical Bar Size	#11	-	
Pier Bar Diameter, d_v	1.41	in	
Number of pier bars, n_v	59	-	
Tie Size	#5	-	
Tie Bar Diameter, d_t	0.625	in	
Clear Cover, cc	3.0	in	



Pad Steel Checks

Pad Shear	14.7%	PASS
Two-Way Shear	14.2%	PASS
Pad Flexure	29.3%	PASS
Steel Yielding	OK	



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

AT&T Existing Facility

Site ID: CT1073

Marlborough - Country Barn
43 North Main Street
Marlborough, CT 06447

June 29, 2016

EBI Project Number: 6216003043

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	15.85 %



June 29, 2016

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

Emissions Analysis for Site: **CT1073 – Marlborough - Country Barn**

EBI Consulting was directed to analyze the proposed AT&T facility located at **43 North Main Street, Marlborough, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

General population/uncontrolled exposure limits apply to situations in which the general public 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 public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

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



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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed AT&T Wireless antenna facility located at **43 North Main Street, Marlborough, 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.

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

- 1) 2 UMTS channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 2) 2 UMTS channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 2 LTE channels (700 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 4) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 5) 2 GSM channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 6) 2 GSM channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.



- 7) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 8) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 9) The antennas used in this modeling are the **Kathrein 7770 and the KMW AM-X-CD-16-65-00T-RET** for transmission in the 700 MHz, 850 MHz and 1900 MHz (PCS) 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.
- 10) The antenna mounting height centerlines of the proposed antennas are **144 feet** above ground level (AGL) for **Sector A**, **144 feet** above ground level (AGL) for **Sector B** and **144 feet** above ground level (AGL) for Sector C.
- 11) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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



AT&T Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Kathrein 7770	Make / Model:	Kathrein 7770	Make / Model:	Kathrein 7770
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	144 feet	Height (AGL):	144 feet	Height (AGL):	144 feet
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A1 MPE%	0.52 %	Antenna B1 MPE%	0.52 %	Antenna C1 MPE%	0.52 %
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	KMW AM-X-CD-16-65-00T-RET	Make / Model:	KMW AM-X-CD-16-65-00T-RET	Make / Model:	KMW AM-X-CD-16-65-00T-RET
Gain:	13.35 / 15.25 dBd	Gain:	13.35 / 15.25 dBd	Gain:	13.35 / 15.25 dBd
Height (AGL):	144 feet	Height (AGL):	144 feet	Height (AGL):	144 feet
Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts
ERP (W):	6,614.85	ERP (W):	6,614.85	ERP (W):	6,614.85
Antenna A2 MPE%	1.81 %	Antenna B2 MPE%	1.81 %	Antenna C2 MPE%	1.81 %
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Kathrein 7770	Make / Model:	Kathrein 7770	Make / Model:	Kathrein 7770
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	144 feet	Height (AGL):	144 feet	Height (AGL):	144 feet
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A3 MPE%	0.52 %	Antenna B3 MPE%	0.52 %	Antenna C3 MPE%	0.52 %

Site Composite MPE%	
Carrier	MPE%
AT&T – Max per sector	2.85 %
MetroPCS	0.41 %
Verizon Wireless	2.18 %
T-Mobile	3.44 %
Town	6.03 %
Sprint	0.94 %
Site Total MPE %:	15.85 %

AT&T Sector A Total:	2.85 %
AT&T Sector B Total:	2.85 %
AT&T Sector C Total:	2.85 %
Site Total:	15.85 %

AT&T_ Max Values Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
AT&T 850 MHz UMTS	2	414.12	144	1.56	850 MHz	567	0.27 %
AT&T 1900 MHz (PCS) UMTS	2	656.33	144	2.48	1900 MHz (PCS)	1000	0.25 %
AT&T 700 MHz LTE	2	1,297.63	144	4.90	700 MHz	467	1.05 %
AT&T 1900 MHz (PCS) LTE	2	2,009.79	144	7.59	1900 MHz (PCS)	1000	0.76 %
AT&T 850 MHz GSM	2	414.12	144	1.56	850 MHz	567	0.27 %
AT&T 1900 MHz (PCS) GSM	2	656.33	144	2.48	1900 MHz (PCS)	1000	0.25 %
						Total:	2.85 %



Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public 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 public exposure to RF Emissions are shown here:

AT&T Sector	Power Density Value (%)
Sector A:	2.85 %
Sector B:	2.85 %
Sector C:	2.85 %
AT&T Maximum Total (per sector):	2.85 %
Site Total:	15.85 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **15.85 %** of the allowable FCC established general public 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.